

# Level instruments

## Continuous level measurement - Radar transmitters

### SITRANS LR560

#### Overview



SITRANS LR560 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids in silos 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 build up
- 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, 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).

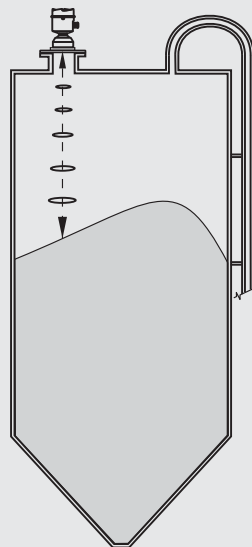
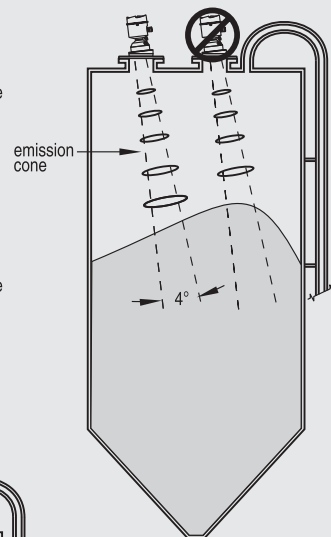
- Key Applications: cement powder, plastic powder/pellets, grain, coal, wood powder, fly ash

#### Configuration

##### Installation

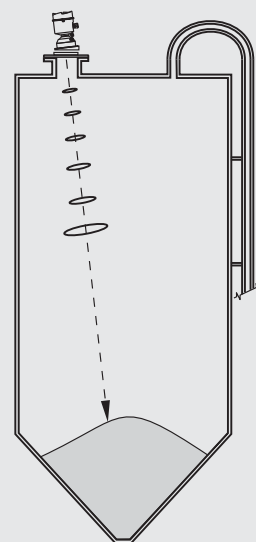
##### Note:

- beam angle is the width of the cone where the energy density is half of the peak energy density
- the peak energy density 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



Aiming is rarely required for signal optimization with 78 GHz frequency.

Aiming will assist in measuring material in the cone



SITRANS LR560 installation

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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") from sensor reference point
Maximum measuring range <sup>1)</sup>	<ul style="list-style-type: none"> <li>• 40 m (131 ft) version</li> <li>• 100 m (328 ft) version</li> </ul>

#### Output

<ul style="list-style-type: none"> <li>• Analog output</li> <li>• Communications</li> </ul>	4 to 20 mA <ul style="list-style-type: none"> <li>• HART</li> <li>• Optional: PROFIBUS PA</li> <li>• Optional: Foundation Fieldbus</li> </ul>
<ul style="list-style-type: none"> <li>• Fail-safe</li> </ul>	<ul style="list-style-type: none"> <li>• Programmable as high, low or hold (Loss of Echo)</li> <li>• NE43 programmable</li> </ul>

#### Performance (according to reference conditions IEC60770-1)

<ul style="list-style-type: none"> <li>• Maximum measured error (including hysteresis and non-repeatability)</li> </ul>	<ul style="list-style-type: none"> <li>• Greater of 25 mm (1") or 0.25 % of range from minimum detectable distance to full range</li> </ul>
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#### Rated operating conditions (according to reference conditions IEC60770-1)

##### Installation conditions

<ul style="list-style-type: none"> <li>• Location</li> </ul>	Indoor/outdoor
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##### Ambient conditions (enclosure)

<ul style="list-style-type: none"> <li>• ambient temperature</li> <li>• installation category</li> <li>• pollution degree</li> </ul>	-40 to +80 °C (-40 to +176 °F) I 4
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#### Medium conditions

<ul style="list-style-type: none"> <li>• Dielectric constant <math>\epsilon_r</math></li> </ul>	>1.6
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##### Process temperature

<ul style="list-style-type: none"> <li>• 40 m version</li> <li>• 100 m version</li> </ul>	-40 to +100 °C (-40 to +212 °F) -40 to +200 °C (-40 to +392 °F)
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#### Design

<ul style="list-style-type: none"> <li>• Enclosure               <ul style="list-style-type: none"> <li>- Construction</li> <li>- Conduit entry</li> <li>- Lens material</li> </ul> </li> <li>• Degree of protection</li> <li>• Weight</li> <li>• Optional local display interface</li> </ul>	316L/1.4404 stainless steel M20x1.5, or ½" NPT via adapter <ul style="list-style-type: none"> <li>• 40 m version: PEI</li> <li>• 100 m version: PEEK</li> </ul> Type 4X/NEMA 4X, Type 6/NEMA 6, IP68 with lid closed 3.15 kg (6.94 lb) including 3" flange Graphic LCD, with bar graph representing level
<h5>Process connections</h5> <ul style="list-style-type: none"> <li>• Universal flat-faced flanges<sup>2)</sup></li> <li>• Universal flat-faced flanges<sup>2)</sup></li> <li>• Aimer flanges<sup>2)</sup></li> </ul>	3, 4, 6"/80, 100, 150 mm, 304 stainless steel 3, 4, 6"/80, 100, 150 mm, 316L/1.4404 or 316L/1.4435 stainless steel 3, 4, 6"/80, 100, 150 mm, polyurethane powder-coated cast aluminum

#### 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 to 32 V DC, per IEC 61158-2

#### Certificates and approvals

<ul style="list-style-type: none"> <li>• General</li> <li>• Radio</li> </ul>	CSA <sub>US/C</sub> , CE, FM Europe (R&TTE), FCC, Industry Canada, C-TICK
<ul style="list-style-type: none"> <li>• Hazardous               <ul style="list-style-type: none"> <li>- Europe</li> <li>- Europe/International</li> </ul> </li> <li>- US/Canada</li> </ul>	ATEX II 3G Ex nA/nL IIC T4 Gc ATEX II 1D, 1/2D, 2D IECEx SIR 09.0149X Ex ta IIC T139 °C Da 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

#### Programming

<ul style="list-style-type: none"> <li>• Intrinsically Safe Siemens handheld programmer</li> <li>- Approvals for handheld programmer</li> </ul>	Infrared receiver  IS model: ATEX II 1GD Ex ia IIC T4 Ga Ex iaD 20 T135°C Ta = -20 ... +50 °C CSA/FM Class I, II, and III, Div. 1., Gr. A-G, T6 Ta=50C
<ul style="list-style-type: none"> <li>• Handheld communicator</li> <li>• PC</li> <li>• Display (local)</li> </ul>	HART communicator 375/475 SIMATIC PDM, AMS, PACTware Graphic local user interface including quick start wizard and echo profile displays

<sup>1)</sup> From sensor reference point

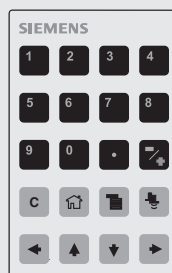
<sup>2)</sup> Universal flange mates with EN 1092-1 (PN16)/ASME B16.5 (150 lb)/JIS 2220 (10K) bolt hole pattern.

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### Accessories

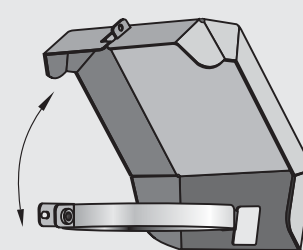
#### Handheld programmer

Part number:  
7ML1930-1BK



#### Sun Shield Cover

Part number:  
7ML1930-1FK



SITRANS LR560 handheld programmer and sun shield cover

# Level instruments

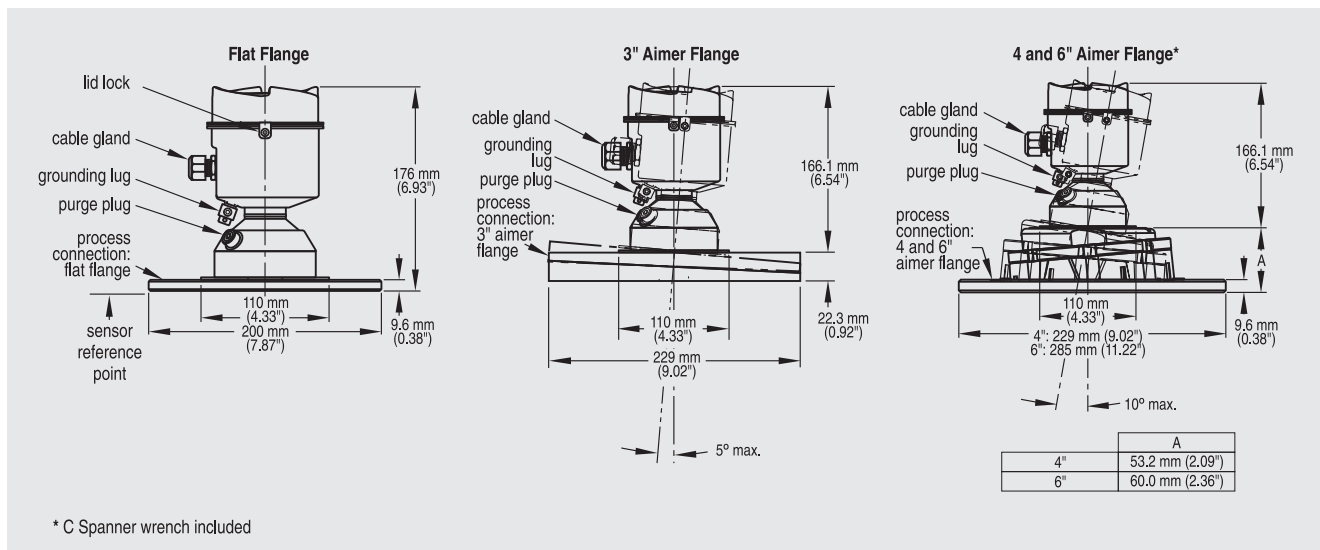
## Continuous level measurement - Radar transmitters

### SITRANS LR560

Selection and Ordering data	Order No.
<b>SITRANS LR560</b> 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids in silos to a range of 100 m (329 ft). <b>Order handheld programmer separately!</b>	C) <b>7ML5440-</b> 
<b>Measurement and process temperature range</b> 40 m (131 ft) max range, -40 to +100 °C 100 m (329 ft) max range, -40 to +200 °C	0 1
<b>Process connection</b> Universal flat-faced flange fits ANSI/DIN/JIS flanges	A B C D E F G H J
3" / 80 mm, 304 stainless steel 4" / 100 mm, 304 stainless steel 6" / 150 mm, 304 stainless steel 3" / 80 mm, 316L stainless steel 4" / 100 mm, 316L stainless steel 6" / 150 mm, 316L stainless steel 3" / 80 mm, painted aluminum, with integral aimer <sup>1)</sup> 4" / 100 mm, painted aluminum, with integral aimer <sup>1)</sup> 6" / 150 mm, painted aluminum, with integral aimer <sup>1)</sup>	A B
<b>Enclosure (with cable inlet)</b> Stainless Steel, 1 X 1/2" NPT Stainless Steel, 1 X M20 x 1.5 (plastic gland included)	A B
<b>Pressure rating</b> 0.5 bar g (7.5 psi g) maximum 3 bar g (40 psi g) maximum	0 1
<b>Output/communication</b> 4 to 20 mA, HART® PROFIBUS PA Foundation Fieldbus	A B C
<b>Approvals</b> General Purpose, CSA <sub>US/C</sub> , Industry Canada, FCC, CE, R&TTE, C-TICK CSA/FM Class I, Div. 2, Gr. A,B,C,D, Class II, Div. 1, Gr. E,F,G, Class III ATEX II 1 D, 1/2 D, 2 D, 3G Ex nA/nL, CE, R&TTE, C-TICK	A B C
<b>Local display interface</b> Without LDI (local display interface) With LDI (local display interface)	1 2
<b>Further designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s).	Order code
Plug M12 with mating connector <sup>2) 3) 4)</sup> Plug 7/8" with mating connector <sup>2) 4) 5)</sup>	<b>A50</b> <b>A55</b>
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000	<b>C11</b>
Inspection Certificate Type 3.1 per EN 10204 <sup>6)</sup> NAMUR NE43 compliant, device preset to failsafe <3.6 mA <sup>7)</sup>	<b>C12</b> <b>N07</b>
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 27 characters) specify in plain text	<b>Y15</b>
<b>Instruction manual for HART device</b>	Order No.
English	C) <b>7ML1998-5KB01</b>
German Note: The instruction manual should be ordered as a separate line item on the order.	C) <b>7ML1998-5KB31</b>
Multi-language Quick Start manual	C) <b>7ML1998-5XF81</b>
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.	

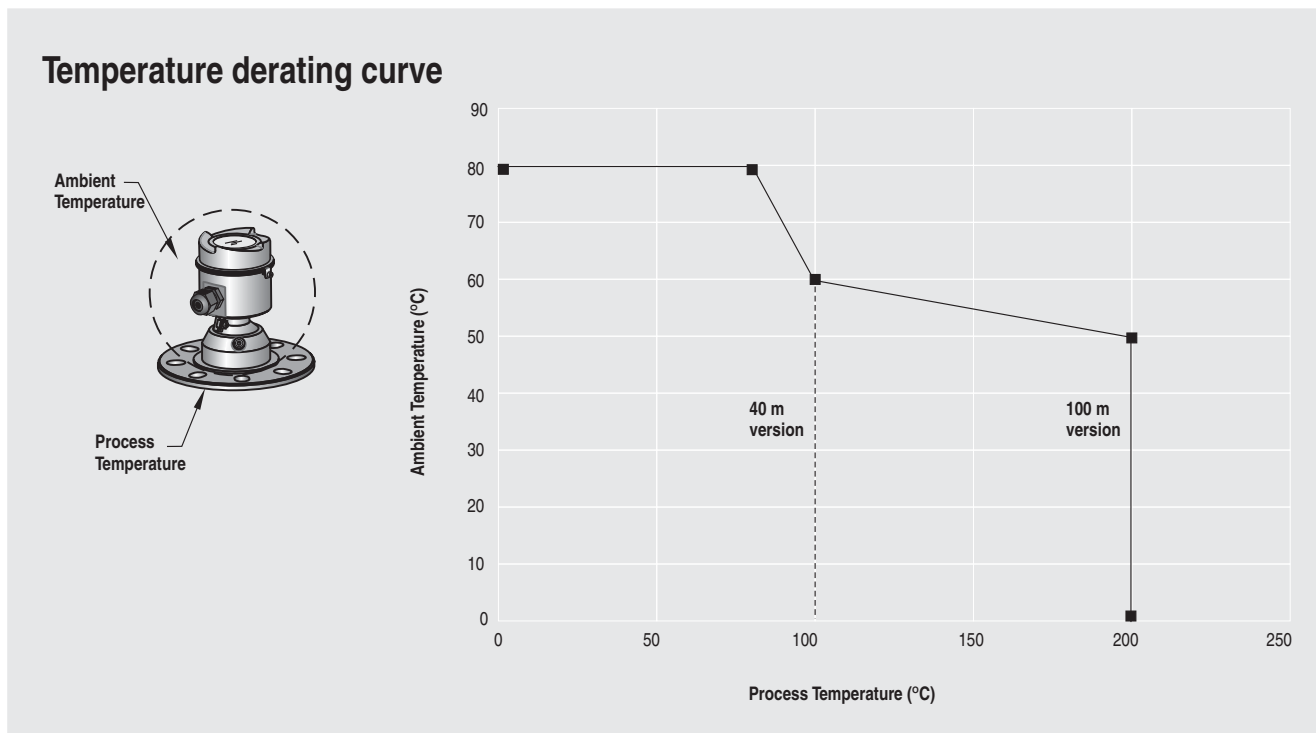
Selection and Ordering data	Order No.
<b>SITRANS LR560</b> 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids in silos to a range of 100 m (329 ft). <b>Order handheld programmer separately!</b>	C) <b>7ML5440-</b> 
<b>Instruction manual for PROFIBUS PA device</b>	Order No.
English	C) <b>7ML1998-5LT01</b>
German Note: The instruction manual should be ordered as a separate line item on the order.	C) <b>7ML1998-5LT31</b>
Multi-language Quick Start manual	C) <b>7ML1998-5XQ81</b>
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.	
<b>Instruction manual for Foundation Fieldbus device</b>	Order No.
English	C) <b>7ML1998-5LY01</b>
German Note: The instruction manual should be ordered as a separate line item on the order.	C) <b>7ML1998-5LY31</b>
Multi-language Quick Start manual	C) <b>7ML1998-5XR81</b>
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.	
<b>Accessories</b>	
Hand Programmer, Intrinsically safe	<b>7ML1930-1BK</b>
Local display interface	<b>7ML1930-1FJ</b>
Sun Shield Cover	<b>7ML1930-1FK</b>
Housing lid with window	<b>7ML1930-1FL</b>
One metallic cable gland M20 x 1.5, rated -40 to +80 °C (-40 to +176 °F), HART	<b>7ML1930-1AP</b>
One metallic cable gland M20 x 1.5, rated -40 to +80 °C (-40 to +176 °F), PROFIBUS PA	<b>7ML1930-1AQ</b>
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	
<sup>1)</sup> Rated to 120 °C max. when used with Pressure rating option 1	
<sup>2)</sup> Available with Approval option A only	
<sup>3)</sup> Available with Enclosure option B only	
<sup>4)</sup> Available with Output/communication options B and C only	
<sup>5)</sup> Available with Enclosure option A only	
<sup>6)</sup> Available with Pressure rating option 1 only	
<sup>7)</sup> Available with Output/communication option A only	
® HART is a registered trademark of HART Communication Foundation	
C) Subject to export regulations AL: N, ECCN: EAR99	
D) Subject to export regulations AL: N, ECCN: EAR99H	
<b>Note 1:</b> available with no pressure rating, 0.5 bar g maximum. Please contact <a href="mailto:nacc.smpi@siemens.com">nacc.smpi@siemens.com</a> for special requests.	

### Dimensional drawings



SITRANS LR560 dimensions

### Characteristic curves



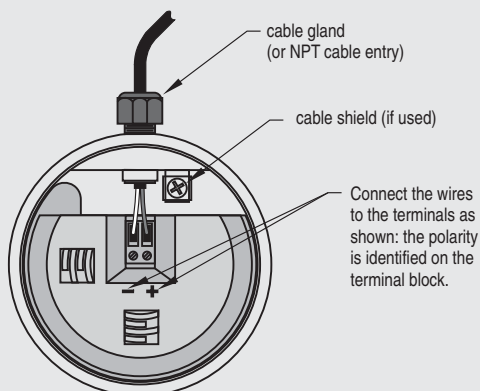
SITRANS LR560 temperature derating curve

# Level instruments

## Continuous level measurement - Radar transmitters

### SITRANS LR560

#### 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.
4. Use shielded twisted pair cable (14 to 22 AWG) for HART version.
5. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR560 connections