

# Level Measurement

## Continuous level measurement – Radar transmitters

### SITRANS LR460

#### Overview



The SITRANS LR460 is a 4-wire, 24 GHz FMCW radar level transmitter with extremely high signal-to-noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft). It is ideal for measurement in extreme dust.

#### Application

SITRANS LR460 provides excellent results even during conditions of extreme dust. The integral Easy Aimer included on the SITRANS LR460 allows for easy positioning for optimum measurement on solids.

Process Intelligence onboard SITRANS LR460 means advanced signal processing is harnessed for reliable operation on both simple and difficult solids application.

SITRANS LR460 features a robust enclosure, flange and horn components. It is virtually unaffected by atmospheric or temperature conditions within the vessel.

An optional dust cap is available for sticky solids. Optional air purging is also available for extremely sticky applications.

Safe on-site local programming is simple using the Intrinsically Safe handheld programmer. SIMATIC PDM can be used for easy remote programming using HART or PROFIBUS PA.

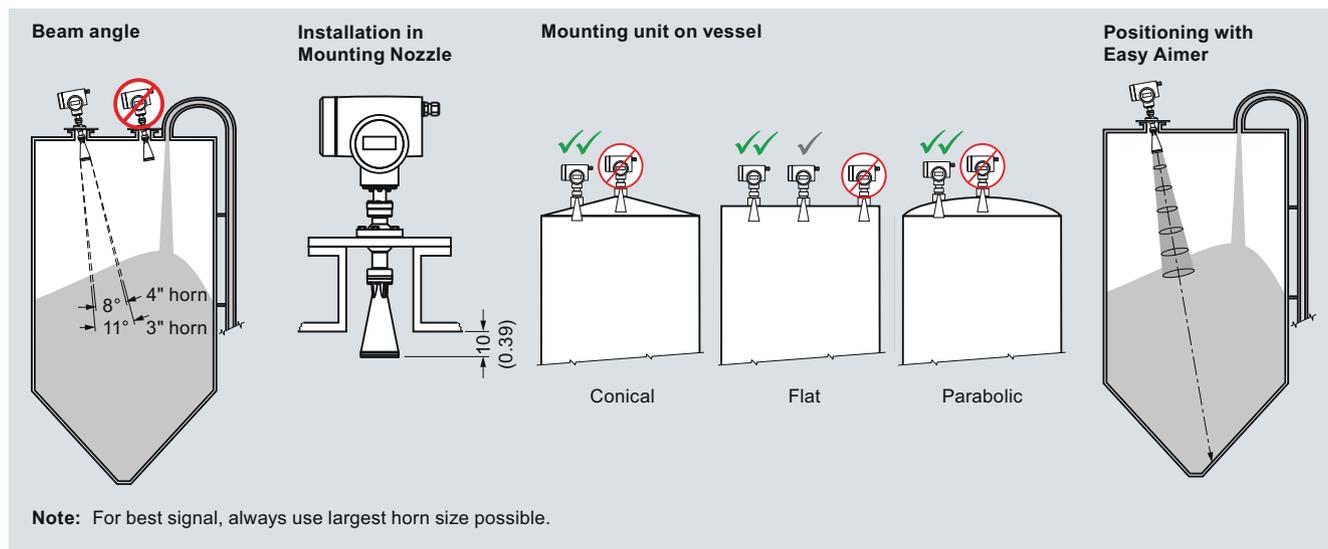
The characteristics of 24 GHz and high signal-to-noise ratio contribute to exceptional signal reflection, regardless of the dielectric value of the medium.

- Key applications: long-range dusty applications, cement powder, fly-ash, coal, flour, grain, plastics

#### Benefits

- Process Intelligence for advanced signal processing and quick and easy adjustment
- Self-guided quick start wizard for plug and play start-up
- 24 GHz provides superior reflective properties on solids surfaces
- 100 m (328 ft) range for long-range and difficult applications
- Easy Aimer optimizes signal quality on sloped surfaces
- Programming using infrared Intrinsically Safe handheld programmer or with SIMATIC PDM or HART handheld device

#### Configuration



SITRANS LR460 installation, dimensions in mm (inch)

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### Technical specifications

<b>Mode of operation</b>	
Measuring principle	FMCW radar level measurement
Frequency	24.2 ... 25.2 GHz FMCW
Measuring range	0.35 ... 100 m (1.15 ... 328.08 ft)
<b>Output</b>	
Analog output (HART)	
• Signal range	Optically isolated
• Load	Max. 600 Ω
• Fail-safe	mA signal programmable as high, low or hold (LOE)
Communication	HART, optional PROFIBUS PA
Digital output	Relay, NC or NO function, max. 50 V DC, max. 200 mA, rating 5 W
PROFIBUS PA protocol	Layer 1 and 2, Class A, Profile 3.01
<b>Performance (Reference conditions according to IEC 60770-1)</b>	
• Non-linearity	Greater of 25 mm (1 inch) or 0.25% of span (including hysteresis and non-repeatability), over the full ambient temperature range
• Non-repeatability	≤ 10 mm (0.4 inch)
<b>Rated operating conditions</b>	
• Amb. temperature for enclosure	-40 ... +65 °C (-40 ... +149 °F)
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
<b>Medium conditions</b>	
Dielectric constant	$\epsilon_r > 1.4$
Process temperature range	-40 ... +200 °C (-40 ... +392 °F)
Vessel pressure	0.5 bar g (7.25 psi g) maximum
<b>Design</b>	
Weight	Approx. 6.1 kg (13.4 lb) with 3" universal flange
<b>Materials</b>	
• Enclosure	Die-cast aluminum, painted
• Degree of protection	IP67/Type 4X/NEMA 4X/Type 6/NEMA 6
• Cable inlet	2x M20x1.5 or ½" NPT
<b>Process connections</b>	
• Universal flanges, 304 stainless steel, flat faced, with integral Easy Aimer	3"/80 mm, 4"/100 mm, 6"/150 mm (mates with flange EN 1092-1, ASME B16.5, or JIS B2238 bolt pattern), 0.5 bar g (7.25 psi g) max. pressure

<b>Programming</b>	
Intrinsically Safe Siemens handheld programmer (ordered separately)	Infrared receiver
• Approvals for handheld programmer	IS model with ATEX II 1G EEx ia IIC T4, CSA/FM Class I, Div. 1, Groups A, B, C, D T6 at max. ambient temperature of 40 °C (104 °F)
Handheld communicator	HART Communicator 375
PC	SIMATIC PDM
Display (local)	Alphanumeric LCD for readout and entry
<b>Power supply</b>	
	100 ... 230 V AC ± 15% (50/60 Hz), 6 W (12 VA) or 24 V DC +25/-20%, 6 W (optional)
<b>Certificates and approvals</b>	
General	CSA <sub>US/C</sub> , CE, FM, C-TICK
Radio	European Radio (R&TTE), Industry Canada, FCC, C-TICK
Hazardous Areas	CSA/FM Class II, Div. 1, Groups E, F and G, Class III ATEX II 1D, 1/2 D, 2D T85 °C INMETRO ExtD A20 IP67 T85 °C GOST Ex DIP A20 T <sub>a</sub> 85°C IP67
<b>Optional equipment</b>	
Dust cap	PTFE
Air purge connection	1/8" NPT

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#### Selection and Ordering data

##### SITRANS LR460

4-wire, 24 GHz FMCW radar level transmitter with extremely high signal-to-noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft). It is ideal for measurement in extreme dust.

#### Order handheld programmer separately!

#### Process connection

Universal, flat faced, 0.5 bar g (7.25 psi g) maximum with integral Easy Aimer ball

- 3" (80 mm)
- 4" (100 mm)
- 6" (150 mm)

#### Antenna

- 3" horn antenna, fits 80 mm (3 inch) nozzles
- 3" horn antenna, fits 80 mm (3 inch) nozzles with 100 mm extension
- 3" horn antenna, fits 80 mm (3 inch) nozzles with 200 mm extension
- 3" horn antenna, fits 80 mm (3 inch) nozzles with 500 mm extension<sup>1)</sup>
- 3" horn antenna, fits 80 mm (3 inch) nozzles with 1000 mm extension<sup>1)</sup>
- 4" horn antenna, fits 100 mm (4 inch) nozzles
- 4" horn antenna, fits 100 mm (4 inch) nozzles with 100 mm extension
- 4" horn antenna, fits 100 mm (4 inch) nozzles with 200 mm extension
- 4" horn antenna, fits 100 mm (4 inch) nozzles with 500 mm extension<sup>1)</sup>
- 4" horn antenna, fits 100 mm (4 inch) nozzles with 1000 mm extension<sup>1)</sup>

#### Purge (self-cleaning) connection

- No purge connection
- Purge connection

#### Output/Communication

- 4 ... 20 mA, HART
- PROFIBUS PA

#### Power supply/cable inlet

- 100 ... 230 V AC
- 2 x M20x1.5
- 2 x ½" NPT
- 24 V DC
- 2 x M20x1.5
- 2 x ½" NPT

#### Approvals

General Purpose, CSA<sub>US/IC</sub>, Industry Canada, FM, FCC, CE and R&TTE, C-TICK  
 CSA/FM Class II, Div. 1, Groups E, F, and G, Class III  
 ATEX II 1/2 D T6, CE, R&TTE

<sup>1)</sup> Available with Purge option 0 only

L) Subject to export regulations AL: N, ECCN: 3A991X.

#### Order No.

L) **7ML5426-**

0 0 0 0

A  
B  
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B

C  
D

A  
B

C

#### Selection and Ordering data

##### Further designs

Please add "-Z" to Order No. and specify Order code(s).

Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 16 characters); specify in plain text

Test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000

##### Operating Instructions

English

French

German

Multi-language Quick Start manual  
 This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

##### Accessories

Handheld programmer, Infra-red, Intrinsically Safe, EEx ia

Dust cap, PTFE, for 3"/80 mm horn

Dust cap, PTFE, for 4"/100 mm horn

HART modem/RS-232  
 (for use with a PC and SIMATIC PDM)

HART modem/USB  
 (for use with a PC and SIMATIC PDM)

One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART<sup>1)</sup>

One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA<sup>1)</sup>

SITRANS RD100 Remote display - see Chapter 8

SITRANS RD200 Remote display - see Chapter 8

SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 8

<sup>1)</sup> Product shipped with plastic cable gland, rated to -20 °C.

If -40 °C rating required, then metallic cable gland is recommended.

C) Subject to export regulations AL: N, ECCN: EAR99.

D) Subject to export regulations AL: N, ECCN: EAR99H.

#### Order code

**Y15**

**C11**

#### Order No.

C) **7ML1998-5JM02**

C) **7ML1998-5JM11**

C) **7ML1998-5JM32**

C) **7ML1998-5QW82**

**7ML5830-2AJ**

**7ML1930-1BL**

**7ML1930-1BM**

D) **7MF4997-1DA**

D) **7MF4997-1DB**

**7ML1930-1AP**

**7ML1930-1AQ**

**7ML5750-1AA000**

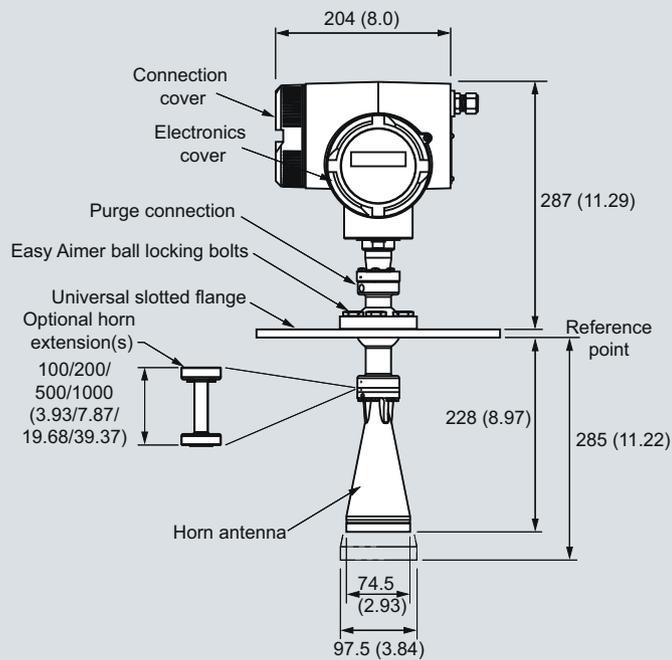
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### Dimensional drawings

SITRANS LR460 (7ML5426)



SITRANS LR460, dimensions in mm (inch)

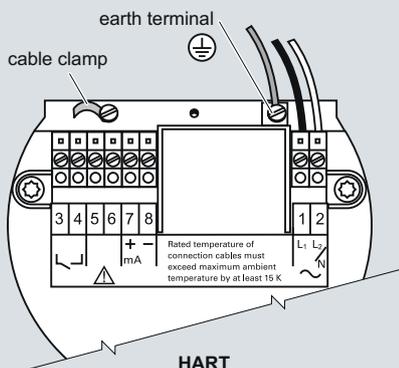
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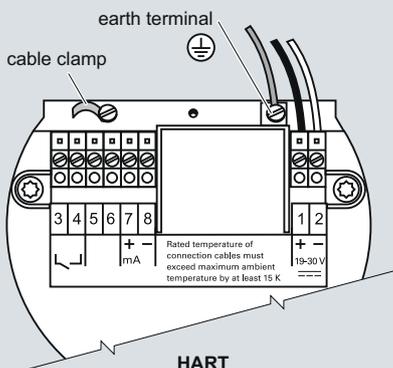
### SITRANS LR460

#### Schematics

AC version



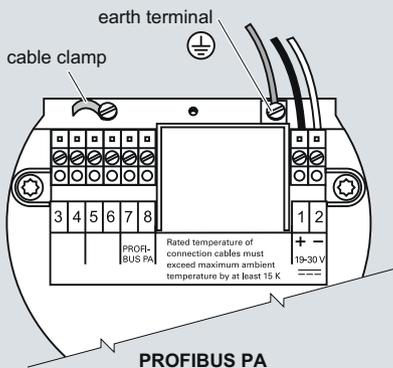
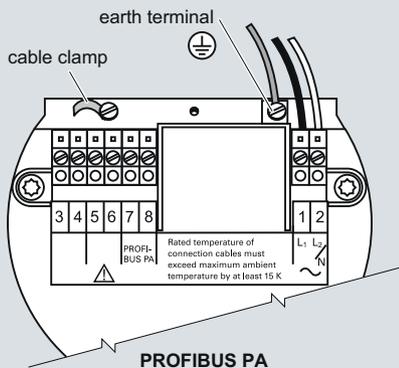
DC version



Hand Programmer



SITRANS LR460  
Part number:  
7ML5830-2AJ



#### Notes

- recommended torque on terminal clamping screws, 0.5 ... 0.6 Nm
- 4 ... 20 mA, Profibus PA, DC input circuits, 14 -20 AWG, shielded copper wire
- AC input circuit, min. 14 AWG copper wire
- all field wiring must have insulation suitable for at least 250 V
- the equipment must be protected by a 15 A fuse or circuit breaker in the building installation

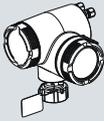
SITRANS LR460 connections

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### SITRANS LR260/LR460 Specials

SITRANS LR260/LR460 Specials	
	Order No.
<b>Process connection part kits - non-pressure-rated</b>	
LR260/LR460, 100 mm extension for horn antenna, no purge, see Note 1	<b>A5E01087872</b>
LR260/LR460, 200 mm extension for horn antenna, no purge, see Note 1	<b>A5E01091262</b>
LR260/LR460, 100 mm extension for horn antenna with purge, see Note 1	<b>A5E01261979</b>
LR260/LR460, 200 mm extension for horn antenna with purge, see Note 1	<b>A5E01261981</b>
LR260/LR460, horn 2", no purge, no emitter, see Note 1	<b>A5E02083905</b>
LR260/LR460, horn 3", no purge, no emitter, see Note 1	<b>A5E01623511</b>
LR260/LR460, horn 4", no purge, no emitter, see Note 1	<b>A5E01623512</b>
LR260/LR460, horn 2", with purge, no emitter, see Note 1	<b>A5E02083906</b>
LR260/LR460, horn 3", with purge, no emitter, see Note 1	<b>A5E01623513</b>
LR260/LR460, horn 4", with purge, no emitter, see Note 1	<b>A5E01623514</b>
LR260/LR460, 3" universal flat faced flange, see Note 1	<b>A5E02303897</b>
LR260/LR460, 4" universal flat faced flange, see Note 1	<b>A5E01259467</b>
LR260/LR460, 6" universal flat faced flange, see Note 1	<b>A5E01261834</b>
LR260/LR460 O-Rings for Easy Aimer, see Note 1	F) <b>A5E01261836</b>
Kit, Emitter for LR260/LR460, see Note 1	<b>A5E02360694</b>
LR260 lid with O-ring	<b>A5E02465410</b>
<b>Purge conversion kit – non-pressure-rated (no flange or extension included)</b>	
LR260/LR460 purge conversion, 2" horn, see Note 1	<b>A5E02083914</b>
LR260/LR460 purge conversion, 3" horn, see Note 1	<b>A5E02083915</b>
LR260/LR460 purge conversion, 4" horn, see Note 1	<b>A5E02083916</b>

SITRANS LR260/LR460 Specials	
	Order No.
<b>Enclosure with electronics</b>	
	
LR260 enclosure with board stack, HART communication, M20 cable inlet, approval option A, no process connection	C) <b>A5E02203605</b>
LR260 enclosure with board stack, PROFIBUS PA communication, M20 cable inlet, approval option A, no process connection	C) <b>A5E02213423</b>
LR260 enclosure with board stack, HART communication, NPT cable inlet, approval option A, no process connection	C) <b>A5E02165924</b>
LR260 enclosure with board stack, PROFIBUS PA communication, NPT cable inlet, approval option A, no process connection	C) <b>A5E02213428</b>
<b>Enclosure with electronics ( LR460)</b>	
	
LR460 enclosure with board stack, HART communication, AC power, M20 cable inlet, approval option A, no process connection	L) <b>A5E02182085</b>
LR460 enclosure with board stack, PROFIBUS PA communication, AC power, M20 cable inlet, approval option A, no process connection	C) <b>A5E02212422</b>
LR460 enclosure with board stack, HART communication, AC power, NPT cable inlet, approval option A, no process connection	L) <b>A5E02212423</b>
LR460 enclosure with board stack, PROFIBUS PA communication, AC power, NPT cable inlet, approval option A, no process connection	L) <b>A5E02212424</b>
LR460 enclosure with board stack, HART communication, DC power, M20 cable inlet, approval option A, no process connection	L) <b>A5E02212425</b>
LR460 enclosure with board stack, PROFIBUS PA communication, DC power, M20 cable inlet, approval option A, no process connection	L) <b>A5E02212426</b>
LR460 enclosure with board stack, HART communication, DC power, NPT cable inlet, approval option A, no process connection	L) <b>A5E02212428</b>
LR460 enclosure with board stack, PROFIBUS PA communication, DC power, NPT cable inlet, approval option A, no process connection	L) <b>A5E02212429</b>

1) Available with no pressure rating, 0.5 bar g maximum.  
Please contact [ceg.smpi@siemens.com](mailto:ceg.smpi@siemens.com) for special requests.

C) Subject to export regulations AL: N, ECCN: EAR99.

F) Subject to export regulations AL: 91999, ECCN: N.

L) Subject to export regulations AL: N, ECCN: 3A991X.