



# LR-56

## Radar level transmitter with two-wire technology



## Features

**/ Robust St. Steel Construction**

**/ 78 GHz high frequency**

**/ Beam angle**

**/ Aimer flange for adjustment**

**/ Purge plug for cleaning**

**/ LDI for on-site maintenance**

## Description:

The LR-56 is a 78 GHz FMCW-radar level-sensor based on two-wire technology for ranges up to 100m. Different than an impulse radar, a FMCW-radar sends out a continuous, modulated frequency. The reflected waves are received by the device and, using the time difference between the send and received signals, the level in the tank is being calculated. At this high frequency of 78 GHz, the signal, prior to being send, has to be transformed into an almost time-linear saw-tooth-frequency, to make calculations easier. As a radar sends out electromagnetic waves, the pulses are not slowed down on their way to the medias surface, regardless of the nature of gas between transmitter and media. The LR-56 offers a 4...20 mA two-wire output which displays the level, distance to media surface or capacity in a linear way. A purge plug for self-cleaning from extremely sticky materials is available. An aimer flange can be chosen to adjust the beam angle more precisely, eg. on the outlet. Programming and diagnosis on site is made possible through a local display and input-possibilities, while a remote hand-held unit could also be used for easier access from a distance.

## Application:

The range of application for the LR-56 radar-level sensor starts where the ultrasonic- and common radar-pulse level measuring reach their capabilities. As electromagnetic instead of sonic waves are used, temperature, pressure and material of the gasphase above the media do not influence the measuring quality. Foam or dust on the medias surface do not change the quality much either, or can at least be easily overcome, without significant damping of the signal. The quick response of the LR-56 is ideal for most applications with bulk goods, even for extreme dust generating materials and high temperatures up to 200 °C (+392 °F). Bulk goods can be measured to a height of 100 m. The main application areas are: pulverized cement, plastics (pulverized or granulated), grains, coal, woodchips or flue ash.



## Technical Specifications:

<b>Meas. principle /</b>	radar-level monitoring	
<b>Frequency /</b>	78 GHz	
<b>min. Distance /</b>	400 mm from sensor	
<b>max. Distance /</b>	40 m or 100 m	
<b>Output /</b>		
Analogue:	4...20 mA	
Communication:	Standard: HART Optional: PROFIBUS PA	
Fail safety:	programmable for max, min or hold (loss of echo), NE43	

**Ambient temp. /** -40...+80 °C

<b>Processtemp./pressure/</b>	<b>40m</b>	<b>100m</b>
Stainless steel: -1 ... 0.5 bar -1 ... 3.0 bar	-40 ... +100 °C (-40 ... +212 °F)	-40 ... +200 °C (-40 ... +392 °F)
Aimer flange: -1 ... 0.5 bar	-40 ... +100 °C (-40 ... +212 °F)	-40 ... +200 °C (-40 ... +392 °F)
Aimer flange: -1 ... 3.0 bar	-40 ... +100 °C (-40 ... +212 °F)	-40 ... +120 °C (-40 ... +248 °F)

**Accuracy /** 5 mm

**Performance (according to reference conditions IEC60770-1) /** Maximum measured error (including hysteresis and non-repeatability):  
5 mm (0.2 inch)

**Dielectric constant  $\epsilon_r$ /** > 1.6

### Housing /

Material:	stainless steel 1.4404
Cable gland:	M20 x 1.5 or 1/2" NPT via adapter
Purge plug:	1/8" NPT, 30 cfm at max 100 psi
Antenna:	40 m version: PEI 100 m version: PEEK a cleansing of only a few seconds every hour is recommended
Protection class:	Typ 4X/NEMA 4X, Typ 6/NEMA6, IP68 with closed lid
Weight:	3.15 kg incl. 3" flange
Display:	graphic-LCD with bar-graph for the portrayal of level

### Process connection /

Universal-flanges:	80, 100, 150 mm st. steel 1.4301; 80, 100, 150 mm st. steel 1.4404 or 1.4435 fitting EN 1092-1 (PN 16)/ASME B16.5 (150 lb)/JIS 2220 (10K)
Aimer flange:	80, 100, 150 mm aluminium with polyurethane-powder coating

<sup>1)</sup> Under severe EMI/EMC environments per IEC61326-1 or NAMUR NE21, the device error may increase to a maximum of 25 mm (1 inch)

## Electrical Specifications:

### Power supply /

4...20 mA/HART: nominal DC 24 V (max. DC 30 V) with max. 550  $\Omega$

PROFIBUS PA/  
Foundation Field Bus: 13.5 mA  
DC 9...32 V, via IEC 61158-2

### Certificates/approvals /

General: CSA<sub>US/C</sub>, CE, FM

Radio: Europe (RED), FCC, Industry Canada, RCM

Ex-Zones: IECEx SIR 09.0149X  
ATEX II 1D, 1/2D, 2D  
Ex ta IIIC T139 °C DA IP68  
ATEX II 3G  
Ex nA II T4 Gc  
Ex nL IIC T4 Gc

### Handheld Unit /

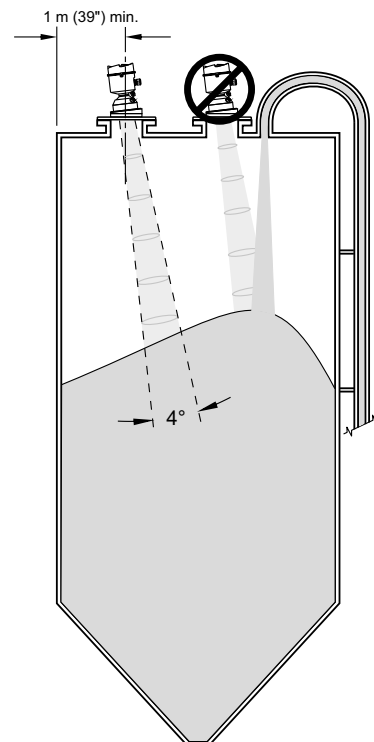
Approvals: intrinsically safe version  
ATEX II 1GD Ex ia IIC T4 Ga  
Ex iaD 20 T135 °C  
T<sub>a</sub> = -20...+50 °C

Field communicator: 375/475 field communicator for HART

PC: SIMATIC PDM, AMS, PACTware

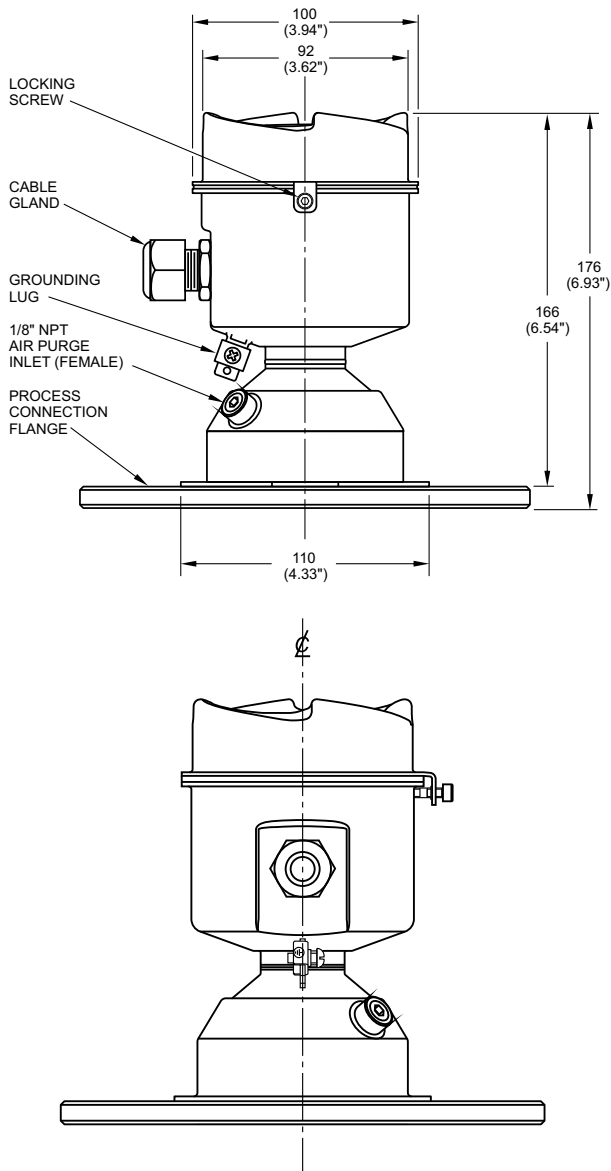
Display (local): Graphic local user interface including quick start wizard and echo profile displays

## Installation Position:

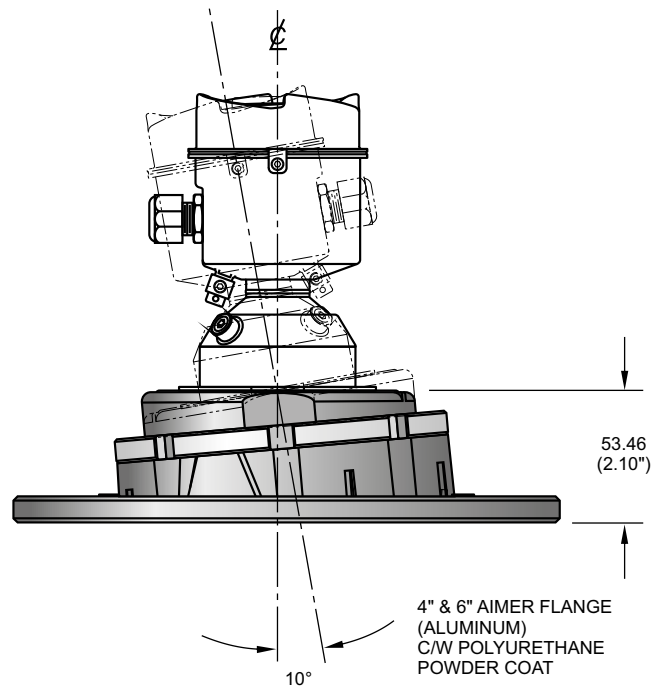
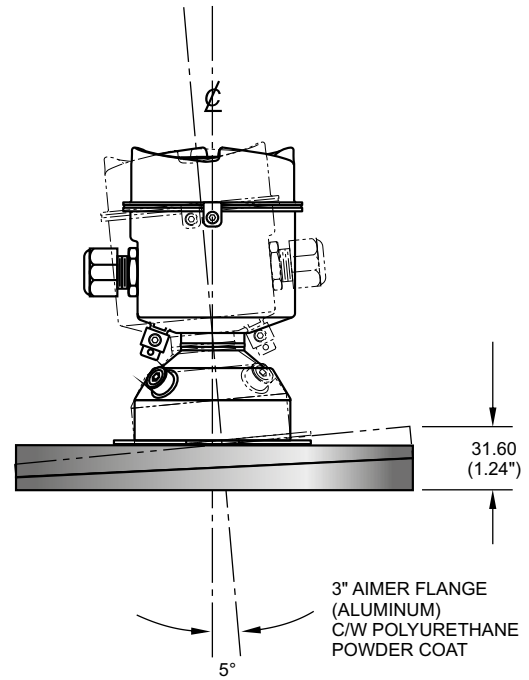




## Dimensions in mm:



## Aimer flanges:





# Ordering Codes:

<b>Order number</b>	<b>LR-56.</b>	<b>2.</b>	<b>4.</b>	<b>1.</b>	<b>A.</b>	<b>1.</b>	<b>3.</b>	<b>0.</b>	<b>1</b>
<b>LR-56 Radar Level Transmitter</b>									
<b>Measuring range /</b>									
1 = 40 m max. measuring range, -40...+100 °C									
2 = 100 m max. measuring range, -40...+200 °C									
<b>Process connection /</b>									
1 = 80 mm, st. steel 1.4301									
2 = 100 mm, st. steel 1.4301									
3 = 150 mm, st. steel 1.4301									
4 = 80 mm, st. steel 1.4404									
5 = 100 mm, st. steel 1.4404									
6 = 150 mm, st. steel 1.4404									
7 = 80 mm, painted aluminium with aimer flange <sup>1)</sup>									
8 = 100 mm, painted aluminium with aimer flange <sup>1)</sup>									
9 = 150 mm, painted aluminium with aimer flange <sup>1)</sup>									
<b>Housing (with cable glands) /</b>									
1 = st. steel, 1 x ½" NPT									
2 = st. steel, 1 x M20 x 1,5 (incl. plastic mounting)									
<b>Nominal pressure /</b>									
A = 0.5 bar g max.									
B = 3 bar g max.									
<b>Output /</b>									
1 = 4...20 mA, HART									
2 = PROFIBUS PA									
<b>Approvals /</b>									
1 = general use, FM, CSA <sub>US/C</sub> , Industry Canada, FCC, CE, RED, RCM									
2 = CSA/FM Class I, Div. 2, groups A, B, C, D, Class II, Div. 1; groups E, F, G, Class III									
3 = ATEX II 3G Ex nA/nL, 1D, 1/2D, 2D Ex ta, INMETRO CE, RED, RCM									
<b>Local display interface /</b>									
0 = without LDI (Local Display Interface)									
9 = with LDI (Local Display Interface)									
<b>Accessories /</b>									
0 = none									
1 = hand-held access unit									
9 = please specify custom wishes									

<sup>1)</sup>for max. 120 °C with nominal pressure option B