

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 20 m (65.6 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 20 m (65.6 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.

Selection and ordering data

| SITRANS LR110 Radar level transmitter Continuous, non-contact, 20 m (65.6 ft) range, for liquids, slurries, or solids, integrated cable connection | | Article No. 7ML531 ● - ● ● ● 0 6 - 0 ● A 0 | | | | | | | | | |
|--|--|---|--|--|--|--|--|--|--|--|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| Communications | | | | | | | | | | | |
| HART (4 ... 20 mA) | | | | | | | | | | | 0 |
| Modbus RTU ⁽⁴⁾⁽⁶⁾ | | | | | | | | | | | 3 |
| Bluetooth function | | | | | | | | | | | |
| Without | | | | | | | | | | | 0 |
| With | | | | | | | | | | | 1 |
| Cable length | | | | | | | | | | | |
| 5 m | | | | | | | | | | | A |
| 10 m | | | | | | | | | | | B |
| 30 m | | | | | | | | | | | C |
| 50 m | | | | | | | | | | | D |
| 100 m | | | | | | | | | | | E |
| Process connection | | | | | | | | | | | |
| 1-½" NPT [(Taper), ASME B1.20.1]/electrical connection 1" NPT | | | | | | | | | | | A |
| R 1-½" [(BSPT), EN 10226]/electrical connection 1" BSPT | | | | | | | | | | | B |
| G 1-½" [(BSPP), EN ISO 228-1]/electrical connection 1" BSPT | | | | | | | | | | | C |
| Type of protection | | | | | | | | | | | |
| Ordinary Locations/General Purpose (Non-Ex), CE, cFM _{US} , cCSA _{US} , RCM ⁽²⁾ | | | | | | | | | | | A |
| ATEX II 1G, 1/2G Ex ia IIC T4 Ga, Ga/Gb, ATEX II 1D, 1/2D Ex ia IIIC T134°C Da, Da/Db; Gas Ex-Zone 0/Class 1, Div. 1; Dust Ex-Zone 20, 21, Class II & III Div. 1 ⁽¹⁾ | | | | | | | | | | | B |
| ATEX II 2G Ex ib mb IIC T4 Gb; ATEX II 1D, 1/2D Ex ta, ta/tb IIIC T200 121 °C Da, Da/Db, ATEX II 2D Ex tb IIIC T200 134 °C Db; ATEX II 1D, 1/2D Ex ta, ta/tb IIIC T200 142 °C Da, Da/Db, ATEX II 2D Ex tb IIIC T200 155 °C Db; Zone 1, 1/2, Zone 20, 21, 22, (Class I, Div. 2), Class II & III, Div. 1 ⁽³⁾ | | | | | | | | | | | G |

| Selection and Ordering data | Order code |
|---|------------|
| 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 | Y15 |
| Inspection certificate 3.1 (EN 10204) - device with test data | C25 |
| cFM _{US} , cCSA _{US} , ATEX, IECEx | E49 |
| INMETRO, IA MASC | E25 |
| NEPSI, CCOE | E27 |
| ATEX, IECEx | E47 |
| CSA-Japan-Ex | E29 |
| EACEx ⁽⁵⁾ | E24 |
| WHG and VLAREM II | E61 |
| NSF 61 Drinking Water and FDA, EG1935/2004 | E84 |

| Accessories | Article No. |
|---|-------------|
| 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 | 7ML1830-1AQ |
| Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings | 7ML1830-1AX |

| Accessories | Article No. |
|---|-------------|
| Easy Aimer 304, NPT with 1" stainless steel coupling | 7ML1830-1AU |
| Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings | 7ML1830-1GN |
| Bracket, 316L Stainless steel, 1 inch mount, 80 mm (3.1 inch) offset | A5E50507509 |
| Bracket, 316L Stainless steel, 1 inch mount, 200 mm (7.9 inch) offset | A5E50507511 |
| Bracket, 316L Stainless steel, 1.5 inch mount, 80 mm (3.1 inch) offset | A5E50507514 |
| Bracket, 316L Stainless steel, 1.5 inch mount, 200 mm (7.9 inch) offset | A5E50507516 |
| FMS-200 universal box bracket, mounting kit | 7ML1830-1BK |
| FMS-210 channel bracket, wall mount | 7ML1830-1BL |
| FMS-220 extended channel bracket, wall mount | 7ML1830-1BM |
| FMS-310 channel bracket, floor mount | 7ML1830-1BN |
| FMS-320 extended channel bracket, floor mount | 7ML1830-1BP |
| FMS-350 bridge channel bracket, floor mount (see Mounting Brackets catalog page for more information) | 7ML1830-1BQ |
| 1" NPT locknut, plastic | 7ML1830-1DS |
| 1" BSP locknut, plastic | 7ML1830-1DR |
| 1-½" BSP locknut, plastic | 7ML1830-1DP |
| Plastic adapter 1" BSP - 20 mm | 7ML1830-1EA |
| Plastic adapter 1" NPT | 7ML1930-1FX |
| Plastic adapter 1" NPT/M20 | 7ML1830-1EF |

Continuous level measurement

Radar level transmitters

SITRANS LR110

Selection and ordering data (continued)

| Accessories | Article No. |
|--|---------------------|
| Polypropylene adapter flange, 2"/DN50, universal, 1.5" NPT | A5E50868980 |
| Polypropylene adapter flange, 2"/DN50, universal, 1,5" BSPT | A5E50868982 |
| Polypropylene adapter flange, 3"/DN80, universal, 1,5" NPT | A5E50868988 |
| Polypropylene adapter flange, 3"/DN80, universal, 1,5" BSPT | A5E50868998 |
| Polypropylene adapter flange, 4"/DN100, universal, 1,5" NPT | A5E50869003 |
| Polypropylene adapter flange, 4"/DN100, universal, 1,5" BSPT | A5E50869005 |
| Note: other polypropylene adapter flange sizes available via PVR request. | |
| SIMATIC RTU3010C compact, remote data manager with alarming | 6NH3112-0BA00-0-XX0 |
| SIMATIC RTU3030C compact, remote data manager with alarming | 6NH3112-3BA00-0-XX0 |
| HART modem with USB interface | 7MF4997-1DC |
| Intrinsically Safe barrier | 7NG4124-1AA00 |
| SITRANS RD100, loop powered display - see Chapter 7 | 7ML5741-.....- |

| Accessories | Article No. |
|---|----------------|
| SITRANS RD150, remote digital display for 4 to 20 mA and HART devices - see Chapter 7 | 7ML5742-.....- |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | 7ML5740-.....- |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | 7ML5744-.....- |
| SITRANS LT500, a versatile, single and multi-vessel level monitor/controller for virtually any application in a wide range of industries. | 7ML60-.....- |
| For applicable back up point level switch - see point level measurement section | |

- 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, 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.

Technical specifications

| SITRANS LR110 | |
|------------------------------------|---|
| Mode of operation | |
| Measuring principle | W band FMCW radar |
| Measuring range | 0 ... 20 m (0 ... 65.6 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 ... 20 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) |
| Minimum dielectric of the medium | 1.6 |
| 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 | Type 4X/6P, IP66/68 |
| 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, Reg. (EC) No. 1935/2004 |
| Radio | CE, FCC, IC, Anatel, ICASA, NCC, KC, CITC, RCM, WPC, Telec, NBTC, MCMC |
| Marine | CCS, RINA, ClassNK, ABS, DNV, LR, BV |
| Water monitoring, flow | MCERTS Class 1 |
| Canadian Registration Number (CRN) | |
| • British Columbia | OF22218.51 |
| • Alberta | OF20596.2 |
| • Saskatchewan | OF2002.3 |
| • Manitoba | OF7032.4 |
| • Ontario | OF22218.5 |
| • Quebec | OF05183.6 |
| • New Brunswick | OF1490.07 |
| • Nova Scotia | OF1490.08 |
| • Prince Edward Island | OF1490.09 |

Technical specifications (continued)

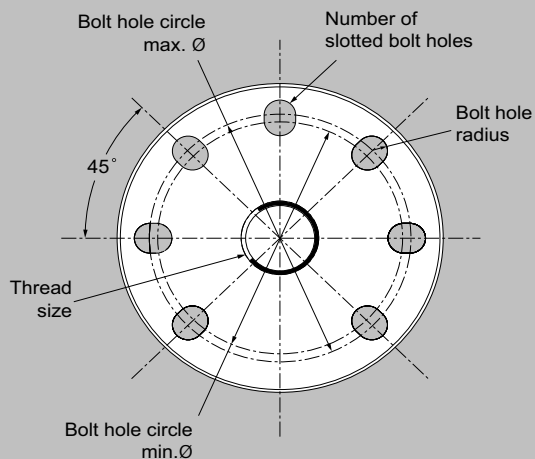
| SITRANS LR110 | |
|-----------------------------|--|
| • Newfoundland and Labrador | OF1490.0 |
| • Yukon | OF1490.0Y |
| • Northwest Territories | OF1490.0T |
| • Nunavut | OF1490.0N |
| Programming | |
| SITRANS mobile IQ App | SITRANS mobile IQ is a Bluetooth app that provides an intuitive interface 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 | |

Continuous level measurement

Radar level transmitters

SITRANS LR110

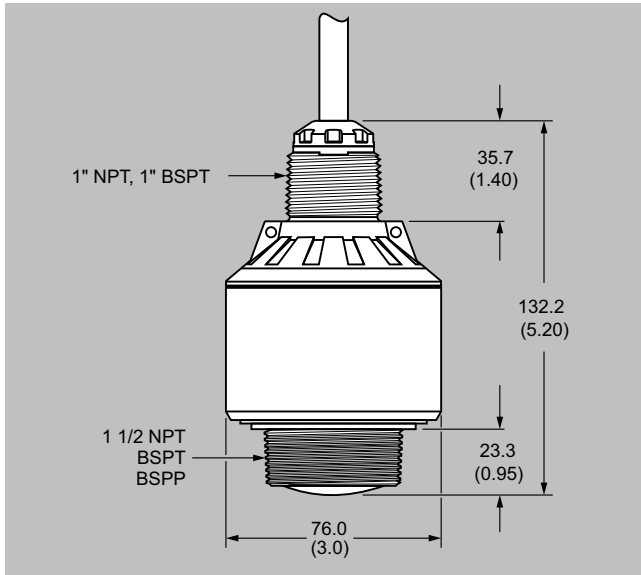
Options



| Part number | Adapter flange size | OD ± 1 | B.C.D. max. for slotted holes (bmax.) ± 0.75 | B.C.D. min. for slotted holes (bmin.) ± 0.75 | Bolt hole radius ± 0.25 | Number of slotted holes | Thread size |
|---|---------------------|--------|--|--|-------------------------|-------------------------|---|
| A5E50868980 A5E50868982 A5E50868983 | 2"/DN50 | 200 | 160 | 150 | R 9.5 | 8 | 1.5" NPT, PP 1.5" BSPT, PP 1.5" BSPP, PP |
| A5E50868988 A5E50868998 A5E50869002 | 3"/DN80 | 200 | 160 | 150 | R 9.5 | 8 | 1.5" NPT, PP 1.5" BSPT, PP 1.5" BSPP, PP |
| A5E50868953 A5E50868975 A5E50869003 A5E50869005 A5E50869010 | 4"/DN100 | 229 | 191 | 175 | R 9.5 | 8 | 1" NPT, PP 1" BSPT, PP 1.5" NPT, PP 1.5" BSPT, PP 1.5" BSPP, PP |
| A5E50868976 A5E50868977 A5E50869012 A5E50869014 A5E50869015 | 6"/DN150 | 285 | 242 | 240 | R 11.5 | 8 | 1" NPT, PP 1" BSPT, PP 1.5" NPT, PP 1.5" BSPT, PP 1.5" BSPP, PP |

SITRANS LR110, Polypropylene adapter flange

Dimensional drawings



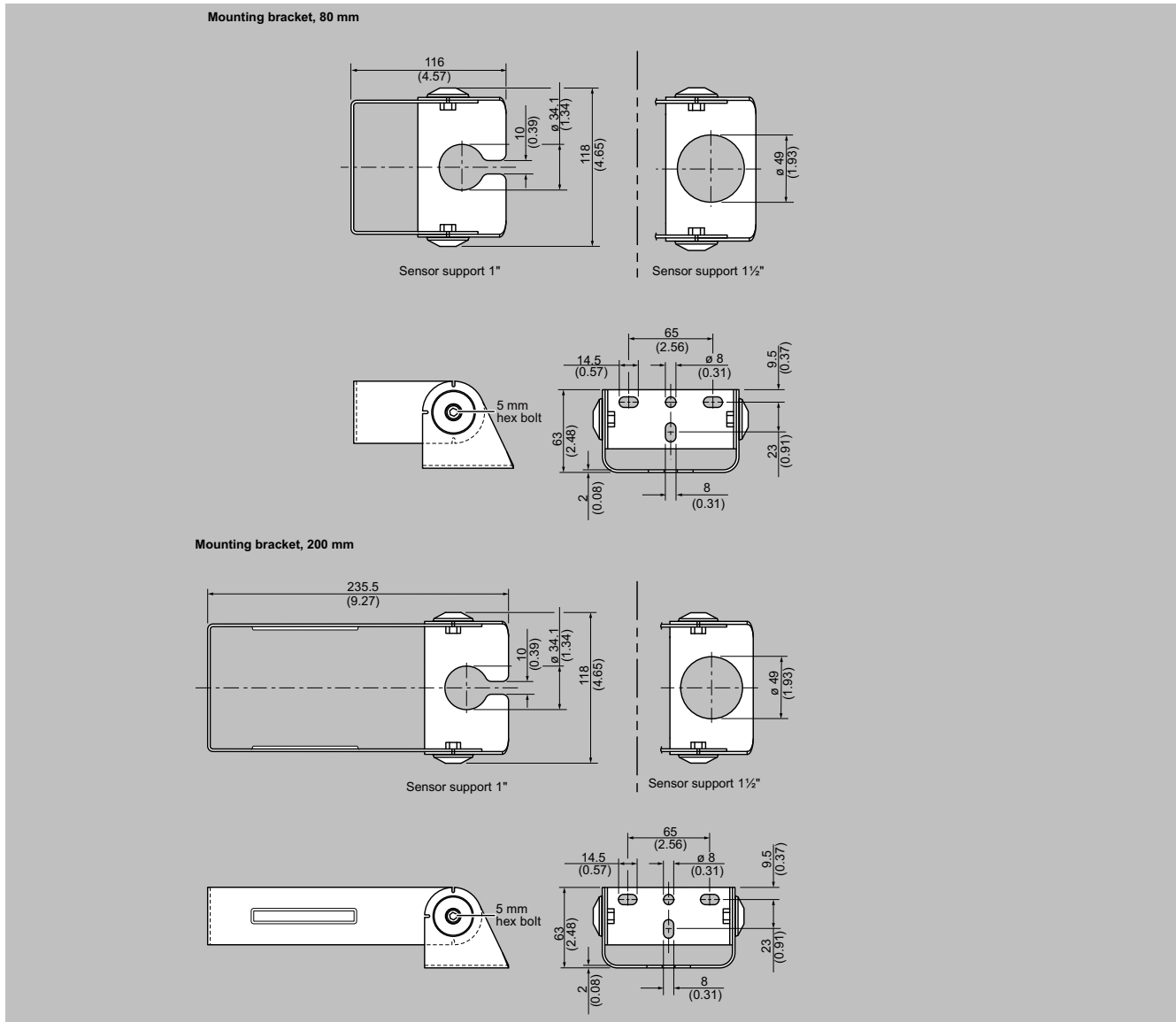
SITRANS LR110, dimensions in mm (inch)

Continuous level measurement

Radar level transmitters

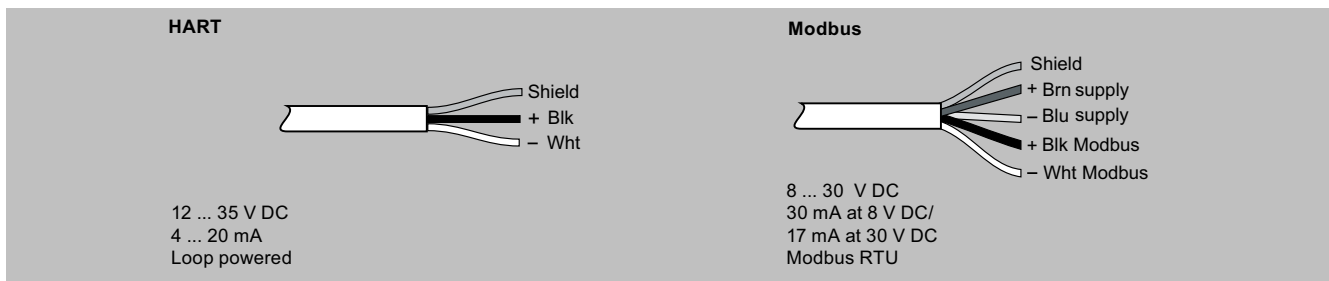
SITRANS LR110

Dimensional drawings (continued)



SITRANS LR110 mounting brackets, dimensions in mm (inch)

Circuit diagrams



SITRANS LR110 connections