SIEMENS

SITRANS L

Radar transmitters
SITRANS LR260 with mA/HART

Operating Instructions

7ML5427

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.

Table of contents

Introduction

1

> **Note**
>
> This manual applies to the SITRANS LR260 mA/HART version only. HART® is a registered trademark of the HART Communication Foundation.

1.1　Purpose of this documentation

These instructions contain all information required to commission and use the device. Read the instructions carefully prior to installation and commissioning. In order to use the device correctly, first review its principle of operation.

The instructions are aimed at persons mechanically installing the device, connecting it electronically, configuring the parameters and commissioning it, as well as service and maintenance engineers.

1.2　Document history

The following table shows major changes in the documentation compared to the previous edition.

Edition	Remark
06/2019	• New polypropylene lens antenna • Documentation format change
06/2010	Maintenance release
12/2007	First edition

1.3　FW 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:

Edition	Firmware rev.	Date	Changes
1.0	1.00.01	5 Dec. 2007	• Initial release
1.1	1.00.04	17 Jun. 2010	• Maintenance release

1.4 Industrial use note

NOTICE
Use in a domestic environment
This Class B Group 1 equipment is intended for use in industrial areas.
In a domestic environment this device may cause radio interference.

1.5 Checking the consignment

1. Check the packaging and the delivered items for visible damages.

2. Report any claims for damages immediately to the shipping company.

3. Retain damaged parts for clarification.

4. Check the scope of delivery by comparing your order to the shipping documents for correctness and completeness.

⚠ WARNING
Using a damaged or incomplete device
Risk of explosion in hazardous areas.
• Do not use damaged or incomplete devices.

1.6 Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines, and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. You can find more information about industrial security by visiting: https://www.siemens.com/industrialsecurity (https://www.siemens.com/industrialsecurity).

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends you apply product updates as soon as available and always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under
https://www.siemens.com/industrialsecurity (https://www.siemens.com/industrialsecurity).

1.7 Transportation and storage

To guarantee sufficient protection during transport and storage, observe the following:

- Keep the original packaging for subsequent transportation.

- Devices/replacement parts should be returned in their original packaging.

- If the original packaging is no longer available, ensure that all shipments are properly packaged to provide sufficient protection during transport. Siemens cannot assume liability for any costs associated with transportation damages.

NOTICE
Insufficient protection during storage
The packaging only provides limited protection against moisture and infiltration. • Provide additional packaging as necessary.

Special conditions for storage and transportation of the device are listed in Technical data (Page 125).

1.8 Notes on warranty

The contents of this manual shall not become part of or modify any prior or existing agreement, commitment or legal relationship. The sales contract contains all obligations on the part of Siemens as well as the complete and solely applicable warranty conditions. Any statements regarding device versions described in the manual do not create new warranties or modify the existing warranty.

The content reflects the technical status at the time of publishing. Siemens reserves the right to make technical changes in the course of further development.

Safety notes 2

2.1 Preconditions for use

This device left the factory in good working condition. In order to maintain this status and to ensure safe operation of the device, observe these instructions and all the specifications relevant to safety.

Observe the information and symbols on the device. Do not remove any information or symbols from the device. Always keep the information and symbols in a completely legible state.

> ⚠️ **WARNING**
>
> **Improper device modifications**
>
> Risk to personnel, system and environment can result from modifications to the device, particularly in hazardous areas.
>
> - Only carry out modifications that are described in the instructions for the device. Failure to observe this requirement cancels the manufacturer's warranty and the product approvals.

2.1.1 Safety marking symbols

In manual	On product	Description
⚠️	⚠️	WARNING: refer to accompanying documents (manual) for details.
🗑️		Dispose of in an environmentally safe manner, and according to local regulations.

2.1.2 Laws and directives

Observe the test certification, provisions and laws applicable in your country during connection, assembly and operation.

2.1.3 FCC Conformity

US Installations only: Federal Communications Commission (FCC) rules

---

Note

- This device has been tested and found to comply with the limits Class B digital device 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 device has also been tested and found to comply with the limits §15.256, Subpart C- Intentional radiators, 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 device generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications, in which case the user will be required to correct the interference at his/her own expense.

- This device is certified to measure levels in fixed or mobile enclosed tanks made from metal, concrete or materials with similar RF attenuating properties.

- Devices equipped with the aluminum horn or the 3 inch or 4 inch stainless horn antennas may be used to measure levels in open air environments or outside enclosed tanks, subject to the following conditions:

  – Devices shall be installed and maintained to ensure a vertically downward orientation of the transmit antenna's main beam.

  – Devices shall be installed only at fixed locations. Devices shall not operate while being moved or while inside a moving container.

  – Hand-held applications and residential use are prohibited.

2.1.4 Industry Canada

The SITRANS LR260 complies with Industry Canada standard RSS211 (March 2015).

1. The installation of the SITRANS LR260 shall be done by trained installers, in strict compliance with the manufacturer's instructions.

2. The use of this device is on a "no-interference, no-protection" basis. That is, the user shall accept operations of high-powered radar in the same frequency band which may interfere with or damage this device. However, devices found to interfere with primary licensing operations will be required to be removed at the user's expense.

3. The installer/user of this device shall ensure that it is at least 10 km from the Penticton radio astronomy station (British Columbia latitude: 49° 19' 12" N, longitude: 119° 37'12" W). For devices not meeting this 10 km separation (e.g. the Okanagan Valley, British Columbia) the installer/ user must coordinate with and obtain the written concurrence of the Director of the Penticton radio astronomy station before the equipment can be installed or operated. The Director of the DRAO may be contacted at 250-497-2300 or at NRC.DRAO-OFR.CNRC@nrc-cnrc.gc.ca. (Alternatively, the Manager, Regulatory Standards, Industry Canada, may be contacted.)

Note

- This device has been tested and found to comply with the limits RS- 211 - Level Probing Radar Equipment. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.
- This device is certified to measure levels in fixed or mobile enclosed tanks made from metal, concrete or materials with similar RF attenuating properties.
- Devices equipped with the aluminum horn or the 3 inch or 4 inch stainless horn antennas may be used to measure levels in open air environments or outside enclosed tanks, subject to the following conditions:
  - Devices shall be installed and maintained to ensure a vertically downward orientation of the transmit antenna's main beam.
  - Devices shall be installed only at fixed locations. Devices shall not operate while being moved or while inside a moving container.
  - Hand-held applications and residential use are prohibited.

2.1.5 Radio Equipment Directive (RED) compliance (Europe)

Hereby, Siemens declares that the SITRANS LR260 is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

The LR260 complies with EN 302 372 for use in closed storage vessels, when installed according to the installation requirements of EN 302 372, and may be used in all EU countries.

For the receiver test that covers the influence of an interferer signal to the device, the performance criterion has at least the following level of performance according to ETSI TS 103 361 [6]:

- Performance criterion: measurement value variation Δd over time during a distance measurement
- Level of performance: Δd ≤ ±50 mm
- Installation and maintenance is performed by suitably qualified and trained personnel.

2.2 Laws and directives

Observe the safety rules, provisions and laws applicable in your country during connection, assembly and operation. These include, for example:

- National Electrical Code (NEC - NFPA 70) (USA)
- Canadian Electrical Code (CEC) (Canada)

Further provisions for hazardous area applications are for example:

- IEC 60079-14 (international)
- EN 60079-14 (EU)

2.2.1 Conformity with European directives

The CE marking on the device symbolizes the conformity with the following European directives:

Electromagnetic compatibility EMC 2014/30/EU	Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to electromagnetic compatibility
Low voltage directive LVD 2014/35/EU	Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits
Atmosphère explosible ATEX 2014/34/EU	Directive of the European Parliament and the Council on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres
Pressure equipment directive PED 2014/68/EU	Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment
RED 2014/53/EU	Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC

The applicable directives can be found in the EC conformity declaration of the specific device.

2.3 Requirements for special applications

Due to the large number of possible applications, each detail of the described device versions for each possible scenario during commissioning, operation, maintenance or operation in systems cannot be considered in the instructions. If you need additional information not covered by these instructions, contact your local Siemens office or company representative.

Note

Operation under special ambient conditions

We highly recommend that you contact your Siemens representative or our application department before you operate the device under special ambient conditions as can be encountered in nuclear power plants or when the device is used for research and development purposes.

2.4　　　Use in hazardous areas

Qualified personnel for hazardous area applications

Persons who install, connect, commission, operate, and service the device in a hazardous area must have the following specific qualifications:

● They are authorized, trained or instructed in operating and maintaining devices and systems according to the safety regulations for electrical circuits, high pressures, aggressive, and hazardous media.

● They are authorized, trained, or instructed in carrying out work on electrical circuits for hazardous systems.

● They are trained or instructed in maintenance and use of appropriate safety equipment according to the pertinent safety regulations.

⚠ **WARNING**

Use in hazardous area

Risk of explosion.

● Only use equipment that is approved for use in the intended hazardous area and labeled accordingly.

● Do not use devices that have been operated outside the conditions specified for hazardous areas. If you have used the device outside the conditions for hazardous areas, make all Ex markings unrecognizable on the nameplate.

⚠ **WARNING**

Loss of safety of device with type of protection "Intrinsic safety Ex i"

If the device or its components have already been operated in non-intrinsically safe circuits or the electrical specifications have not been observed, the safety of the device is no longer ensured for use in hazardous areas. There is a risk of explosion.

● Connect the device with type of protection "Intrinsic safety" solely to an intrinsically safe circuit.

● Observe the specifications for the electrical data on the certificate and/or in Technical data (Page 125).

Description

3

3.1 Overview SITRANS LR260

SITRANS LR260 is a 2-wire 25 GHz pulse radar level transmitter for continuous monitoring of solids and liquids in storage vessels including extreme levels of dust and high temperatures, to a range of 30 m (98.4 ft).
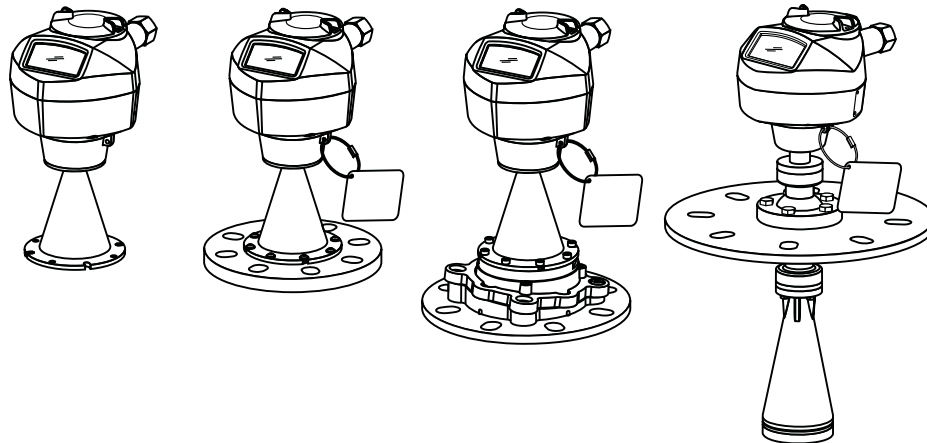
3.2 Features

The instrument consists of an electronic component coupled to a permanently attached horn antenna with an optional integral Easy Aimer and flange or threaded connection for quick and easy positioning. A dust cover or air purging are available as options.

SITRANS LR260 supports HART communication protocol, and SIMATIC PDM software. Signals are processed using Process Intelligence which has been field-proven in over 1,000,000 applications worldwide (ultrasonic and radar).

3.3 Applications

Inventory level measurement or process control

SITRANS LR260 is designed to measure levels of solids and liquids in a variety of applications:

- Cement powder
- Plastic pellets
- Grain
- Chemical
- Petrochemical

- Coal
- Solids and liquids bulk storage vessels

3.4 System configuration

Typical PLC/mA configuration with HART
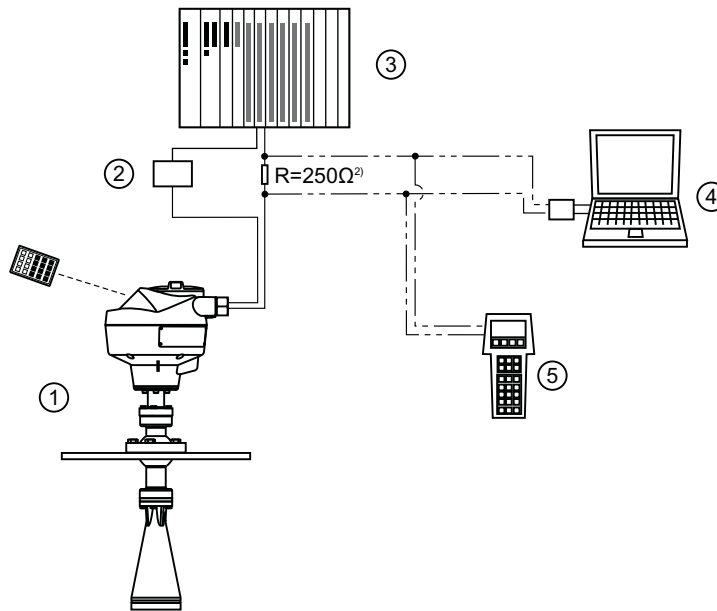
① SITRANS LR260
② Power supply [1]
③ Active PLC
④ HART modem
⑤ HART communicator

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

[2] Loop resistance (total of cable resistance plus 250 Ohm [resistor]) must be less than 550 Ohm for the device to function properly.

3.5 HART communication

This device supports HART communication protocol. For more information, see HART Communication (https://fieldcommgroup.org/).

Installing/mounting

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

4.1   Basic safety notes

> **⚠ DANGER**
>
> **Pressure applications**
>
> Danger to personnel, system and environment will result from improper disassembly.
> - Never attempt to loosen, remove, or disassemble process connection while vessel contents are under pressure.

> **Note**
>
> **Material compatibility**
>
> Siemens can provide you with support concerning selection of sensor components wetted by process media. However, you are responsible for the selection of components. Siemens accepts no liability for faults or failures resulting from incompatible materials.

> **⚠ WARNING**
>
> **Unsuitable connecting parts**
>
> Risk of injury or poisoning.
>
> In case of improper mounting, hot, toxic, and corrosive process media could be released at the connections.
> - Ensure that connecting parts (such as flange gaskets and bolts) are suitable for connection and process media.

> **⚠ WARNING**
>
> **Exceeded maximum permissible operating pressure**
>
> Risk of injury or poisoning.
>
> The maximum permissible operating pressure depends on the device version, pressure limit and temperature rating. The device can be damaged if the operating pressure is exceeded. Hot, toxic and corrosive process media could be released.
>
> Ensure that maximum permissible operating pressure of the device is not exceeded. Refer to the information on the nameplate and/or in Technical data (Page 125).

4.1.1 External stresses and loads

⚠ CAUTION
External stresses and loads
Damage to device by severe external stresses and loads (e.g. thermal expansion or pipe tension). Process media can be released. • Prevent severe external stresses and loads from acting on the device.

4.1.2 Installation location requirements

NOTICE
Aggressive atmospheres
Damage to device through penetration of aggressive vapors. • Ensure that the device is suitable for the application.

NOTICE
Direct sunlight
Device damage.
The device can overheat or materials become brittle due to UV exposure. • Protect the device from direct sunlight. • Make sure that the maximum permissible ambient temperature is not exceeded. Refer to the information in Technical data (Page 125).

4.1.2.1 Strong vibrations

NOTICE
Strong vibrations
Damage to device. • In installations with strong vibrations, mount the transmitter in a low vibration environment.

4.1.3 Proper mounting

NOTICE

Incorrect mounting

The device can be damaged, destroyed, or its functionality impaired through improper mounting.

- Before installing ensure there is no visible damage to the device.
- Make sure that process connectors are clean, and suitable gaskets and glands are used.
- Mount the device using suitable tools. Refer to the information in Technical data (Page 125).

Note

- Correct location is key to a successful application.
- Avoid reflective interference from vessel walls and obstructions by following guidelines in this chapter.

4.2 Disassembly

⚠ **WARNING**

Incorrect disassembly

The following risks may result from incorrect disassembly:

- Injury through electric shock

- Risk through emerging media when connected to the process

- Risk of explosion in hazardous area

In order to disassemble correctly, observe the following:

- Before starting work, make sure that you have switched off all physical variables such as pressure, temperature, electricity etc. or that they have a harmless value.
- If the device contains hazardous media, it must be emptied prior to disassembly. Make sure that no environmentally hazardous media are released.
- Secure the remaining connections so that no damage can result if the process is started unintentionally.

Note

Do not disassemble and reassemble the horn from the polymeric flange version more than five times.

4.3　Proper mounting

4.3.1　Nozzle location note

Note

Beam angle depends on horn size. For details on avoiding false echoes, see Auto False Echo Suppression (Page 55).

4.3.2　Nozzle location
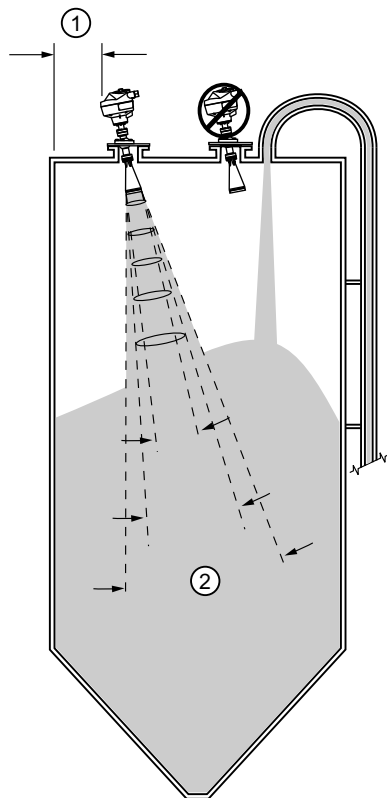
① Minimum 1 m (39")
② Beam angle　2" horn = 15°
　　　　　　　　3" horn = 10°
　　　　　　　　4" horn = 8°

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

● Avoid central locations on tall, narrow vessels.

● Align the antenna so that the radar cone is perpendicular to the surface of the monitored material, if possible. See Easy Aimer (Page 28)

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

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

- Provide a sunshield if the instrument will be mounted in direct sunlight.
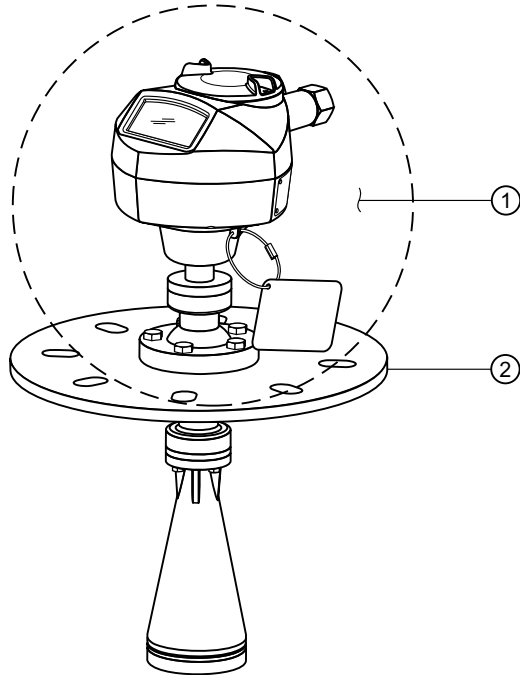
①   Ambient temperature –40 °C to +80 °C (–40 °F to +176 °F)

②   Process temperature (with FKM O-ring)

         Non-pressure version: –40 to +200 °C (–40 to +392 °F)

         Pressure rated version: –40 to +80 °C (–40 to +176 °F)

         Polypropylene lens antenna version: -40 to +80 °C (–40 to +176 °F)

See also

Auto false echo suppression (Page 55)

4.3.3   Orientation in a vessel with obstructions

Note

For best results on a vessel with obstructions, orient the front or back of the device toward the obstructions.

①   Polarization axis
②   Polarization reference point
③   Display
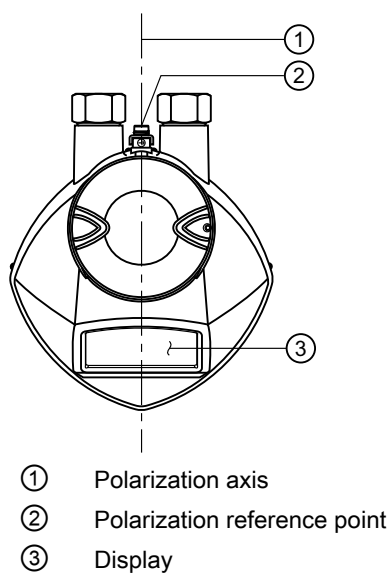
4.3.4   Stainless steel Easy Aimer

Note

When the Easy Aimer ball is loosened, the device is free to tilt to a maximum of 30°.
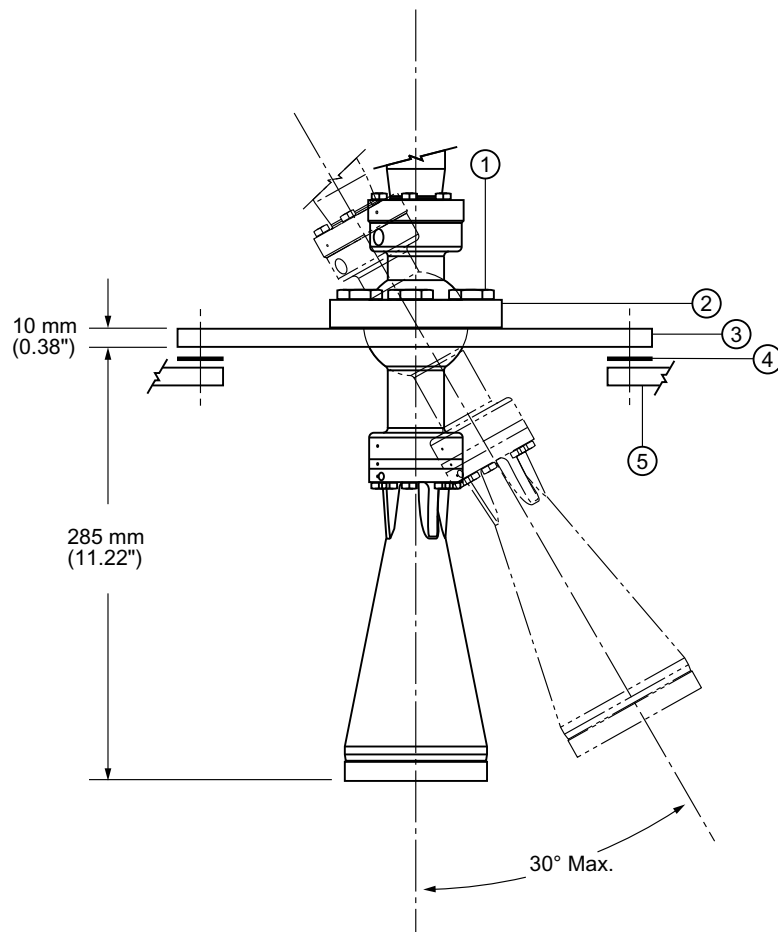
①   Easy Aimer ball locking bolts

②   Top clamping plate (upper socket)

③   Bottom clamping plate (lower socket)

④   Customer gasket as required [recommended thickness 1.5 to 1.8 mm (0.06 to 0.07")]

⑤   Customer mounting plate, as required ø 102 mm (4") min., central opening

Directing the Easy Aimer

1. Holding the electronics enclosure firmly, loosen the Easy Aimer ball locking bolts and gently reposition the enclosure.

2. Direct SITRANS LR260 so the horn antenna is pointed at an angle perpendicular to the material surface, if possible. (As a guide, aim the beam at a point approximately 2/3 of the way across the tank diameter.)

3. When the desired position is reached, retighten the 5 bolts to 15-23 Nm (11 to 17 Lbf-ft).
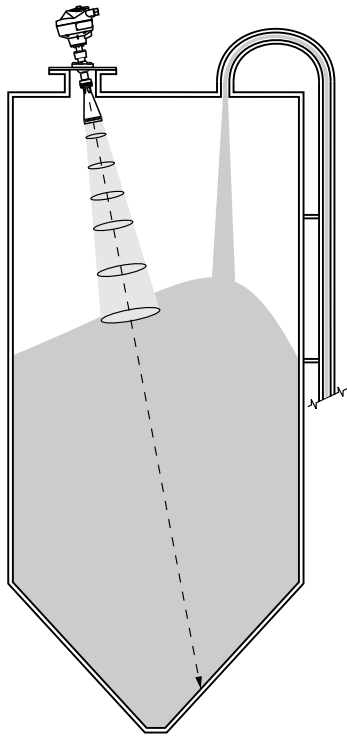
4.3.5 Aluminum aimer flanges

5°

10°
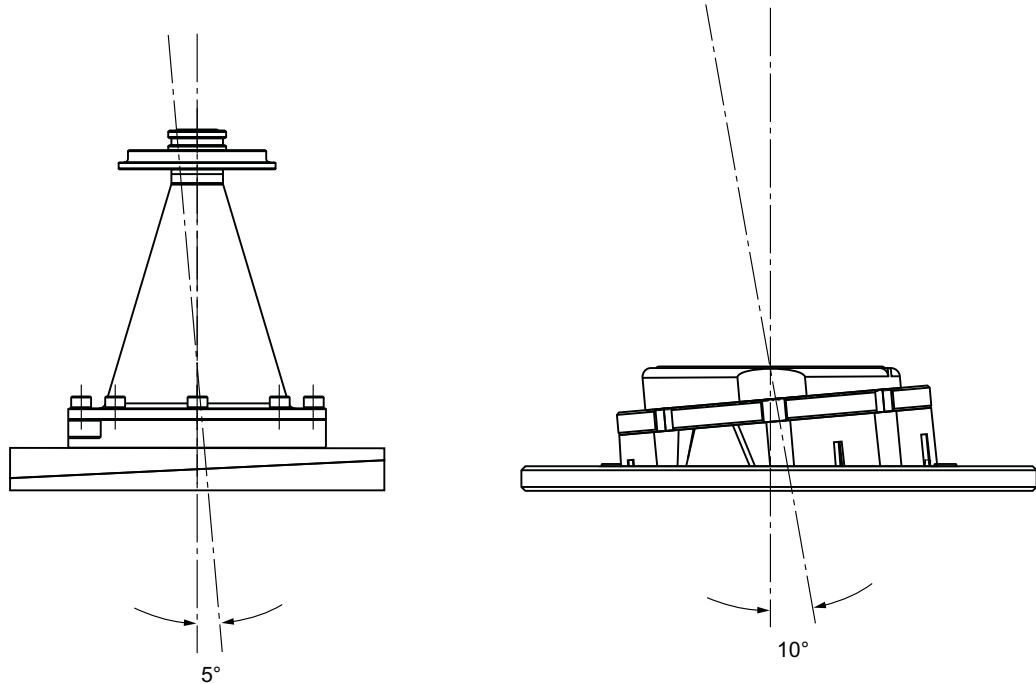
3" (80 mm) aimer can be adjusted from 0 to 5 degrees

4" (100 mm) aimer can be adjusted from 0 to 10 degrees

6" (150 mm) aimer can be adjusted from 0 to 10 degrees

4.3.6 Air purging system (optional)

Note

Air purge system is only available with stainless steel horn versions.

For more frequent cleaning, a purging system can be installed between the flange and the horn antenna. The system provides an 1/8" inlet (female thread) on the flange where cooling air or cleaning fluid passes through the flange and exits the inside of the horn to clean it. The customer will supply the purging medium by a manual or automatic valve system.

This option is only available with the universal flange for purging.

Note

The Air Purge feature should not be activated with a dust cap in place.

• Purge duration, pressure, and interval, will vary with each application. It is the user's responsibility to determine the requirements depending on the application and cleaning required.

• Short duration bursts of high pressure provide more effective cleaning than continuous low pressure air.

• Some dust particles are highly abrasive and can be drawn into the inside of the horn during purge cleaning, damaging the internal PTFE emitter of the antenna. A replacement kit is available from your local Siemens representative.

• It is the customer's responsibility to ensure that any vacuum or pressure in the measured vessel is maintained, considering the hole that passes through the process connection and SITRANS LR260 antenna system.

Air Consumption (Flow rate versus applied pressure)	
Air Pressure (psi)[2]	Approx. inlet volume flow rate
20[3]	5 SCFM
40[3]	6 SCFM
60	8 SCFM
80	9 SCFM
90	10 SCFM
Recommended 90 to 110 psi for effective cleaning with inlet flow of 10 SCFM[1]	

● The purge connection is closed by the manufacturer, using a 1/8" plug.

● When the plug is removed to connect a purging system, the operator is responsible for ensuring that the purging circuit conforms to "Ex" requirements: for example, by fitting an NRV valve.
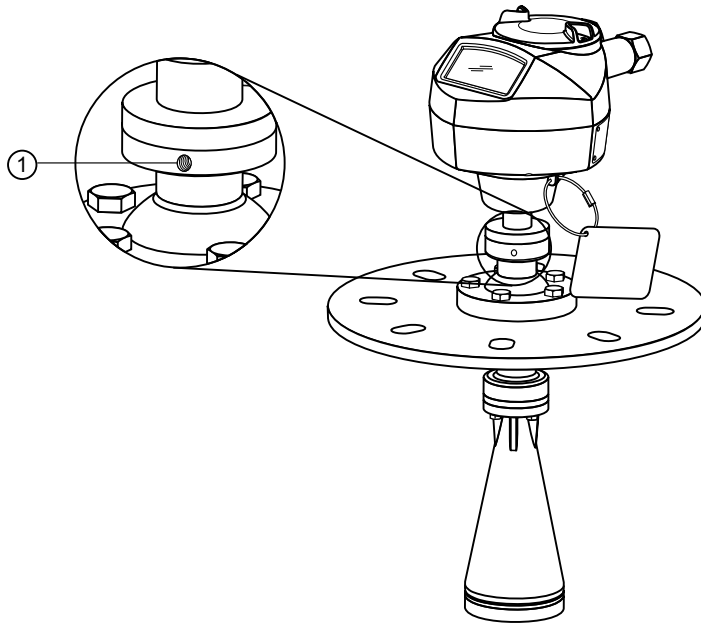
①   Purged process connection with factory installed 1/8" NPT plug

$^{1)}$ SCFM (standard cubic feet/minute) referenced to 14.7 psi, +68 °F and 36% relative humidity (RH).

$^{2)}$ Air pressure in vessel can affect purge operation.

$^{3)}$ Not for pressure applications.

4.3.7   Universal Slotted Flange

> ⚠ **WARNING**
>
> **The user is responsible for the selection of bolting and gasket materials which will fall within the limits of the flange and its intended use and which are suitable for the service conditions.**

Universal flange mates with EN 1092-1 (PN16) / ASME B16.5 (150lb) / JIS 2220 (10K) bolt patterns. See Dimension drawings (Page 131) for more details.

4.3.8   PTFE dust cap for stainless horn versions

Note

The dust cap must be removed before using the Air Purge feature. See Air Purging System (Page 31).

The dust cap fits onto the end of the horn and prevents the buildup of dust and other process material inside the horn.

- It is particularly useful for applications in areas of high humidity, or with bulk solids with a high moisture content.

- Three sizes are available, to fit the standard 2", 3" and 4" horns.

Installation

1. Thoroughly clean inside the horn. If you remove the horn for easier cleaning, take care not to damage or bend the plastic emitter.

2. Press the cap firmly onto the horn until the ridge inside the cap snaps into position in the groove on the outside of the horn.

3. Hand tighten the adjustable clamp supplied to secure the cap.

4. Use a screwdriver or nut driver to tighten the clamp screw until the clamp provides an air-tight seal.

Note

It is critical to ensure no moisture can be trapped inside.

---
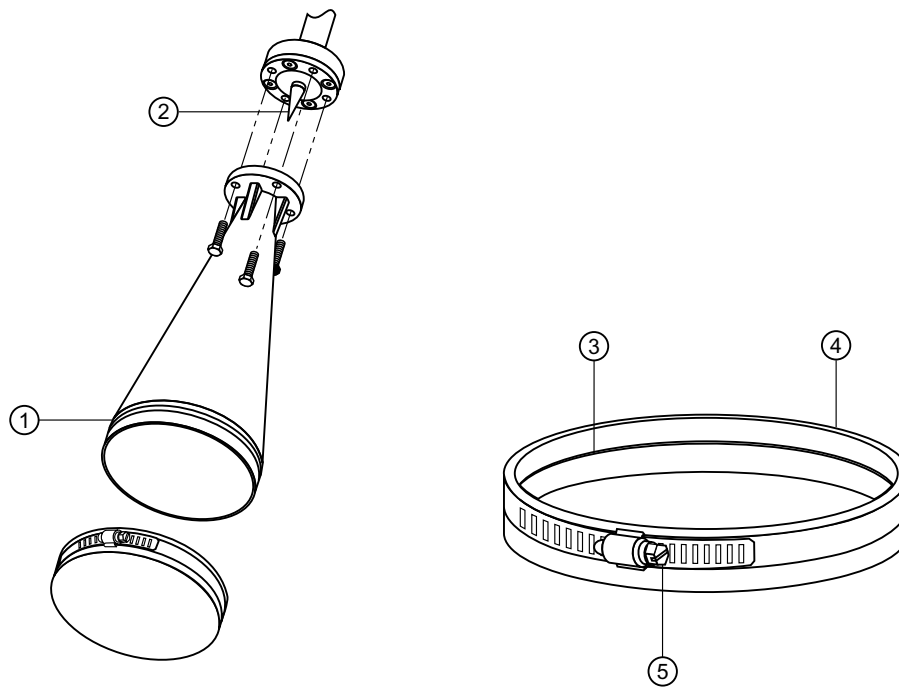
①	Groove
②	Plastic emitter
③	Ridge
④	Dust cap
⑤	Clamp screw

4.3.9 Aluminum horn with polypropylene lens (dust cover) antenna version

The polypropylene lens acting as a dust cover fits onto the end of the horn and prevents the buildup of dust and other process material inside the horn. It is particularly useful for applications in areas of high humidity, or with bulk solids with a high moisture content.
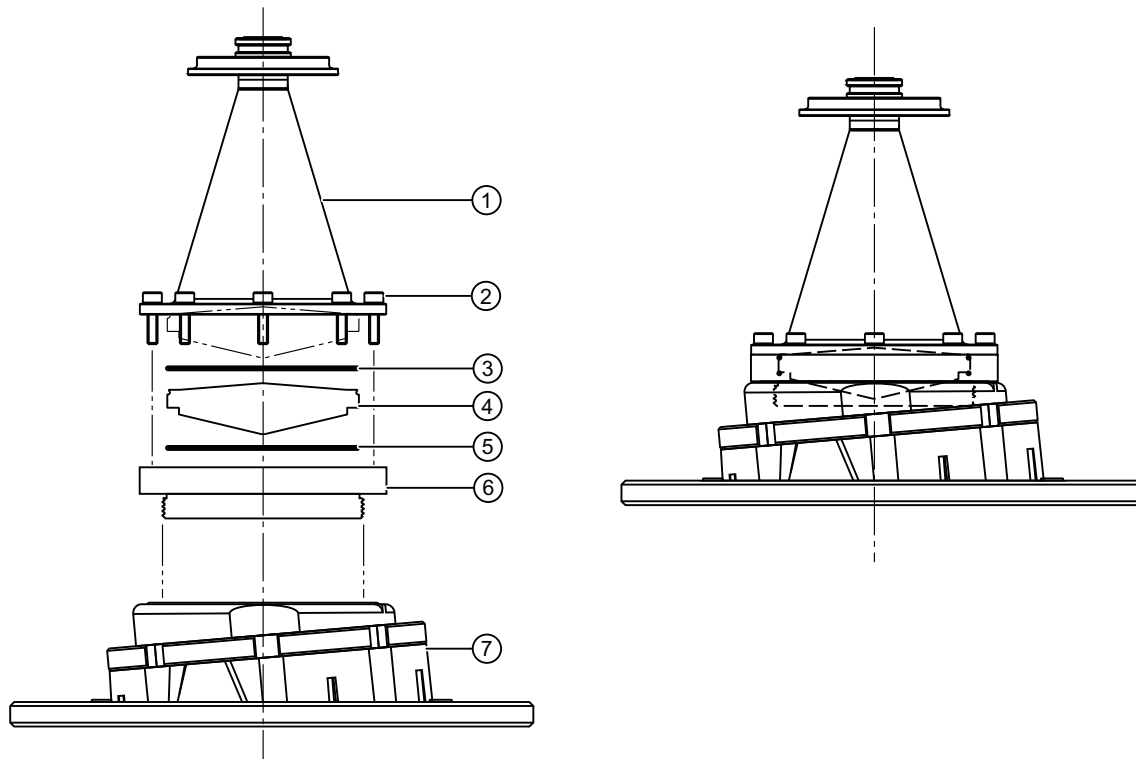
①	Aluminum horn antenna	⑤	O-ring
②	8xM5 screws	⑥	Universal aimer adaptor
③	O-ring	⑦	Universal aimer flange
④	Polypropylene lens (dust cover)		

Installation

1. Disassemble the aimer flange assembly⑦ from the device by unscrewing the large M90 thread.

2. Remove the aimer adaptor⑥ by unscrewing the 8xM5 screws② from the horn assembly①. Discard the removed aimer adaptor⑥ and screws②.

3. Thoroughly clean the internal threads on the aimer flange assembly⑦ using a soft bristle brush.

4. Thoroughly clean the mating surfaces of the flange, horn① and the aimer flange assembly⑦.

5. Apply the Molykote 111 grease from the provided polybag on both o-rings③ provided in the kit to aid assembly.

6. Install one of the two o-rings③ provide using the kit on the groove at the top of the lens④.

7. Seat the second o-ring⑤ (provided in the kit) in the groove inside the aimer adaptor⑥.

8. Assemble the aimer adaptor⑥ and the lens assembly④ on to the horn assembly① using 8xM5 screws② (provided in the kit). It is recommended to torque the threads to 25 in lb.

9. Thread the assembly on top of the aimer flange⑦. Ensure the face sealing o-ring⑤ on the on top of the aimer flange⑦ is properly placed. Make sure that intimate contact of the two metallic surfaces of the assembly is obtained.

10. Use an appropriate screwdriver or nut driver to tighten the clamp screw until the clamp is an air-tight seal.

Note

It is critical to ensure no moisture can be trapped inside.

Connecting 5

5.1 Basic safety notes

5.1.1 Missing PE/ground connection

⚠ WARNING
Missing PE/ground connection
Risk of electric shock.
Depending on the device version, connect the power supply as follows:
• **Power plug**: Ensure that the used socket has a PE/ground conductor connection. Check that the PE/ground conductor connection of the socket and power plug match each other.
• **Connecting terminals**: Connect the terminals according to the terminal connection diagram. First connect the PE/ground conductor.

⚠ WARNING
Unsuitable cables, cable glands and/or plugs
Risk of explosion in hazardous areas.
• Use only cable glands/plugs that comply with the requirements for the relevant type of protection.
• Tighten the cable glands in accordance with the torques specified in Technical data (Page 125).
• Close unused cable inlets for the electrical connections.
• When replacing cable glands, only use cable glands of the same type.
• After installation, check that the cables are seated firmly.

5.1.2 Connecting device in energized state in hazardous areas

⚠ WARNING
Connecting device in energized state
Risk of explosion in hazardous areas.
● Connect devices in hazardous areas only in a de-energized state.
Exceptions:
● Devices having the type of protection "Intrinsic safety Ex i" may also be connected in energized state in hazardous areas.

5.1.3 Incorrect selection of type of protection

⚠ WARNING
Incorrect selection of type of protection
Risk of explosion in areas subject to explosion hazard.
This device is approved for several types of protection.
1. Select the appropriate type of protection.
2. Connect the device in accordance with the selected type of protection.

5.2 Connecting SITRANS LR260

⚠ WARNING
Incorrect connection to power source
Risk to personnel, system and environment can result from improper power connection.
● 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. For example, Class 2 or Limited Energy Source.
● All field wiring must have insulation suitable for rated voltages.

> **⚠ WARNING**
>
> **Loss of protection**
>
> Loss of approvals can result from improper connection.
>
> - Check the nameplate on your device, to verify the approval rating.
> - Use appropriate cable entry seals to maintain IP or NEMA rating.
> - See Instructions specific to hazardous area installation (Page 41).

Note

Use twisted pair cable: AWG 22 to 14 (0.34 mm^2 to 2.5 mm^2). Separate cables and conduits may be required to conform to standard instrumentation wiring practices or electrical codes.

---

① Use a 2 mm Allen key to loosen the lid-lock set screw.	④ Cable shield (if used)
② Plug[1]	
③ Cable gland (or NPT cable entry)[1]	
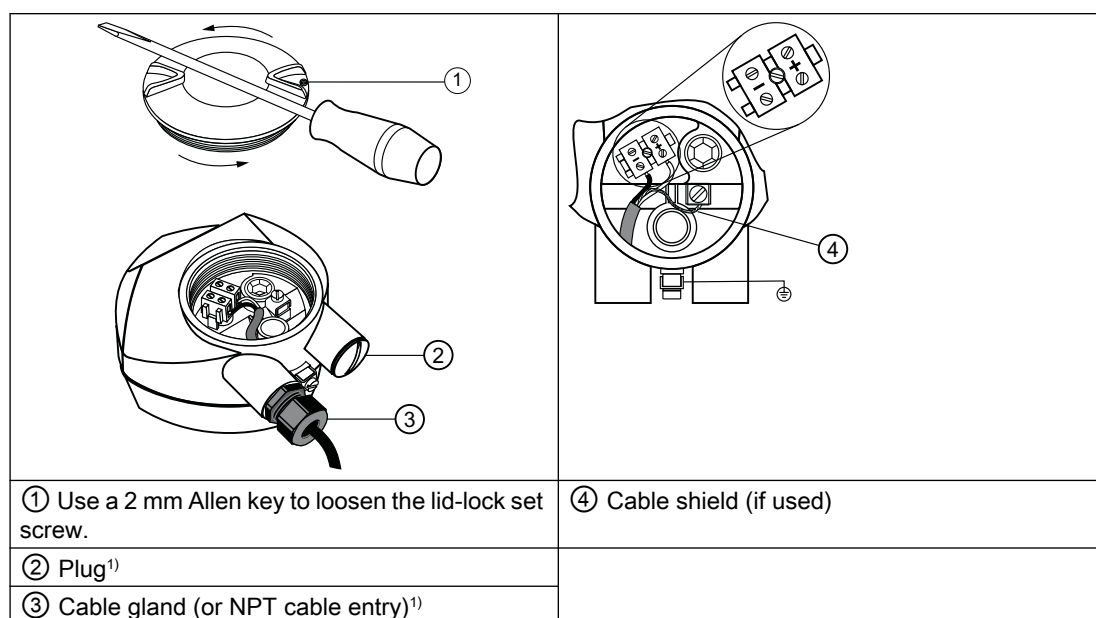
1. Strip the cable jacket for approximately 70 mm (2.75") from the end of the cable, and thread the wires through the gland.[2]

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

3. Ground the instrument according to local regulations.

4. Tighten the gland to form a good seal.

[1] Depending on the approval rating, glands and plugs may be supplied with your instrument.

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

Typical PLC/mA configuration with HART
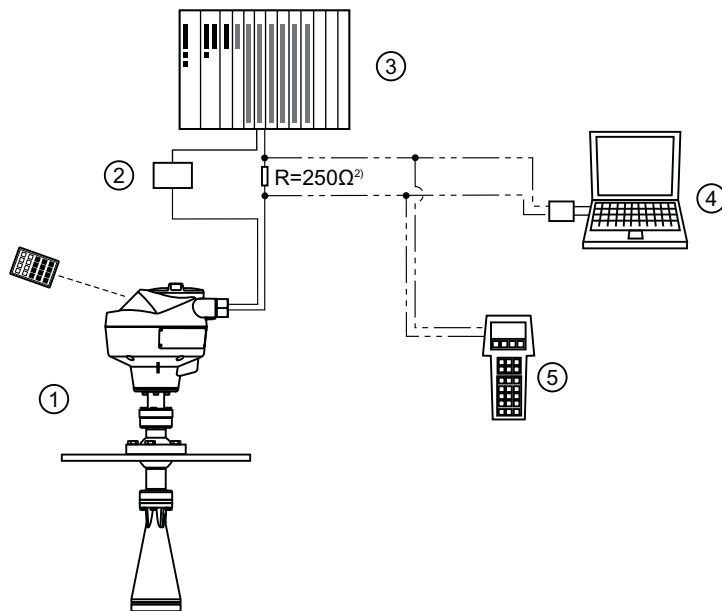
① SITRANS LR260

② Power supply [1]

③ Active PLC

④ HART modem

⑤ HART communicator

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

[2] Loop resistance (total of cable resistance plus 250 Ohm [resistor]) must be less than 550 Ohm for the device to function properly.

5.3 Hazardous area installation

⚠ WARNING
Improper power supply
Risk of explosion in hazardous areas as result of incorrect power supply.
• Connect the device in accordance with the specified power supply and signal circuits. The relevant specifications can be found in the certificates, in Technical data (Page 125) or on the nameplate.

5.3.1 Instructions specific to hazardous area installation

Device nameplate (ATEX/IECEX/INMETRO/C-TICK)
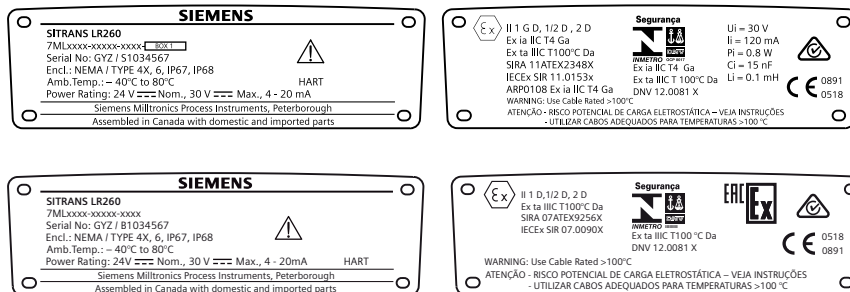
The ATEX certificates listed on the nameplates can be downloaded from the product page (www.siemens.com/sitranslr260). Go to Support > Approvals / Certificates.

The IECEx certificates listed on the nameplates can be viewed on the IECEx website (http://iecex.iec.ch). Go to: http://iecex.iec.ch (http://iecex.iec.ch)and click on Ex Equipment Certificates of Conformity then enter the certificate number IECEx SIR 11.0153X or IECEx SIR 07.0090X.

Device nameplate (FM/CSA)
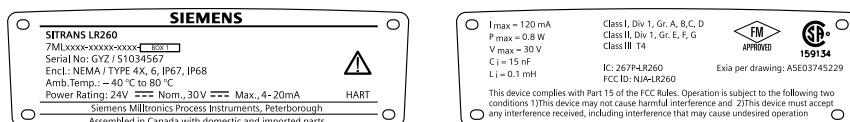
FM/CSA Intrinsically Safe connection drawing number A5E03745229 can be downloaded from the product page of our website at: www.siemens.com/LR260. Go to **Technical info > Images, graphics and drawings**

For power demands see Startup Behavior (Page 162).

- For wiring requirements: follow local regulations.

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

- Refer to Instructions specific to hazardous area installations (Page 40)

Note

Selecting a suitable PLC input module, power supply, or barrier 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.
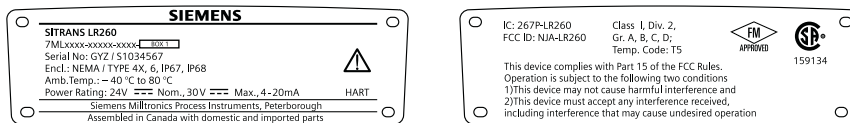
A5E03745453 - Non-incendive wiring (US/Canada only)

FM/CSA Class 1, Div 2 connection drawing number A5E03745541 can be downloaded from the product page of our website at:

- www.siemens.com/LR260.

- Go to **Technical Info > Images, graphics, drawings**.

- For power demands see Startup Behavior (Page 162).
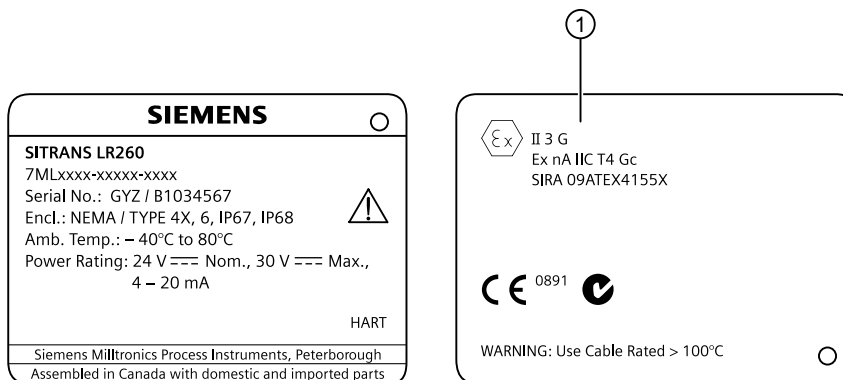
①   The ATEX certificate listed on the nameplate.

The ATEX certificate listed on the nameplate can be downloaded from the product page of our website at:

www.siemens.com/LR260.

Go to Support > Approvals / Certificates.

- For power demands see Startup Behavior (Page 162).

- For wiring requirements: follow local regulations.

- Refer to Instructions specific to hazardous area installations (Page 41).

5.3.1.1 Special conditions for safe use (denoted by X after the certificate number)

- Parts of the enclosure may be non-conducting and may generate an ignition-capable level of electrostatic charge under certain extreme conditions. The user shall ensure that the equipment is not installed in a location where it may be subjected to external conditions (such as high-pressure steam), which might cause a build-up of electrostatic charge on non-conducting surfaces.

- Aluminium, magnesium, titanium or zirconium may be used at the accessible surface of the equipment. In the event of rare incidents, ignition sources due to impact and friction sparks could occur. This shall be considered when the Sitrans LR260 is being installed in locations that specifically require Equipment Protection Level Ga or Da.

- The equipment shall be bonded to the system earth in accordance with the relevant code of practice.

- When these products are used in the presence of combustible dust, any glands, conduit entry devices or blanking elements fitted to the equipment shall be suitable for use in the presence of combustible dusts and certified as such by a notified body; the installation of these devices shall not compromise the IP6X rating of the equipment enclosure.

- Unused cable entries shall be fitted with blanking elements that can only be removed with the aid of a tool.

- For applications that use the purge facility, the user shall provide a means to ensure that combustible dust from the hazardous area cannot enter the purge supply in such a way as to compromise the area classification.

- When these products are installed in the Category 3 G according to certificates 09ATEX4155X and 09ATEX4156X, the end user must ensure that the explosion protection and ingress protection of IP65 is maintained at each entry to the enclosure by use of a blanking element or cable entry device that meets the requirements of the protection concepts type 'n' or increased safety 'e' or flameproof 'd'.

5.3.1.2 (Reference European ATEX Directive 2014/34/EU)

The following instructions apply to equipment covered by certificate number Sira 11ATEX2348X, Sira 07ATEX9256X, Sira 09ATEX4155X and Sira 09ATEX4156.

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

2. The equipment is certified for use as category 1GD, 1/2D, 2D equipment per Sira 11ATEX2348X; Category 1D, 1/2D, 2D equipment per Sira 07ATEX9256X; and Category 3G equipment per Sira 09ATEX4155X and Sira 09ATEX4156.

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 2014/34/EU, 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 contains no user-replaceable parts and is not intended to be repaired by the user. Repair of the equipment is to be carried out by the manufacturer, or their approved agents, in accordance with the applicable code of practice.

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 Basic safety notes

6.1.1 Hot surfaces

⚠ WARNING
Hot surfaces
Risk of burns resulting from hot surfaces.
• Take corresponding protective measures, for example by wearing protective gloves.

6.1.2 Toxic gases and liquids

⚠ DANGER
Toxic gases and liquids
Danger of poisoning when venting the device: if toxic process media are measured, toxic gases and liquids can be released.
• Before venting ensure that there are no toxic gases or liquids in the device, or take the appropriate safety measures.

6.1.3 Loss of explosion protection

⚠ WARNING
Loss of explosion protection
Risk of explosion in hazardous areas if the device is open or not properly closed.
• Close the device as described in Installing/mounting (Page 23).

6.2 Local commissioning

The handheld programmer used with this device contains lithium batteries that are non-replaceable.

Lithium batteries are primary power sources with high energy content designed to provide the highest possible degree of safety.

⚠ WARNING
Potential hazard
Lithium batteries may present a potential hazard if they are abused electrically or mechanically. Observe the following precautions when handling and using lithium batteries: ● Do not short-circuit, recharge or connect with false polarity.   ● Do not expose to temperatures beyond the specified temperature range.   ● Do not incinerate.   ● Do not crush, puncture or open cells or disassemble.   ● Do not weld or solder to the battery's body.   ● Do not expose contents to water.

6.2.1 Power up

6.2.1.1 Activating the radar device

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.

6.2.2 Handheld programmer functions

6.2.2.1 Handheld programmer functions overview

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:

6.2.2.2   Remote Quick Start options

- locally [see Quick Start Wizard via the handheld programmer (Page 51)]

- or from a remote location [see Quick Start Wizard via SIMATIC PDM (Page 60), or Quick Start Wizard via AMS Device Manager]

For more complex setups see Application Examples (Page 147), and for the complete range of parameters see Parameter Reference (Page 73).

6.2.2.3   Quick Start via local operation

SITRANS LR260 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 guide to help you configure the device for a simple application. There are two ways to access the wizard:

- 7-step Quick Start Wizard via the handheld programmer

- 4-step Quick Start Wizard via SIMATIC PDM for programming via SIMATIC PDM.

For more complex setups, see Appendix E: Application Example (Page 147), and for the complete range of parameters, see Parameter Reference (Page 73).

6.2.2.4 The LCD display

Measurement mode display

Normal operation
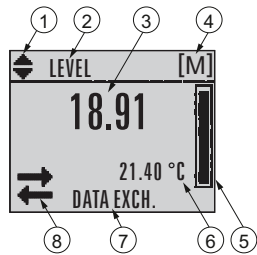
① Toggle indicator [a] for linear units or %

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 120)

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

[b] In response to a key press request. For details, see Handheld Programmer (Page 50) for key functions in Measurement mode.

Fault present
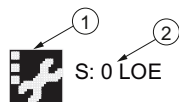
① Device status indicator, see Device status icons (Page 120)

② Text area displays status messages

PROGRAM mode display

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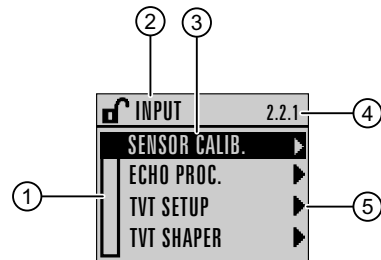
①	Menu bar	④	Current item number
②	Current menu	⑤	Pointer
③	Current item		

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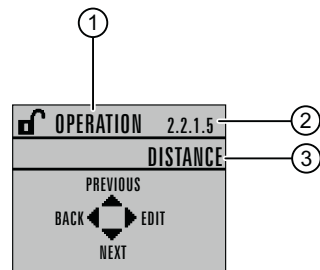
①	Parameter name
②	Parameter number
③	Parameter value/selection
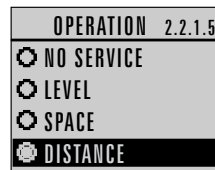
6.2.2.5 Handheld programmer (Part No. 7ML1930-1BK)

The programmer is ordered separately.

6.2.2.6 Key functions in measurement mode

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.

6.2.3 Programming

6.2.3.1 Programming the radar device

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 2 minutes, depending on the menu level).

6.2.3.2 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 73). (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

- Point the programmer at the display from a maximum distance of 500 mm (1.6 ft), then press **RIGHT arrow** ▶ to activate PROGRAM mode and open menu level 1.
- Press **RIGHT arrow** ▶ twice to navigate to menu item 1.1 and open parameter view.
- Press **RIGHT arrow** ▶ to open **Edit** mode or **DOWN arrow** ▼ to accept default values.
- To change a setting, scroll to the desired item or key in a new value.
- After modifying a value, press **RIGHT arrow** ▶ to accept it and press **DOWN arrow** ▼ to move to the next item.
- The Quick Start Wizard settings are inter-related and changes apply only after you click on **Yes** in **Apply?** at the end of the Quick Start steps.

6.2.3.3 Application Type (1.1.)

Options	STEEL	Silo construction
	CONCRETE	
	Default: STEEL	

6.2.3.4 Response Rate (1.2.)

Sets the reaction speed of the device to measurement changes in the target range.

	SLOW	0.1 m/minute
	MED	1.0 m/minute
Options	FAST	10.0m/minute
	Default: FAST	

Use a setting just faster than the maximum filling or emptying rate (whichever is greater). Slower settings provide higher accuracy; faster settings allow for more level fluctuation.

6.2.3.5 Units (1.3.)

Select the units for the Quick Start variables (high and low calibration point, and level, distance, or space).

Options	M, CM, MM, FT, IN
	Default: M

6.2.3.6 Operation (1.4.)

	NO SERVICE	Stops updating measurements and associated loop current. Last valid measurement value is displayed.
	LEVEL	Distance to material surface referenced from Low Calibration Point (process empty level).
Options	SPACE	Distance to material surface referenced from High Calibration Point (process full level).
	DISTANCE	Distance to material surface referenced from Sensor Reference Point.
	Default: DISTANCE	

Operation Types

①	Sensor reference point (flange face)
②	High calibration point
③	Distance
④	Space
⑤	Level
⑥	Low calibration point

6.2.3.7   Low Calibration Point (LOW CALIB. PT.) (1.5.)

Distance from Sensor Reference to Low Calibration Point: usually process empty level. (See Operation (Page 52) types for an illustration.)

| | Range: 0.0000 to 30.000 m |
| **Values** | Default: horn type dependent |

6.2.3.8 High Calibration Point (HIGH CALIB. PT.) (1.6.)

Distance from Sensor Reference to High Calibration Point: usually process full level.
(See Operation (Page 52) types for an illustration.)

Values	Range: 0.0000 to 30.000 m
	Default: 0.0 m
Related parameters	Near Range (2.2.1.12.) (Page 81)

When setting the High Calibration Point value, note that echoes are ignored within Near Range (2.2.1.12.) (Page 81)

6.2.3.9 Apply (1.7.)

In order to save the Quick Start settings, it is necessary to select Yes and apply changes.

	YES, NO, DONE
Options	Display shows **DONE** when Quick Start is successfully completed.

● Press **Mode** to return to Measurement mode.

6.2.3.10 Requesting an Echo Profile

```
 ⌐┐  DIAGNOSTICS      3.2
┗┛
    ECHO PROFILE
    MEAS. VALUES      ▶
    REMAIN. DEV. LIFE ▶
    REMAIN. SENS. LIFE ▶
```
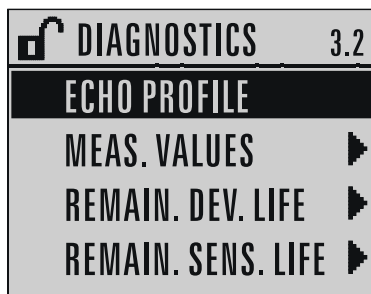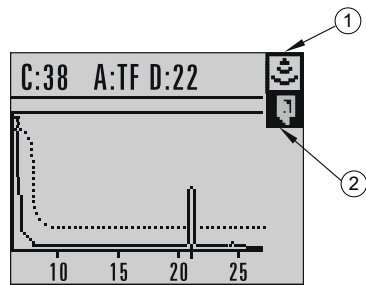
① Transmit icon, de-
   selected
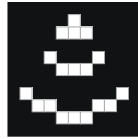
② Exit icon, selected

a.	In PROGRAM mode, navigate to: **LEVEL METER> DIAGNOSTICS> ECHO PROFILES (3.1)**
b.	Press **RIGHT arrow** ► to request a profile.
c.	In the Profile screen, press **UP arrow** ▲ to select the **Transmit** icon, and **Right arrow** ► to update the profile.
d.	Press **DOWN arrow** ▼ to select the **Exit** icon, then **Right arrow** ► to return to previous menu.

6.2.3.11   Device address

The default address for the device is 0. To reset the address via the handheld programmer, see Device Reset (Page 111)

6.2.3.12   Auto false echo suppression

If SITRANS LR260 displays a false high level, or the reading is fluctuating between the correct level and a false high level, you can use the Auto False Echo Suppression parameters to prevent false echo detection. See TVT (Auto False Echo Suppression) setup (TVT SETUP) (Page 86) for instructions.

6.3 Application examples

6.3.1 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.

6.3.2 Level application example

The application is a steel silo containing flour that takes an average of 3 hours to fill and 3 weeks to empty.

Using the Easy Aimer, orient the SITRANS LR260 so that the emission cone is approximately perpendicular to the material surface.
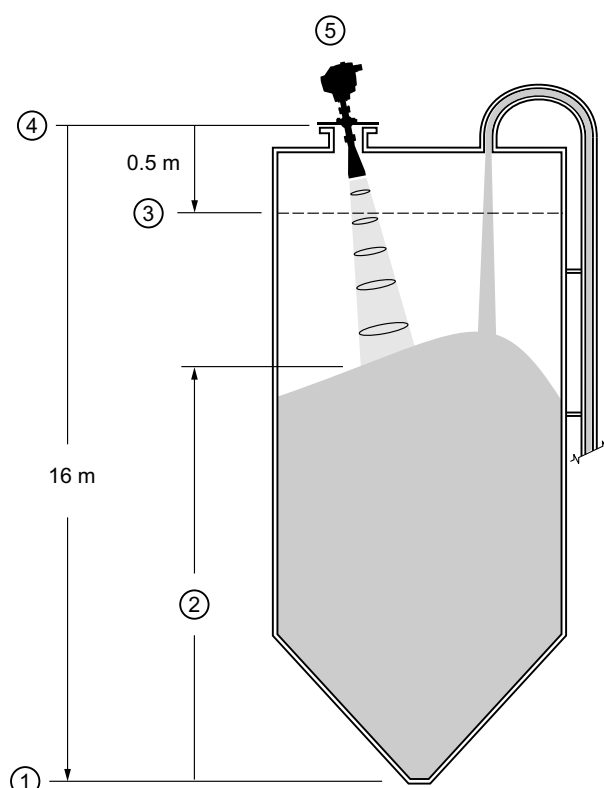
①   Low calibration point
②   Level
③   High calibration point
④   Sensor reference point
⑤   SITRANS LR260

Fill rate = 0.09 m/minute (Low Cal Pt. minus High Cal Pt.) / fastest fill/empty time

= (16 m – 0.5 m) / 180 min.

= 15.5 m /180 min. = 0.09 m/min.

Quick start setting		Description
APPLICATION (Page 74)	STEEL	
RESPONSE RATE (Page 74)	SLOW	Response rate = 0.1 m/minute.
UNITS (Page 75)	m	
OPERATION (Page 75)	LEVEL	Material level referenced from Low Calibration Point.
LOW CALIBRATION POINT (Page 76)	16	Process empty level.
HIGH CALIBRATION POINT (Page 77)	0.5	Process full level.
APPLY? (Page 77) (CHANGES)	YES	Save new settings.

Operating

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 on versions and compatibility at our website.

7.1.1 Functions in SIMATIC PDM

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

Feature	Function
Quick Start (Page 74)	Device configuration for simple applications
Display (Page 65)	Monitor process variables
Echo profile (Page 65)	Easy access to echo profile viewing/comparison, TVT shaping, auto false echo suppression and echo setup
Trend (Page 66)	Level trend monitoring
Auto False Echo Suppression (Page 87)	Screen out false echoes
Simulate AO (Analog Output) (Page 70)	Simulate a process value during commissioning and maintenance

7.1.1.1 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 Support > Automation Technology > Process control systems > SIMATIC PCS 7 > System components > Plant Device Management > SIMATIC PDM.**

7.1.1.2 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 173) for a chart and Changing parameter settings using SIMATIC PDM (Page 64) 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 65) for parameters that do not appear in the menu structure in SIMATIC PDM.

7.1.1.3   Initial setup

Initial setup

It is required to obtain the SITRANS LR260 EDD from the product support website and install into PDM using the device integration manager utility.

7.1.1.4   Updating the Electronic Device Description (EDD)

You can locate the EDD in Device Catalog, under **Sensors/Level/Echo/SiemensMilltronics/ SITRANS LR260**. 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/ LR260)

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.

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/LR260).

---

1. Check that you have the most recent EDD, and if necessary update it. [See Updating the Electronic Device Description (EDD) (Page 60) 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.

7.1.2   Quick Start Wizard via SIMATIC PDM

7.1.2.1   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.

7.1.2.2 Quick start note

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 103).
- 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 65) or see Parameter Reference (Page 73) 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 87).

7.1.2.3 Quick start menu and instruction

Launch SIMATIC PDM, open the menu **Device – Wizard - Quick Start**, and follow steps 1 to 4.
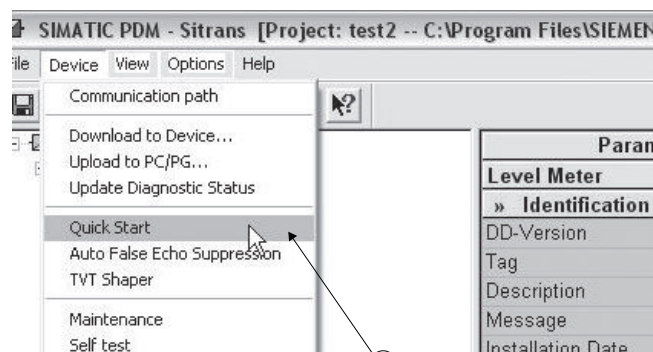
①   Quick start

7.1.2.4 Quick start steps with images

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.)
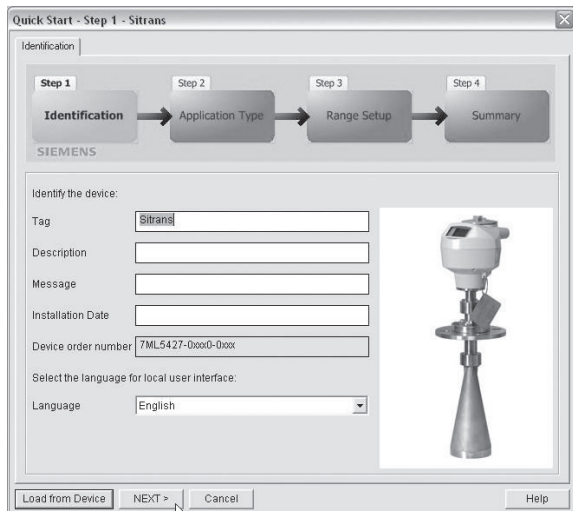
Step 2 – Application

Select the application type (level or volume) and the material, then click on **NEXT**.
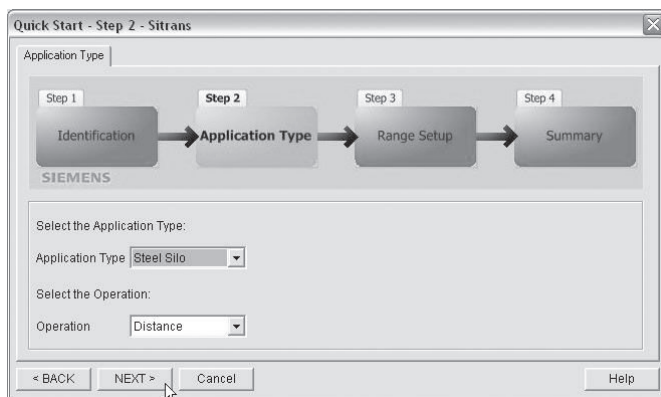
Step 3 – Ranges

Set the parameters, and click on **NEXT**.
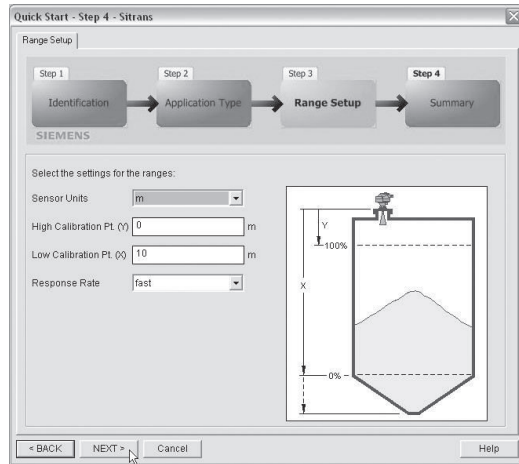
Step 4 – Summary

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.
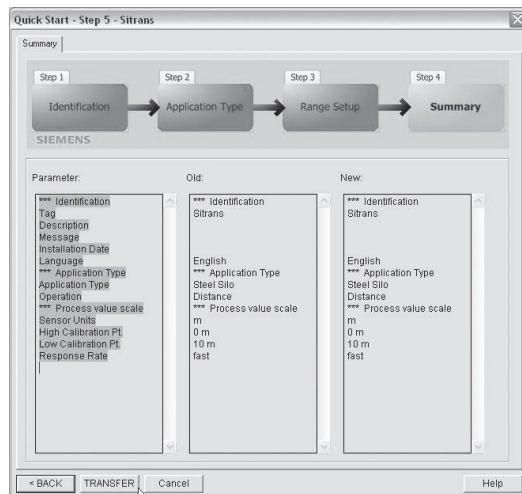
The message **Quick Start was successful** will appear. Click on **OK**.

7.1.3 Changing parameter settings using SIMATIC PDM

Note

- For a complete list of parameters, see Parameter Reference (Page 73).
- 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 65) 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.

7.1.4 SIMATIC PDM pull-down menu image

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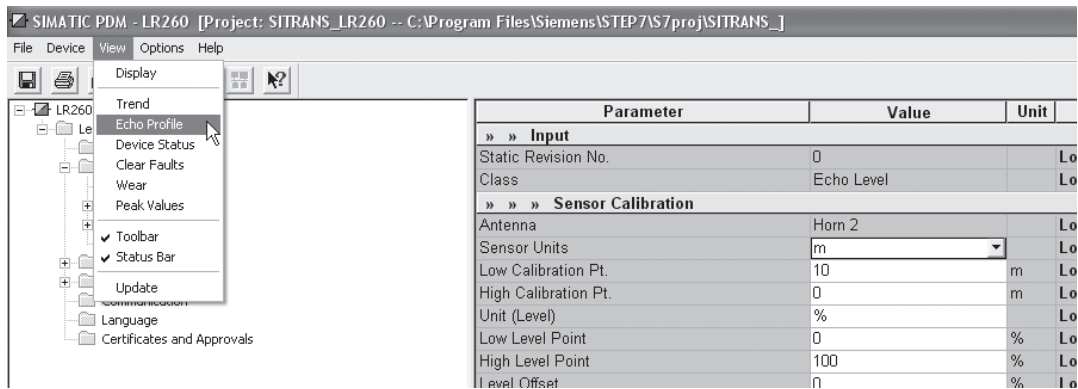
7.1.5 Parameters accessed via pull-down menus

7.1.5.1 Parameters accessed via pull-down menus

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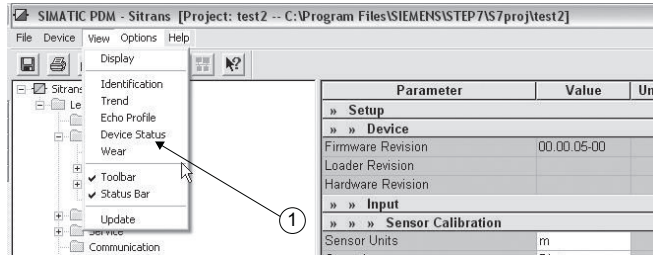
①   pull-down menus

7.1.5.2 Display

To compare outputs in real time, open the menu **View – Display.**
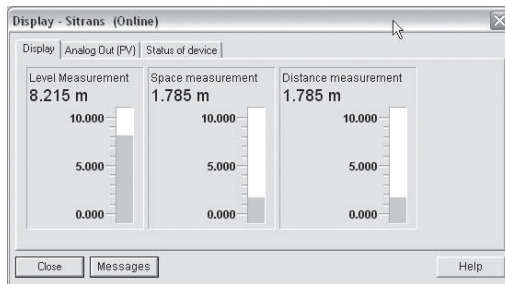
7.1.5.3 Echo profile

Open the menu **View - Echo Profile**.
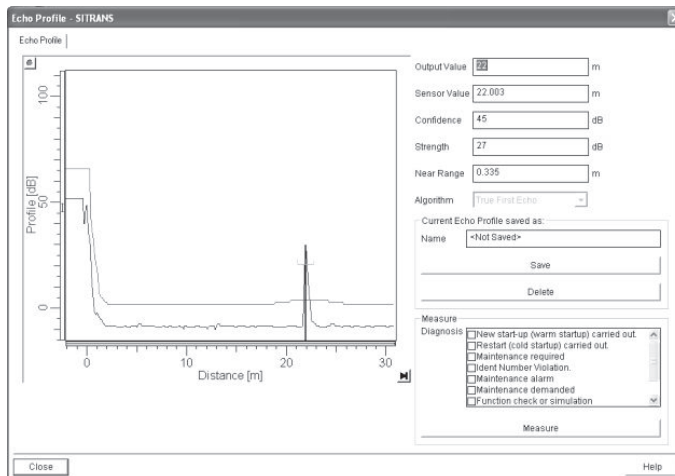
Note

- Double click on each axis and record the Xscale and Data Scale values, so that you can restore the default view by resetting to these values.
- You can save a profile or delete a saved profile.
- After saving a profile, open menu **View – Echo profile**.

7.1.5.4 Trend

Note

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

Open the menu **View – Trend.**
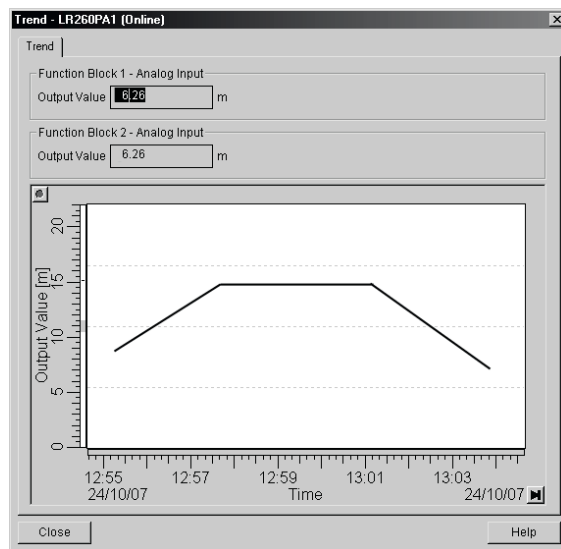
7.1.5.5 Auto false echo suppression

Note

- If possible, adjust **Auto False Echo Suppression** parameters with an empty or almost empty vessel. There should be a minimum distance of two meters from the radar instrument to the material.
- Set **Auto False Echo Suppression** and **Auto Suppression Range** during installation, if possible.
- Before adjusting these parameters, rotate the instrument for best signal (minimum false-echo amplitude).

SITRANS LR260 first learns the echo profile. Then the learned profile, or part of it, is used to screen out false echoes. (See Auto False Echo Suppression (Page 87)for a more detailed explanation.)
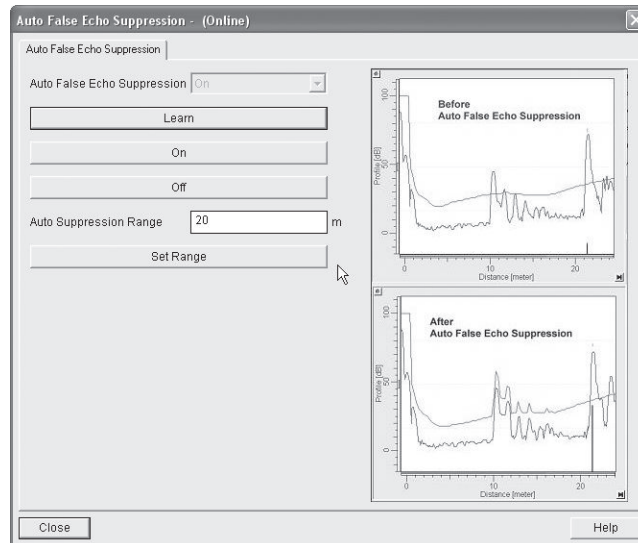
1. Determine **Auto Suppression Range** (the distance within which the learned TVT will replace the default TVT). Measure the actual distance from the antenna reference point to the material surface using a rope or tape measure, and make allowances for the actual location of the LR260. Subtract 2 m (6.56 ft) from this distance, and use the resulting value.

2. Open the menu **Device – Auto False Echo Suppression.**

3. Enter the value for **Auto Suppression Range** and click on **Set Range**.

4. Click on **Learn**. While the new curve is being learned, all buttons are inaccessible. Unless calculation is instantaneous, buttons will disappear until it is complete.

5. When buttons are visible, click on **Close**. Auto TVT is now on, and the learned TVT curve will be used.

6. To turn Auto False Echo Suppression off or on, reopen menu **Device – Auto False Echo Suppression** and click on **Off** or **On.**

7.1.5.6   TVT Shaper

Note

Record the default X-Scale (horizontal axis) and Data Scale (vertical axis) values so that you can restore the default view by resetting to these values.

This feature allows you to manually adjust the TVT curve to avoid false echoes caused by obstructions. For an explanation see Auto False Echo Suppression. (Page 87)

Open the menu **Device – TVT Shaper**.
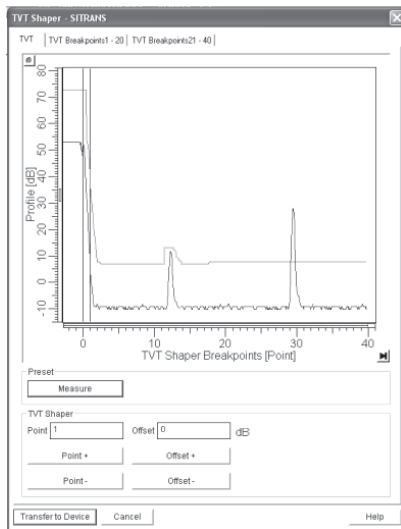
- Press **Measure** to refresh the echo profile and load the current TVT curve from the device.
- Change the position of the cursor on the TVT curve using the **Point+** and **Point–** buttons: raise and lower the curve using **Offset+** and **Offset–** (entered in dB).
- Alternatively, enter values for **Point** and **Offset** directly into the dialog boxes.
- If desired, click on the TVT breakpoints tabs to see settings.
- Click on **Transfer to Device**.

7.1.5.7 Device Status

Open the menu **View – Device Status** to view Device Status, Maintenance, and Diagnostics status.

See Diagnostics (Page 95)

See Remaining Device Lifetime (REMAIN. DEV. LIFE.) (Page 97) and Remaining Sensor Lifetime (REMAIN SENS. LIFE.) (Page 100)

7.1.5.8 Wear

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

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

- Powered Days
- Power-on Resets

Note

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

7.1.5.9 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 click on **Write.**

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

4. If desired, activate alerts for either or both of **Maintenance Required/Maintenance Demanded.**

5. Click on **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 click on **Write.**

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

4. If desired, activate alerts.

5. Click on **Service Performed** to reset the schedule.

7.1.5.10 Device Reset

Factory Defaults

Use **Device Reset** to reset all user parameters excluding device addresses, the parameter block Identification, and Maintenance Schedule parameters to the default settings.

1. Open the menu **Device - Device Reset** and click on **OK** to perform a reset to Factory Defaults.

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

Note

If you are performing a reset after replacing the device with a different instrument, do not upload parameters to the PC/PG.

7.1.5.11 Configuration flag reset

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

7.1.5.12 D/A (Digital/Analog) Trim

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

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

7.1.5.13 Select AnalogOut

Allows you to select one of three operation types:

- level
- space
- distance

1. Open the menu **Device – Select AnalogOut**.

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

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

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

7.1.5.14 Simulate AO (Analog Output)

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

To simulate a user-defined mA value:

1. Open the menu **Device - Simulate AO.**

2. Select **Other**, enter the simulated value, and click on **OK.** The message 'Field Device fixed at new value' appears. Click on **OK**.

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

7.1.5.15   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).

7.1.5.16   How to set the device address

The default address for the device is 0. To reset the address via the handheld programmer see Device Address. (Page 111)

SITRANS LR260 with mA/HART
Operating Instructions, 11/2019, A5E32337683-AD

Parameter reference 8

8.1 Parameter reference

> **Note**
> - Parameter names and menu structure are almost identical for SIMATIC PDM and the local user interface (LUI).
> - Default settings in the parameter tables are indicated with an asterisk (*) unless explicitly stated.
> - **Mode** 🗒 toggles between **PROGRAM** and **Measurement** Modes.
> - For Quick Access to parameters via the handheld programmer, press **Home** 🏠, then enter the menu number, for example: **2.2.1.**
> - In Navigation mode, **ARROW keys** (◄ ▲ ▼ ►) navigate the menu in the direction of the arrow.
> - Press **RIGHT arrow** ► to open **Edit** Mode, or to save a modification.

Parameters are identified by name and organized into function groups. See LCD menu structure (Page 173) for a chart. For AMS Device Manager the structure varies slightly.

Parameters accessible via the handheld programmer are followed by the device menu number in parenthesis. Parameters not followed by a number are accessible only via remote operation.

For more details see operating via SIMATIC PDM (Page 59)

8.2 Pull-down menus via SIMATIC PDM

Device menus	View menus
Communication path	Display (Page 65)
Download to device Upload to PC/PG Update Diagnostic Status	Trend (Page 66) Echo Profile (Page 65) Show Echo Profile (Page 95) Device Status (Page 69) Clear Faults Wear (Page 68) Peak Values
Set Address	Toolbar Status bar

Device menus	View menus
Quick Start (Page 74)	
Auto False Echo Suppression (Page 87)	
TVT shaper (Page 67)	
Maintenance (Page 69)	Update
Device Reset (Page 69)	
Simulate AO (Page 70)	
Write Locking	

8.3 Quick Start Wizard

The Quick Start wizard groups together all the settings you need to configure for a simple application. You can access it either via SIMATIC PDM, or via the handheld programmer.

Note

Do not use the Quick Start wizard to modify individual parameters (perform customization for your application only after the Quick Start has been completed).

8.4 Quick start (1.)

8.4.1 Application Type (1.1.)

Options	STEEL	Silo construction
	CONCRETE	
	Default: STEEL	

8.4.2 Response Rate (1.2.)

Sets the reaction speed of the device to measurement changes in the target range.

	SLOW	0.1 m/minute
	MED	1.0 m/minute
Options	FAST	10.0m/minute
	Default: FAST	

Use a setting just faster than the maximum filling or emptying rate (whichever is greater). Slower settings provide higher accuracy; faster settings allow for more level fluctuation.

8.4.3 Units (1.3.)

Select the units for the Quick Start variables (high and low calibration point, and level, distance, or space).

Options	M, CM, MM, FT, IN
	Default: M

8.4.4 Operation (1.4.)

	NO SERVICE	Stops updating measurements and associated loop current. Last valid measurement value is displayed.
Options	LEVEL	Distance to material surface referenced from Low Calibration Point (process empty level).
	SPACE	Distance to material surface referenced from High Calibration Point (process full level).
	DISTANCE	Distance to material surface referenced from Sensor Reference Point.
	Default: DISTANCE	

Operation Types

①   Sensor reference point (flange face)

②   High calibration point

③   Distance

④   Space

⑤   Level

⑥   Low calibration point

8.4.5   Low Calibration Point (LOW CALIB. PT.) (1.5.)

Distance from Sensor Reference to Low Calibration Point: usually process empty level.
(See Operation (Page 75) types for an illustration.)

Values	Range: 0.0000 to 30.000 m
	Default: horn type dependent

8.4.6 High Calibration Point (HIGH CALIB. PT.) (1.6.)

Distance from Sensor Reference to High Calibration Point: usually process full level. (See Operation (Page 75) types for an illustration.)

Values	Range: 0.0000 to 30.000 m
	Default: 0.0 m
Related parameters	Near Range (2.2.1.12.) (Page 81)

When setting the High Calibration Point value, note that echoes are ignored within Near Range (2.2.1.12.) (Page 81)

8.4.7 Apply (1.7.)

In order to save the Quick Start settings, it is necessary to select Yes and apply changes.

	YES, NO, DONE
Options	Display shows **DONE** when Quick Start is successfully completed.

- Press **Mode** to return to Measurement mode.

8.5 Setup (2.)

Note

- See Programming via the handheld programmer (Page 51) or Operating via SIMATIC PDM (Page 59) for instructions.
- Default settings in the parameter tables are indicated with an asterisk (*) unless explicitly stated.
- Values shown in the following tables can be entered via the handheld programmer

---

8.5.1 Device (2.1.)

8.5.2 Firmware Revision (FIRMWARE REV.) (2.1.1.)

Corresponds to the software or firmware that is embedded in the SITRANS LR260. Read only.

8.5.3 Loader Revision (LOADER REV.) (2.1.2.)

Corresponds to the software used to update the SITRANS LR260. Read only.

8.5.4 Hardware Revision (HARDWARE REV.) (2.1.3.)

Corresponds to the electronics hardware of the SITRANS LR260. Read only.

8.5.5 Input (2.2.)

8.5.6 Sensor Calibration (SENSOR CALIB.) (2.2.1.)

You can configure each of the related parameters, to suit your particular application.

8.5.7 Antenna (2.2.1.1.)

Sets antenna type.

	No Horn, Horn 2, Horn 3, Horn 4
Values (view only)	Default is set by factory depending on horn size.

8.5.8 Sensor Units (2.2.1.4.)

Units the sensor is measuring in.

	M, CM, MM, FT, IN
Values	Default: M

8.5.9 Operation (2.2.1.5.)

Options		NO SERVICE	SITRANS LR260 stops updating measurements and associated loop current. Last valid measurement value is displayed.
		LEVEL	Distance to material surface referenced from Low Calibration Point (process empty level).
		SPACE	Distance to material surface referenced from High Calibration Point (process full level).
	*	DIS-TANCE	Distance to material surface referenced from Sensor Reference Point.

Operation types
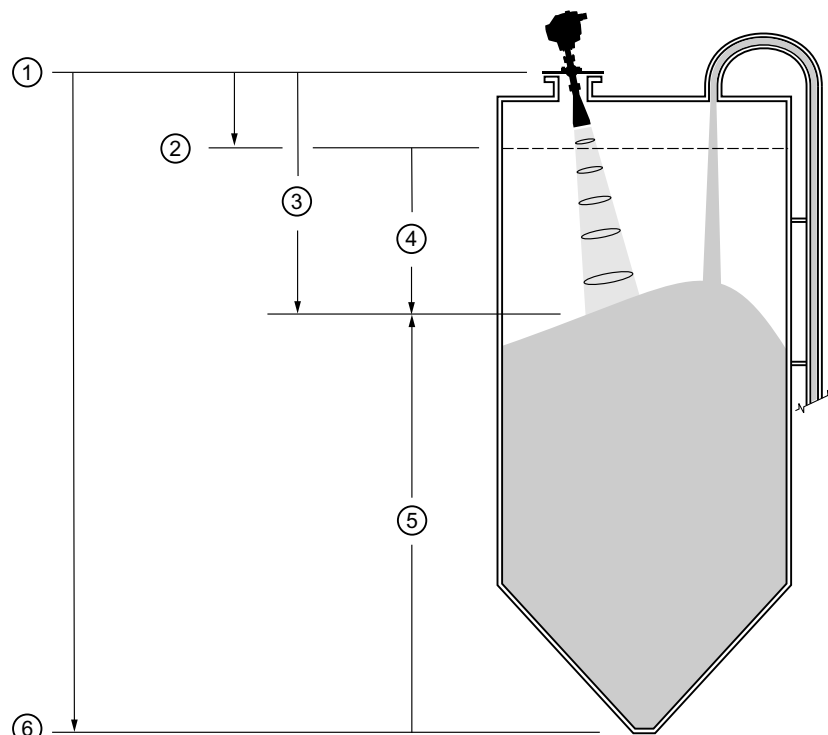
① Sensor reference point (flange face)
② High calibration point
③ Distance[1]
④ Space
⑤ Level
⑥ Low calibration point

[1] The distance from sensor reference point to the target.

8.5.10   Low Calibration Pt. (LOW CALIB. PT.) (2.2.1.6.)

Distance from Sensor Reference to Low Calibration Point (corresponding to Low Level Point). Units are defined in Sensor Units.
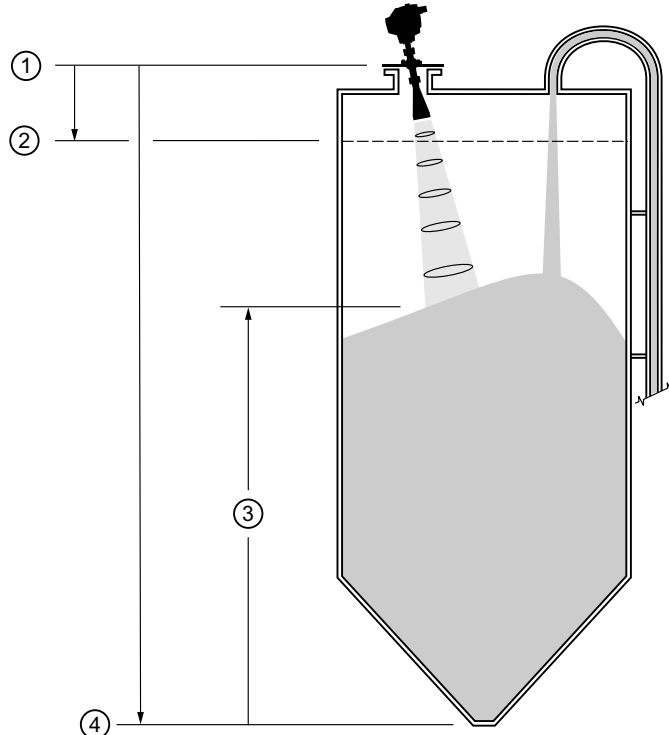
①   sensor reference point (flange face)

②   high calibration point

③   Level[1]

④   low calibration point

[1] The point from which level measurement is referenced. See Dimensions. (Page 131)

Values	Range: 0 to 30 m.
	Default dependent on horn type

[1] The point from which level measurement is referenced. See Dimensions: on page 11.

[2] The distance from sensor reference point to the target.

8.5.11   High Calibration Pt. (HIGH CALIB. PT.) (2.2.1.7.)

Distance from Sensor Reference to High Calibration Point (corresponding to High Level Point). Units are defined in Sensor Units. (See Operation types (Page 75)for an illustration.)

Values	Range: 0 to 30 m.
	Default 0 m
Related parameters	2.2.1.12. Near Range (Page 81)

When setting the High Calibration Point value, note that echoes are ignored within Near Range (2.2.1.11).

8.5.12 Limit Sensor Value (2.2.1.8.)

When On, limits the sensor value to the range between Low Calibration Point and High Calibration Point.

Options	ON, OFF. Default: On

8.5.13 Near Range (2.2.1.12.)

The range in front of the device (measured from the sensor reference point) within which any echoes will be ignored, defined in sensor units. This is sometimes referred to as blanking or a dead zone. The factory setting is 50 mm past the end of the horn and the range is dependent on the horn type and any extensions.

	Factor Defaults	
	2" horn	0.21 m (8.43")
Values	3" horn	0.28 m (10.95")
	4" horn	0.34 m (13.19")
	Range: 0 to 30 m	

8.5.14 Far Range (2.2.1.13.)

Allows the material level to drop below Low Calibration Point without generating a Loss of Echo (LOE) state. Unit is defined in Sensor units. See 2.2.1.5. Operation for an illustration.

	Range: 5 to 31.5 m	
		Min. = Low Calibration Pt.
		Max. for 2" horn = 13 m (42.65 ft)
Options		Max. for 3" horn = 23 m (75.46 ft)
		Max. for 4" horn = 31 m (103.35 ft)
	Default: Value for Low Calibration Pt. + 1 m (3.28 ft)	

Use this feature if the measured surface can drop below the Low Cal. Point in normal operation.

8.5.15   Sensor Offset (2.2.1.25.)

A constant offset that can be added to Sensor value[1] to compensate if the sensor has been changed. Units are defined in Sensor Units.

Values	Range: -99 999 to 99 999
	Default: 0 m

[1] The value produced by the echo processing which represents the distance from the sensor reference point to the target.

8.5.16   Echo processing (ECHO PROC.)(2.2.4.)

8.5.16.1   Echo select (2.2.4.1.)

Algorithm (2.2.4.1.1.)

Selects the algorithm to be applied to the echo profile to extract the true echo.

		ALF	Area Largest First
		A	Echo Area
		L	Largest Echo
		F	First echo
		AL	Area Largest
		AF	Area First
		LF	Largest First
		BLF	Best of Largest or First echo
		BL	Best Largest
Options		**BF**	Best First
		L	Last echo
	*	**TF**	True First

Echo Position (2.2.4.1.2)

Defines where on the echo the distance measurement is determined. (See Echo Position Detection (Page 153))

		Rising Edge
	*	Center of Mass (COM)
Options		Hybrid (Center and CLEF)
		CLEF (Constrained Leading Edge Fit)

Note

Rising Edge is recommended for solids. COM is recommended for flat targets and liquids.

Echo Threshold (2.2.4.1.3.)

Sets the minimum echo confidence that the echo must meet in order to prevent a Loss of Echo condition and the expiration of the LOE timer. When Echo Confidence exceeds the Echo Threshold, the echo is accepted as a valid echo and is evaluated.

Values	Range: 0 to 99 dB
	Default: 5
Related Parameters	2.4.1. Fail-safe Timer (Page 94)

Use this feature when an incorrect material level is reported.

Echo Marker (2.2.4.1.5.)

The point on the selected echo from which the measured value is taken.

Values	Range: 5 to 95%
	Default: 70%
Related Parameters	2.2.4.1.2. Echo Position (Page 82)

When SITRANS LR260 is using Rising Edge, higher values will cause lower level readings and lower values will cause higher level readings.

8.5.16.2 Sampling (2.2.4.2.)

Provides a method of checking the reliability of a new echo before accepting it as the valid reading, based on numbers of samples above or below the currently selected echo.

8.5.16.3 Echo Lock (2.2.4.2.1.)

Selects the measurement verification process.

Options		Lock Off
	*	Maximum Verification
		Material Agitator
		Total Lock (not recommended for radar)
Related parameters		2.2.7.2. Fill Rate (FILL RATE/MIN)
		2.2.7.3. Empty rate (EMPTY RATE/MIN)
		2.2.4.2.4. Up Sampling
		2.2.4.2.5. Down Sampling
		2.2.4.2.6. Window

8.5.16.4 Up Sampling (2.2.4.2.4.)

Specifies the number of consecutive echoes that must appear above the echo currently selected, before the measurement is accepted as valid.

Values	Range: 1 to 50
	Default: 5

8.5.16.5 Down Sampling (2.2.4.2.5.)

Specifies the number of consecutive echoes that must appear below the echo currently selected, before the measurement is accepted as valid.

Values	Range: 1 to 50
	Default: 5

8.5.16.6 Window (2.2.4.2.6.)

A "distance window" centered on the echo[1], used to derive the reading. When a new measurement is in the window, the window is re-centered and the reading is calculated.

Values	Range: 0 to 30 m
	Default: 0

When the value is 0, the window is automatically calculated after each measurement.

- For slower Measurement Response values, the window is narrow.

- For faster Measurement Response values, the window becomes progressively wider.

Note

The echo lock window is stored as standard sample, but displayed in sensor units. Any value entered for the echo lock window will be rounded to the nearest sample.

8.5.16.7 Filtering (2.2.4.3.)

Damping Filter (2.2.4.3.2.)

The time constant for the damping filter. The damping filter smooths out the response to a sudden change in level. This is an exponential filter and the engineering unit is always in seconds. See Damping (Page 156) for more detail.

Values	Range: 0 to 1000 s
	Default: 0 s

Narrow Echo Filter (2.2.4.3.6.)

Filters out echoes of a specific width.

Values	Range: 0 to 255
	0 = OFF
	greater = wider
Related parameters	Echo Confidence Long 2.2.4.3.7. Reform Echo (Page 85)

To remove a false echo from the Echo Profile, take its width in mm and multiply it by 0.013. Enter the result.

For example, to filter out a spike with 500 mm width, enter 6 or 7 (the closest integer product of 500 x 0.013).

When a value is keyed in, the nearest acceptable value is entered.

Reform Echo (2.2.4.3.7.)

Smooths jagged peaks in the echo profile. Reforms fragmented echoes into one echo.

Values	Set to 0 = OFF for liquid applications
	greater = wider
	Range: 0 to 50 mS
	Recommended: 5 to 20 mS; higher is not recommended.
Related parameters	2.2.4.1.1. Algorithm (Page 82)
	2.2.4.3.6. Narrow Echo Filter (Page 85)
	2.2.4.1.5. Echo Marker (Page 83)

8.5.16.8   Noise (2.2.4.5.)

Echo Confidence (2.2.4.5.1.)

Indicates echo reliability. It displays the echo confidence of the last measurement. Echo Threshold defines the Echo Confidence minimum criterion for echo confidence. Echo confidence must be greater than Echo Threshold to be accepted as valid and evaluated for an echo.

Values (view only)	0 to 99 dB	
	----	Shot not used
Related Parameters	2.2.4.1.3. Echo Threshold	

In PDM, open the menu **View – Echo Profile.**

2.2.4.5.2. Echo Strength

Displays the absolute strength (in dB above 1 µV rms) of the echo selected as the measurement echo.

Values (view only)	–20 to 99 dB

In PDM, open the menu **View – Echo Profile.**

Noise Average (2.2.4.5.3.)

Displays the average ambient noise (in dB above 1 µV rms) of a noise profile (view only). Noise level is a combination of transient noise and receiving circuitry. After a measurement, the values from the previous noise shot will be displayed.

8.5.17   TVT (Auto False Echo Suppression) setup (TVT SETUP) (2.2.5.)

First SITRANS LR260 learns the echo profile. Then the learned profile, or part of the learned profile, is used to screen out false echoes. See Before and After Auto False Echo Suppression. (Page 87)

8.5.18   TVT Hover Level (2.2.5.1.)

Defines how high the TVT (Time Varying Threshold) curve is placed above the noise floor of the echo profile, as a percentage of the difference between the peak of the largest echo in the profile and the noise floor. When SITRANS LR260 is located in the center of the vessel, the TVT hover level may be lowered to increase the confidence level of the largest echo. (For an illustration of the TVT curve see Before Auto False Echo Suppression (Page 87).)

Values	Range: 0 to 100%
	Default: 33%

8.5.19 Auto False Echo Suppression (2.2.5.2.)

Enables a 'learned' TVT curve to be used in place of the default TVT curve. See Auto False Echo Suppression (Page 153).

Note

- If possible adjust Auto False Echo Suppression parameters with an empty or almost empty vessel.
- Set Auto False Echo Suppression and Auto False Echo Range during startup, if possible.

Options			
		OFF	Default TVT curve will be used.
	*	ON	'Learned' TVT curve will be used.
		LEARN	'Learn' the TVT curve.

1. Determine **Range** (the distance within which the learned TVT will replace the default TVT). Measure the actual distance from the sensor reference point to the material surface using a rope or tape measure, and make allowances for the actual location of the device.

2. Subtract 2 m (6.56 ft) from this distance, and use the resulting value.

To use Auto False Echo Suppression via SIMATIC PDM:

1. Open the menu **Device – Auto False Echo Suppression** and set Range. For more detail see Auto False Echo Suppression (Page 153).

2. Select **Learn**. The device will automatically revert to On (Use Learned TVT) after a few seconds.

To set Auto False Echo Suppression via the handheld programmer:

1. Go to 2.2.5.3. Auto Suppression Range and enter new value.

2. Go to 2.2.5.2. Auto False Echo Suppression . Press **RIGHT ARROW** to open Edit Mode.

3. Select Learn. The device will automatically revert to On (Use   Learned TVT) after a few seconds.

8.5.20 Auto Suppression Range (2.2.5.3.)

Defines the endpoint of the Learned TVT distance. Units are defined in sensor units.

Values	
	Range: 0.00 to 30.00 m
	Default: 1.00 m

1. Press **RIGHT ARROW** to open Edit mode.

2. Enter the new value and press **RIGHT ARROW** to accept it.

3. Set 2.2.5.2. Auto False Echo Suppression (Page 87).

8.5.21 Shaper Mode (2.2.5.4.)

Adjusts the TVT curve at a specified range.

Options		ON
	*	OFF

8.5.22 TVT Type (2.2.5.6.)

Selects the TVT shaping type to be applied to the echo profile to extract the true echo.

Options		Short Curved
		Short Flat
		Long Flat
		Long Smooth Front
		Long Smooth
		Slopes
	*	Long Smooth 2
		Short Curved 2

8.5.23 TVT shaper (2.2.6.)

A breakpoint on the TVT curve. This allows you to reshape the TVT curve to avoid unwanted echoes. There are 40 breakpoints arranged in five groups. To adjust the TVT curve after shape definition, see Shaper Mode (Page 88).

8.5.24 Shaper 1-9 (2.2.6.1.)

Values	Range: –50 to 50 dB
	Default: 0 dB

8.5.25 Shaper 10-18 (2.2.6.2.)

Values	Range: –50 to 50 dB
	Default: 0 dB

8.5.26   Shaper 19-27 (2.2.6.3.)

Values	Range: –50 to 50 dB
	Default: 0 dB

8.5.27   Shaper 28-36 (2.2.6.4.)

Values	Range: –50 to 50 dB
	Default: 0 dB

8.5.28   Shaper 37-40 (2.2.6.5.)

Values	Range: –50 to 50 dB
	Default: 0 dB

8.5.29   Rate (2.2.7.)

8.5.30   Response Rate (2.2.7.1.)

Note

Changing Response Rate resets Fill Rate, Empty Rate, Damping Filter and Echo Lock.

Sets the reaction speed of the device to measurement changes.

Related pa-rameters		Response Rate	Fill Rate	Empty Rate	Damping Filter	Echo Lock
Options		slow	0.1 m/min	0.1 m/min	10 s	max. verifications
		medium	1 m/min	1 m/min	10 s	max verifications
	*	fast	10 m/min	10 m/min	0 s	max. verifications

Use a setting just faster than the maximum filling or emptying rate (whichever is faster).

8.5.31 Fill Rate (FILL RATE/MIN.) (2.2.7.2.)

Defines the maximum rate at which the reported sensor value is allowed to increase. Allows you to adjust the SITRANS LR260 response to increases in the actual material level. Fill Rate is automatically updated whenever Response Rate is altered.

Values	Range: **0 to 30** m / min.
	Default: **10** m/min.
Altered by	Response Rate
Related parameters	Sensor Units

Enter a value slightly greater than the maximum vessel-filling rate, in Sensor Units per minute.

Options	Meters/Minute
Slow	0.1
Medium	1
Fast	10

8.5.32 Empty rate (EMPTY RATE/MIN.) (2.2.7.3.)

Defines the maximum rate at which the reported sensor value is allowed to decrease. Adjusts the SITRANS LR260 response to decreases in the actual material level. Empty Rate is automatically updated whenever Response Rate is altered.

Values	Range: **0 to 30** m / min.
	Default: **10** m / min.
Altered by	Response Rate
Related	Sensor Units

Enter a value slightly greater than the vessel's maximum emptying rate, in Sensor Units per minute.

Options	Meters/Minute
Slow	0.1
Medium	1
Fast	10

8.5.33 Transducer Block (TB) Values (2.2.8.)

For diagnostic purposes.

8.5.34 Level Measurement (LEVEL MEAS.) (2.2.8.2.)

The value for level. Read Only. In SIMATIC PDM, open the menu **View – Display**, and select the tab **Display.**

8.5.35 Space Measurement (SPACE MEAS.) (2.2.8.3.)

The value for space. Read Only. In SIMATIC PDM, open the menu **View – Display**, and select the tab **Display**.

8.5.36 Distance Measurement (DISTANCE MEAS.)

The value for distance. Read Only. In SIMATIC PDM, open the menu **View – Display**, and select the tab **Display**.

8.5.37 Output (2.3.)

8.5.37.1 mA Output (2.3.1.)

8.5.38 mA Output (2.3.1.)

8.5.39 mA Output Value (2.3.1.1.)

The loop current value in mA. Read Only except if the Manual option is chosen in mA Output function below (2.3.1.2).

	User Entry only if Manual option is chosen in 2.3.1.2.
Values	Range: 3.6 mA to 22.6 mA

8.5.40 mA Output Function (mA OUTPUT FUNC.) (2.3.1.2.)

Alters the mA output/measurement function and allows the output to be set independently.

		Manual
		Level
Options		Space
	*	Distance

Note

- The mA Output Function is set independently from the setting in Operation. Set Operation first and then mA Output Function. (Operation resets mA Output Function to the same value.)

- The mA Output Function controls the primary value and the loop current for the SITRANS LR260. Use caution when changing the mA Output function when connected to a HART network.

- mA Output Function must be set to Manual before you can modify the mA Output Value (2.3.1.1). Remember to restore your previous setting after using mA Output Function.

8.5.41 4 mA Setpoint (2.3.1.3.)

Sets the process level corresponding to the 4 mA value. 4 mA always defaults to 0, and mA Output Function determines whether this is a Level, Space, or Distance measurement. Level and Space are measured as a percentage of the difference between High Calibration Point and Low Calibration Point. Distance is measured as a percentage of the Low Calibration Point.
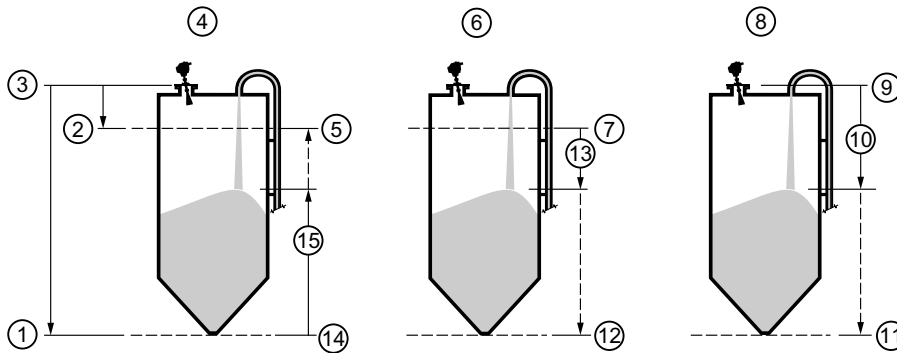
①	Low calibration point	⑧	Distance
②	High calibration point	⑨	4 mA 0%
③	Sensor reference point	⑩	Distance
④	Level	⑪	100% 20 mA
⑤	20 mA 100%	⑫	100% 20 mA
⑥	Space	⑬	Space
⑦	4 mA 0%	⑭	0% 4 mA
		⑮	Level

Values	Range: **0 to 30 m**[1)]
	Default: **0 m** (set to value corresponding to 0% as defined by mA Output Function)
Related Parameters	mA Output Function

Enter the reading that is to correspond to a 4 mA output. Units are defined in Sensor units for Level, Space, or Distance.[1]

[1] 4 mA setpoint can be set less than 0 m, and 20 mA setpoint can be set greater than 30 m when using handheld programmer. Recommended range is 0 to 30 m.

8.5.42   20 mA Setpoint (2.3.1.4.)

Sets the process level corresponding to the 20 mA value. 20 mA always defaults to 100%, and mA Output Function determines whether this is a Level, Space, or Distance measurement. Level and Space are measured as a percentage of the difference between High Calibration Point and Low Calibration Point: Distance is measured as a percentage of Low Calibration Point.

Values	Range: **0 to 30 m**[1]
	Default: **30 m** (set to value corresponding to 100% as defined by mA Output Function)
Related Parameters	mA Output Function

Enter the reading that is to correspond to a 4 mA output. Units are defined in Sensor units for Level, Space, or Distance.

[1] 4 mA setpoint can be set less than 0 m, and 20 mA setpoint can be set greater than 30 m when using handheld programmer. Recommended range is 0 to 30 m.

8.5.43   Minimum mA limit (MIN. mA LIMIT) (2.3.1.5.)

Prevents the mA output from dropping below this minimum level for a measurement value. This does not restrict the Fail-safe or manual settings.

Values	Range: **3.8 to 20.5 (mA)**
	Default: **3.8 (mA)**

8.5.44   Maximum mA limit (MAX. mA LIMIT) (2.3.1.6.)

Prevents the mA output from rising above this maximum level for a measurement value. This does not restrict the Fail-safe or manual settings.

Values	Range: **3.8 to 20.5 (mA)**
	Default: **20.5 (mA)**

8.5.45 4 mA Output Trim (2.3.1.7.)

Calibrates the 4 mA output. The mA output of the device is pre-calibrated; however, 4 mA Output Trim can be used to trim remote displays or inputs.

Values	Range: **2.0 to 6.0 (mA)**
Related parameters	20 mA Output Trim

1. Set mA Output Function to Manual.

2. Set mA Output Value to 4 mA.

3. Attach a calibrated meter and check the output at the terminals; record the remote reading in mA.

4. Enter this value in 4 mA Output Trim.

5. Restore mA Output Function to previous setting.

6. Confirm that the mA output is as expected.

8.5.46 20 mA Output Trim (2.3.1.8.)

Calibrates the 20 mA output. The mA output of the device is pre-calibrated; however, 20 mA Output Trim can be used to trim remote displays or inputs.

Values	Range: **18.0 to 24.0 (mA)**
Related parameters	4 mA Output Trim

1. Set mA Output Function to Manual.

2. Set mA Output Value to 20 mA.

3. Attach a calibrated meter and check the output at the terminals; record the remote reading in mA.

4. Enter this value in 20 mA Output Trim.

5. Restore mA Output Function to previous setting.

6. Confirm that the mA output is as expected.

8.5.47 Fail-safe (2.4.)

8.5.48 Fail-safe Timer (2.4.1.)

Sets the time to elapse in minutes since the last valid reading, before Fail-safe State activates.

Values	Range: **0 to 720 min.**
	Default: 1

Note

The last valid reading is maintained until the Fail-safe timer expires. After the timer expires, the reading is set based on Fail-safe Material Level.

8.5.49   Fail-safe Material Level (FAILSAFE MAT. LE) (2.4.2.)

Options		HI: Use 22.6 mA (max. mA Limit) as material level
		LO: Use 3.6 mA (min. mA Limit) as material level
	*	HOLD: Level remains at last reading
		VALUE: User-selected value (defined in Fail-safe Level)

8.5.50   Fail-safe Level (2.4.4.)

Defines a user-defined level to report when the Fail-safe timer expires.

Values	Range: **3.6 mA to 22.6 mA**
	Default: 22.6 mA

Note

This value can be used only if Fail-safe Material Level is set to VALUE.

8.6   Diagnostics (3.)

8.6.1   Echo Profile (3.1.)

Allows you to request the current echo profile either via the handheld programmer, or via SIMATIC PDM. (For more detail see Echo Processing (Page 151).)

To request a profile via SIMATIC PDM:

1. Open the menu **View – Echo Profile.**

2. If desired, press **Save**.

3. To view the saved profile, open the menu **View – Show Echo Profile**.

To request a profile via the handheld programmer:
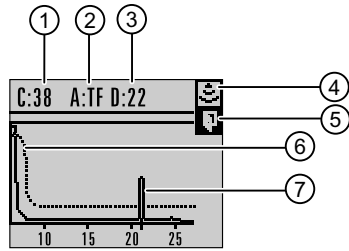
①	Echo confidence value	⑤	Exit icon, selected
②	Algorithm selection (true first)	⑥	TVT curve
③	Distance value	⑦	Material level
④	Transmit icon, deselected		

1. In PROGRAM mode, navigate to **LEVEL METER > DIAGNOSTICS > ECHO PROFILE (3.1)**

2. Press **RIGHT arrow** to request a profile.

3. In the Profile screen, press **UP arrow** to select the **Transmit** icon, and **Right ARROW** to update the profile.

4. Press **DOWN arrow** to select the **Exit** icon, then **Right ARROW** to return to previous menu.

8.6.2   Measured Values (MEAS. VALUES) (3.14.)

8.6.3   Current Internal Temperature (CURR. INTERN. TEMP.) (3.14.1.)

Read Only. Displays (in degrees C) the current temperature on the circuit board recorded by the internal electronics.

8.6.4   Maximum Internal Temperature (MAX. INTERN. TEMP.) (3.14.2.)

Read Only. Displays (in degrees C) the maximum temperature recorded by the internal electronics. The high and low values are maintained over a power cycle.

8.6.5   Minimum Internal Temperature (MIN. INTERN. TEMP.) (3.14.3.)

Read Only. Displays (in degrees C) the minimum temperature recorded by the internal electronics. The high and low values are maintained over a power cycle.

8.6.6 Remaining Device Lifetime (REMAIN. DEV. LIFE.) (3.15.)

Note

- Four sets of parameters allow you to monitor the Device/Sensor Lifetimes and set up Maintenance/Service schedules, based on operating hours instead of a calendar-based schedule. See also Remaining Sensor Lifetime (Page 98), Service Interval (Page 105), and Calibration Interval (Page 108).

- Performing a Device Reset to Factory Defaults using the handheld programmer will reset all the Maintenance Schedule parameters to their factory defaults.

- The device operates in years. To view Remaining Device Lifetime parameters in hours or days (via SIMATIC PDM only) see Total Expected Device Life (Page 102).

The device tracks itself based on operating hours and monitors its predicted lifetime. You can modify the expected device lifetime, set up schedules for maintenance alerts, and acknowledge them.

The maintenance warnings and alarms are communicated to the end user through status information. This information can be integrated into any Asset Management system. For optimal use, we recommend that you use SIMATIC PCS7 Asset Management Software in conjunction with SIMATIC PDM.

To access these parameters via SIMATIC PDM:

- Open the menu Device – Maintenance and select the Remaining Device Lifetime tab.

- After modifying values/units as required, click on Write to accept the change, and Read to view the effect of the change.

- Click on Snooze to add a year to the Total Expected Device Life.

8.6.7 Total Device Operating Time (TOTAL OP. TIME) (3.15.1.)

Read only. The amount of time the device has been operating in selected units.

8.6.8 Remaining Device Lifetime (REMAIN. LIFETIME) (3.15.2.)

Read only. Remaining Lifetime in selected units.

8.6.9 Maintenance Required Limit (MAINT. REQ. LIMIT) (3.15.3.)

If the Remaining Lifetime is equal to or less than this limit, the device sets Maintenance Required.

Values	Range: **0 to 20 years**
	Default: 0.164 years

In SIMATIC PDM, open the menu **Device – Maintenance**, click on **Remaining Device Lifetime**.

1. Modify limit values as required.

2. Enable 3.15.5. Maintenance Alert Activation (ALERT ACTIVATION) .

8.6.10 Maintenance Demanded Limit (MAINT. DEM. LIMIT) (3.15.4.)

If Remaining Device Lifetime is equal to or less than this limit, a Maintenance Demanded status is generated.

Values	Range: **0 to 20 years**
	Default: 0.019 years

In SIMATIC PDM, open the menu **Device – Maintenance**, click on Remaining Device Lifetime.

1. Modify limit values as required.

2. Select the desired Maintenance Alert Activation option.

8.6.11 Maintenance Alert Activation (ALERT ACTIVATION) (3.15.5.)

Note

To modify this parameter via SIMATIC PDM it must be accessed via the pull-down menu **Device – Maintenance.**

Allows you to enable a maintenance limit.

Options		Warning Limit 1 (Maintenance Required Limit)
		Warning Limit 2 (Maintenance Demanded Limit)
		Warning Limits 1 and 2 (Maintenance Required and Maintenance Demanded Limits)
	*	OFF

First set the limit values in **Maintenance Required Limit (3.15.3.)/ Maintenance Demanded Limit (3.15.4.).**

Select the desired **Maintenance Alert Activation** option.

8.6.12 Total Expected Device Life (TOTAL EXP. LIFE) (3.15.6.)

Note

The device always operates in years. Changing the units affects only the parameter view of the Remaining Device Lifetime parameters in SIMATIC PDM.

Allows you to override the factory default.

Values	Units[1]: hours, days, years
	Range: **0 to 20 years**
	Default: 10 years

[1] Units are selectable only via SIMATIC PDM.

8.6.13 Maintenance Status (MAINT. STAT.) (3.15.7.)

Read only. Displays the status of the Maintenance limits.

In SIMATIC PDM, open the menu **View – Device Status**, click on the **Maintenance** tab and check the **Device Lifetime Status** window.

8.6.14 Acknowledge Status (ACK STATUS) (3.15.8.)

Read only. Displays the status of the Maintenance limits.

In SIMATIC PDM, open the menu **View – Device Status**, click on the Maintenance tab and check the **Device Lifetime Status** window.

8.6.15 Acknowledge (ACK) (3.15.9.)

Acknowledges the current limit status

To acknowledge an alert via PDM:

1. Open the menu View – Device Status and click on the tab Maintenance.

2. In the Device Lifetime section, click on Acknowledge Warnings.

To acknowledge an alert via the handheld programmer:

1. Press RIGHT arrow twice to open parameter view and activate Edit Mode.

2. Press RIGHT arrow to acknowledge the alert.

8.6.16 Remaining Sensor Lifetime (REMAIN SENS. LIFE.) (3.16.)

Note

Four sets of parameters allow you to monitor the Device/Sensor Lifetimes and set up Maintenance/Service schedules, based on operating hours instead of a calendar-based schedule. See also Remaining Device Lifetime (Page 106), Service Interval (Page 105), and Calibration Interval (Page 108).

The device operates in years. To view Remaining Sensor Lifetime parameters in hours or days (via SIMATIC PDM only) see Total Expected Sensor Life (Page 102).

The device monitors the predicted lifetime of the sensor (the components exposed to the vessel environment). You can modify the expected sensor lifetime, set up schedules for maintenance alerts, and acknowledge them.

To access these parameters via SIMATIC PDM:

- Open the menu **Device – Maintenance** and select the **Remaining Sensor Lifetime** tab.

- After modifying values/units as required, click on **Write** to accept the change, and **Read** to view the effect of the change.

- Click on **Snooze** to add a year to the Total Expected Sensor Life.

- Click on **Sensor Replaced** to restart the timer and clear any fault messages.
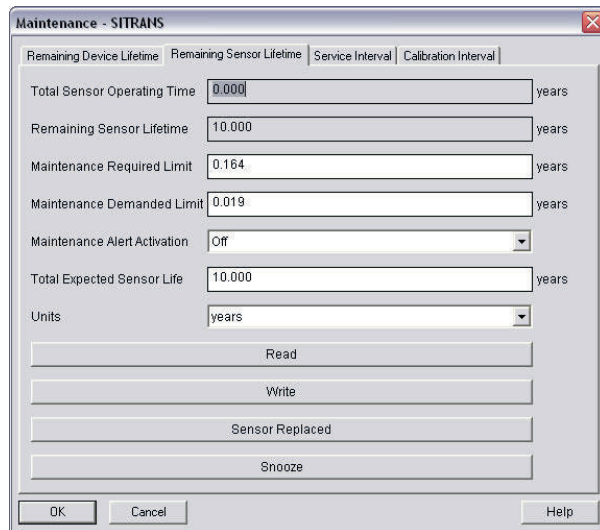
8.6.17 Total Sensor Operating Time (SENS OP. TIME) (3.16.1.)

Displays the amount of time the sensor has been operating in selected units. Can be reset to zero after performing a service or replacing the sensor.

To reset to zero:

- In SIMATIC PDM, open the menu **Device – Maintenance**, click on the **Remaining Sensor Lifetime** tab, and click on **Sensor Replaced** to restart the timer and clear any fault messages.

- Via the handheld programmer, manually reset Total Sensor Operating Time to zero.

8.6.18 Remaining Sensor Lifetime (REMAIN. LIFETIME) (3.16.2.)

Read only. **Total Expected Sensor Life** less **Total Sensor Operating Time** in selected units.

8.6.19 Maintenance Required Limit (MAINT. REQ. LIMIT) (3.16.3.)

If Remaining Sensor Lifetime is equal to or less than this limit, the device sets Maintenance Required.

Values	Range: **0 to 20 years**
	Default: 0.164 years

To modify the value via PDM, open the menu **Device – Maintenance** and click on **Remaining Sensor Lifetime**.

1. Modify limit values as required.

2. Enable 3.16.5. Maintenance Alert Activation (ALERT ACTIVATION) . Click on **Write** to accept the changes.

8.6.20 Maintenance Demanded Limit (MAINT. DEM. LIMIT) (3.16.4.)

If Remaining Sensor Lifetime is equal to or less than this limit, the device sets Maintenance Demanded.

Values	Range: **0 to 20 years**
	Default: 0.019 years

To modify the value via PDM, open the menu **Device – Maintenance** and click on **Remaining Sensor Lifetime**.

Modify limit values as required.

Enable 3.16.5. Maintenance Alert Activation (ALERT ACTIVATION) (Page 102). Click on **Write** to accept the changes.

8.6.21 Maintenance Alert Activation (ALERT ACTIVATION) (3.16.5.)

> **Note**
>
> To modify this parameter via SIMATIC PDM it must be accessed via the pull-down menu **Device – Maintenance**.

Allows you to enable a maintenance limit.

		Warning Limit 1 (Maintenance Required Limit)
		Warning Limit 2 (Maintenance Demanded Limit)
Options		Warning Limits 1 and 2 (Maintenance Required and Maintenance Demanded Limits)
	*	OFF

1. First set the limit values in **Maintenance Required Limit/Maintenance Demanded Limit.**
2. Select the desired **Maintenance Alert Activation** option.

8.6.22 Total Expected Sensor Life (TOTAL. EXP. LIFE) (3.16.6.)

Allows you to override the factory default.

	Units[1]: hours, days, years
Values	Range: **0 to 20 years**
	Default: 10 years

[1]Units are selectable only via SIMATIC PDM.

8.6.23 Maintenance Status (MAINT. STATUS) (3.16.7.)

Read only. Displays the status of the Maintenance limits

Via SIMATIC PDM, open the menu **View – Device Status**, click on the **Maintenance** tab and check the **Sensor Lifetime Status** window.

8.6.24 Acknowledge Status (ACK. STATUS) (3.16.8.)

Read only. Acknowledges the status of the Maintenance limits.

Via SIMATIC PDM, open the menu **View – Device Status**, click on the **Maintenance** tab and check the **Sensor Lifetime Status** window.

8.6.25 Acknowledge (ACK.) (3.16.9.)

Acknowledges the current limit status.

To acknowledge an alert via SIMATIC PDM:

1. Open the menu **View – Device Status** and click on the **Maintenance** tab.

2. In the **Sensor Lifetime** section click on **Acknowledge Warnin**gs.

To acknowledge an alert via the handheld programmer:

1. Press **RIGHT arrow** twice to open parameter view and activate **Edit** Mode.

2. Press **RIGHT arrow** to acknowledge the alert.

8.7 Service (4.)

8.7.1 Device Reset (4.1.)

Resets all parameter to factory defaults, with the following exceptions:

- The Lock and Unlock values are not reset.

- The learned TVT curve is not lost.

- The device address is not reset.

- In PDM, the Identification parameters are not reset.

Note

Following a reset to factory defaults, complete reprogramming is required.

Options	*	Idle or Done (Return to previous menu)
		Factory Defaults

To perform a reset to factory defaults via SIMATIC PDM, open the menu **Device – Device Reset** and click on Factory Defaults.

8.7.2 Manufacture Date (MANUF. DATE) (4.2.)

The date of manufacture of the SITRANS LR260 (yy mm dd).

8.7.3 LCD Fast Mode (4.3.)

Note

Affects Measurement mode only: has no effect on Navigation mode.

Enables a faster rate of measurement from the device by disabling most of the display area. Only the bar graph will be refreshed when LCD Fast Mode is set to ON. When Fast Mode is set to ON, there is a delay of 30 minutes with no pressed buttons before actions result.

Values	ON or OFF
	Default: OFF

8.7.4 LCD Contrast (4.4.)

The factory setting is for optimum visibility at room temperature and in average light conditions. Extremes of temperature will lessen the contrast.

Values	Range: 0 (High contrast) to 20 (Low contrast).
	Default: Matches factory calibration for best visual contrast.

Adjust the value to improve visibility in different temperatures and luminosity. Change the LCD contrast in small steps to ensure you can continue to read the display and to prevent viewing difficulties.

8.7.5 Powered Hours (4.6.)

Read only. Displays the number of hours the unit has been powered up since manufacture.

Via SIMATIC PDM, open the menu **View – Wear.** Time powered is displayed in user selectable units via PDM.

8.7.6 Power-on Resets (4.8.)

Read only. The number of power cycles that have occurred since manufacture.

Via SIMATIC PDM, open the menu **View – Wear.**

8.7.7 Memory Test (MEM. TEST) (4.11.)

Allows verification of the RAM, EEPROM, and Flash memory of the SITRANS LR260.

	IDLE	No test in progress.
	BUSY	Test in progress.
	PASS	Memory test successful.
	FAIL	Test failed.
LCD Display	Err1	Test returned unexpected results.
	P Oxcafe	Test passed with result data.
	F Oxcafe	Test failed with result data.
Handheld programmer entry	1 to 9	Any numeric key from 1 to 9 activates test.

Press any numeric key from 1 to 9 to activate the test. The reading will display BUSY followed by the test result text.

8.7.8 Service Interval (4.16.)

Note

- Four sets of parameters allow you to monitor the Device/Sensor Lifetimes and set up Maintenance/Service schedules, based on operating hours instead of a calendar-based schedule. See also **Remaining Device Lifetime, Service Interval,** and **Calibration Interval.**
- The device operates in years. To view Remaining Sensor Lifetime parameters in hours or days (via SIMATIC PDM only) see **Total Expected Sensor Life.**

The device tracks service intervals based on operating hours and monitors the predicted lifetime to the next service. You can modify the Total Service Interval, set schedules for Maintenance Alerts, and acknowledge them.

The maintenance warnings and alarms are communicated to the end user through status information. This information can be integrated into any Asset Management system. For optimal use, we recommend that you use SIMATIC PCS7 Asset Management Software in conjunction with SIMATIC PDM.

To access these parameters via SIMATIC PDM:

- Open the menu **Device – Maintenance** and select the **Service Interval** tab.

- After modifying values/units as required, click on **Write** to accept the change, and **Read** to view the effect of the change.

- Click on **Service Performed** to restart the timer and clear any fault messages.

8.7.9 Time Last Serviced (TIME LAST SERV.) (4.16.1.)

Time elapsed since device was last serviced in selected units. Can be reset to zero via the handheld programmer (after performing a service.)

To reset to zero:

- In SIMATIC PDM, open the menu **Device – Maintenance**, click on the **Service Interval** tab, and click on **Service Performed** to restart the timer and clear any fault messages.

- Via the handheld programmer, manually reset **Time Last Serviced** to zero.

8.7.10 Remaining Lifetime (REMAIN LIFETIME) (4.16.2.)

Read only. **Total Service Interval** less **Time Last Serviced** in selected units.

8.7.11 Maintenance Required Limit (MAINT. REQ. LIMIT) (4.16.3.)

If **Remaining Lifetime** is equal to or less than this limit, the device sets Maintenance Required.

Values	Range: **0 to 20 years**
	Default: 0.164 years

1. Modify limit values as required.

2. Set Maintenance Alert Activation to the desired option.

8.7.12 Maintenance Demanded Limit (4.16.4.)

If **Remaining Lifetime** is equal to or less than this limit, the device sets Maintenance Demanded.

Values	Range: **0 to 20 years**
	Default: 0.019 years

1. Modify limit values as required.

2. Set Maintenance Alert Activation to the desired option.

8.7.13 Maintenance Alert Activation (4.16.5.)

Note

To modify this parameter via SIMATIC PDM it must be accessed via the pull-down menu **Device – Maintenance**.

Allows you to enable a maintenance limit.

Values	*	Timer off
		On - no limits
		On - limit 1
		On - limits 1 and 2
		On - limit 2

1. First set the limit values in Maintenance Required Limit/Maintenance Demanded Limit.

2. Select the desired Maintenance Alert Activation option

8.7.14 Total Service Interval (4.16.6.)

Note

The device always operates in years. Changing the units affects only the parameter view of the Service Interval parameters in SIMATIC PDM.

User-configurable recommended time between product inspections

Values	Units[1]: hours, days, years
	Range: 0 to 20 years
	Default: 1 year

[1] Units are selectable only via SIMATIC PDM.

8.7.15 Maintenance Status (MAINT. STAT) (4.16.7.)

Read only. Displays the status of the Maintenance limits.

Open the menu **View – Display Status**, click on the **Maintenance** tab and check the **Service Schedule Status** window.

8.7.16 Acknowledge Status (ACK. STATUS) (4.16.8.)

Read only. Acknowledges the current limit status.

Open the menu **View – Display Status**, click on the **Maintenance** tab and check the **Service Schedule Status** window.

8.7.17 Acknowledge (ACK.) (4.16.9.)

Acknowledges the current limit status.

To acknowledge an alert via SIMATIC PDM:

1. Open the menu **View – Device Status** and click on the **Maintenance** tab.

2. In the **Service Schedule Status** section click on **Acknowledge Warnings**.

To acknowledge an alert via the handheld programmer:

1. Press **RIGHT arrow** twice to open parameter view and activate Edit Mode.

2. Press **RIGHT arrow** to acknowledge the alert.

8.7.18 Calibration Interval (CALIB. INTERVAL) (4.17.)

Note

Four sets of parameters allow you to monitor the Device/Sensor Lifetimes and set up Maintenance/Service schedules, based on operating hours instead of a calendar-based schedule. See also **Remaining Device Lifetime, Service Interval**, and **Calibration Interval**.

The device operates in years. To view Remaining Sensor Lifetime parameters in hours or days (via SIMATIC PDM only) see **Total Expected Sensor Life.**

The device tracks calibration intervals based on operating hours and monitors the predicted lifetime to the next calibration. You can modify the Total Calibration Interval, set schedules for Maintenance Alerts, and acknowledge them.

To access these parameters via SIMATIC PDM:

- Open the menu **Device – Maintenance** and select the **Calibration Interval** tab.

- After modifying values/units as required, click on **Write** to accept the change, and **Read** to view the effect of the change.

- Click on **Calibration Performed** to restart the timer and clear any fault messages.

8.7.19 Time Last Calibrated (TIME LAST CAL.) (4.17.1.)

Time elapsed since last calibration Can be reset to zero via the handheld programmer (after performing a service).

To reset to zero:

- In SIMATIC PDM, open the menu **Device – Maintenance**, click on the **Calibration Interval** tab, and click on **Calibration Performed** to restart the timer and clear any fault messages.

- Via the handheld programmer, manually reset **Time Last Calibrated** to zero.

8.7.20 Remaining Lifetime (REMAIN LIFETIME) (4.17.2.)

Read only. **Total Calibration Interval** less **Time Last Calibrated**.

8.7.21 Maintenance Required Limit (MAINT. REQ. LIMIT) (4.17.3.)

If Remaining Lifetime is equal to or less than this limit, the device sets Maintenance Required.

Values	Range: **0 to 20 years**
	Default: 0.164 years

1. Modify limit values as required.

2. Set Maintenance Alert Activation to the desired option.

8.7.22 Maintenance Demanded Limit (MAINT. DEM. LIMIT) (4.17.4.)

If **Remaining Lifetime** is equal to or less than this limit, the device sets Maintenance Demanded.

Values	Range: **0 to 20 years**
	Default: 0.019 years

1. Modify limit values as required.

2. Set Maintenance Alert Activation to the desired option.

8.7.23 Maintenance Alert Activation (4.17.5.)

Note

To modify this parameter via SIMATIC PDM it must be accessed via the pull-down menu **Device – Maintenance**.

Allows you to enable a maintenance limit.

Values	*	Timer off
		On - no limits
		On - limit 1
		On - limits 1 and 2
		On - limit 2

1. First set the limit values in Maintenance Required Limit/Maintenance Demanded Limit.

2. Select the desired Alert Activation option.

8.7.24 Total Calibration Interval (TOTAL CALIB. INTRV.) (4.17.6.)

Note

The device always operates in years. Changing the units affects only the parameter view of the Calibration Interval parameters in SIMATIC PDM.

User-configurable recommended time between product calibrations.

	Units[1]: hours, days, years
Values	Range: **0 to 20 years**
	Default: 1 year

[1] Units are selectable only via SIMATIC PDM.

8.7.25 Maintenance Status (MAINT. STAT.) (4.17.7.)

Read only. Displays the status of the Maintenance Limits.

In SIMATIC PDM, open the menu **View – Device Status**, click on the **Maintenance** tab and check the **Calibration Schedule Status** window.

8.7.26 Acknowledge Status (ACK. STATUS) (4.17.8.)

Read only. Acknowledges the status of the Maintenance limits.

In SIMATIC PDM, open the menu **View – Device Status,** click on the **Maintenance** tab and check the **Calibration Schedule Status** window.

8.7.27 Acknowledge (ACK.) (4.17.9.)

Acknowledges the current limit status.

To acknowledge an alert via SIMATIC PDM:

1. Open the menu **View – Device Status** and click on the **Maintenance** tab.

2. In the **Calibration Schedule Status** section, click on **Acknowledge Warnings**.

To acknowledge an alert via the handheld programmer:

1. Press **RIGHT arrow** twice to open parameter view and activate **Edit** Mode.

2. Press **RIGHT arrow** to acknowledge the alert.

8.8 Communication (5.)

8.8.1 Device Address (5.1.)

Sets the device address or poll ID on a HART network. Any address other than 0 will cause the output current to be a fixed value, and the current will not indicate the reading.

Values	Range: **0 to 15**
	Default: 0

To set the address via the handheld programmer:

- Press **RIGHT arrow** to activate **PROGRAM** mode and open menu level 1.
- Press **DOWN arrow** repeatedly to navigate to **COMMUNICATION** (menu item 5).
- Press **RIGHT arrow** to display the parameter list.
- Scroll to **DEVICE ADDRESS** and press **RIGHT arrow** to open parameter view.
- Press **RIGHT arrow** to open **Edit** mode. Key in a new value and press **RIGHT arrow** to accept it.

8.8.2 Communication Control (5.2.)

Note

SITRANS LR260 can only reset this parameter via the handheld programmer.

Enables /disables the read/write access to parameters via remote communications.

		Read Only	No changes are permitted via remote communications.
Options	*	Read Write	Changes are permitted.
		Restricted	Sets the status to Read Only, with the potential for another HART device to change this via remote communications.

8.9 Security (6.)

8.9.1 Lock (6.1.)

Note

- Do not lose this number value.
- This lock affects only the handheld programmer. A remote master can change configuration if Communication Control is set to allow this.

Prevents any changes to parameters via the handheld programmer.

Handheld programmer Values		Range: 1 to 9999	
	*	1954 (unlock value)	Off (enables local programming)
		Any other value	On (disables local programming)
Related parameter		**Unlock value (6.2.)**	

To secure the programming lock: Key in any value other than the unlock value. Parameters are now locked and cannot be changed.

To unlock the device and enable handheld programming changes: Key in the unlock value. Parameters are now unlocked and may be changed.

8.9.2 Unlock value (6.2.)

Note

- Default setting for 6.1 (Lock) is Unlocked.
- After a new value is stored in Unlock Value (6.2), that value will be recalled after a reset to Factory Defaults.
- Consult your Siemens representative if you have forgotten the unlock value.

Stores the value to be entered in **6.1. Lock** to unlock programming. If Lock is on, Unlock Value will not display the unlocked value.

Handheld programmer Values	Range: 1 to 9999	
	Factory Default: 1954	
	– – – –	Display when Lock is on

8.10   Language (7.)

Selects the language to be used on the LCD.

Options	*	English
		German
		French
		Spanish

Service and maintenance

<div align="right">9</div>

9.1 Basic safety information

9.1.1 Maintenance

The device is generally maintenance-free. However, a periodic inspection according to pertinent directives and regulations must be carried out.

An inspection can include check of:

● Ambient conditions

● Seal integrity of the process connections, cable entries, and cover screws

● Reliability of power supply, lightning protection, and grounds

9.1.2 Impermissible repair of the device

⚠ WARNING
Impermissible repair of the device
● Repair must be carried out by Siemens authorized personnel only.

9.1.3 Penetration of moisture into the device

NOTICE
Penetration of moisture into the device
Device damage
● Make sure when carrying out cleaning and maintenance work that no moisture penetrates the inside of the device.

9.2 Cleaning

9.2.1 Cleaning the enclosure

Cleaning the enclosure

- Clean the outside of the enclosure with the inscriptions and the display window using a cloth moistened with water or a mild detergent.

- Do not use any aggressive cleansing agents or solvents, e.g. acetone. Plastic parts or the painted surface could be damaged. The inscriptions could become unreadable.

9.2.2 Electrostatic charge

⚠ WARNING
Electrostatic charge
Danger of explosion in hazardous areas if electrostatic charges develop, for example, when cleaning plastic surfaces with a dry cloth.
• Prevent electrostatic charging in hazardous areas.

9.2.3 Cleaning the device

The radar device requires no cleaning under normal operating conditions.

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

- Note the antenna material and the process medium, and select a cleaning solution that will not react adversely with either.

- Remove the device from service and wipe the antenna clean using a cloth and suitable cleaning solution.

9.3 Maintenance and repair work

9.3.1 Impermissible repair of the device

> ⚠ **WARNING**
>
> **Impermissible repair of the device**
>
> ● Repair must be carried out by Siemens authorized personnel only.

9.3.2 Maintenance

The device is maintenance-free. However, a periodic inspection according to pertinent directives and regulations must be carried out.

An inspection can include, for example, check of:

● Ambient conditions

● Seal integrity of the process connections, cable entries, and cover

● Reliability of power supply, lightning protection, and grounds

9.3.3 Unit repair and excluded liability

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

● The user is responsible for all changes and repairs made to the device.

● All new components must be provided by Siemens.

● Restrict repair to faulty components only.

● Do not re-use faulty components.

9.4 Return procedure

Enclose the bill of lading, return document and decontamination certificate in a clear plastic pouch and attach it firmly to the outside of the packaging.

Required forms

- Delivery note

- Return goods note (http://www.siemens.com/processinstrumentation/returngoodsnote)
  with the following information:

  - Product (item description)

  - Number of returned devices/replacement parts

  - Reason for returning the item(s)

- Declaration of decontamination (http://www.siemens.com/sc/
  declarationofdecontamination)
  With this declaration you warrant "that the device/replacement part has been carefully
  cleaned and is free of residues. The device/replacement part does not pose a hazard for
  humans and the environment."
  If the returned device/replacement part has come into contact with poisonous, corrosive,
  flammable or water-contaminating substances, you must thoroughly clean and
  decontaminate the device/replacement part before returning it in order to ensure that all
  hollow areas are free from hazardous substances. Check the item after it has been cleaned.
  Any devices/replacement parts returned without a decontamination declaration will be
  cleaned at your expense before further processing.

9.5 Disposal

Devices described in this manual should be recycled. They may not be
disposed of in the municipal waste disposal services according to the Di-
rective 2012/19/EC on waste electronic and electrical equipment (WEEE).

Devices can be returned to the supplier within the EC, or to a locally ap-
proved disposal service for eco-friendly recycling. Observe the specific
regulations valid in your country.

Further information about devices containing batteries can be found at:
Information about battery/ product return (WEEE) (https://
support.industry.siemens.com/cs/document/109479891/)

Diagnosing and troubleshooting

10

10.1 Communication troubleshooting

1. Check the following:

   – There is power at the device.

   – The LCD shows the relevant data.

   – The device can be programmed using the handheld programmer.

   – If any fault codes are being displayed see General Fault Codes (Page 121) for a detailed list.

2. Verify that the wiring connections are correct.

3. See the table below for specific symptoms.

Symptom	Corrective action
The device cannot be programmed via the handheld programmer.	• Ensure **Lock (6.1.)** is set to the unlock value.
You set a SITRANS LR260 parameter via remote communications but the parameter remains unchanged.	• Ensure **Lock (6.1.)** is set to the unlock value, then try setting the parameter via the handheld programmer. • Ensure **Communications control (5.2.)** is set to **Read/Write** to allow you to write parameters to SITRANS LR260. • Some parameters can be changed only when the device is not scanning. Try pressing Mode 📄 to put the device into PROGRAM mode.
If you see unanticipated displays. For example: • PROGRAM mode displayed instead of Measurement mode • The wrong parameter displayed in response to a command • A parameter displayed in response to no command	• Ensure no infrared-capable device is close to SITRANS LR260. Any device with infrared capabilities (laptops, cell phones, PDAs) can cause interference which simulates a command to the SITRANS LR260, potentially causing it to switch modes or to change a parameter.
Operation is erratic	• Ensure the Hand Programmer is not being used at the same time as SIMATIC PDM.

If you continue to experience problems go to our website and check the FAQs for SITRANS LR2650:

Product page (http://www.siemens.com/LR260), or contact your Siemens representative.

10.2   Device status icons

Icon	Priority Level	Meaning
	1	• Maintenance alarm • Measurement values are not valid
	2	• Maintenance warning: maintenance demanded immediately • Measured signal still valid
	3	• Maintenance required • Measured signal still valid
	1	• Process value has reached an alarm limit
	2	• Process value has reached a warning limit
	3	• Process value has reached a tolerance limit
	1	• Configuration error • Device will not work because one or more parameters/components is incorrectly configured
	2	• Configuration warning • Device can work but one or more parameters/components is incorrectly configured
	3	• Configuration changed • Device parameterization not consistent with parameterization in project. Look for info text.
	1	• Manual operation (local override) • Communication is good; device is in manual mode.
	2	• Simulation or substitute value • Communication is good; device is in simulation mode or works with substitute values.
	3	• Out of operation • Communication is good; device is out of action.
		• Data exchanged
		• No data exchange
		• Write access enabled
		• Write access disabled

10.3   General fault codes

Note

- If more than one fault is present, the device status indicator and text for each fault alternate at 2 second intervals.
- Some faults cause the device to go to Fail-safe mode (Fault 52). These are indicated with an asterisk (*).

Code/ Icon		Meaning	Corrective Action
S: 0	*	The device was unable to get a measurement within the Fail-safe LOE Timer period. Possible causes: faulty installation, antenna material buildup, foaming/other adverse process conditions, invalid configuration range.	• Ensure installation details are correct. • Ensure no antenna material buildup. Clean if necessary. • Adjust process conditions to minimize foam or other adverse conditions. • Correct configuration range. • If fault persists, contact your local Siemens representative.
S: 2	*	Unable to collect profile because of a power condition that is outside the operating range of the device.	Repair required: contact your local Siemens representative.
S: 3		Device is nearing its lifetime limit according to the value set in Maintenance Required Limit.	Replacement is recommended
S: 4		Device is nearing its lifetime limit according to the value set in Maintenance Demanded Limit.	Replacement is recommended.
S: 6		Sensor is nearing its lifetime limit according to the value set in Maintenance Required Limit.	Replacement is recommended.
S: 7		Sensor is nearing its lifetime limit according to the value set in Maintenance Demanded Limit.	Replacement is recommended.
S: 8		Service interval as defined in Maintenance Required Limit has expired.	Perform service.
S: 9		Service interval as defined in Maintenance Demanded Limit has expired.	Perform service.
S: 11		Internal temperature sensor failure.	Repair required: contact your local Siemens representative.

Code/ Icon		Meaning	Corrective Action
S: 12		Internal temperature of device has exceeded specifications: it is operating outside its temperature range.	• Relocate device and/or lower process temperature enough to cool device. • Inspect for heat-related damage and contact your local Siemens representative if repair is required. • Fault code will persist until a manual reset is performed using SIMATIC PDM or the LCD interface.
S: 17		Calibration interval as defined in Maintenance Required Limit has expired.	Perform calibration.
S: 18		Calibration interval as defined in Maintenance Demanded Limit has expired.	Perform calibration.
S: 28	*	Internal device failure caused by a RAM memory error.	Repair required: contact your local Siemens representative.
S: 29	*	EEPROM damaged.	Repair required: contact your local Siemens representative
S: 31	*	Flash error.	Repair required: contact your local Siemens representative
S: 33	*	Factory calibration for the internal temperature sensor has been lost.	Repair required: contact your local Siemens representative
S: 34	*	Factory calibration for the device has been lost.	Repair required: contact your local Siemens representative
S: 35	*	Factory calibration for the device has been lost.	Repair required: contact your local Siemens representative
S: 36	*	Unable to start microwave module.	Cycle power. If fault persists, contact your local Siemens representative.
S: 37	*	Measurement hardware problem.	Cycle power. If fault persists, contact your local Siemens representative.
S: 38	*	Failure in the device electronics.	Cycle power. If fault persists, contact your local Siemens representative: repair required.
S: 43	*	Factory calibration for the radar receiver has been lost.	Repair required: contact your local Siemens representative.

Code/ Icon		Meaning	Corrective Action
S: 45	*	No valid boot program detected: firmware corrupt	Repair required: contact your local Siemens representative.
S: 48	*	User configuration is invalid. One or more of parameters: Low Calibration Point, High Calibration Point, Volume breakpoints, and/or Auto False-Echo Suppression, are set to invalid values.	• Reconfigure the unit. • Ensure the difference between High Calibration Point and Low Calibration Point is not less than or equal to zero; do a Master Reset.
S: 49	*	EEPROM corrupt.	Repair required: contact your local Siemens representative.
S: 50	*	EEPROM corrupt.	Repair required: contact your local Siemens representative.
S: 51	*	EEPROM corrupt.	Repair required: contact your local Siemens representative.
S: 52		Fail-safe is activated. Possible causes: 1. hardware failure 2. memory failure 3. Fail-safe LOE timer expired– possible causes: faulty installation, antenna material buildup, foaming/other adverse process conditions, invalid calibration range.	For 3: • Correct configuration; ensure installation is correct; • no antenna buildup; • adjust process conditions to minimize foaming/other adverse conditions; • correct calibration range. If fault persists, or for 1 and 2, contact your local Siemens representative.
S: 53	*	Configuration lost: one or more parameter settings have been lost. This may occur after a firmware upgrade causes user parameters to be reset.	Restore user parameters using SIMATIC PDM.

10.4 Operation troubleshooting

Operating symptoms, probable causes, and resolutions.

Symptom	Cause	Action
Display shows S: 0 LOE	level or target is out of range	• check specifications • check **Echo Confidence Pt. (2.2.1.6.)** (Page 80) • increase **Echo Confidence (2.2.4.5.1.)** (Page 86)
Display shows S: 0 LOE	material build-up on antenna	• clean the antenna • re-locate SITRANS LR260

Symptom	Cause	Action
Display shows S: 0 LOE	location or aiming: • poor installation • flange not level	• check to ensure nozzle is vertical • use **Auto False Echo Suppression (2.2.5.2** (Page 87)**)** and check **Auto Suppression Range (2.2.5.3)** (Page 87) to ensure nozzle protrudes from end of vessel nozzle.
Display shows S: 0 LOE	antenna malfunction: • temperature too high • physical damage	• check **Current Internal Temperature (3.14.1)** (Page 96) • relocate
Reading does not change, but the level does	SITRANS LR260 processing wrong echo. For example, vessel wall or structural member	• re-locate SITRANS LR260 • ensure nozzle protrudes 10 mm min. • rotate device 90°. See Orientation in a vessel with obstructions (Page 27). • use **Auto False Echo Suppression (2.2.5.2.)** (Page 87) and **Auto Suppression Range (2.2.5.3.)** (Page 87)
Measurement is consistently off by a constant amount	• setting for **Low Calibration Pt. (2.2.1.6.)** (Page 80) not correct • setting for **Sensor Offset (2.2.1.25.)** (Page 82) not correct	• check distance from sensor reference point to **Low Calibration Pt. (2.2.1.6.)** (Page 80) • check **Sensor Offset (2.2.1.25.)** (Page 82)
Screen blank	power error	• check nameplate rating against voltage supply • check power wiring or source
	too much load resistance	• remove something from the loop, or • increase supply voltage
Reading erratic	echo confidence weak	• refer to **Echo Confidence (2.2.4.5.1.)** (Page 86) • use **Auto False Echo Suppression (2.2.5.2.)** (Page 87)and **Auto False Echo Suppression Range (2.2.5.3.)** (Page 87) • use foam deflector or stillpipe
	material filling	• Re-locate SITRANS LR260
Reading response slow	**Fill Rate (2.2.7.2)** (Page 90) setting incorrect	• increase measurement response if possible
Reads correctly but occasionally reads high when vessel is not full	• detecting close range echo • build up near top of vessel or nozzle • nozzle problem	• clean the antenna • use **Auto False Echo Suppression (2.2.5.2.)** (Page 87)and **Auto Suppression Range (2.2.5.3.)** (Page 87)
Level reading lower than actual material level	• material is within Near Range zone • multiple echoes processed	• decrease **Near Range (2.2.1.12.)** (Page 81) (minimum value depends on antenna type) • raise SITRANS LR260 • ensure **Algorithm (2.2.4.1.1.)** (Page 82)is set to F (First echo)

Technical data

11

Note

Device specifications

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

11.1 Power

⚠	General Purpose Intrinsically Safe Non-Sparking Non-incendive (FM/CSA US/Canada only)	Nominal 24 V DC at 550 Ohm

- Maximum 30 V DC

- 4 to 20 mA

- Max. startup current see Startup Behaviour (Page 162).

11.2 Performance

Reference operating conditions according to IEC 60770-1

Ambient temperature	15 to 25 °C (59 to 77 °F)
Humidity	45 to 75% relative humidity
Ambient pressure	860 to 1060 mbar a (86000 to 106000 N/m² a)

Measurement Accuracy (measured in accordance with IEC 60770-1)

Maximum measured error (including hysteresis and non-repeatability)		25 mm (1.0") from min. detectable distance to 500 mm (19.7")
		6 mm (0.23") remainder of range or 0.05% of span (whichever is greater)
Frequency		K-band (25 GHz nominal)
Max. measurement range[1]	Solids	2" horn: 10 m (32.8 ft)
		3" horn: 20 m (65.6 ft)
		4" horn: 30 m (98.4 ft)
	Liquids	2" horn: 20 m (65.6 ft)
		3" horn: 30 m (98.4 ft)
		4" horn: 30 m (98.4 ft)

Min. detectable distance[2]	Stainless steel	0.05 m (1.97") from end of horn
	Aluminum horn, with polypropylene lens antenna	0.2 m (7.90") from end of horn
Update time[3]		minimum 2 seconds, depending on settings for Response Rate (2.2.7.1.) (Page 89) and LCD Fast Mode (4.3.) (Page 103)
Influence of ambient temperature		< 0.003%/K (average over full temperature range, referenced to maximum range)
Dielectric constant of material measured	Minimum dK	1.6 (depending on antenna and application type)
Memory		non-volatile EEPROM
		no battery required

[1]From sensor reference point.

[2]See Dimensions

[3]Reference conditions: Response Rate (2.2.7.1.) (Page 89)set to FAST and LCD Fast Mode (4.3.) (Page 103)set to ON

11.3   Interface

Analog output	Signal range	4 to 20 mA (± 0.02 mA accuracy) upper limit 20 to 23 mA adjustable
	Fail signal	3.6 mA to 23 mA or last value [For more details, see Fail-safe Mode] (Page 94)
	Load	Max. 600 Ω
Communication: HART	Load	230 to 600 Ω, 230 to 500 Ω when connecting a coupling module
	Max. line length	multi-wire: ≤ 1 500 m (4 921 ft)
	Protocol	HART, Version 5.1
Configuration	Remote	Siemens SIMATIC PDM or AMS Device Manager (PC)
	Local	Siemens infrared handheld programmer, or HART handheld communicator
	Display (local)[1]	graphic LCD, with bar graph representing level

[1]   Display quality will be degraded in temperatures below –25 °C (–13 °F) and above +65 °C (+149 °F).

11.4 Mechanical

Process connec-tion:	Stainless steel	Flange and horn	304 stainless steel or aluminum and polypropylene
		Universal aimer flanges [1]	50 mm (2"), 80 mm (3"), 100 mm (4"), 150 mm (6")
		Horn	50 mm (2"), 80 mm (3"), 100 mm (4")
		Air Purge Connec-tion: equipped with female 1/8" NPT fit-ting	
		Weight: Standard model	< 8.14 kg (17.9 lb) including 4" flange and standard Easy Aimer with 4" horn antenna
		Dust cap (optional): 50 mm (2")	PTFE, pipe clamp connection, O.D. 50 mm (1.97")
		80 mm (3")	PTFE, pipe clamp connection, O.D. 75 mm (2.95")
		100 mm (4")	PTFE, pipe clamp connection, O.D. 100 mm (3.94")
	Threaded connection		2" NPT (ASME B1.20.1), 2" R (BSPT, EN 10226-1) or 2" G (BSPP, EN ISO 228-1)
	Materials		316L /1.4404 or 316L /1.4435 stainless steel PTFE emitter
	Aluminum	Horn	80 mm (3") horn, aluminum polyester powder coated exterior
		Universal flanges [1]	Polyurethane powder- coated cast aluminum, 80 mm (3"), 100 mm (4"), 150 mm (6")
	Polymeric flange [1]		3" (80 mm)
			4" (100 mm)
			6" (150 mm)
	Materials		Polypropylene, FKM seal
	Dust cover for aluminum flange		kit includes polypropylene lens and FKM O-rings
	Replacement lens for polymeric flange ver-sion		kit includes polypropylene lens and FKM O-rings
Transmitter housing	Construction		aluminum, polyester powder-coated
	Conduit entry		2 x M20x1.5, or 2 x ½" NPT
	Ingress protection		Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68

1) Universal flange mates with EN 1092-1 (PN16) / ASME B16.5 (150lb) / JIS 2220 (10K) bolt patterns.

11.5 Environmental

Note

- For the specific configuration you are about to use or install, check transmitter nameplate and see Approvals (Page 129).
- Use appropriate conduit seals to maintain IP or Type rating.

Location	indoor/ outdoor	
Altitude	5000 m (16,404 ft) max.	
Ambient temperature	Storage	−40 to +80 °C (−40 to +176 °F)
	Operating	−40 to +80 °C (−40 to +176 °F)
Relative humidity	suitable for outdoor	
	Type 4X, Type 6, IP67, IP68 enclosure (see note above)	
Installation category	I	
Pollution degree	4	

11.6 Process

Temperature[1]	Stainless steel versions	-40 to 200 °C (-40 to 392 °F)
	Aluminum horn, with polypropylene lens antenna version	-40 to 80 °C (-40 to 176 °F)
Pressure (vessel)[1]	Refer to Process Pressure/Temperature derating curves (Page 159)	

1) The maximum temperature is dependent on the ambient temperature and vessel pressure. For more detail, or for other configurations, see Process Pressure/Temperature derating curves (Page 159)

2) Pressure rated version for maximum process temperature of 80 °C (176 °F)
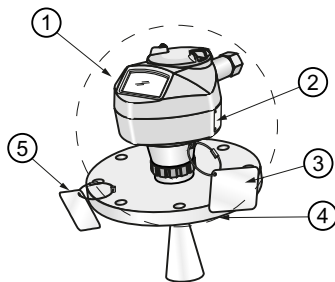
①   Ambient temperature
②   Device nameplate
③   Device tag
④   Process temperature (at process connection)
⑤   Process connection tag (contains process connection related information)

11.7   Approvals data

Application type	LR260 version	Approval rating	Valid for:
Non-hazardous	General purpose	$_c$CSA$_{US}$, FM, CE, RCM	N. America, Europe
	Radio	Europe (RED), FCC, Industry Canada	
Hazardous	Intrinsically safe (Page 41)	ATEX II 1G Ex ia IIC T4 Ga ATEX II 1D, 1/2D, 2D Ex ta IIIC 100°C Da ATEX II 3G Ex nA II T4 Gc	Europe
		IECEx SIR 11.0153X Ex ia IIC T4 Ga, Ex ta IIIC T100 °C Da IECEx SIR 07.0090X Ex ia IIC T4 Ga, Ex ta IIIC T100 °C Da	International
		FM/CSA Class I, Div. 1, Groups A, B, C, D Class II, Div. 1, Groups E, F, G Class III T4 FM/CSA Class I, Div 2, Groups A, B, C, D T5	US/Canada
		INMETRO: DNV 12.0081 X Ex ia IIC T4 Ga Ex ia ta IIIC T100 °C Da -40 °C ≤ Ta ≤ +80 °C IP67/IP68	Brazil

11.8   Programmer data - 7ML1930-1BK

Siemens Infrared IS (Intrinsically Safe) Handheld Programmer for hazardous and all other locations (battery is non-replaceable).

Approvals	CE FM/CSA Class I, II, III, Div. 1, Gr. A to G T6 ATEX 1 GD Ex ia op is IIC T4 Ga Ex ia op is IIIC T135°C Da IECEx Ex ia op is IIC T4 Ga Ex ia op is IIIC T135°C Da INMETRO Ex ia op is IIC T4 Ga Ex ia op is IIIC T135°C Da
Ambient temperature	−20 to +50 °C (−5 to +122 °F)
Interface	proprietary infrared pulse signal
Power	3 V non-replaceable lithium battery
Weight	150 g (0.3 lb)
Color	black
Part number	7ML1930-1BK

Dimension drawings 12

12.1 Stainless steel aimer version

Note

- Process temperature and pressure capabilities are dependent upon information on the process device tag.
- Signal amplitude increases with horn diameter, so use the largest practical size.

---
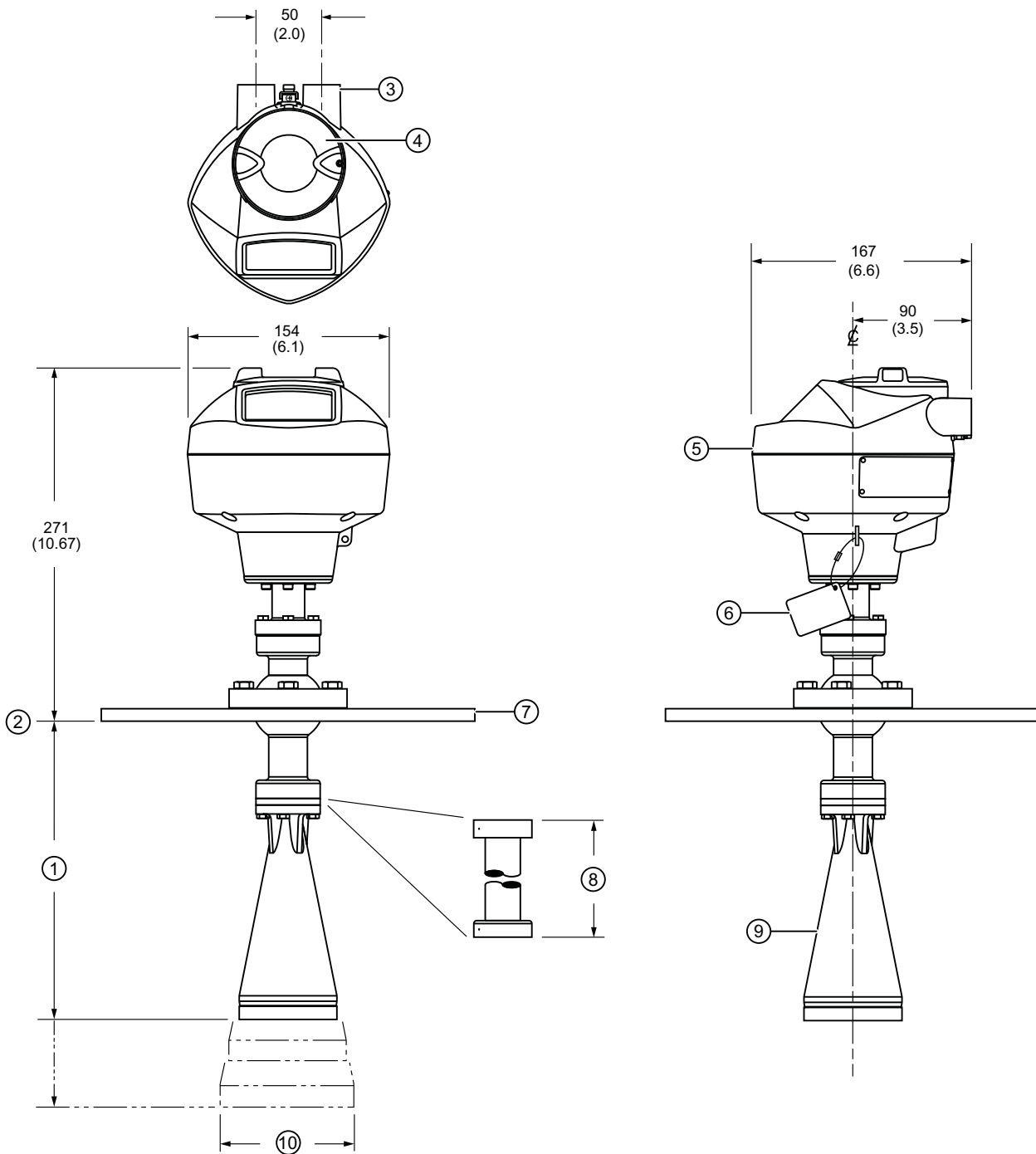
①	Height to sensor reference point[a]	⑥	Process device tag
②	Sensor reference point	⑦	Universal slotted flange
③	½" NPT or M20 cable entry	⑧	Optional horn extension
④	Threaded cover	⑨	Horn antenna
⑤	Enclosure/electronics	⑩	Antenna O.D.

Dimensions in mm (inch)

Antenna type	Antenna O.D.	Height to sensor reference point[a]	Optional horn extension	Measurement range
2 inch horn: 163 mm (6.4")	49.0 mm (1.90")	168 mm (6.40")	100 mm (4.0") 200 mm (8.0") 500 mm (19.7") 1000 mm (39.4")	20m (65.6 ft)
3 inch horn: 228 mm (9.0")	74.5 mm (2.90")	228 mm (9.00")		30m (98.4 ft)
4 inch horn: 285 mm (11.2")	97.5 mm (3.80")	285 mm (11.20")		30m (98.4 ft)

[a] Height from bottom of horn to sensor reference point as shown.

12.2 Stainless steel threaded version

Note

- Process temperature and pressure capabilities are dependent upon information on the process connection tag.
- Signal amplitude increases with horn diameter, so use the largest practical size.
- Optional extensions can be installed below the threads.

12.2 Stainless steel threaded version
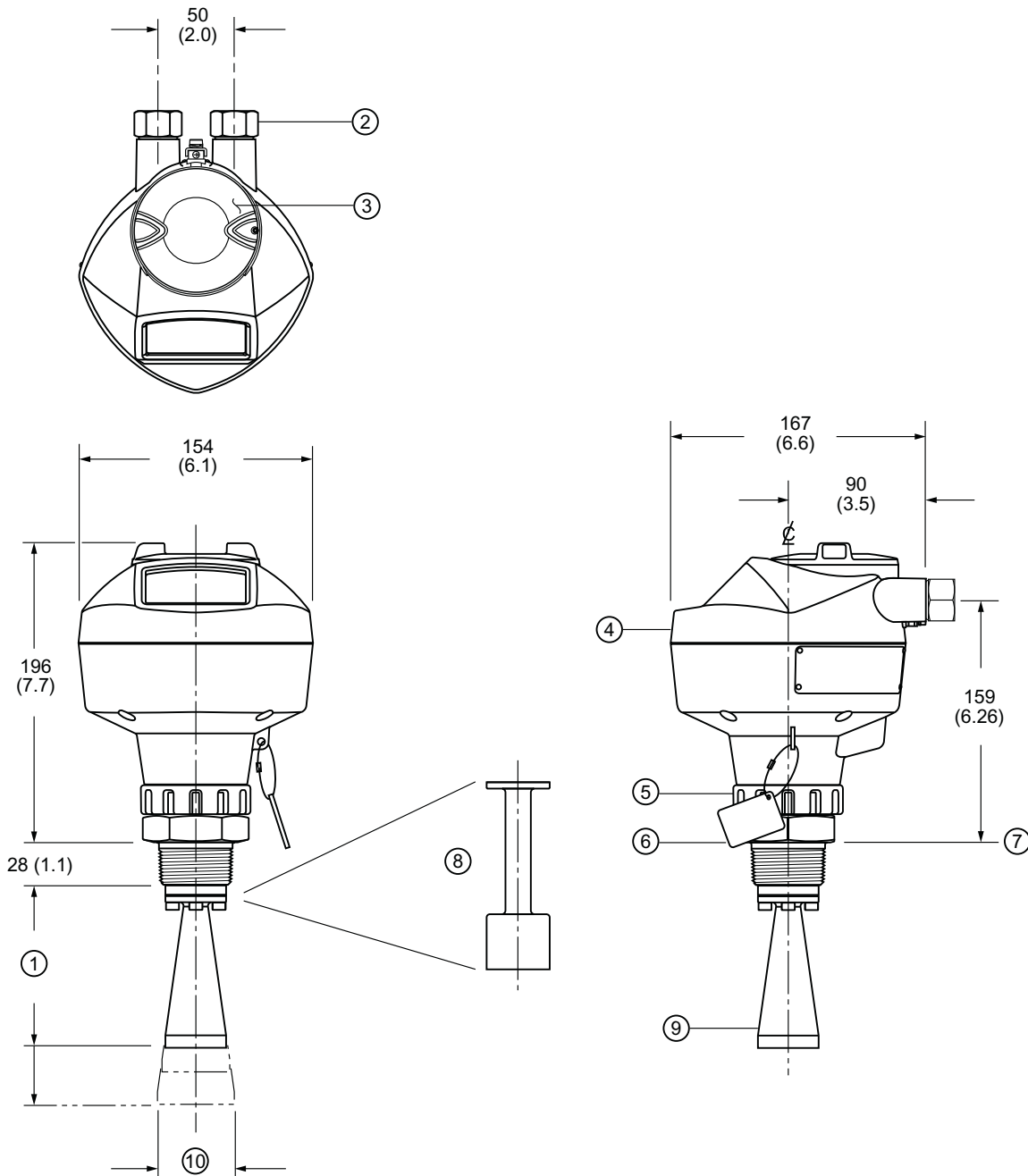
①	Height to sensor reference point	⑥	Process connection tag
②	½" NPT or M20 cable entry	⑦	Sensor reference point
③	Threaded cover	⑧	Optional 100 mm (4.0 ") horn extension
④	Enclosure/ electronics	⑨	Horn
⑤	Retaining collar	⑩	Horn O.D.

Dimensions in mm (inch)

Antenna Type	Antenna O.D.	Height to sensor reference point[a]			Measurement Range
		1-1/2" threaded connection	2" threaded connection	3" threaded connection	
2 inch horn	47.8 mm (1.88")	N/A	166 mm (6.55")	180 mm (7.09")	20m (65.6 ft)
3 inch horn	74.8 mm (2.94")	N/A	199 mm (7.85")	213 mm (8.39")	30m (98.4 ft)
4 inch horn	94.8 mm (3.73")	N/A	254 mm (10")	268 mm (10.55")	30m (98.4 ft)

[a] Height from bottom of horn to sensor reference point as shown.

12.3 Aluminum horn antenna
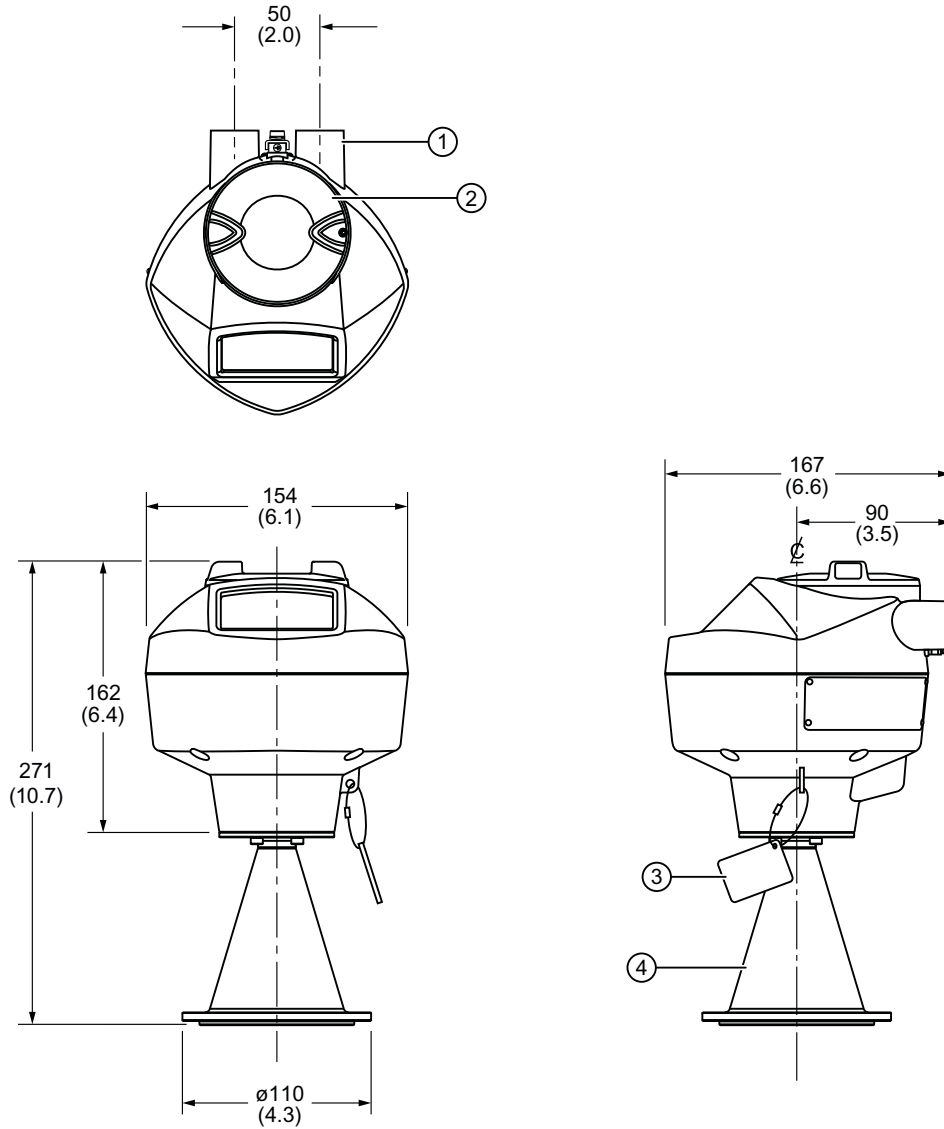
① ½" NPT or M20 cable entry
② threaded cover
③ process connection tag
④ Aluminum horn antenna

Dimensions in mm (inch)

12.4 Aluminum horn with polypropylene lens antenna and polymeric flange
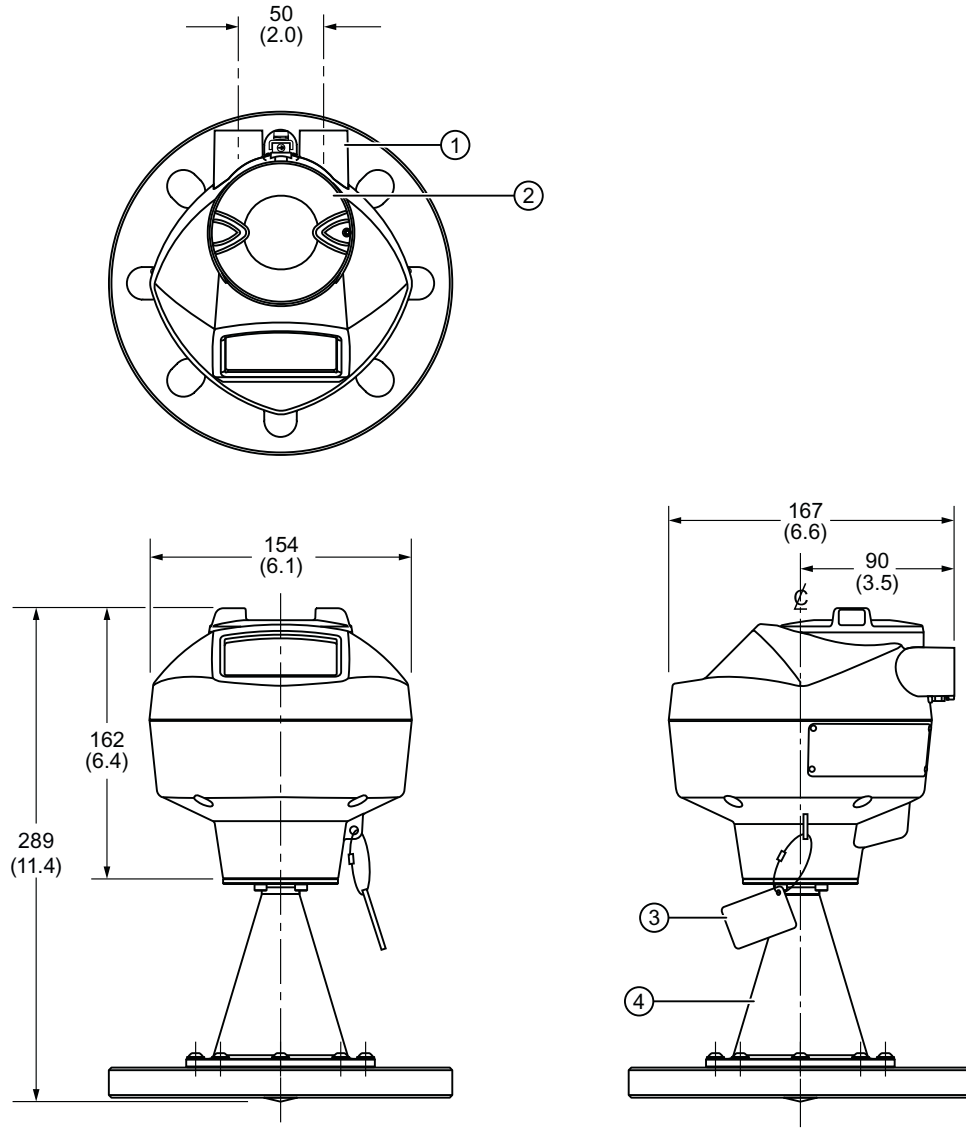
① ½" NPT or M20 cable entry

② threaded cover

③ process connection tag

④ aluminum horn with polypropylene lens antenna

Dimensions in mm (inch)

12.5 Aluminum horn antenna with aluminum aiming flange

Aluminum horn antenna with 3" (80 mm) universal aiming flange

① ½" NPT or M20 cable entry
② Threaded cover
③ Process connection tag
④ Horn
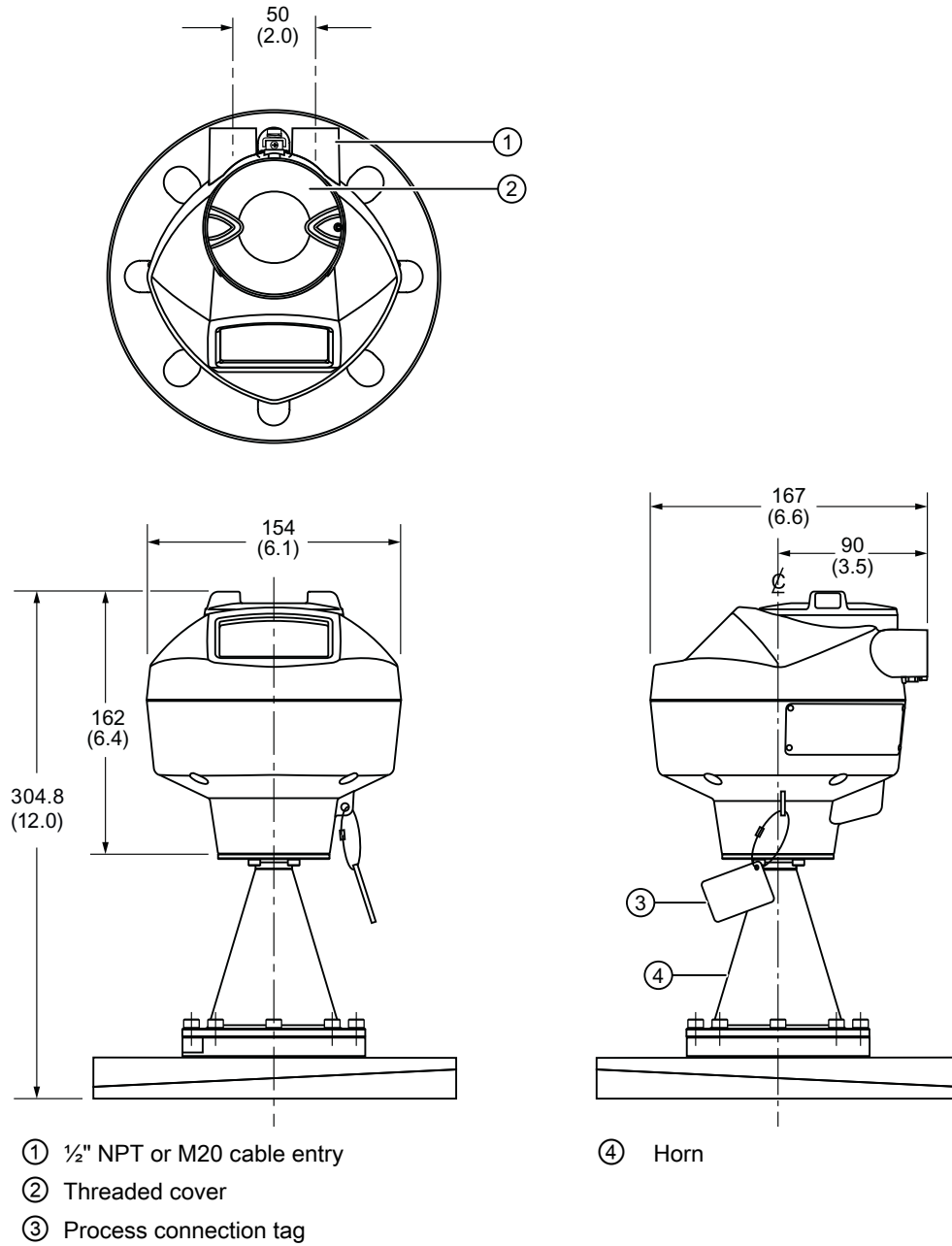
Dimensions in mm (inch)

Aluminum horn antenna with 4" (100 mm) universal aiming flange

①	½" NPT or M20 cable entry	④	Horn
②	Threaded cover	⑤	Universal aimer
③	Process connection tag		

Dimensions in mm (inch)

Aluminum horn antenna with 6" (150 mm) universal aiming flange
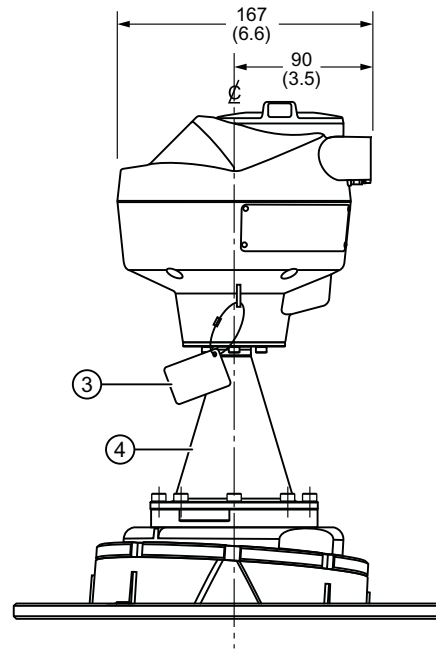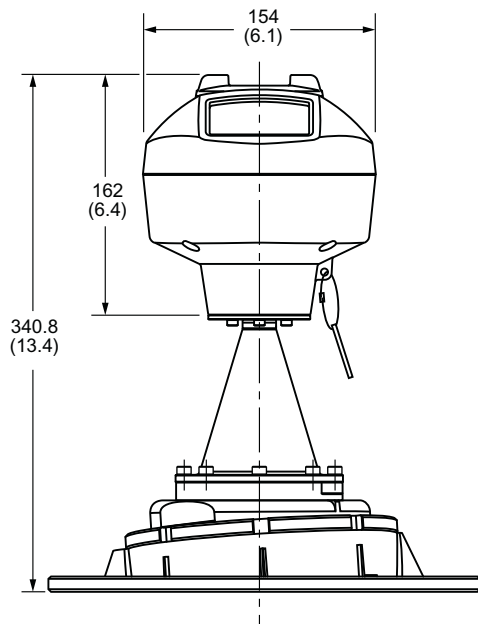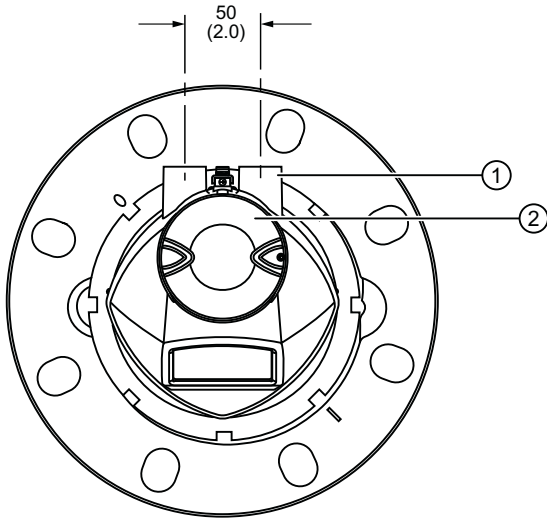
① ½" NPT or M20 cable entry

② Threaded cover

③ Process connection tag

④ Horn

Dimensions in mm (inch)

12.6 Universal stainless steel slotted flange

Note

Bolting and gasket materials

The user is responsible for the selection of bolting and gasket materials which will fall within the limits of the flange and its intended use and which are suitable for the service conditions.

① Number of slotted bolt holes   ④ flange O.D.

② Bolt hole circle max. diameter   ⑤ thickness

③ Bolt hole circle min. diameter   ⑥ Section "A-A"
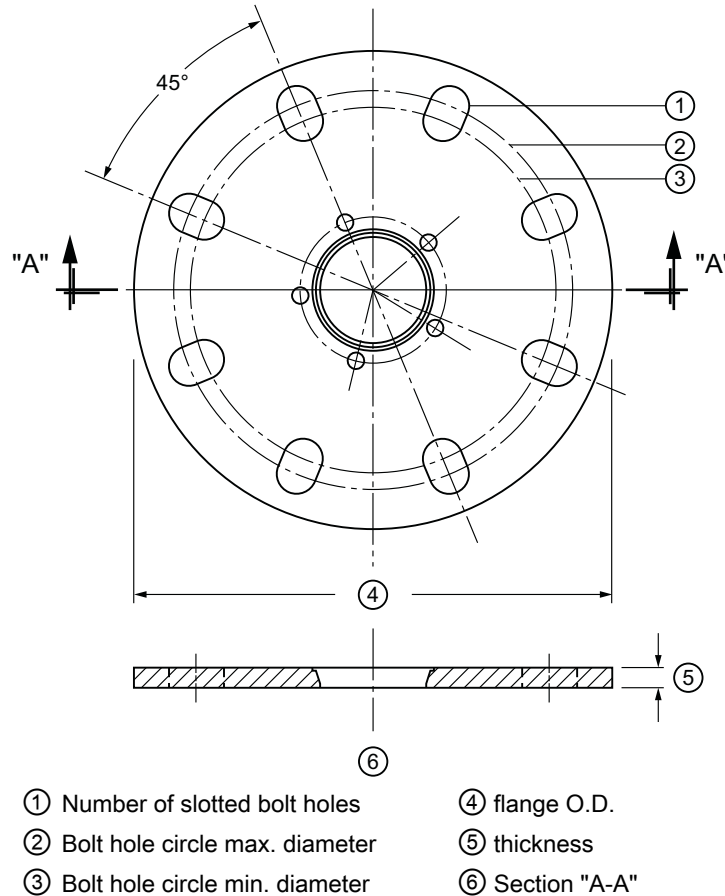
Slotted flange dimensions[1]

Pipe size	Flange O.D.	Thickness	Bolt hole circle max Ø	Bolt hole circle min Ø	Bolt hole radius	No. of slotted holes
2 (50)	6.50 (165)	0.38 (9.65)	4.92 (125)	4,72 (120)	0.38 (9.65)	4
3 (80)	7.87 (200)	0.38 (9.65)	6.30 (160)	5.91 (150)	0.37 (9.5)	8
4 (100)	9.00 (229)	0.38 (9.65)	7.52 (191)	6.89 (175)	0.37 (9.5)	8
6 (150)	11.22 (285)	0.38 (9.65)	9.53 (242)	9.45 (240)	0.45 (11.5)	8

Dimensions are in inch (mm)

[1] Universal flange mates with EN 1092-1 (PN16)/ASME B16.5 (150 lb)/JIS 2220 (10K) bolt hole pattern.

12.7 Universal polymeric flange
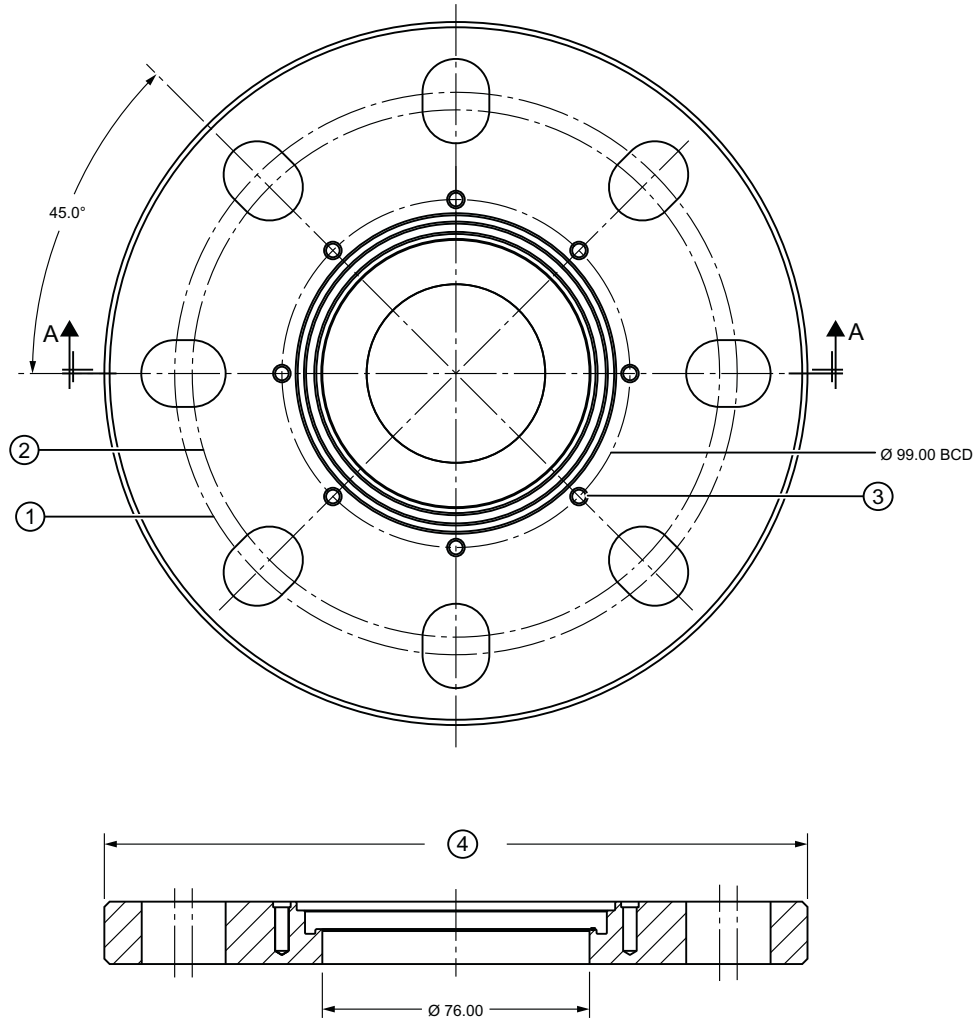
① Bolt hole circle max. diameter
② Bolt hole circle min. diameter
③ Bolt hole
④ Flange O.D.

Nominal pipe size	Flange O.D.	Thickness	Bolt hole circle max. Ø	Bolt hole circle min. Ø	Bolt hole radius	No. of slotted holes
3 (80)	7.87 (200)	0.7 (17.5)	6.30 (160)	5.91 (150)	0.37 (9.5)	8
4 (100)	9.00 (229)	0.7 (17.5)	7.52 (191)	6.89 (175)	0.37 (9.5)	8
6 (150)	11.22 (285)	0.7 (17.5)	9.53 (242)	9.45 (140)	0.45 (11.5)	8

Dimensions are in inch (mm)

12.8   Universal aluminum aimer flange

Note

Bolting and gasket materials

The user is responsible for the selection of bolting and gasket materials which will fall within the limits of the flange and its intended use and which are suitable for the service conditions.

① bolt hole circle max. diameter   ⑤ flange O.D.

② number of slotted bolt holes   ⑥ thickness

③ bolt hole radius   ⑦ bolt hole circle min. diameter

④ section A-A
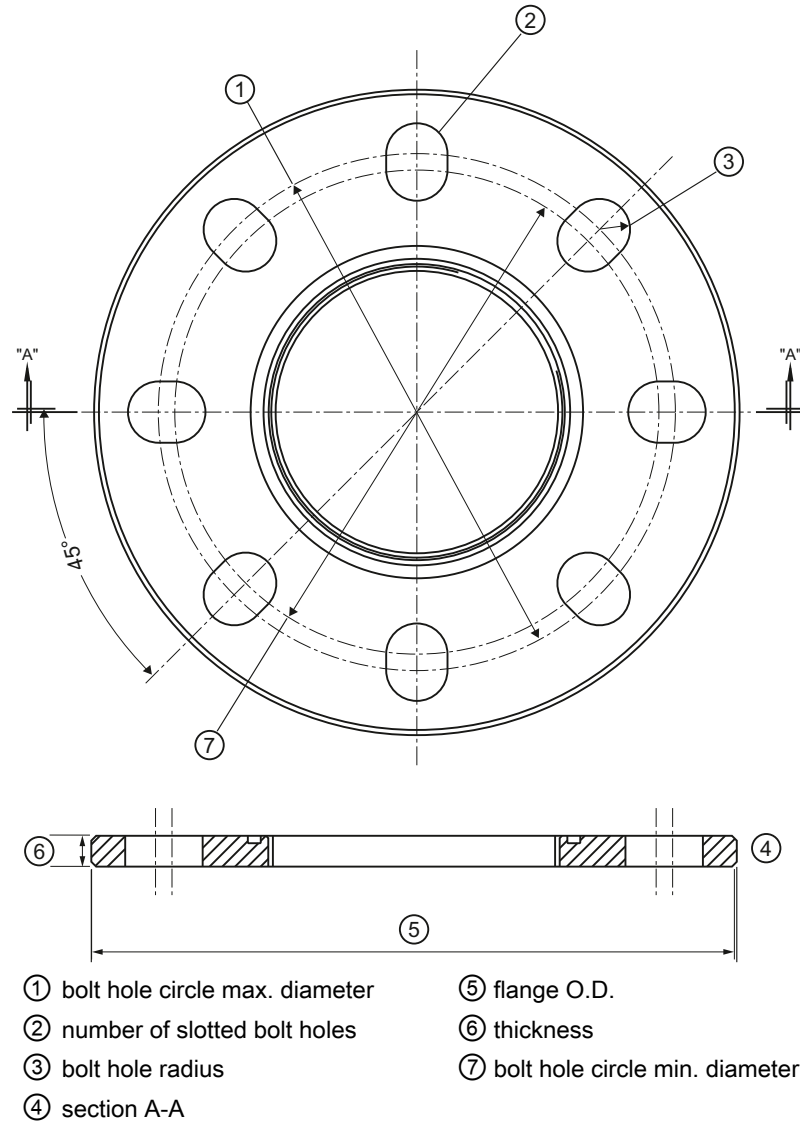
12.8 Universal aluminum aimer flange

Pipe size	Flange O.D.	Thickness	Bolt hole circle max Ø	Bolt hole circle min Ø	Bolt hole radius	No. of slotted holes
3 (80)	7.87 (200)	0.88 (22.3)	6.30 (160)	5.91 (150)	0.37 (9.5)	8
4 (100)	9.00 (229)	0.88 (22.3)	7.52 (191)	6.89 (175)	0.37 (9.5)	8
6 (150)	11.22 (285)	0.88 (22.3)	9.53 (242)	9.45 (240)	0.45 (11.5)	8

Dimensions are in inch (mm)

12.9 Mounting bracket

ø10 x 3

234 (9.2)

160 (6.3)

117 (4.6)

75 (2.9)

50 (2.0)

179 (7.1)

237 (9.3)

② ③ ④ ①
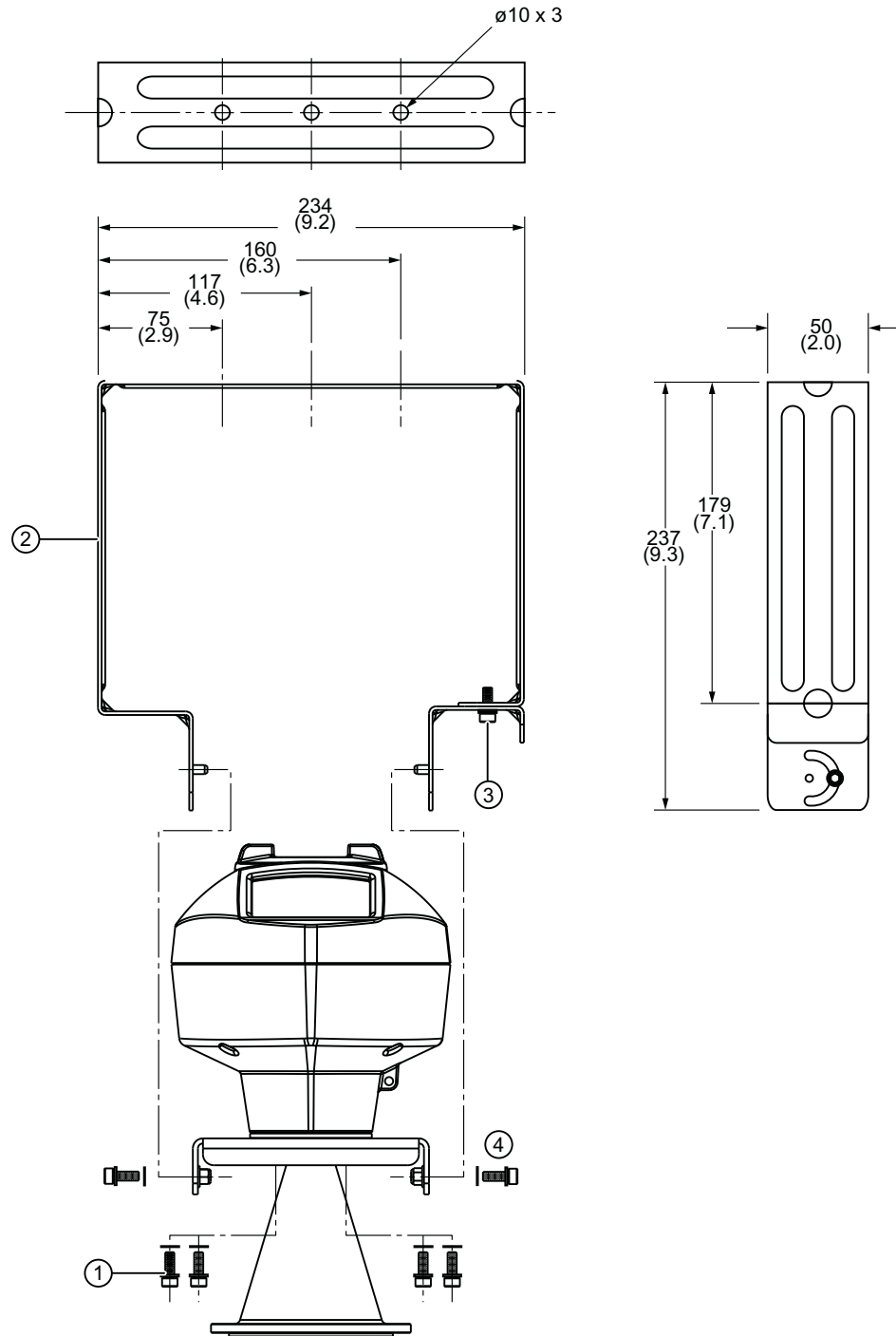
① Stainless steel socket head screw

(4) M5 x 0.8 x 14 screws, washers, lock washers

② Mounting bracket

③ (2) M5 x 0.8 x 16 screws, washers, lock washers

④ (2) M5 x 0.8 x 16 screws, washers, lock washers, nylon insert lock nuts

Dimensions in mm (inch)

Note

Torque the bracket screws to 5 Nm (3.7ft/lbs) to hold the aiming adjustment of the antenna.

Wall and ceiling mount for free space applications
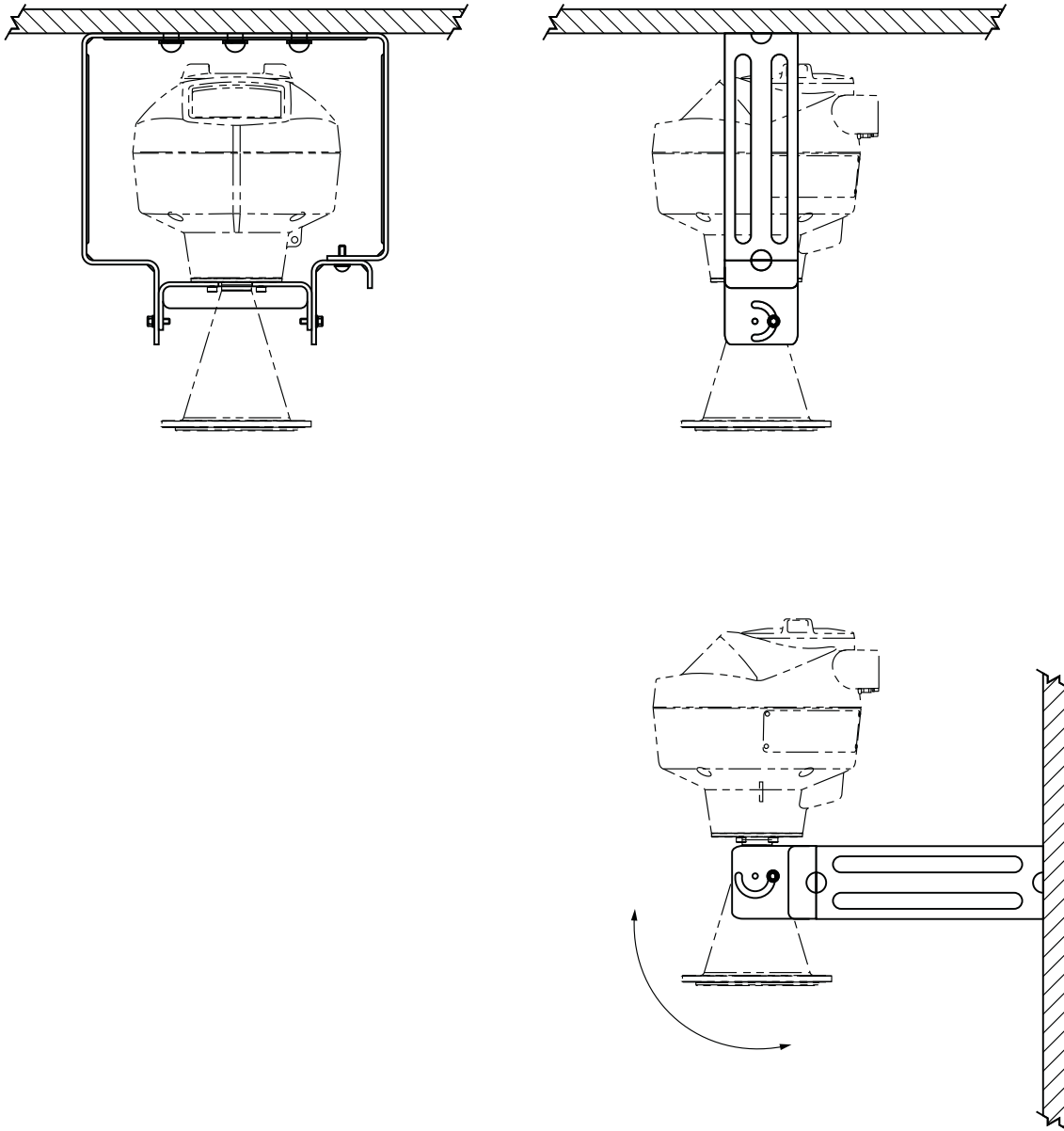
Application examples 13

13.1 Application Example

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

You can use this example 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 YES in step 7 to apply changes.)

In each example, after performing a Quick Start, navigate to the other required parameters (either via the handheld programmer, or via SIMATIC PDM) and enter the appropriate values.
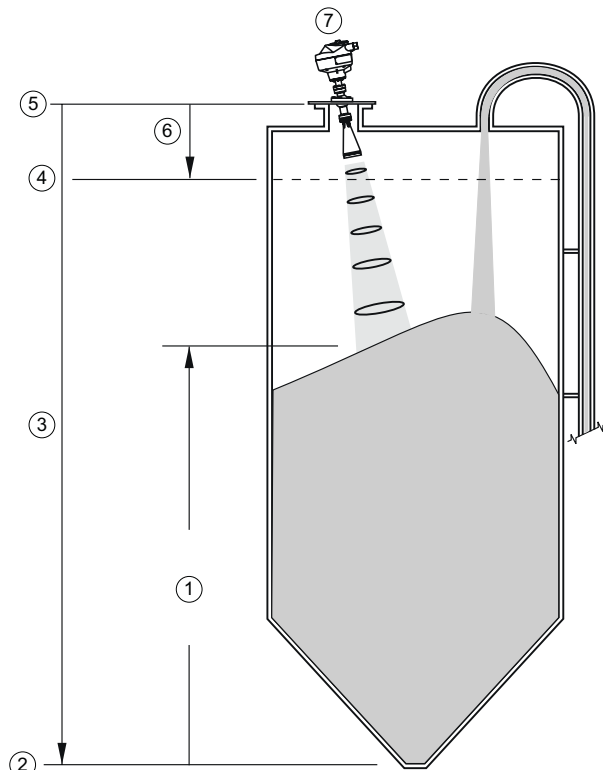
① Level
② Low Calibration Point
③ 16 m
④ High Calibration Point
⑤ Sensor Reference Point
⑥ 0.5 m
⑦ SITRANS LR260

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

- Low Calibration Pt. = vessel bottom
- High Calibration Pt.= 0.5 m from sensor reference point.
- Maximum fill/empty rate = 0.1 m/ min.
- In the event of a loss of echo, SITRANS LR260 is to go into Fail-safe High after two minutes.

Parameter type	Parameter No. and Name	Options/ Values	Function
Quick Start Wizard pa-rameters	Application Type (1.1.) (Page 74)	**STEEL**	
	Response Rate (1.2.) (Page 74)	**SLOW**	Slow = m/minute
	Units (1.3.) (Page 75)	**M**	meters
	Operation (1.4.) (Page 75)	**LEVEL**	Level
	Low Calibration Point (LOW CALIB. PT.) (1.5.) (Page 76)	**16**	16 m
	High Calibration Point (HIGH CALIB. PT.) (1.6.) (Page 77)	**0.5**	0.5 m
	Apply? (Apply changes) (1.7.) (Page 77)	**YES**	Transfers Quick Start settings to device.
Independent parame-ters	Fail-safe Timer (2.4.1.) (Page 94)	**2**	2 minutes
	Fail-safe Material Level (FAILSAFE MAT. LE) (2.4.2.) (Page 95)	**HI**	Failsafe level set to High

Appendix A: Technical reference

<div style="text-align: right; font-size: 2em;">A</div>

A.1 Appendix A: Tech Ref note

Note

Where a number follows the parameter name [for example, **Master Reset (4.1.)**] this is the parameter access number via the handheld programmer. See Parameter Reference (Page 73) for a complete list of parameters.

A.2 Principles of operation

SITRANS LR260 is a 2-wire 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries. (The microwave output level is significantly less than that emitted from cellular phones.) Radar level measurement uses the time of flight principle to determine distance to a material surface. The device transmits a signal and waits for the return echo. The transit time is directly proportional to the distance from the material.

Pulse radar uses polarized electromagnetic waves. Microwave pulses are emitted from the antenna at a fixed repetition rate, and reflect off the interface between two materials with different dielectric constants (the atmosphere and the material being monitored).

Electromagnetic wave propagation is virtually unaffected by temperature or pressure changes, or by changes in the vapor levels inside a vessel. Electromagnetic waves are not attenuated by dust.

SITRANS LR260 consists of an enclosed electronic circuit coupled to an antenna and process connection. The electronic circuit generates a radar signal (25 GHz) that is directed to the antenna.

The signal is emitted from the antenna, and the reflected echoes are digitally converted to an echo profile. The profile is analyzed to determine the distance from the material surface to the sensor reference point. See Dimension drawings (Page 131). This distance is used as a basis for the display of material level and mA output.

A.3 Echo Processing

A.3.1 Process Intelligence

The signal processing technology embedded in Siemens radar level devices is known as **Process Intelligence**.

Process intelligence provides high measurement reliability regardless of the dynamically changing conditions within the vessel being monitored. The embedded Process Intelligence dynamically adjusts to the constantly changing material surfaces within these vessels.

Process Intelligence is able to differentiate between the true microwave reflections from the surface of the material and unwanted reflections being returned from obstructions such as seam welds or supports within a vessel. The result is repeatable, fast and reliable measurement. This technology was developed as result of field data gained over some twenty years from more than 1,000,000 installations in many industries around the world.

Higher order mathematical techniques and algorithms are used to provide intelligent processing of microwave reflection profiles. This "knowledge based" technique produces superior performance and reliability.

A.3.2 Time Varying Threshold (TVT) Curves

A Time Varying Threshold (TVT) curve hovers above the echo profile to screen out unwanted reflections (false echoes).

①	TVT curve	⑥	Low Cal. Pt.
②	Sensor reference point	⑦	True echo
③	High Cal. Pt. = 0	⑧	Echo marker
④	Obstruction at 1.2 m	⑨	False echo
⑤	Material level at 2.9 m		
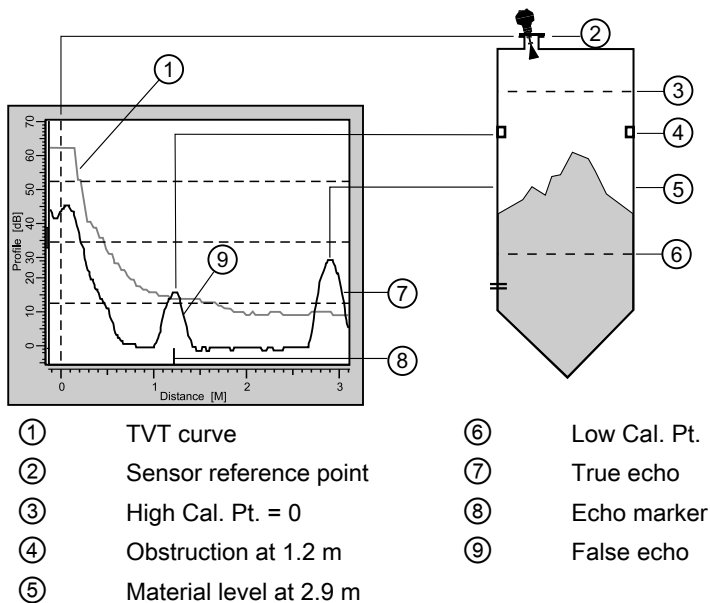
In most cases the material echo is the only one which rises above the default TVT curve. In a vessel with obstructions a large false echo may rise above the default TVT. The Auto False Echo Suppression feature (see below) can be used to screen it out.

The device characterizes all echoes that rise above the TVT as potential good echoes. Each peak is assigned a rating based on its strength, area, height above the TVT, amongst other characteristics.

The true echo is selected based on the setting for the Echo selection algorithm (Algorithm 2.2.4.1.1 (Page 82)).

A.3.3   Echo Lock

If the echo selected by Algorithm is within the Echo Lock window, the window is centered about the echo, which is used to derive the measurement.

- **Lock Off:** SITRANS LR260 responds immediately to a new selected echo (within the restrictions set by the Maximum Fill / Empty Rate), but measurement reliability is affected.

A.3.4   Echo Position Detection

The echo position algorithm (2.2.4.1.2. Echo Position) determines which point on the echo will be used to calculate the precise time of flight, and calculates the range using the calibrated propagation velocity (adjusted by a propagation factor, if necessary).

The options are **Center, CLEF** (Constrained Leading Edge Fit), **Hybrid** or **Rising Edge. CLEF** uses the leading edge of the echo. It can be used to compensate for materials with a low dK value, which may cause the vessel bottom to be reported as the level instead of the actual material level, in low level conditions.

Hybrid uses a combination of **Center** and **CLEF**, depending on the setting for CLEF range. **CLEF range** is the level below which the CLEF algorithm will be used: above this level the Center algorithm is used.

A.3.5   Auto False Echo Suppression

Note

- For detailed instructions on using this feature via PDM see Auto False Echo Suppression (Page 87).
- For detailed instructions on using this feature via the handheld programmer see **Auto False Echo Suppression (AUTO ECHO SUPP) (2.2.4.3.)**

Auto False Echo Suppression is designed to learn a specific environment (for example, a particular vessel with known obstructions), and in conjunction with Auto False Echo Suppression Range to remove false echoes appearing in front of the material echo.

The material level should be below all known obstructions at the moment when Auto False Echo Suppression learns the echo profile. Ideally the vessel should be empty or almost empty, and if an agitator is present, it should be running.

The device learns the echo profile over the whole measurement range and the TVT is shaped around all echoes present at that moment.

Auto False Echo Suppression (AUTO ECHO SUPP) (2.2.4.3.)

Auto False Echo Suppression Range specifies the range within which the learned TVT is applied. Default TVT is applied over the remainder of the range.

The learned TVT screens out the false echoes caused by obstructions. The default TVT allows the material echo to rise above it.

Auto False Echo Suppression Range must be set to a distance shorter than the distance to the material level when the environment was learned, to avoid the material echo being screened out.

Example before Auto False Echo Suppression
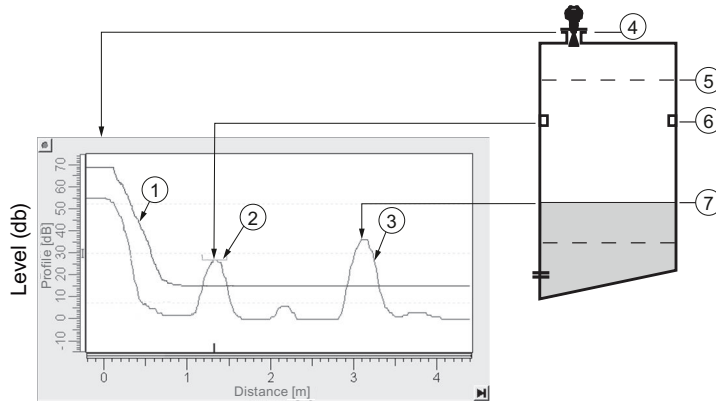
①	default TVT	⑤	high calibration point = 0
②	false echo	⑥	obstruction at 1.3. m
③	material echo	⑦	material level at 3.2 m
④	sensor reference point		

Example after Auto False Echo Suppression
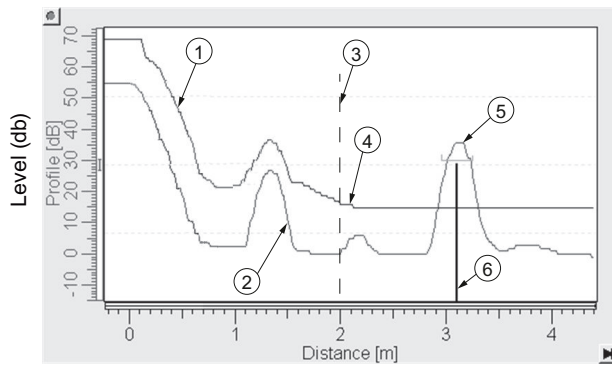
Auto False Echo
Suppression
Range set to 2 m

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

A.4 Measurement Range

A.4.1 Near Range

Near Range programs (2.2.1.12) (Page 81) SITRANS LR260 to ignore the zone in front of the antenna. The default blanking distance is 50 mm (1.97 inch) from end of horn antenna.

Near Range allows you to increase the blanking value from its factory default. Auto False Echo Suppression (2.2.5.2) (Page 87) is generally recommended in preference to extending the blanking distance from factory values.

A.4.2 Far Range

In applications where the base of the vessel is conical or parabolic, a reliable echo may be available below the vessel empty distance, due to an indirect reflection path. Increasing the range extension to 30% or 40% can provide stable empty vessel readings.

Note

On 30 m vessel, range extension cannot exceed 31.5 m.

A.5 Measurement Response

The measurement response (response rate) limits the maximum rate at which the display and output respond to changes in the measurement. Once the real process fill/empty rate (m/s) is established, a response rate can be selected that is slightly higher than the application rate. The response rate automatically adjusts the filters that affect the output response rate.

There are three preset options: slow, medium, and fast.

Fill Rate 2.2.7.2. (Page 90) (FILL RATE/ MIN)		Fill Rate 2.2.7.2. (Page 90) (FILL RATE/ MIN) Empty rate 2.2.7.3. (Page 90) (EMPTY RATE/MIN)	Echo Lock 2.2.4.2.1. (Page 83)	Failsafe Timer 2.4.1. (Page 94) (time in min.)	Damping Filter 2.2.4.3.2. (Page 85)
Slow		0.1 m/min	MAX. VERFI-CATION	100	60
Medium		1 m/min	MAX. VERFI-CATION	10	10
Fast	*	10 m/min	MAX. VERFI-CATION	1	0

A.6   mA Output

The mA output is proportional to the level, in the range 4 to 20 mA. Generally, the output is set so that the output for 0% is 4 mA, and the output for 100% is 20 mA. 0 and 100% are percentages of the full-scale reading (m, cm, mm, ft, in).

①	Low Calibration Point	⑨	4 mA 0%
②	High Calibration Point	⑩	Distance
③	Sensor reference point	⑪	100% 20 mA
④	Level	⑫	100% 20 mA
⑤	20 mA 100%	⑬	Space
⑥	Space	⑭	0% 4 mA
⑦	4 mA 0%	⑮	Level
⑧	Distance		
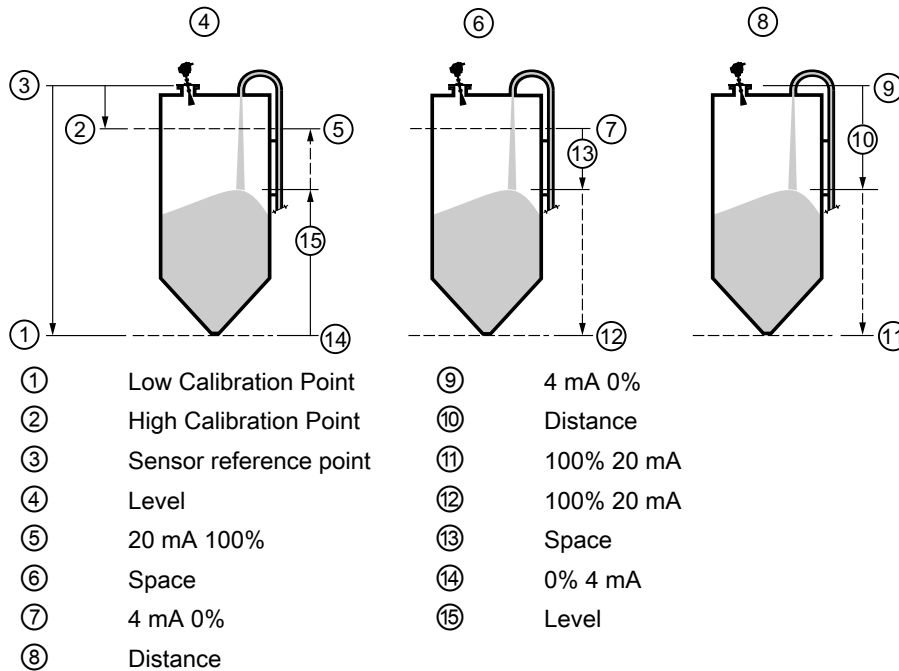
When SITRANS LR260 is put into **PROGRAM** mode it stops responding to the process. It stores the most recent measurement, and holds the associated readings and mA signal output. The instrument reverts to the parameter last addressed during the previous program session.

When the instrument is returned to **Measurement** mode, the transceiver resumes operation. The reading and mA output default to the last measurement taken. The reading and associated outputs migrate to the current process level at a rate controlled by the response rate (2.2.7.1). (Page 89)

If SITRANS LR260 is left in **PROGRAM** mode for 10 minutes without input, it automatically reverts to **Measurement** mode.

A.7   Damping

A damping filter smooths out the response to a sudden change in level. This is an exponential filter and the engineering unit is always in seconds. The setting can be modified in Damping Filter 2.2.4.3.2.. (Page 85)

Damping example
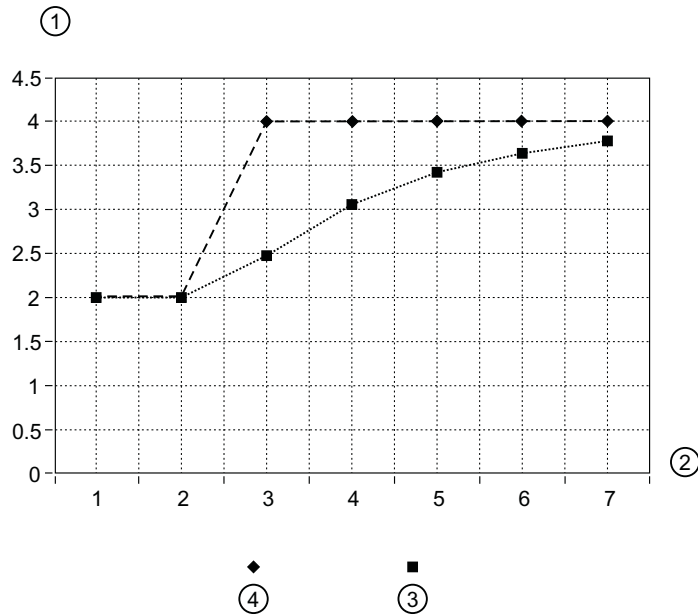
①	Level (m)
②	Time (s)
③	Input (level)
④	Smoothed output

- time constant = 2 seconds

- input (level) change = 2 m

- In 5 time constants the output rises exponentially: from 63.2% of the change in the first time constant, to almost 100% of the change by the end of the 5th time constant.

A.8   Loss of Echo (LOE)

A loss of echo (LOE) occurs when the calculated measurement is judged to be unreliable because the echo confidence value has dropped below the echo confidence threshold.

If the LOE condition persists beyond the time limit set in 2.4.1. LOE Timer the LCD displays the Maintenance Alarm icon, and the text region displays the fault code S: 0 and the text LOE.

If two faults are present at the same time, the fault code, error text, and error icon for each fault are displayed alternately. For example, Loss of Echo and Temperature Sensor Failure.

▣	S: 0 LOE
▣	S: 11 Temp. Sensor Failure

A.9 Fail-safe Mode

A.9.1 Fail-safe Mode

The purpose of the Fail-safe setting is to put the process into a safe mode of operation in the event of a fault or failure. The value to be reported in the event of a fault is selected so that a loss of power or loss of signal triggers the same response as an unsafe level.

A.9.2 Fail-safe Timer

Fail-safe Timer determines the time to elapse after the last valid reading before a Failsafe state is activated. Fail-safe Material Level determines the level to be reported when the Fail-safe timer expires. Upon receiving a reliable echo, the loss of echo condition is aborted, the Service Required icon and error message are cleared, and the reading and mA output return to the current level.

A.9.3 Fail-safe Material Level

When the Fail-safe Timer 2.4.1. (Page 94) expires, the material level to be reported is determined by

Fail-safe Material Level	
HI	Use Maximum mA Limit as material level
LO	Use Minimum mA Limit as material level
HOLD	Level remains at last reading
VALUE	User-selected value as defined in Fail-safe Level

A.9.4 Fail-safe Level

When Fail-safe Material level is set to Value, the Fail-safe Level defines a user-defined level to report when the Fail-safe timer expires.

Fail-safe Level	
Values	3.6 to 22.6 mA

A.10 Process Pressure/Temperature derating curves

> ⚠ **WARNING**
>
> **Exceeded maximum permissible operating pressure**
>
> Danger of injury or poisoning.
>
> The maximum permissible operating pressure depends on the device version. The device can be damaged if the operating pressure is exceeded. Hot, toxic and corrosive process media could be released.
>
> - Make sure that the device is suitable for the maximum permissible operating pressure of your system.

> ⚠ **DANGER**
>
> **Pressure applications**
>
> Danger to personnel, system and environment will result from improper disassembly.
>
> - Never attempt to loosen, remove, or disassemble process connection while vessel contents are under pressure.

> ⚠ **WARNING**
>
> **Pressure applications**
>
> Danger to personnel, system and environment can result from improper installation.
>
> - Improper installation may result in loss of process pressure.

> ⚠ **WARNING**
>
> **Unsuitable connecting parts**
>
> Risk of injury or poisoning.
>
> In case of improper mounting, hot, toxic, and corrosive process media could be released at the connections.
>
> - Ensure that connecting parts (such as flange gaskets and bolts) are suitable for connection and process media.

Note

Material compatibility

Siemens can provide you with support concerning selection of sensor components wetted by process media. However, you are responsible for the selection of components. Siemens accepts no liability for faults or failures resulting from incompatible materials.

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 A-08 and A-20).

A.11 Versions with 3 bar pressure rating
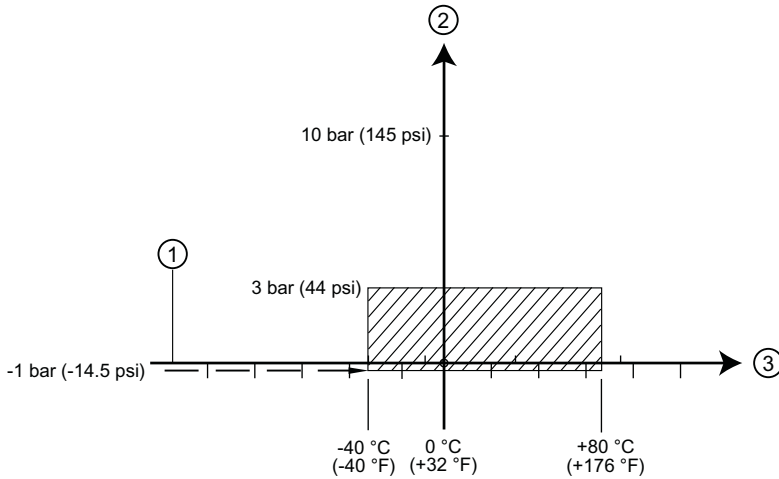
① Atmospheric
② Permitted operating pressure
③ Permitted operating temperature

> ⚠ **WARNING**
>
> **Never attempt to loosen, remove or disassemble process connection or instrument housing while vessel contents are under pressure.**

A.12 Loop power

A.12.1 Typical Connection Drawing

Note

Loop voltage is the voltage at the terminals of the power supply (not the voltage at the terminals of the device).
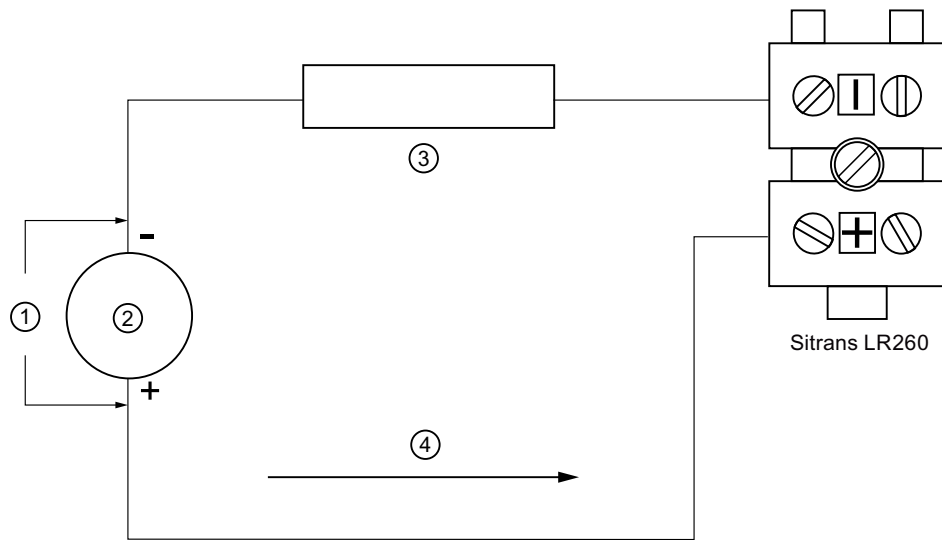
①   Loop voltage
②   Power supply
③   Loop resistance RL
④   Loop current IL

A.12.2 Allowable operating area of SITRANS LR260

Loop Voltage versus Loop Resistance
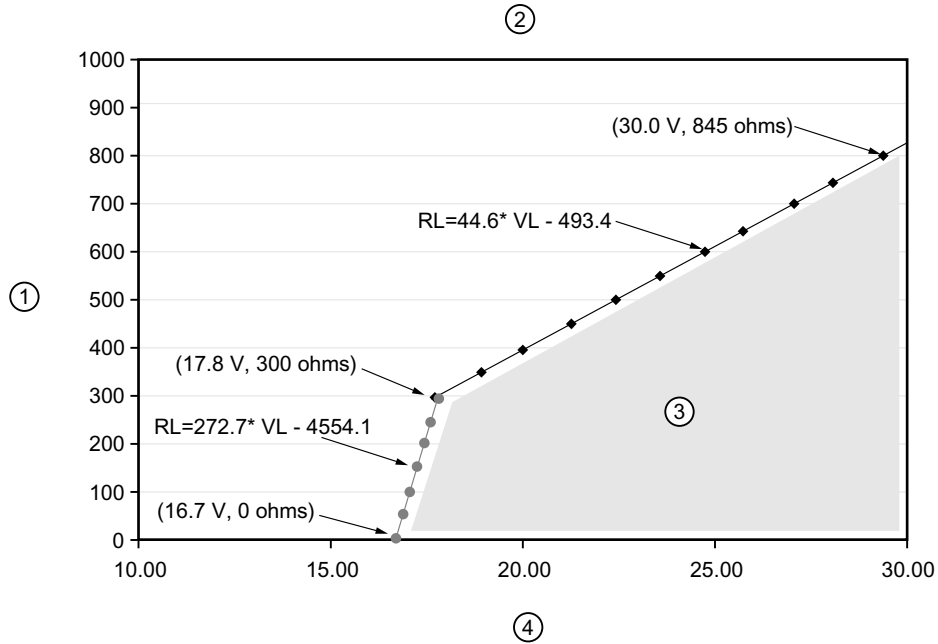
① Loop Resistance - RL
② Power supply requirements
③ Allowable operating area
④ Loop Voltage -VL

A.12.3 Startup Behavior

Note
- SITRANS LR260 is designed to start reliably with a power supply capable of delivering at least 25 mA.
- When connected to a power supply with a current limit of < 25 mA, the LR260 may not start reliably.

Typical Startup Current

①	Current (mA)
②	Loop Power Supply without Current Limit
③	Loop Power Supply with 25 mA Current Limit
④	Time (seconds)
⑤	Current-limited power
⑥	No current limit
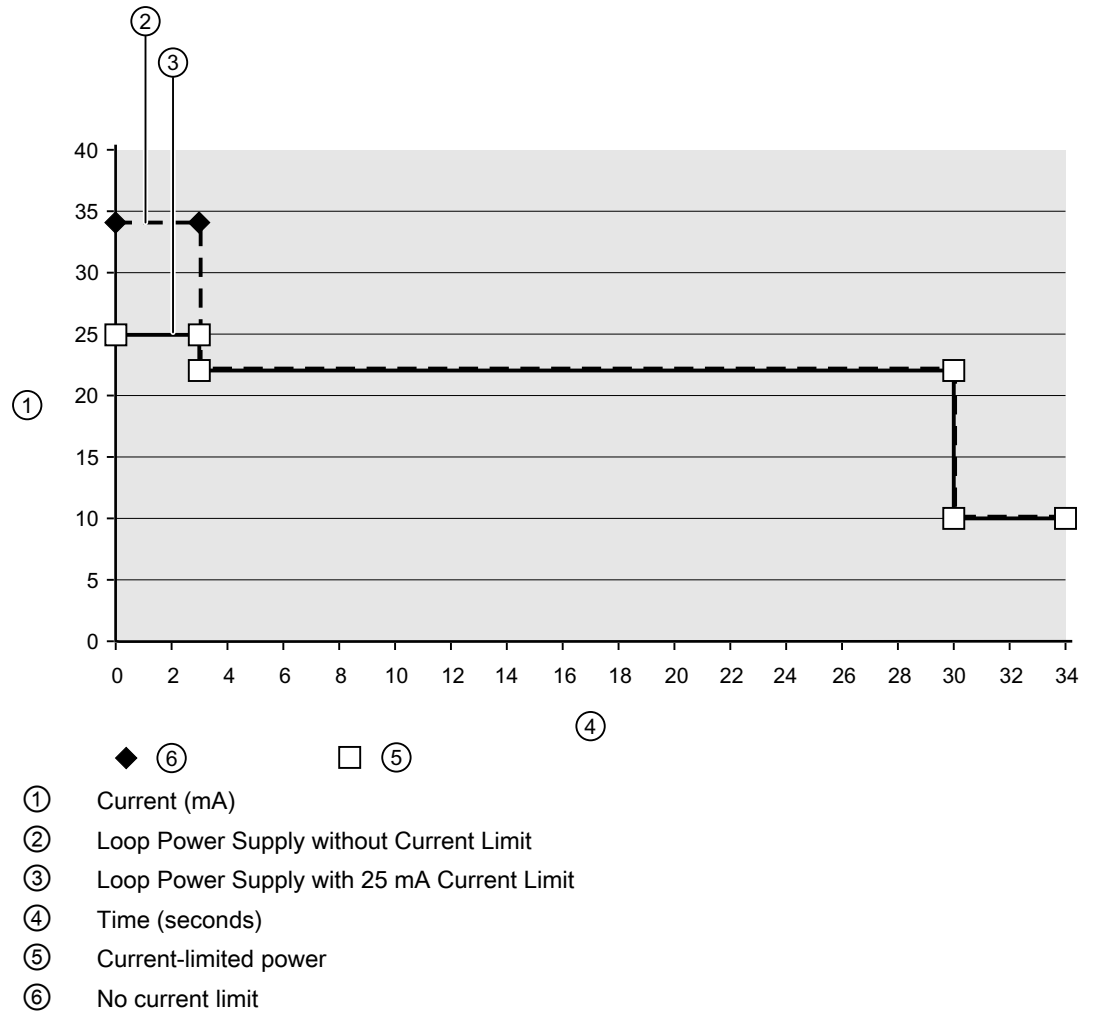
Appendix B: HART Communications

B

B.1 HART communications

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

HART Communication Foundation (www.hartcomm.org)

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

B.2 SIMATIC PDM

This software package is designed to permit easy configuration, monitoring, and troubleshooting of HART devices. The HART EDD for this device was written with SIMATIC PDM in mind and has been extensively tested with this software. For more information, see Operating via SIMATIC PDM (Page 59).

B.3 HART Electronic Device Description (EDD)

In order to configure a HART device, the configuration software requires the HART Electronic Device Description for the instrument in question.

You can download the HART EDD for this device from our website:

Product page (www.siemens.com/sitranslr260)

Click on **Support>Software Downloads.** Older versions of the library will have to be updated in order to use all the features of this device.

B.4 HART communication protocol

This device supports HART communication protocol. Signals are processed using Process Intelligence which has been field-proven in over 1,000,000 applications worldwide (ultrasonic and radar).

B.5 HART Communicator 375 Menu Structure

Note

HART Communicator 375 is supported by SITRANS LR260 HART. The menu structure is aligned with the menu structure of SIMATIC PDM.

LEVEL METER

    IDENTIFICATION
        TAG
        DESCRIPTION
        MESSAGE
        INSTALLATION DATE
        DEVICE ORDER NUMBER

    SETUP
        DEVICE
            FIRMWARE REVISION
            LOADER REVISION
            HARDWARE REVISION
        INPUT
            SENSOR CALIBRATION
                ANTENNA
                SENSOR UNITS
                OPERATION
                LOW CALIBRATION PT.
                HIGH CALIBRATION PT.
                LIMIT SENSOR VALUE
                NEAR RANGE
                FAR RANGE
                SENSOR OFFSET
            ECHO PROCESSING
                ECHO SELECT
                    ALGORITHM
                    POSITION DETECT
                    ECHO THRESHOLD
                    ECHO MARKER
                SAMPLING
                    ECHO LOCK
                    SAMPLING UP
                    SAMPLING DOWN
                    WINDOW
                FILTERING
                    DAMPING FILTER
                    NARROW ECHO FILTER
                    REFORM ECHO
                NOISE
                    ECHO CONFIDENCE
                    ECHO STRENGTH
                    NOISE AVERAGE
           3.   TVT SETUP
                TVT HOVER LEVEL
                AUTO FALSE ECHO SUPPRESSION
                AUTO SUPPRESSION RANGE
                SHAPER MODE
                TVT type

                TVT SHAPER
                        SHAPER 1-9 (Shaper points 1-9)
                        SHAPER 10-18 (Shaper points 10-18)
                        SHAPER 19-27 (Shaper points 19-27)
                        SHAPER 28-36 (Shaper points 28-36)
                        SHAPER 37-40 (Shaper points 37-40)
                RATE

                        RESPONSE RATE
                        FILL RATE PER MINUTE
                        EMPTY RATE PER MINUTE
        OUTPUT
                MA OUTPUT
                        MA OUTPUT FUNCTION
                        4 MA SETPOINT
                        20 MA SETPOINT
                        MINIMUM MA LIMIT
                        MAXIMUM MA LIMIT
        FAIL-SAFE
                FAILSAFE TIMER
                FAILSAFE MATERIAL LEVEL
                FAILSAFE LEVEL
DIAGNOSTICS
        MEASURED VALUES
                CURRENT INTERNAL TEMP.
                MAX. INTERNAL TEMP.
                MIN. INTERNAL TEMP.
        REMAINING DEVICE LIFETIME
                TOTAL DEVICE OPERATING TIME
                REMAINING DEVICE LIFETIME
                MAINTENANCE REQUIRED LIMIT
                MAINTENANCE DEMANDED LIMIT
                MAINTENANCE ALERT ACTIVATION
                DEVICE LIFETIME MAINTENANCE ACKNOWLEDGE
                TOTAL EXPECTED DEVICE LIFE
        REMAINING SENSOR LIFETIME
                TOTAL SENSOR OPERATING TIME
                REMAINING SENSOR LIFETIME
                MAINTENANCE REQUIRED LIMIT
                MAINTENANCE DEMANDED LIMIT
                MAINTENANCE ALERT ACTIVATION
                SENSOR LIFETIME MAINTENANCE ACKOWLEDGE
                TOTAL EXPECTED SENSOR LIFE
 SERVICE
        LCD FAST MODE
        LCD CONTRAST
        SERVICE INTERVAL
                TIME ELAPSED SINCE LAST SERVICE
                REMAINING LIFETIME
                MAINTENANCE REQUIRED LIMIT
                MAINTENANCE DEMANDED LIMIT
                MAINTENANCE ALERT ACTIVATION
                SERVICE ACKNOWLEDGE
                TOTAL SERVICE INTERVAL

        CALIBRATION INTERVAL
                TIME ELAPSED SINCE LAST CALIBRATION
                REMAINING LIFETIME
                MAINTENANCE REQUIRED LIMIT
                MAINTENANCE DEMANDED LIMIT
                MAINTENANCE ALERT ACTIVATION
                CALIBRATION ACKNOWLEDGE
                TOTAL CALIBRATION INTERVAL

COMMUNICATION
        COMMUNICATION CONTROL
SECURITY
        LOCK
        UNLOCK VALUE
LANGUAGE
        LANGUAGE

B.6 Supported HART Commands

SITRANS LR260 conforms to HART rev. 5 and supports the following:

Universal Commands

0, 1, 2, 3, 6, 7, 8, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22

Common Practice Commands

33, 34, 35, 36, 37, 38, 40,41, 42, 44, 45, 46, 48, 50, 51, 53, 54, 59

Device Specific Commands

Command 150	Read Echo Summary
Command 151	Read Echo Data Profile
Command 160	Updated Read Echo Summary
Command 166	Read Failsafe
Command 167	Write Failsafe
Command 170	Read Echo Lock
Command 171	Write Echo Lock
Command 172	Read TVT
Command 173	Write TVT
Command 174	Read TVT Shaper
Command 175	Write TVT Shaper
Command 178	Read Analog Special
Command 179	Write Analog Special
Command 182	Read Range Calibration
Command 183	Write Range Calibration
Command 186	Read Wear
Command 206	Read Confidence
Command 207	Write Confidence Threshold
Command 208	Read Local Display Commands
Command 209	Read Local Display Commands

B.7 Universal and Common Practice Commands

For details on the Universal and Common Practice Commands, please contact the HART Communication Foundation.

Product documentation and support

C

C.1 Product documentation

Process instrumentation product documentation is available in the following formats:

- Certificates (http://www.siemens.com/processinstrumentation/certificates)
- Downloads (firmware, EDDs, software) (http://www.siemens.com/processinstrumentation/downloads)
- Catalog and catalog sheets (http://www.siemens.com/processinstrumentation/catalogs)
- Manuals (http://www.siemens.com/processinstrumentation/documentation)
  You have the option to show, open, save, or configure the manual.
  - "Display": Open the manual in HTML5 format
  - "Configure": Register and configure the documentation specific to your plant
  - "Download": Open or save the manual in PDF format
  - "Download as html5, only PC": Open or save the manual in the HTML5 view on your PC

You can also find manuals with the Mobile app at Industry Online Support (https://support.industry.siemens.com/cs/ww/en/sc/2067). Download the app to your mobile device and scan the device QR code.

Product documentation by serial number

Using the PIA Life Cycle Portal, you can access the serial number-specific product information including technical specifications, spare parts, calibration data, or factory certificates.

Entering a serial number

1. Open the PIA Life Cycle Portal (https://www.pia-portal.automation.siemens.com).
2. Select the desired language.
3. Enter the serial number of your device. The product documentation relevant for your device is displayed and can be downloaded.

To display factory certificates, if available, log in to the PIA Life Cycle Portal using your login or register.

Scanning a QR code

1. Scan the QR code on your device with a mobile device.
2. Click "PIA Portal".

To display factory certificates, if available, log in to the PIA Life Cycle Portal using your login or register.

C.2 Technical support

Technical support

If this documentation does not completely answer your technical questions, you can enter a Support Request (http://www.siemens.com/automation/support-request).

Additional information on our technical support can be found at Technical Support (http://www.siemens.com/automation/csi/service).

Service & support on the Internet

In addition to our technical support, Siemens offers comprehensive online services at Service & Support (http://www.siemens.com/automation/service&support).

Contact

If you have further questions about the device, contact your local Siemens representative at Personal Contact.

To find the contact for your product, go to "all products and branches" and select "Products & Services > Industrial automation > Process instrumentation".

Contact address for business unit:
Siemens AG
Digital Industries
Process Automation
Östliche Rheinbrückenstr. 50
76187 Karlsruhe, Germany

See also

Instructions and manuals (http://www.siemens.com/processinstrumentation/)

List of abbreviations D

D.1 List of abbreviations

Short form	Long form	Description	Units
A/D	Analog to digital		
CE / FM / CSA	Conformité Européene / Factory Mutual / Canadian Standards Association	safety approval	
C_i	Internal capacitance		F
D/A	Dialog to analog		
DAC	Digital Analog Converter		
DCS	Distributed Control System	control room apparatus	
dK	dielectric constant		
ESD	Electrostatic Discharge		
HART	Highway Addressable Remote Transducer		
I_i	Input current		mA
I_o	Output current		mA
IS	Intrinsically Safe	safety approval	
L_i	Internal inductance		mH
mH	milliHenry	10^{-3}	H
µF	microFarad	10^{-6}	F
µs	microsecond	10^{-6}	s
NPS	Nominal Pipe Size		
PED	Pressure Equipment Directive	safety approval	
pF	pico Farads	10^{-12}	F
ppm	parts per million		
PV	Primary Variable	measured value	
SV	Secondary Variable	equivalent value	
TVT	Time Varying Threshold	sensitivity threshold	
U_i	Input voltage		V
U_o	Output voltage		V

LCD menu structure

14

14.1 LCD menu structure

> **Note**
> - In Navigation mode, **ARROW keys** (◄ ▲ ► ▼) navigate the menu in the direction of the arrow. See Parameter Reference (Page 73) for detailed information and instructions.

LEVEL METER

```
— 1. QUICK START
         1.1  APPLICATION TYPE
         1.2  RESPONSE RATE
         1.3  UNITS
         1.4  OPERATION
         1.5  LOW CALIB. PT.
         1.6  HIGH CALIB. PT.
         1.7  APPLY?

— 2. SETUP
         2.1  DEVICE
                  2.1.1  FIRMWARE REV
                  2.1.2  LOADER REV
                  2.1.3  HARDWARE REV
         2.2  INPUT
                  2.2.1  SENSOR CALIB.
                                 2.2.1.1   ANTENNA
                                 2.2.1.4   SENSOR UNITS
                                 2.2.1.5   OPERATION
                                 2.2.1.6   HIGH CALIB. PT.
                                 2.2.1.7   LOW CALIB. PT.
                                 2.2.1.8   LIMIT SENS VALUE
                                 2.2.1.12  NEAR RANGE
                                 2.2.1.13  FAR RANGE
                                 2.2.1.25  SENSOR OFFSET

                  2.2.4  ECHO PROC.
                                 2.2.4.1  ECHO SELECT
                                              2.2.4.1.1   ALGORITHM
                                              2.2.4.1.2   POSITION
                                              2.2.4.1.3   ECHO THRESHOLD
                                              2.2.4.1.5   ECHO MARKER
                                 2.2.4.2  SAMPLING
                                              2.2.4.2.1   ECHO LOCK
                                              2.2.4.2.4   UP SAMP
                                              2.2.4.2.5   DOWN SAMP.
                                              2.2.4.2.6   WINDOW
                                 2.2.4.3  FILTERING
                                              2.2.4.3.2   DAMPING FILTER
                                              2.2.4.3.6   NARROW ECHO FIL.
                                              2.2.4.3.7   REFORM ECHO
                                 2.2.4.5  NOISE
                                              2.2.4.5.1   CONFIDENCE
                                              2.2.4.5.2   STRENGTH
                                              2.2.4.5.3   NOISE AVERAGE
```

2. **SETUP** (cont'd)

    2.2.5   TVT SETUP
- 2.2.5.1   TVT HOVER LEVEL
- 2.2.5.2   AUTO ECHO SUPP
- 2.2.5.3   AUTO ECHO RANGE
- 2.2.5.4   SHAPER MODE
- 2.2.5.6   TVT TYPE

    2.2.6   TVT SHAPER
- 2.2.6.1   SHAPER 1-9
- 2.2.6.2   SHAPER 10-18
- 2.2.6.3   SHAPER 19-27
- 2.2.6.4   SHAPER 28-36
- 2.2.6.5   SHAPER 37-40

    2.2.7 RATE
- 2.2.7.1   RESPONSE RATE
- 2.2.7.2   FILL RATE/MIN
- 2.2.7.3   EMPTY RATE/MIN

    2.2.8 TB VALUES
- 2.2.8.1   LEVEL MEAS.
- 2.2.8.2   LEVEL MEAS.
- 2.2.8.3   DISTANCE MEAS.

  2.3 OUTPUT
    2.3.1 MA OUTPUT
- 2.3.1.1   MA OUTPUT VALUE
- 2.3.1.2   MA OUTPUT FUNC.
- 2.3.1.3   4 MA SETPOINT
- 2.3.1.4   20 MA SETPOINT
- 2.3.1.5   MIN. MA LIMIT
- 2.3.1.6   MAX. MA LIMIT
- 2.3.1.7   4 MA OUTPUT TRIM
- 2.3.1.8   20 MA OUTPUT TRIM

  2.4 FAIL-SAFE
- 2.4.1 FAILSAFE TIMER
- 2.4.2 FAILSAFE MA. LE
- 2.4.4 FAILSAFE LEVEL

3. **DIAGNOSTICS**

  3.1 ECHO PROFILE
  3.14 MEAS. VALUES
- 3.14.1 CURR. INTERN. TEMP.
- 3.14.2 MAX. INTERN. TEMP.
- 3.14.3 MIN. INTERN TEMP.

  3.15 REMAIN. DEV. LIFE
- 3.15.1 TOTAL OP-TIME
- 3.15.2 REMAIN. LIFETIME
- 3.15.3 MAINT REQ LIMIT
- 3.15.4 MAINT DEM LIMIT
- 3.15.5 ALERT ACTIVATION
- 3.15.6 TOTAL EXP. LIFE
- 3.15.7 MAINT STAT
- 3.15.8 ACK STATUS
- 3.15.9 ACK

  3.16 REMAIN. SENS. LIFE
- 3.16.1 SENSOR OP-TIME
- 3.16.2 REMAIN. LIFETIME
- 3.16.3 MAINT REQ LIMIT
- 3.16.4 MAINT DEM LIMIT
- 3.16.5 ALERT ACTIVATION
- 3.16.6 TOTAL EXP. LIFE
- 3.16.7 MAINT STAT
- 3.16.8 ACK STATUS
- 3.16.9 ACK

- **4. SERVICE**
  - 4.1 DEVICE RESET
  - 4.2 MANUF. DATE
  - 4.3 LCD FAST MODE
  - 4.4 LCD CONTRAST
  - 4.6 POWERED HOURS
  - 4.9 POWERON RESETS
  - 4.11 MEM. TEST
  - 4.16 SERVICE INTERVA
    - 4.16.1 TIME LAST SERV
    - 4.16.2 REMAIN LIFETIME
    - 4.16.3 MAINT REQ LIMIT
    - 4.16.4 MAINT DEM LIMIT
    - 4.16.5 ALERT ACTIVATION
    - 4.16.6 SERVICE INTERVAL
    - 4.16.7 MAINT STAT
    - 4.16.8 ACK STATUS
    - 4.16.9 ACK
  - 4.17 CALIB. INTERVAL
    - 4.18.1 TIME LAST CAL..
    - 4.18.2 REMAIN LIFETIM.
    - 4.18.3 MAINT REQ LIMIT.
    - 4.18.4 MAINT DEM LIMIT.
    - 4.18.5 ALERT ACTIVATIO
    - 4.18.6 TOTAL CALIB. INT
    - 4.18.7 MAINT STAT
    - 4.18.8 ACK STATUS
    - 4.18.9 ACK
- **5. COMMUNICATION**
  - 5.1 DEVICE ADDRESS
  - 5.2 COMM. CONTROL
- **6. SECURITY**
  - 6.1 LOCK
  - 6.2 UNLOCK VALUE
- **7. LANGUAGE**

Glossary

accuracy

degree of conformity of a measure to a standard or a true value.

algorithm

a prescribed set of well-defined rules or processes for the solution of a problem in a finite number of steps.

ambient temperature

the temperature of the surrounding air that comes in contact with the enclosure of the device.

antenna

an aerial which sends out and receives a signal in a specific direction. There are four basic types of antenna in radar level measurement, horn, parabolic, rod, and waveguide.

attenuation

a term used to denote a decrease in signal magnitude in transmission from one point to another. Attenuation may be expressed as a scalar ratio of the input magnitude to the output magnitude or in decibels.

Auto False-Echo Suppression

a technique used to adjust the level of a TVT curve to avoid the reading of false echoes. (See TVT.)

Auto False-Echo Suppression Distance

defines the endpoint of the TVT distance. (See TVT.) This is used in conjunction with auto false echo suppression.

beam spreading

the divergence of a beam as it travels through a medium.

beam width

the angle diametrically subtended by the one-half power limits (-3 dB) of the microwave beam.

blanking

a blind zone extending away from the reference point plus any additional shield length. The instrument is programmed to ignore this zone.

capacitance

the property of a system of conductors and dielectrics that permits the storage of electricity when potential differences exist between the conductors. Its value is expressed as the ratio of a quantity of electricity to a potential difference, and the unit is a Farad.

confidence

Higher values represent higher quality. Confidence threshold defines the minimum value.

damping

term applied to the performance of an instrument to denote the manner in which the measurement settles to its steady indication after a change in the value of the level.

dB (decibel)

a unit used to measure the amplitude of signals.

derating

to decrease a rating suitable for normal conditions according to guidelines specified for different conditions.

dielectric

a nonconductor of direct electric current.[1]

dielectric constant (dK)

the ability of a dielectric to store electrical potential energy under the influence of an electric field. Also known as Relative Permittivity. An increase in the dielectric constant is directly proportional to an increase in signal amplitude. The value is usually given relative to a vacuum / dry air: the dielectric constant of air is 1[1]

echo

a signal that has been reflected with sufficient magnitude and delay to be perceived in some manner as a signal distinct from that directly transmitted. Echoes are frequently measured in decibels relative to the directly transmitted signal.

Echo confidence

describes the quality of an echo. Higher values represent higher quality. Echo threshold defines the minimum value required for an echo to be accepted as valid and evaluated.

Echo Lock Window

a window centered on an echo in order to locate and display the echo's position and true reading. Echoes outside the window are not immediately processed.

Echo Marker

a marker that points to the processed echo.

Echo Processing

the process by which the radar unit determines echoes.

Echo Profile

a graphical display of a processed echo.

Echo Strength

describes the strength of the selected echo in dB referred to 1 μV rms.

false echo

any echo which is not the echo from the desired target. Generally, false echoes are created by vessel obstructions.

frequency

the number of periods occurring per unit time. Frequency may be stated in cycles per second.

HART

Highway Addressable Remote Transducer. An open communication protocol used to address field instruments.

Hertz (Hz)

unit of frequency, one cycle per second. 1 Gigahertz (GHz) is equal to 109 Hz.

horn antenna

a conical, horn-shaped antenna which focuses microwave signals. The larger the horn diameter, the more focused the radar beam.

inductance

> the property of an electric circuit by virtue of which a varying current induces an electromotive force in that circuit or in a neighboring circuit. The unit is a Henry.

microwaves

> the term for the electromagnetic frequencies occupying the portion of the radio frequency spectrum from 1 GHz to 300 GHz.

multiple echoes

> secondary echoes that appear as double, triple, or quadruple echoes in the distance from the target echo.

Near Blanking

> see Blanking

nozzle

> a length of pipe mounted onto a vessel that supports the flange.

parameters

> in programming, variables that are given constant values for specific purposes or processes.

polarization

> the property of a radiated electromagnetic wave describing the time-varying direction and amplitude of the electric field vector.

polarization error

> the error arising from the transmission or reception of an electromagnetic wave having a polarization other than that intended for the system.

propagation factor (pf):

> where the maximum velocity is 1.0, pf is a value that represents a reduction in propagation velocity as a result of the wave travelling through a pipe or medium.

pulse radar

> a radar type that directly measures distance using short microwave pulses. Distance is determined by the return transit time.

radar

radar is an acronym for RAdio Detection And Ranging. A device that radiates electromagnetic waves and utilizes the reflection of such waves from distant objects to determine their existence or position.

range

distance between a transmitter and a target.

range extension

the distance below the zero percent or empty point in a vessel.

relative humidity

the ratio of the actual amount of moisture in the atmosphere to the maximum amount of moisture the atmosphere could hold (which varies depending on the air temperature).

relative permittivity

see dielectric constant.

repeatability

the closeness of agreement among repeated measurements of the same variable under the same conditions.

shot

one transmit pulse or measurement.

speed of light

the speed of electromagnetic waves (including microwave and light) in free space. Light speed is a constant 299, 792, 458 meters per second.

stilling-well

see stillpipe.

stillpipe

a pipe that is mounted inside a vessel parallel to the vessel wall, and is open to the vessel at the bottom.

TVT (time varying threshold)

a time-varying curve that determines the threshold level above which echoes are determined to be valid.

two wire radar

a low-energy radar. Can be loop powered, analog, intrinsically safe 4 to 20 mA, or a digital (BUS) transmitter.

waveguide antenna

a hollow, metallic tube that transmits a microwave signal to the product target.

Index

A

Abbreviations and identifications list, 171
activating, 46
analog output
    fail signal, 126
    select, 70
    signal range, 126
    simulate via PDM, 70
Auto False Echo Suppression
    explanation, 153
    TVT Shaper adjustment, 67

C

calibration schedules via PDM, 69
Catalog
    catalog sheets, 169
Certificates, 17, 169
Cleaning, 116
    instructions,
communication
    load, 126
    maximum line length, 126
conduits
    requirements, 39
configuration
    Quick Start via LUI, 51
configuration flag reset, 70
Customer Support, (Refer to Technical support)

D

Device Description (DD)
    see EDD, 60
Disassembly, 25
Disposal, 118
Document history, 11
Downloads, 169

E

echo processing
    Process Intelligence, 151
EDD
    updating, 60

Electronic Device Description (EDD)
    required for PROFIBUS PA, 60
    updating, 60

F

false echo
    see Auto False Echo Suppression, 153

H

HART Communication
    set preambles, 71
HART Communications
    details, 165
Hazardous area
    Laws and directives, 17
    Qualified personnel, 19
Hotline, (Refer to Support request)

I

Identifications and abbreviations
    list, 171

L

Laws and directives
    Disassembly, 17
    Personell, 17
LCD display
    measurement mode, 48
Lithium batteries
    Safety, 46
Local User Interface (LUI), 48
LUI (Local User Interface)
    contrast adjustment, 48

M

mA output
    select analog output, 70
maintenance,
    calibration schedules, 69
    repairs, 116
    service schedules, 69
Manuals, 169