Guided Wave Radar Transmitters

SITRANS LG200

Operating Instructions · 02/2011



SITRANS

SIEMENS

Safety Guidelines: Warning notices must be observed to ensure personal safety as well as that of others, and to protect the product and the connected equipment. These warning notices are accompanied by a clarification of the level of caution to be observed.

Qualified Personnel: This device/system may only be set up and operated in conjunction with this manual. Qualified personnel are only authorized to install and operate this equipment in accordance with established safety practices and standards.

Unit Repair and Excluded Liability:

- The user is responsible for all changes and repairs made to the device by the user or the user's agent.
- All new components are to be provided by Siemens Milltronics Process Instruments.
- Restrict repair to faulty components only.
- Do not reuse faulty components.

Warning: Cardboard shipping package provides limited humidity and moisture protection. This product can only function properly and safely if it is correctly transported, stored, installed, set up, operated, and maintained.
This product is intended for use in industrial areas. Operation of this equipment in a residential area may cause interference to several frequency based communications.

Note: Always use product in accordance with specifications.

Copyright Siemens AG 2011. All Rights Reserved	Disclaimer of Liability
This document is available in bound version and in electronic version. We encourage users to purchase authorized bound manuals, or to view electronic versions as designed and authored by Siemens Milltronics Process Instruments. Siemens Milltronics Process Instruments will not be responsible for the contents of partial or whole reproductions of either bound or electronic versions.	While we have verified the contents of this manual for agreement with the instrumentation described, variations remain possible. Thus we cannot guarantee full agreement. The contents of this manual are regularly reviewed and corrections are included in subsequent editions. We welcome all suggestions for improvement. Technical data subject to change.

MILLTRONICS® is a registered trademark of Siemens Milltronics Process Instruments.

Contact SMPI Technical Publications at the following address:
Technical Publications
Siemens AG
Siemens Milltronics Process Instruments
1954 Technology Drive, P.O. Box 4225
Peterborough, Ontario, Canada, K9J 7B1
Email: techpubs.smpi@siemens.com

European Authorized Representative

Siemens AG
Industry Sector
76181 Karlsruhe
Deutschland

- For a selection of Siemens Milltronics level measurement manuals, go to: **www. siemens.com/processautomation**. Under Process Instrumentation, select *Level Measurement* and then go to the manual archive listed under the product family.
- For a selection of Siemens Milltronics weighing manuals, go to: **www. siemens.com/processautomation**. Under Weighing Technology, select *Continuous Weighing Systems* and then go to the manual archive listed under the product family.

© Siemens AG 2011

Table of Contents

Safety Notes 1
Safety marking symbols 1
FCC Conformity 1
The Manual 2
Technical Support 2
Abbreviations and Identifications 3

SITRANS LG200 Overview 4
Model Chart 5

Specifications 7
Dimensions 19
SITRANS LG200 Enclosure 19

Installation 27
Pressure Equipment Directive, 97/23/EC 27
Mounting location 28
Nozzle design (mounting requirements) 28
Installation in non-metallic silos 28
Installation Instructions 29
General installation instructions 29
Installing the probe 30
Bulk Solids Probes 33
Installing the Transmitter 34

Wiring 35
Power 35
Connecting SITRANS LG200 35
Connecting HART 36
Wiring setups for hazardous area installations 37
1. General Purpose or Non-Incendive Wiring (Class I, Div. 2 Installations) 37
2. Intrinsically Safe Wiring 38
3. Explosion Proof Wiring 39
Instructions Specific to Hazardous Installations 39
General Probe Assembly Drawing for EEx d Applications 41

Quick Setup 42
Transmitter Display and Keypad 43

Operating via SIMATIC PDM 45
Functions in SIMATIC PDM 45
Features of SIMATIC PDM Rev. 6.0, SP2, HF1 (or higher) 45
Electronic Device Description (EDD) 45
Write Protection 45
Configuring a new device 46
Quick Start Wizard via SIMATIC PDM 47
Changing parameter settings using SIMATIC PDM 50
Parameters accessed via pull-down menus 51

Parameter Reference 57
Password Protection (Default = 0) 58

Hart Output 64

Appendix A: Alphabetical Parameter List 72

Appendix B: Troubleshooting 75

System Issues 75

Error Messages 76

Level Applications 79

Interface Applications 80

Appendix C: Technical Reference 81

Micropower Impulse Radar (MIR) 81

Time Domain Reflectometry (TDR) 81

Equivalent Time Sampling (ETS) 82

Interface Detection 82

Maximum Process Temperature Chart 83

Process Pressure/Temperature Derating Curves 84

Appendix D: Maintenance 85

Unit Repair and Excluded Liability 85

Appendix E: HART Communications 86

SIMATIC PDM 86

HART Device Description (EDD) 86

HART Communicator 375 Menu Structure 87

Appendix F: Intrinsically Safe Installation 91

Safety Notes

Special attention must be paid to warnings and notes highlighted from the rest of the text by grey boxes.

WARNING: relates to a caution symbol on the product, and means that failure to observe the necessary precautions can result in death, serious injury, and/or considerable material damage.

WARNING[1]: means that failure to observe the necessary precautions can result in death, serious injury, and/or considerable material damage.

Note: means important information about the product or that part of the operating manual.

Safety marking symbols

In manual	On product	Description
		Earth (ground) Terminal
		Protective Conductor Terminal
		(Label on product: yellow background.) WARNING: refer to accompanying documents (manual) for details.
		Caution: Observe electrostatic discharge precautions prior to handling the device local user interface and display within the wiring compartment.

FCC Conformity

US Installations only: Federal Communications Commission (FCC) rules

WARNING: Changes or modifications not expressly approved by Siemens Milltronics could void the user's authority to operate the equipment.

Notes:

- This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.
- This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference to radio communications, in which case the user will be required to correct the interference at his own expense.

1. This symbol is used when there is no corresponding caution symbol on the product.

The Manual

Notes:
- This product is intended for use in industrial areas. Operation of this equipment in a residential area may cause interference to several frequency based communications.
- Please follow the installation and operating procedures for a quick, trouble-free installation and to ensure the maximum accuracy and reliability of your SITRANS LG200.
- This manual applies to the SITRANS LG200 only.

This manual will help you set up your SITRANS LG200 for optimum performance. We always welcome suggestions and comments about manual content, design, and accessibility. Please direct your comments to techpubs.smpi@siemens.com.

For other Siemens Milltronics level measurement manuals, go to: www.siemens.com/level and click on **Instructions and Manuals** in the **More Info** list.

Technical Support

Support is available 24 hours a day.

To find your local Siemens Automation Office address, phone number, and fax number go to:

www.siemens.com/automation/partner

- Click on the tab **Contacts by Product** and then find your product group (**+Process Automation > +Process Instrumentation > +Level Measuring Instruments)**.
- Select the team **Technical Support.** Click **Next**.
- Click the appropriate continent, then select the country followed by the city. Click **Next**.

For on-line technical support go to:

www.siemens.com/automation/support-request

- Enter the device name (SITRANS LG200) or order number, then click on **Search**, and select the appropriate product type. Click **Next**.
- You will be prompted to enter a keyword describing your issue. Then either browse the relevant documentation, or click **Next** to email a detailed description of your issue to Siemens Technical Support staff.

Siemens A&D Technical Support Center: phone +49 180 50 50 222

fax +49 180 50 50 223

Abbreviations and Identifications

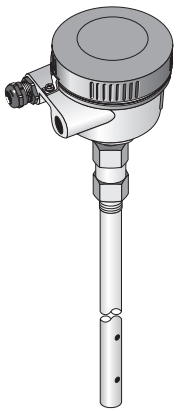
Short form	Long Form	Description	Units
CE / FM / CSA	Conformité Européenne / Factory Mutual / Canadian Standards Association	safety approval	
DCS	Distributed Control System	control room apparatus	
dK	dielectric constant		
ESD	Electrostatic Discharge		
HART	Highway Addressable Remote Transducer	Communication protocol	
IS	Intrinsically Safe	safety approval	
µs	microsecond	10^{-6}	s
PED	Pressure Equipment Directive	safety approval	
PV	Primary Variable	measured value	
SFF	Safe Failure Fraction		
SIL	Safety Integrity Level		
SV	Secondary Variable	equivalent value	

SITRANS LG200 Overview

SITRANS LG200 is a guided wave radar transmitter for short and medium range level, level/interface and volume measurement of liquids and solids. It is unaffected by changes in process conditions, high temperatures and pressures, and steam.

The device consists of an electronic enclosure coupled to a coaxial probe, single or twin solid rod, or flexible cable probes. LG200 can be configured to measure Level Only, Level and Volume, Interface, or Interface and Volume, depending on probe selection.

SITRANS LG200 supports HART[1] communication protocol, and SIMATIC PDM software.



Programming

SITRANS LG200 is very easy to install and configure using the 3 programing buttons on the device. You can also program the LG200 using the HART hand-held communicator, or using SIMATIC PDM via HART.

Applications

- liquids and slurries
- light solids including pellets, grain and powders

Approvals and Certificates

SITRANS LG200 is available with General Purpose approval, or with approvals for hazardous areas. For details, see page 18.

1. HART® is a registered trademark of the HART Communication Foundation

Model Chart

Model Names	Model Numbers	Reference Number
SITRANS LG200 Coaxial Probe	7ML1301-1xxxx-xxxx	7xA-x
SITRANS LG200 Coaxial HT/HP Probe	7ML1301-2xxxx-xxxx	7xD-x
SITRANS LG200 Coaxial HP Probe	7ML1301-3xxxx-xxxx	7xP-x
SITRANS LG200 Coaxial Overfill/ Flooded Cage Probe	7ML1301-4xxxx-xxxx	7xR-x
SITRANS LG200 Coaxial HT/HP Steam Probe	7ML1301-5xxxx-xxxx	7xS-x
SITRANS LG200 Coaxial Interface Probe	7ML1301-6xxxx-xxxx	7xT-x
SITRANS LG200 Twin Rod Probe	7ML1302-1xxxx-xxxx	7xB-x
SITRANS LG200 Flexible Twin Rod Probe for Bulk Solids	7ML1302-2xxxx-xxxx	7x5-x
SITRANS LG200 Flexible Twin Rod Probe	7ML1302-3xxxx-xxxx	7x7-x
SITRANS LG200 Single Rigid Rod Probe	7ML1303-1xxxx-xxxx	7xF-x
SITRANS LG200 Single Rigid Rod Probe, Sanitary	7ML1303-1Dxx-xxxx	7xF-E
SITRANS LG200 Single Rigid Rod Probe, PFA faced flange	7ML1303-1Exx-xxxx	7xF-F
SITRANS LG200 Single Rigid Rod Probe, PFA rod insulation	7ML1303-1Jxx-xxxx	7xF-4
SITRANS LG200 Single Rod HT/HP Probe	7ML1303-2xxxx-xxxx	7xJ-x
SITRANS LG200 Single Flexible Rod Probe	7ML1304-1xxxx-xxxx	7x1-x
SITRANS LG200 Single Flexible Rod Probe for Bulk Solids	7ML1304-2xxxx-xxxx	7x2-x
SITRANS LG200 Chamber Replacement Probe	7ML1305-1xxxx-xxxx	7xK-x

Notes

Specifications

Note: Siemens Milltronics makes every attempt to ensure the accuracy of these specifications but reserves the right to change them at any time.

Power (measured at device terminals)

⚠ 11 to 36 V DC (General Purpose/Intrinsically Safe/Explosion Proof

Performance (Level/Volume Models)

Reference operating conditions[1] according to reflection from water at +20 °C (+70 °F) with 1829 mm (72") coaxial probe (CFD threshold)

- operating temperature: -40 to +80 °C (-40 to +175 °F): General Purpose applications
  -40 to +70 °C (-40 to +160 °F): ATEX approved applications
- LCD temperature range: -20 to +70 °C (-5 to +160 °F)
- humidity: 0 to 99%, non-condensing

Measurement accuracy[2]

- linearity[3]: Coaxial/Twin Rod probes: <0.1% of probe length or 2.5 mm (0.1"), whichever is greater
  Single Rod probes: <0.3% of probe length or 7.6 mm (0.3"), whichever is greater
- measured error[3]: Coaxial/Twin Rod probes: ±0.1% probe length or 2.5 mm (0.1"), whichever is greater
  Single Rod probes: ±0.5% of probe length or 12.7 mm (0.5"), whichever is greater
- resolution: ±2.5 mm (0.1")
- repeatability: <2.5 mm (0.1")
- hysteresis: <2.5 mm (0.1")

Update time: < 1 second

Influence of amb. temperature: +0.02% of probe length/°C

Process dielectric effect: <7.6 mm (0.3") within selected range

1. Specifications will be lower with Model 7ML1302-1, 7ML1301-2, and 7ML1301-3 probes and/or Fixed threshold configuration.
2. If an electronics or probe replacement occurs, please ensure that any measurement is verified and that programming is adjusted accordingly. Failure to do so may mean accuracy falls outside of specification, and an adjustment by Siemens or Siemens authorized specialists may be necessary.
3. Top 610 mm (24") of Model 7ML1302-1 probe: 30 mm (1.2"). Specification for top 1.22 m (48") will be application dependent.

Performance (Interface Models)

Reference operating conditions according to reflection from liquid of selected dielectric at +20 °C (+70 °F) with 1829 mm (72") coaxial interface probe

- operating temperature: -40 to +80 °C (-40 to +175 °F): Gen. Purpose applications
  -40 to +70 °C (-40 to +160 °F): ATEX approved applications
- LCD temperature range: -20 to +70 °C (-5 to +160 °F)
- humidity: 0 to 99%, non-condensing

Measurement accuracy

- linearity[1]: <12.7 mm (0.5")
- measured error: Upper layer: ± 25.4 mm (1")
  Interface layer: ± 25.4 mm (1") (clean distinct interface required)
- resolution: ±2.5 mm (0.1")
- repeatability: <12.7 mm (0.5")
- hysteresis: <12.7 mm (0.5")

Update time: < 1 second

Influence of amb. temperature: +0.02% of probe length/°C

Upper layer dielectric: 1.4 to 5.0

Interface layer dielectric: >15

Electromagnetic compatibility[2]: Meets CE requirements (EN 61000-6-2/2001, 61000-6-4/2001)

Input

- measured variable: level, determined by time-of-flight of guided radar pulse from transmitter to product surface and back
- zero and span: 15 cm to 22.86 m (6" to 75 ft)
- user interface: 3 button menu-driven data entry and system security
- digital communication: HART Version 5.x compatible

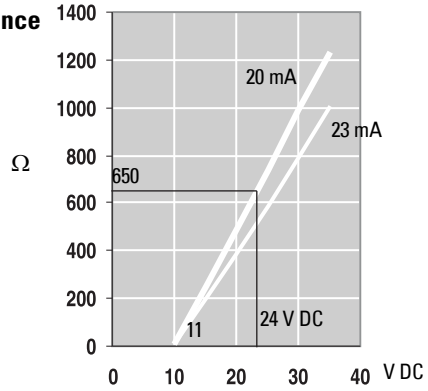
Output

- mA: Analog: 4 to 20 mA with HART digital signal
- range: Analog: 3.8 to 20.5 mA usable
- resolution: Analog: 0.01 mA
  Digital: 2.5 mm (0.1")
- start-up current: 4 mA

1. Top 610 mm (24") of Model 7ML1302-1 probe: 30 mm (1.2"). Specification for top 1.22 m (48") will be application dependent.
2. Single and Twin Rod probe versions should only be used in metallic vessels or stilling wells for compliance with CE regulations (where applicable)

- Loop resistance (max.) General Purpose/Intrinsically Safe/Explosion Proof: 650 Ω at 24 V DC

Loop Resistance



- Diagnostic alarm adjustable 3.6 mA, 22 mA, HOLD
- Damping Adjustable 0 to 10 seconds

Display (local)[1] 2-line, 8 character display

Mechanical

Enclosure

- construction aluminum, epoxy-coated
- conduit entry 2 x M20x1.5, or 2 x ½" NPT
- ingress protection Type 4/NEMA 4, IP65

Weight[2]

- transmitter with solid lid: 1.48 kg (2.83 lbs)
  with glass window lid: 1.60 kg (3.52 lbs)

Environmental

- location indoor/ outdoor
- altitude 2000 m (6562 ft) max.
- ambient temperature -40 to +80 °C (-40 to +175 °F)
- relative humidity Type 4/NEMA 4, IP65
- installation category II
- pollution degree 2

1. Display quality will be reduced in temperatures below –20 °C (–5 °F) and above +70 °C (+160 °F).
2. Probe weights are dependant on Type and Process Connection.

Probe specifications

	Coaxial Probe (7ML1301-1)	Coaxial HT/HP Probe (7ML1301-2)	Coaxial HP Probe (7ML1301-3)	Coaxial Overfill/ Flooded Cage Probe (7ML1301-4)
Model reference number	**7xA-x**	**7xD-x**	**7xP-x**	**7xR-x**
Recommended applications:	General purpose: clean, low viscosity liquids < +150 °C (+300 °F)	Clean, high temperature/high pressure liquids > +200 °C (+400 °F), ammonia, chlorine, LNG[1], LPG[1]	Clean, high pressure liquids < +200 °C (+400 °F), ammonia, chlorine, LNG, LPG	General applications, overfill, temperatures to +200 °C (+400 °F), clean, low viscosity liquids, displacer/ torque-tube replacement
Not recommended for:	Coating and buildup, foam	Coating and buildup, foam, steam	Coating and buildup, foam, steam	Coating and buildup, foam
Materials/ wetted parts	316 L SS, TFE spacers, O-ring[2]	316L SS, Alumina spacers[3] (option PEEK[4] or TFE[5]), Borosilicate	316L SS, TFE spacers, Borosilicate	316L SS, TFE spacers, O-ring[2]
Process seal	O-ring[2]	Borosilicate (no O-ring)	Borosilicate (no O-ring)	O-ring[2]
Rod/tube diameter:				
Standard	ø 8 mm (0.3125") rod ø 22 mm (0.875") tube	ø 8 mm (0.3125") rod ø 22 mm (0.875") tube	ø 8 mm (0.3125") rod ø 22 mm (0.875") tube	ø 8 mm (0.3125") rod ø 22 mm (0.875") tube
Enlarged	ø 15 mm (0.63") rod ø 45 mm (1.75") tube	ø 15 mm (0.63") rod ø 45 mm (1.75") tube	ø 15 mm (0.63") rod ø 45 mm (1.75") tube	ø 15 mm (0.63") rod ø 45 mm (1.75") tube
Process connection thread:				
Standard	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]
Enlarged	2" NPT [(Taper), ANSI/ASME B1.20.1]	2" NPT [(Taper), ANSI/ASME B1.20.1]	2" NPT [(Taper), ANSI/ASME B1.20.1]	2" NPT [(Taper), ANSI/ASME B1.20.1]
Flange ASME (EN/DIN):				
Standard	1 to 4" (DN 25 to 100)	1 to 4" (DN 25 to 100)	1 to 4" (DN 25 to 100)	1 to 4" (DN 25 to 100)
Enlarged	2 to 4" (DN 50 to 100)	2 to 4" (DN 50 to 100)	2 to 4" (DN 50 to 100)	2 to 4" (DN 50 to 100)
Length	60 to 610 cm (24 to 240")	60 to 610 cm (24 to 240")	60 to 610 cm (24 to 240")	60 to 610 cm (24 to 240")
Transition zone[6]: Top	25 mm (1") at dK = 1.4 150 mm (6") at dK = 80	none	25 mm (1") at dK = 1.4 150 mm (6") at dK = 80	none
Transition zone[6]: Bottom	150 mm (6") at dK = 1.4 25 mm (1") at dK = 80	150 mm (6") at dK = 1.4 25 mm (1") at dK = 80	150 mm (6") at dK = 1.4 25 mm (1") at dK = 80	150 mm (6") at dK = 1.4 25 mm (1") at dK = 80
Process temperature maximum	+150 °C at 27 bar g (+300 °F at 400 psi g)	+427 °C at 133 bar g (+800 °F at 2000 psi g)[7]	+200 °C at 379 bar g (+400 °F at 5500 psi g)	+200 °C at 18 bar g (+400 °F at 270 psi g)
Process temperature minimum	-40 °C at 70 bar g (-40 °F at 1000 psi g)	-196 °C at 430 bar g (-321 °F at 6250 psi g)	-196 °C at 430 bar g (-321 °F at 6250 psi g)	-40 °C at 70 bar g (-40 °F at 1000 psi g)
Process pressure maximum	70 bar g at +20 °C (1000 psi g at +70 °F)	431 bar gat +20 °C (6250 psi g at +70 °F)	431 bar gat +20 °C (6250 psi g at +70 °F)	70 bar g at +20 °C (1000 psi g at +70 °F)

Process pressure minimum/ vacuum service	Yes, not hermetic[8]	Yes, hermetic[8] ($<10^{-8}$ cc/sec at 1 atmosphere)	Yes, hermetic[8] ($<10^{-8}$ cc/sec at 1 atmosphere)	Yes, not hermetic[8]
Dielectric range	1.4 to 100	1.4 to 100[1]	1.4 to 100	1.4 to 100
Maximum viscosity (cP)				
Standard	500	500	500	500
Enlarged	1500	1500	1500	1500
Coating/buildup	No	No	No	No
Foam	No	No	No	No
Corrosives	Yes	Yes	Yes	Yes
Sanitary	No	No	No	No
Overfill	No	Yes	No	Yes

1. Dependent on spacer option
2. See *O-Ring and Seal Selection Guide* on page 17 for guidance
3. For dK ≥ 2, maximum temperature +427 °C (+800 °F)
4. For dK ≥ 1.4, maximum temperature +343 °C (+650 °F), PEEK spacers standard on enlarged coaxial design
5. For dK ? 1.4, maximum temperature +288 °C (+550 °F)
6. Transition zone is dielectric dependent: dK = dielectric permittivity. Unit will function but accuracy will decrease in Transition Zone
7. +345 °C (+650 °F) with PEEK spacers
8. Not hermetic: sealing by means of O-ring. Hermetic: sealing by means of borosilicate glass window

® Viton is a registered trademark of DuPont Dow Elastomers.

® Hastelloy is a registered trademark of Haynes International.

® Kalrez is a registered trademark of DuPont Dow Elastomers.

® Monel is a registered trademark of Special Metals Corporation.

	Coaxial Steam Probe (7ML1301-5)	Coaxial Interface Probe (7ML1301-6)	Single Rigid Rod Probe (7ML1303-1)	Single Rigid Rod HT/HP Probe (7ML1303-2)	Single Rigid Rod Probe, PFA rod insulation (7ML1303-1J)
Model reference number	**7xS-x**	**7xT-x**	**7xF-x**	**7xJ-x**	**7xF-4**
Recommended applications:	Hot water (steam) >+200 °C (+400 °F) (external chamber is required for use in boilers)	Liquid/liquid-interface, temperatures to +200 °C (+400 °F); clean, low-viscosity liquids	Coating and buildup, foam	Coating and buildup, foam	Excessive coating and buildup, foam
Not recommended for:	General purpose, coating and buildup, foam	Coating and buildup, foam	Low dielectric media (dK < 10)[1]	Low dielectric media (dK < 10)[1]	Low dielectric media (dK < 10)[1]
Materials/ wetted parts	316L SS, PEEK spacers, Aegis PF128 O-ring[2]	316L SS, TFE spacers, O-ring[2]	316L SS, TFE, O-ring[2]	316L SS, TFE, O-ring[2]	316L SS, PFA, TFE, O-ring[2]
Process seal	Aegis PF128 O-ring[2], PEEK only	O-ring[2]	O-ring[2]	Aegis PF128 O-ring only[2]	O-ring[2]
Rod/Tube diameter:					
Standard	ø 8 mm (0.3125″) rod ø 22 mm (0.875″) tube	ø 8 mm (0.3125″) rod ø 22 mm (0.875″) tube	ø 12 mm (0.5″) rod	ø 12 mm (0.5″) rod	ø 12 mm (0.5″) rod ø 16 mm (0.625″) insulation
Enlarged	N/A	ø 15 mm (0.63″) rod ø 45 mm (1.75″) tube	N/A	N/A	N/A
Process connection thread:					
Standard	¾″ NPT [(Taper), ANSI/ASME B1.20.1], G 1″ [(BSPP), EN ISO 228-1]	¾″ NPT [(Taper), ANSI/ASME B1.20.1], G 1″ [(BSPP), EN ISO 228-1]	¾″ NPT [(Taper), ANSI/ASME B1.20.1], G 1″ [(BSPP), EN ISO 228-1]	¾″ NPT [(Taper), ANSI/ASME B1.20.1], G 1″ [(BSPP), EN ISO 228-1]	2″ NPT [(Taper), ANSI/ASME B1.20.1], G 2″ [(BSPP), EN ISO 228-1]
Enlarged	N/A	2″ NPT [(Taper), ANSI/ASME B1.20.1]	N/A	N/A	N/A
Flange ASME (EN/DIN):					
Standard	1 to 4″ (DN 25 to 100)	1 to 4″ (DN 25 to 100)	2 to 4″ (DN 50 to 100)	2 to 4″ (DN 50 to 100)	2 to 4″ (DN 50 to 100)
Enlarged	N/A	2 to 4″ (DN 50 to 100)	N/A	N/A	N/A
Length	60 to 455 cm (24 to 180″)	60 to 610 cm (24 to 240″)	60 to 610 cm (24 to 240″)	60 to 610 cm (24 to 240″)	60 to 610 cm (24 to 240″)
Transition zone[3]: **Top**	25 mm (1″) at dK ≥ 10	none	Application, installation, and dielectric dependent	Application, installation, and dielectric dependent	Application, installation, and dielectric dependent
Transition zone[3]: **Bottom**	25 mm (1″) at dK ≥ 10	150 mm (6″) at dK = 1.4 25 mm (1″) at dK = 80	25 mm (1″) at dK >10	25 mm (1″) at dK >10	25 mm (1″) at dK >10

Process temperature maximum	+343 °C at 165 bar g (+650 °F at 2400 psi g) (saturated steam)	+200 °C at 18 bar g (+400 °F at 270 psi g)	+150 °C at 27 bar g (+300 °F at 400 psi g)	+316 °C at 165 bar g (+605 °F at 2400 psi g)	+150 °C at 27 bar g (+300 °F at 400 psi g)
Process temperature minimum	-40 °C at 207 bar g (-40 °F at 3000 psi g)	-40 °C at 70 bar g (-40 °F at 1000 psi g)	-40 °C at 70 bar g (-40 °F at 1000 psi g)	-40 °C at 70 bar g (-40 °F at 1000 psi g)	-40 °C at 50 bar g (-40 °F at 750 psi g)
Process pressure maximum	165 bar g at +343 °C (2400 psi g at +650 °F)	70 bar g at +20 °C (1000 psi g at +70°F)	70 bar g at +20 °C (1000 psi g at +70 °F)	207 bar g at +20 °C (3000 psi g at +70 °F)	70 bar g at +20 °C (1000 psi g at +70 °F)
Process pressure minimum/ vacuum service	Yes, not hermetic	Yes, not hermetic	Not suitable	Not suitable	Not suitable
Dielectric range	10 to 100	Upper liquid layer 1.4 to 5 Interface liquid layer 15 to 100	1.9 to 100[1]	1.9 to 100[1]	1.9 to 100[1]
Maximum viscosity					
Standard	500 cP	500 cP	10000 cP (consult factory if severe agitation/turbulence)		
Enlarged	N/A	1500 cP			
Coating/ buildup	No	No	Yes, maximum error 10% of coated length;% error related to dielectric of media, thickness of coating and coated probe length above media		
Foam	No	No	Yes	Yes	Yes
Corrosives	Yes	Yes	Yes	Yes	Yes
Sanitary	No	No	No	No	No
Overfill	Yes	Yes	No	No	No

1. With dK of 1.9 to 10, the device must be mounted between 50 and 150 mm (2 to 6") of metal tank wall or in chamber/bridle
2. See *O-Ring and Seal Selection Guide* on page 17 for guidance
3. Transition zone is dielectric dependent: dK = dielectric permittivity. Unit will function but accuracy wll decrease in Transition Zone

	Single Rigid Rod Probe, Sanitary (7ML1303-1D)	Single Rigid Rod Probe, PFA faced flange(7ML1303-1E)	Single Flexible Rod Probe (7ML1304-1)	Single Flexible Rod Probe for Bulk Solids (7ML1304-2)
Model reference number	**7xF-E**	**7xF-F**	**7x1-x**	**7x2-x**
Recommended applications:	Applications demanding sanitary specifications	Extreme corrosives, coating/buildup, foam	Coating and buildup, foam; lengths > 6 m (20 ft) headroom	Granular bulk solids applications (powders, grain, dust) 3000 lb pull down force
Not recommended for:	Low dielectric media (dK < 10)[1]	Low dielectric media (dK < 10)[1]	Low dielectric media (dK < 4)	Solids with dK < 4
Materials/ wetted parts	316L SS, TFE, 15 µ-inch (<0.4 µm) R_a	All PFA - wetted surfaces	316L SS, TFE, O-ring[2]	316L SS, TFE, O-ring[2]
Optional	AL6XN SS	N/A	N/A	N/A
Process seal	316L SS, TFE, O-ring[2]	PFA, no O-ring	O-ring[2]	Sealant
Rod/tube diameter	ø 12 mm (0.5") rod	ø 12 mm (0.5") rod ø 16 mm (0.625") insulation	ø 5 mm (0.188") cable	ø 6 mm (0.25") cable
Process connection thread	N/A	N/A	2" NPT [(Taper), ANSI/ ASME B1.20.1], G 2" [(BSPP), EN ISO 228-1]	2" NPT [(Taper), ANSI/ ASME B1.20.1], G 2" [(BSPP), EN ISO 228-1]
Flange ASME (EN/DIN)	19 to 100 mm (¾ to 4") Triclover-style 16 amp fitting	2 to 4" (DN 50 to 100)	2 to 4" (DN 50 to 100)	2 to 4" (DN 50 to 100)
Length	60 to 610 cm (24 to 240")	60 to 610 cm (24 to 240")	1 to 22.5 meters (3 to 75 ft)	1 to 22.5 meters (3 to 75 ft)
Transition zone[3]: Top	Application, installation, and dielectric dependent	Application, installation, and dielectric dependent	Application, installation, and dielectric dependent	Application, installation, and dielectric dependent
Transition zone[3]: Bottom	25 mm (1") at dK >10	25 mm (1") at dK >10	305 mm (12")	305 mm (12")
Process temperature maximum	+150 °C at 5.1 bar g (+300 °F at 75 psi g)	+150 °C at 27 bar g (+300 °F at 400 psi g)	+150 °C at 27 bar g (+300 °F at 400 psi g)	+66 °C at 3.4 bar g (+150 °F at 50 psi g)
Process temperature minimum	0 °C at 5.1 bar g (+32 °F at 75 psi g)	-40 °C at 13.7 bar g (-40 °F at 200 psi g)	-40 °C at 70 bar g (-40 °F at 1000 psi g)	-40 °C at 3.4 bar g (-40 °F at 50 psi g)
Process pressure maximum	5.1 bar g at +150 °C (75 psi g at +300 °F)	70 bar g at +20 °C (1000 psi g at +70°F)	70 bar g at +20 °C (1000 psi g at +70 °F)	3.4 bar g +66 °C (50 psi g at +150 °F)
Process pressure minimum/ vacuum service	Not suitable for vacuum applications			
Dielectric range	1.9 to 100[1]	1.9 to 100[1]	4 to 100[1]	4 to 100
Maximum viscosity (cP)	10000 (consult factory if severe agitation/turbulence)			N/A
Coating/buildup	Yes, maximum error 10% of coated length;% error related to dielectric of media, thickness of coating and coated probe length above media			

Foam	Yes	Yes	Yes	Yes
Corrosives	No	Yes	No	No
Sanitary	Yes	No	No	No
Overfill	No	No	No	No

1. With dK of 1.9 to 10, the device must be mounted between 50 and 150 mm (2 to 6") of metal tank wall or in chamber/bridle
2. See *O-Ring and Seal Selection Guide* on page 17 for guidance
3. Transition zone is dielectric dependent: dK = dielectric permittivity. Unit will function but accuracy wll decrease in Transition Zone

	Twin Rod Probe (7ML1302-1)	Flexible Twin Rod Probe (7ML1302-3)	Flexible Twin Rod Bulk Solids Probe (7ML1302-2)
Model reference number	**7xB-x**	**7x7-x**	**7x5-x**
Recommended applications:	General purpose, foam, minor film coating	Low dielectric media (1.9 to 10) with lengths > 6 m (20 ft)	Granular light bulk solids applications (powders, grains, dust), 3000 lbs pull-down force
Not recommended for:	Media bridging between rods or building up on spacers	Dielectric > 10: media bridging on flexible elements	Media bridging flexible elements
Materials/wetted parts	316L SS, TFE spacers, O-ring[1]	316L SS, FEP webbing, O-ring[1]	316L SS, FEP webbing, O-ring[1]
Process seal	O-ring[1]	O-ring[1]	Sealant
Rod/tube diameter	Two, ø 12 mm (0.5") rod; 22 mm (0.875") C_L to C_L	Two, ø 6 mm (0.25") cables; 22 mm (0.875") C_L to C_L	Two, ø 6 mm (0.25") cables; 22 mm (0.875") C_L to C_L
Process connection thread	2" NPT [(Taper), ANSI/ASME B1.20.1], G 2" [(BSPP), EN ISO 228-1]	2" NPT [(Taper), ANSI/ASME B1.20.1], G 2" [(BSPP), EN ISO 228-1]	2" NPT [(Taper), ANSI/ASME B1.20.1], G 2" [(BSPP), EN ISO 228-1]
Flange ASME (EN/ DIN)	2 to 4" (DN 50 to 100)	2 to 4" (DN 50 to 100)	2 to 4" (DN 50 to 100)
Length	60 to 610 cm (24 to 240")	1 to 22.5 m (3 to 75 ft)	1 to 22.5 m (3 to 75 ft)
Transition zone[2]: **Top**	150 mm (6") at dK > 1.9 Blocking distance: none	150 mm (6") at dK > 1.9 Blocking distance: 12 to 50 cm (4.8 to 20")	150 mm (6") at dK > 1.9 Blocking distance: 12 to 50 cm (4.8 to 20")
Transition zone[2]: **Bottom**	150 mm (6") at dK = 1.9 25 mm (1") at dK = 80	305 mm (12")	305 mm (12")
Process temperature max.[3]	+200 °C at 19 bar g (+400 °F at 275 psi g)		+66 °C at 3.4 bar g (+ 150 °F at 50 psi g)
Process temperature min.	-40 °C at 70 bar g (-40 °F at 1000 psi g)		-40 °C at 3.4 bar g (-40 °F at 50 psi g)
Process pressure max.	70 bar g at +20 °C (1000 psi g at +70 °F)		3.4 bar g at +66 °C (50 psi g at + 150 °F)
Process pressure min./vacuum service	Yes, not hermetic		Not suitable
Dielectric range	1.9 to 100	1.9 to 100	1.9 to 100
Maximum viscosity (cP)	1500	1500	Not suitable
Coating/buildup	Yes, maximum error 3% of coated length with conductive media Bridging not recommended.[4]		
Foam	Yes	Yes	Yes
Corrosives	Yes	No	Yes
Sanitary	No	No	No
Overfill	No	No	No

1. See *O-Ring and Seal Selection Guide* on page 17 for guidance
2. Transition zone is dielectric dependent: dK = dielectric permittivity. Unit will function but accuracy will decrease in Transition Zone
3. Refer to Ambient Temperature vs Process Temperature graphs or instruction manual
4. Bridging is defined as continuous accumulation of material between the probe elements

O-Ring and Seal Selection Guide

Material	Recommended for Use in:	Not Recommended for Use In:
Viton GFLT	General purpose, steam, ethylene	Ketones (MEK, acetone), skydrol fluids, amines, anhydrous ammonia, low molecular weight esters and ethers, hot hydrofluoric or chlorosulfuric acids, sour HCs
EPDM	Acetone, MEK, skydrol fluids	Petroleum oils, di-ester base lubricants, propane, steam, anhydrous ammonia
Kalrez (4079)	Inorganic and organic acids (including HF and nitric) aldehydes, ethylene, glycols, organic oils, silicone oils, vinegar, sour HCs	Black liquor, hot water/steam, hot aliphatic amines, ethylene oxide, propylene oxide, molten sodium, molten potassium, anhydrous ammonia
Aegis PF128	Inorganic and organic acids (including HF and nitric) aldehydes, ethylene, glycols, organic oils, silicone oils, vinegar, sour HCs, steam, amines, ethylene oxide, propylene oxide	Black liquor, Freon 43, Freon 75, Galden, KEL-F liquid, molten sodium, molten potassium, anhydrous ammonia
Borosilicate (HT/HP probes only)	General high temperature/high pressure applications, hydrocarbons, full vacuum (hermetic), anhydrous ammonia	Steam, hot alkaline solutions, HF acid, media with pH>12, condensate

Approvals

Note: The device nameplate lists the approvals that apply to your device.

North America

- General Purpose and Intrinsically Safe
  CSA/FM Class I, Div. 1, Groups A, B, C, and D; Class II, Div. 1, Groups E, F, and G T4, Class III
- Non-Incendive
  CSA Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups E, F, G; FM Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups F, G
- Explosion Proof
  CSA/FM Class I, Div. 1, Groups B, C, and D; Class II, Div. 1, Groups E, F, and G, T4; Class III
- Non-Incendive
  CSA Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups E, F, G; FM Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups F, G

Europe

- General Purpose and Intrinsically Safe
  ATEX II 1G EEx ia IIC T4
- Explosion Proof
  ATEX II 1/2 GD EEx d [ia] IIC T6
- Non-sparking
  ATEX II 3G EEx nA II/EEx nA (nL) IIC T4 to T6

Safety Integrity Level (SIL)

Further information can be found in SITRANS LG200 Functional Safety Manual: 7ML19985LC01.

SIL-1

- Transmitter 7ML1300-xxAxx-xxxx Safe Failure Fraction (SFF) = 85.5%

SIL-2

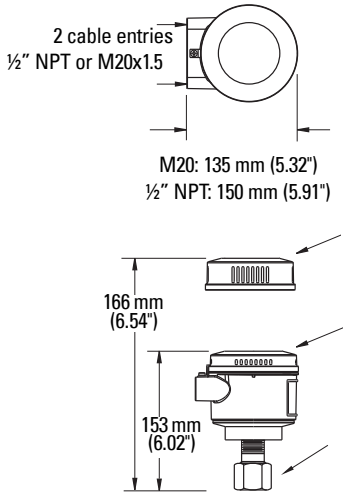
- Transmitter 7ML1300-xxBxx-xxxx Safe Failure Fraction (SFF) = 91%

! WARNING: Measured media inside vessel must be non-flammable only. If media inside vessel is flammable, the explosion proof version is required.

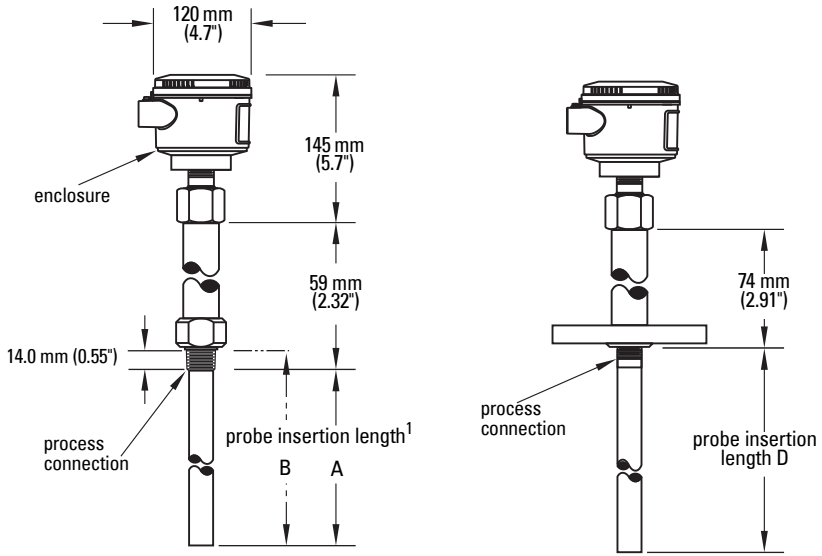
Dimensions

Note: Threaded process connections/dimensions are NPT unless otherwise stated.

SITRANS LG200 Enclosure

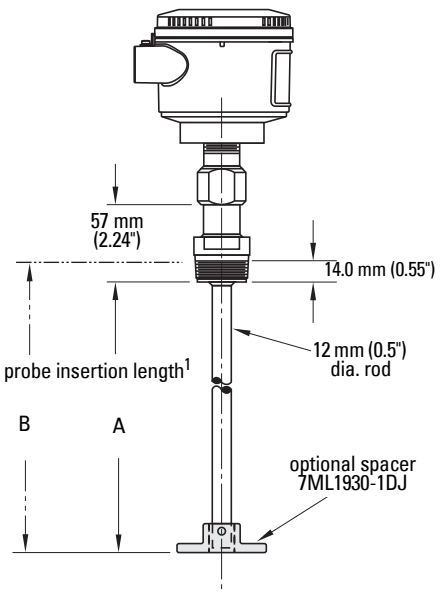


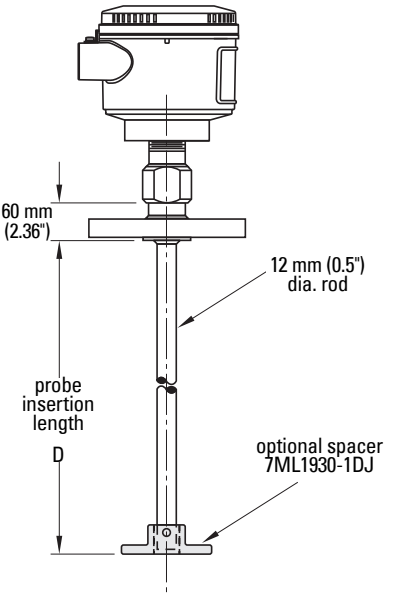
Model 7ML1301-1 (7xA-x) Coaxial Probe, Threaded and Flanged Connection



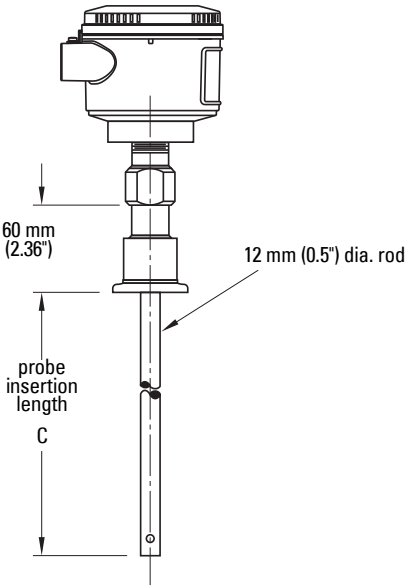
1. Dependant on process connection. See "Probe Connections and Insertion Lengths" on page 26.

Model 7ML1303-1 (7xF-x) Single Rod Probe, Threaded and Flanged Connection



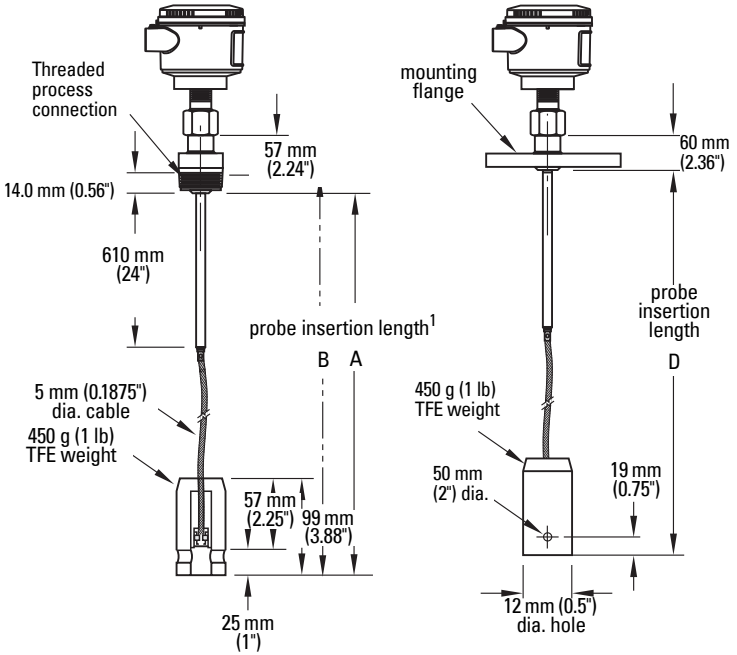


Model 7ML1303-1D (7xF-E) Probe, Sanitary Connection

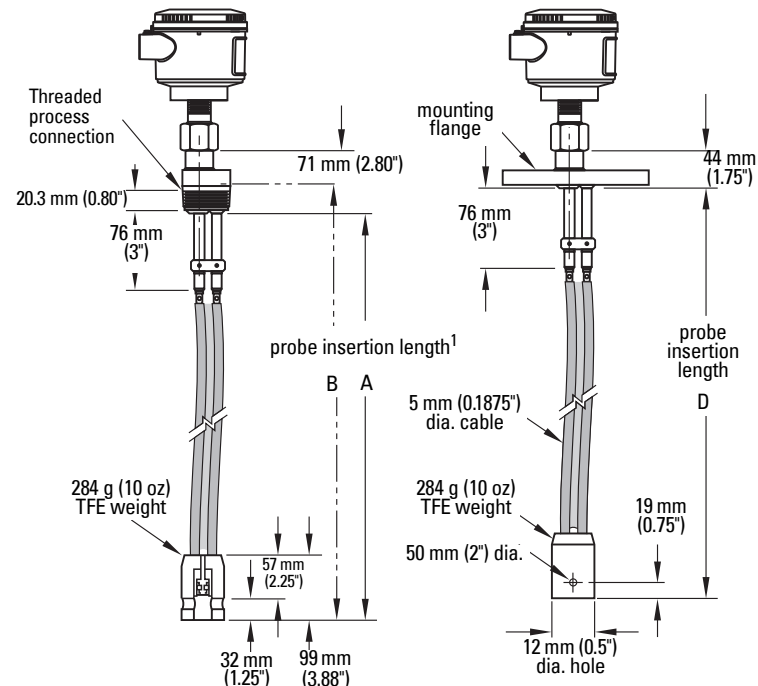


1. Dependant on process connection. See "Probe Connections and Insertion Lengths" on page 26.

Model 7ML1304-1 (7x1-x) Flexible Probe Threaded or Flanged Connection

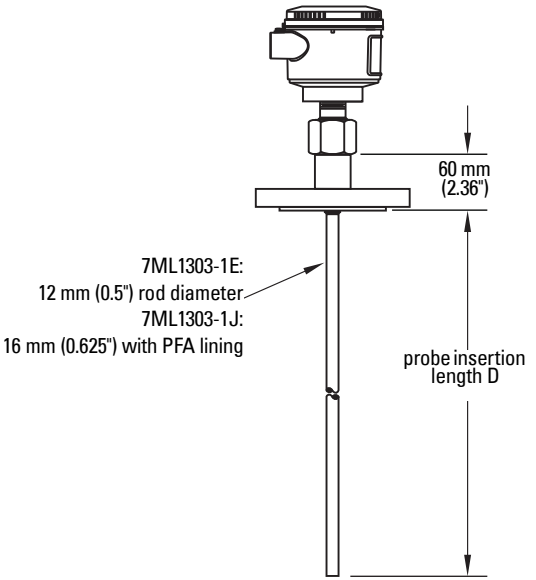


Model 7ML1302-3 (7x7-x) Twin Rod Flexible Probe, Threaded or Flanged Connection

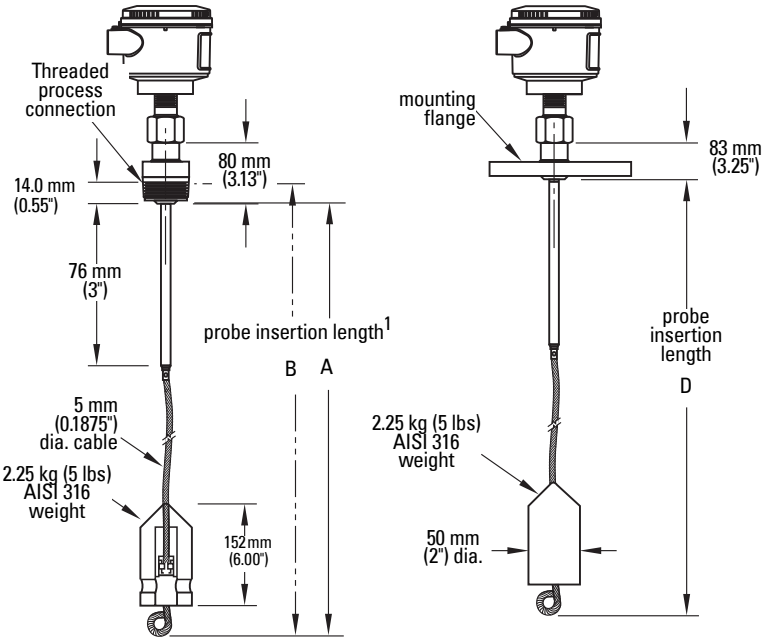


1. Dependant on process connection. See "Probe Connections and Insertion Lengths" on page 26.

Model 7ML1303-1E (7xF-F) Probe, Flat-Faced Flanged Connection

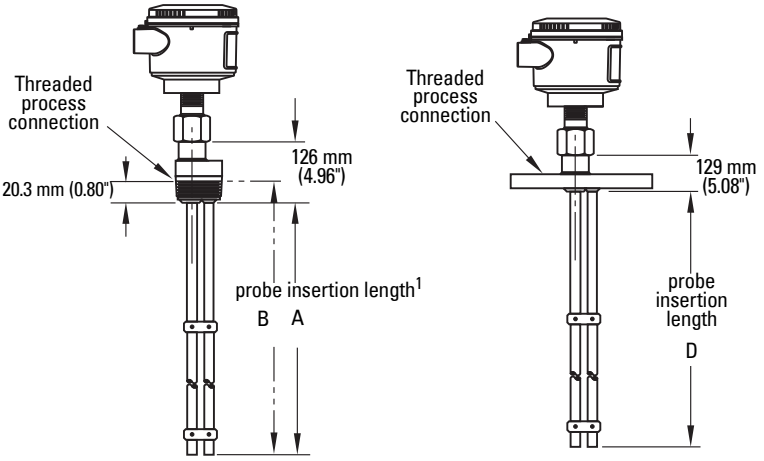


Model 7ML1304-2 (7x2-x) Bulk Solids Flexible Probe, Threaded or Flanged Connection

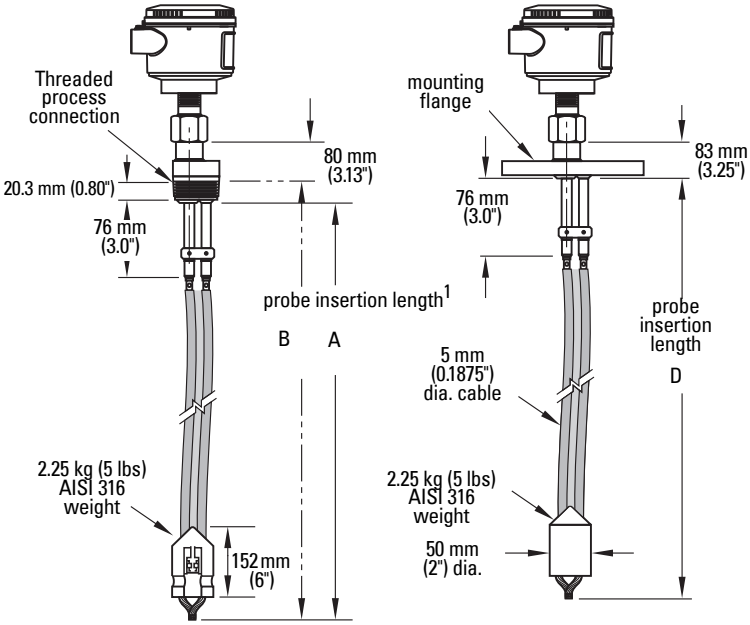


1. Dependant on process connection. See "Probe Connections and Insertion Lengths" on page 26.

Model 7ML1302-1 (7xB-x) Twin Rod Probe, Threaded and Flanged Connection

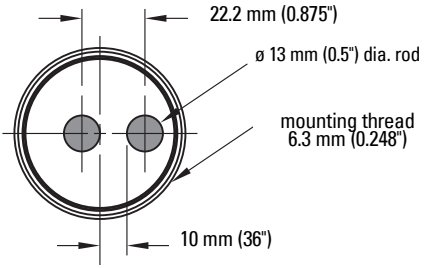


Model 7ML1302-2 (7x5-x) Twin Rod Bulk Solids Flexible Probe, Threaded or Flanged Connection

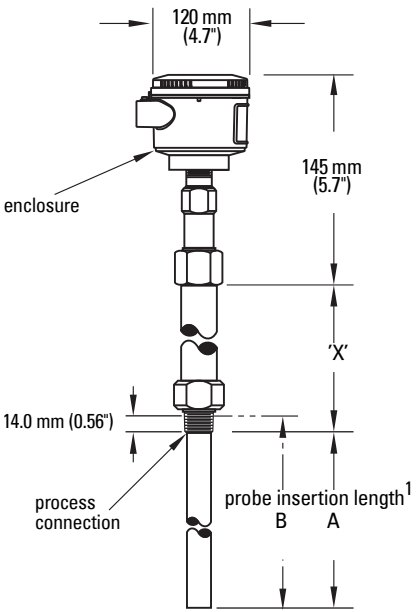


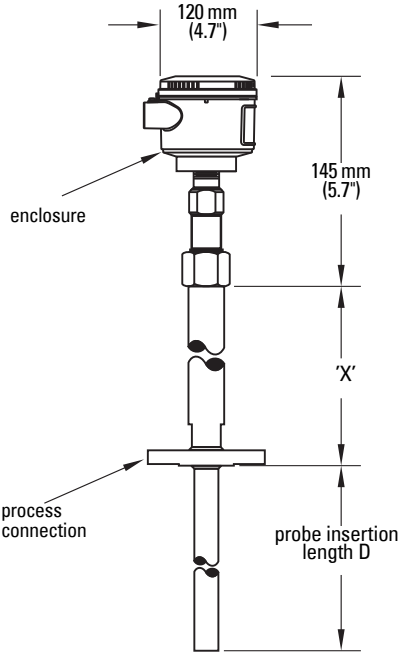
1. Dependant on process connection. See "Probe Connections and Insertion Lengths" on page 26.

Twin Rod Probe, End View



Model 7ML1301-2 (7xD-x), 7ML1301-3 (7xP-x), 7ML1301-4 (7xR-x), 7ML1301-6 (7xT-x) Probe, Threaded or Flanged Connection



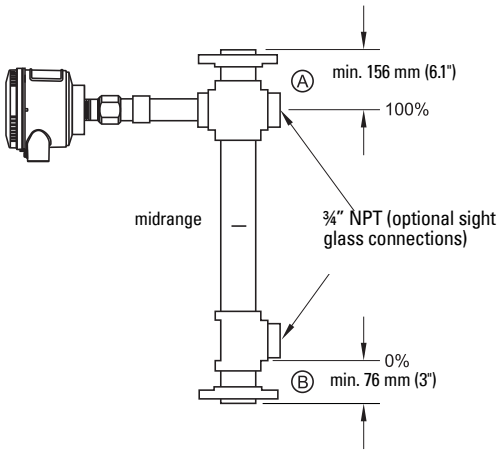


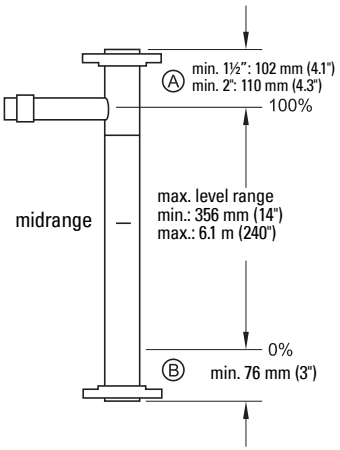
Probes	'X' Dimension (NPT)	'X' Dimension (Flanged)
7ML1301-2 (Coaxial HT/HP Probe)	217 mm (8.55")	277 mm (10.91")
7ML1301-3 (Coaxial HP Probe)	106 mm (4.18")	166 mm (6.54")
7ML1301-4 (Coaxial Overfill/Flooded Cage Probe), 7ML1301-6 (Coaxial Interface Probe)	150 mm (5.89")	167 mm (6.57")
7ML1301-5 (Coaxial HT/HP Steam Probe)	180 mm (7.10")	242 mm (9.52")

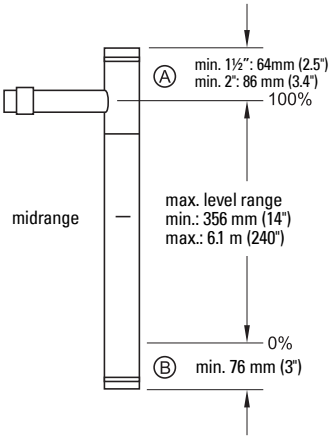
Note: Refer to the Model Number chart on page 5 to cross-reference the reference number appearing on the probe to the actual Probe model number

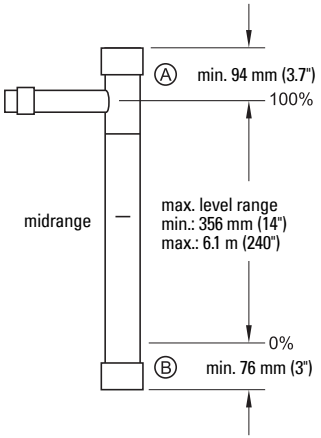
1. Dependant on process connection. See "Probe Connections and Insertion Lengths" on page 26.

Model 7ML1305-1 Chamber Replacement Probe



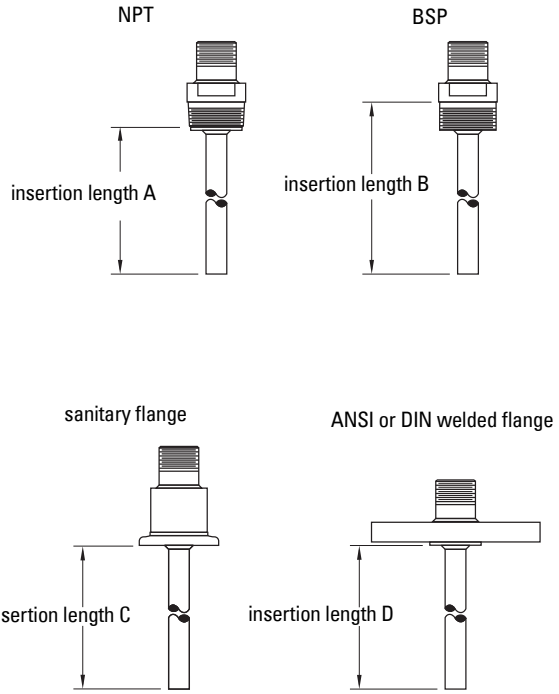






Probe Connections and Insertion Lengths

(Note BSP connections differ from NPT)



! WARNINGS:

- **Installation shall only be performed by qualified personnel and in accordance with local governing regulations.**
- **SITRANS LG200 is to be used only in the manner outlined in this manual, otherwise protection provided by the device may be impaired.**
- **Never attempt to loosen, remove, or disassemble process connection or instrument housing while vessel contents are under pressure.**
- **The Model 7ML1301-2, 7ML1301-4 or 7ML1301-6 overfill probes should be used for Shutdown/Overfill applications. All other Guided Wave Radar probes should be installed so the maximum overfill level is a minimum of 150 mm (6") below the process connection. This may include using a nozzle or spool piece to raise the probe. Consult factory to ensure proper installation.**
- **Materials of construction are chosen based on their chemical compatibility (or inertness) for general purposes. For exposure to specific environments, check with chemical compatibility charts before installing.**
- **The user is responsible for the selection of bolting and gasket materials which will fall within the limits of the flange and its intended use and which are suitable for the service conditions.**
- **Improper installation may result in loss of process pressure.**

Notes:

- For European Union and member countries, installation must be according to ETSI EN 302372.
- Refer to the device nameplate for approval information.

Pressure Equipment Directive, 97/23/EC

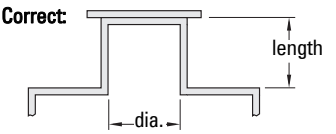
Siemens Milltronics level transmitters with flanged, threaded, or sanitary clamp type process mounts have no pressure-bearing housing of their own and, therefore, do not come under the Pressure Equipment Directive as pressure accessories, (see EU Commission Guideline 1/8).

Mounting location

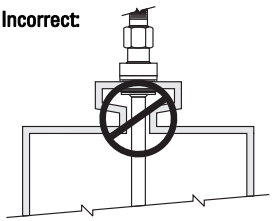
Notes:
- Each SITRANS LG200 is built to match the specific physical specification of the required installation. Make sure the probe connection is correct for the threaded or flanged mounting on the vessel or tank where the transmitter will be placed.
- Make sure that the wiring between the power supply and LG200 transmitter is complete and correct for the type of installation.

! WARNING: Do not place insulating material around any part of the SITRANS LG200 transmitter including the probe flange as this may cause excessive heat buildup.

Nozzle design (mounting requirements)



- Single Rod:
  1. Do not mount in nozzles <50 mm (2") in diameter.
  2. Mount in applications where ratio of diameter:length is 1:1 or greater. Any ratio less than 1:1 (ie: a 2"x6" nozzle = 1:3) may require a blocking distance and/or dielectric adjustment.
  3. Do not use pipe reducers.
  4. Keep conductive objects away from probe to ensure proper performance.



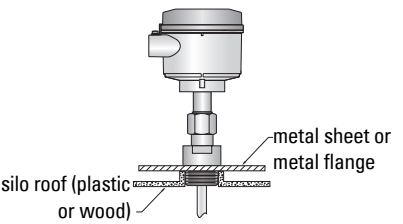
- Twin rod:
  1. Active rod must be mounted at least 25 mm (1") away from any obstructions.
  2. Minimum stillwell or nozzle diameter for probe is 76 mm (3").

Installation in non-metallic silos[1]

For installation in vessels of a non-metallic construction or possibly open vessels, a suitable launch plate is required to optimize the impedance of the transmitted signal as it travels along the probe. Optimal performance cannot be guaranteed if a suitable transition is not available at the process connection.

When using single rod versions (flexible or solid) and a threaded process connection, a metal sheet or flange will greatly improve conditions as this provides a suitable launch plate.

A flanged process connection is generally accepted to be provision of this launch plate.



1. Single and Twin Rod probe versions should only be used in metallic vessels or stilling wells for compliance with CE regulations (where applicable).

Installation Instructions

! WARNING: Do not disassemble probe when in service and under pressure.

High Level or Overfill Applications:
- The Model 7ML1301-2, 7ML1301-4 or 7ML1301-6 overfill probes should be used for Shutdown/Overfill applications.
- All other Guided Wave Radar probes should be installed so the maximum overfill level is a minimum of 150 mm (6") below the process connection. A nozzle can raise the probe to the appropriate level. Consult factory to ensure proper installation.

Recommended equipment and tools

- Open-end wrenches or adjustable wrench to fit the process connection size and type. Coaxial probe 1½" (38 mm), twin rod probe 1-7/8" (47 mm), transmitter 1½" (38 mm). A torque wrench is preferred.
- Flat-blade screwdriver
- Digital multimeter or digital volt/ammeter
- 24 V DC power supply, 23 mA

General installation instructions

CAUTION: Do not place insulating material around any part of the SITRANS LG200 transmitter including the probe flange as this may cause excessive heat buildup.

Before installation, ensure that:

- Probe Type, Process Connection Type and Length are known (examine nameplate and *Probe specifications* on page 10 for information needed)
- Probe has adequate room for installation and has unobstructed entry to the bottom of the vessel. The Model 7ML1301-2 (High Temp./High Pressure) probe, Model 7ML1301-3 (High Pressure) probe, Model 7ML1301-4 (Overfill) probe, Model 7ML1301-5 (Steam) probe and Model 7ML1301-6 (Interface) probe require added clearance.
- Process temperature, pressure, dielectric, and viscosity are within the probe specifications for the installation.
- Handle Model 7ML1301-2 (High Temperature/High Pressure) probes with extra care.

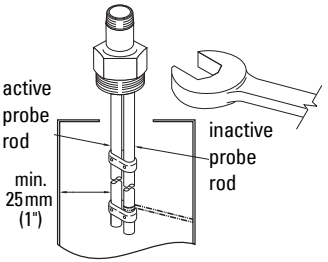
Note: Do not use sealing compound or TFE tape on probe connection to transmitter as this connection is sealed with a Viton® O-ring.

Installing the probe

Coaxial probe

1. Make sure the process connection is at least ¾" NPT or a flanged mounting.
2. Carefully place the probe into the vessel. Align the gasket on flanged installations.
3. Align the probe process connection with the threaded or flanged mounting on the vessel.
4. For threaded connections, tighten the hex nut of the probe process connection. For flanged connections, tighten flange bolts.

Twin Rod Probe (Rigid)



1.Make sure the process connection is at least 2" NPT or a flanged mounting.

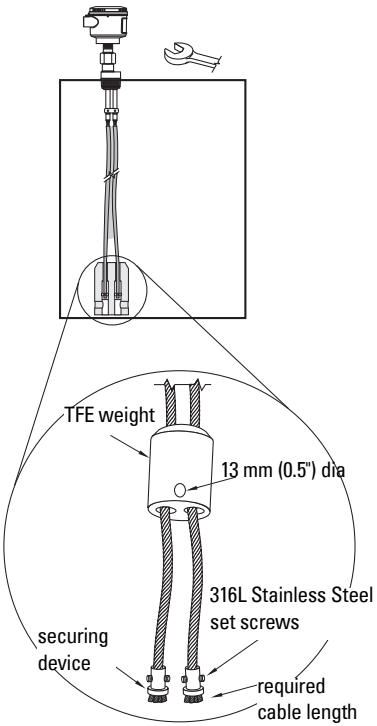
2.Make sure that there is at least 25 mm (1") spacing between the active probe rod and any part of the tank (walls, still-well, pipes, support beams, mixer blades, etc.). Minimum stillwell or nozzle diameter for Twin Rod probe is 80 mm (3").

3.Carefully place the probe into the vessel. Align the gasket on flanged installations.

4.Align the probe process connection with the threaded or flanged mounting on the vessel.

5. For threaded connections, tighten the hex nut of the probe process connection. For flanged connections, tighten flange bolts.
6. Probe can be stabilized by attaching the inactive probe rod to vessel.

Twin Rod Probe (Flexible for liquids)



1.Make sure the process connection is at least 2" NPT or a flanged mounting.

2.Make sure that there is at least 25 mm (1") spacing between the active probe rod and any part of the tank (walls, still-well, pipes, support beams, mixer blades, etc.). Minimum stillwell diameter for Twin Rod probe is 76 mm (3").

3.Carefully place the probe into the vessel. Align the gasket on flanged installations.

4.Align the probe process connection with the threaded or flanged mounting on the vessel.

5.For threaded connections, tighten the hex nut of the probe process connection. For flanged connections, tighten flange bolts.

6.Probe can be shortened in the field:

a. Raise the weight to expose the two securing devices.
b. Loosen the two #10-32 set screws on both securing devices using a 3/32" (2.5 mm) hex wrench and slide the securing devices off of the probe.
c. Slide the TFE weight off of the probe.
d. Cut and remove the required cable length.
e. Remove 89 mm (3½") of the rib between the two cables.
f. Strip 16 mm (5/8") of coating from the two cables.
g. Slide the TFE weight back on to the probe.
h. Reattach securing device and tighten screws.
i. Enter new probe length (inches or cm) in length parameter after transmitter is connected.

Single Rigid Rod Probe

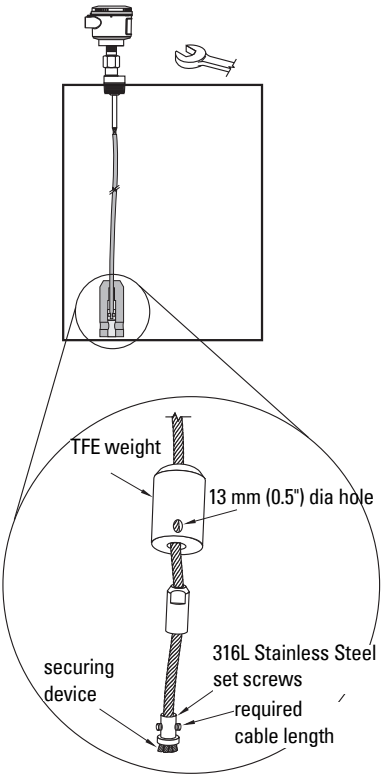
1. Make sure the process connection is at least 2" NPT or a flanged mounting.
2. Carefully place the probe into the vessel. Align the gasket on flanged installations.
3. Align the probe process connection with the threaded or flanged mounting on the vessel.
4. For threaded connections, tighten the hex nut of the probe process connection. For flanged connections, tighten flange bolts.

5. Probe can be stabilized by placing into a non-metallic cup or bracket at the bottom of the probe. A TFE bottom spacer (7ML1930-1DJ) is optional for mounting into a metallic cup or bracket.

Note: Do not use sealing compound to TFE tape on probe connection to transmitter as this connection is sealed with a Viton® O-ring.

Single Rod Probe Clearance Guidelines

Distance to Probe (nominal)	Acceptable Objects
< 150 mm (6")	Continuous, smooth, parallel conductive surface. Probe must not touch tank wall
>150 mm (6")	<25 mm (1") diameter pipe and beams, ladder rungs
> 300 mm (12")	<75 mm (3") diameter pipes and beams, concrete walls
> 450 mm (18")	All remaining objects



Single Flexible Rod Probe

1.Make sure the process connection is at least 2" NPT or a flanged mounting.
2.Carefully place the probe into the vessel. Align the gasket on flanged installations.
3.Align the probe process connection with the threaded or flanged mounting on the vessel.
4.For threaded connections, tighten the hex nut of the probe process connection. For flanged connections, tighten flange bolts.
5.Probe can be shortened in field:
a.Raise TFE weight exposing securing device.
b.Loosen both #10–32 set screws using 2.5 mm (0.1") hex wrench and remove securing device.
c.Cut and remove needed cable length.
d.Reattach securing device and tighten screws.
e.Enter new probe length (inches or cm) in length parameter.
Probe can be attached to the tank bottom using the 13 mm (0.50") diameter hole provided in the TFE weight.

Cable tension should not exceed 20 lbs.

Bulk Solids Probes

Installation Guidelines (Models 7ML1304-2, 7ML1302-2)

The Model 7ML1304-2 and 7ML1302-2 Bulk Solids probes are designed for a 1360 kg (3000 lb) pull-down force for use in applications such as sand, plastic pellets and grains. It is offered with a maximum 22 m (75 ft) probe length.

Model 7ML1304-2 Flexible Single Rod — to be mounted in applications with a dk≥ 4

Model 7ML1302-2 Flexible Twin Rod — dielectric dk ≥ 1.9

Applications:

Plastic pellets, sugar: dk≥ 1.9 to 2.0

Grains, seeds, sand: dk ≥ 2.0 to 3.0

Salts: dk≥ 4.0 to 7.0

Metallic powder, coal dust: dk> 7.0

Mounting Recommendations

1. Use a weight instead of securing the probe to the vessel.
2. Mount probe at least 12" (305 mm) from the wall. Ideal location is 1/4 to 1/6 the diameter to average the angel of repose.
3. A metal flange must be used when mounting on plastic vessels.

Installing Model 7ML1302-2 bulk solids flexible twin rod probe

1. Make sure the process connection is at least 2" NPT or a flanged mounting.
2. Make sure that there is at least 25 mm (1") spacing between the active probe rod and any part of the tank (walls, stillwell, pipes, support beams, mixer blades, etc.). Minimum stillwell diameter for Twin Rod probe is 76 mm (3").
3. Carefully place the probe into the vessel. Align the gasket on flanged installations.
4. Align the probe process connection with the threaded or flanged mounting on the vessel.
5. For threaded connections, tighten the hex nut of the probe process connection. For flanged connections, tighten flange bolts.



Probe can be shortened in the field:

a.Loosen and remove the two cable clamps.
b.Slide the weight off of the probe.
c.Cut the cable to the required length.
d.Remove 305 mm (12") of the rib between the two cables.
e.Strip 152 mm (6") of coating from the two cables.
f.Slide the weight back on to the probe.
g.Reinstall the two cable clamps and tighten.
h.Enter the new probe length (inches or cm) in software.

Installing Model 7ML1304-2 bulk solids flexible single rod probe

1. Make sure the process connection is at least 2" NPT or a flanged mounting.
2. Carefully place the probe into the vessel. Align the gasket on flanged installations.

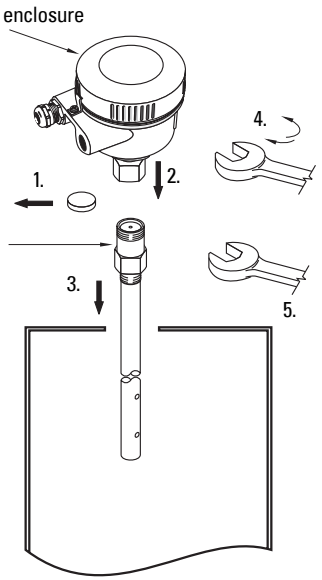
3. Align the probe process connection with the threaded or flanged mounting on the vessel.
4. For threaded connections, tighten the hex nut of the probe process connection. For flanged connections, tighten flange bolts.



Probe can be shortened in the field:

a.Loosen and remove the two cable clamps.
b.Slide the weight off of the probe.
c.Cut the cable to the required length plus 162 mm (6.38").
d.Slide the weight back on to the probe.
e.Reinstall the two cable clamps and tighten.
f.Enter the new probe length (inches or cm) in software.

Installing the Transmitter



1.Remove the protective plastic cap from the top of the probe. Put the cap in a safe place in case the transmitter has to be removed later.
2.Place the transmitter on the probe. Be careful not to bend or dirty the gold, high frequency (male) connector.
3.Align the universal connection at the base of the transmitter housing with the top of the probe. Hand tighten the connection.
4.Rotate the transmitter to face the most convenient direction for wiring, configuration, and viewing.
5.When the transmitter is facing the desired direction, use a 38 mm (1½") wrench to tighten the universal connection on the transmitter to 15 ft-lbs. A torque wrench is highly recommended. This is a critical connection. **DO NOT LEAVE HAND TIGHT.**

Power

WARNINGS:

- **Installation shall only be performed by qualified personnel and in accordance with local governing regulations.**
- **All HART versions of SITRANS LG200 transmitter operate at voltages of 11 to 36 V DC at the device terminals. Higher voltage will damage the transmitter.**

Note: Use shielded twisted pair cable 0.5 to 1 mm² (AWG 22 to 18), recommended but not needed when wired as per NAMUR NE 21 for field strengths up to 10 V/m.

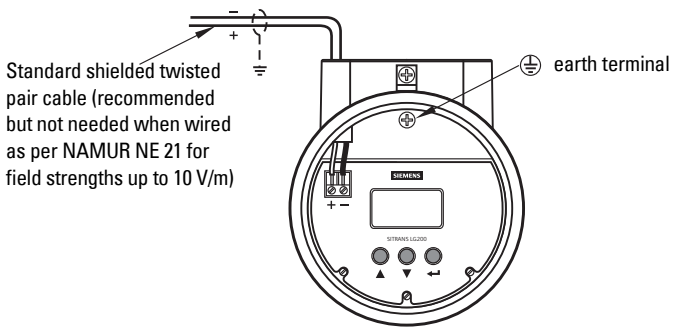
Connecting SITRANS LG200

WARNING: Check the nameplate on your instrument, to verify the approval rating.

Within the transmitter enclosure, connections are made to the terminal blocks and the ground connectors. The wiring instructions for the LG200 transmitter depend on the application:

- General Purpose or Non-incendive (Class I, Div. 2)
- Intrinsically Safe
- Explosion Proof

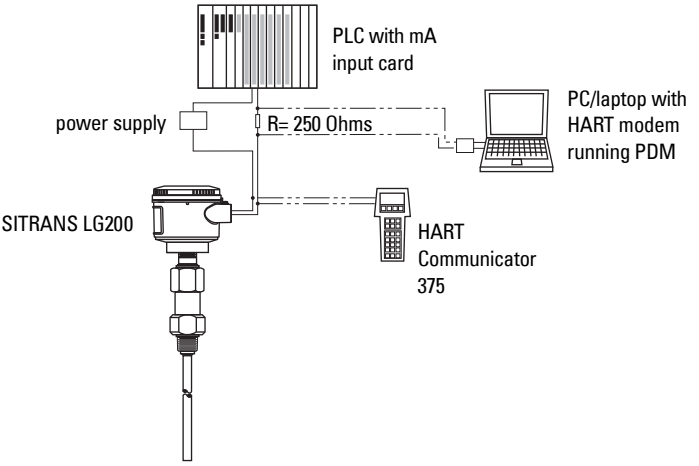
WARNING: Explosion hazard. Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.



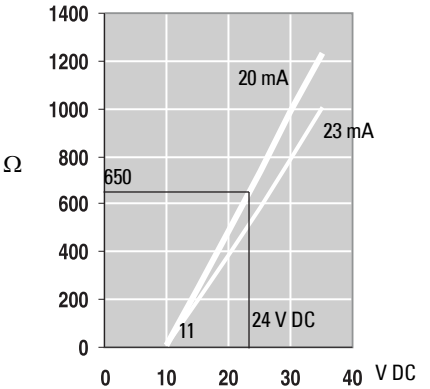
Connecting HART

- **Typical PLC/mA configuration with HART**

Notes:
- For error-free communication via the HART protocol, a 250 Ohm resistor may be required if the loop resistance is less than 250 Ohms.
- Only one HART communication device should be inserted in the loop.

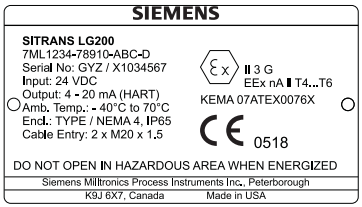


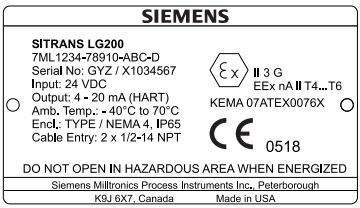
Loop Voltage versus Loop Resistance

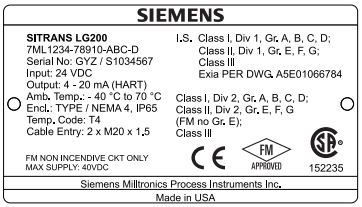


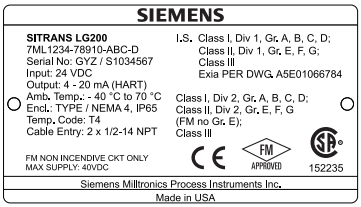
Wiring setups for hazardous area installations

1. General Purpose or Non-Incendive Wiring (Class I, Div. 2 Installations)









A general purpose installation does not have flammable media present. Areas rated non-incendive (Class I, Div. 2) have flammable media present only under abnormal conditions. Observe electrical data below:

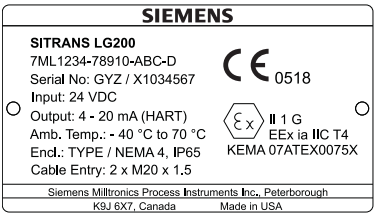
Note:

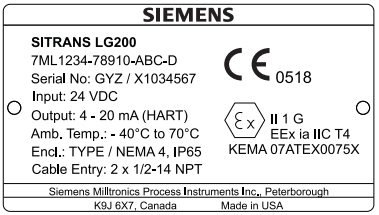
- Electrical data for SITRANS LG200 Level Transmitter Model 7ML1300-1Axx1-xEA0: Supply/output circuit: 11 - 36 V DC, 4 - 20 mA

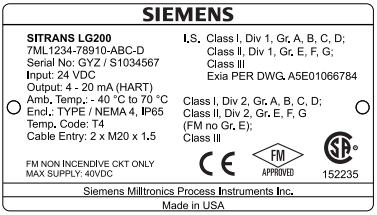
! WARNING: If flammable media is contained in the vessel, the transmitter must be installed per Class I, Div. 1 ATEX II 1/2 GD EEx d [ia] (Explosion Proof) standards of area classification.

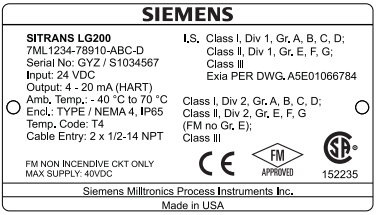
1. Unscrew and remove the enclosure lid.
2. Install a cable gland in the conduit entry. Use PTFE tape/sealant to ensure a liquid-tight connection.
3. Install a conduit fitting and feed the supply wires into the SITRANS LG200 through the conduit entry.
4. Connect shield to an earth ground at power supply.
5. Connect an earth ground wire to the nearest green ground screw.
6. Connect the positive supply wire to the (+) terminal and the negative supply wire to the (-) terminal.
7. Replace the enclosure lid.

2. Intrinsically Safe Wiring









An intrinsically safe (IS) installation potentially has flammable media present. An approved IS barrier must be installed in the non-hazardous (safe) area. Observe electrical data below:

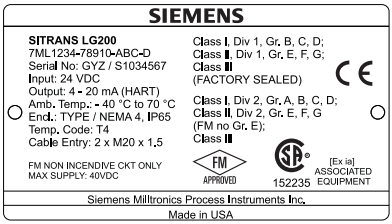
Note:

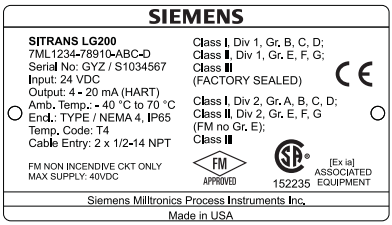
- Electrical data for SITRANS LG200 Level Transmitter Model 7ML1300-1Axx1-xCA0: Output/supply circuit (terminals + and -):
  in type of protection intrinsic safety EEx ia IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:
  Ui = 28,4 V; Ii = 94 mA; Pi = 0,67 W; Ci = 2,2 nF; Li = 3 µH. or
- Electrical data in type of protection intrinsic safety EEx ia IIC, only for connection to a certified intrinsically safe circuit, with the following maximum values:
  Ui = 28,4 V; Ii = 94 mA; Pi = 0,67 W; Ci = 3 nF; Li = 3 µH.

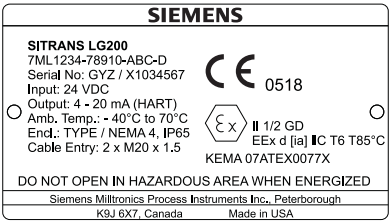
! WARNING: If flammable media is contained in the vessel, the transmitter must be installed per Class I, Div. 1 ATEX II 1/2 GD EEx d [ia] (Explosion Proof) standards of area classification.

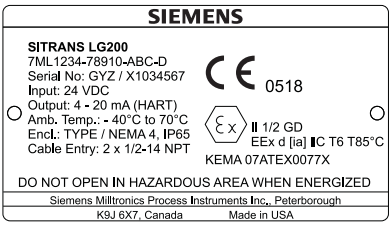
1. Install a suitable IS barrier in the non-hazardous (safe) area. Complete the wiring from the barrier to the SITRANS LG200 transmitter. (refer to local plant or facility procedures)
2. Unscrew and remove the enclosure lid.
3. Install a cable gland in the conduit entry. Use PTFE tape/sealant to ensure a liquid-tight connection.
4. Install a conduit fitting and feed the supply wires into the SITRANS LG200 through the conduit entry.
5. Connect shield to an earth ground at power supply.
6. Connect an earth ground wire to the nearest green ground screw.
7. Connect the positive supply wire to the (+) terminal and the negative supply wire to the (-) terminal.
8. Replace the enclosure lid.

3. Explosion Proof Wiring









Explosion Proof (XP) is a method of designing equipment for installation in hazardous areas. A hazardous location is an area in which flammable gases or vapors are, or may be, present in the air in quantities sufficient to produce explosive or ignitable mixtures. The wiring for the transmitter must be contained in Explosion Proof conduit extending into the safe area.

In North American applications, due to the specialized design of the SITRANS LG200 transmitter, no Explosion Proof conduit fitting is required within 457 mm (18") of the transmitter. An Explosion Proof conduit fitting is required between the hazardous and safe areas.

In European applications, an Ex d gland is required at the conduit connection of the transmitter.

1. Install Explosion Proof conduit from the safe area to the conduit connection of the SITRANS LG200 transmitter (refer to local plant or facility procedures).
2. Remove the cover to the wiring compartment of the transmitter.
3. Connect shield to an earth ground at the power supply.
4. Connect the positive supply wire to the (+) terminal and the negative supply wire to the (-) terminal.
5. Replace the enclosure lid before applying power.

Instructions Specific to Hazardous Installations

For KEMA 07ATEX0075 X:

Special conditions for safe use:

Because the enclosure of the Guided Wave Radar Level Transmitter SITRANS LG200 Model 7ML1300-1xxx1-xCA0 and/or Probe Model 7..-….-... is made of aluminium, if it is mounted in an area where the use of category 1 G apparatus is required, it must be

installed such, that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.

For applications in explosive atmospheres caused by gases, vapors or mists and where category 1G apparatus is required, electrostatic charges on the non-metallic parts of the Probe Model 7ML1302-2 (7x5), Model 7ML1302-3 (7x7), and Model 7ML1303 (7xF) shall be avoided.

Routine tests

A routine voltage test, in accordance with EN 50020 Clause 10.6, shall be conducted on each Guided Wave Radar Level Transmitter SITRANS LG200 Model 7ML1300-1xxx1-xCA0 between the output/supply circuits and the base of the unit using a test voltage of 500 V AC during one minute.

For KEMA 07ATEX0076 X:

Special conditions for safe use:

For applications in explosive atmospheres caused by gases, vapors or mists and where category 1G apparatus is required, electrostatic charges on the non-metallic parts of the Probe Model 7ML1302-2 (7x5), Model 7ML1302-3 (7x7), and Model 7ML1303 (7xF) shall be avoided.

For KEMA 07ATEX0077 X:

Installation instructions

- For use in potentially explosive atmospheres of flammable gases, fluids or vapors:

The cable entry devices and the closing elements of unused apertures shall be of a certified flameproof type, suitable for the conditions of use and correctly installed.

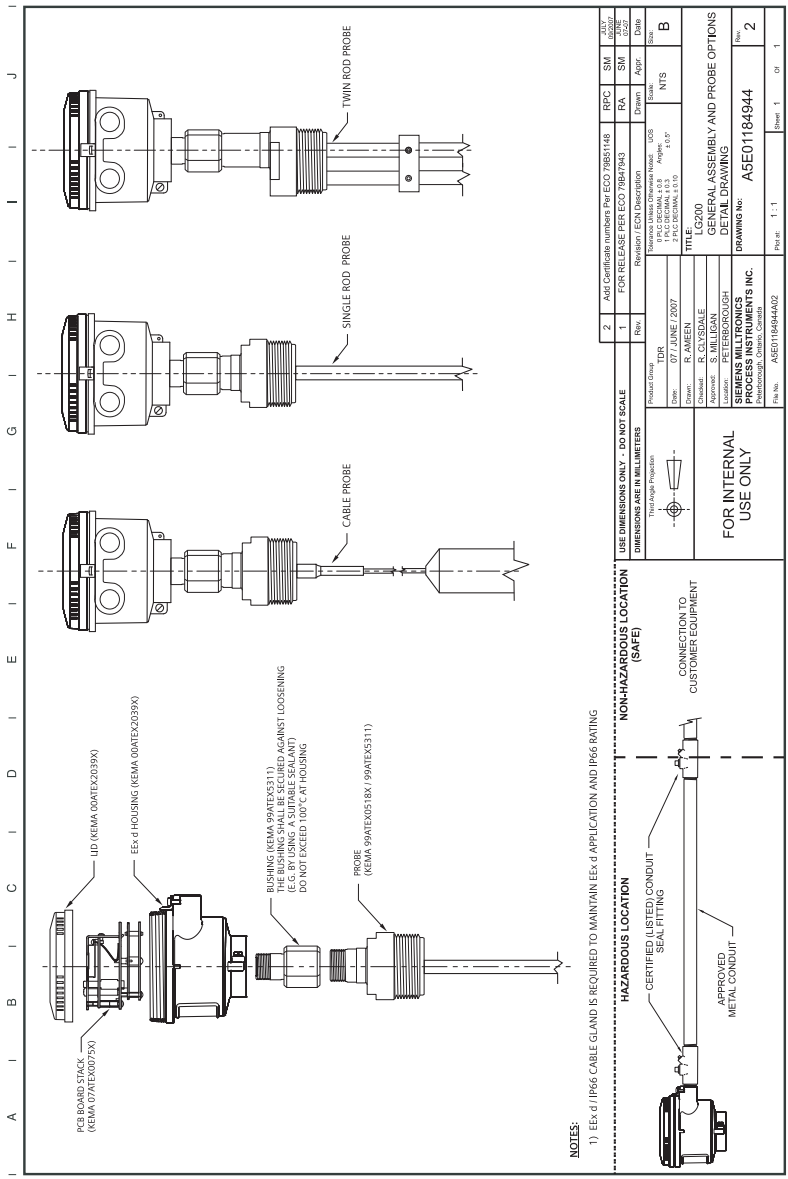
- For use in the presence of combustible dust:

The cable entry devices and the closing elements of unused apertures shall be of a certified flameproof type, suitable for the conditions of use and correctly installed. The minimum ingress protection requirement of IP 65 according to EN 60529 must be satisfied.

Special conditions for safe use

For applications in explosive atmospheres caused by gases, vapors or mists and where category 1G apparatus is required, electrostatic charges on the non-metallic parts of the Probe Model 7ML1302-2 (7x5), Model 7ML1302-3 (7x7), and Model 7ML1303 (7xF) shall be avoided.

General Probe Assembly Drawing for EEx d Applications

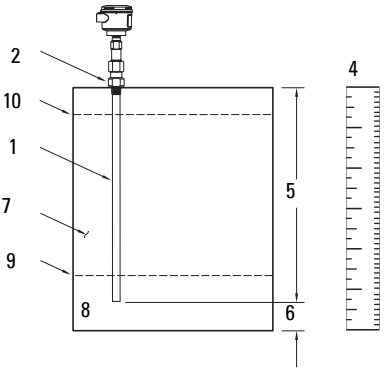


Quick Setup

WARNINGS:

- **Installation shall only be performed by qualified personnel and in accordance with local governing regulations.**
- **All HART versions of SITRANS LG200 transmitter operate at voltages of 11 to 36 V DC at the device terminals. Higher voltage will damage the transmitter.**

To program the Quick Start parameters, it is important to know the following information (space is left for recording the values):



1. Probe Model [See Probe Nameplate (7MLxxxx-x) (7xX) for details]: _____

2. Probe Mounting Type NPT, BSP, or flanged [use part number to establish Probe Mount type (NPT and BSP differ in insertion length)]: _____

3. Measurement Type (level only, volume, interface level, or interface level and volume): _____

4. Level Units (inches, centimeters, feet, meters): _____

5. Probe Length [listed on model information at top of probe(Note Y01 = xxx cm)]: _____

6. Level Offset (desired level reading when liquid is at the end of the probe): _____

7. Dielectric (dielectric constant range of process medium, upper layer dielectric for interface applications): _____

8. Loop Control (Is output current to be controlled by level or volume?): _____

9. Set 4.0 mA[1] (What is the reference point for the 4.0 mA value?): _____

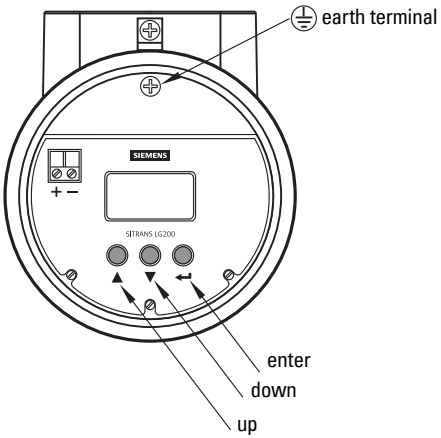
10. Set 20 mA[1] (What is the reference point for the 20.0 mA value?): _____

1. For more information, see page 65.

Quick Start Programming

1. Power up the LG200 transmitter. The display changes every 2 seconds to show one of four values: **Status**, **Level**, **%Output**, and **Loop current**. See *Run Mode Display Options* on page 57 for more information about each display option.
2. Remove the cover of the electronics.
3. Use Down (▼) arrow key to move from one step of the configuration program to the next.
4. Press the Enter (↵)arrow key. The last character in the first line of the display changes to an exclamation point (!).
5. Use Up or Down Arrow keys ▲▼ to increase or decrease the value in the display or to scroll through the choices.
6. Press the Enter (↵) arrow to accept a value and move to the next step of the configuration process (the default password is 0).
7. To return to RUN mode, scroll to the display parameters (*Status*).
8. After entering the last value, allow 10 seconds before removing power from the transmitter (save function).

Transmitter Display and Keypad



The SITRANS LG200 transmitter has a liquid crystal display (LCD) capable of showing two lines of 8 characters each. Transmitter measurements and configuration menu screens are shown on the LCD.

The transmitter default display is the measurement screen. It cycles every 2 seconds to display **STATUS**, **LEVEL**, ***%OUT***, and **LOOP** information. See *Run Mode Display Options* on page 57 for more information about each display option. The transmitter defaults to this display after 5 minutes if no keystrokes are sensed.

The keypad has three arrows used to scroll through the displays and to calibrate the transmitter: Up and Down Arrow (▲▼) keys and the Enter (↵) key.

Function of Keys in RUN and PROGRAM Mode

Up and Down Keys: 

In RUN mode, these keys move forward and backward from one display to another.

In PROGRAM mode, these keys increase or decrease the value displayed and move to the next choice. Hold the Arrow Key for rapid scrolling.

Enter Key: 

In RUN mode, press Enter to switch to PROGRAM mode (shows an exclamation point ! as the last character in the top display line).

In PROGRAM mode, press ENTER to accept a value and move to the next step of the programming.

Operating via SIMATIC PDM

Notes:
- SITRANS LG200 supports SIMATIC PDM version 6.0 and above.
- Some special features are only available in PDM Version 6.0 SP2 and above.
- For a complete list of parameters with instructions, see *Parameter Reference* on page 57.

SIMATIC PDM is a software package used to commission and maintain SITRANS LG200 and other process devices. Please consult the operating instructions or online help for details on using SIMATIC PDM. (You can find more information at www.fielddevices.com: go to **Products and Solutions > Products and Systems > Communications and Software > Process Device Manager.**)

Functions in SIMATIC PDM

SIMATIC PDM monitors the process values, alarms and status signals of the device. It allows you to display, compare, adjust, verify, and simulate process device data.

Features of SIMATIC PDM Rev. 6.0, SP2, HF1 (or higher)

The scrolling menu of the SITRANS LG200 makes configuring and monitoring easy.

- See *Online Display* on page 51 to monitor process variables.
- See *Trend Diagram (Level Trend over Time)* on page 53 for Level Trend Monitoring.

Electronic Device Description (EDD)

Note: SITRANS LG200 requires the EDD for SIMATIC PDM version 6.0 with SP2 and HF1, or higher. If using a Multiplexer, SIMATIC PDM version 6.0 with SP2 and HF3 or SIMATIC PDM version 6.0, SP3 is required.

You can locate the EDD in Device Catalog, under **Sensors/Level/Echo/Siemens Milltronics/ SITRANS LG200**. Check the product page of our website at: https://pia.khe.siemens.com/index.asp?Nr=15361, under **Downloads**, to make sure you have the latest version of SIMATIC PDM, the most recent Service Pack (SP) and the most recent hot fix (HF). If you need to install a new EDD, see Configuring a new device below.

Write Protection

The Write Protection feature of the LG200 will prevent unauthorized users from changing parameters in the device.

Note: The password must be set locally at the device. This cannot be done from SIMATIC PDM

If there is a password set in the device and SIMATIC PDM is to be used, enter the password value in the **User Password** text box and then click **Send Password**.

This will allow parameters to be changed during this session of SIMATIC PDM.

If the password is forgotten, click **Forgot Password?** and an encrypted number will be generated. Send this to Siemens Technical Support and they will decrypt it and tell you what the password is for that device.

Password test



Configuring a new device

Note: Clicking on **Cancel** during an upload from device to SIMATIC PDM will result in some parameters being updated.

1. Check that you have the most recent EDD, and if necessary download it from the product page listed above. Save the files to your computer, and extract the zipped file to an easily accessed location. Launch **SIMATIC PDM – Options>Manage Device Catalog**, browse to the unzipped EDD file and select it.
2. Launch SIMATIC Manager and create a new project for LG200. Application Guides for setting up HART and PROFIBUS PA devices with SIMATIC PDM can be downloaded from the product page of our website at: https://pia.khe.siemens.com/index.asp?Nr=15361.
   Be sure to save this project for reinstalling factory default parameters for SITRANS LG200.
3. Upload all parameters from the device to the PC/PG.
4. Configure the device.

Quick Start Wizard via SIMATIC PDM

The graphic Quick Start Wizard provides an easy 4-step guide to help you configure the device for a simple application.

Please consult the operating instructions or online help for details on using SIMATIC PDM. (Application Guides for setting up Siemens HART instruments with SIMATIC PDM are available on our website: www.siemens.com/processautomation.)

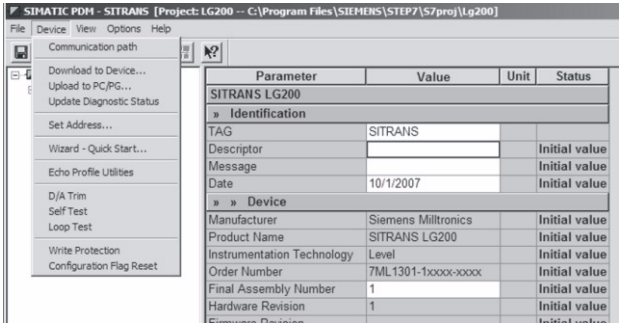
1. If you have not already done so, check that you have the most up-to-date Device Description (EDD) for your instrument. (See *Configuring a new device* on previous page.)
2. Launch SIMATIC Manager and create a new project for LG200. Application Guides for setting up HART devices with SIMATIC PDM can be downloaded from the product page of our website at: https://pia.khe.siemens.com/index.asp?Nr=11813.
3. Program the device via the Quick Start Wizard.

Quick Start Wizard steps

Notes:

- Click on **BACK** to return and revise setting or **Cancel** to exit the Quick Start.

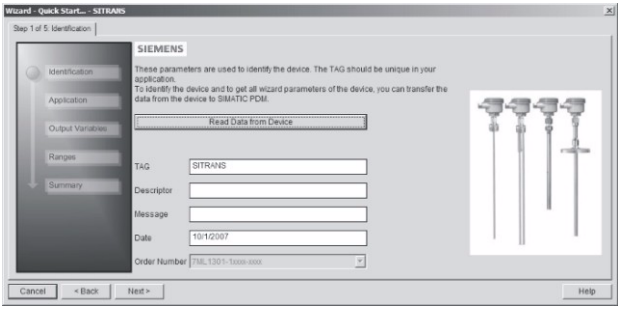
Launch SIMATIC Manager, create a new project, open the menu **Device – Wizard - Quick Start**, and follow steps 1 to 5.



Step 1 – Identification

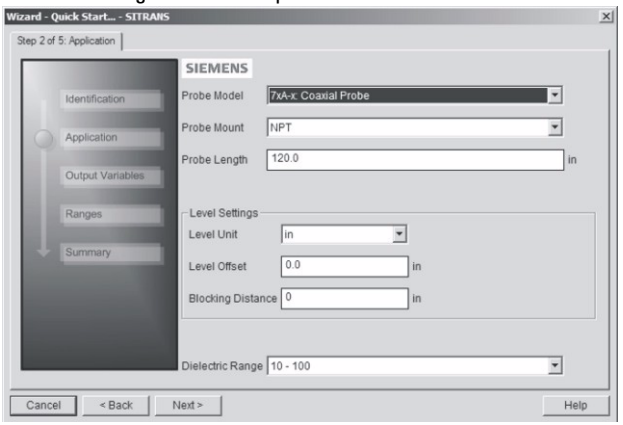
Note: The layout of the dialog boxes shown may vary according to the resolution setting for your computer monitor.

Click on **NEXT** to accept the default values (Description, Message, and Installation Date fields can be left blank). Description field is limited to 16 characters and Message field is limited to 30 characters.



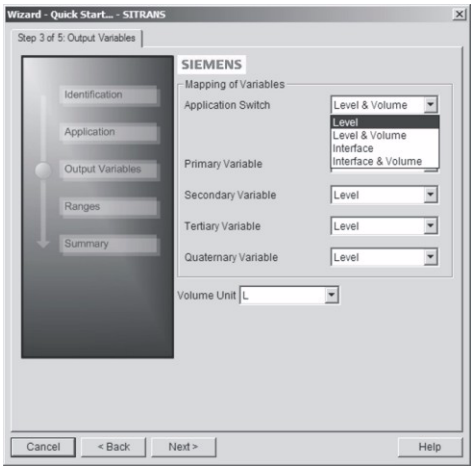
Step 2 – Application

Select the probe model, probe mount, and probe length, and then define the level settings: level unit, level offset, and blocking distance (if required). Then select the appropriate dielectric range from the drop down list. Click on **NEXT**.



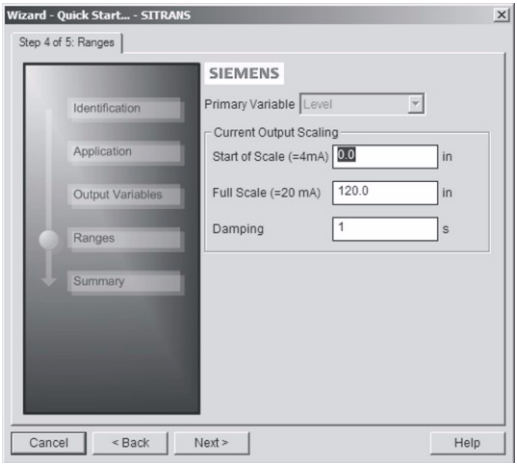
Step 3 – Output Variables

Select the application switch (level, level and volume, interface, interface & volume) from the drop down list. Click on **NEXT**.



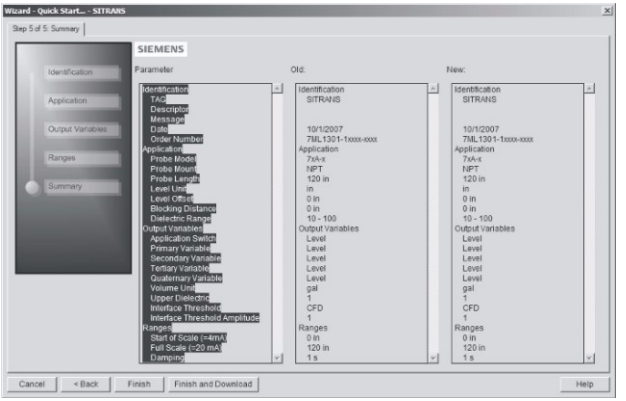
Step 4 – Ranges

Set start of scale (4 mA), full scale (20 mA), and damping values. The primary variable is selected in step 2. Click on **Next**.



Step 5 – Summary

Check parameter settings. Click on **BACK** to revise values, **Finish** to return to PDM without transferring the values, or **Finish and Download** to transfer values to the device.

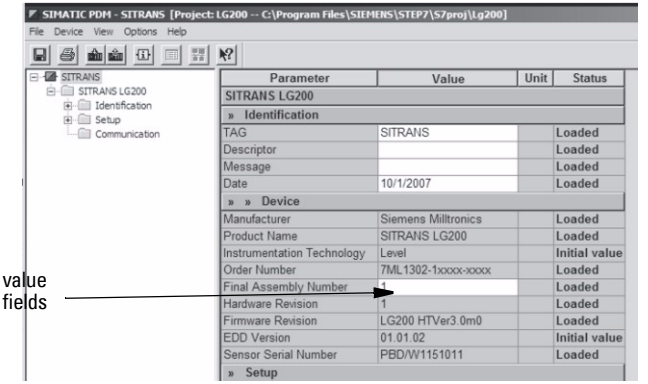


Changing parameter settings using SIMATIC PDM

Notes:

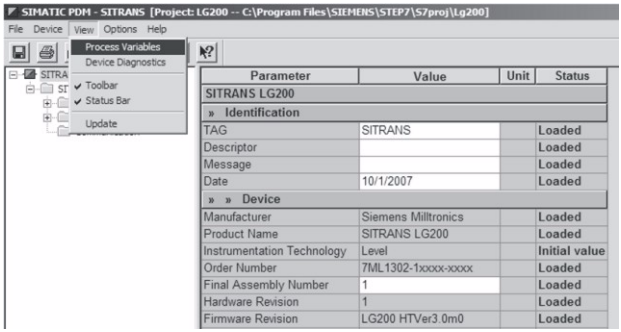
- For a complete list of parameters, see *Parameter Reference* on page 57.
- Clicking on **Cancel** during an upload from device to SIMATIC PDM will result in some parameters being updated.

1. Launch SIMATIC PDM, connect to SITRANS LG200, and upload data from the device.
2. Adjust parameter values in the parameter value field then press **Enter.** The status fields read **Changed**.
3. Open the Device menu, click on **Download to device**, then use **File – Save**, to save parameter settings. The status fields are cleared.



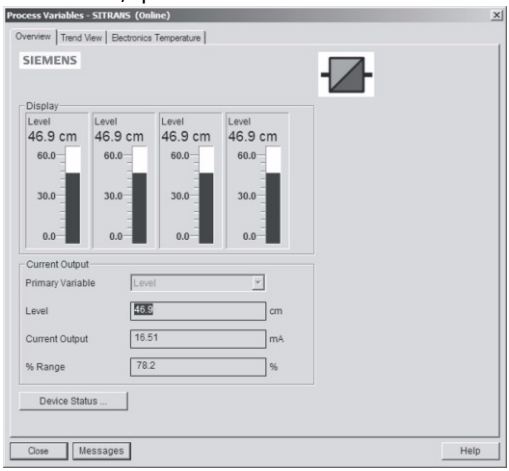
Parameters accessed via pull-down menus

You have access to a number of functions via pull-down menus from the menu bar under **Device** or **View**.



Online Display

To compare outputs in real time, open the menu **View – Process Variables**.

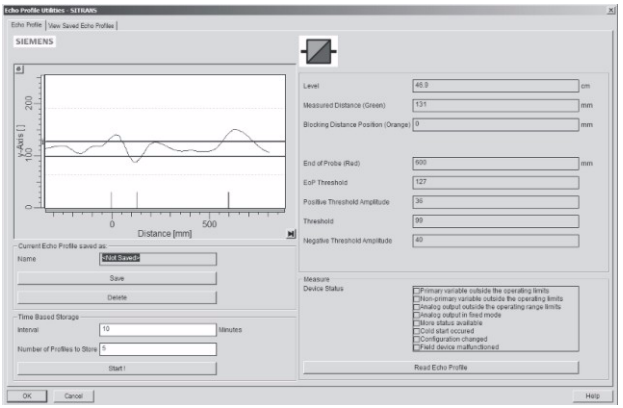


Echo profile

Notes:

- Double click on each axis to see the **X** scale and Data Scale values. Click on the axis and drag to reposition the scale.
- After saving a profile click on **OK**, not the **X** button, to close the Echo Profile Utilities window, otherwise the profile will not be saved.

- Open the menu **Device** - **Echo Profile Utilities.** Click on the Echo Profile tab.
- Click on the Measure button to update the profile.
- To save the echo profile, click **Save** and in the new window enter a name and click **OK**.
- Click **OK** to exit.



Echo profile data logging

You can store up to 50 profiles at a selected interval (maximum 60 minutes).

In the **Echo Profile Utilities** window, in the Time Based Storage section:

- Enter the desired interval between stored profiles.
- Enter the desired number of profiles to be stored (maximum 50).
- Click on **Start**. A message appears warning of the time delay and warning that all previous saved profiles will be overwritten. Click on **OK** to proceed. The new profiles will be saved with their date and time.

View Saved Echo Profiles

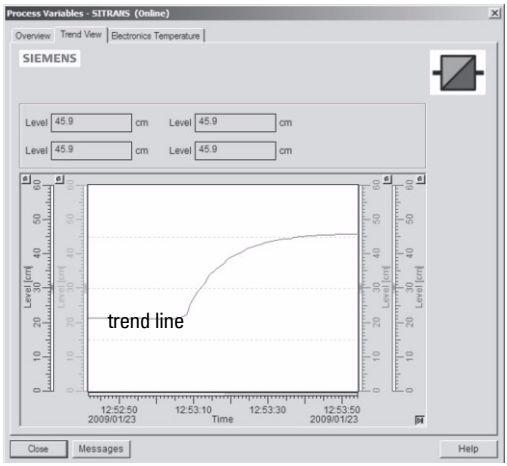
To view a saved profile, in the **Echo Profile Utilities** window, click on the **View Saved Echo Profiles** tab.

Trend Diagram (Level Trend over Time)

Notes:

- Double click on each axis and record the Xscale and Data Scale values, so that you can restore the default view by resetting to these values.

Open the menu **View – Process Variables.** Click on **Trend View** tab.



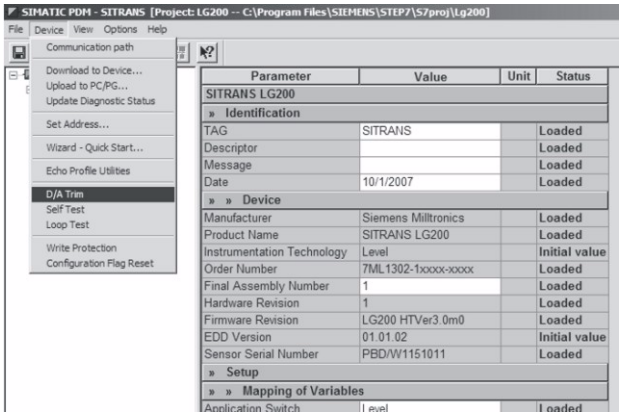
Configuration Flag Reset

To reset the configuration flag to zero, open the menu **Device – Configuration Flag Reset** and execute a reset.

Trim Loop Current

Allows you to trim the 4 mA and 20 mA points in order to calibrate the mA output.

Open the menu **Device – D/A Trim.** You will be prompted to attach a calibrated meter and enter the values at 4 mA and at 20 mA.

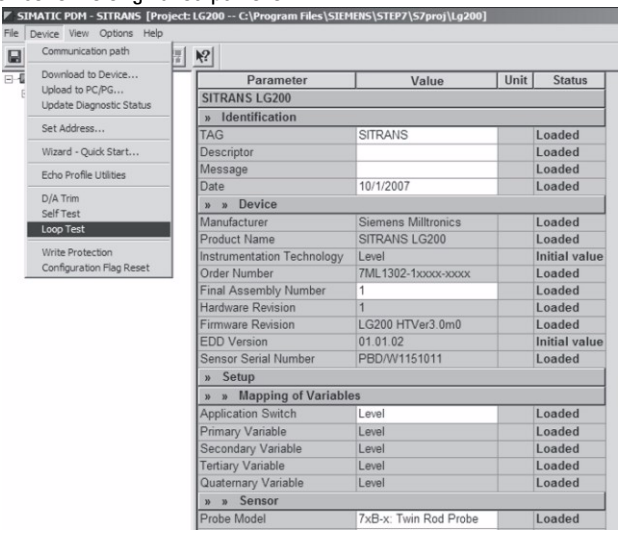


Loop Test

Allows you to input a simulated value in order to test the functioning of the mA connections during commissioning or maintenance of the device.

To simulate a user-defined mA value:

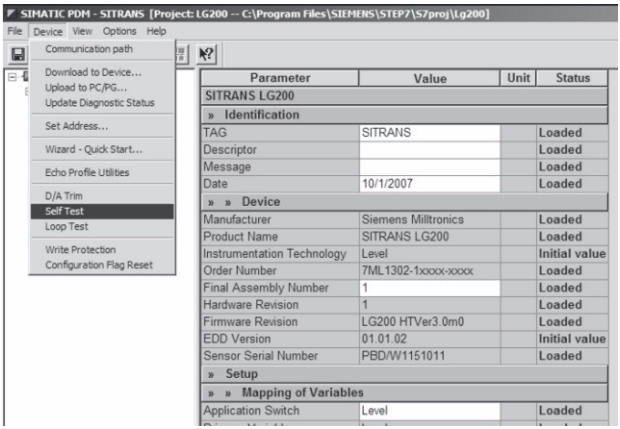
1. Open the menu **Device – Loop Test.**
2. Select **Other,** enter the new value, and click on **OK.** The message 'Field Device fixed at new value' appears. Click on **OK**.
3. When you are ready to end simulation, select **End** and click on **OK** to return the device to the original output level.



Self Test

Allows you to complete a self test function with the unit.

1. Open the menu **Device –Self Test**.
2. Select **Yes**, and the device will execute a self test. The LG200 will return to Run mode upon test completion.


SIMATIC PDM - SITRANS [Project: LG200 -- C:\Program Files\SIEMENS\STEP7\S7proj\Lg200]
File
Device
View
Options
Help
Communication path
Download to Device...
Upload to PC/PG...
Update Diagnostic Status
Set Address...
Wizard - Quick Start...
Echo Profile Utilities
D/A Trim
Self Test
Loop Test
Write Protection
Configuration Flag Reset
Parameter
Value
Unit
Status
SITRANS LG200
» Identification
TAG
SITRANS
Loaded
Descriptor
Loaded
Message
Loaded
Date
10/1/2007
Loaded
» » Device
Manufacturer
Siemens Milltronics
Loaded
Product Name
SITRANS LG200
Loaded
Instrumentation Technology
Level
Initial value
Order Number
7ML1302-1xxxx-xxxx
Loaded
Final Assembly Number
1
Loaded
Hardware Revision
1
Loaded
Firmware Revision
LG200 HTVer3.0m0
Loaded
EDD Version
01.01.02
Initial value
Sensor Serial Number
PBD/W1151011
Loaded
» Setup
» » Mapping of Variables
Application Switch
Level
Loaded

Notes

Parameter Reference

The following parameter listing explains the SITRANS LG200 parameter menus. Each parameter is marked if it applies specific application types (Level, Volume, Interface/Level, Interface/Volume).

The parameters are in the order they would appear if the arrow keys were used to scroll through the menu.

To reset SITRANS LG200 to factory defaults, set each parameter to the default parameter settings shown in user parameters below or listed in *Appendix A: Alphabetical Parameter List* on page 72.

Display loop

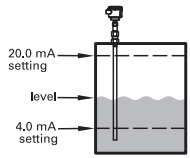
Run Mode Display Options

Status

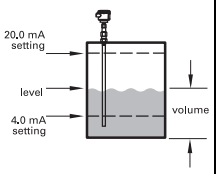
*If you choose *Status*, the LG200 display will show Status, Level , % Output, and Loop (and/or Volume, and/or Interface/Level, and/or Interface/Volume) values cycling every two seconds.*

Values (View only)	*Status*
	Level or *Volume* or *IfcLvl* or *IfcVol*
	% Out
	Loop

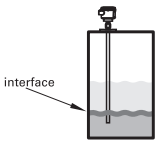
Level: Measures level only in selected level units



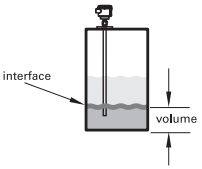
Volume: Measures volume only in selected volume units



Interface/Level (Ifc/Level): Measures upper level and interface level



Interface/Volume (Ifc/Vol): Measures interface level and interface volume



Level

Displays level value in selected units.

Values (View only)	Level xxx.x (in, cm, ft, m)

Output (% Output)

% Output measurement derived from 20 mA span.

Values (View only)	% Output xx.x %

Loop Value (Loop)

Loop value (in mA).

Values (View only)	Loop xx.xx mA

Volume (if Measurement Type set to Lvl&Vol)

Displays volume value in selected units.

Values (View only)	Volume xxx.x (liters or gallons)

Ifc Level (if Measurement Type set to Intrface)

Displays interface value in selected units.

Values (View only)	IfcLvl xxx.x (in, cm, ft, m)

Ifc Vol (if Measurement Type set to Ifc&Vol)

Displays interface and volume value in selected units.

Values (View only)	IfcVol xxx.x (liters or gallons)

To return to RUN mode, scroll to *Status*.

Parameter Listing

Password Protection (Default = 0)

The SITRANS LG200 transmitter is password protected to restrict access to parts of the menu structure that affect the operation of the system.

The LG200 uses three levels of password: user, factory and superuser passwords.

User password

In Program Mode, when the proper user password is entered, an exclamation point (!) is the last character of the first line of the display. The user password can be changed to any numerical value up to 255. The password is required whenever configuration values are changed.

The default user password is 0. Enter a new password in the last step of the configuration menu. With a password of 0, the transmitter is no longer password protected and any value in the menu can be altered without entering a confirming password, except diagnostic values. The device remains unprotected for five minutes without a button pressed, and then the password protection set is applied.

After a SIMATIC PDM upload to or from the device, the password must be entered, because the password is not transmitted from PDM to the device or vice versa.

NOTE: If the user password is not known, the menu item New Password displays an encrypted value representing the present password. Call the factory with this encrypted value to determine the present password.

Factory and Superuser passwords

Factory and Superuser passwords are applied to parameters for technical support personnel.

Factory password is available to factory authorized repair technicians.

Superuser password is available to a user (together with a Siemens technical support representative). Please contact your Siemens Milltronics representative for more details.

NOTE: Parameters described in the following are dependant on probe type. Default values may change according to probe type. This will assist with set-up of the SITRANS LG200 with pre-programmed, application specific defaults.

Users should check all parameters for validity before returning the unit into operation.

Probe Model (PrbModel)

Select the type of probe used. See Model Chart on page 5. (User password)

Values	Select from: **7xA-x** (7ML1301-1) (Default), **7xB-x** (7ML1302-1), **7xD-x** (7ML1301-2), **7xF-x** (7ML1303-1), **7xF-E** (7ML1303-1D), **7xF-F** (7ML1303-1E), **7xF-4** (7ML1303-1J), **7xJ-x** (7ML1303-2), **7xK-x** (7ML1305-1), **7xP-x** (7ML1301-3), **7xR-x** (7ML1301-4), **7xS-x** (7ML1301-5), **7xT-x** (7ML1301-6), **7x1-x** (7ML1304-1), **7x2-x** (7ML1304-2), **7x5-x** (7ML1302-2), **7x7-x** (7ML1302-3)

Probe Mount (PrbMount)

Sets probe mounting type. (User password)

Values	NPT (threaded) (Default)
	BSP (threaded)
	Flange

Measurement Type (MeasType)

Select measurement type. (User password)

Values	Lvl Only (Default)
	Lvl&Vol
	Intrface [7ML1301-6 (7xT-x) only]
	Ifc&Vol [7ML1301-6 (7xT-x) only]

Level Units (LVL Units)

Select level units. (User password)

Values	cm
	inches (Default)
	feet
	meters

Probe Length (Probe Ln)

Probe length is type dependant and is printed on the nameplate and order information. (User password). Please consult Probe specifications on page 10 for minimum and maximum lengths of specific probe models.

Values	Probe Ln xxx.x (Default: 120.0 in)

Level Offset (Lvl Ofst)

Level Offset is the distance from the probe tip to the desired zero level point. Enter desired reading when probe is dry. (User password)

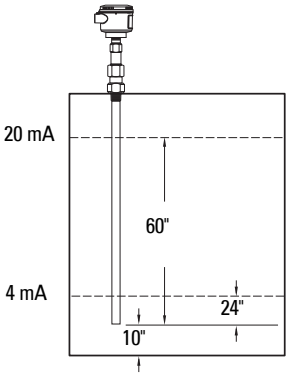
Values	Range: -61 to 762 cm (-24 to 300 in) (Default: 0 in)

Note: Device firmware will allow a negative value up to the probe length to be accepted.

Offset Description

The parameter referred to as Lvl Ofst in the SITRANS LG200 menu is the desired level reading when liquid surface is at the end of the probe. The LG200 transmitter is shipped from the factory with Lvl Ofst set to 0. With this configuration, all measurements are referenced from the bottom of the probe. See Example 1.

Example 1 (Lvl Ofst = 0):

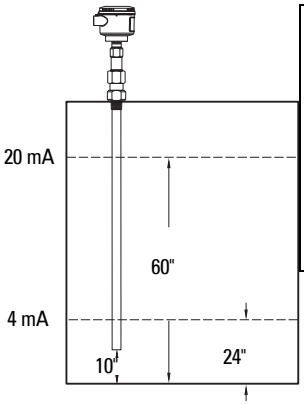


Lvl Units: in
PrbModel: 7xA-x
PrbMount: NPT
PrbLn: 72"
Lvl Ofst: 0.0 in
Dielctrc: 10 -100
Set 4mA: 24.0"
Set 20 mA: 60.0"

Application calls for a 72" NPT coaxial probe in water with the bottom of the probe 10" above the bottom of the tank. The user wants the 4 mA point at 24" and the 20 mA point at 60" as referenced from the bottom of the probe.

When all measurements are referenced from the bottom of the vessel, the value of Lvl Ofst should be changed to the distance between the bottom of the probe and the bottom of the vessel as shown in Example 2.

Example 2 (Lvl Ofst = 10):



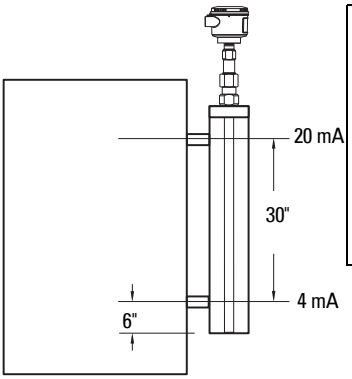
Lvl Units: in
PrbModel: 7xA-x
PrbMount: NPT
PrbLn: 72"
Lvl Ofst: 10.0 in
Dielctrc: 10 -100
Set 4mA: 24.0"
Set 20 mA: 60.0"

Application calls for a 72" NPT coaxial probe in water with the bottom of the probe 10" above the bottom of the tank. The user wants the 4 mA point at 24" and the 20 mA point at 60" as referenced from the bottom of the tank.

When the SITRANS LG200 transmitter is mounted in a chamber/bridle, the unit is usually configured with the 4 mA (0%) point at the lower process connection and the 20 mA (100%) point at the upper process connection. The span is the center-to-center

dimension. In this case, a negative Lvl Ofst needs to be entered. In doing so, all measurements are then referenced at a point up on the probe as shown in Example 3.

Example 3 (Lvl Ofst = -6):



Lvl Units: in
PrbModel: 7xR-x
PrbMount: Flange
PrbLn: 48"
Lvl Ofst: -6.0 in
Dielctrc: 10 -100
Set 4mA: 0"
Set 20 mA: 30"

Application calls for a 122 cm (48") cage-coaxial flanged probe measuring water in a chamber with the bottom of the probe 15 cm (6") below the lower process connection. The user wants the 4 mA point to be 0 cm (0") at the bottom process connection and the 20 mA point to be 76 cm (30") at the top process connection.

Volume Units (Vol Units)

Applicable only when Lvl&Vol, Ifc&Vol selected. Select the volume units. (User password)

Values	liters
	gallons (Default)

Strapping Table (StrapTbl)

Applicable only when Lvl&Vol, Ifc&Vol selected. Access the strapping table (also called Volume Breakpoints). Enables conversion from level to volume. (User password)

Values	Press Enter to access strapping table. See below to setup strapping table. (Default: Pt Lvl: 0.0 cm, Pt Vol 0.0 g)

Strapping Table (Breakpoints)

SITRANS LG200 is available with a 20-point custom strapping table. Up to 20 pairs of Level—Volume points can be entered to linearize the 4 to 20 mA output for odd-shaped vessels.

There are two ways to enter data into the strapping table.

Procedure 1 (this method is the most common):

1. Select **Level and Volume** as the Measurement Type.
2. Ensure that the correct Level Units and Volume Units are chosen.
3. Scroll down to the **StrapTbl** parameter and press **Enter**. **Pt01Lvl** is displayed.
4. Press Enter, then enter the desired level for Point 1 in the strapping table and press enter.
5. Enter corresponding volume for Point 1 in the strapping table (shown as Pt01Vol on the LCD) and then press Enter.
6. Repeat steps 4 and 5 for remaining points.

Notes:

1. All twenty strapping table points do not have to be used.

2. Strapping table point values can be entered or changed in any order.

3. All strapping table points must be larger than the previous entry. If not, the strapping length will stop at that entry.

Procedure 2:

The SITRANS LG200 transmitter also allows the level points to be entered automatically.

As above, a twenty point table is available. However, with this procedure, the user can allow the SITRANS LG200 to use the present level as the strapping table entry.

1. Scroll down to the Strapping Table parameter and press enter, Pt01Lvl is displayed.
2. Press and hold the ENTER button, then press the UP arrow at the same time. (The present level reading is now captured and entered into the strapping table.) Press enter and the display shows Pt01Vol.
3. Enter the corresponding volume and press enter.
4. Add a known liquid volume to the vessel.
5. For the remaining points, add a known liquid volume to vessel and repeat steps 2 to 3.

Dielectric (Dielctrc)

Select range bounding the dielectric constant of the media. The LG200 uses this dielectric setting to adjust the Sensitivity setting. (User password)

Values	1.4–1.7
	1.7–3
	3–10
	10–100 (Default)

The lower the dielectric setting, the higher the sensitivity. In applications where the dielectric may vary, enter the range for the minimum dielectric for your application.

Selection is fixed at 10-100 for 7ML1301-5. For Interface Mode (7ML1301-6 only), select 10-100

Dielectric Range for probe models.

1.4- 1.7	1.7-3	3-10	10-100
7ML1301-1, 7ML1301-2, 7ML1301-3, 7ML1301-4			
			7ML1301-5, 7ML1304-1
			7ML1301-6 (Upper Liquid Layer 1.4-5, Interface Liquid Layer 15 to 100)
	7ML1303-1, 7ML1303-2, 7ML1303-1J, 7ML1303-1D, 7ML1303-1B, 7ML1302-1, 7ML1302-3, 7ML1302-2(1.9 to 100)		
		7ML1304-2 (4 to 100)	

Sensitivity (Senstvty)

Allows fine gain adjustment for single rod probes. This parameter requires a user password for single rod probes. (User or Superuser password)

Values	Enter value upward or downward to sense liquid surface. (Default: 55, probe model dependent)

Sensitivity adjustment is only available to technical support users for coaxial and twin rod probe applications.

Hart Output

Loop Control (Loop Ctrl)

Select variable to control loop current (mA output). (User password)

Values	Lvl (Level) (Default)
	Lvl&Vol (Volume)
	Ifc (Interface Level), [7ML1301-6 (7xT-x) only]
	Ifc&Vol (Interface Volume), [7ML1301-6 (7xT-x) only]

4 mA Setpoint (Set 4 mA) (0%* reference point)

Enter the level for 0% or 4 mA output. It may be lower or higher than the 20 mA point. If a 4 mA and 20 mA points are entered with the same value, the unit will read 3.8 mA when level is below the setpoints, and 20.5 mA when level is above the setpoints. (User password)

Values	Set 4 mA xxx.x (Enter PV value for the 4 mA point). (Default: 0.0 in or 0.0 gal) Minimum = -90.0 in Maximum = 1200.0 in

*The 4 mA can also be 100% of the level depending on the configuration.

Note: Dependant on probe, a small transition zone [0 to 15 cm (6")] may exist at the top/ bottom of the probe.

20 mA Setpoint (Set 20 mA) (100%* reference point)

Enter the level for 100% or 20 mA output. It may be lower or higher than the 4 mA point. If a 4 mA and 20 mA points are entered with the same value, the unit will read 3.8 mA when level is below the setpoints, and 20.5 mA when level is above the setpoints. (User password)

Values	Set 20 mA xxx.x (Enter PV value for the 20 mA point). (Default: 120.0 in, 396.3 gal) Minimum = -90.0 in Maximum = 1200.0 in

*The 20 mA can also be 0% of the level depending on the configuration.

Note: Dependant on probe, a small transition zone [0 to 15 cm (6")] may exist at the top/ bottom of the probe.

Damping (Damping)

A Damping factor (0–10 seconds) can smooth a noisy display and/or output due to turbulence. (User password)

Values	Range: 0 to 10 seconds (Default: 0 sec.)

For example, if damping is set to 1, and the level is instantaneously changed from 0 to 100 inches, the level will approach 100 after about 5 seconds.

Fault Output (Fault)

Select loop current in case of a fault. (User password)

Values	3.6 mA
	22 mA (Default)
	HOLD

Set the required output in the event of a fault. (HOLD is not recommended.)

Blocking Distance (BlockDis)

Also known as Blanking distance. Enter distance below reference point where level is not sensed (also called blanking distance). (User password)

Values	Range: 0 to 2286 cm (0 to 900 inches) (Default: 0)

Typically used for single rod applications where long or narrow nozzles are producing unwanted ringing near the top of the probe.

Because operation of the LG200 is not defined in the blocking distance, use the Safety Zone Fault function. The safety zone is the user-defined area between the span and blocking distance, and is used to set the measurement behavior approaching the blocking distance.

Safety Zone Fault (SZ Fault)

Select loop current behavior when level is sensed in safety zone. Safety Zone is a user-defined area just below the Blocking Distance. Enable Fault if necessary to ensure safe, reliable high-level readings in critical applications. (User password)

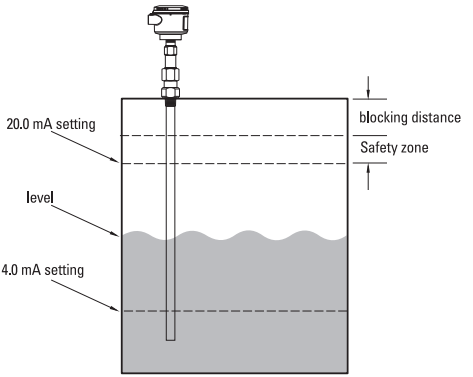
Values	None (Default)
	3.6 mA
	22 mA
	Latch 3.6
	Latch 22

If Latch 3.6 or Latch 22 is chosen, the loop current will remain in alarm until it is manually cleared with the Safety Zone Alarm Reset below.

Safety Zone Height (SZ Height)

Enter distance below Blocking Distance where Safety Zone Fault will be implemented. The SITRANS LG200 will report a Safety Zone Fault if the level rises into this area. (User password)

Values	Minimum: 2.0 in; Range 0 to 3000 cm (0 to 1181 in) (Default: 2.0 in)



Safety Zone Alarm Reset (SZ Alarm Reset)

Clears a latched Safety Zone Fault. (User password)

Values	Press Enter to clear a latched Safety Zone alarm.

Threshold (Threshld)

Select threshold type. (User password)

Values	CFD (Constant Fraction Discriminator)
	FIXED (Default)

Only select FIXED in applications with low dielectric material over higher dielectric material where device is reading incorrect level (for example, oil over water.)

In FIXED mode, the device captures the first valid return signal and should be used in water bottom applications or with bulk solids probes with stainless steel weights.

Interface Threshold (Ifc Threshld)

Applicable only when Ifc, Ifc&Vol selected. Select threshold type for interface level pulse. (User password)

Values	CFD (Constant Fraction Discriminator) (Default)
	FIXED

For interface mode only. Threshold for interface pulse levels. Set to CFD for most common applications.

Poll Address (Poll Adr)

Enter HART polling address number. (User password)

Values	Range 0 to 15. Enter 0 for single transmitter installation (enter digit other than 0 for multi-drop applications). (Default: 0)

Trim Level (Trim Lvl)

Enter value to adjust level reading. (User password)

Values	Trim Lvl xx.x (Range ±20") (Default: 0.0 in)

Trim 4 mA (Trim 4)

Adjust setting to output exactly 4.0 mA. (User password)

Values	Trim 4 xxxx (Trim 4.0 mA output) (Default: 654)

Attach a current meter into the loop. Adjust the trim until the meter reads 4.00 mA. The value of Trim mA is typically 651 counts, but will vary from unit to unit by about ±25 counts.

Trim 20 mA (Trim 20)

Adjust setting to output exactly 20.0 mA. (User password)

Values	Trim 20 xxxx (Trim 20.0 mA output) (Default: 3269)

Attach a current meter into the loop. Adjust the trim until the meter reads 20.0 mA. The value of Trim mA is typically 3266 counts, but will vary from unit to unit by about ±100 counts.

Loop Test mA (Loop Tst)

Enter value to adjust level reading. Used to adjust for mounting/installation effects with single rod probes. A value can be programmed to test connected equipment. (User password)

Values	Loop Tst xx.x mA (Range ±20")

Level Ticks (Lvl Ticks)

Time of flight from reference point to level signal return measured in multiples of 2.14 μs. Count may exceed display capabilities (9999) on long probes.

Values	LvlTicks Xxxxx (0 to 9999, display dependent)

Interface Ticks (Ifc Ticks)

Time of flight through upper liquid.

Values	LvlTicks Xxxxx (0 to 9999, display dependent)

Medium

Applicable only when Ifc, Ifc&Vol selected. Provides information on interface layer, based on analog waveform.

Values (View Only)	Unknown
	Oil only
	Thin oil
	Thick oil
	Dry probe

New Password (New Pass)

Displays encrypted value of present password. To retrieve forgotten password, contact factory with encrypted value. Then enter new password. (User password)

Values	Default: 0 (Range 0 to 255)

Language (Language)

Language choice for LCD display (factory screens related to steam calibration will always be displayed in English). (User password)

Values	English (Default)
	Spanish
	French
	German

Firmware Version

Product Identification firmware version for SITRANS LG200

Values (View only)	Product identification and firmware version displayed

Display Factory Parameters (Disp Fact)

Select Yes to display factory parameter menus. After five minutes of keypad inactivity, reverts to No. For authorized personnel only.

Values	DispFact: Yes or No

Diagnostic and Factory Parameters (Factory Authorized Personnel Only)

History (factory authorized personnel only)

View history of exceptions and their duration since the most recent power on.

Run Time (factory authorized personnel only)

View the value of the elapsed time counter since power on or a History reset.

History Reset (factory authorized personnel only)

Clear exception history and time counter by pressing enter (similar to Safety Zone Alarm Reset); Superuser password required.

Fiducial Ticks (Fid Ticks) (factory authorized personnel only)

Time of flight in counts from reference point to measured point. This value can be converted from equivalent time to real distance via calculations.

Fiducial Spread (Fid Sprd) (factory authorized personnel only)

Variability measure of Fiducial Ticks.

Fiducial Type (Fid Type) (factory authorized personnel only)

Default: negative. Select from positive or negative (only available on selected probe models); Superuser password required.

Fiducial Gain (Fid Gain) (factory authorized personnel only)

Default: 90. Amount of gain applied to fiducial signal; Superuser password required.

Window (Window) (factory authorized personnel only)

Default: 204. Used to adjust Fiducial Ticks. Typical values are between 200 and 212 for integral units and between 150 and 165 for remote units; factory password required.

Conversion Factor (Conv Fct) (factory authorized personnel only)

*Default: 985. Calibration parameter. This value equals (mm/tick)*2048. The nominal value is 963. This is the slope of the straight line measurement equation; factory password required.*

Scale Offset (Scl Ofst) (factory authorized personnel only)

Default: 0. Calibration parameter. Expressed in mm, typically between 0 and 50, but will vary with mounting process connection and probe type; factory password required.

Adjusting Trim Level is equivalent in opposite direction and requires a user password.

Negative Amplitude (Neg Ampl) (factory authorized personnel only)

Default: 36. Diagnostic parameter. Controls the threshold setting for detection of the negative signal for Fixed Threshold mode, and is where the echo is selected for measurement. Changing probe model or dielectric range will adjust negative amplitude appropriately; Superuser password required.

Interface Amplitude (Ifc Ampl) (factory authorized personnel only)

Applicable only when Ifc, Ifc&Vol selected. Default: 36. Diagnostic parameter. Controls the threshold setting for detection of the negative level signal corresponding to the interface level in Fixed Threshold mode; Superuser password required.

Positive Amplitude (Pos Ampl) (factory authorized personnel only)

Default: 60. Diagnostic parameter. Controls the threshold setting for detection of the positive end of probe signals. Changing probe model or dielectric range will adjust amplitude correctly; Superuser password required.

Signal (Signal) (factory authorized personnel only)

Indication of level signal amplitude with respect to the CFD (Constant Fraction Discriminator) threshold position

Compensate (Compsate) (factory authorized personnel only)[1]

Default: None. Select from None, Manual, or Auto; Superuser password required.

Derating Function (Lvl only) (factory authorized personnel only)[1]

Compensate = Auto. Velocity Derating factor for Model 7ML1301-5 Steam probe

Target Amplitude (Lvl only) (factory authorized personnel only)[1]

Compensate = Auto. Indication of steam reference target amplitude

Target Ticks (Lvl only) (factory authorized personnel only)[1]

Compensate = Auto. Measured time of flight from reference point to steam reference target

Target Calibration (Lvl only) (factory authorized personnel only)[1]

Default: 1000. Compensate = Auto. Calibrated time of flight from reference point to target in room temperature air.

1. For Steam Probe model [7ML1301-5 (7xS-x)] only. This parameter is dependent on value of **Compensate** parameter.

Operating Mode (Lvl only) (factory authorized personnel only)[1]

Default: Run. Compensate = Auto. Select from Run, Calibrate, Off; Superuser password required.

7ML1305-1 Correction (factory authorized personnel only)

Default: 0.0. Distance in mm from reference to user reference point (7ML1305-1 probe characteristic); Superuser password required.

Electronics Temperature (Elec Temp) (factory authorized personnel only)

Present temperature in electronics compartment (degrees Celsius)

Maximum Temperature (Max Temp) (factory authorized personnel only)

Maximum electronics temperature recorded.

Minimum Temperature (Min Temp) (factory authorized personnel only)

Minimum electronics temperature recorded.

Safety Zone Hysteresis (Sz Hyst) (factory authorized personnel only)

Default: 1.0 in. Safety Zone Hysteresis height; Superuser password required.

Appendix A: Alphabetical Parameter List

NOTE: Parameters described in the following are dependant on probe type. Default values may change according to probe type. This will assist with set-up of the SITRANS LG200 with pre-programmed, application specific defaults.

Users should check all parameters for validity before returning the unit into operation.

Parameter Name	Page Number
20 mA Setpoint (Set 20 mA) (100%* reference point) Default: 120 in, 396.3 gal (User password)	65
4 mA Setpoint (Set 4 mA) (0%* reference point) Default: 0.0 in, 0 gal (User password)	65
7ML1305-1 Correction (factory authorized personnel only) Default: 0.0 (Superuser password)	71
Blocking Distance (BlockDis) Default: 0 cm (User password)	66
Compensate (Compsate) (factory authorized personnel only) Default: None (Superuser password)	70
Conversion Factor (Conv Fct) (factory authorized personnel only) Default: 985 (Factory password)	69
Damping (Damping) Default: 0 sec. (User password)	65
Volume Units (Vol Units) Default: gallons (User password)	62
Level Units (LVL Units) Default: inches (User password)	60
Loop Control (Loop Ctrl) Default: Level ((User password)	64
Measurement Type (MeasType) Default: Lvl Only (User password)	60
Derating Function (Lvl only) (factory authorized personnel only)1	70
Dielectric (Dielctrc) Default: 10 - 100 (probe dependent) (User password)	63
Display Factory Parameters (Disp Fact)	69
Electronics Temperature (Elec Temp) (factory authorized personnel only)	71
Fault Output (Fault) Default: 22 mA (User password)	65

Parameter Name	Page Number
Fiducial Gain (Fid Gain) (factory authorized personnel only) Default: 90 (Superuser password)	69
Fiducial Spread (Fid Sprd) (factory authorized personnel only)	69
Fiducial Ticks (Fid Ticks) (factory authorized personnel only)	69
Fiducial Type (Fid Type) (factory authorized personnel only) Default: negative (Superuser password)	69
Firmware Version	69
History (factory authorized personnel only)	69
History Reset (factory authorized personnel only) (Superuser password)	69
Interface Amplitude (Ifc Ampl) (factory authorized personnel only) Default: 36 (Superuser password)	70
Interface Threshold (Ifc Threshld) Default: CFD (User password)	67
Interface Ticks (Ifc Ticks)	68
Language (Language) Default: English (User password)	68
Level Offset (Lvl Ofst) Default: 0 in (User password)	60
Level Ticks (Lvl Ticks)	68
Loop Test mA (Loop Tst)	68
Maximum Temperature (Max Temp) (factory authorized personnel only)	71
Medium	68
Minimum Temperature (Min Temp) (factory authorized personnel only)	71
Negative Amplitude (Neg Ampl) (factory authorized personnel only) Default: 36 (Superuser password)	70
New Password (New Pass) Default: 0 (User password)	68
Operating Mode (Lvl only) (factory authorized personnel only)1 Default: Run (Superuser password)	71
Poll Address (Poll Adr) Default: 0 (User password)	67
Positive Amplitude (Pos Ampl) (factory authorized personnel only) Default: 60 (Superuser password)	70
Probe Length (Probe Ln) Default: 120 in (User password)	60
Probe Model (PrbModel) Default: 7xA-x (User password)	59
Probe Mount (PrbMount) Default: NPT (threaded) (User password)	59

Parameter Name	Page Number
Run Time (factory authorized personnel only)	69
Safety Zone Alarm Reset (SZ Alarm Reset) (User password)	67
Safety Zone Fault (SZ Fault) Default: None (User password)	66
Safety Zone Height (SZ Height) Default: 2.0 in (User password)	66
Safety Zone Hysteresis (Sz Hyst) (factory authorized personnel only) Default: 1.0 in (Superuser password)	71
Scale Offset (Scl Ofst) (factory authorized personnel only) Default: 0 (Factory password)	70
Sensitivity (Senstvty) Default: 55, probe model dependent ((User or Superuser password)	64
Strapping Table (Breakpoints) Default: 0.0	62
Strapping Table (StrapTbl) Default: Pt Lvl: 0.0 cm, Pt Vol 0.0 g (User password)	62
Target Calibration (Lvl only) (factory authorized personnel only)1 Default: 1000	70
Threshold (Threshld) Default: Fixed (User password)	67
Trim 20 mA (Trim 20) Default: 3266 (User password)	67
Trim 4 mA (Trim 4) Default: 651 (User password)	67
Trim Level (Trim Lvl) Default: 0.0 in (User password)	67
Dielectric (Dielctrc) Default: 2.10 (User password)	63
Window (Window) (factory authorized personnel only) Default: 204 (Factory password)	69
Signal (Signal) (factory authorized personnel only)	70
Target Amplitude (Lvl only) (factory authorized personnel only)1	70
Target Ticks (Lvl only) (factory authorized personnel only)1	70

Appendix B: Troubleshooting

WARNING: Explosion hazard. Do not connect or disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

System Issues

Symptom	Problem	Corrective Action
LEVEL, % OUTPUT and LOOP values are all inaccurate	Basic configuration data is questionable Interface level has significant emulsion.	Reconfigure Probe Model and/or Probe Mount, Probe Length or Level Offset 1. Ensure the Level is accurate. 2. Verify 4 mA and 20 mA Loop values. Examine process to reduce/eliminate emulsion layer.
Level readings are repeatable but consistently high or low from actual by a fixed amount	Configuration data does not accurately match probe length or tank height.	Ensure proper Probe Model and probe length. Adjust trim level by the amount of noted inaccuracy
Level, % Output and Loop values fluctuate	Turbulence High Frequency connection	Increase the Damping factor until the readings stabilize. Check Fid Spread (should be stable within ±10 counts).
Level, % Output and Loop values all reading low vs. actual	Lower dielectric material over higher dielectric material, e.g. oil over water Coating, clumping, or buildup on probe Dense, water based foam	Select Fixed Threshold option These may be expected inaccuracies due to affect on pulse propagation These may be expected inaccuracies due to affect on pulse propagation
Level reading on Display is correct but Loop is stuck on 4 mA	Basic configuration data is questionable	Set POLL ADR to 0 if not using HART multi-drop.
HART device only: handheld will only read universal commands	Most current device descriptors (DDs) are not installed in HART Communicator 375 handheld	Contact local HART service centre for the latest DDs

Symptom	Problem	Corrective Action
Level reading on Display is stuck at full scale, loop is stuck at 20.5 mA	Software believes probe is flooded (level very near top of probe)	Check actual level. If probe is not flooded, check for buildup or obstructions near top of probe. Select higher dielectric range. Check for condensation in probe connection. Add Blocking Distance.
Level, % Output, and Loop values all at maximum level	Possible configuration issue with single rod probe	1. Increase Blocking Distance. 2. Increase Dielectric Range.
Level, % Output, and Loop values all reading high vs. actual	Possible obstruction in tank affecting single rod probe	1. Increase Dielectric Range until obstruction is ignored. 2. Relocate probe away from obstruction.
Level value reading high when should be zero	Transmitter loose or disconnected from probe	Ensure transmitter connected securely to probe.

Error Messages

Display message	Action	Comment
OK	None	Normal Operating Mode
Initial	None	Program is initializing, level reading held at 4 mA setpoint. This is a transient condition
DryProbe	None	Normal message for dry probe. End of probe signal is being detected.
EOP Low	End of Probe signal from a dry probe is out of range	• Ensure probe length is entered correctly. • Set transmitter to a lower dielectric range.
EOP High	End of Probe signal is out of range	• Ensure probe length is entered correctly. • Consult factory.
Lvl < PL	Highest level signal detected is below Probe Length	• Ensure probe length is entered correctly.
EOP < PL	End of Probe signal is below Probe Length	• Ensure probe length is entered correctly.
WeakSgnl	None. Signal amplitude is lower than desired	• Set transmitter to lower dielectric range • Increase sensitivity

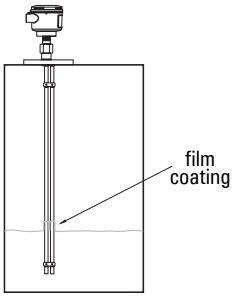
Display message	Action	Comment
Flooded?	Loss of level signal, possibly due to flooding, twin rod probes only	• Decrease level in vessel. • Set transmitter to lower dielectric range • Replace with Model 7ML1301-4 Overfill probe
NoSignal	No level signal being detected	• Ensure dielectric setting is correct for measured medium. • Increase sensitivity • Confirm that the probe type is proper for the dielectric of the medium. • Consult factory
No Fid	Fiducial signal is not being detected	• Check connection between probe and transmitter • Check for moisture on top of probe • Check for damaged gold pin on the high-frequency connector • Consult factory
FidShift	FidTicks shifted from expected value	• Check connection between probe and transmitter • Check for moisture on top of probe • Check for damaged gold pin on the high-frequency connector • Consult factory
Fid Sprd	Fiducial Ticks variation is excessive.	• Check connection between probe and transmitter. • Check for moisture on top of probe • Consult factory
SZ Alarm	Safety Zone alarm has been tripped, loop current fixed at SZ fault	Decrease level in vessel
Hi Temp	Present temperature in electronics compartment is above +80 °C (176 °F)	• Transmitter may need to be moved to ensure ambient temperature is within specification • Change to remote mount transmitter
Lo Temp	Present temperature in electronic compartment is below –40 °C (-40 °F)	• Transmitter may need to be moved to ensure ambient temperature is within specification • Change to remote mount transmitter.
HiVolAlarm	Level more than 5% above highest point in strapping table	Verify strapping table is entered correctly. (occurs only when measurement type is set to Vol with strapping table defined)
Sys Warn	Unexpected but non-fatal software event	Consult factory

Display message	Action	Comment
TrimReqd	Factory set Loop values are defaults; loop output may be inaccurate	Consult factory
Cal Reqd	Factory set default calibration parameters are in use; level reading may be inaccurate	Consult factory
SlopeErr	Ramp circuit generating improper voltage	Consult factory
LoopFail	Loop current differs from expected value	Consult factory
No Ramp	No End-of-Ramp signal detected	Consult factory
DfltParm	Internal non-volatile parameters have been defaulted	Consult factory
EE Fail	EEPROM error allowing watch-dog timer to expire	Consult factory
CPU Fail	A-D converter time out allowing watch-dog timer to expire	Consult factory
SfwrFail	A fatal software error allowing watch-dog timer to expire	Consult factory

Application Troubleshooting

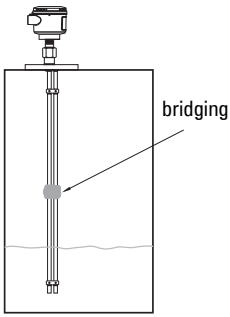
Media buildup on the probe and stratification are common application concerns. Media buildup on the probe is not a problem in most cases, but when it occurs, it can be viewed as two types: Film Coating and Bridging. A twin rod probe can be used when minor film coating is a possibility. For more extreme buildup, use the Model 7ML1303 or 7ML1304 Single Rod Probes.

Level Applications



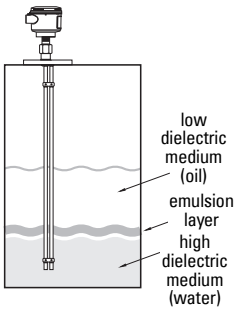
Continuous Film Coating

The most typical of coating problems where the media forms a continuous coating on the probe. SITRANS LG200 will continue to measure effectively with some small degradation in performance. A problem can develop if the product begins to build up on the spacers that separate the probe elements. High dielectric media (e.g., water-based) will cause the greatest error.



Bridging

Media that is viscous or solid enough to form a clog, or bridge, between the elements causes the greatest degradation in performance. High dielectric media (e.g., water-based) will show as level at the location of the bridging.



Stratification/Interface

The standard SITRANS LG200 transmitter is designed to measure the first air/media interface it detects. However, a low dielectric over a high dielectric application can cause a measurement problem and cause the electronics to trigger on the high dielectric medium that lies beneath the low dielectric medium. Select the Fixed Threshold option to read the upper medium. Example: Oil over water.

Interface Applications

It is not uncommon for interface applications to have an emulsion layer form between the two media. This emulsion layer may pose problems for Guided Wave Radar as it may decrease the strength of the reflected signal. Since the properties of this emulsion layer are difficult to quantify, applications with emulsion layer should be avoided with SITRANS LG200. These applications should be considered with Capacitance Technology.

Single Rod Applications

Nozzles

Nozzles can create false echoes that can cause diagnostic messages and/or errors in measurement. If BAD CAL PARAMTRS is displayed when first configuring the instrument:

1. Ensure the PROBE LENGTH as entered in the software is equal to the actual probe length as noted on the nameplate. This value must be changed if the probe is cut shorter from the original length.
2. Increase the Blocking Distance value until the message is eliminated; 20 mA point may need to be lowered.
3. Increase the DIELECTRIC RANGE a small amount to aid in reducing echoes in nozzle. Increasing the DIELECTRIC setting reduces the gain, which may cause instrument to lose level of lower dielectric media; consult factory.

Obstructions

If the level reading repeatedly locks on to a specific level higher than the actual level, it may be caused by a metallic obstruction. Obstructions in the vessel (e.g., pipes, ladders) that are located close to the probe may cause the instrument to show them as level.

1. Refer to "Single Rod Probe Clearance Guidelines" on page 32.
2. Increase the DIELECTRIC RANGE a small amount to aid in reducing echoes in nozzle. Increasing the DIELECTRIC setting reduces the gain, which may cause instrument to lose level of lower dielectric media; consult factory.

Coating/Buildup

The SITRANS LG200 and Single Rod probe were designed to operate effectively in the presence of media building up. Some expected error may be generated based upon the following factors:

- Dielectric of the media that created the coating
- Thickness of the coating
- Length of the coating above the present level

Stratification/Interface

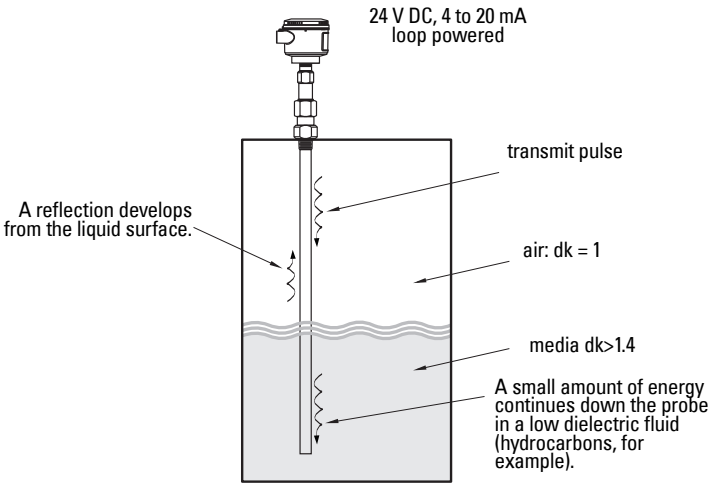
The SITRANS LG200 and Single Rod probe should not be used in applications where media can separate and stratify creating an interface application (e.g., water over oil). The circuitry will detect the lower level—the higher dielectric medium (e.g., the water level).

Appendix C: Technical Reference

SITRANS LG200 is a loop-powered two-wire level transmitter based on the concept of Guided Wave Radar. Guided Wave Radar, or Micropower Impulse Radar (MIR), is a revolutionary, new level measurement technology.

Micropower Impulse Radar (MIR)

MIR (Micropower Impulse Radar) combines TDR (time domain reflectometry), ETS (equivalent time sampling) and modern low power circuitry.



Time Domain Reflectometry (TDR)

TDR uses pulses of electromagnetic (EM) energy to measure distances or levels. When a pulse reaches a dielectric discontinuity (created by media surface), part of the energy is reflected. The greater the dielectric difference, the greater the amplitude (strength) of the reflection.

In telephone, computer, and power transmission industries, it is used to successfully find wire or cable breaks and shorts. An EM pulse is sent through the wire, traveling unimpeded until it finds a line break or short. A reflection is then returned from the break enabling a timing circuit to pinpoint the location.

In the SITRANS LG200 transmitter, a waveguide with a characteristic impedance in air is used as a probe. When part of the probe is immersed in a material other than air, there is lower impedance due to the increase in the dielectric. When an EM pulse is sent down the probe and meets the dielectric discontinuity, a reflection is generated.

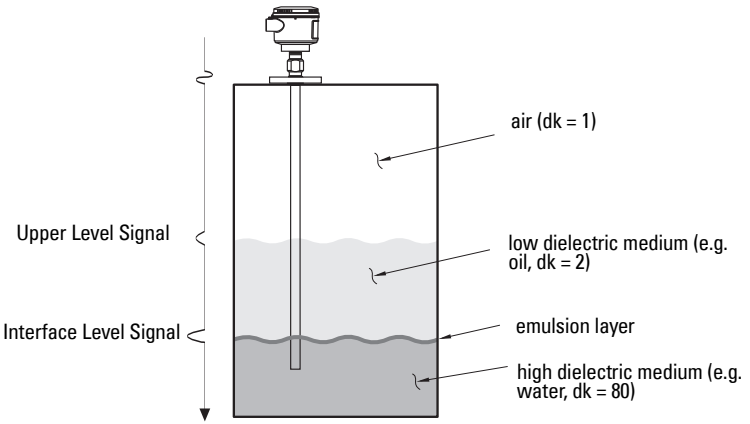
Equivalent Time Sampling (ETS)

ETS (Equivalent Time Sampling) is used to measure the high speed, low power EM energy. ETS is a critical key in the application of TDR to vessel level measurement technology. The high speed EM energy (1000 ft/µs) is difficult to measure over short distances and at the resolution required in the process industry. ETS captures the EM signals in real time (nanoseconds) and reconstructs them in equivalent time (milliseconds), which is much easier to measure with today's technology.

ETS is accomplished by scanning the waveguide to collect thousands of samples. Approximately 8 scans are taken per second; each scan gathers more than 30,000 samples.

Interface Detection

The SITRANS LG200, Model 7ML1301-6 coaxial probe, is a transmitter capable of measuring both an upper level and an interface level. The upper liquid must have a dielectric constant between 1.4 and 5 and the two liquids have a difference in dielectric constants greater than 10. A typical application would be oil over water, with the upper layer of oil being non-conductive with a dielectric constant of approximately 2 and the lower layer of water being very conductive with a dielectric constant of approximately 80. This interface measurement can only be accomplished when the dielectric constant of the upper medium is lower than the dielectric constant of the lower medium.



SITRANS LG200 Guided Wave Radar is based upon the technology of TDR (Time Domain Reflectometry). TDR uses pulses of electromagnetic energy transmitted down a wave guide or probe. When a pulse reaches a liquid surface that has a higher dielectric constant than air (dielectric constant of 1) in which it is traveling, the pulse is reflected and ultra high speed timing circuitry provides an accurate measure of liquid level. Even after the pulse is reflected from the upper surface, some of the energy continues down the length of the probe through the upper liquid. The pulse is again reflected when it reaches the higher dielectric lower liquid. Since the speed of the signal through the upper liquid is dependent on the dielectric constant of the medium in which it is traveling, the dielectric constant of the upper liquid must be known to accurately determine the interface level.

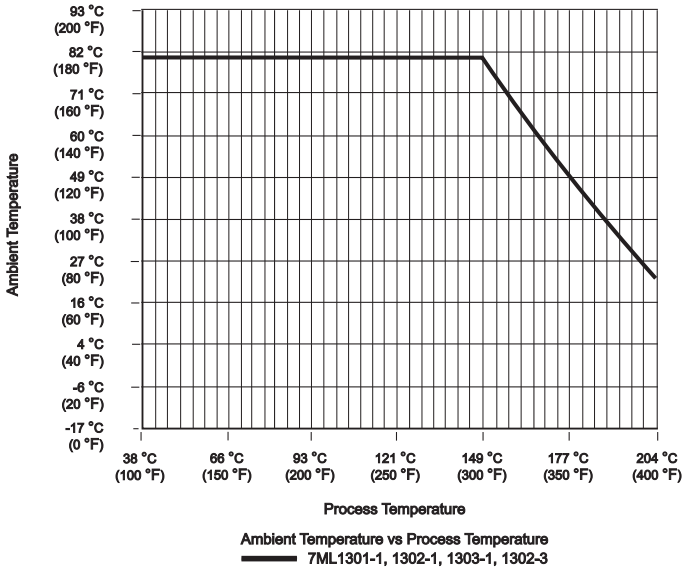
By knowing the time between the first and second reflections, along with knowing the upper layer dielectric constant, the thickness of the upper layer can be determined. In order to properly process the reflected signals, the SITRANS LG200 is specified for those applications where the thickness of the upper layer is greater than 2 inches. The maximum upper layer is limited to the length of the Model 7ML1301-6 probe, which is available in lengths from 60 to 610 cm (24 to 240").

Emulsion Layers

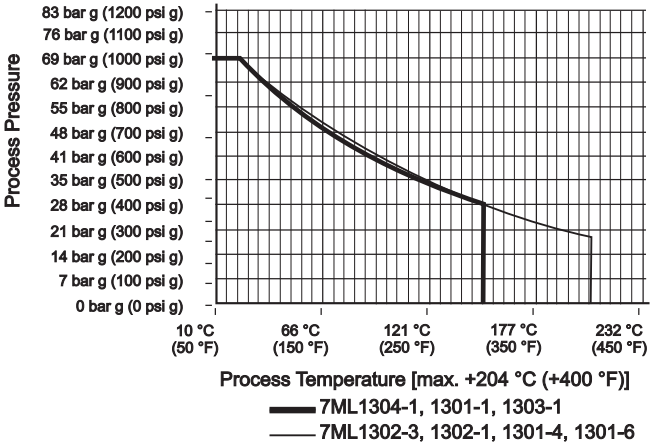
As emulsion (rag) layers can decrease the strength of the reflected signal, the SITRANS LG200 should only be used in applications that have clean, distinct layers. Contact the factory for application assistance.

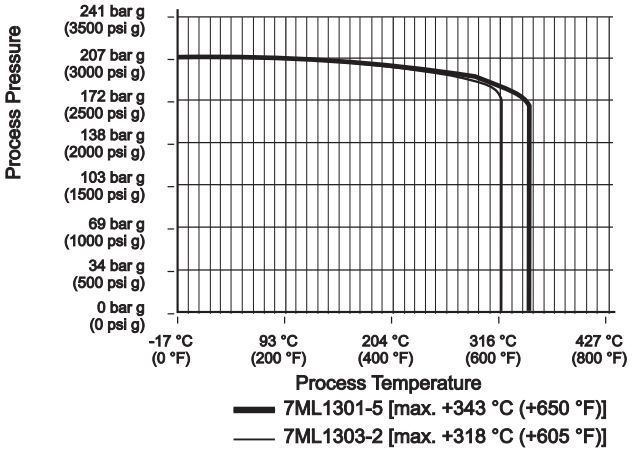
Maximum Process Temperature Chart

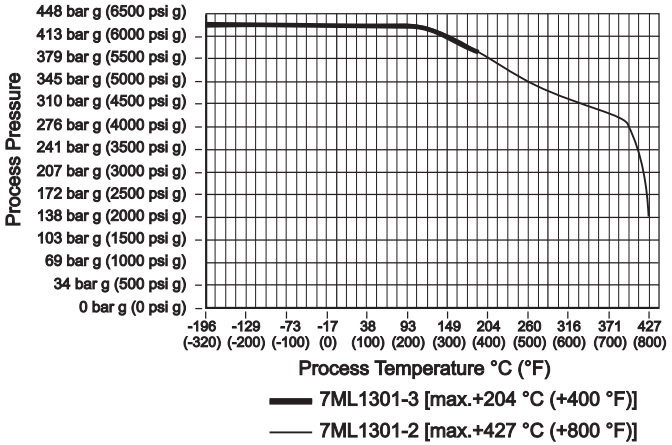
Note: The charts below are for guidance only:



Process Pressure/Temperature Derating Curves







Note: Above charts represent threaded process connections only. Flanged process connections should be derated according to ASME/EN/JIS standards

Appendix D: Maintenance

SITRANS LG200 requires no maintenance or cleaning under normal operating conditions.

Under severe operating conditions, the probe may require periodic cleaning. If cleaning becomes necessary:

- Note the probe material and the process medium, and select a cleaning solution that will not react adversely with either.
- Remove the device from service and wipe the probe clean using a cloth and suitable cleaning solution.

Unit Repair and Excluded Liability

All changes and repairs must be done by qualified personnel, and applicable safety regulations must be followed. Please note the following:

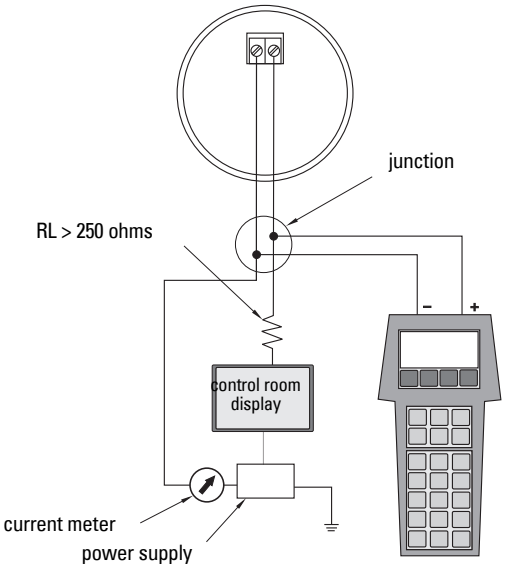
- The user is responsible for all changes and repairs made to the device.
- All new components must be provided by Siemens Milltronics Process Instruments Inc.
- Restrict repair to faulty components only.
- Do not re-use faulty components.

Note: If an electronics or probe replacement occurs, please ensure that any measurement is verified and that programming is adjusted accordingly. Failure to do so may mean accuracy falls outside of specification and an adjustment by Siemens or Siemens authorized specialists may be necessary.

Appendix E: HART Communications

Highway Addressable Remote Transducer, HART, is an industrial protocol that is superimposed on the 4-20 mA signal. It is an open standard, and full details about HART can be obtained from the HART Communication Foundation at www.hartcomm.org

SITRANS LG200 can be configured over the HART network using either the HART Communicator 375 by Fisher-Rosemount, or a software package. The recommended software package is the SIMATIC Process Device Manager (PDM) by Siemens.



SIMATIC PDM

This software package is designed to permit easy configuration, monitoring, and troubleshooting of HART devices. The HART EDD for SITRANS LG200 was written with SIMATIC PDM in mind and has been extensively tested with this software.

For more information, see *Operating via SIMATIC PDM* on page 45.

HART Device Description (EDD)

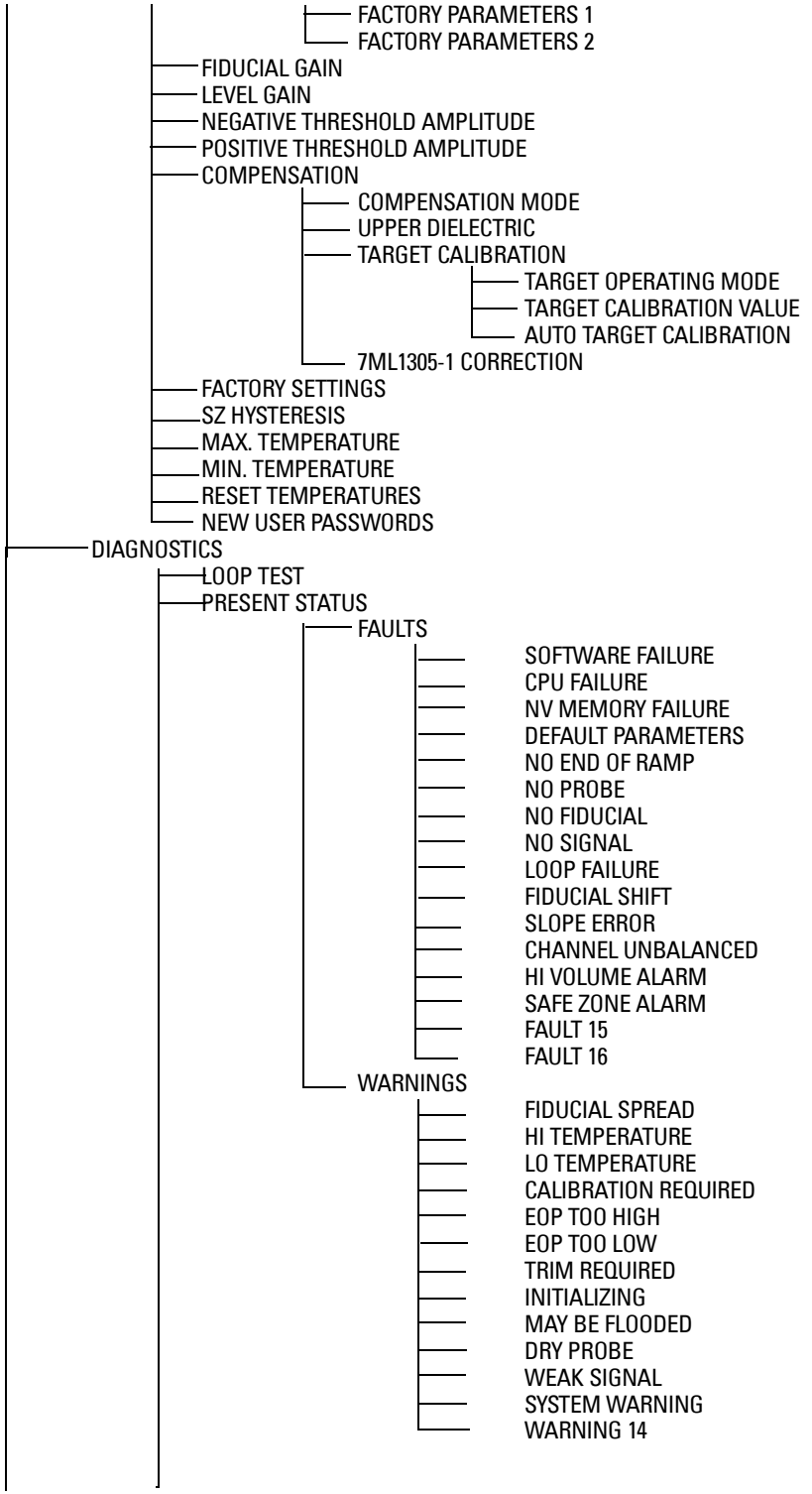
In order to configure a HART device, the configurator must have the HART Device Description for the instrument in question. HART DDs are controlled by the HART Communication Foundation. Please check with the HART Communication Foundation for the availability of the HART EDD for SITRANS LG200. Older versions of the library will have to be updated in order to use all the features of SITRANS LG200.

HART Communicator 375 Menu Structure

Note: HART Communicator 375 is supported by SITRANS LG200. The menu structure is aligned with the menu structure of SIMATIC PDM.

Device Setup

- CALIBRATION
  - PROBE MODEL
  - PROBE MOUNT
  - MEASUREMENT TYPE
  - LEVEL UNITS
  - PROBE LENGTH
  - LEVEL OFFSET
  - VOLUME PARAMETERS
    - VOLUME UNITS
    - STRAPPING TABLE
    - STRAPPING TABLE LENGTH
  - DIELECTRIC RANGE
  - SENSITIVITY
  - PV IS
  - VARIABLE SELECTION
    - SV IS
    - TV IS
    - QV IS
  - 4 mA SETPOINT
  - 20 mA SETPOINT
  - DAMPING
  - SYSTEM FAULT STATE
  - BLOCKING DISTANCE
  - SZ FAULT STATE
  - SZ HEIGHT
  - SZ ALARM RESET
  - THRESHOLD
  - INTERFACE PARAMETERS
    - UPPER DIELECTRIC
    - INTERFACE THRESHOLD
    - INTERFACE THRESHOLD AMPLITUDE
  - TRIM LEVEL
  - DATE/TIME/INITIALS
- BASIC SETUP
  - TAG
  - DESCRIPTOR
  - DATE
  - MESSAGE
  - POLL ADDRESS
  - FINAL ASSEMBLY NUMBER
- ADVANCED SETUP
  - TRIM LOOP CURRENT
  - ENTER PASSWORD
  - FIDUCIAL TYPE
    - SERIAL NUMBER
    - DEVICE ID
    - <WINDOW>
    - CONVERSION FACTOR
    - SCALE OFFSET


FACTORY PARAMETERS 1
FACTORY PARAMETERS 2
FIDUCIAL GAIN
LEVEL GAIN
NEGATIVE THRESHOLD AMPLITUDE
POSITIVE THRESHOLD AMPLITUDE
COMPENSATION
COMPENSATION MODE
UPPER DIELECTRIC
TARGET CALIBRATION
TARGET OPERATING MODE
TARGET CALIBRATION VALUE
AUTO TARGET CALIBRATION
7ML1305-1 CORRECTION
FACTORY SETTINGS
SZ HYSTERESIS
MAX. TEMPERATURE
MIN. TEMPERATURE
RESET TEMPERATURES
NEW USER PASSWORDS
DIAGNOSTICS
LOOP TEST
PRESENT STATUS
FAULTS
SOFTWARE FAILURE
CPU FAILURE
NV MEMORY FAILURE
DEFAULT PARAMETERS
NO END OF RAMP
NO PROBE
NO FIDUCIAL
NO SIGNAL
LOOP FAILURE
FIDUCIAL SHIFT
SLOPE ERROR
CHANNEL UNBALANCED
HI VOLUME ALARM
SAFE ZONE ALARM
FAULT 15
FAULT 16
WARNINGS
FIDUCIAL SPREAD
HI TEMPERATURE
LO TEMPERATURE
CALIBRATION REQUIRED
EOP TOO HIGH
EOP TOO LOW
TRIM REQUIRED
INITIALIZING
MAY BE FLOODED
DRY PROBE
WEAK SIGNAL
SYSTEM WARNING
WARNING 14

- WARNING 15
- WARNING 16
- STATUS HISTORY
- LEVEL TICKS
- FIDUCIAL TICKS
- FIDUCIAL SPREAD
- SIGNAL STRENGTH
- ELEC. TEMPERATURE
- INTERFACE TICKS
- INTERFACE MEDIUM
- DERATING FACTOR
- TARGET RATIO
- TARGET TICKS

REVIEW

- MODEL
- MANUFACTURER
- SERIAL NUMBER
- FIRMWARE VERSION
- TAG
- DESCRIPTOR
- DATE
- MESSAGE
- POLL ADDRESS
- FINAL ASSEMBLY NUMBER
- DEVICE ID
- PROBE MODEL
- PROBE MOUNT
- MEASUREMENT TYPE
- LEVEL UNITS
- PROBE LENGTH
- LEVEL OFFSET
- VOLUME UNITS
- DIELECTRIC RANGE
- SENSITIVITY
- PV IS
- SV IS
- TV IS
- QV IS
- 4 mA SETPOINT
- 20 mA SETPOINT
- DAMPING
- SYSTEM FAULT STATE
- BLOCKING DISTANCE
- SZ FAULT STATE
- SZ HEIGHT
- THRESHOLD
- INTERFACE THRESHOLD
- INTERFACE THRESHOLD AMPLITUDE
- TRIM LEVEL
- 4 mA TRIM
- 20 mA TRIM
- FIDUCIAL TYPE
- FIDUCIAL GAIN
- LEVEL GAIN
- NEGATIVE THRESHOLD AMPLITUDE

- POSITIVE THRESHOLD AMPLITUDE
- COMPENSATION MODE
- UPPER DIELECTRIC
- 7ML1305-1 CORRECTION
- SZ HYSTERESIS
- UNIVERSAL REV
- FIELD DEV. REV
- SOFTWARE REV
- NUMBER REQ. PREAMS

PV LEVEL (OR VOL)

PV % OUT

PV LOOP

DEVICE VARIABLES

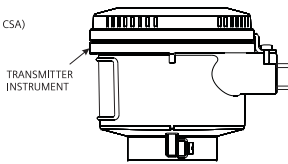
- LEVEL
- VOLUME
- INTERFACE LEVEL
- INTERFACE VOLUME

HAZARDOUS LOCATION

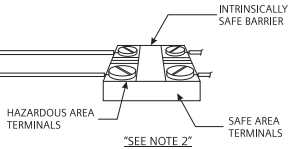
MODEL 7ML1300-XXXXX-XAA0
INTRINSICALLY SAFE FOR:
CLASS I, DIV. I GROUPS A, B, C & D
CLASS II, DIV. I GROUPS E,F & G (G ONLY FOR CSA)
CLASS III

ENTITY
Vmax = 28.6V
Imax = 140mA
Pmax = 1W
Ci = 5.5nF
Li = 9.4µH

MODEL 7ML1300-XXXXX-XAA0



NON-HAZARDOUS LOCATION
LIMITING VALUES



Voc ≤ 28.6V
Isc ≤ 140mA

Ca ≥ 5.5nF
La ≥ 440µH

THE VOLTAGE (V max) AND CURRENT (I max) WHICH THE TRANSMITTER CAN RECEIVE MUST BE EQUAL TO OR GREATER THAN THE MAXIMUM OPEN CIRCUIT VOLTAGE (Voc OR V+) AND THE MAXIMUM SHORT CIRCUIT CURRENT (Isc OR IE), WHICH CAN BE DELIVERED BY THE SOURCE DEVICE. IN ADDITION, THE MAXIMUM CAPACITANCE (Ci) AND INDUCTANCE (Li) OF THE LOAD AND THE CAPACITANCE AND INDUCTANCE OF THE INTERCONNECTING WIRING, MUST BE EQUAL TO LESS THAN THE CAPACITANCE (Ca) OR THE INDUCTANCE (La), WHICH CAN BE DRIVEN BY THE SOURCE DEVICE.

NOTES:
1. FOR EXPLOSION PROOF OR DUST-IGNITION PROOF INSTALLATIONS. THE I.S. GROUND TERMINAL SHALL BE CONNECTED TO AN APPROPRIATE INTRINSICALLY SAFE GROUND IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE [CEC] [FOR CSA] OR THE NATIONAL ELECTRICAL CODE [NEC, ANSI/NFPA 70] [FOR FMRC], FOR INTRINSICALLY SAFE INSTALLATION. THE I.S. GROUND TERMINAL DOES NOT REQUIRE GROUNDING.
2. MANUFACTURER'S INSTALLATION INSTRUCTIONS SUPPLIED WITH THE PROTECTIVE BARRIER AND THE CEC [FOR CSA] OR THE NEC AND ANSI/ISA RP 12.6 [FOR FMRC] MUST BE FOLLOWED WHEN INSTALLING THIS EQUIPMENT. THE BARRIER MUST BE CSA CERTIFIED FOR CANADIAN INSTALLATIONS & FM APPROVED FOR U.S. INSTALLATIONS.
3. CONTROL EQUIPMENT CONNECTED TO PROTECTIVE BARRIERS MUST NOT USE OR GENERATE MORE THAN 250 VDC OR VRMS.
4. NRTL LISTED DUST-TIGHT SEALS MUST BE USED WHEN TRANSMITTER IS INSTALLED IN CLASS II & III ENVIRONMENTS.
5. NO REVISION TO THIS DRAWING WITHOUT CSA AND FMRC APPROVAL.
6. FOR CSA: Exia INTRINSICALLY SAFE/SECURITE INTRINSEQUE.
7. FOR CSA: WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR HAZARDOUS LOCATIONS.
8. FOR SUPPLY CONNECTIONS, USE WIRE SUITABLE FOR THE OPERATING TEMPERATURE. FOR 71°C AMBIENT, USE WIRE WITH A MINIMUM TEMPERATURE RATING OF 75°C.
9. THE TRANSMITTER CAN ALSO BE INSTALLED IN:
   CLASS I, DIVISION 2, GROUPS A, B, C & D
   CLASS II, DIVISION 2, GROUPS E, F & G (F & G ONLY FOR FMRC)
   CLASS III, DIVISION 2,
   IF THE TRANSMITTER IS INSTALLED IN ONE OF THESE LOCATIONS IT DOES NOT REQUIRE CONNECTION TO A PROTECTIVE BARRIER WHEN INSTALLED PER THE CANADIAN ELECTRICAL CODE OR THE NATIONAL ELECTRICAL CODE AND WHEN CONNECTED TO A POWER SOURCE NOT EXCEEDING 30 VDC.
10. CSA CERTIFIED BARRIERS WITH LINEAR OUTPUT CHARACTERISTICS MUST BE USED. REFER TO THE FOLLOWING TABLE FOR GUIDANCE ON SELECTION OF "LINEAR OUTPUT" BARRIERS. THE PARAMETERS LISTED ARE "TYPICAL".

ASSOCIATED APPARATUS (SAFETY BARRIER), GROUP A/B GAS OUTPUT ENTITY PARAMETERS
FOR LINEAR AND NON-LINEAR SUPPLIES, FOR TYPICAL OUTPUT CURRENTS

BARRIER OUTPUT CURRENT (ISC)	LINEAR TYPE BARRIER OUTPUT			NON-LINEAR TYPE BARRIER OUTPUT		
	VOC	Ca	La MINIMUM	VOC	Ca	La MINIMUM
80mA	30V	0.12µF	4.0mH	14V	0.14µF	1mH
				15V	0.16µF	0.5mH
100mA	28V	0.13µF	3.0mH	12V	0.16µF	1mH
				13.6V	0.175µF	0.5mH
120mA	26V	0.17µF	2.3mH	12.5V	0.18µF	0.5mH
				14.7V	0.25µF	0.15mH
140mA	24V	0.21µF	1.7mH	11.5V	0.18µF	0.5mH
				14V	0.275µF	0.15mH

THE OUTPUT POWER OF A "LINEAR" OUTPUT BARRIER MAY BE CALCULATED AS FOLLOWS: Po=(Voc*Isc), OR Po=(Uo*Io)/4
THE OUTPUT POWER OF A "NON-LINEAR" OUTPUT BARRIER MAY BE CALCULATED AS FOLLOWS: Po=Voc*Isc, OR Po=Uo*Io

USE DIMENSIONS ONLY - DO NOT SCALE	1	FOR RELEASE PER ECO 79B36122	HS	SM	JAN 25/07
DIMENSIONS ARE IN MILLIMETERS	Rev.	Revision / ECN Description	Drawn	Appr.	Date

Third Angle Projection

Product Group: TDR
Date: 25 / JAN / 2007
Drawn: HAMED SHATERI
Checked: S. NGUYEN
Approved: S. MILLIGAN
Location: PETERBOROUGH

Tolerance Unless Otherwise Noted: UOS
0 PLC DECIMAL ± 0.8
1 PLC DECIMAL ± 0.3
2 PLC DECIMAL ± 0.10
Angles: ± 0.5°

Scale: NTS
Size: B

TITLE: LG200 TRANSMITTER HAZARDOUS LOCATIONS INSTALLATION DRAWING

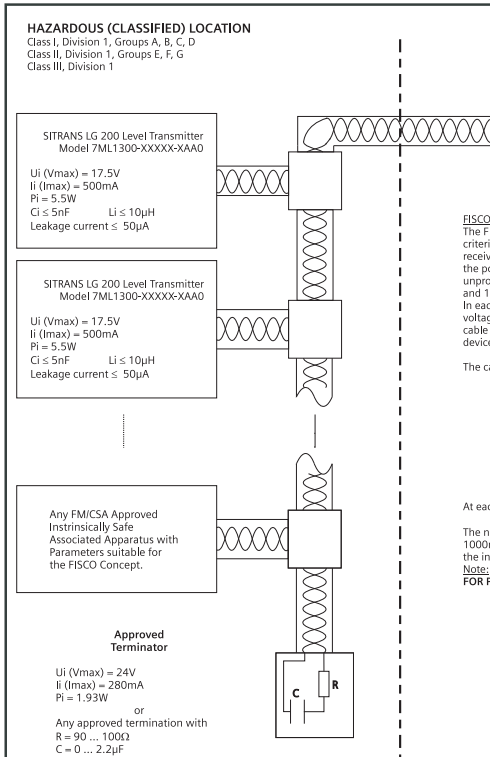
FOR INTERNAL USE ONLY

SIEMENS MILLTRONICS PROCESS INSTRUMENTS INC.
Peterborough, Ontario, Canada

DRAWING No: A5E01066784 Rev. 1

File No. A5E01066784A01

Plot at: 1 : 1 Sheet 1 Of 2



FISCO Concept:
The FISCO concept allows interconnection of intrinsically safe apparatus to associated apparatus not specifically examined such combination. The criteria for the interconnection is that the voltage (Ui or Vmax), the current (Ii or Imax) and the power (Pi) which intrinsically safe apparatus can receive and remain intrinsically safe, considering faults, must be equal or greater than the voltage (Uo or Voc or Vt), the current (Io or Isc or It) and the power (Po or Pt) levels which can be delivered by the associated apparatus, considering faults and applicable factors. In addition, the maximum unprotected capacitance (Ci) and (Li) of each apparatus (other than the termination) connected to the fieldbus must be less than or equal to 5nF and 10µH respectively.
In each segment only one active device, normally the associate apparatus, is allowed to provide the necessary energy for the fieldbus system. The voltage (Uo or Voc or Vt), of the associated apparatus has to be limited to the range of 14V to 24V D.C. All other equipment connected to the bus cable has to be passive, meaning that they are not allowed to provide energy to the system, except to a leakage current of 50µA for each connected device. Separately powered equipment needs a galvanic isolation to assure that the intrinsically safe fieldbus circuit remains passive.

The cable used to interconnect the devices needs to have the parameters in the following range:

Loop resistance R':	15 ... 150 Ω/km
Inductance per unit length L':	0.4 ... 1mH/km
Capacitance per unit length C':	80 ... 200nF/km

C' = C' line/line + 0.5 C' line/screen, if both line are floating or
C' = C' line/line + C' line/screen, if screen is connected to one line.

Length of splice	≤ 1m (T-box must only contain terminal Connections with no energy storage capability)
Length of spur cable:	≤ 30m
Length of trunk cable:	≤ 1km

At each end of the trunk cable an approved infallible termination with the following parameters is suitable:
R = 90 ... 100Ω and C = 0 ... 2.2 µF
The number of passive devices connected to the bus segment is not limited for I.S. reasons. If the above rules are followed, up to a total length of 1000m (sum of the length of the trunk cable and all spur cables), the inductance and capacitance of the cable will not impair the intrinsic safety of the installation.
Note:
FOR PROPER INSTALLATION REFERENCE ALL APPLICABLE NOTES FROM PAGE 1-A5E01066784

USE DIMENSIONS ONLY - DO NOT SCALE	1	FOR RELEASE PER ECO 79B36122	HS	SM	JAN 25-07
DIMENSIONS ARE IN MILLIMETERS	Rev.	Revision / ECN Description	Drawn	Appr.	Date

Third Angle Projection

Product Group: TDR	Tolerance Unless Otherwise Noted: UOS 0 PLC DECIMAL ± 0.8 Angles: ± 0.5° 1 PLC DECIMAL ± 0.3 2 PLC DECIMAL ± 0.10	Scale: NTS	Size: B
Date: 25 / JAN / 2007	TITLE: LG200 TRANSMITTER HAZARDOUS LOCATIONS INSTALLATION DRAWING		
Drawn: HAMED SHATERI			
Checked: S. NGUYEN			
Approved: S. MILLIGAN			
Location: PETERBOROUGH			
SIEMENS MILLTRONICS PROCESS INSTRUMENTS INC. Peterborough, Ontario, Canada	DRAWING No: A5E01066784		Rev. 1
File No. A5E01066784A01	Plot at: 1 : 1	Sheet 2 Of 2	

FOR INTERNAL USE ONLY

Index

A
abbreviations 3
application troubleshooting 75
approvals 18
B
breakpoints (strapping table) 62
    programming 62
C
cleaning
    instructions 85
connections 35
D
derating curves 84
device description
    HART 86
diagnostic parameters 69
display 43
display loop 57
E
echo profile viewing
    via PDM 51
error messages 76
explosion proof wiring 39
F
factory parameters 69
function keys 44
H
HART
    device description 86
HART Communications
    details 86
I
input 8
installation 27
    installation instructions 29
    Pressure Equipment Directive 27
installing probe
    bulk solids 33
    bulk solids flexible single rod 33
    bulk solids flexible twin rod 33
    flexible twin rod 31
    single flexible rod 32
    single rigid rod 31
installing transmitter 34
interface
    performance 8
intrinsically safe wiring 38
K
key function 44
keypad 43
L
level
    performance 7
level offset 60
LG200
    model chart 5
    overview 4
loop
    display 57
M
maintenance 85
    cleaning 85
manual 2
model
    parameter 59
model chart 5
mounting
    nozzle design 28
    Pressure Equipment Directive 27
    requirements 28
O
offset 60
output 8
overview 4
P
parameter 57
parameter settings
    adjust via PDM 45
password 58
performance
    specifications 7, 8
power 7
pressure derating curves 84
probe model specification 5, 59
process conditions 18
programming 42
    parameters 57
protection 58
Q
quick setup 42
Quick Start
    launching via PDM 47

quick start 42
Quick Start Wizard
    via SIMATIC PDM 47
S
settings
    adjust parameters via PDM 45
setup 42
SIMATIC PDM 45
    Quick Start 47
specifications 7
    environmental 9
    input 8
    output 8
    performance 7, 8
    power 7
    process conditions 18
strapping table 62
T
technical reference 81
technical support
    contact information 2
temperature derating curves 84
transmitter display 43
troubleshooting
    application 75
W
wiring 35
    explosion proof 39
    general purpose 37
    intrinsically safe 38

For more information

www.siemens.com/level

www.siemens.com/weighing

Siemens AG
Industry Sector
1954 Technology Drive
P.O. Box 4225
Peterborough, ON
Canada K9J 7B1
email: techpubs.smpi@siemens.com

www.siemens.com/processautomation

Subject to change without prior notice
7ML19985KA02 Rev. 2.2

© Siemens AG 2011

7 M L 1 9 9 8 5 K A 0 2
Printed in Canada