Radar Transmitters

SITRANS LR250 (HART)

Operating Instructions · 01/2014

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.

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- 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

SITRANS

Radar Transmitters
SITRANS LR250 (HART)

Operating Instructions

01/2014
A5E32220602-AB

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER
indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING
indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION
indicates that minor personal injury can result if proper precautions are not taken.

NOTICE
indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

⚠ WARNING
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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SITRANS LR250 (HART)

Introduction 1

1.1 The manual

This manual will help you set up your radar device for optimum performance. For other Siemens Milltronics level measurement manuals, go to:

Siemens level (http://www.siemens.com/level)

Follow these operating instructions for quick, trouble-free installation, and maximum accuracy and reliability of your device.

We always welcome suggestions and comments about manual content, design, and accessibility. Please direct your comments to:

Technical publications (mailto:techpubs.smpi@siemens.com)

Note

This manual applies to the SITRANS LR250 mA/HART version only.

Application examples

The application examples used in this manual illustrate typical installations. [See Application examples (Page 52).] Because there is often a range of ways to approach an application, other configurations may also apply.

In all examples, substitute your own application details. If the examples do not apply to your application, check the applicable parameter reference for the available options.

Note

For industrial use only

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.

1.2   Firmware revision history

This history establishes the correlation between the current documentation and the valid firmware of the device.

The documentation of this edition is applicable for the following firmware:

Firmware rev.	PDM EDD rev.	Date	Changes
1.00.03	1.00.03	25 Feb 2007	• Initial release
1.01.00	1.01.00	27 Jul 2007	• EDD [a]/SIMATIC PDM: **View > Display > Distance** [b] correctly reported • EDD/SIMATIC PDM: Improved rendering of the echo profile and TVT
1.01.01	1.01.01	10 Jun 2008	• Maintenance release of firmware and EDD [a]
1.01.01	1.01.03	17 Jun 2008	• The internal EDD revision has been incremented
1.02.01	1.02.01	2 Apr 2009	• AMS EDD Rev. 1.02.01 • Support NAMUR NE 43 • Harmonization of menu structures and parameter names across products • Display indicates progress towards first measurement
1.02.03	1.02.01	16 June 2010	• Display contrast improvement • Antenna type parameter cannot be modified
1.03.02 (requires HW 2.0.0)	1.02.01	16 June 2010	• Low current HW 2.0.0 supported
1.03.03 (requires HW 2.0.0)	1.02.01	19 May 2011	• Threaded PVDF antenna supported
1.03.04	1.02.03	31 Oct 2012	• LUI updated version (new startup, progress bars, quick start updated to latest version, echo profile pan/zoom on display) • antenna parameter removed, default near range set at factory

[a] Electronic Device Description

[b] See **Sensor Mode (2.2.2.)** for an illustration of **Distance**.

Safety notes 2

2.1 Safety marking symbols

In manual	On product	Description
⚠	⚠	(Label on product: yellow background.) WARNING: refer to accompanying documents (manual) for details.

2.2 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.

Note

- 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 operating instructions, 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.

2.3   CE Electromagnetic Compatibility (EMC) Conformity

This equipment has been tested and found to comply with the following EMC Standards:

EMC Standard	Title
CISPR 11:2004/EN 55011:1998+A1:1999&A2:2002, CLASS B	Limits and methods of measurements of radio disturbance characteristics of industrial, scientific, and medical (ISM) radio-frequency equipment.
EN 61326:1997+A1:1998+A2:2001+A3:2003 (IEC 61326:2002)	Electrical Equipment for Measurement, Control and Laboratory Use – Electromagnetic Compatibility.
EN61000-4-2:2001	Electromagnetic Compatibility (EMC) Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test.
EN61000-4-3:2002	Electromagnetic Compatibility (EMC) Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test.
EN61000-4-4:2004	Electromagnetic Compatibility (EMC) Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test.
EN61000-4-5:2001	Electromagnetic Compatibility (EMC) Part 4-5: Testing and measurement techniques – Surge immunity test.
EN61000-4-6:2004	Electromagnetic Compatibility (EMC) Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields.
EN61000-4-8:2001	Electromagnetic Compatibility (EMC) Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test.

Description

3

3.1   SITRANS LR250 overview

⚠ WARNING
SITRANS LR250 is to be used only in the manner outlined in this manual, otherwise protection provided by the device may be impaired.

SITRANS LR250 is a 2-wire 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels including high pressure and high temperature, to a range of 20 meters (66 feet). It is ideal for small vessels and low dielectric media.

The device consists of an electronic circuit coupled to an antenna and either a threaded or flange type process connection.

This device supports HART communication protocol. HART® is a registered trademark of the HART Communication Foundation. Signals are processed using Process Intelligence which has been field-proven in over 1,000,000 applications worldwide (ultrasonic and radar).
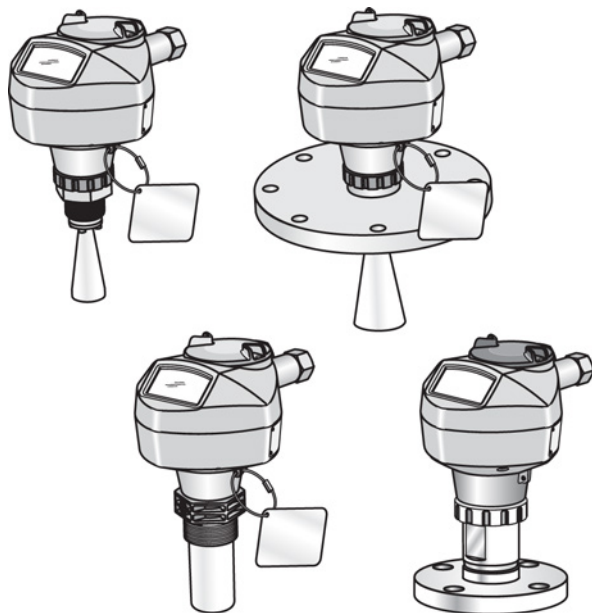
3.2 Programming

This device is very easy to install and configure via a graphical local user interface (LUI). You can modify the built in parameters either locally via the Siemens infrared handheld programmer, or from a remote location using one of the following options:

- SIMATIC PDM

- AMS Device Manager

- FDT/DTM platform (such as PACTware™ or FieldCare)

- HART Handheld 375/475

3.3 Applications

- liquids and slurries

- bulk storage vessels

- simple process vessels

3.4 Approvals and certificates

Note

For further details see Approvals (Page 187).

SITRANS LR250 is available with General Purpose approval, or for hazardous areas. In all cases, check the nameplate on your device, and confirm the approval rating.

Process Connections
A wide range of process connections and antenna options are available to suit virtually any vessel configuration.

Installing/mounting

<div style="text-align: right; font-size: 3em;">4</div>

⚠ WARNING

- Installation shall only be performed by qualified personnel and in accordance with local governing regulations.
- Handle the device using the enclosure, not the process connection tag, to avoid damage.
- Take special care when handling the threaded PVDF and Flanged encapsulated antennas. Any damage to the antenna surface, particularly to the tip/lens, could affect performance.
- 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.

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

4.1 Pressure applications

⚠ WARNING
Pressure applications
• Never attempt to loosen, remove, or disassemble process connection or device housing while vessel contents are under pressure.
• The user is responsible for the selection of bolting and gasket (except for Flanged encapsulated antenna) materials which will fall within the limits of the process connection and its intended use and which are suitable for the service conditions.
• For Flanged encapsulated antenna, lens acts as integral gasket, no other required
• Use spring washers for Flanged encapsulated antenna.
• Improper installation may result in loss of process pressure.

Note

• The process connection tag shall remain with the process pressure boundary assembly. (The process pressure boundary assembly comprises the components that act as a barrier against pressure loss from the process vessel: that is, the combination of process connection body and emitter, but normally excluding the electrical enclosure).

• SITRANS LR250 units are hydrostatically tested, meeting or exceeding the requirements of the ASME Boiler and Pressure Vessel Code and the European Pressure Equipment Directive.

4.1.1 Pressure Equipment Directive, PED, 97/23/EC

Siemens 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 or safety accessories (see EU Commission Guideline 1/8 and 1/20).

4.2 Mounting location

Note

- Correct location is key to a successful application.
- Avoid reflective interference from vessel walls and obstructions by following the guidelines below:

4.2.1 Nozzle design
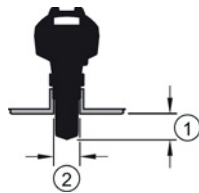
Threaded PVDF antenna   **Stainless steel horn antenna**   **Flanged encapsulated antenna**
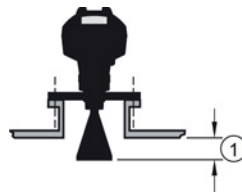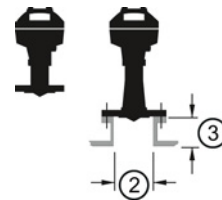
①   Minimum clearance: 10 mm (0.4")

②   Minimum diameter: 50 mm (2")

③   Maximum nozzle length: 500 mm (20")

- The end of the antenna must protrude a minimum of 10 mm (0.4") to avoid false echoes being reflected from the nozzle[1].
- Minimum recommended nozzle diameter for the threaded PVDF antenna is 50 mm (2").
- An antenna extension (100 mm/3.93") is available for any version except the Threaded PVDF and Flanged encapsulated antenna (FEA).
- The maximum nozzle length for the FEA is 500 mm (20").

[1] Not applicable for FEA

4.2.2   Nozzle Location

- Avoid central locations on tall, narrow vessels

- Nozzle must be vertical

| ✓✓ | Preferred |
| ⊘ | Undesirable |
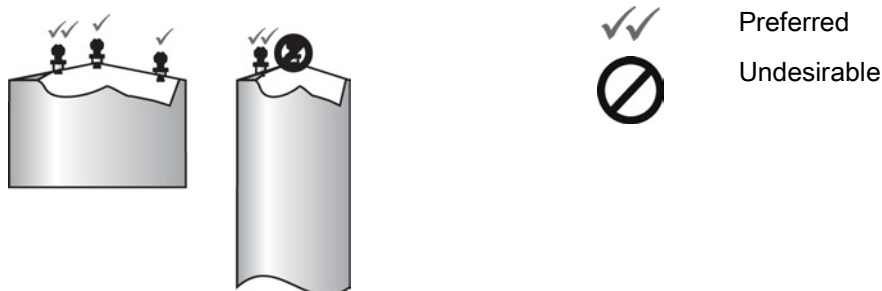
Environment

- Provide an environment suitable to the housing rating and materials of construction.

- Provide a sunshield if the device will be mounted in direct sunlight.
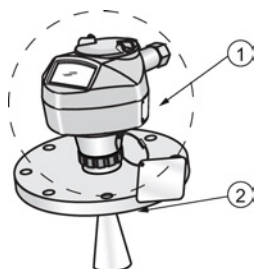
①   Ambient temperature
②   Process temperature (at process connection)

Antenna	①	②
Horn	-40 to +80 °C (-40 to +176 °F)	with FKM O-ring:-40 to +200 °C (-40 to 392 °F)
		with FFKM O-ring:-20 to +200 °C (-4 to +392 °F)
PVDF	-40 to +80 °C (-40 to +176 °F)	-40 to +80 °C (-40 to +176 °F)
Flanged encapsulated	-40 to +80 °C (-40 to +176 °F)	-40 to +170 °C (-40 to +338 °F)

Access for programming

- Provide easy access for viewing the display and programming via the handheld programmer.

Beam angle

Note

- Beam width depends on antenna size: see below.
- For details on avoiding false echoes, see Auto False Echo Suppression (Page 221).

- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the antenna.
- There is a signal transmitted outside the beam angle, therefore false targets may be detected.
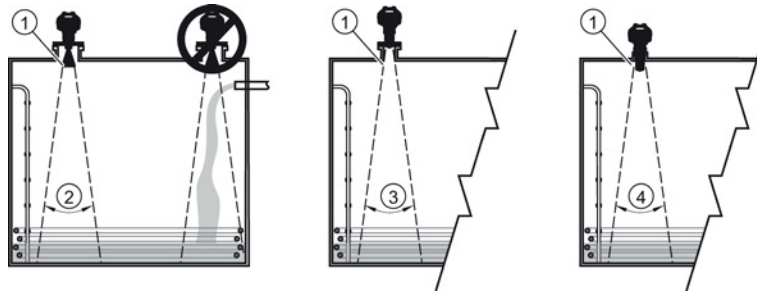
① Emission cone

		Size	Beam angle
②	Horn	1.5"	19°
		2"	15°
		3"	10°
		4"	8°
③	Flanged encapsulated	2"/DN50/50A	12.8°
		3"/DN80/80A	9.6°
		4"/DN100/100A	9.6°
		6"/DN150/150A	9.6°
④	Threaded PVDF		19°

Emission cone

- Keep emission cone free of interference from ladders, pipes, I-beams, or filling streams.

4.2.3 Orientation in a vessel with obstructions

Polarization reference point

For best results on a vessel with obstructions, or a stillpipe with openings, orient the front or back of the device toward the obstructions. For an illustration, see Device orientation (Page 21).
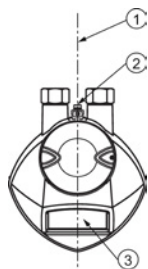
① Polarization axis
② Polarization reference point
③ Display

4.2.4 Mounting on a Stillpipe or Bypass Pipe

A stillpipe or bypass pipe is used for products with a low dK, or when vortex or extremely turbulent conditions exist. It can also be used to provide optimum signal conditions on foaming materials. See Dielectric constant of material measured in Performance (Page 182) for more information.

- The pipe diameter must be matched with the antenna size. Use the largest antenna size that will fit the stillpipe/bypass pipe[1]. See Threaded Horn dimensions or Raised-Face Flange per EN 1092-1 (Page 208).

- One continuous length of metallic pipe is preferred, without joints. Bad joints create reflections.

- Joints (if unavoidable) must be machined to ± 0.25 mm (± 0.010") and must have welded connecting sleeve on the outside.

[1] Mounting in a pipe greater than 100 mm (4") can cause large errors, and therefore is not recommended.

Suitable pipe diameters:	Horn antenna	40 to 100 mm (1.5 to 4")
	PVDF antenna	50 mm (2") only
	Flanged encapsulated antenna	50 to 100 mm (2 to 4")
Not recommended:	> 100 mm (4")	
Bypass vent:	Required at the upper end of the bypass [1]	

[1] To equalize pressure and keep the liquid level in the bypass constant with the liquid level in the vessel.

4.2.5 Device orientation

Bypass pipe installation

Stillpipe installation
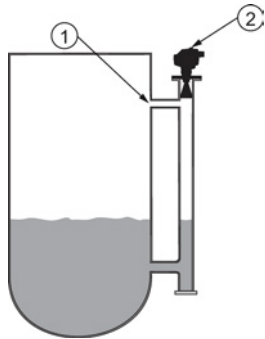
① Vent

② Align front or back of device with vents[1]
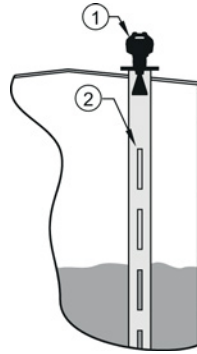
① Align front or back of device with stillpipe slots[1]

② Slots

[1] Horn antenna version shown as example

4.3 Installation instructions

> ⚠ **WARNING**
>
> For pressure applications, it will be necessary to use PTFE tape or other appropriate thread sealing compound, and to tighten the process connection beyond hand-tight. (The maximum recommended torque for Threaded versions is 40 N-m (30 ft.lbs.) See Flange bolting, Flanged encapsulated antenna only (Page 22) for FEA recommended torque values.)

Note

- On devices with a removable head, there is no limit to the number of times a device can be rotated without damage.
- When mounting, orient the front or back of the device towards the closest wall.
- Do not rotate the enclosure after programming and vessel calibration, otherwise an error may occur, caused by a polarity shift of the transmit pulse.

Threaded versions

1. Before inserting the device into its mounting connection, check to ensure the threads are matching, to avoid damaging them.

2. Simply screw the device into the process connection, and hand tighten, or use a wrench. For pressure applications see Warning above.

Flanged versions

See Flanged Horn with extension (Page 196), Raised-Face Flange per EN 1092-1 (Page 208), Flat-Face Flange (Page 211), and Flanged encapsulated antenna (3"/DN80/80A sizes and larger) (Page 202) for dimensions.

4.4 Flange bolting, Flanged encapsulated antenna only

Note

- Use spring washers
- Do not use additional gasket
- Use recommended torque values for tightening bolts

Flange bolting: recommended torque

Pressure class	Nominal pipe size (NPS)	Number of bolts	Recommended torque (Nm)
ASME B16.5, Class 150	2"	4	30 – 50
	3"		50 – 70
	4"	8	40 – 60
	6"		70 – 90
EN1092-1, PN16 / JIS B 2220, 10K	DN50/50A	4	30 – 50
	DN80/80A	8	
	DN100/100A		
	DN150/150A		60 – 80
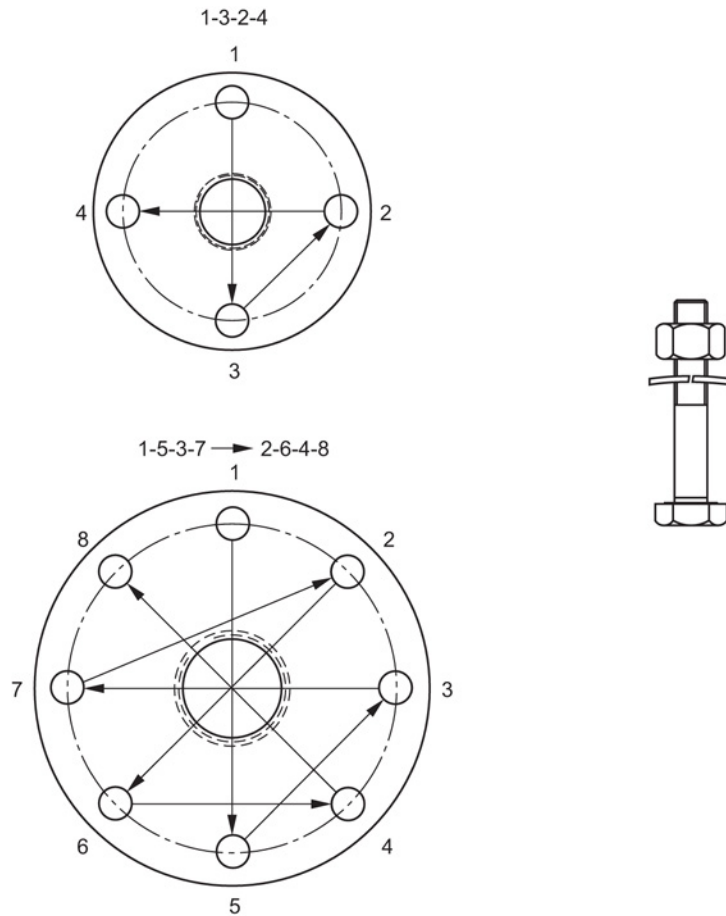
Recommendations for flange bolting:

- Use cross-pattern sequence as shown

- Check uniformity of the flange gap

- Apply adjustments by selective tightening if required

- Torque incrementally until desired value is reached

- Check/re-torque after 4 to 6 hours

- Check bolts periodically, re-torque as required

- Use new lens, O-ring and spring washers after removal from installation.

For instructions on replacing the lens, see Part replacement (Page 169).

Connecting 5

5.1 Power

⚠ WARNING
The DC input terminals shall be supplied from a source providing electrical isolation between the input and output, in order to meet the applicable safety requirements of IEC 61010-1.

Note

All field wiring must have insulation suitable for rated voltages.

5.2 Connecting SITRANS LR250

⚠ **WARNING**

- Check the nameplate on your device, to verify the approval rating.
- Use appropriate conduit seals to maintain IP or NEMA rating.
- See Wiring setups for hazardous area installations (Page 28).

Note

- Separate cables and conduits may be required to conform to standard instrumentation wiring practices or electrical codes.

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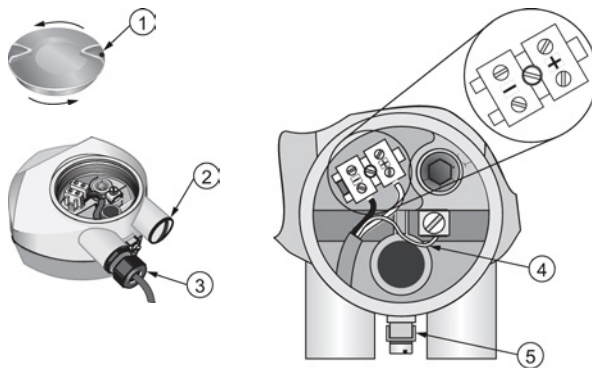
①	Use a 2 mm Allen key to loosen the lid-lock set screw	④	Cable shield
②	Plug (IP 68)	⑤	Ground terminal
③	Optional cable gland [a] [b] (or NPT cable entry)[b]		

[a] May be shipped with the device.

[b] If cable is routed through conduit, use only approved suitable-size hubs for waterproof applications.

Wiring instructions

1. Strip the cable jacket for approximately 70 mm (2.75") from the end of the cable, and thread the wires through the gland. (If cable is routed through conduit, use only approved suitable-size hubs for waterproof applications.)

2. Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

3. Ground the device according to local regulations.

4. Tighten the gland to form a good seal.

5. Close the lid and secure the locking screw before programming and device configuration.

Connecting HART

Typical PLC/mA configuration with HART

①	Power supply	④	Active PLC
②	SITRANS LR250	⑤	HART modem
③	R = 250 Ω	⑥	HART communicator
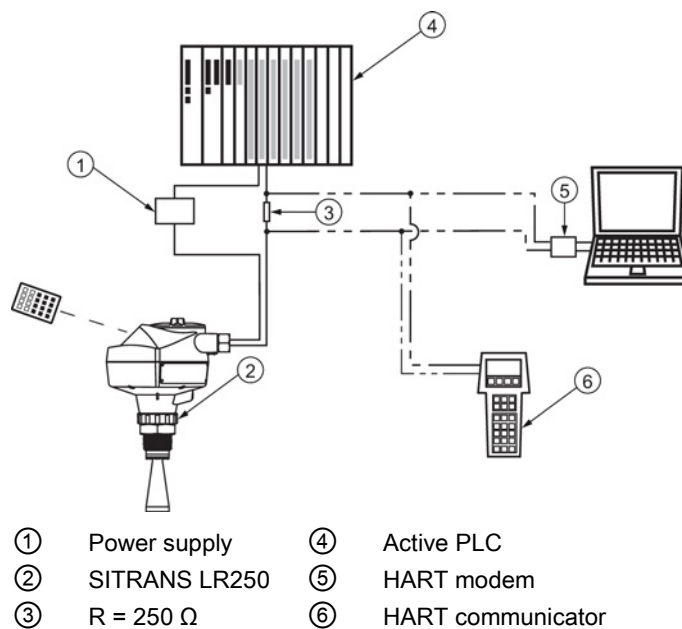
Note

- Depending on the system design, the power supply may be separate from the PLC, or integral to it.

- HART resistance (total loop resistance, that is, cable resistance plus 250 Ohm [resistor]) must be limited according to the allowable operating area as shown in either Curve 1 (Page 237) (General Purpose, Intrinsically Safe, Non-Sparking, Non-incendive) or Curve 2 (Page 238) (Flameproof, Increased Safety, Explosion-proof).

5.3 Wiring setups for hazardous area installations

There are six wiring options for hazardous area installations:

- Intrinsically Safe wiring (Page 28)

- Non-Sparking wiring (Page 30)

- Non-incendive wiring (US/Canada only) (Page 30)

- Flameproof wiring (Page 31)

- Increased safety wiring (Page 32)

- Explosion-proof wiring (US/Canada only) (Page 32)

In all cases, check the nameplate on your instrument, confirm the approval rating, and perform installation and wiring according to your local safety codes.

5.3.1 Intrinsically safe wiring

Device nameplate (ATEX/IECEX/INMETRO/C-TICK)
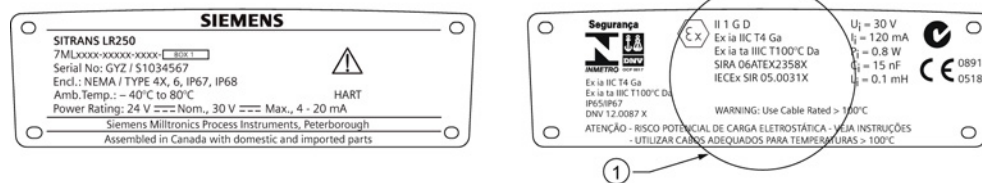
① ATEX certificate

The ATEX certificate listed on the nameplate can be downloaded from our website:

Product page (http://www.siemens.com/LR250)

Go to **Support > Approvals / Certificates.**

The IECEx certificate listed on the nameplate can be viewed on the IECEx website. Go to:

IECEx (http://iecex.iec.ch/)

Click on **Certified Equipment** then enter the certificate number IECEx SIR 05.0031X.

Device nameplate (FM/CSA)
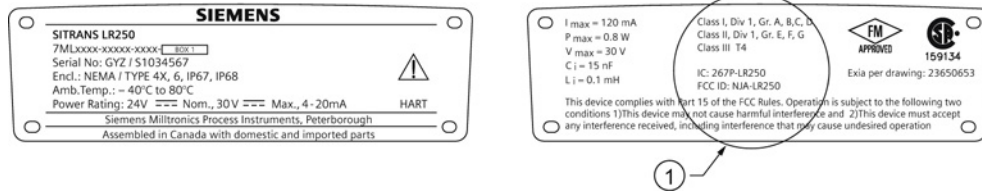
①   FM/CSA Intrinsically Safe connection drawing

FM/CSA Intrinsically Safe connection drawing number 23650653 can be downloaded from our website:

Product page (http://www.siemens.com/LR250)

Go to **Support > Installation Drawings > Level Measurement > SITRANS LR250**.

- For power demands see Curve 1 (General Purpose, Intrinsically Safe, Non-Sparking, Non-incendive) (Page 237).

- For wiring requirements: follow local regulations.

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

- Refer to Instructions specific to hazardous area installations (Page 33).

Note

Selecting a suitable PLC input module or power supply requires knowledge about Intrinsic Safety and the application. It is the responsibility of the installer to ensure that the intrinsically safe installation complies with both the apparatus approval requirements and the relevant national code of practice.

5.3.2 Non-sparking wiring
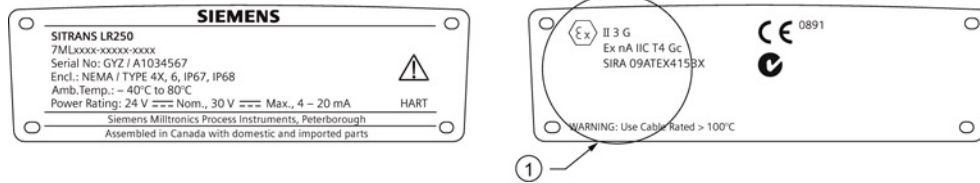
① ATEX certificate

The ATEX certificate listed on the nameplate can be downloaded from our website:

Product page (http://www.siemens.com/LR250)

Go to: **Support > Approvals / Certificates**.

- For power demands see Curve 1 (General Purpose, Intrinsically Safe, Non-Sparking/Energy Limited, Non-incendive) (Page 237).

- For wiring requirements follow local regulations.

5.3.3 Non-incendive wiring (US/Canada only)
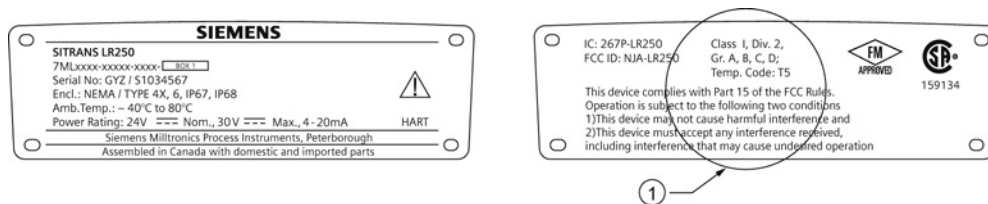
① FM/CSA Class 1, Div 2 connection drawing number 23650673

FM/CSA Class 1, Div 2 connection drawing number 23650673 can be downloaded from our website:

Product page (http://www.siemens.com/LR250)

Go to **Support > Installation Drawings > Level Measurement > SITRANS LR250.**

- For power demands see Curve 1 (General Purpose, Intrinsically Safe, Non-Sparking, Non-incendive) (Page 237).

5.3.4   Flameproof wiring
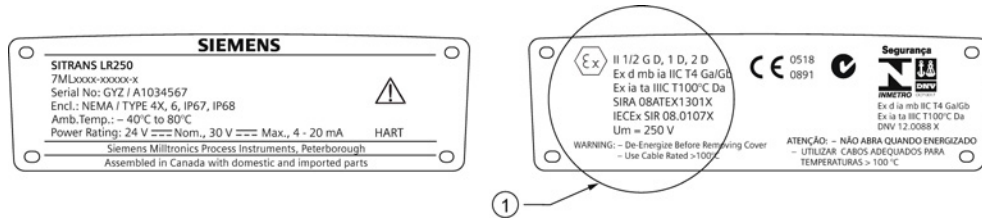
① ATEX certificate

The ATEX certificate listed on the nameplate can be downloaded from our website:

Product page (http://www.siemens.com/LR250)

Go to **Support > Approvals / Certificates**.

The IECEx certificate listed on the nameplate can be viewed on the IECEx website. Go to:

IECEx (http://iecex.iec.ch/)

Click on **Certified Equipment** then enter the certificate number IECEx SIR 08.0107X.

● For power demands see Curve 2 (Flameproof, Increased Safety, Explosion-proof) (Page 238).

● For wiring requirements follow local regulations.

● See also Instructions specific to hazardous area installations (Page 33) and the ATEX certificate listed above.

5.3.5 Increased safety wiring
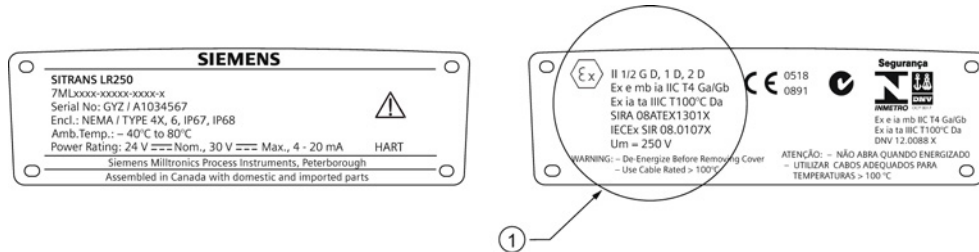
① Certificate

The ATEX certificate can be downloaded from the product page of our website:

Product page (http://www.siemens.com/LR250)

Go to **Support > Approvals / Certificates**.

The IECEx certificate listed on the nameplate can be viewed on the IECEx website:

IECEx (http://iecex.iec.ch/)

Click on **Certified Equipment** then enter the certificate number IECEx SIR 08.0107X.

● For power demands see Curve 2 (Flameproof, Increased Safety, Explosion-proof) (Page 238).

● For wiring requirements follow local regulations.

● See also Instructions specific to hazardous area installations (Page 33) and the ATEX certificate listed above.

5.3.6 Explosion-proof wiring (US/Canada only)
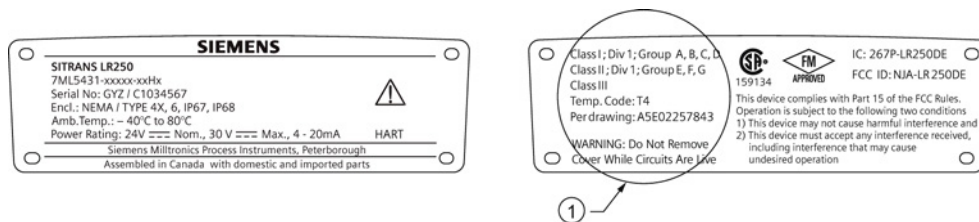
① FM/CSA Explosion Proof connection drawing

FM/CSA Explosion Proof connection drawing number A5E02257843 can be downloaded from our website:

Product page (http://www.siemens.com/LR250)

Go to **Support > Installation Drawings > Level Measurement > SITRANS LR250**

● For power demands see Curve 2 (Flameproof, Increased Safety, Explosion-proof) (Page 238).

5.4 Instructions specific to hazardous area installations

5.4.1 (Reference European ATEX Directive 94/9/EC, Annex II, 1/0/6)

The following instructions apply to equipment covered by certificate number SIRA 06ATEX2358X, SIRA 08ATEX1301X, and SIRA 09ATEX4153X.

1. For use and assembly, refer to the main instructions.

2. The equipment is certified for use as Category 1GD equipment per SIRA 06ATEX2358X; Category 1/2 GD, 1D, 2D equipment per SIRA 08ATEX1301X; and Category 3G equipment per SIRA 09ATEX4153X.

3. The equipment may be used with flammable gases and vapors with apparatus group IIC, IIB and IIA and temperature classes T1, T2, T3 and T4.

4. The equipment has a degree of ingress protection of IP67 and a temperature class of T100 °C and may be used with flammable dusts.

5. The equipment is certified for use in an ambient temperature range of –40 °C to +80 °C.

6. The equipment has not been assessed as a safety related device (as referred to by Directive 94/9/EC Annex II, clause 1.5).

7. 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).

8. The equipment is non-repairable.

9. The certificate numbers have an 'X' suffix, which indicates that special conditions for safe use apply. Those installing or inspecting this equipment must have access to the certificates.

10. 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: for example, acidic liquids or gases that may attack metals, or solvents that may affect polymeric materials.

    – Suitable precautions: for example, establishing from the material's data sheet that it is resistant to specific chemicals.

Commissioning

6

6.1 Operating via the handheld programmer

6.1.1 Power up

Power up the device. A transition screen showing first the Siemens logo and then the current firmware revision is displayed while the first measurement is being processed. The first time the device is configured, you will be prompted to select a language (English, German, French, or Spanish). To change the language again, see **Language (7.)**.

Press **Mode** to toggle between Measurement and Program mode.

6.1.2 Handheld programmer functions

The radar device carries out its level measurement tasks according to settings made via parameters. The settings can be modified locally via the Local User Interface (LUI) which consists of an LCD display and a handheld programmer.

A Quick Start Wizard provides an easy step-by-step procedure to configure the device for a simple application. Access the wizards:

*   locally [see Quick Start Wizard via the handheld programmer (Page 46)]

*   or from a remote location [see Quick Start Wizard via SIMATIC PDM (Page 65),
    or Quick Start Wizard via AMS Device Manager (Page 92)]

For more complex setups see Application Examples (Page 52), and for the complete range of parameters see Parameter Reference (Page 113).

6.1.2.1 The LCD display

Measurement mode display

Normal operation
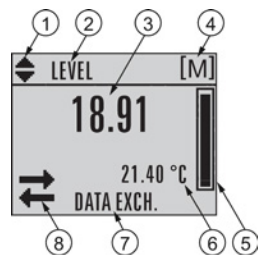
①   Toggle indicator [a)] for linear units or %
②   Selected operation: level, space, distance, or volume
③   Measured value (level, space, distance, or volume)
④   Units
⑤   Bar graph indicates level
⑥   Secondary region indicates on request [b)] electronics temperature, echo confidence, loop current, or distance
⑦   Text area displays status messages
⑧   Device status indicator, see Device status icons (Page 172)

[a)] Press **UP** or **DOWN** arrow to switch.

[b)] In response to a key press request. For details, see Handheld Programmer (Page 38) for key functions in Measurement mode.

Fault present
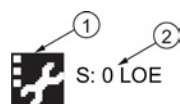
①   Device status indicator, see Device status icons (Page 172)
②   Text area displays status messages

PROGRAM mode display

Navigation view
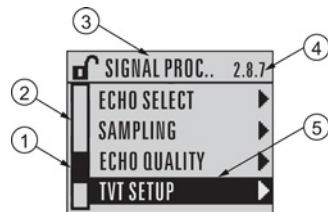
①	Item band	④	Current item number
②	Menu bar	⑤	Current item
③	Current menu		

- A visible menu bar indicates the menu list is too long to display all items.

- A band halfway down the menu bar indicates the current item is halfway down the list.

- The depth and relative position of the item band on the menu bar indicates the length of the menu list, and approximate position of the current item in the list.

- A deeper band indicates fewer items.

Parameter view
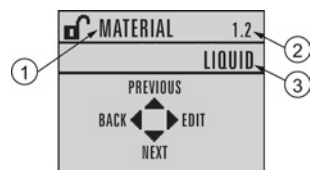
Edit view

①	Parameter name
②	Parameter number
③	Parameter value/selection
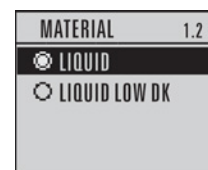
6.1.2.2   Handheld programmer (Part No. 7ML1930-1BK)

The programmer is ordered separately.

Key functions in measurement mode

Key	Function	Result
5	Updates the loop current	New value is displayed in LCD secondary region.
6	Updates internal enclosure temperature reading	
8	Updates echo confidence value	New value is displayed in LCD secondary region.
	Updates distance measurement	
	Mode opens PROGRAM mode	Opens the menu level last displayed in this power cycle, unless power has been cycled since exiting PROGRAM mode or more than 10 minutes have elapsed since PROGRAM mode was used. Then top level menu will be displayed.
	RIGHT arrow opens PROGRAM mode	Opens the top level menu.
	UP or **DOWN arrow** toggles between linear units and percent	LCD displays measured value in either linear units or percent.

6.1.3 Programming

Note

- While the device is in PROGRAM mode the output remains fixed and does not respond to changes in the device.
- The device automatically returns to Measurement mode after a period of inactivity in PROGRAM mode (between 15 seconds and 10 minutes, depending on the menu level).

Change parameter settings and set operating conditions to suit your specific application. For remote operation see Operating via SIMATIC PDM (Page 61) or Operating via AMS Device Manager (Page 88).

Parameter menus

Note

For the complete list of parameters with instructions, see Parameter Reference (Page 113).

Parameters are identified by name and organized into function groups. See LCD menu structure (Page 247).

1. QUICK START
2. SETUP
       2.1. DEVICE
       ....
       2.7. LINEARIZATION
             2.7.1. VOLUME
                   2.7.1.1. VESSEL SHAPE
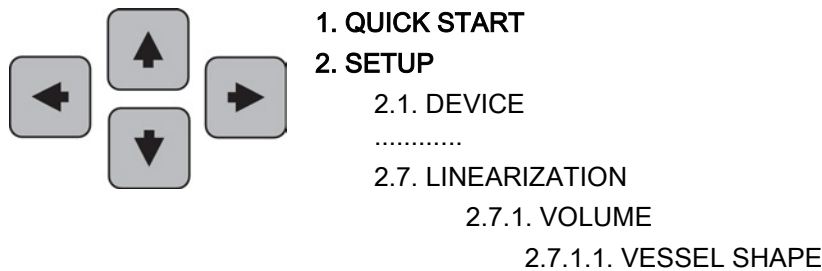
1. Enter PROGRAM mode

- Point the programmer at the display from a maximum distance of 300 mm (1 ft).

- **RIGHT arrow** ▶ activates PROGRAM mode and opens menu level 1.

- **Mode** ▣ opens the menu level last displayed in PROGRAM mode within the last 10 minutes, or menu level 1 if power has been cycled since then.
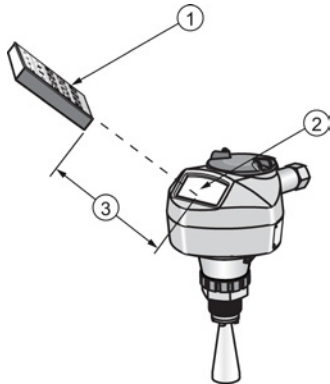
①	Handheld programmer
②	Display
③	Maximum distance: 300 mm (1 ft)

2. Navigating: key functions in Navigation mode

Note

- In Navigation mode **ARROW** keys move to the next menu item in the direction of the arrow.

- For Quick Access to parameters via the handheld programmer, press Home 🔲 , then enter the menu number, for example: **2.7.1.** (Volume).

Key	Name	Menu level	Function
	UP or **DOWN arrow**	menu or parameter	Scroll to previous or next menu or parameter
	RIGHT arrow	menu	Go to first parameter in the selected menu, or open next menu.
		parameter	Open **Edit** mode.
	LEFT arrow	menu or parameter	Open parent menu.
	Mode	menu or parameter	Change to **MEASUREMENT** mode.
	Home	menu or parameter	Open top level menu: menu 1.

3. Editing in PROGRAM mode

1. Navigate to the desired parameter.

2. Press **RIGHT arrow** ▸ to open parameter view.

3. Press **RIGHT arrow** ▸ again to open **Edit** mode. The current selection is highlighted. Scroll to a new selection.

4. Press **RIGHT arrow** ▸ to accept it.

The LCD returns to parameter view and displays the new selection.
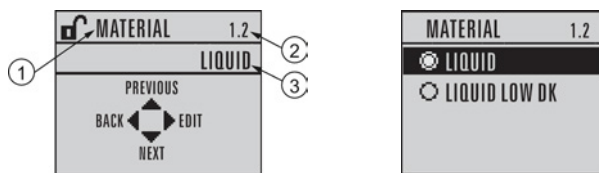
①	Parameter name
②	Parameter number
③	Current selection

Changing a numeric value

1. Navigate to the desired parameter.

2. Press **RIGHT arrow** ▶ to open parameter view. The current value is displayed.

3. Press **RIGHT arrow** ▶ again to open **Edit** mode. The current value is highlighted.

4. Key in a new value.

5. Press **RIGHT arrow** ▶ to accept it.

The LCD returns to parameter view and displays the new selection.
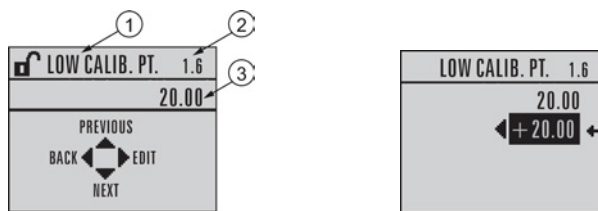
①	Parameter name
②	Parameter number
③	Current selection

Key functions in edit mode

Key	Name	Function	
	UP or **DOWN arrow**	Selecting options	Scrolls to item.
		Numeric editing	• Increments or decrements digits • Toggles plus and minus sign
	RIGHT arrow	Selecting options	• Accepts the data (writes the parameter) • Changes from **Edit** to **Navigation** mode
		Numeric editing	• Moves cursor one space to the right • or, with cursor on Enter sign, accepts the data and changes from **Edit** to **Navigation** mode
	LEFT arrow:	Selecting options	Cancels **Edit** mode without changing the parameter.
		Numeric editing	• Moves cursor to plus/minus sign if this is the first key pressed • or moves cursor one space to the left
	Clear	Numeric editing	Erases the display.
	Decimal point	Numeric editing	Enters a decimal point.
	Plus or minus sign	Numeric editing	Changes the sign of the entered value.
	Numeral to	Numeric editing	Enters the corresponding character.

6.1.3.1 Quick Start Wizard via the handheld programmer

Note

- A reset to factory defaults should be performed before running the Quick Start Wizard if the device has been used in a previous application. See **Master Reset (4.1.)**.
- The Quick Start wizard settings are inter-related and changes apply only after you select **Finish** in the Wizard Complete step.
- Do not use the Quick Start wizard to modify parameters: see instead Parameter Reference (Page 113). (Perform customization for your application only after the Quick Start has been completed).
- Default settings in the parameter tables are indicated with an asterisk (*).

1. Quick Start

1.1. Quick Start Wiz

1. Point the programmer at the display from a maximum distance of 300 mm (1 ft), then press **RIGHT arrow** ▶ to activate PROGRAM mode and open menu level 1.

2. Press **RIGHT arrow** ▶ twice to navigate to menu item 1.1 and open parameter view.

3. Press **RIGHT arrow** ▶ to open Edit mode or DOWN arrow to accept default values and move directly to the next item.

4. To change a setting, scroll to the desired item or key in a new value.

5. After modifying a value, press **RIGHT arrow** ▶ to accept it and press **DOWN arrow** ▼ to move to the next item.

6. Quick Start settings take effect only after you select **Finish.**

Material

Selects the appropriate echo processing algorithms for the material [see **Position Detect (2.8.4.2.)** for more detail].
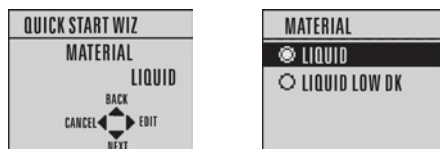
Options	*	LIQUID
		LIQUID LOW DK [a] (low dielectric liquid – CLEF algorithm enabled)

[a] dK < 3.0

Response Rate

Sets the reaction speed of the device to measurement changes in the target range. Use a setting just faster than the maximum filling or emptying rate (whichever is greater).
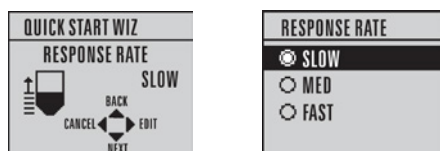
Options		Response Rate (1.3.)	Fill rate per Minute (2.4.2.)/Empty rate per Minute (2.4.3.)
	*	SLOW	0.1 m/min (0.32 ft/min)
		MED	1.0 m/min (3.28 ft/min)
		FAST	10.0 m/min (32.8 ft/min)

Units

Sensor measurement units.
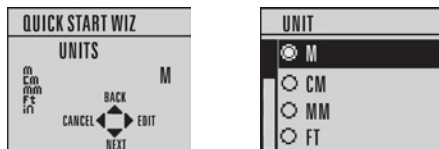
Options	m, cm, mm, ft, in.
	Default: m

Operation
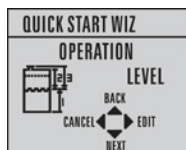
Operation		Description
NO SERVICE		Measurement and associated loop current are not updated, and the device defaults to Fail-safe mode [a].
LEVEL	*	Distance to material surface referenced from Low Calibration Point
SPACE		Distance to material surface referenced from High Calibration Point
DISTANCE		Distance to material surface referenced from Sensor reference point

[a] See **Material Level (2.5.1.)** for more detail.
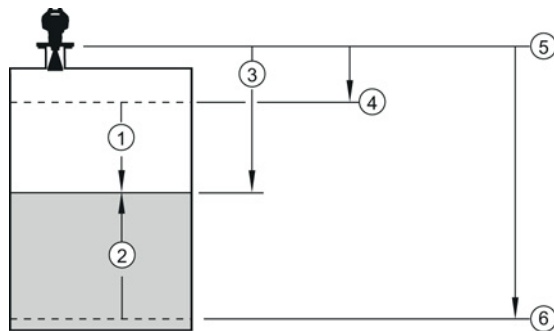
①	Space	④	High Calibration Point (process full level)
②	Level	⑤	Sensor reference point a)
③	Distance	⑥	Low Calibration Point (process empty level)

a) The point from which High and Low Calibration points are referenced: see Dimensions (Page 191).

Low Calibration Point

Distance from Sensor Reference to Low Calibration Point: usually process empty level. (See **Operation** for an illustration.)
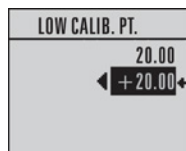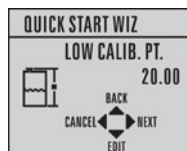
Values	Range: 0.00 to 20.00 m

High Calibration Point

Distance from Sensor reference point to High Calibration Point: usually process full level. (See **Operation** for an illustration.)
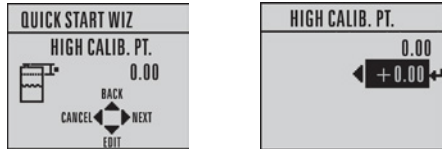
Values	Range: 0.00 to 20.00 m

Wizard complete

Options	BACK, CANCEL, FINISH (Display returns to 1.1 Quick Start Wiz menu when Quick Start is successfully completed.)

Press **DOWN arrow** ▼ **(Finish).** Then press **LEFT arrow** ◄ to return to **Measurement** mode. SITRANS LR250 is now ready to operate.

6.1.3.2   Auto False Echo Suppression

If you have a vessel with known obstructions, we recommend using Auto False Echo Suppression to prevent false echo detection. See **TVT setup (2.8.7.)** for instructions.

This feature can also be used if the display shows a false high level, or the reading is fluctuating between the correct level and a false high level.

6.1.3.3 Requesting an Echo Profile

- In **PROGRAM** mode, navigate to: **Level Meter > 3. > 3.1**.
- Press **RIGHT arrow** ▶ to request a profile.
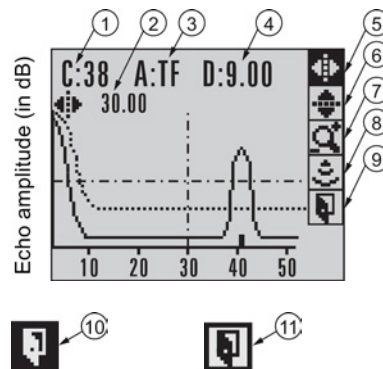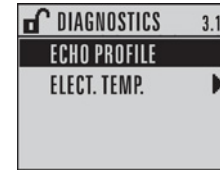
①	Confidence	⑦	Zoom
②	Distance from Low Calibration Point to vertical cross-hair	⑧	Measure
③	Algorithm: t**F** (trueFirst)	⑨	Exit
④	Distance from flange face to target	⑩	Exit icon selected
⑤	Pan left/right - selected	⑪	Exit icon deselected
⑥	Pan up/down		

- Use **UP** ▲ or **DOWN** ▼ **arrow** to scroll to an icon. When an icon is highlighted, that feature becomes active.
- To move a cross-hair, press **RIGHT** ▶ **arrow** to increase the value, **LEFT** ◀ **arrow** to decrease.
- To Zoom into an area, position the intersection of the cross-hairs at the center of that area, select **Zoom**, and press **RIGHT** ▶ **arrow.** Press **LEFT** ◀ **arrow** to Zoom out.
- To update the profile, select **Measure** and press **RIGHT** ▶ **arrow.**
- To return to the previous menu, select **Exit** then press **RIGHT** ▶ **arrow.**

6.2   Application examples

Note

In the applications illustrated below, values are for example purposes only.

You can use these examples as setup references. Enter the values in the parameter tables to select the corresponding functions.

Configure the basic settings using the Quick Start wizard parameters. (These parameters are inter-related, and changes take effect only after you select **FINISH** to apply changes in the final step.)

In each example, after performing a Quick Start, navigate to the other required parameters either via the handheld programmer, or using a Device Management tool (SIMATIC PDM or AMS Device Manager) and enter the appropriate values.

6.2.1　Liquid resin in storage vessel, level measurement

Note

Minimum distance from flange face to target is limited by **Near Range (2.8.1.)**.

To obtain level measurement/4 to 20 mA output proportional to resin levels:

- Low Calibration Pt. = 5 m (16.5 ft) from sensor reference point
- High Calibration Pt.= 0.5 m (1.64 ft) from sensor reference point
- Max.fill/empty rate = 0.2 m/min (0.65 ft/min)

In the event of a loss of echo:

- SITRANS LR250 is to go into Fail-safe High after 2 minutes.
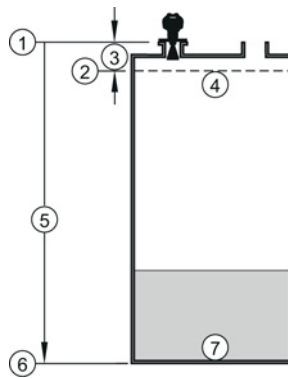
①	Sensor reference point	⑤	5 m
②	High calibration point	⑥	Low calibration point
③	0.5 m	⑦	0% level
④	100% level		

Parameter type	Parameter No. /Name	Options/ Values	Function
Quick Start Wizard parameters	Introduction	NEXT	Continue with Wizard.
	Language	NEXT	Continue with current language.
	Material	LIQUID	
	Response Rate	MED	Medium =1 m/minute

Parameter type	Parameter No. /Name	Options/ Values	Function
	Units	**M**	meters
	Operation	**LEVEL**	Level
	Low Calibration Point	**5**	5 m (16.5 ft)
	High Calibration Point	**0.5**	0.5 m (1.64 ft)
	Wizard Complete	**FINISH**	Transfers Quick Start settings to device.
Independent parameters	**LOE Timer (2.5.2.)**	**2**	2 minutes
	Material Level (2.5.1.)	**HI**	Fail-safe level set to High

Return to **Measurement**: press **Mode** 🔲 to start normal operation.

6.2.2   Horizontal vessel with volume measurement

Note

The minimum distance from the flange face to the target is limited by **Near Range (2.8.1.)**.

To obtain level measurement/4 to 20 mA output proportional to vessel volume in a chemical vessel:

- Low Calibration Point = 3.5 m (11.48 ft) from sensor reference point

- High Calibration Point = 0.5 m (1.64 ft) from sensor reference point

- Max. fill/empty rate = 0.2 m/min (0.65 ft/min)

Select vessel shape, Parabolic Ends, and enter values for A and L, to obtain a volume reading instead of level.

In the event of a loss of echo: SITRANS LR250 is to go into Fail-safe High after 2 minutes.

①	Sensor reference point	⑥	A = 0.8 m
②	0.5 m	⑦	L = 6 m
③	High Calibration Point	⑧	100% = 8000 L
④	3.5. m	⑨	Volume reading
⑤	Low Calibration Point		

Parameter type	Parameter No./Name	Options/ Values	Function
Quick Start Wizard parameters	**Introduction**	**NEXT**	Continue with Wizard.
	Language	**NEXT**	Continue with current language.
	Material	**LIQUID**	
	Response Rate	**MED**	Medium =1 m/minute
	Units	**M**	meters
	Operation	**LEVEL**	Level is reported as Volume when a vessel shape is selected.
	Low Calibration Point	**3.5**	3.5 m (11.48 ft)

Parameter type	Parameter No./Name	Options/ Values	Function
	High Calibration Point	**0.5**	0.5 m (1.64 ft)
	Wizard Complete	**FINISH**	Transfers Quick Start settings to device.
Independent parameters	**Vessel Shape (2.7.1.1.)**	**PARABOLIC ENDS**	Defines vessel shape.
	Maximum Volume (2.7.1.2.)	**8000**	8000 liters
	Vessel Dimension A (2.7.1.3.)	**0.8**	0.8 m (2.62 ft)
	Vessel Dimension L (2.7.1.4.)	**6**	6 m (19.68 ft)
	LOE Timer (2.5.2.)	**2**	2 minutes
	Material Level (2.5.1.)	**HI**	Fail-safe level set to High

Return to **Measurement:** press **Mode** 📋 to start normal operation.

6.2.3   Application with stillpipe

Note

- **Near Range (2.8.1.)** (Blanking) will be set at the factory. Check the process connection tag for specific values.
- Suitable pipe diameters are 40 mm (1.5") to 100 mm (4").
- The pipe diameter must be matched with the antenna size. Use the largest antenna size that will fit the stillpipe/bypass pipe. See Dimensions (Page 191).
- See Mounting on a Stillpipe or Bypass Pipe (Page 20) for installation guidelines.

This application is to obtain a level measurement and corresponding 4 to 20 mA output proportional to the oil level in a fuel storage vessel.

- Low Calibration Pt. is 5 m (16.5 ft) from the sensor reference point.
- High Calibration Pt. is 0.5 m (1.65 ft) from the sensor reference point.
- The stillpipe inside diameter is 50 mm (1.96").
- The maximum rate of filling or emptying is about 0.1 m (4")/min.
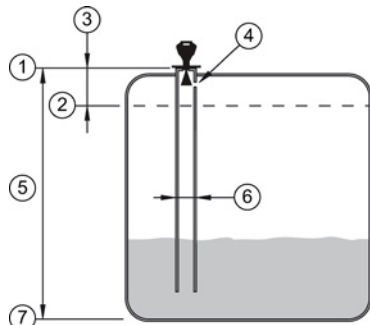
①	sensor reference point	⑤	5 m
②	high calibration point	⑥	50 mm I.D.
③	0.5 m	⑦	low calibration point
④	vent hole		

Parameter type	Parameter No./Name	Options/Values	Function
Quick Start Wizard	**Introduction**	NEXT	Continue with Wizard.
	Language	NEXT	Continue with current language.
	Material	LIQUID LOW DK	
	Response Rate	MED	Medium =1 m/minute
	Units	M	meters

Parameter type	Parameter No./Name	Options/Values	Function
	Operation	LEVEL	Level is reported as Volume when a vessel shape is selected.
	Low Calibration Point	5	5 m (16.5 ft)
	High Calibration Point	0.5	0.5 m (1.64 ft)
	Wizard Complete	FINISH	Transfers Quick Start settings to device.
Independent parameters	**Propagation Factor (2.8.3.)**[a]	0.988	P.F. for a 50 mm (1.96") I.D. stillpipe
	Position Detect (2.8.4.2.)	HYBRID	
	CLEF Range (2.8.4.4.)[a]	4.3	Low calibration point - 0.7 m = 4.3 m (14.1 ft)

[a] The recommended values for the propagation factor and for CLEF range are dependent on the stillpipe diameter. Refer to the next table for values.

Propagation Factor/Stillpipe Diameter
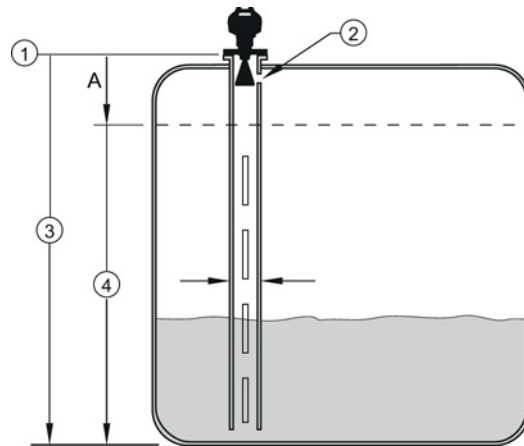
① sensor reference point   ③ low calibration point
② air gap   ④ CLEF range 2.8.4.4.
A 700 or 1000 mm (see CLEF Range settings in table below)

Values	Range	0.3 to 1.0 depending on pipe size		
	Default	1.0000		
Nominal Pipe Size [a]	40 mm (1.5")	50 mm (2")	80 mm (3")	100 mm (4")
Propagation Factor	0.9844	0.988	0.9935	0.9965
CLEF Range (2.8.4.4.) settings	Low calibration point - 700 mm (2.29 ft)[b]	Low calibration point - 700 mm (2.29 ft)[b]	Low calibration point -1000 mm (3.28 ft)[b]	Low calibration point -1000 mm (3.28 ft)[b]

[a] Since pipe dimensions may vary slightly, the propagation factor may also vary.

[b] CLEF range covers the whole measurement range except first 700 or 1000 mm from sensor reference point

Note

Flanged encapsulated antenna

For Flanged encapsulated antenna (7ML5432) match the process connection size to the pipe diameter. For example, DN 80/3" flange to DN 80/3" pipe.

Remote operation

7

7.1   Operating via SIMATIC PDM

SIMATIC PDM is a software package used to commission and maintain process devices. Please consult the operating instructions or online help for details on using SIMATIC PDM. You can find more information at our website:

SIMATIC PDM (www.siemens.com/simatic-pdm).

7.1.1   Functions in SIMATIC PDM

Note

- For a complete list of parameters, see Parameter Reference (Page 113).
- While the device is in **PROGRAM** mode the output remains fixed and does not respond to changes in the device.

7.1.1.1   PDM function overview

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; also to set schedules for calibration and maintenance.

Parameters are identified by name and organized into function groups. See LCD menu structure (Page 247) for a chart and Changing parameter settings using SIMATIC PDM (Page 70) for more details. The menu structure for SIMATIC PDM is almost identical to that for the LCD.

See Parameters accessed via pull-down menus (Page 71) for parameters that do not appear in the menu structure in SIMATIC PDM.

7.1.1.2 Features of SIMATIC PDM Rev. 6.0, SP4 or higher

The graphic interface in the device makes monitoring and adjustments easy.

Feature	Function
Quick Start (Page 65)	Device configuration for simple applications
Echo Profile Utilities (Page 72)	Easy access to echo profile viewing/comparison, TVT shaping, auto false echo suppression and echo setup
Auto False Echo Suppression (Page 76)	Screen out false echoes
TVT Shaper (Page 75)	Manual TVT adjustment
Process Variables (Page 84)	Monitor process variables and level trend
Security (Page 87)	Protect security and communication parameters from modification by the maintenance user

7.1.1.3 Features of SIMATIC PDM Rev. 5.2, SP1

SIMATIC PDM Rev. 5.2 SP1 is supported only for basic configuration and troubleshooting. For advanced features such as the Quick Start wizard, Rev. 6.0 SP3 HF2 or higher is required.

7.1.1.4 SIMATIC PDM Version

Check the support page of our website to make sure you have the latest version of SIMATIC PDM, the most recent Service Pack (SP) and the most recent hot fix (HF): SIMATIC PDM Version (https://support.automation.siemens.com). Browse to **Product Information > Automation Technology > Process control systems > SIMATIC PCS 7 > System components > SIMATIC PDM.**

7.1.2 Initial setup

To ensure that SIMATIC PDM connects properly, complete the following two processes:

1. De-activate buffers

2. Update the Electronic Device Description (EDD)

7.1.2.1 Deactivating buffers

This deactivation is required to align SIMATIC PDM with the HART modem for Windows 2000®
and Windows® XP operating Systems. Windows® is a registered trademark of the Microsoft
Corporation.

Note

• This deactivation is only necessary when you're connecting via RS232 (COM1) as
   opposed to USB.

• You will need administrative rights on your operating system to deactivate buffers.

• SIMATIC PDM operates only in the Windows XP Professional version, not in the Home
   version.

---

1. Click **Start/Settings/Control Panel** to begin configuration.

2. Double click **System**, select the **Hardware** tab, and click the **Device Manager** button.

3. Open **Ports** folder and double click the COM Port used by the system to open the
   Communications Port Properties window.

4. Select the **Port Settings** tab and double click the **Advanced** button.

5. If the **Use FIFO buffers** radio box is selected, click to deselect.
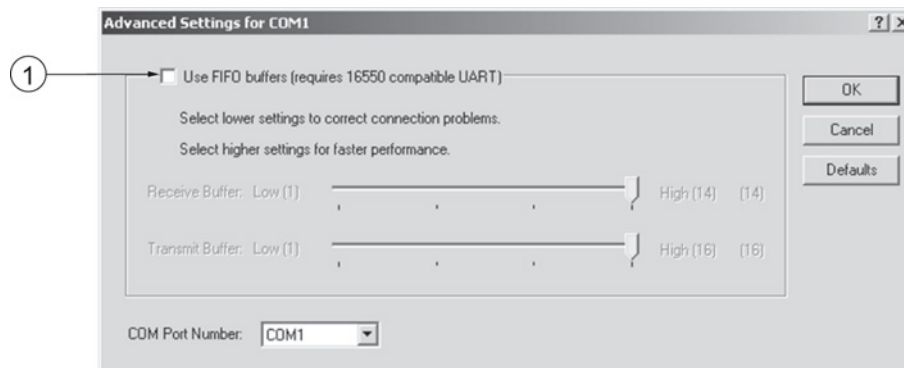
① Deselect **Use FIFO buffers** radio box

6. Click **OK** to close out. Close all screens and then reboot.

7.1.3 Updating the Electronic Device Description (EDD)

You can locate the EDD in Device Catalog, under **Sensors/Level/Echo/SiemensMilltronics/SITRANS LR250**. The EDD revision must match the Firmware revision in the device.

To install a new EDD:

1. Download the most current EDD from our website: Product page (http://www.siemens.com/LR250)

2. Save files to your computer, and extract the zipped file to an easily accessed location.

3. Launch **SIMATIC PDM – Manage Device Catalog**, browse to the unzipped EDD file and select it.

7.1.3.1 Configuring a new device

Note

- Clicking on **Cancel** during an upload from device to SIMATIC PDM will result in some parameters being updated.
- Application Guides for setting up HART devices with SIMATIC PDM can be downloaded from our website:
  Product page (http://www.siemens.com/LR250).

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1. Check that you have the most recent EDD, and if necessary update it. [See Updating the Electronic Device Description (EDD) (Page 64) above].

2. Launch SIMATIC Manager and create a new project for the device.

3. Open the menu **Device – Master Reset** and click on **OK** to perform a reset to Factory Defaults.

4. After the reset is complete upload parameters to the PC/PG.

5. Configure the device via the Quick Start wizard.

7.1.4   Quick Start Wizard via SIMATIC PDM

The graphic Quick Start Wizard provides an easy step-by-step procedure that configures the device for a simple application.

Please consult the operating instructions or online help for details on using SIMATIC PDM.

1. If you have not already done so, check that you have the most up-to-date Electronic Device Description (EDD) for your device. [See Configuring a new device (Page 64).]

2. Launch SIMATIC Manager and create a new project. Application Guides for setting up HART and PROFIBUS PA devices with SIMATIC PDM can be downloaded from the product page of our website:
Product page (http://www.siemens.com/LR250)

Quick start

Note

- A reset to **Factory Defaults** should be performed before running the Quick Start Wizard if device has been used in a previous application. See Master Reset via SIMATIC PDM (Page 82).

- The Quick Start wizard settings are inter-related and changes apply only after you click on **FINISH AND DOWNLOAD** at the end of the last step to save settings offline and transfer them to the device.

- Do not use the Quick Start Wizard to modify individual parameters: for quick access to echo profile parameters, see Echo Profile via SIMATIC PDM (Page 73) or see Parameter Reference (Page 113) for a complete list. (Perform customization only after the Quick Start has been completed.)

- Click on **BACK** to return and revise settings or **CANCEL** to exit the Quick Start.

- For a vessel with obstructions see Auto False Echo Suppression via SIMATIC PDM (Page 76).

Launch SIMATIC PDM, open the menu **Device – Wizard - Quick Start**, and follow steps 1 to 5.
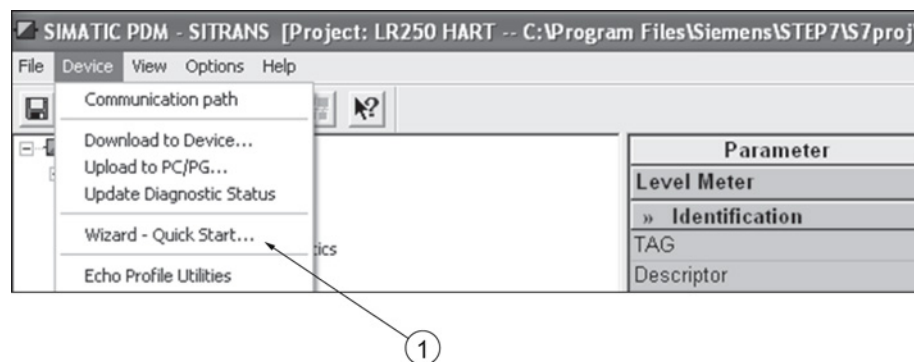
① 	Quick Start

Step 1 – Identification

Note

- The layout of the dialog boxes shown may vary according to the resolution setting for your computer monitor.
- SITRANS PDM limits the TAG field to a maximum of 24 characters.

---

1. Click on **Read Data from Device** to upload Quick Start parameter settings from the device to the PC/PG and ensure PDM is synchronized with the device.

2. If required, change the language for the local user interface.

3. Click on **NEXT** to accept the default values. (Description, Message, and Installation Date fields can be left blank.)

Step 2 – Application

Select the application type (level or volume) and the material, then click on **NEXT**.

See Application with Stillpipe (Page 57) for a Low Dielectric Liquid application.
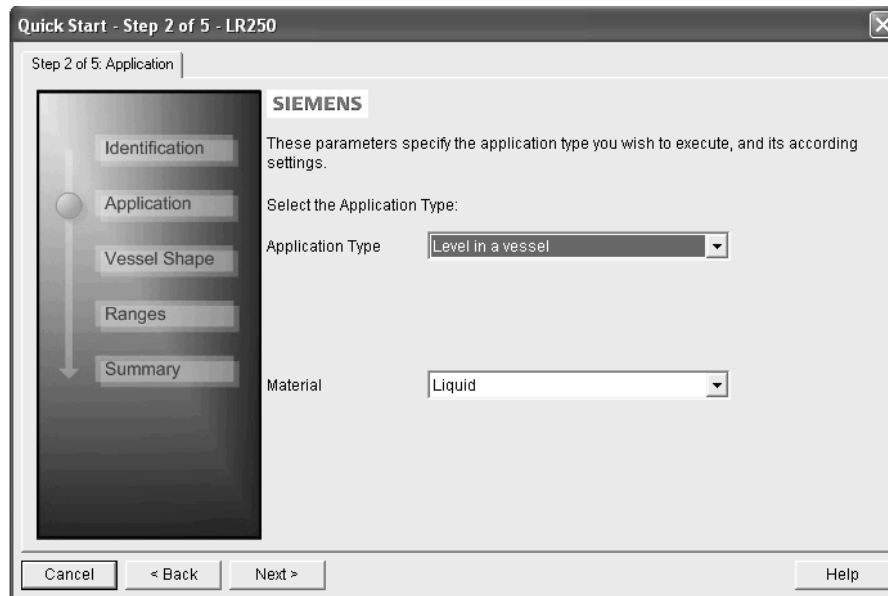
Step 3 – Vessel Shape

The vessel shapes shown are predefined.

For a vessel with obstructions, see Auto False Echo Suppression via SIMATIC PDM (Page 76).

Select the vessel shape, and click on **NEXT**.
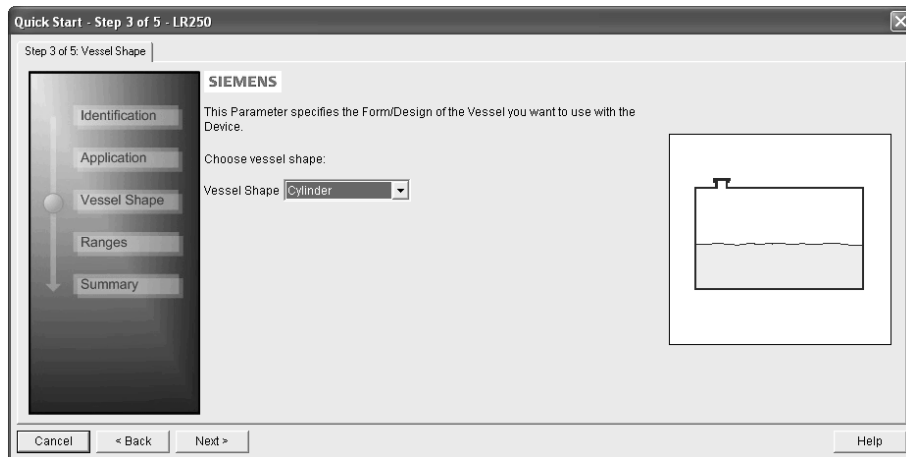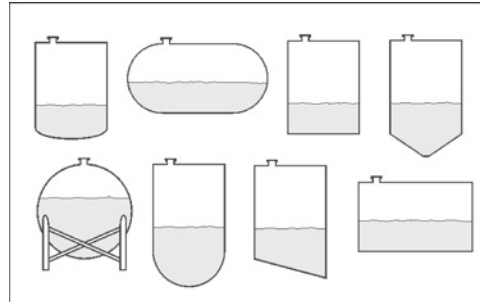
Step 4 – Ranges

Set the parameters, and click on **NEXT**.
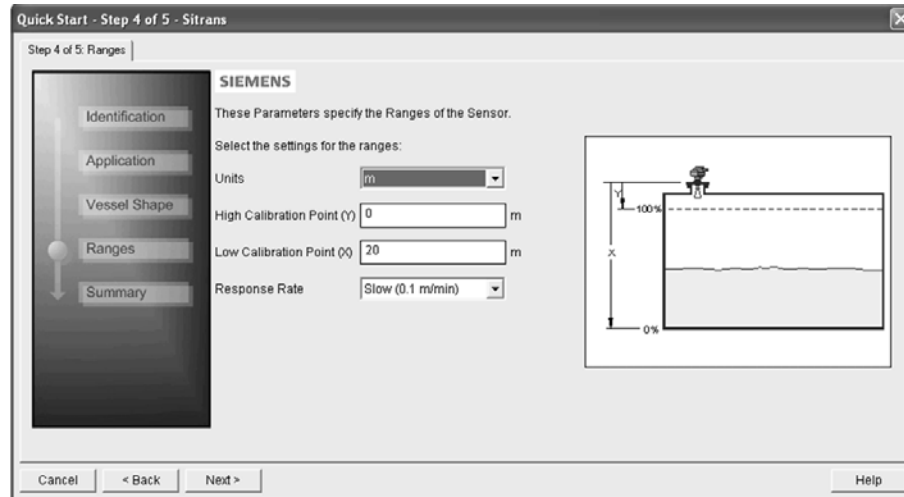
Step 5 – Summary

Check parameter settings, and click on **BACK** to return and revise values, **FINISH** to save settings offline, or **FINISH AND DOWNLOAD** to save settings offline and transfer them to the device.
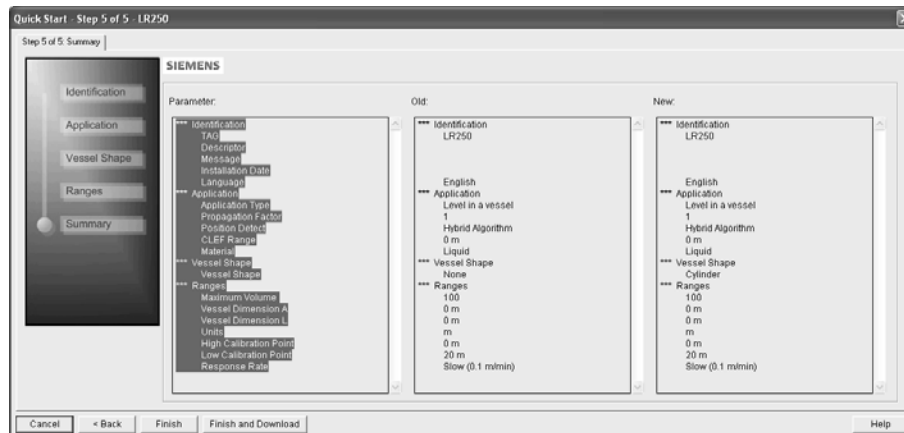
The message **Quick Start was successful** will appear. Click on **OK**.

7.1.5 Changing parameter settings using SIMATIC PDM

Note

- For a complete list of parameters, see Parameter Reference (Page 113).
- Clicking on **Cancel** during an upload from device to SIMATIC PDM will result in some parameters being updated.

Many parameters are accessed via pull-down menus in PDM. See Parameters accessed via pull-down menus (Page 71) for others.

1. Launch SIMATIC PDM, connect to device, and upload data from device.

2. Adjust parameter values in the parameter value field then **Enter**. The status fields read **Changed**.

3. Open the Device menu, click on **Download to device**, then use **File - Save** to save settings offline. The status fields are cleared.
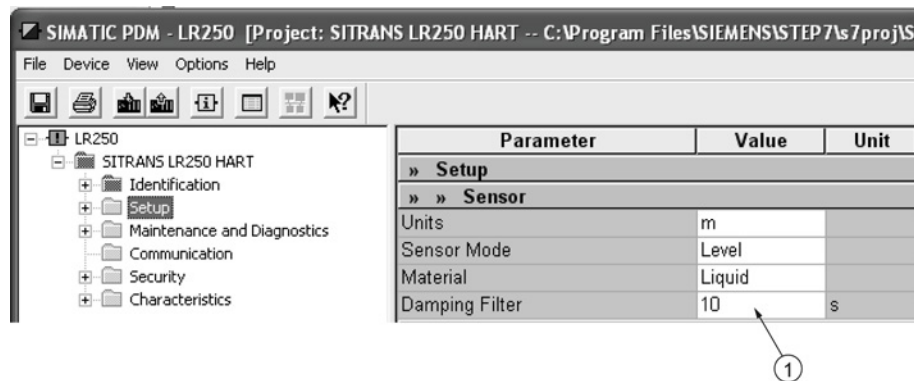
① Value fields

7.1.6 Parameters accessed via pull-down menus

Click on **Device** or **View** to open the associated pull-down menus.
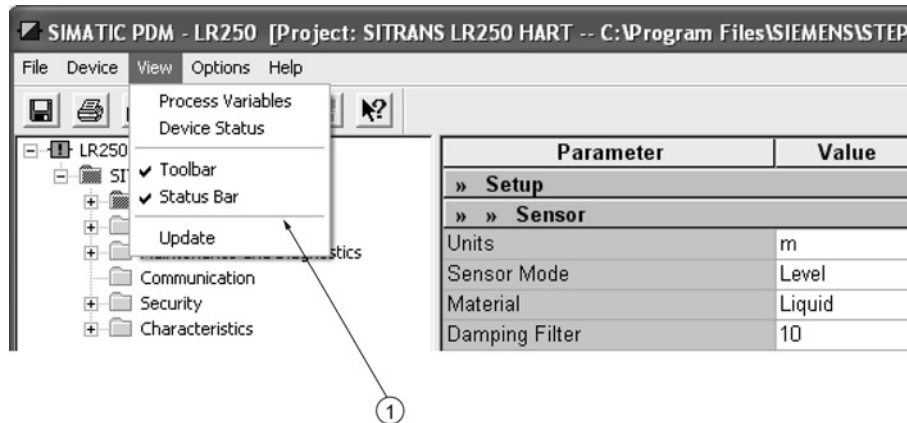
① pull-down menus

Pull-down menus

Device menus	View menus
Communication path	Process Variables (Page 84)
Download to device	Device Status (Page 86)
Upload to PC/PG	Toolbar
Update Diagnostic Status	Status bar
Wizard - Quick Start (Page 65)	Update
Echo Profile Utilities (Page 72)	
Maintenance (Page 80)	
Wear (Page 83)	
Select Analog Output (Page 81)	
Self Test (Page 81)	
Loop Test (Page 82)	
Configuration Flag Reset (Page 82)	
Master Reset (Page 82)	
HART Communication (Page 83)	

7.1.6.1 Echo profile utilities

Open the menu **Device – Echo Profile Utilities** and click on the appropriate tab for easy access to:

- Echo profile (Page 73)
- View Saved Echo Profiles (Page 74)
- TVT Shaper (Page 75)
- Auto False Echo Suppression (Page 76)
- Echo Setup (Page 79)

7.1.6.2   Echo profile

Note

- Double click on each axis to see the Xscale and Data Scale values.
- To zoom in to a section of the profile, left-click and drag a marquee around it. Right click inside the window to zoom out.
- Expand or compress the x and/or y axes:
  - Left-click on the axis and drag in either direction to reposition the low end of the scale.
  - Right-click on the axis and drag in either direction to reposition the high end of 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.

- In the **Echo Profile Utilities** window click the **Echo Profile** tab.
- Initial profile graph is blank upon entry to dialog. Click **Measure** to update the profile.
- It is recommended to use the **Detailed** resolution view of the echo profile for troubleshooting. For faster and more coarse views, the **Standard** resolution may be used.
- Click **Save** and in the new window enter a name and click **OK**.
- Click **OK** to exit.
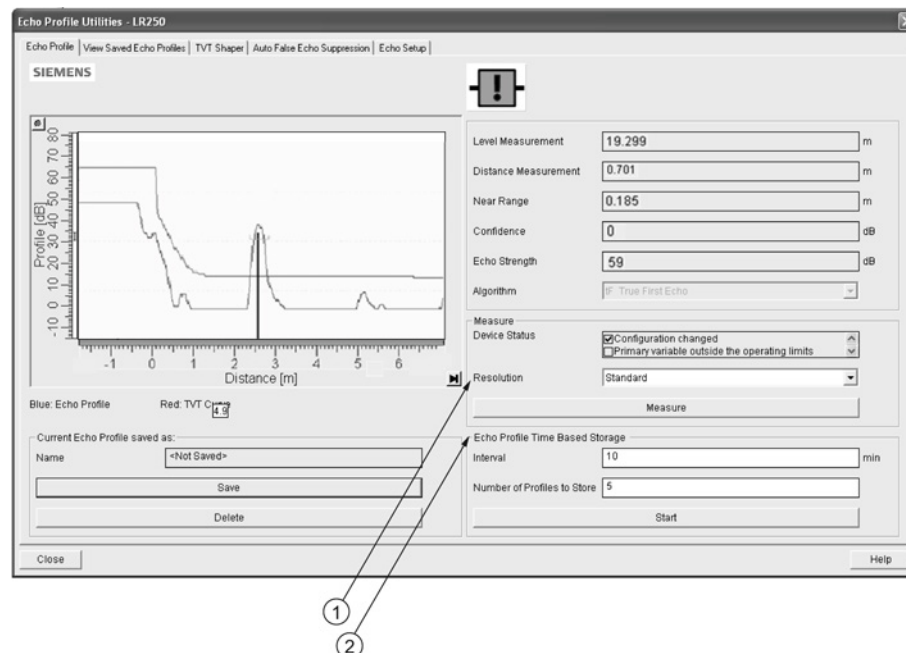
①   Resolution
②   Echo Profile Time Based Storage

7.1.6.3 View saved echo profiles

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

Echo profile data logging

You can store up to 60 profiles at a selected interval (maximum 60 minutes). Inside Echo Profile Utilities, in the **Echo Profile Time Based Storage** window:

- Enter the desired interval between stored profiles.

- Enter the maximum number of profiles to be stored (maximum 60).

- 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.

- Click on the tab **View Saved Echo Profiles** to view the stored profiles.

7.1.6.4 TVT Shaper

Note

Double click on each axis to see the X scale and data scale values. Right-click or Left-click on the axis and drag to reposition the scale.

This feature allows you to manually adjust the TVT to avoid false echoes caused by obstructions. For an explanation see Auto False Echo Suppression (Page 221).

Open the menu **Device – Echo Profile Utilities** and click the tab **TVT Shaper**.
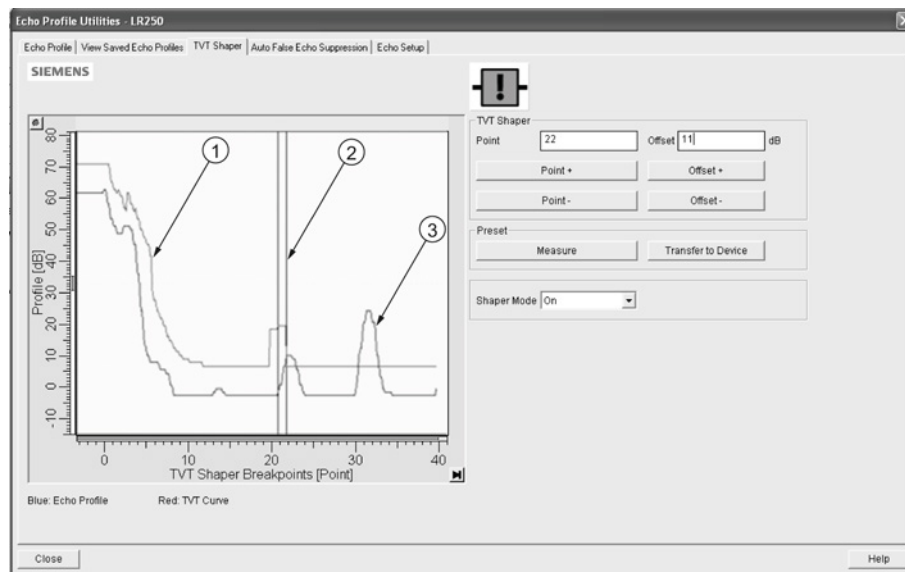
①   TVT
②   Cursor
③   Echo profile

- Initial profile graph is blank upon entry to dialog. Click on **Measure** to view and upload the current TVT from device.

- Change the position of the cursor on the TVT using the **Point+** and **Point–** buttons: raise and lower the TVT using **Offset+** and **Offset**-.

- Alternatively, enter values for **Point** and **Offset** directly into the dialog boxes.

- Click on **Transfer to Device**.

7.1.6.5 Auto false echo suppression

Note

- Ensure material level is below all known obstructions when using Auto False Echo Suppression to learn the echo profile. An empty or almost empty vessel is recommended.
- Note the distance to material level when learning the echo profile, and set Auto False Echo Suppression Range to a shorter distance to avoid the material echo being screened out.
- Set Auto False Echo Suppression and Auto False Echo Suppression Range during startup, if possible.
- If the vessel contains an agitator it should be running.
- Before adjusting these parameters, rotate the device for best signal (lower false-echo amplitude).

If you have a vessel with known obstructions, use Auto False Echo Suppression to prevent false echo detection. This feature can also be used if the device displays a false high level, or the reading is fluctuating between the correct level and a false high level.

The device learns the echo profile over the whole measurement range and the TVT is shaped around all echoes present at that moment. See Auto False Echo Suppression (Page 221) for a more detailed explanation.

The learned TVT will be applied over a specified range. The default TVT is applied over the remainder of the measurement range.
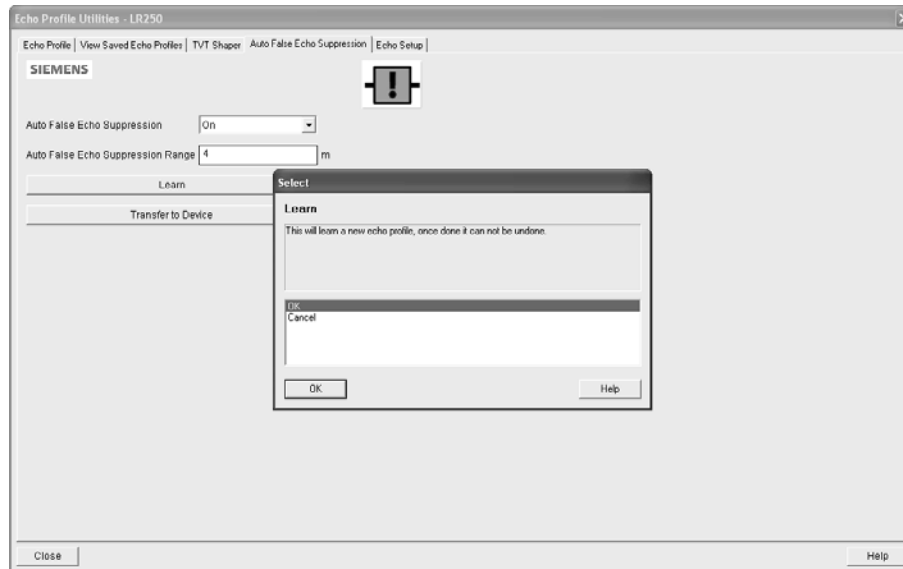
1. Make sure the material level is below all known obstructions.

2. Determine **Auto False Echo Suppression Range**. Measure the actual distance from the sensor reference point to the material surface using a rope or tape measure. Subtract 0.5 m (20") from this distance, and use the resulting value.

3. Open the menu **Device – Echo Profile Utilities** and click on the tab **Auto False Echo Suppression**.

4. Make sure **Auto False Echo Suppression Range** is **On**.

5. Enter the value for **Auto False Echo Suppression Range.**

6. Click **Learn**. The message appears: **'This will learn a new echo profile. Once done it cannot be undone'**. Click **OK**.

7. Once Auto TVT is complete click **Transfer to Device**. To exit click **Close**. Auto TVT is enabled and the learned TVT will be used.

8. To turn **Auto False Echo Suppression** off or on, reopen the **Auto False Echo Suppression** window, change the Auto False Echo Suppression to **Off** or **On**, click on **Transfer to Device.**

Before Auto False Echo Suppression
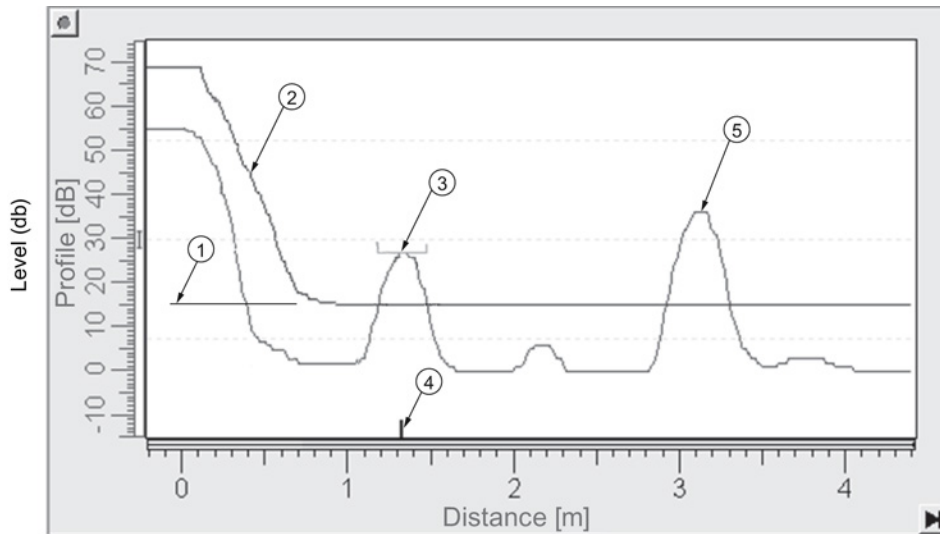
①	TVT Hover Level	④	Echo marker
②	Default TVT	⑤	Material level
③	False echo		

After Auto False Echo Suppression
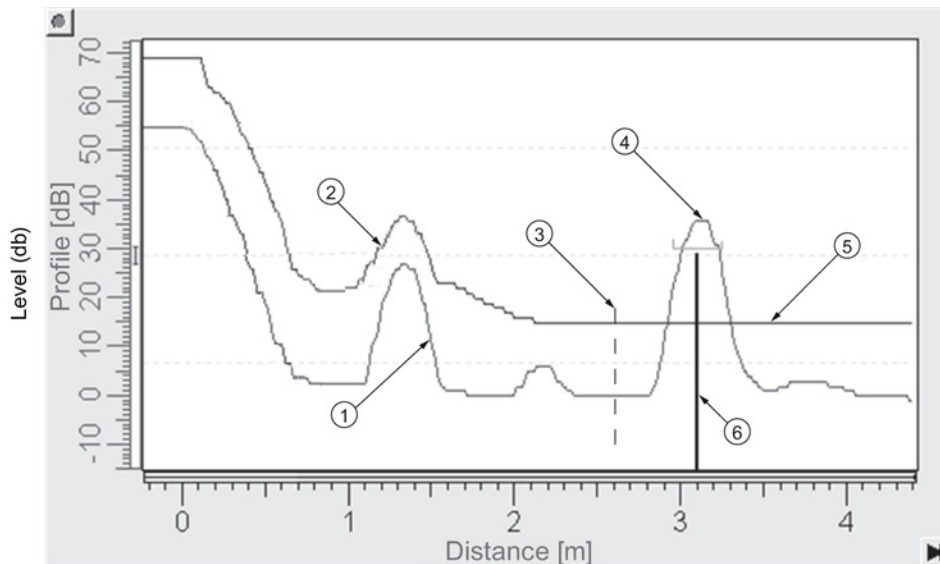
①	False echo	④	Material level
②	Learned TVT	⑤	Default TVT
③	Auto False Echo Suppression Range	⑥	Echo marker

7.1.6.6 Echo setup

Provides quick access to echo selection, filtering, and response rate parameters.

Open the menu **Device – Echo Profile Utilities** and click on **Echo Setup**.
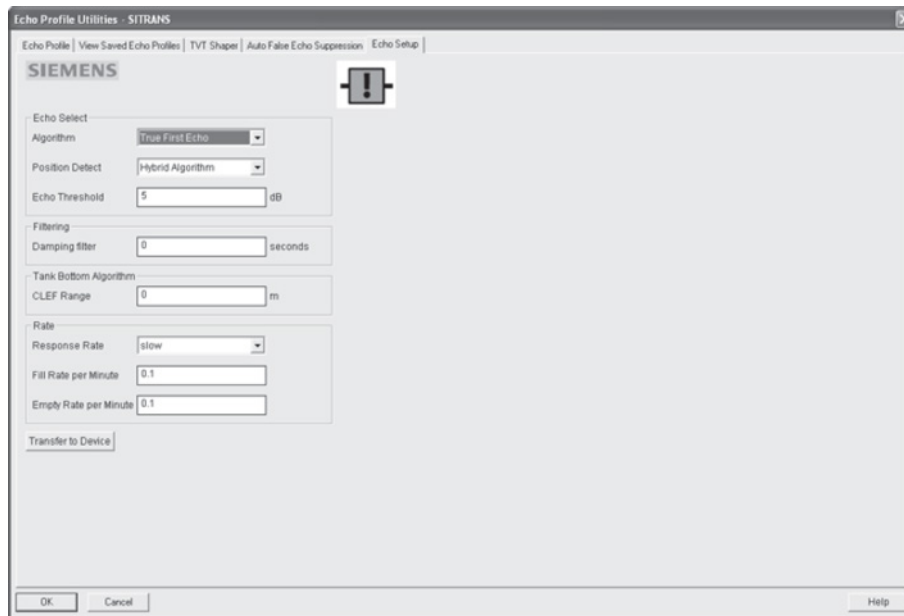
7.1.6.7 Maintenance

You can set schedules and reminders for:

- device maintenance based on its projected lifetime
- sensor maintenance based on its projected lifetime
- service
- calibration
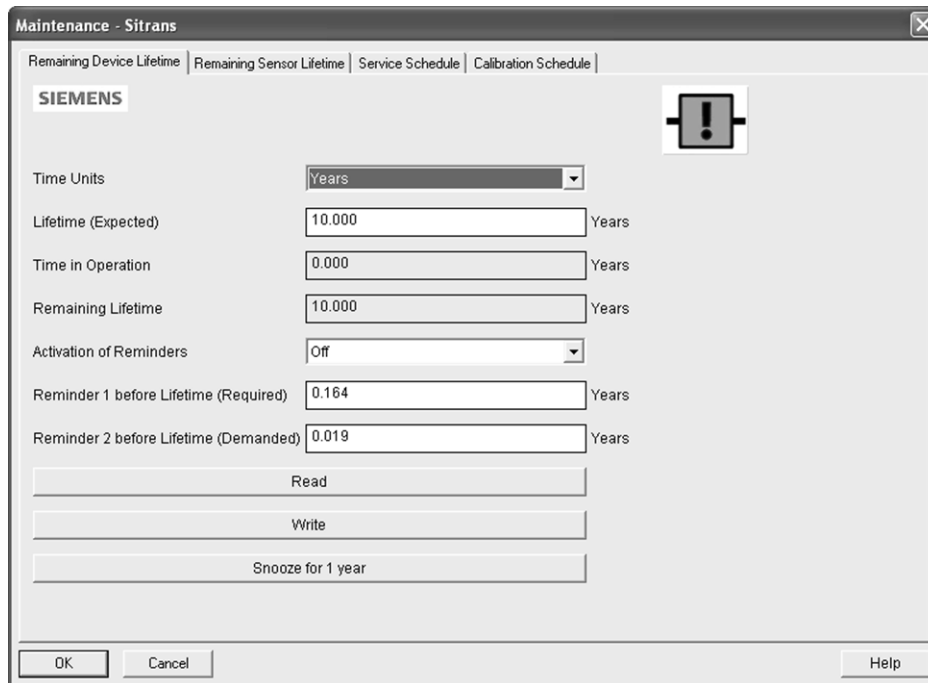
To set Device/Sensor Maintenance schedules:

1. Open the menu **Device – Maintenance**, and click on the **Remaining Device/Sensor Lifetime** tab.

2. Modify desired values, and if desired, set reminders for either or both of **Reminder 1 before Lifetime (Required)/Reminder 2 before Lifetime (Demanded)**.

3. Click **Write.**

4. Click **Read**, to see the effects of your modification.

5. Click **Snooze** to add a year to the Total Expected Device Life.

To set Service/Calibration schedules:

1. Open the menu **Device – Maintenance**, and click on the **Service/Calibration Schedule** tab.

2. Modify desired values and if desired, set reminders for either or both of **Reminder 1 before Lifetime (Required)/Reminder 2 before Lifetime (Demanded)**.

3. Click **Write.**

4. Click **Read**, to see the effects of your modification.

5. Click **Service/Calibration Performed** to reset the schedule.

7.1.6.8 Select analog output

Allows you to set the mA Output to report Level, Distance, Space, or Volume. See **Current Output Function (2.6.1.)** for an illustration.

If a volume application is selected, mA Output is automatically set to **Volume**. See Analog Output (Page 224) for more details.

1. Open the menu **Device – Select Analog Output**.

2. **Select Analog Output** window displays the current setting: click **OK**.

3. Select a different setting and click **OK**.

4. **Select Analog Output** window displays the new setting: click **OK**.

7.1.6.9 Self test

Checks memory (RAM and Flash). If there are no errors, returns the message 'Self Test OK.' If errors are found, returns the message 'Self Test Fails'.

Open the menu **Device – Self Test**, select **Yes** and click **OK**.

7.1.6.10   Loop test

Note

The simulated AO (Analog Output) value influences output to the control system.

Allows you to input a simulated value (4 mA, 20 mA, or a user-defined value) in order to test the functioning of the mA connections during commissioning or maintenance of the device. The range is 3.56 mA to 22.6 mA, see **mA Output Value (2.6.6.).**

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**. The Loop Test window remains open.

3. When you are ready to end simulation, select **End** and click on **OK** to return the device to the actual output value.

7.1.6.11   Configuration flag reset

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

7.1.6.12   Master reset

Factory Defaults

Factory Defaults resets all parameters to the default settings with the following exceptions:

- **Device Address (5.1.)** remains unchanged if the reset command is sent remotely (via AMS, PDM, DTM, FC375) but is reset to 0 if the reset command is sent via LUI.

- **Write Protect (6.2.1.)** and **PIN to Unlock (6.2.2.)**

- **Learned TVT curve, see Auto False Echo Suppression (2.8.7.1)**

1. Open the menu **Device – Master Reset**, select **Yes**, and click on **OK** to perform a reset to Factory Defaults.

2. After the reset is complete upload parameters to the PC/PG. (If you are performing a reset after replacing the device with a different instrument, do not upload parameters to the PC/PG).

7.1.6.13   Wear

Reports the number of hours the device has been operating, and the number of times it has been powered up.

Open the menu **Device – Wear** to view:

- Powered Days
- Power-on Resets

Note

Powered days are whole days only. Fractional days are truncated.

7.1.6.14   HART Communication

Sets the number of request/response preambles (default 5).

The preamble consists of three or more hexadecimal FF characters (all 1s). This allows the receiving modem to get its frequency-detection circuits synchronized to the signal after any pause in transmission.

We recommend you do not change the default value (5).

7.1.6.15   Process variables

To compare outputs in real time open the menu **View – Process Variables** and click on **Overview** to see reading (level, space, distance, volume); analog output; device status; and current electronics temperature.

To see highest and lowest electronics temperatures, navigate to **Level Meter > Maintenance and Diagnostics > Electronics Temperature**.
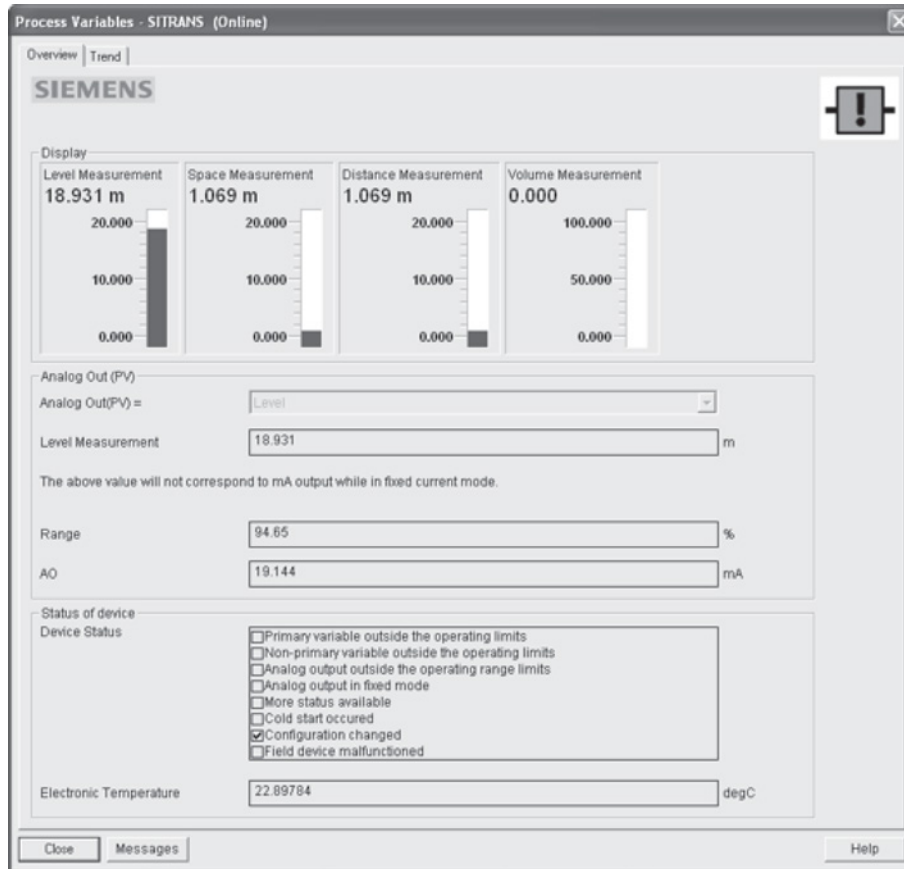
7.1.6.16   Trend

Open the menu **View – Process Variables** and click on **Trend**.

Four trend lines can be monitored (distinguished by color in SIMATIC PDM):
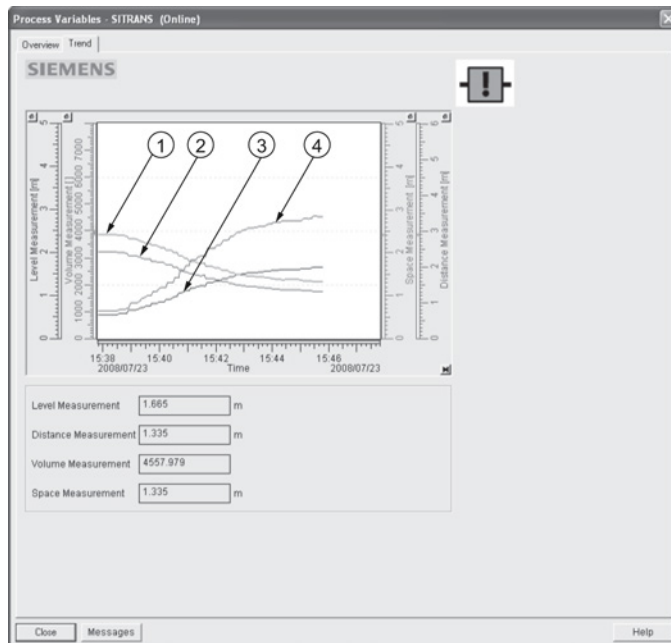
①	Space
②	Distance
③	Level
④	Volume

7.1.6.17 Device status

Open the menu **View – Device Status** to view Diagnostics, Device Status, Hardware/ Firmware (HW/FW) Status, and Maintenance status.
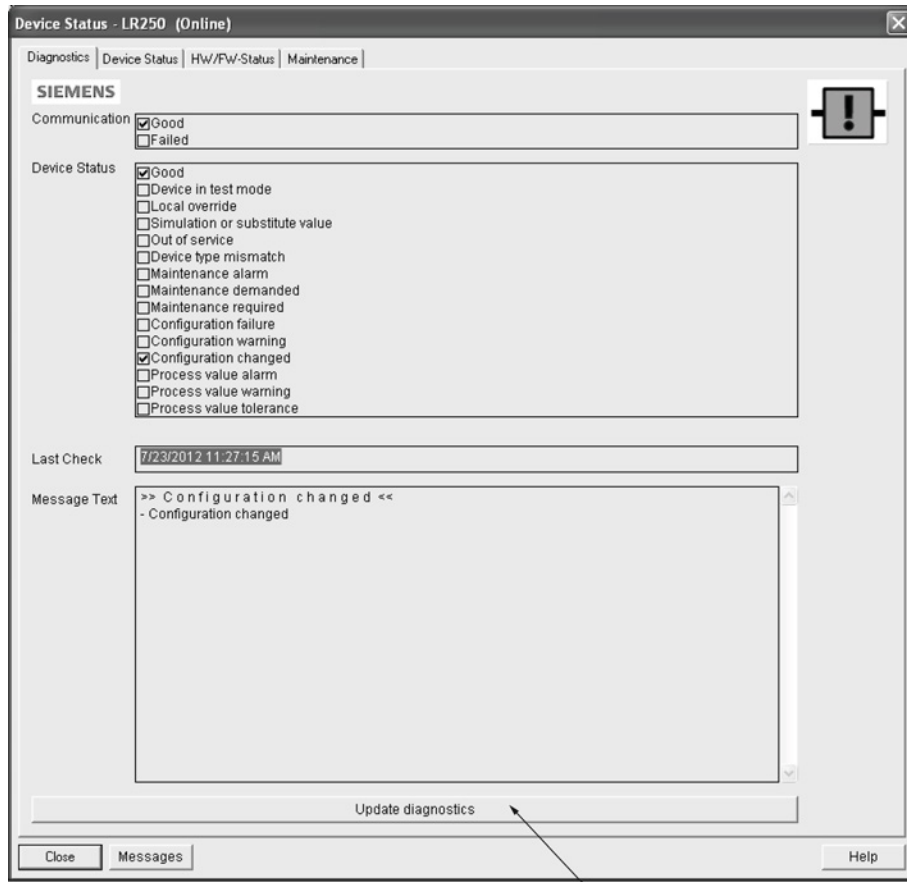
① update diagnostics

In the Diagnostics window, click on **Update diagnostics** to update diagnostic information and refresh linked icons.

7.1.6.18 Update
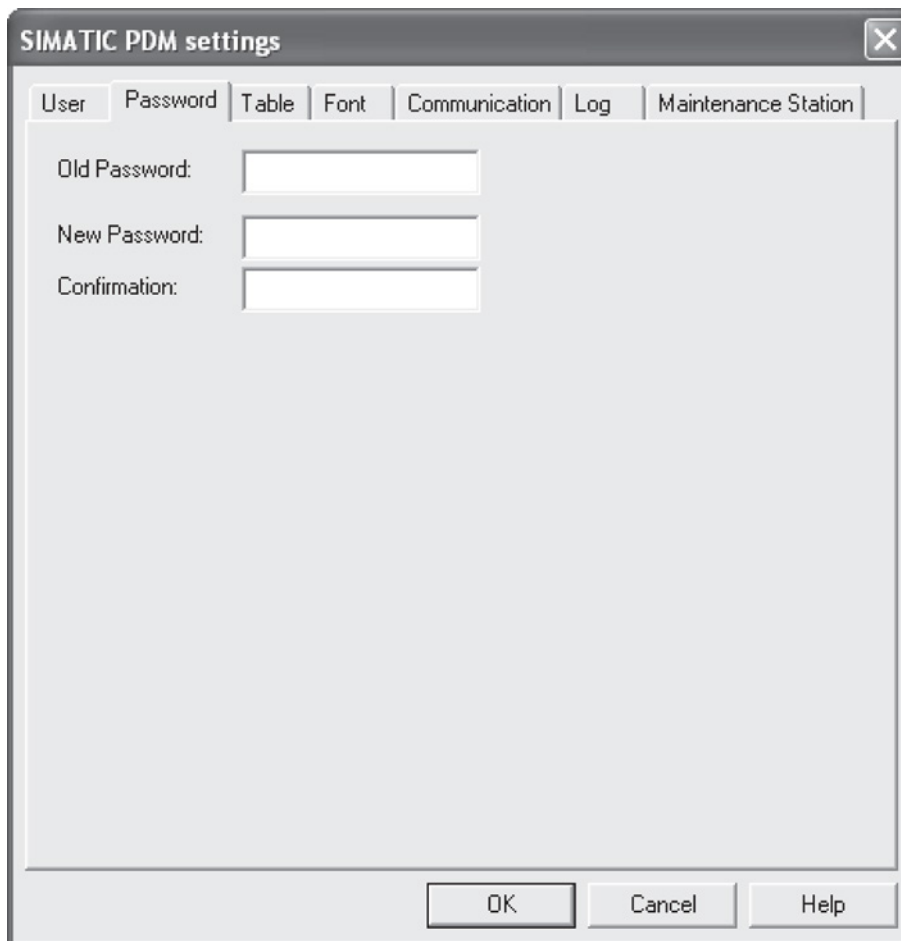
Open the menu **View – Update** to refresh the screen.

7.1.6.19   Security

A password option protects security and communication control parameters from modification by a maintenance user.

When you open a project the **User** dialog window provides two options: maintenance or specialist. If a password has been set it will not be possible to open the project as a specialist without it. A maintenance user will be able to open the project without a password but will not have access to security and communication control parameters.

1. Open a project, double-click on the device icon, and in the **User** window select **Specialist**.

2. Open the menu **Options – Settings** and click on the **Password** tab.

3. Enter a new password and re-enter it in the **Confirmation** window. Click on **OK**.

7.2 Operating via AMS Device Manager

AMS Device Manager is a software package that monitors the process values, alarms and status signals of the device. Please consult the operating instructions or online help for details on using AMS Device Manager. You can find more information at:

 Emerson (http://www.emersonprocess.com/AMS/)

Application Guides for setting up Siemens HART devices with AMS Device Manager are available on our website:

Process automation (www.siemens.com/processautomation)

7.2.1 Functions in AMS Device Manager

Note

While the device is in PROGRAM mode the output remains fixed and does not respond to changes in the device.

7.2.1.1 AMS function overview

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

Parameters organized into three main function groups allow you to configure and monitor the device:

- Configure/Setup
- Device Diagnostics (read only)
- Process Variables (read only)

See AMS Menu Structure (Page 107) for a chart and Changing parameter settings using AMS Device Manager (Page 95) for more details. The menu structure for AMS Device Manager is almost identical to that for the LCD.

7.2.1.2 Features of AMS Device Manager

The graphic interface in the radar device makes monitoring and adjustments easy.

Feature	Function
Quick Start (Page 92)	Device configuration for simple applications
Echo Profile (Page 100)	Echo profile viewing
TVT (Page 99)	Screen out false echoes
Linearization (Page 93)	Volume measurement in an irregular vessel
Process Variables (Page 104)	Monitor process variables and level trend
Security (Page 102)	Protect security and communication parameters from modification by the maintenance user

7.2.1.3 Electronic Device Description (EDD)

The EDDs are linked to the type, version of configuration software, and protocol being used. Select the LR250 AMS EDD for the version of AMS installed. EDDs can be downloaded from our website, see Product page (http://www.siemens.com/LR250).

The HART EDD for LR250 is labeled as supporting AMS Device Manager version 9.5. This EDD is also operational with AMS version 9.0 and 10.1. There is also an application guide that details how to use the Hart Communication Foundation EDDs in AMS version 11.5 and above. There is no EDD for the LR250 for AMS version 10.5 to 11.1.

Please check the product page for updated EDDs and application guide.

7.2.1.4 Configuring a new device

1. Check our website to make sure you have the most recent EDD.
   Product page (http://www.siemens.com/LR250)
   Go to **Support > Software Downloads** and if necessary download it. Save the files to your computer, and extract the zipped file to an easily accessed location.

2. Launch **AMS Device Manager– Add Device Type**, browse to the unzipped EDD file and select it.

7.2.1.5   Startup

1. **Launch AMS Device Manager**. (Application Guides for setting up HART devices with AMS Device Manager can be downloaded from our website:
Product page (http://www.siemens.com/LR250)

2. In **Device Connection View** right-click on the device icon and select **Scan Device** to upload parameters from the device.

3. Double click the device icon to open the startup screen. The startup screen shows device identification details, and a navigation window on the left-hand side of the screen.
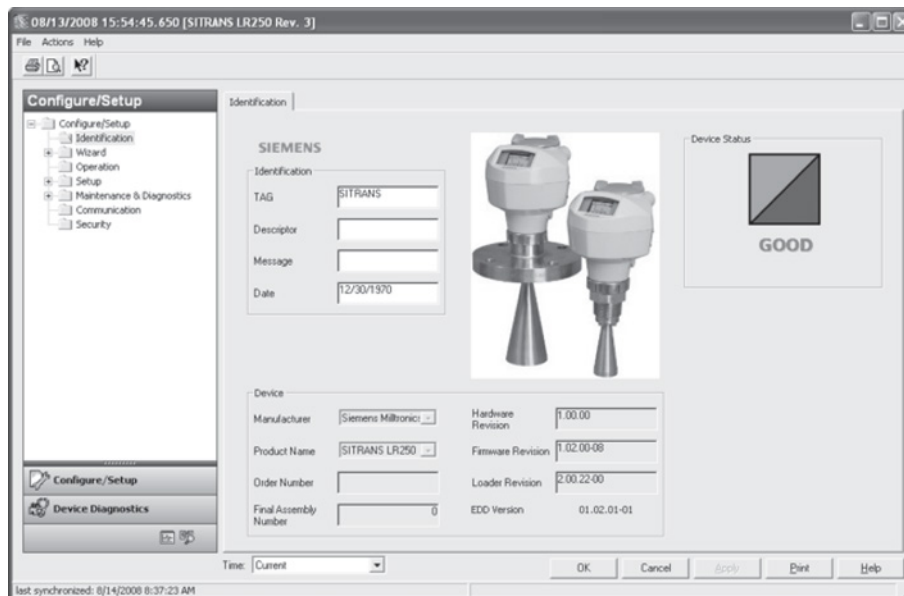
Master reset

> **Note**
>
> **Device Address (5.1.)** remains unchanged if the reset command is sent remotely (via AMS, PDM, DTM, FC375) but is reset to 0 if the reset command is sent via LUI.

- Navigate to **Configure/Setup > Operation**
- In the **General** field click on **Master Reset** and accept the option **Factory Defaults**.

7.2.1.6 Pull-down menu access
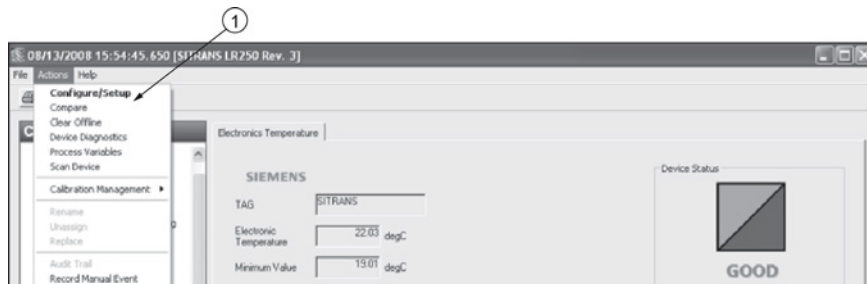
① Action menu items

A pull-down menu under **Actions** gives alternative access to several features.

Scan Device

• Open the menu **Actions – Scan Device**.
• **Scan Device** uploads parameters from the device (synchronizes parameters).

7.2.1.7 Device configuration

1. Navigate to **Configure/Setup > Operation** and click to open the dialog window.

2. In the **General** field, click on **Master Reset** and perform a reset to Factory Defaults.

3. Open the pull-down menu **Actions – Scan Device** to synchronize parameters (upload parameters from the device to AMS).

4. Configure the device via the Quick Start wizard.
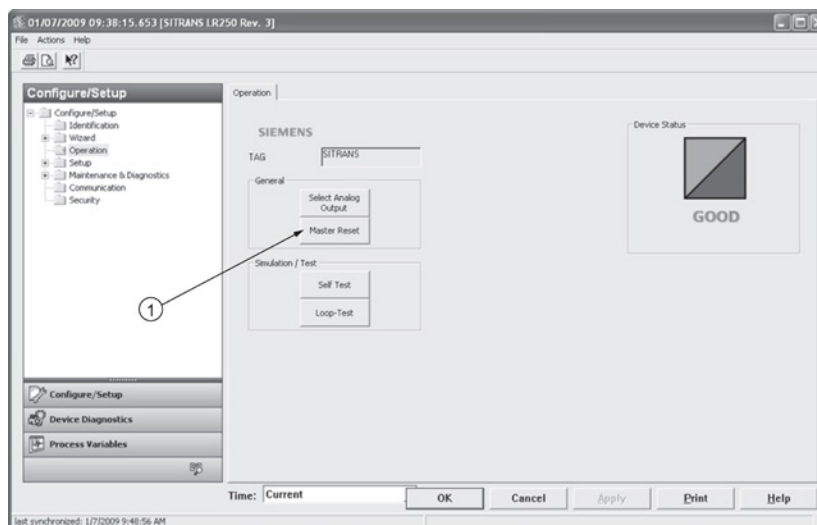
① Master reset

7.2.1.8   Quick Start Wizard via AMS Device Manager

Note

- A reset to Factory Defaults should be performed before running the Quick Start Wizard if device has been used in a previous application. See Master Reset (Page 90).
- The layout of the dialog boxes shown may vary according to the resolution setting for your computer monitor.
- At each step, you can accept the default values without modification and click on the next step to proceed.
- After modifying parameters click on **Apply** inside the Quick Start window to write the new values to the device.
- Click on **OK** only if you wish to update all parameters to the device and close AMS.

A Wizard provides an easy 5-step Quick Start procedure that configures the device for a simple application.

Quick Start

Step 1 – Identification

1. Navigate to **Configure/Setup > Wizard > Quick Start**.

2. Click on **Step 1**.

3. You can accept the default values without modification. (Description, Message, and Installation Date fields can be left blank.) If desired, make changes then click on **Apply**.
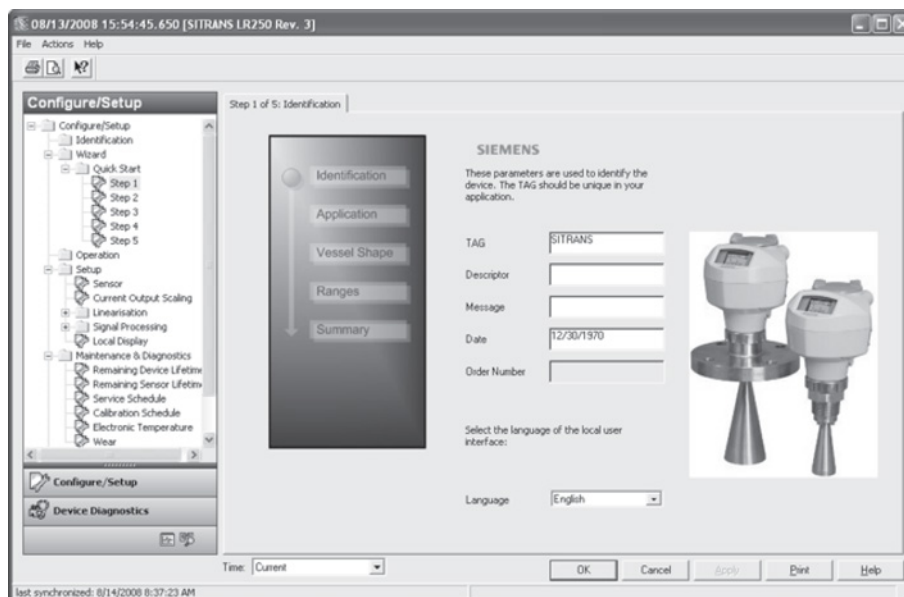
Step 2 – Application

1. Click on **Step 2**.

2. Select the application type (Level/vessel, Level/stillpipe, Level/bypass pipe, Volume/vessel, Volume/stillpipe, or Volume/bypass pipe) and the material (Liquid or Low dielectric liquid).

3. Click on **Apply**.

Step 3 – Vessel Shape

1. Click on **Step 3**.

2. Select a predefined vessel shape. To describe a more complex shape see Linearization (Page 93).

3. Click on **Apply**.

Step 4 – Ranges

1. Click on **Step 4**.

2. Change units if desired (in meters by default).

3. Set High and Low Calibration points.

4. To convert the reading from level to volume enter a value for Maximum Volume.

5. If a vessel shape with parabolic ends has been selected, set dimensions **A** and **L**.

6. Click on **Apply**.

Step 5 – Summary

Check parameter settings, and click on **Cancel** to abort, or **Apply** to transfer values to the device.

Linearization

You can use the linearization feature to define a more complex vessel shape and enter up to 32 level breakpoints where the corresponding volume is known. The values corresponding to 100% and 0% levels must be entered. The breakpoints can be ordered from top to bottom, or the reverse.

Using linearization via the Quick Start wizard

Navigate to **Configure/Setup > Wizard > Quick Start**.

In **Step 1 – Identification,** make any desired modifications and click on **Apply**.

In **Step 2 – Application,** select a level application and liquid as a material.

In **Step 3 – Vessel Shape**, choose the vessel shape option **Linearization Table**.

In **Step 4 – Ranges**, enter a value for maximum volume.
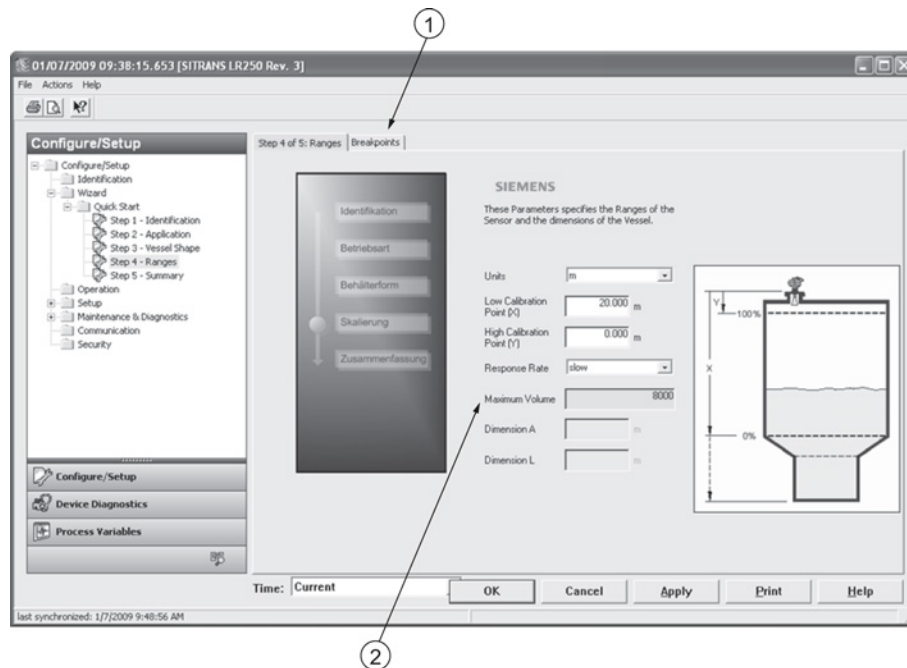
①   Breakpoints
②   Maximum volume

1. Click on the **Breakpoints** tab and enter values for level and volume for up to **32** breakpoints.

2. Navigate to **Configure/Setup > Setup > Linearization** and click on **Characteristic** to preview the characteristic curve of the vessel breakpoints. (The conversion will function correctly even if not all breakpoints are entered, but the curve will display correctly only if all breakpoints are entered.)

3. In **Step 5 – Summary**, check parameter values. Click on the appropriate step menu to return and revise values, or click on a different menu to exit **Quick Start.**

Changing parameter settings using AMS Device Manager

Note

For a complete list of parameters, see Parameter Reference (Page 113).

For more detailed explanations of the parameters listed below see the pages referenced.

1. Adjust parameter values in the parameter value field in Configure/Setup view, then click on **Apply** to write the new values to the device. The parameter field will display in yellow until the value has been written to the device.

2. Click on **OK** only if you wish to update all parameters and exit AMS.

Operation
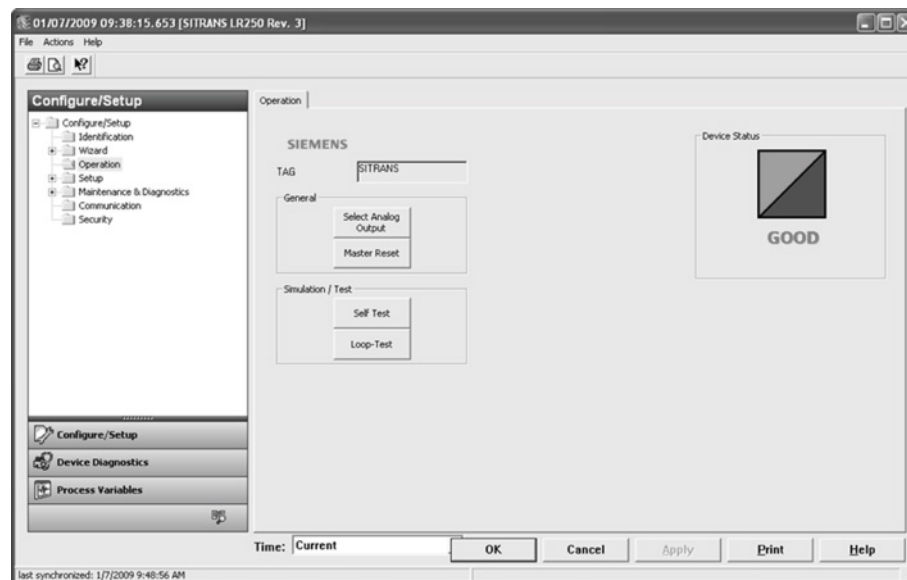
Navigate to **Configure/Setup > Operation** and click on **Operation** to open the dialog window for access to:

General

- Select Analog Output [see Select Analog Output (Page 81)]
- Master Reset [see Master Reset (Page 82)]

Simulation/Test

- Self Test [see Self Test (Page 81)]
- Loop Test [see Loop Test (Page 82)]

Setup

Note

For more detailed explanations of the parameters listed below see the pages referenced.

Sensor
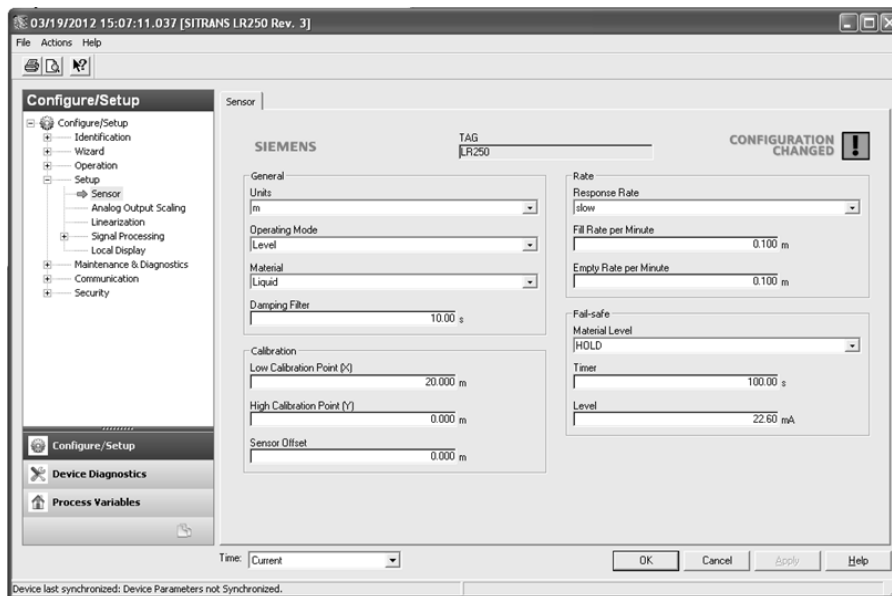
Navigate to **Configure/Setup > Setup** and click on **Sensor** for access to:

General [see Sensor (2.2.)]

- Units
- Operating Mode
- Material
- Damping Filter

Calibration [see Calibration (2.3.)]

- Low Calibration Point
- High Calibration Point
- Sensor Offset

Rate [see Rate (2.4.)]

- Response Rate

- Fill Rate per Minute

- Empty Rate per Minute

Fail-safe [see Fail-safe (2.5.)]

- Material level

- Timer

- Level

Analog Output Scale
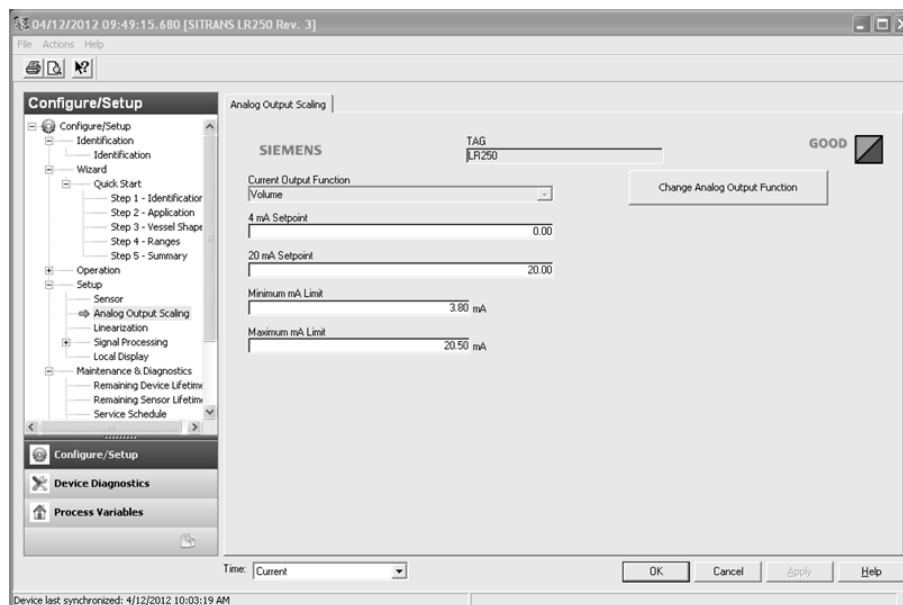
Navigate to **Configure/Setup > Setup** and click on **Analog Output Scaling** for access to:
Analog Output Scaling [see **Analog Output Scaling (2.6.)**]

- Current Output Function

- 4 mA Setpoint

- 20 mA Setpoint

- Minimum mA Limit

- Maximum mA Limit

Signal Processing
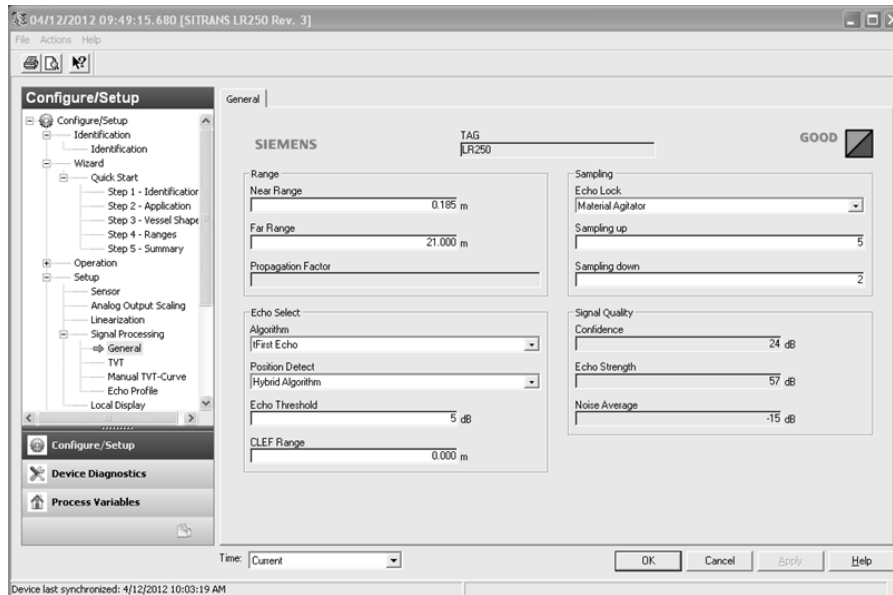
General

Navigate to **Configure/Setup > Setup > Signal Processing** and click on **General** for access to:

Range **[see** Signal Processing (2.8.)**]**

- Near Range
- Far Range
- Propagation Factor

Echo Select [see Echo Select (2.8.4.)]

- Algorithm
- Position Detect
- Echo Threshold
- CLEF Range

Sampling [see Sampling (2.8.5.)]

- Echo Lock
- Sampling Up
- Sampling Down

Signal Quality

- Confidence

- Echo Strength

- Noise Average

TVT

Modify the TVT to screen out false echoes. See Auto False Echo Suppression (2.8.7.1.) (Page 221).
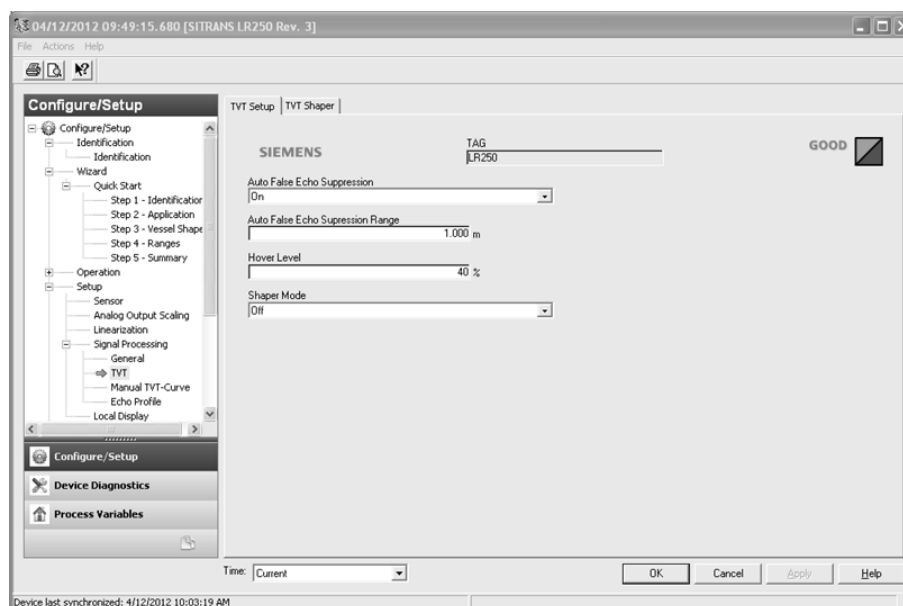
Navigate to **Configure/Setup > Setup > Signal Processing** and click on **TVT**. Click on one of the two tabs to access the parameters listed:

TVT Setup [see TVT setup (2.8.7.)]

- Auto False Echo Suppression

- Auto False Echo Suppression Range

- Hover Level

- Shaper Mode

TVT Shaper

- Shaper breakpoints 1 to 40. (Turn **TVT Setup/Shaper Mode** on to activate.)

Manual TVT Curve

Displays the effects of the TVT shaper modifications. Navigate to **Configure/Setup > Setup > Signal Processing** and click on **Manual TVT Curve**.

Echo Profile

- Navigate to **Configure/Setup > Setup > Signal Processing** and click on **Echo Profile**.
- Select **Standard** operation for faster display.

Local Display

Navigate to **Configure/Setup > Setup > Local Display** for access to:

- Language
- LCD Fast Mode [see **LCD Fast Mode (4.9.)**]
- LCD Contrast [see **LCD Contrast (4.10.)**]

7.2.2 Maintenance and diagnostics

Navigate to **Maintenance and Diagnostics** for access to:

Remaining Device Lifetime [see Remaining Device Lifetime (4.2.)]

- Lifetime (expected)
- Time in Operation
- Remaining Lifetime
- Activation of Reminders
- Reminder 1 before Lifetime (Required)
- Reminder 2 before Lifetime (Demanded)

Remaining Sensor Lifetime [see Remaining Sensor Lifetime (4.3.)]

- Lifetime (expected)
- Time in Operation
- Remaining Lifetime
- Activation of Reminders
- Reminder 1 before Lifetime (Required)
- Reminder 2 before Lifetime (Demanded)

Service Schedule [see Service Schedule (4.4.)]

- Service Interval

- Time Since Last Service

- Time Until Next Service

- Activation of Reminders

- Reminder 1 before Service (Required)

- Reminder 2 before Service (Demanded)

Calibration Schedule [see Calibration Schedule (4.5.)]

- Calibration Interval

- Time Since Last Calibration

- Time Until Next Calibration

- Activation of Reminders

- Reminder 1 before Calibration (Required)

- Reminder 2 before Calibration (Demanded)

Electronic Temperature

- Electronic Temperature

- Lowest Value

- Highest Value

Wear

- Powered Days

- Poweron Resets

See Wear via SIMATIC PDM (Page 83) for more detail.

7.2.3 Communication

Navigate to **Communication** to read the following:

Tag; Manufacturer's ID; Device ID; Product ID; Device Revision; EDD Revision; Universal Command Revision

7.2.4 Security

Navigate to **Configure/Setup > Security** to access:

Remote Access [see Remote Access (6.1.)]

Note

If access control is changed to limit remote access, it can only be reset via the handheld programmer. See **Access Control (6.1.1.)**.

- Write Protect (read only)
- Access Control

Local Access [see Local Access (6.2.)]

- Local Write Protected
- PIN to Unlock

See also Password Protection (Page 105).

7.2.5 Device Diagnostics

Click on the **Device Diagnostics** bar at the bottom of the navigation window, for access to:

Device Status

Hardware/Firmware Status
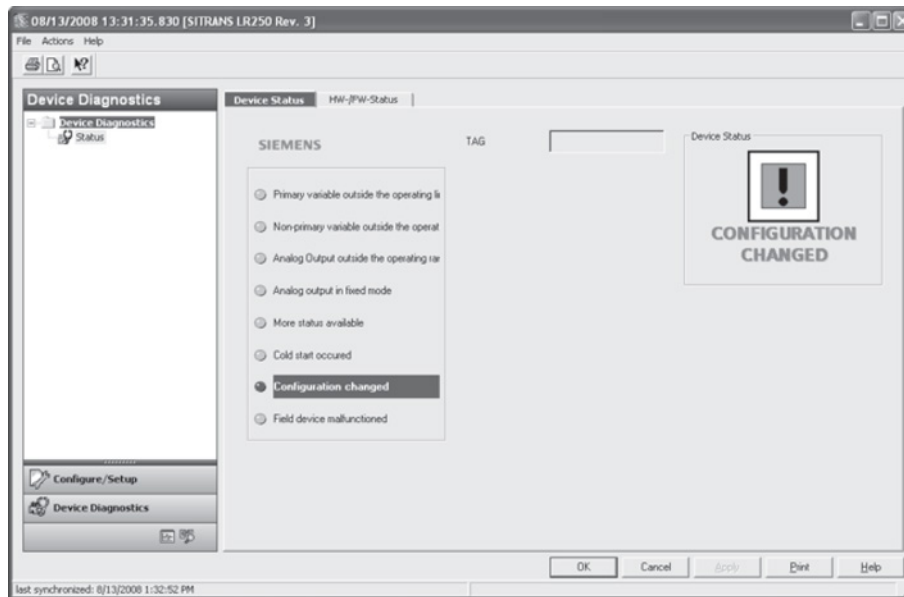
7.2.5.1 Process variables

To compare outputs in real time click on **Process Variables** at the bottom of the navigation window for access to:

Process Variables

- Values (level, volume, space, distance)
- Analog Output
- Trend View
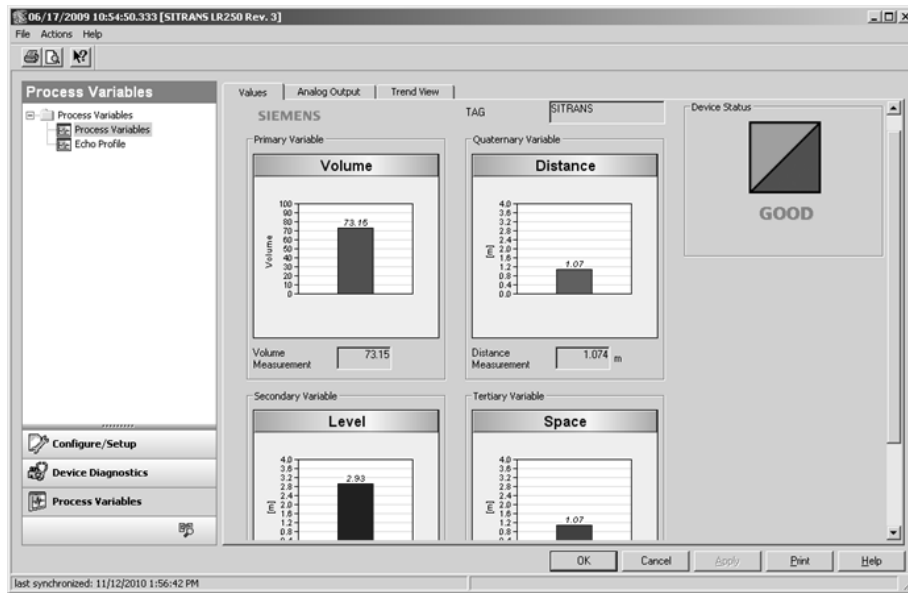
Echo Profile

7.2.5.2   Password protection

An AMS Device Manager administrator can configure the user to require a password. The use of passwords is recommended. A password should be assigned to the 'admin' username immediately after installing AMS Device Manager.

Each user is given an AMS Device Manager username and password and required to enter them when they start AMS Device Manager. Access to functions depends on the level of permissions granted.

Login types

● standard, local, or domain

A standard user can change their password in AMS Device Manager. A Local or Domain Windows user cannot change their password using AMS Device Manager and must request their network administrator to do so.

7.2.5.3 User Manager utility

Usernames, passwords, and permissions, are assigned to users by an AMS Device Manager administrator, using the User Manager utility on the Server Plus Station. Only a user with AMS Device Manager System Administration rights can log in to User Manager.

To configure a new user/edit existing user:

1. From the Windows taskbar select: **Start > AMS Device Manager > User Manager**.

2. In the User Manager window click on **Add User**.

The Add User Wizard dialog allows you to:

*   select a user type, standard (AMS Device Manager) or Window user.

*   enter the username and password, and set permissions

*   edit existing users
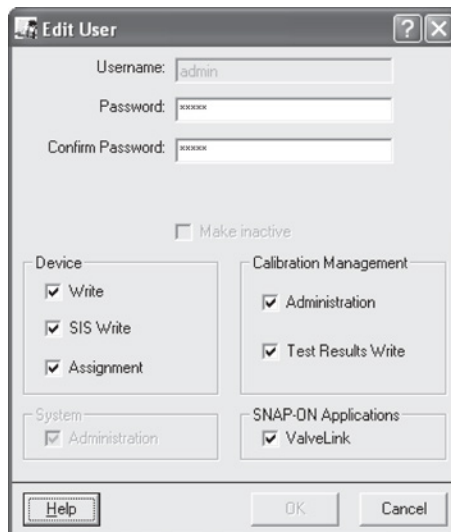
7.2.6   AMS menu structure

```
—— Configure/Setup
        —Identification
              Identification
                    Identification
                          Tag
                          Descriptor
                          Message
                          Date
                    Device
                          Manufacturer
                          Product Name
                          Order Number
                          Final Assembly Number
                          Hardware Revision
                          Firmware Revision
                          Loader Revision
                          EDD version
                    Device Status
        —Wizard
              Quick Start
                    Step 1 (Identification)
                    Step 2 (Application)
                    Step 3 (Vessel Shape)
                    Step 4 (Ranges)
                    Step 5 (Summary)
        —Operation
              Operation
                    Tag
                    General
                          Select Analog Output
                          Master Reset
                    Simulation/Test
                          Self Test
                          Loop Test
                    Device Status
        —Setup
              Sensor
                    Sensor
                          Tag
                          General
                                Units
                                Operating Mode
                                Material
                                Damping Filter
                          Calibration
                                Low Calibration Point
                                High Calibration Point
                                Sensor Offset
```

```
── Configure/Setup (continued)
        ── Setup/Sensor (continued)
                        Rate
                                Response Rate
                                Fill Rate per Minute
                                Empty Rate per Minute
                        Fail-safe
                                Material Level
                                Timer
                                Level
                        Device Status
                Analog Output Scaling
                        Analog Output Scaling
                        Tag
                        Current Output Function
                        4 mA Setpoint
                        20 mA Setpoint
                        Minimum mA Limit
                        Maximum mA Limit
                        Device Status
                Linearization
                        Vessel Shape
                        Tag
                        Vessel Shape
                                Vessel Shape
                        Vessel Dimensions
                                Maximum Volume
                                Dimension A
                                Dimension L
                        Device Status
                        Breakpoints
                        Tag
                        Levels and Volume breakpoints
                        Device status
                        Vessel Shape
        ── Signal Processing
                General
                        General
                        Tag
                        Range
                                Near Range
                                Far Range
                                Propogation Factor
                        Echo Select
                                Algorithm
                                Position Detect
                                Echo Threshold
                                CLEF Range
                        Sampling
                                Echo Lock
                                Sampling Up
                                Sampling Down
                        Signal Quality
                                Confidence
                                Echo Strength
                                Noise average
                        Device Status
```

```
── Configure/Setup (continued)
      ── Signal Processing (continued)
         TVT
            TVT Setup
               Tag
               Auto False Echo Suppression
               Auto False Echo Suppression Range
               Hover Level
               Shaper Mode
               Device Status
            TVT Shaper
               Tag
               Breakpoints
               Device Status
               Shaper Mode
         Manual TVT Curve
            Manual TVT diagram
               Tag
               Shaper Mode
         Echo Profile
            Echo Profile
               Tag
               Device Status
            Echo Profile Parameters
               Level Measurement
               Distance Measurement
               Confidence
               Near Range
      ── Local Display
         Local Display
            Tag
            Language
            LCD Fast Mode
            LCD Contrast
            Device Status
── Maintenance and Diagnostics
      ── Remaining Device Lifetime
         Device Lifetime
            Tag
            Lifetime (expected)
            Time in Operation
            Remaining Lifetime
            Activation of Reminders
            Reminder 1 before Lifetime (Required)
            Reminder 2 before Lifetime (Demanded)
            Device Status
      ── Remaining Sensor Lifetime
         Sensor Lifetime
            Tag
            Lifetime (expected)
            Time in Operation
            Remaining Lifetime
            Activation of Reminders
            Reminder 1 before Lifetime (Required)
            Reminder 2 before Lifetime (Demanded)
            Device Status
```

Maintenance and Diagnostics (continued)

   Service Schedule
      Service Schedule
         Tag
         Service interval
         Time Since Last Service
         Time Until Next Service
         Activation of Reminders
         Reminder 1 before Service (Required)
         Reminder 2 before Service (Demanded)
         Device Status

   Calibration Schedule
      Calibration Schedule
         Tag
         Calibration Interval
         Time Since Last Calibration
         Time Until Next Calibration
         Activation of Reminders
         Reminder 1 before Calibration (Required)
         Reminder 2 before Calibration (Demanded)
         Device Status

   Electronic Temperature
      Electronic Temperature
         Tag
         Electronic Temperature
         Lowest Value
         Highest Value
         Device Status

   Wear
      Wear
         Tag
         Powered Days
         Poweron Resets
         Device Status

Communication

   Communication
      Communication
         Tag
         Manufacturer's ID
         Device ID
         Product ID
         Device Revision
         EDD Revision
         Universal Command Revision
         Device Status

Security

   Security
      Remote Access
         Write Protect
         Access Control
      Remote Access
         Local Write Protected
         PIN to Unlock
      Device Status

7.3   Operating via FDT (Field Device Tool)

FDT is a standard used in several software packages designed to commission and maintain field devices. Two commercially available FDTs are PACTware and Fieldcare.

Functionally FDT is very similar to PDM. See Operating via SIMATIC PDM (Page 61) for more detail.

- To configure a field device via FDT you need the DTM (Device Type Manager) for the device.
- To configure a field device via SIMATIC PDM, you need the EDD (Electronic Data Description) for the device.

7.3.1   Device Type Manager (DTM)

A DTM is a type of software that 'plugs into' FDT. It contains the same information as an EDD but an EDD is independent of the operating system.

7.3.2   SITRANS DTM

- SITRANS DTM is an EDDL interpreter developed by Siemens to interpret the EDD for that device.
- To use SITRANS DTM to connect to a device, you must first install SITRANS DTM on your system and then install the device EDD written for SITRANS DTM.
- You can download SITRANS DTM from the Siemens service and support website. Go to Service & Support (http://www.siemens.com/automation/service&support), click on **Product Support**, and drill down to **Product Information/Automation Technology/Sensor systems/Process Instrumentation/Software & Communications**.

7.3.3   The device EDD

The SITRANS LR250 HART EDD for SITRANS DTM can be downloaded from our website:

Product page (http://www.siemens.com/LR250).

Go to **Support > Software Downloads**.
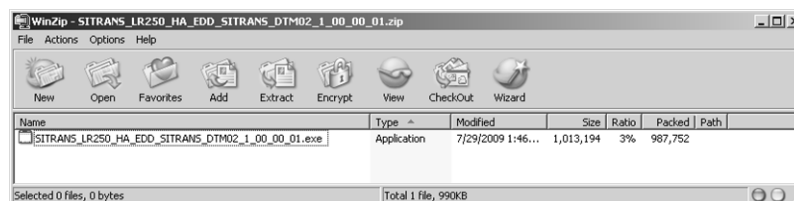
7.3.4 Configuring a new device via FDT

The full process to configure a field device via FDT is outlined in an Application Guide which can be downloaded from our website under **Support > Application Guides**.

Product page (http://www.siemens.com/LR250)