

# Radar Transmitters

SITRANS Probe LU (PROFIBUS PA)

Quick Start Manual • 12/2013



SITRANS

**SIEMENS**



# SITRANS Probe LU (PROFIBUS PA) Quick Start Manual

This manual outlines the essential features and functions of the SITRANS Probe LU (PROFIBUS PA). We strongly advise you to acquire the detailed version of the manual so you can use your instrument to its fullest potential. The complete manual can be downloaded from the Siemens website at: [www.siemens.com/level](http://www.siemens.com/level). The printed manual is available from your local Siemens representative.

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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.

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## 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.



**WARNING:** relates to a warning 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<sup>1</sup>:** 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.

<sup>1</sup> This warning symbol is used when there is no corresponding caution symbol on the product.

# SITRANS Probe LU (PROFIBUS PA)

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

**Note:** 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.

SITRANS Probe LU is a 2-wire loop-powered, continuous level monitor that uses advanced ultrasonic techniques. The instrument consists of an electronic component coupled to the transducer and process connection.

The transducer is available in ETFE (ethylene-tetrafluoroethylene) or PVDF (polyvinylidene fluoride), allowing SITRANS Probe LU to be used in a wide variety of industries and applications using corrosive chemicals.

The ultrasonic transducer contains a temperature-sensing element to compensate for temperature changes in the application.

Communication is via PROFIBUS PA. This device supports acyclic communications from both a PROFIBUS Class I and Class II master. Signals are processed using Sonic Intelligence® which has been field-proven in over 500,000 applications worldwide (ultrasonic and radar).

SITRANS Probe LU is available in three versions:

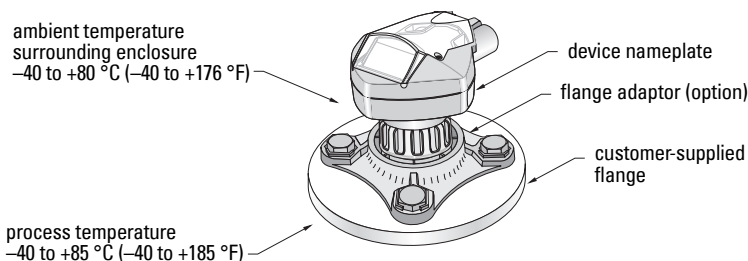
- General Purpose (non-hazardous)
- Intrinsically Safe (with suitable barrier)
- Non-Incendive (FM Class I, Div. 2)

## Specifications

For a complete listing, see the SITRANS Probe LU (PROFIBUS PA) Operating Instructions. For Approvals information, please refer to the device nameplate<sup>1</sup>.

### Ambient/Operating Temperature

**Note:** Process temperature and pressure capabilities are dependent upon information on the device nameplate. The reference drawing listed on the nameplate can be downloaded from the Siemens website. Go to the SITRANS Probe LU product page at: [www.siemens.com/probelu](http://www.siemens.com/probelu).



### Power

- Bus powered                      On PROFIBUS PA, as per IEC 61158-2
- Current consumed              12 mA (default value)<sup>2</sup>

### Performance

- Update time with 12 mA loop current<sup>2</sup>                      6.0 s (typical), maximum 16.0 s<sup>3</sup>

### Approvals

- General      CSA<sub>US/C</sub>, FM, CE
- Hazardous Intrinsically Safe      (Europe)      ATEX II 1 G Ex ia IIC T4 Ga  
   (US/Canada)      FM<sup>4</sup>/CSA<sup>4</sup>: barrier required  
   Class I, Div. 1, Groups A, B, C, D  
   Class II, Div. 1, Groups E, F, G  
   Class III      T4

<sup>1</sup>. For device nameplate see *Wiring setups for hazardous area installations* on page 7.

<sup>2</sup>. For 13, 15, or 20 mA options, see *PROFIBUS Current Consumption* on page 16.

<sup>3</sup>. Temperature dependent: typical value at +20 °C (+68 °F); max. value at +80 °C (+176 °F).

<sup>4</sup>. See *FM/CSA Intrinsically Safe Connection Drawing* on page 1 of Appendix A, for drawing number 23650617.

	(Brazil)	INMETRO: DNV 12.0084 X Ex ia IIC T4 Ga IP67/IP68 $-40^{\circ}\text{C} \leq T_a \leq +80^{\circ}\text{C}$ DNV #OCP 0017 ABNT NBR IEC 60079-0:2008 ABNT NBR IEC 60079-11:2009 e ABNT NBR IEC 60079-26:2008
Non-incendive	(US)	FM <sup>1</sup> : Class I, Div. 2, Groups A, B, C, D    T5

**Note:** Approved dust-tight and water-tight conduit seals are required for outdoor Type 4X / NEMA 4X, Type 6 / NEMA 6, IP67, IP68 locations..

## Installation



### ! WARNINGS:

- **Installation shall only be performed by qualified personnel and in accordance with local governing regulations.**
- **SITRANS Probe LU is to be used only in the manner outlined in this manual, otherwise protection provided by the equipment may be impaired.**

**Note:** Please refer to the device nameplate for approval information.

## Mounting location

### Recommendations

- Ambient temperature should be within  $-40$  to  $+80^{\circ}\text{C}$  ( $-40$  to  $+176^{\circ}\text{F}$ ).
- Provide easy access for viewing the display and programming via the handheld programmer.
- Provide an environment suitable to the housing rating and materials of construction.
- Keep the sound path perpendicular to the material surface.

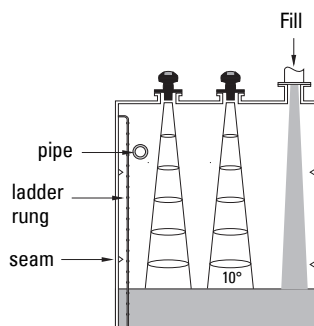
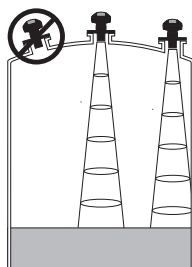
<sup>1</sup>. See *FM: Class I, Div. 2 Connection Drawing* on page 5 of Appendix A, for drawing number 23650583.

## Precautions

- Avoid proximity to high voltage or current wiring, high voltage or current contacts, and to variable frequency motor speed controllers.
- Avoid interference to the sound path from obstructions or from the fill path.

The sound path should be:

- perpendicular to the monitored surface
- clear of rough walls, seams, rungs, or other obstructions
- clear of the fill path



## Mounting instructions

**Note:** Ideally, mount SITRANS Probe LU so that the face of the transducer is at least 300 mm (1 ft) above the highest anticipated level.

SITRANS Probe LU is available in three thread types: 2" NPT, 2" BSP, or PF2/G (BS EN ISO 228-1).

1. Before inserting SITRANS Probe LU into its mounting connection, ensure that the threads are of the same type to avoid damaging them.
2. Simply screw SITRANS Probe LU into the process connection and hand tighten.

## Wiring

### Power

#### WARNINGS:



**DC terminals shall be supplied from an SELV<sup>1</sup> source in accordance with IEC-1010-1 Annex H.**



**All field wiring must have insulation suitable for rated voltages.**

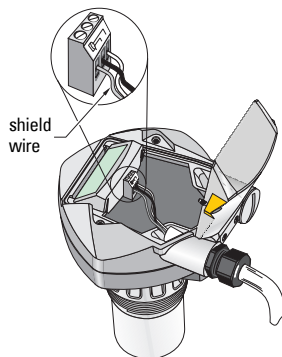
<sup>1</sup> Safety Extra Low Voltage

## Connecting SITRANS Probe LU (PROFIBUS PA)

### Note:

- For detailed wiring instructions, please see the full manual.
- For Intrinsically Safe setups (FM/CSA Class I, Div. 1), see *FM/CSA Intrinsically Safe Connection Drawing* on page 1 of Appendix A, for drawing number 23650617.
- For Non-Incendive setups (FM: Class I, Div. 2), see *FM: Class I, Div. 2 Connection Drawing* on page 5 of Appendix A, for drawing number 23650583.
- The non-metallic enclosure does not provide a continuous ground path between conduit connections: use grounding-type bushings and jumpers.
- Separate cables and conduits may be required to conform to standard instrumentation wiring practices, or electrical codes.

1. Strip the cable jacket for approximately 70 mm (2.75") from the end of the PROFIBUS PA cable, and thread the wires through the gland<sup>1</sup>.
2. Connect the wires to the terminal as shown: Probe LU (PROFIBUS PA) is not polarity-sensitive.
3. Ground the instrument according to local regulations.
  - For Intrinsically Safe applications, connect the cable shield to the instrument shield connection<sup>2</sup>, and ground the shield connection to an external ground that is connected to an equal-potential grounding grid. For more detail on Explosion Protection, you can download the brochure *Siemens Process Automation Explosion Protection* (part number A5E00265440) from [www.siemens.com/level](http://www.siemens.com/level), under Brochures/General.
  - For General Purpose applications, ground the shield at one point only (usually the power supply side) and continue the shield from device to device, connecting it to the shield connection in each Probe LU.
4. Tighten the gland to form a good seal.
5. Close the cover and tighten screws: **please do not overtighten screws**. Recommended torque is 0.5 to 1.1 N-m (5 to 10 in-lb).



**Note:** PROFIBUS PA must be terminated at both extreme ends of the cable for it to work properly. Please refer to the *PROFIBUS PA User and Installation Guidelines* (order number 2.092), available from [www.profibus.com](http://www.profibus.com).

<sup>1</sup> If cable is routed through conduit, use only approved suitable-size hubs for waterproof applications.  
<sup>2</sup> The instrument shield connection is internally connected to the external ground lug.

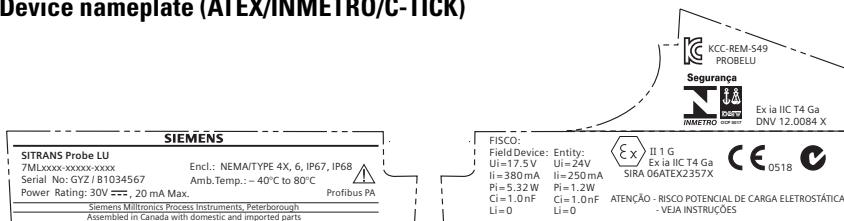


# Wiring setups for hazardous area installations

Always check the device nameplate and process device tag to verify the approval rating.

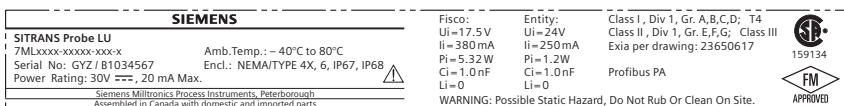
## 1. Intrinsically Safe wiring

### Device nameplate (ATEX/INMETRO/C-TICK)



The ATEX certificate can be downloaded from the product page of our website at: [www.siemens.com/probelu](http://www.siemens.com/probelu). Go to **Support > Approvals / Certificates**.

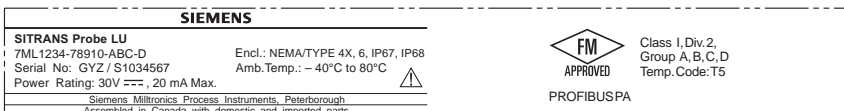
### Device nameplate (FM/CSA)



FM/CSA Intrinsically Safe connection drawing number **23650617** can be downloaded from the product page of our website at: [www.siemens.com/probelu](http://www.siemens.com/probelu). Go to **Support > Installation Drawings > Level Measurement > Continuous - Ultrasonic**.

- For wiring requirements: follow local regulations.
- Approved dust-tight and water-tight conduit seals are required for outdoor Type 4X / NEMA 4X, Type 6 / NEMA 6, IP67, IP68 locations.
- Refer to *Instructions specific to hazardous area installations (Reference European ATEX Directive 94/9/EC, Annex II, 1/0/6)* on page 8.

## 2. Non-incendive wiring (FM US only)



FM Class 1, Div 2 connection drawing number **23650583** can be downloaded from the product page of our website at: [www.siemens.com/probelu](http://www.siemens.com/probelu). Go to **Support > Installation Drawings > Level Measurement > Continuous - Ultrasonic**.

## Instructions specific to hazardous area installations (Reference European ATEX Directive 94/9/EC, Annex II, 1/0/6)

The following instructions apply to equipment covered by certificate number SIRA 06ATEX2357X:

1. For use and assembly, refer to the main instructions.
2. The equipment is certified for use as Category 1G equipment.
3. The equipment may be used with flammable gases and vapors with apparatus group IIC and temperature class T4.
4. The equipment is certified for use in an ambient temperature range of  $-40^{\circ}\text{C}$  to  $80^{\circ}\text{C}$ .
5. The equipment has not been assessed as a safety related device (as referred to by Directive 94/9/EC Annex II, clause 1.5).
6. Installation and inspection of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice (EN 60079-14 and EN 60079-17 in Europe).
7. Repair of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice (e.g. EN 60079-19 within Europe).
8. Components to be incorporated into or used as replacements in the equipment shall be fitted by suitably trained personnel in accordance with the manufacturer's documentation.
9. It is the responsibility of the user to ensure that manual override is possible in order to shut down the equipment and protective systems incorporated within automatic processes which deviate from the intended operating conditions, provided that this does not compromise safety.
10. The 'X' suffix to the certificate number relates to the following special conditions for safe use:
  - a. Parts of the enclosure may be non-conducting and may generate an ignition-capable level of electrostatic charge under certain extreme conditions. The user should ensure that the equipment is not installed in a location where it may be subjected to external conditions (such as high-pressure steam) which might cause a build-up of electrostatic charge on non-conducting surfaces.
  - b. As either Aluminum, Magnesium, Titanium or Zirconium may be used at the accessible surface of the equipment, in the event of rare incidents, ignition sources due to impact and friction sparks could occur. This shall be considered when the SITRANS Probe LU (PROFIBUS PA) is being installed in locations that specifically require group II, category 1G equipment.

11. The certification of this equipment relies upon the following materials used in its construction:

Aluminum alloy ANSI ref. A380.0 (aluminum enclosure option)  
 STYCAST<sup>1</sup> 2651-40FR encapsulant, catalyst II

The detailed composition of Aluminum A380.0 as used in the metal enclosure (threaded lid option only) is as follows:

Si – 8.5%, Fe – 1.3%, Cu – 3.5%, Mn – 0.5%, Mg – 0.1%, Ni – 0.1%, Zn – 3%,  
 Sn – 0.35%, others – 0.5%, Al - balance

If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.

Aggressive substances: e.g. acidic liquids or gases that may attack metals, or solvents that may affect polymeric materials.

Suitable precautions: e.g. regular checks as part of routine inspections or establishing from the material's data sheet that it is resistant to specific chemicals.

12. **Equipment Marking:**

The equipment marking contains at least the information on the product label, shown on the inside front cover of this manual.

## Communications via PROFIBUS PA

### Notes:

- The following instructions assume that the user is familiar with PROFIBUS PA.
- For a complete list of applicable parameters, please see the full manual.

### Configuring the PROFIBUS PA master

To configure SITRANS Probe LU on the network, you will need the GSD file. You can download the files (**SIEM8124.gsd** for the 6 m Probe LU, or **SIEM8123.gsd** for the 12 m Probe LU) from our web site. Go to the SITRANS Probe LU product page at: [www.siemens.com/probelu](http://www.siemens.com/probelu) and click **Downloads**.

### Startup

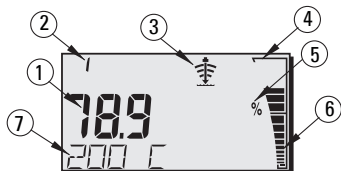
SITRANS Probe LU automatically starts up in **RUN** mode, and detects the material level. The LCD displays the material level referenced from the Low Level Point<sup>2</sup> (the output of Analog Input Function Block1/AIFB1). System status is displayed on the LCD, or on a remote communications terminal.

<sup>1</sup> STYCAST® is a registered trademark of the National Starch and Chemical Company.

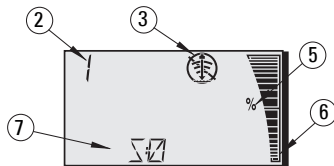
<sup>2</sup> See *Quick Setup* on page 14 for an illustration.

## Startup Display (RUN mode)

### Normal operation





### Failsafe operation



1 – Primary region displays material level (Output of the active AIFB)

2 – Menu number (displays the number of the active AIFB: 1 or 2)

3 – Echo status indicator: Reliable Echo  or Unreliable Echo 

(The Unreliable Echo border flashes if Loss of Echo (LOE) is pending<sup>1</sup>. When LOE becomes active, the border is solid and the secondary region displays **S:0.**)

4 – Bar graph border (always visible in RUN mode)

5 – Units or Percent

6 – Active bar graph represents material level

(The lowest bar flashes once per second as a heartbeat.)

7 – Secondary region displays one of the following:


- Internal electronics temperature
- Value representing echo confidence
- Distance (Secondary Value 2)
- General status information, or a fault code (see the full manual for a list of fault codes and their meanings)

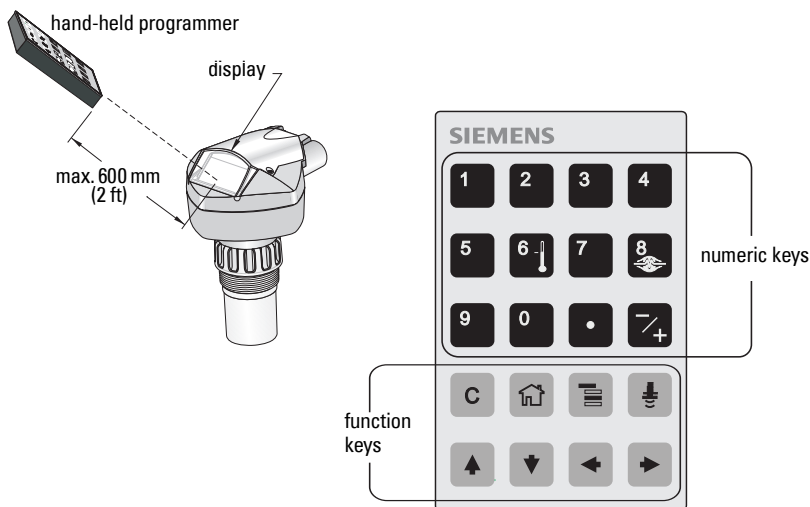
## Programming SITRANS Probe LU (PROFIBUS PA)

The parameters that control the operation of the Probe LU (PROFIBUS PA) are organized into function groups, and arranged in a 4-level menu structure that can be accessed either via the handheld programmer, or via PDM and PROFIBUS PA. (For charts showing the complete menu structure, refer to the full manual.)




<sup>1</sup>. For more details on Loss of Echo, refer to the full manual.

## The handheld programmer<sup>1</sup>

To activate PROGRAM mode, point the handheld programmer at the display from a maximum distance of 600 mm (2 ft), and press the Mode key .

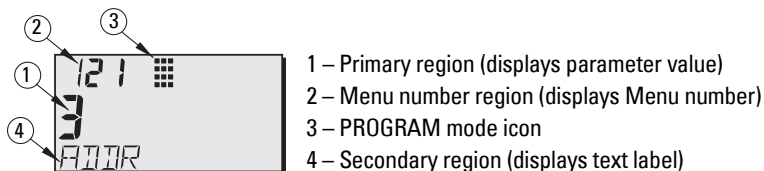


Within Program Mode, the handheld programmer has two modes of operation: Navigation and Edit.

- Press the Mode key  to switch from RUN to PROGRAM and enter Navigation Mode: the rightmost digit of the menu number flashes and the PROGRAM icon  is not visible.
- Press Right arrow a second time to change the mode from Navigation to Edit.
- In Edit mode, the PROGRAM icon  appears and flashes.

## PROGRAM Mode Display

**Note:** SITRANS Probe LU (PROFIBUS PA) continues to monitor In and Out values even when the device is in PROGRAM mode.



When you activate PROGRAM mode for the first time in any power cycle, the LCD displays the first menu. If, during the same power cycle, you switch to RUN mode, and then back to PROGRAM mode, the LCD will display the menu or item that was last accessed in PROGRAM mode.

<sup>1</sup>. For complete instructions on local programming using the handheld programmer, please see the full manual.

# Security

## Local operation enable

Local Operation can be enabled or disabled via PDM. Go to **Identification > Device > Local Operation Enable** and select the desired setting.


## Write Locking

Write locking prevents any changes to parameters via PDM or via the handheld programmer, but still allows access to the device.

Via PDM, open the menu **Device – Write Locking**, and select **Off** or **On**.

<b>Hand programmer values</b>	2457 (unlock value)	Off	Enables parameter changes
	any other value	On	Disables parameter changes


Via the handheld programmer:

- Open **Identification** Menu, then scroll down to CONFIG.
- Press **Right ARROW**  to open the Config Menu, then scroll down to LOCK.
  - 1. Identification**
    - 1.3. Configuration
      - 1.3.5. Lock
- To enable programming, set LOCK to **2457**. To disable programming, enter any other value.

## Remote operation enable

Remote Operation can be enabled or disabled via the handheld programmer.

<b>Values</b>	<b>0</b>	Off	Remote operation enabled.
	<b>1</b>	On	Remote operation disabled.

- Open **Identification** Menu, then scroll down to CONFIG.
- Press **Right ARROW**  to open the Config Menu, then scroll down to REMLOCK.
  - 1. Identification**
    - 1.2. Configuration
      - 1.2.2. Remote Lockout
- To enable programming, set REMLOCK to **0**. To disable programming, enter **1**.

## Master Reset

In PDM, open the menu **Device – Master Reset**, to access the reset options, including Factory Reset.

# Activating SITRANS Probe LU




**Note:** Keep infrared devices such as laptops, cell phones, and PDAs, away from SITRANS Probe LU (PROFIBUS PA) to prevent inadvertent operation.






Power up the instrument. SITRANS Probe LU (PROFIBUS PA) starts in **RUN** mode, and the LCD displays the output of AIFB1.

## Network Address (default 126)

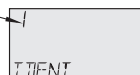
### Verifying/changing the device address via the handheld programmer

#### Notes:

- Local programming must be enabled, to allow changes (see *Local operation enable* on page 12).
- CLEAR**  can be used to clear the field.
- Press **Right ARROW**  to open Edit mode: the PROGRAM icon flashes.
- Press **Left ARROW**  to cancel Edit mode: the Menu number flashes (the PROGRAM icon is not visible).

- Press **Mode**  to activate **PROGRAM** mode and open Menu level 1.
- Press **Right ARROW**  twice to navigate to PROFIBUS Address.
- Press **Right ARROW**  again to open Edit mode: the PROGRAM icon will flash.
- Key in a new value and press **Right ARROW**  to accept it. (The LCD displays the new value, PROGRAM icon disappears, and the last menu digit flashes to indicate Navigation mode.)
- Press **Mode**  to return to RUN mode.

Menu level: last digit flashes in Navigation mode



Program icon: flashes in Edit mode



Right-most digit flashes in Navigation mode



## Performing calibration via PROFIBUS PA

To use PROFIBUS PA, you will need a PC configuration tool: we recommend SIMATIC PDM. Please consult the operating instructions or online help for details on using SIMATIC PDM. (An Application Guide *SIMPI PROFIBUS PA instruments and SIMATIC PDM* is available on our website at: [www.siemens.com/probelu](http://www.siemens.com/probelu).)

## Changing parameter settings

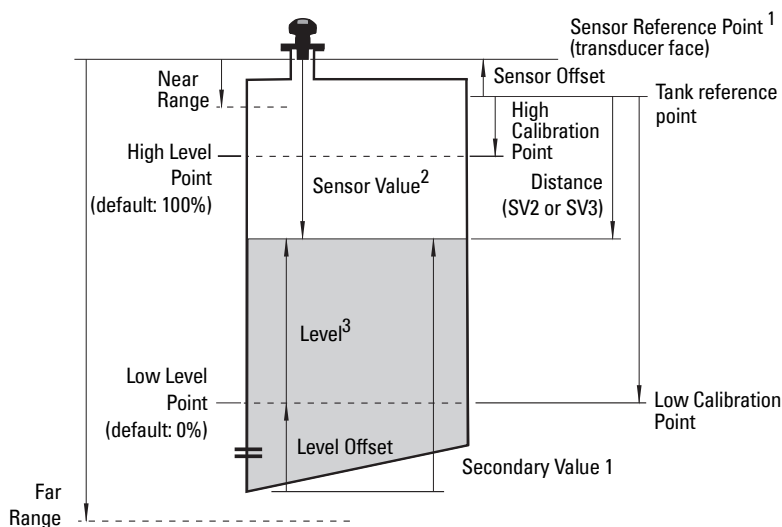
- First launch SIMATIC PDM, connect to SITRANS Probe LU (PROFIBUS PA), and upload data from the device.
- Adjust parameter values in the parameter view field (right side of screen).
- After adjusting the value, press **Enter** (the status fields read **Changed**).
- When you have completed the adjustments, open the **Device** menu, download data to the device, and save parameter settings offline (the status fields go blank).

## Quick Setup

Only four settings are required for a Quick Setup:

- High Calibration Point and High Level Point
- Low Calibration Point and Low Level Point

Primary Variable (PV) will be level (SV1). SV1 (Secondary Value 1) is the sum of Level plus Level Offset (if any).



## Calibration

1. Open the menu **Device – Sensor Calibration** and select the tab **Dry Calibration**. (Click on **Additional Information** to see the schematic showing the PROFIBUS parameters.)
2. Enter the new value for Low Calibration Point (default units are meters).
3. Enter the corresponding value for Low Level Point in percent (default is 0).
4. Enter the new value for High Calibration Point (default units are meters).
5. Enter the corresponding value for High Level Point in percent (default is 100).
6. Click on **Transfer**.
7. SITRANS Probe LU is now ready to operate.

- 
1. Sensor Reference Point: the point to which all of the above parameters are referenced.
  2. Sensor Value: the value produced by the echo processing, which represents the distance from the Sensor Reference Point to the target.
  3. Level Value: the level measured in level units.



## Auto False Echo Suppression

Enables a "learned" TVT curve to be used in place of the default TVT curve. Use this feature to ignore false echoes on the echo profile. Set Range (Auto False Echo Suppression Distance)<sup>1</sup> first, then set Auto False Echo Suppression.

### Range (Auto False Echo Suppression Distance)<sup>1</sup>: (default 1)

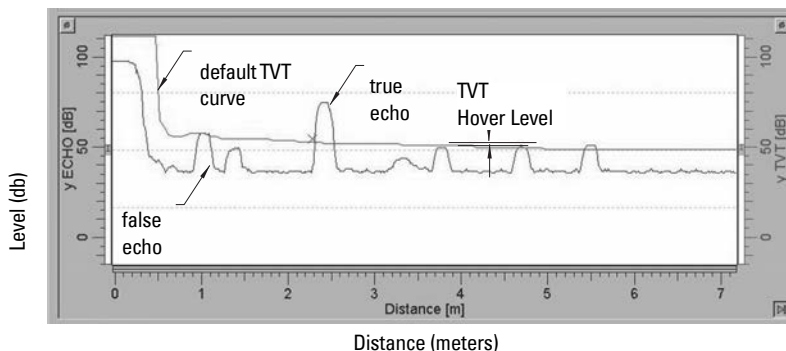
Defines the endpoint of the Learned TVT distance.

1. Rotate the instrument for best signal (lower false-echo amplitude).
2. Go to **Input > Detailed Setup > TVT setup > Distance**.
3. Determine the actual distance from the reference point (transducer face) to the material surface.
4. Subtract 0.5 m (20") from this distance, and enter the result.

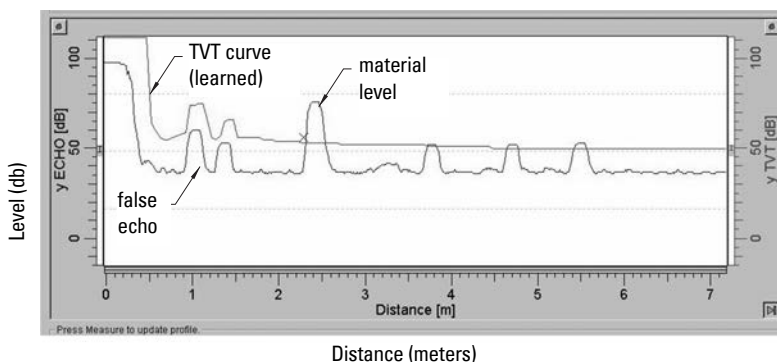
### Set Auto False Echo Suppression

1. Open the menu **Device – Auto False Echo Suppression** and select the option to change it.
2. Select **Learn**. The device will automatically revert to **On** (Use Learned TVT) after a few seconds.

### Display before Auto False Echo Suppression



### Display after Auto False Echo Suppression



<sup>1</sup> This parameter cannot be reset to the factory default.

## PROFIBUS Current Consumption

**Warning:** This parameter should be modified only once at installation, to match the design criteria of the network.

*Allows you to select the PROFIBUS device current. Higher values allow faster update rates.*

Values		Loop current	Update time <sup>1</sup>
0	*	12 mA	6.0 s (typical), maximum 16.0 s
1		13 mA	5.0 s (typical), maximum 14.0 s
2		15 mA	3.7 s (typical), maximum 8.0 s
3		20 mA	2.4 s (typical), maximum 4.0 s

Go to **Input > Standard Setup > PROFIBUS Current Consumption**, and enter the value corresponding to the desired device current.

## Maintenance

SITRANS Probe LU requires no maintenance or cleaning.

## Unit Repair and Excluded Liability

For detailed information, please see the inside back cover.

<sup>1</sup> Temperature dependent: typical value at +20 °C (+68 °F); maximum value at +80 °C (+176 °F).

# Appendix A: Connection Drawings

## FM/CSA Intrinsically Safe Connection Drawing

**Note:** Reference drawing 23650617 is available from the product page of our website at: [www.siemens.com/probelu](http://www.siemens.com/probelu).

### FISCO-Concept

The FISCO Concept allows interconnection of intrinsically safe apparatus to associated apparatus not specifically examined in such combination. The criteria for interconnection is that the voltage ( $U_i$  or  $V_{max}$ ), the current ( $I_i$  or  $I_{max}$ ) and the power ( $P_i$  or  $P_{max}$ ) which intrinsically safe apparatus can receive and remain intrinsically safe, considering faults, must be equal or greater than the voltage ( $U_o$  or  $V_{oc}$  or  $V_i$ ), the current ( $I_o$  or  $I_{sc}$  or  $I_i$ ) and the power ( $P_o$  or  $P_{max}$ ) levels which can be delivered by the associated apparatus, considering faults and applicable factors. In addition, the maximum unprotected capacitance ( $C_i$ ) and inductance ( $L_i$ ) of each apparatus (other than the termination) connected to the fieldbus must be less than or equal to 5 nF and 10  $\mu$ H respectively.

In each segment only one active device, normally the associated apparatus, is allowed to provide the necessary energy for the fieldbus system. The allowed voltage  $U_o$  (or  $V_{oc}$  or  $V_i$ ) of the associated apparatus is limited to the range of 14V dc to 24V dc. 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 50  $\mu$ A 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 $\Omega$ / km
inductance per unit length $L^*$ :	0,4 ... 1 mH / km
capacitance per unit length $C^*$ :	80 ... 200 nF / km

$C^* = C^*_{line/line} + 0.5 C^*_{line/screen}$ , if both lines are floating or

$C^* = C^*_{line/line} + C^*_{line/screen}$ , if the screen is connected to one line

Maximum allowed cable length:	CLASS I, ZONE 0 ia	CLASS I, ZONE 1 ib
Length of spur cable:	$\leq 30$ m	$\leq 30$ m
Length of trunk cable:	$\leq 1$ km	$\leq 5$ km
Total length (sum of trunk and spur cables)	$\leq 1$ km	$\leq 5$ km
Length of splice	$\leq 1$ m	$\leq 1$ m

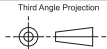
At each end of the trunk cable an approved infallible line termination with the following parameters is suitable:

$R = 90 \dots 100 \Omega$

$C = 0 \dots 2.2 \mu F$ .

One of the allowed terminations might already be integrated in the associated apparatus.

The number of passive devices connected to the bus segment is not limited due to I.S. reasons. If the above rules are respected, up to the specified total length, the inductance and capacitance of the cable will not impair the intrinsic safety or the installation.

1		CHANGE CI RATING PER ECO 79B35457		RPC	SN	JAN 19 / 2007
0		FOR CONSTRUCTION		RPC	SN	APRIL 18 / 2005
USE DIMENSIONS ONLY - DO NOT SCALE		Rev.		Revision / ECN Description		Date
DIMENSIONS ARE IN INCHES		Rev.		Drawn		Appr.
		Product Group: ULTRASONICS Date: 18 / APRIL / 2005 Drawn: R. CLYSDALE Checked: E. DeSIMONE Approved: S. NGUYEN Location: PETERBOROUGH SIEMENS MILLTRONICS PROCESS INSTRUMENTS INC. Peterborough, Ontario, Canada File No. 2365061701		Tolerance Unless Otherwise Noted: UOS 1 Place Decimal $\pm 0.03$ 2 Place Decimal $\pm 0.01$ 3 Place Decimal $\pm 0.002$ Angles: $\pm 0.5^\circ$		Scale: NTS Size: A
		TITLE: SITRANS Probe LU PROFIBUS PA CONNECTION DRAWING				
		DRAWING No: 23650617				Rev: 1
		Plot at: 1 : 1		Sheet 1 Of 4		

The number of passive devices connected to the bus segment is not limited due to I.S. reasons. If the above rules are respected, up to the specified total length, the inductance and capacitance of the cable will not impair the intrinsic safety or the installation.

**Notes:**

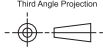
**INTRINSICALLY SAFE**

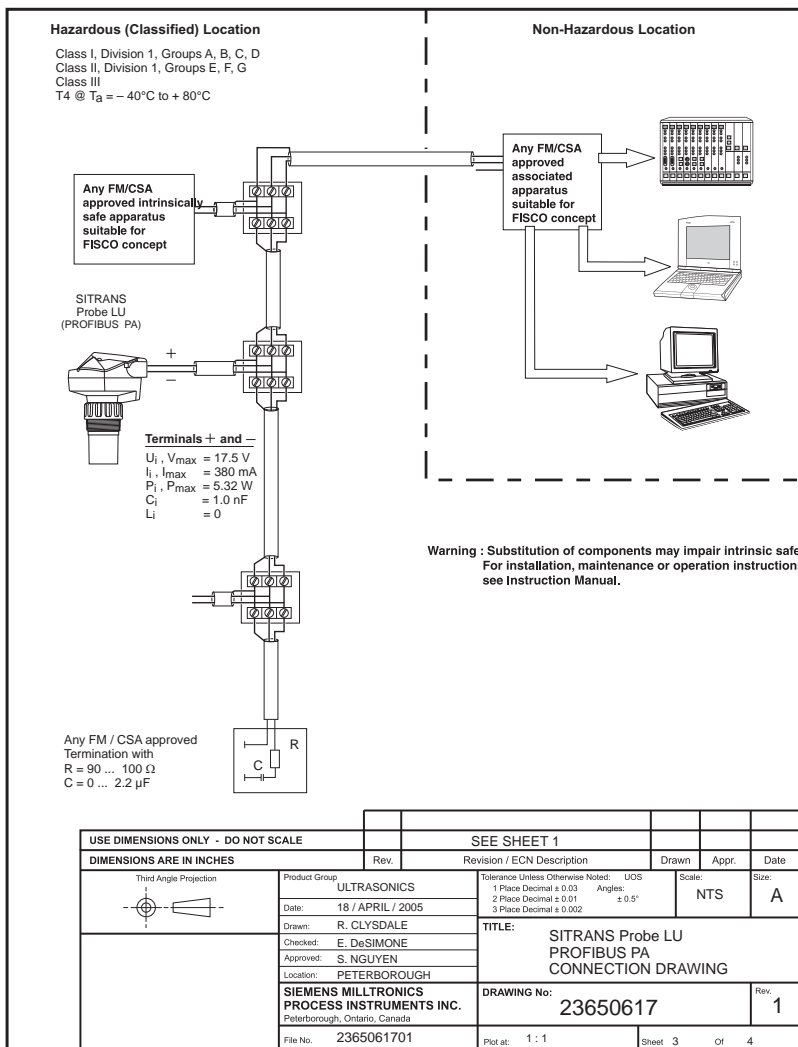
**CLASS I, II, III DIV. 1, GROUPS A, B, C, D, E, F, G**  
**CLASS I, ZONE 0/1 GROUPS IIB / IIC**

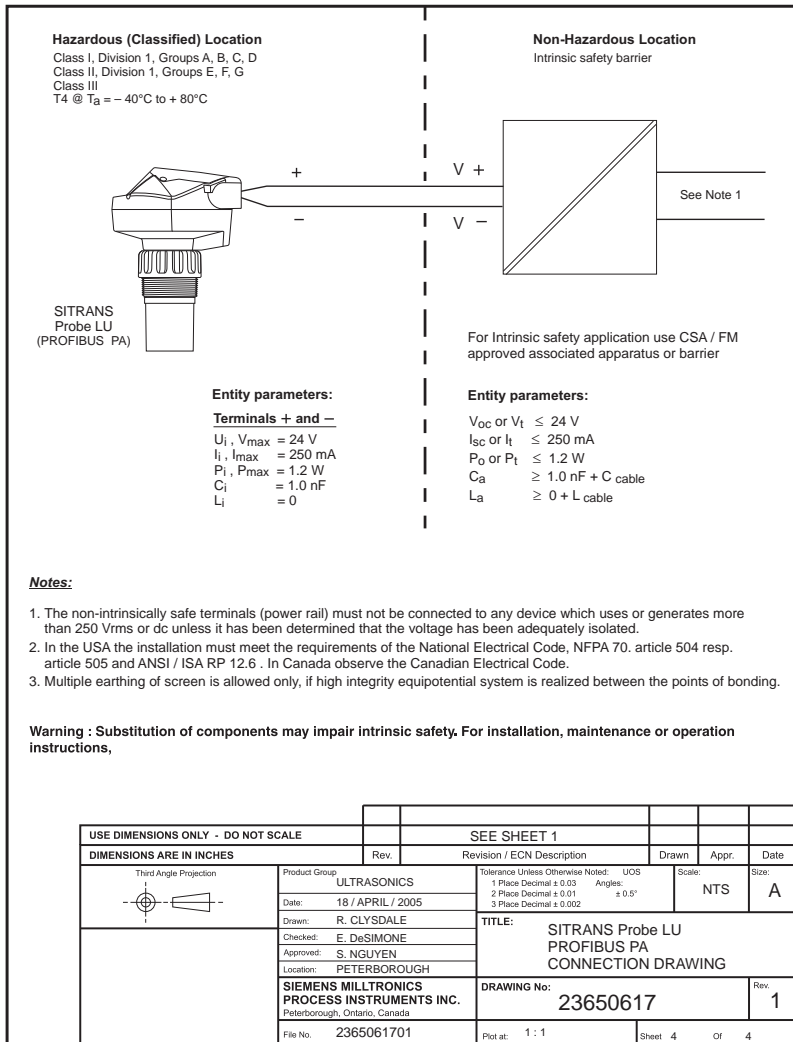
1. Approved apparatus must be installed in accordance with manufacturer instructions.
2. Approved associated apparatus must meet the following requirements:  
 $U_0$  or  $V_{oc}$  or  $V_t \leq U_i$  ( $V_{max}$ ) and  $I_0$  or  $I_{sc}$  or  $I_t \leq I_i$  ( $I_{max}$ ) and  $P_0$  or  $P_{max} \leq P_i$  ( $P_{max}$ )
3. The maximum non-hazardous area voltage must not exceed 250 V.
4. In the USA the installation must be in accordance with the National Electrical Code NFPA 70, Article 504, resp. Article 505 and ANSI/ISA-Rp 12.6 (except chapter 5). In Canada observe the Canadian Electrical Code.
5. Multiple earthing of screen is allowed only, if high integrity equipotential system is realized between the points of bonding.
6. **WARNING:** Substitution of components may impair intrinsic safety.

**FM applications: NONINCENDIVE, CLASS I, II, III DIV. 2, GROUPS A, B, C, D, E, F, G**

1. Intrinsic safety barrier not required. Max. supply voltage 30 V.
2. **WARNING:** Explosion Hazard - do not disconnect equipment unless power has been switched off or the area is known to be Non- Hazardous.
3. **WARNING:** Substitution of components may impair suitability for Class I, Division 2.

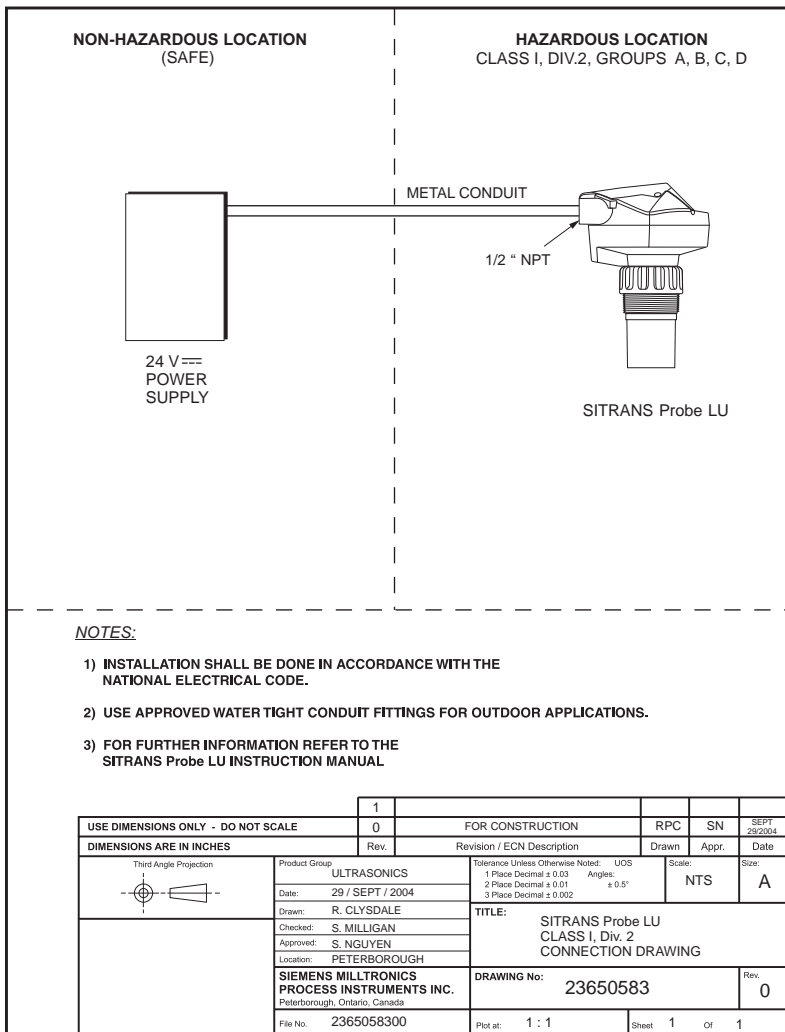
USE DIMENSIONS ONLY - DO NOT SCALE		SEE SHEET 1			
DIMENSIONS ARE IN INCHES		Rev.	Revision / ECN Description	Drawn	Appr. Date
	Product Group	ULTRASONICS		Tolerance Unless Otherwise Noted: UOS	Scale:
	Date:	18 / APRIL / 2005		1 Place Decimal $\pm 0.03$ 2 Place Decimal $\pm 0.01$ 3 Place Decimal $\pm 0.002$	Angles: $\pm 0.5^\circ$
	Drawn:	R. CLYSDALE		NTS	
	Checked:	E. DeSIMONE		<b>TITLE:</b> SITRANS Probe LU PROFIBUS PA CONNECTION DRAWING	
	Approved:	S. NGUYEN			
	Location:	PETERBOROUGH			
	<b>SIEMENS MILLTRONICS</b> <b>PROCESS INSTRUMENTS INC.</b> Peterborough, Ontario, Canada		<b>DRAWING No:</b> 23650617		Rev. 1
	File No.	2365061701		Plot at:	1 : 1
		Sheet	2	Of	4





# FM: Class I, Div. 2 Connection Drawing

**Note:** Reference drawing 23650583 is available from the product page of our website at: [www.siemens.com/probelu](http://www.siemens.com/probelu).



## For more information

[www.siemens.com/level](http://www.siemens.com/level)

[www.siemens.com/weighing](http://www.siemens.com/weighing)

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