Continuous level measurement - Radar transmitters



SITRANS LR560

Overview



SITRANS LR560 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids and liquids to a range of 100 m (329 ft).

Benefits

- · Rugged stainless steel design for industrial applications
- 78 GHz high frequency provides very narrow beam, virtually no mounting nozzle noise, and optimal reflection from sloped solids
- Aimer option to direct beam to area of interest, such as draw point of cone
- Lens antenna is highly resistant to product buildup
- Air purge connection is included for self-cleaning of extremely sticky solids
- Local display interface (LDI) allows local programming and diagnostics

Application

SITRANS LR560's plug and play performance is ideal for most solids applications and long range liquid applications, including those with extreme dust and high temperatures to 200 °C (392 °F). Unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR560 includes an optional graphical local display interface (LDI) that improves setup and operation using an intuitive Quick Start Wizard, and echo profile display for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.

SITRANS LR560 measures practically any solids material to a range of 100 m (328 ft).

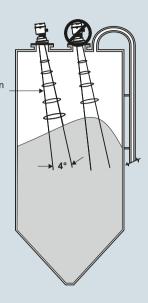
• Key Applications: cement powder, plastic powder/pellets, grain, coal, wood powder, fly ash

Configuration

Installation

Note:

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





SITRANS LR560 installation, dimensions in mm (inch)



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Technical specifications

Mode of operation			
Measuring principle	Radar level measurement		
Frequency	78 GHz FMCW		
Minimum detectable distance	400 mm (15.75 inch) from sensor reference point		
Maximum measuring range ¹⁾	40 m (131 ft) version100 m (328 ft) version		
Output			
Analog output	4 20 mA		
Communications	 HART Optional: PROFIBUS PA Optional: FOUNDATION Fieldbus 		
Fail-safe	 Programmable as high, low or hold (Loss of Echo) NE43 programmable 		
Performance (according to reference conditions IEC60770-1)			
Maximum measured error (including hysteresis and non-repeatability) ²⁾	5 mm (0.2 inch)		
Rated operating conditions (according to reference conditions IEC60770-1)			
Installation conditions Location 	Indoor/outdoor		
Ambient conditions (enclosure)			
Ambient temperature	-40 +80 °C (-40 +176 °F)		
Installation categoryPollution degree	4		
Medium conditions			
Dielectric constant ε_r	> 1.6		
Process temperature and pressure	See chart below		
Design			
Enclosure			
Construction	316L/1.4404 stainless steel		
Conduit entry	M20 x 1.5, or ½" NPT via adapter		
Purge inletLens material	1/8" NPT, 30 cfm at max. 100 psi • 40 m version: PEI		
Lono matorial	• 100 m version: PEEK		
	Damage to lens could result from con- tinuous purging/cleaning (due to abrasive solids). Recommended to purge/clean only a few seconds every hour.		
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP68		
Weight	3.15 kg (6.94 lb) including 3 inch flange		
Optional local display interface	Graphic LCD, with bar graph repre- senting level		
Process connections • Universal flat-faced flanges ³⁾	 3, 4, 6 inch/80, 100, 150 mm, 304 stainless steel 3, 4, 6 inch/80, 100, 150 mm, 316L/1.4404 or 316L/1.4435 stain- less steel 		
 Universal stamped flange³⁾ 	3, 4, 6 inch/80, 100, 150 mm, 304 stainless steel		
• Aimer flanges ³⁾	3, 4, 6 inch/80, 100, 150 mm, polyure- thane powder-coated cast aluminum		

Dewer eventy				
Power supply				
4 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω			
PROFIBUS PA/FOUNDATION Fieldbus	13.5 mA 9 32 V DC, per IEC 61158-2			
Certificates and approvals				
General	CSA _{US/C} , CE, FM			
Radio	Europe (R&TTE), FCC, Industry Canada, RCM			
Hazardous				
Europe/International	IECEX SIR 09.0149X ATEX II 1D, 1/2D, 2D Ex ta IIIC T139 °C Da ATEX II 3G Ex nA II T4 Gc Ex nL IIC T4 Gc			
• US/Canada	FM/CSA Class II, Div. 1, Groups E, F, G Class III T4 FM/CSA Class I, Div. 2, Groups A, B, C, D, T4			
• China	NEPSI Ex nA II T4 Ex nL IIC T4 DIP A20 TA, T139 °C			
• Brazil	INMETRO Ex na IIC T4 Gc Ex ta IIIC T139 °C Da			
Programming				
Intrinsically Safe Siemens handheld programmer	Infrared receiver			
Approvals for handheld programmer	IS model: ATEX II 1GD Ex ia IIC T4 Ga Ex iaD 20 T135 °C $T_a = -20 \dots +50$ °C CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G, T6 $T_a = 50$ °C			
Handheld communicator	HART communicator 375/475			
PC	SIMATIC PDM, AMS, PACTware			
Display (local)	Graphic local user interface including quick start wizard and echo profile displays			
1) From sensor reference point				

⁽¹⁾ From Sensor relevence point
 ⁽²⁾ Under severe EMI/EMC environments per IEC61326-1 or NAMUR NE21, the device error may increase to a maximum of 25 mm (1 inch)
 ⁽³⁾ Universal flange mates with EN 1092-1 (PN16)/ASME B16.5 (150 lb)/JIS 2220 (10K) bolt hole pattern.

Process temperature and pressure

Version	Stainless steel	Aimer flange: -1 0.5 bar	Aimer flange: -1 3.0 bar
40 m	-40 +100 °C	-40 +100 °C	-40 +100 °C
	(-40 +212 °F)	(-40 +212 °F)	(-40 +212 °F)
100 m	-40 +200 °C	-40 +200 °C	-40 +120 °C
	(-40 +392 °F)	(-40 +392 °F)	(-40 +248 °F)

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SITRANS LR560

SITFANS L1550 7NL5440- Zwier, 26, GLE, TEMOV radia (road) transmitter for continuous monitoring of solids and liquids to a range of 10 m (239 ft). A50 Plug 7/8" with mating connector ¹²⁵³) A50 Statiless stellar (38 x 06 x) A50 Click on the Anticle No. for the online configuration to PEAN table Systems A50 Van (131 (ft) max range, 40, +100 °C 0 Van (131 (ft) max range, 40, +100 °C 0 Van (131 (ft) max range, 40, +100 °C 0 Van (131 (ft) max range, 40, +100 °C 0 Van (131 (ft) max range, 40, +100 °C 0 Van (131 (ft) max range, 40, +100 °C 0 Van (131 (ft) max range, 40, +100 °C 0 Van (131 (ft) max range, 40, +100 °C 0 Van (131 (ft) max range, 40, +100 °C 0 Van (131 (ft) max range, 40, +100 °C 0 Van (131 (ft) max range, 40, +100 °C 0 Van (131 (ft) max range, 40, +100 °C 1 Van (131 (ft) max range, 40, +100 °C 1 Van (131 (ft) max range, 40, +100 °C 1 Van (131 (ft) max range, 40, +100 °C 1 Van (131 (ft) max range, 40, +100 °C 1	Selection and Ordering data	A	Article N	0.	Selection and Ordering data	Order code
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IsO Immo inch, 304 stainless steel-7 M Enclosure (with cable inlet) SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 TML5744 Stainless steel, 1 X M20 x 1.5 (plastic gland included) B B SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 TML5750 Pressure rating SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7 TML5750 Output/communication 1 I Valiable with Approval option A only Valiable with Output/communication options B and C only A20 mA, HART A B C I Valiable with Output/communication option A only PROFIBUS PA FOUNDATION Fieldbus A B C If 40 °C rating required, then metallic cable gland is recommended Approvals C FCC, CE, R&ITE, RCM B C C Div. 1, Groups E, F, G, Class III, Industry Canada, FCC C C C C Local display interface C C C C Without 1 1 T T		•	L			7ML5740
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Stainless steel, 1 X M20 x 1.5 (plastic gland included) B B SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7 TML5750 Pressure rating 0.5 bar g (7.5 psi g) maximum 0 1 For applicable back up point level switch - see point level measurement section 1 Output/communication 4 20 mA, HART A A 1 1 Available with Approval option A only 2 Available with Dutput/communication options B and C only 3 Available with Pressure rating option 1 only 5 1 1 Available with Colsure option B only 4 Available with Dutput/communication option A only 2 3 2 </td <td>Enclosure (with cable inlet)</td> <td></td> <td></td> <td></td> <td></td> <td>/WL3/44</td>	Enclosure (with cable inlet)					/WL3/44
(plastic gland included) Image: Solution for instrumentation - see Chapter 7 Pressure rating solution for instrumentation - see Chapter 7 0.5 bar g (7.5 psi g) maximum Image: Solution for instrumentation - see Chapter 7 0 3 bar g (40 psi g) maximum Image: Solution for instrumentation - see Chapter 7 0 4 20 mA, HART Image: Solution for instrumentation - see Chapter 7 PROFIBUS PA Image: Solution for instrumentation - see Chapter 7 FOUNDATION Fieldbus Image: Solution for instrumentation - see Chapter 7 Approvals Image: Solution for instrumentation - see Chapter 7 General Purpose, FM, CSA _{US/C} , Industry Canada, FCC Image: Solution for instrumentation - see Chapter 7 B Image: Solution for instrumentation - see Chapter 7 FCC RATEX II 3G Ex nA/nL, 1D, 1/2D, 2D Ex ta, INMETRO Image: Solution for instrumentation - see Chapter 7 For applicable with output/communication option A only Image: Solution for instrumentation - see Chapter 7 FCC Approvals Image: Solution for instrumentation - see Chapter 7 General Purpose, F, G, Class III, Industry Canada, FCC Image: Solution for instrumentation option A only Attex II 3G Ex nA/nL, 1D, 1/2D, 2D Ex ta, INMETRO C Ce, R&TTE, RCM Image: Solution for instrumentation - see Chapter 7 <td>,</td> <td>•</td> <td></td> <td></td> <td>Chapter 7</td> <td></td>	,	•			Chapter 7	
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 a) bar g (40 psi g) maximum b) bar g (40 psi g) maximum a) bar g (40 psi g) maximum a) bar g (40 psi g) maximum b) bar g (40 psi g) maximum a) bar g (40 psi g) maximum b) bar g (40 psi g) maximum c) bar g (40 psi g) maximum b) bar g (40 psi g) maximum c) bar g (40 psi g) maximum b) bar g (40 psi g) maximum b) bar g (40 psi g) maximum c) bar g (40 psi g) maximum b) bar g (40 psi g) maximum c) bar g (40 psi g) maximum d) bar g (40 psi g) maximum <lid) (40="" bar="" g="" g)="" li="" maximum<="" psi=""> d)</lid)>	•					
Output/communication 4 20 mA, HART PROFIBUS PA FOUNDATION Fieldbus Approvals General Purpose, FM, CSA _{US/C} , Industry Canada, • FCC, CE, R&TTE, RCM CSA/FM Class I, Div. 2, Groups A, B, C, D, Class II, • Div. 1, Groups E, F, G, Class III, Industry Canada, + FCC ATEX II 3G Ex nA/nL, 1D, 1/2D, 2D Ex ta, INMETRO • CE, R&TTE, RCM Without Image: Construct of the construction of the construction option A (NPT thread)						
 4 20 mA, HART PROFIBUS PA FOUNDATION Fieldbus Approvals General Purpose, FM, CSA_{US/C}, Industry Canada, • FCC, CE, R&TTE, RCM CSA/FM Class I, Div. 2, Groups A, B, C, D, Class II, • Div. 1, Groups E, F, G, Class III, Industry Canada, FCC ATEX II 3G Ex nA/nL, 1D, 1/2D, 2D Ex ta, INMETRO • CE CE CE Available with Output/communication options B and C only Available with Pressure rating option 1 only Available with Output/communication option A only Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended Only available with enclosure option A (NPT thread) We can offer shorter delivery times for configurations designated with the Quick Ship Symbol •. For details see page 10/11 in the appendix Without T 	Output/communication					
 FOUNDATION Fieldbus FOUNDATION Fieldbus Approvals General Purpose, FM, CSA_{US/C}, Industry Canada, FCC, CE, R&TTE, RCM CSA/FM Class I, Div. 2, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III, Industry Canada, FCC Artex II 3G Ex nA/nL, 1D, 1/2D, 2D Ex ta, INMETRO Cc, R&TTE, RCM Tocal display interface Without Without 	•	٠		Α	3) Available with Output/communication options B and C	Conly
 Approvals General Purpose, FM, CSA_{US/C}, Industry Canada, FCC, CE, R&TTE, RCM CSA/FM Class I, Div. 2, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III, Industry Canada, FCC ATEX II 3G Ex nA/nL, 1D, 1/2D, 2D Ex ta, INMETRO Cacal display interface Without Without 		٠				
Approvals If -40 °C rating required, then metallic cable gland is recommended General Purpose, FM, CSA _{US/C} , Industry Canada, • A FCC, CE, R&TTE, RCM B CSA/FM Class I, Div. 2, Groups A, B, C, D, Class II, • B Div. 1, Groups E, F, G, Class III, Industry Canada, FCC We can offer shorter delivery times for configurations designated with the Quick Ship Symbol •. For details see page 10/11 in the appendix ATEX II 3G Ex nA/nL, 1D, 1/2D, 2D Ex ta, INMETRO • C Ce, R&TTE, RCM C Hootal display interface 1	FOUNDATION Fieldbus	٠		С) °C.
 FCC, CE, R&TTE, RCM We can offer shorter delivery times for configurations designated with the Quick Ship Symbol For details see page 10/11 in the appendix For details see page 10/11 in the appendix We can offer shorter delivery times for configurations designated with the Quick Ship Symbol For details see page 10/11 in the appendix We can offer shorter delivery times for configurations designated with the Quick Ship Symbol For details see page 10/11 in the appendix We can offer shorter delivery times for configurations designated with the Quick Ship Symbol For details see page 10/11 in the appendix 	••				If -40 °C rating required, then metallic cable gland is r	
CSA/FM Class I, Div. 2, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III, Industry Canada, FCC ATEX II 3G Ex nA/nL, 1D, 1/2D, 2D Ex ta, INMETRO • CE, R&TTE, RCM Local display interface Without • 1	FCC, CE, R&TTE, RCM					designated with the
CE, R&TTE, RCM Local display interface Without 1	Div. 1, Groups E, F, G, Class III, Industry Canada,	٠		В		
Without		٠		С		
	Local display interface					
With 2						
	With	٠		2		

¹⁾ Rated to 120 °C max. when used with Pressure rating option 1

2) Available with Pressure Rating option 0 only

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol

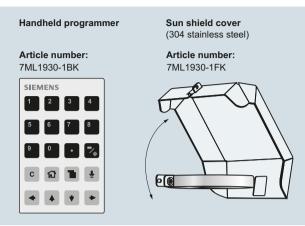
 For details see page 10/11 in the appendix



Continuous level measurement - Radar transmitters

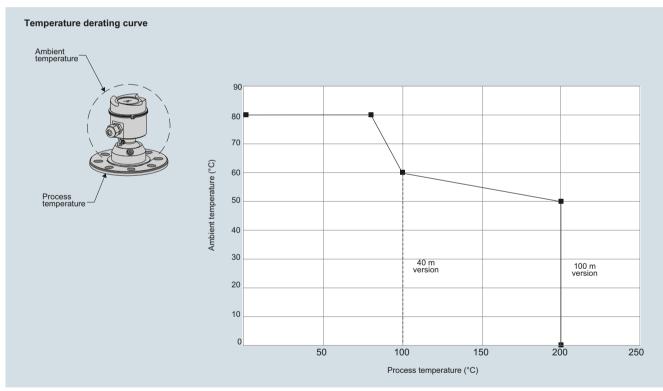
SITRANS LR560

Options



SITRANS LR560 handheld programmer and sun shield cover

Characteristic curves



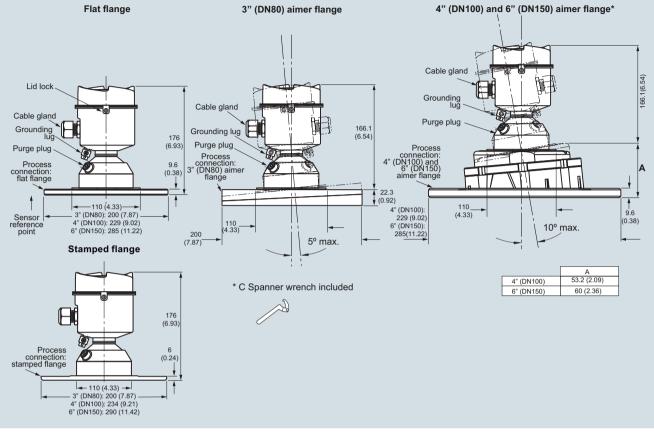
SITRANS LR560 temperature derating curve

Continuous level measurement - Radar transmitters



SITRANS LR560

Dimensional drawings



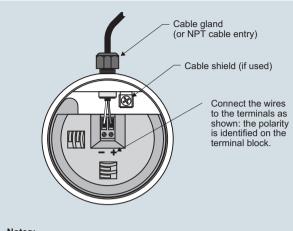
SITRANS LR560, dimensions in mm (inch)



Continuous level measurement - Radar transmitters

SITRANS LR560 Specials

Schematics



Notes: 1. Depending on the approval rating, glands and plugs may be

supplied with your instrument. 2. 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. 3. 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 LR560 connections

Selection and ordering data

SITRANS LR560 Specials

	Article No.
SITRANS LR560 Electronics Modules	
SITRANS LR560 Electronics Module, HART, 100 m range, compatible with 7ML5440-100A, no enclosure or process connection included.	7ML1830-3AC
SITRANS LR560 Electronics Module, PROFIBUS PA, 100 m range, compatible with 7ML5440-100B, no enclosure or process connection included.	7ML1830-3AH
SITRANS LR560 Electronics Module, FOUNDATION Fieldbus, 100 m range, compati- ble with 7ML5440-100C, no enclosure or process connection included.	7ML1830-3AJ
SITRANS LR560 Electronics Module, HART, 40 m range, compatible with 7ML5440-000A, no enclosure or process connection included.	7ML1830-3AK
SITRANS LR560 Electronics Module, PROFIBUS PA, 40 m range, compatible with 7ML5440-000B, no enclosure or process connection included.	7ML1830-3AL
SITRANS LR560 Electronics Module, FOUNDATION Fieldbus, 40 m range, compati- ble with 7ML5440-000C, no enclosure or process connection included.	7ML1830-3AM
SITRANS LR560 Miscellaneous Spare Kits	
Kit, lid gasket, EPDM	7ML1830-3AA
Kit, wrench for 4" and 6" Aimers	7ML1830-3AB
Kit, O-rings for 3" Aimer	7ML1830-3AD
Kit, O-rings for 4" Aimer	7ML1830-3AE
Kit, O-rings for 6" Aimer	7ML1830-3AF
Kit, lid screw and purge plug set with hex keys	7ML1830-3AG
Kit, lid, no window	7ML1830-3AP

Customers interested in a custom designed device should consult a local sales person. For more information, please visit http://www.automation.siemens.com/aspa_app.