

Level Measurement

Continuous level measurement
Radar level transmitters

SITRANS LR110

Overview



SITRANS LR110 is a compact radar transmitter for continuous level measurement of liquids, slurries, or solids to a range of 15 m (49.2 ft).

Benefits

- Bluetooth connectivity for easy setup with SITRANS mobile IQ
- Chemically resistant PVDF enclosure
- HART 7.0 or Modbus RTU communication for intelligent integration into your application
- W band FMCW radar yields narrow beam with small antenna for superior performance in short range applications
- Approved for open air applications outside of a tank
- 2 mm accuracy and zero near range distance yields optimum inventory management capability
- Compact design fits in limited space installations
- Hazardous area variants available for safe use in explosive gas or dust environments.

Application

SITRANS LR110 is a W band FMCW radar level transmitter, packaged in a hermetically sealed PVDF enclosure for years of trouble-free reliable measurement service.

4 to 20 mA loop powered with HART [optional 4-wire Modbus RTU], providing accurate level measurement to ranges of 15 m (49.2 ft). Measurement is possible non-intrusively through plastic vessel tops for easy installation. Programming is convenient using the Bluetooth connection and SITRANS mobile IQ application on your smart device.

Technical specifications

Mode of operation	
Measuring principle	W band FMCW radar
Measuring range	0 ... 15 m (0 ... 49.2 ft)
Frequency	80 GHz nominal
Beam angle	8°
Power Supply	
HART	
• Voltage	12 ... 35 V DC
• Current	4 ... 20 mA
Modbus	
• Voltage	8 ... 30 V DC
• Current	38 mA at 8 V DC/17 mA at 30 V DC
Communications	
4 ... 20 mA	HART 7.0
Modbus (4-wire option)	RTU
Accuracy	
	± 2 mm (range 0.25 ... 0.15 m), ± 10 mm (range 0 ... 0.25 m)
Rated operating conditions	
Vessel pressure	-1 ... +3 bar (14.50 ... 43.51 psi g)
Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
Process temperature	-40 ... +80 °C (-40 ... +176 °F)
Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
Design	
Weight	0.5 kg (1.1 lb), plus 0.1 kg/m (0.2 lb/ft) cable length
Material (enclosure)	PVDF
Process connection	1-½" NPT, 1-½" BSPT or 1-½" BSPP
Degree of protection	IP66/IP68
Cable connection	1" NPT or 1" BSPT threaded connection
• HART	Length options: 5 ... 100 m (16.4 ... 328.1 ft), 2 conductor, twisted with shield 18 AWG, PVC jacket
• Modbus version	Length options: 5 ... 100 m (16.4 ... 328.1 ft), 4 conductor, twisted pairs, 22 AWG, polyurethane jacket
Certificates and approvals	
	CE, cFM _{US} , cCSA _{US} , ATEX, IECEx, EACEx, CSA-Japan-Ex, RCM, INMETRO, NEPSI, CCOE, PESO, FDA(EG)1935/2004
Radio	CE, FCC, IC, Anatel, ICASA, NCC, KC, CITC, RCM, WPC, Telec, NBTC, MCMC
Marine	ABS, CCS, DNV-GL, LR, NK, RINA
Water monitoring, flow	MCERTS Class 1
Canadian Registration Number (CRN)	
• British Columbia	0F22218.51
• Alberta	0F20596.2
• Saskatchewan	0F2002.3
• Manitoba	0F7032.4
• Ontario	0F22218.5
• Québec	0F05183.6
• New Brunswick	0F1490.07
• Nova Scotia	0F1490.08
• Prince Edward Island	0F1490.09
• Newfoundland and Labrador	0F1490.0
• Yukon	0F1490.0Y
• Northwest Territories	0F1490.0T
• Nunavut	0F1490.0N

Programming

SITRANS mobile IQ App

SITRANS mobile IQ is a Bluetooth app that provides an intuitive interface to quickly configure, set up and monitor SITRANS LR100 series. For more information:
<http://www.siemens.com/mobileIQ>

SIMATIC PDM

SIMATIC PDM allows for remote PC configuration and diagnostics (for installation on a network).

SITRANS DTM

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Selection and ordering data

Article No.

Order code

SITRANS LR110 Radar level transmitter

Continuous, non-contact, 15 m (49.2 ft) range, for liquids, slurries, or solids, integrated cable connection

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

Communications

HART (4 ... 20 mA)
Modbus RTU^{4/6)}

Bluetooth function

Without
With

Cable length

5 m
10 m
30 m
50 m
100 m

Process connection

1-½" NPT [(Taper), ASME B1.20.1]/
electrical connection 1" NPT
R 1-½" [(BSPT), EN 10226]/
electrical connection 1" BSPT
G 1-½" [(BSPP), EN ISO 228-
1]/electrical connection 1" BSPT

Type of protection

Non Ex (ordinary locations) CE, cFM_{US},
cCSA_{US}, RCM²⁾
Ex i (ia) (Gas Ex-Zone 0/Class 1, Div. 1) Dust
Ex-Zone 20, 21, Class II & III Div. 1¹⁾
Ex ib mb, Ex ta, ta/tb, Zone 1, 1/2, Zone 20,
21, 22, (Class I, Div. 2), Class II & III,
Div. 1¹⁾³⁾

7ML531
- - - 0 6 - 0 - A 0
0 3
0 1
A B C D E
A B C
A B G

Further designs

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

Tag (device parameter, max. 32 characters) plate stainless steel 304/1.4301

Inspection certificate 3.1 (EN 10204) - device with test data

cFM_{US}, cCSA_{US}, ATEX, IECEx

INMETRO, IA MASC

NEPSI, CCOE

ATEX, IECEx

CSA-Japan-Ex

EACEx⁵⁾

WHG and VlareM

Operating Instructions

All literature is available to download for free, in a range of languages, at

<http://www.siemens.com/processinstrumentation/documentation>

Accessories

Easy Aimer 2, aluminum,
NPT with ¾" x 1" PVC coupling

Easy Aimer 2, aluminum with M20 adapter and
1" and 1½" BSPT aluminum couplings

Easy Aimer 304, NPT with 1" stainless steel coupling

Easy Aimer 304, with M20 adapter and
1" and 1½" BSPT 304 stainless steel couplings

Bracket, Stainless steel, 1 inch mount,
80 mm (3.1 inch) offset

Bracket, Stainless steel, 1 inch mount, 200 mm
(7.9 inch) offset

Bracket, Stainless steel, 1.5 inch mount, 80 mm
(3.1 inch) offset

Bracket, Stainless steel, 1.5 inch mount, 200 mm
(7.9 inch) offset

FMS-200 universal box bracket, mounting kit

FMS-210 channel bracket, wall mount

FMS-220 extended channel bracket, wall mount

FMS-310 channel bracket, floor mount

FMS-320 extended channel bracket, floor mount

FMS-350 bridge channel bracket, floor mount
(see Mounting Brackets on page 4/186 for
more information)

1" NPT locknut, plastic

1" BSP locknut, plastic

Plastic adapter 1" BSP - 20 mm

Plastic adapter 1" NPT

Plastic adapter 1" NPT/M20

SIMATIC RTU3010C compact, remote data manager
with alarming

SIMATIC RTU3030C compact, remote data manager
with alarming

Intrinsically Safe barrier

Y15

C25

E49

E25

E27

E47

E29

E24

E61

Article No.

7ML1830-1AQ

7ML1830-1AX

7ML1830-1AU

7ML1830-1GN

A5E50507509

A5E50507511

A5E50507514

A5E50507516

7ML1830-1BK

7ML1830-1BL

7ML1830-1BM

7ML1830-1BN

7ML1830-1BP

7ML1830-1BQ

7ML1830-1DS

7ML1830-1DR

7ML1830-1EA

7ML1930-1FX

7ML1830-1EF

6NH3112-
0BA00-0XX0

6NH3112-
3BA00-0XX0

7NG4124-1AA00

Accessories

SITRANS RD100, loop powered display - see Chapter 7

SITRANS RD150, remote digital display for 4 to 20 mA and HART devices - see Chapter 7

SITRANS RD200, universal input display with Modbus conversion - see Chapter 7

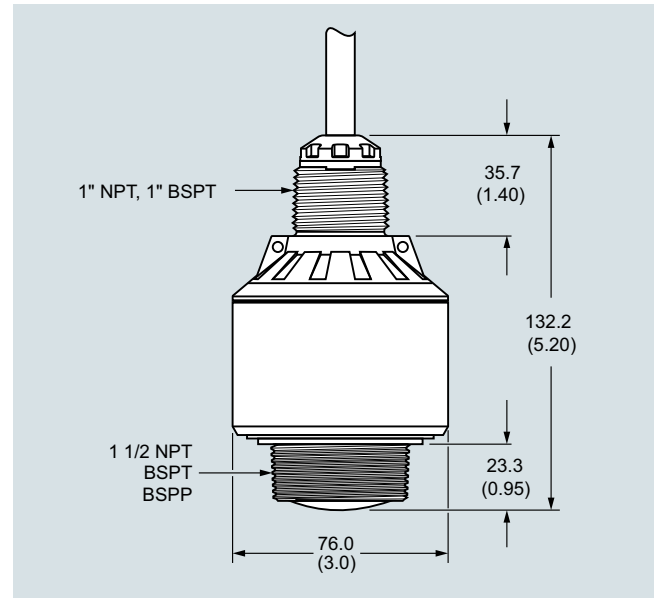
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7

SITRANS LT500, a versatile, single and multi-vessel level monitor/controller for virtually any application in a wide range of industries.

For applicable back up point level switch - see point level measurement section

Article No.**7ML5741-.....-****7ML5742-.....-****7ML5740-.....-****7ML5744-.....-****7ML60..-.....-**

- 1) Must be ordered in combination with order codes E49, E25, E27, E47 E29, or E24.
- 2) Not available in combination with order codes E49, E25, E27, E47, E29, or E24.
- 3) When ordered in combination with NPT thread types, this option is available with any order code. When ordered in combination with BSPP or BSPT thread types, this option is only available with order codes E49, E25, E27, E47, or E29.
- 4) Available only with Type of protection options A and G.
- 5) Available only with Type of protection option B.
- 6) Available only with Bluetooth option 1.

Dimensional drawings

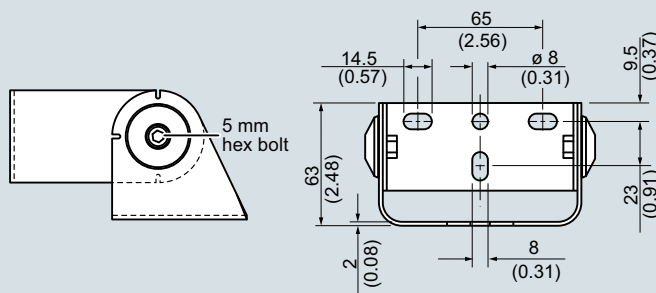
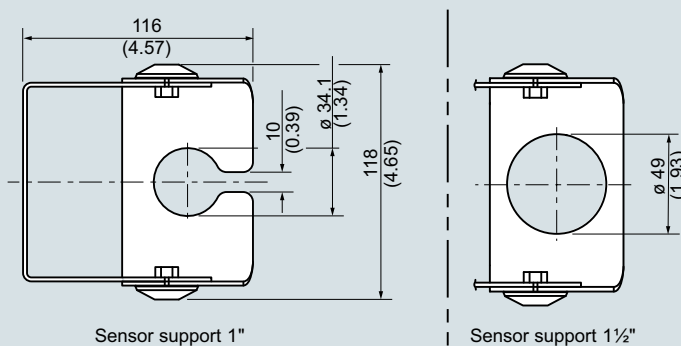
SITRANS LR110, dimensions in mm (inch)

Level Measurement

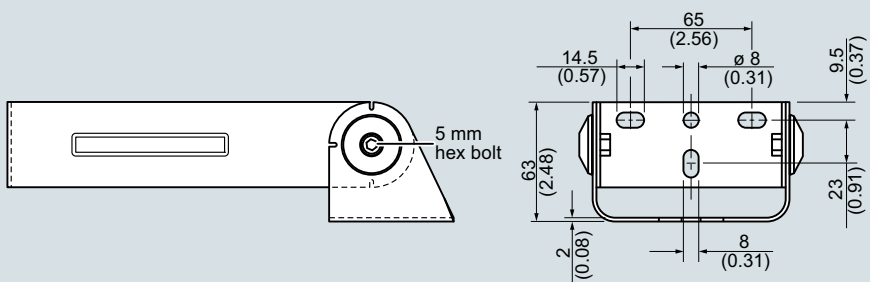
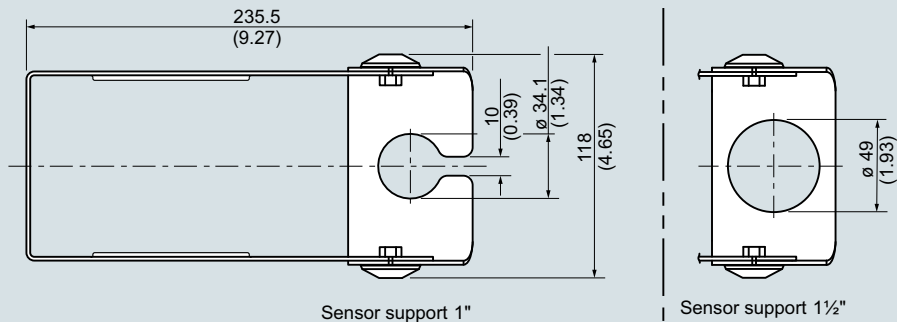
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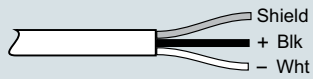
Mounting bracket, 80 mm



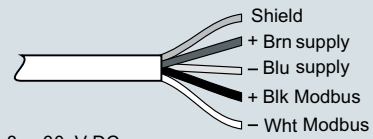
Mounting bracket, 200 mm



SITRANS LR110 mounting brackets, dimensions in mm (inch)

Circuit diagrams**HART**

12 ... 35 V DC
4 ... 20 mA
Loop powered

Modbus

8 ... 30 V DC
30 mA at 8 V DC/
17 mA at 30 V DC
Modbus RTU

SITRANS LR110 Connections