SIEMENS

SITRANS L

Controllers
SITRANS LT500 with mA/HART sensor inputs

Compact Operating Instructions

7ML60.. (SITRANS LT500 with mA/HART sensor inputs)

05/2022

A5E52003504-AA

Legal information

Warning notice system

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

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

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

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

Qualified Personnel

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

Proper use of Siemens products

Note the following:

⚠ WARNING

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

Trademarks

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

Disclaimer of Liability

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

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Table of contents

Getting started

1

Use this chapter as a quick reference. It provides links to the steps required for startup.

Before you begin, read the following safety information:

- General safety information (Page 12)
- Basic safety information: Installing/mounting (Page 15)
- Basic safety information: Connecting (Page 26)
- Basic safety information: Commissioning (Page 41)

Procedure

1. Install/mount the device.
   Installing/mounting (Page 15)
2. Connect the device.
   Connecting (Page 26)
3. Power up the device.
   Device startup (Page 43)
4. Commission the device via quick commissioning wizard:
   Quick commissioning: Level/Space/Distance (Page 52)
   Quick commissioning: Volume (Page 56)
   Quick commissioning: Volume flow (Page 64)
5. Setup pumps (if applicable).
   Pump control (Page 74)
6. Configure basic control relays (if applicable).
   Basic control (Page 80)
7. Configure alarms (if applicable).
   Alarms (Page 83)
8. Configure totalizers and samplers (if applicable) referencing the respective parameters.

Startup is complete.

Introduction 2

2.1 Purpose of this documentation

These instructions are a brief summary of important features, functions and safety information, and contain all information required for safe use of 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 who install and commission the device.

To realize optimum performance from the device, read the complete operating instructions.

2.2 Designated use

Use the device in accordance with the information on the nameplate and in the Technical specifications (Page 95).

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

2.3 Product compatibility

The following table describes compatibility between document edition, device revision, engineering system and associated Electronic Device Description (EDD).

Service channel

Manual edition	**Remarks**	**Device revision**	**Compatible version of device integration package**	
10/2021	New device features	Service channel FW: 1.02.00 HW: 1.00.00 Device revision 1 or later	SIMATIC PDM V9.1	EDD: 1.00.00 or later
			SITRANS DTM V4.1 SP4	EDD: 1.00.00 or later
10/2020	First edition	Service channel FW: 1.01.00 HW: 1.00.00 Device revision 0	Not applicable	Not applicable

Modbus RTU

Manual edition	Remarks	Device revision	Compatible version of device integration package	
10/2021	New device features	Modbus RTU FW: 1.02.00 HW: 1.00.00 Device revision 1 or later	Not applicable	Not applicable
10/2020	First edition	Modbus RTU FW: 1.01.00 HW: 1.00.00 Device revision 0	Not applicable	Not applicable

HART

Manual edition	Remarks	Device revision	Compatible version of device integration package	
10/2021	New device features	HART FW: 1.02.00 HW: 1.00.00 Device revision 1 or later	Not applicable	Not applicable
10/2020	First edition	HART FW: 1.01.00 HW: 1.00.00 Device revision 0	Not applicable	Not applicable

PROFIBUS PA

Manual edition	Remarks	Device revision	Compatible version of device integration package	
10/2021	New device features	PROFIBUS PA FW: 1.02.00 HW: 1.00.00 Device revision 1 or later GSD: si0281de.gsd	Not applicable	Not applicable
10/2020	First edition	PROFIBUS PA FW: 1.01.00 HW: 1.00.00 Device revision 0 GSD: si0181de.gsd	Not applicable	Not applicable

PROFIBUS DP

Manual edition	Remarks	Device revision	Compatible version of device integration package	
10/2021	New device features	PROFIBUS DP FW: 1.02.00 HW: 1.00.00 Device revision 1 or later GSD: si0281df.gsd	Not applicable	Not applicable
10/2020	First edition	PROFIBUS DP FW: 1.01.00 HW: 1.00.00 Device revision 0 GSD: si0181df.gsd	Not applicable	Not applicable

PROFINET

Manual edition	Remarks	Device revision	Compatible version of device integration package	
10/2021	New device features	PROFINET FW: 1.02.00 HW: 1.00.00 Device revision 1 or later GSDML: gsdml-v2.35-sitrans_lt500-0b10-20210622.xml	Not applicable	Not applicable
10/2020	First edition	PROFINET FW: 1.01.00 HW: 1.00.00 Device revision 0 GSDML: gsdml-v2.4-sitrans_lt500-0b10-20200701.xml	Not applicable	Not applicable

2.4 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.

2.5 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 constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit
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 that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the 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).

2.6 Security note

NOTICE
Unauthorized product information or software Use only authorized Siemens websites when accessing any product information or software, including firmware updates, device integration files (EDD, for example), as well as other product documentation. Using unauthorized product information or software could result in a security incident, such as breach of confidentiality, or loss of integrity and availability of the system. For more information, see Product documentation and support (Page 103).

2.7 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 specifications (Page 95).

2.8 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

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3.1 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.

3.1.1 Warning symbols on the device

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.

3.1.2 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 Part I) (Canada)

3.1.3 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
2011/65/EU RoHS	Directive of the European Parliament and the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment

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

3.1.4 Conformity with UK regulations

The UKCA marking on the device symbolizes the conformity with the following UK regulations:

Electromagnetic compatibility EMC SI 2016/1091	Electromagnetic Compatibility Regulations 2016
Low voltage directive LVD SI 2016/1101	Electrical Equipment (Safety) Regulations 2016
RoHS SI 2012/3032	The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

The applicable regulations can be found in the UKCA declaration of conformity of the specific device.

⚠ 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.

3.1.5 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.

Installing/mounting

4

4.1 Basic safety notes

⚠ WARNING

Improper installation

Risk to personnel, system and environment can result from improper installation.

- Installation shall only be performed by qualified personnel and in accordance with local governing regulations.

4.1.1 Installation location requirements

NOTICE

Direct sunlight

Damage to device.

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 specifications (Page 95).

NOTICE

Strong vibrations

Damage to device.

- In installations with strong vibrations, mount the transmitter in a low vibration environment.

4.1.2 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 specifications (Page 95).

4.2 Installing/mounting the device

4.2.1 General installation notes

Requirements of installation

- Install device display window at shoulder level, unless most interaction is through a SCADA system.
- Provide easy access to local buttons.
- Minimize cable length requirements.
- Ensure mounting surface is free from vibration.
- Provide sufficient room to swing device lid open with clear access.
- Provide a place for a laptop computer for on-site configuration (optional, as laptop not required for configuration).

Things to avoid

- Exposure to direct sunlight. (Provide a sun shield to avoid direct sunlight.)
- Proximity to high voltage/current runs, contactors, SCR or variable frequency motor speed controllers.

Note

Improper device support

Regardless of the mounting surface used, it **must** be able to support four times the weight of the device or damage to the device may occur.

- Mount directly to wall or to electrical cabinet back panel with mounting screws: M4 (#6).

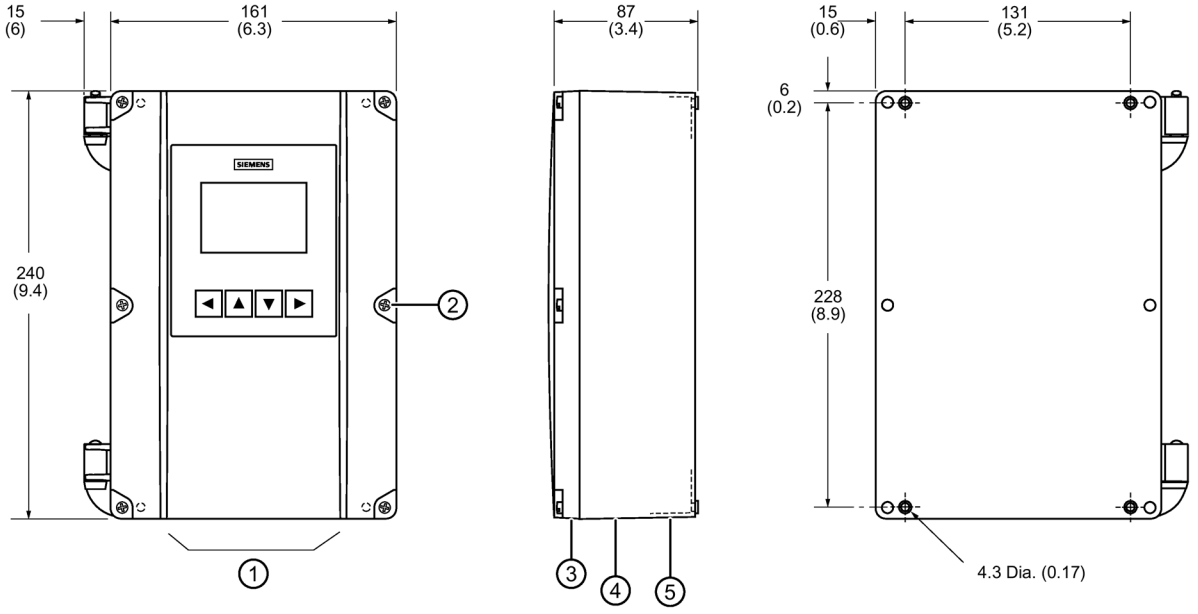
Note

Incorrect torque on device lid

Ensure torque for lid screws is set properly or damage to the device may occur.

- Tighten lid screws to 0.7 to 0.9 Nm (6 to 8 lb-inch).

Enclosure dimensions



Dimensions in mm (inch)

① Cable entry location
② Lid screws (6)
③ Enclosure lid
④ Cable entry
⑤ Enclosure base
⑥ 4.3 mm diameter (0.17 inch), 4 mounting holes

4.2.2 Drilling cable entry holes

Cable entry holes can be ordered pre-drilled, or they can be drilled by the customer per the following procedure.

Condition

- The following have been reviewed: Basic safety notes (Page 15), and General installation notes (Page 16).
- This procedure (if applicable) must be completed prior to mounting the device.

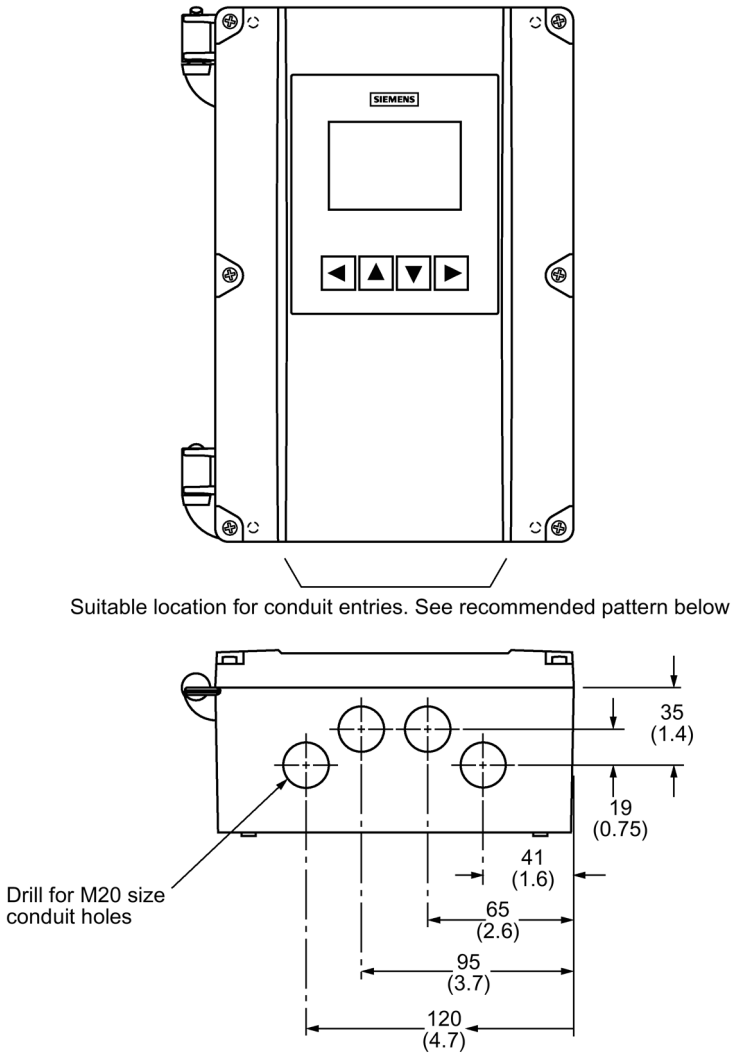
Procedure

CAUTION

Electrostatic discharge

Some components in the device are sensitive to electrostatic discharge and could be damaged. Observe electrostatic discharge precautions prior to handling electronic components within the wiring compartment.

1. Remove the lid from the device by undoing its six lid screws and lifting it off its hinges.
2. Disconnect the display cable by pressing the locking tab and pulling straight out.
3. Remove the four screws holding the plastic cover and motherboard to the enclosure.
4. Remove the plastic cover by pulling it straight out.
5. Remove the motherboard from the enclosure by pulling the board straight out.
6. Drill the required cable entry holes. Ensure conduit holes do not interfere with the lower areas on the terminal block, circuit board, or communication card. See illustration below.
7. Reinstall the motherboard and plastic cover; secure them with the mounting screws.
8. Reconnect the display cable.
9. Reattach the lid onto the hinges.
10. Follow the applicable procedure to mount the device on wall or panel.



Dimensions in mm (inch)

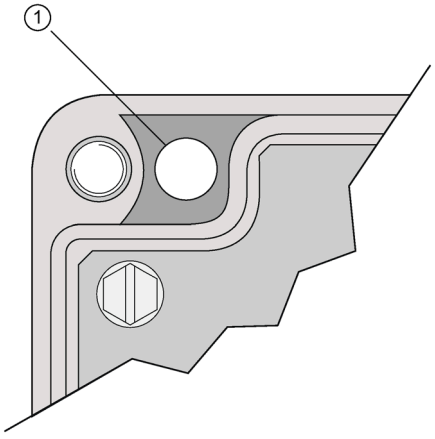
4.2.3 Wall mounting

Condition

- The following have been reviewed: Basic safety notes (Page 15), and General installation notes (Page 16).
- The correct number of cable entry holes (for this installation) are available; device was ordered with pre-drilled cable entry holes, or customer has completed procedure Drilling cable entry holes (Page 18).

Procedure

1. Unscrew the lid (six screws) and open it to reveal the mounting holes.
2. Mark and drill four holes in the mounting surface for the four screws (customer supplied).

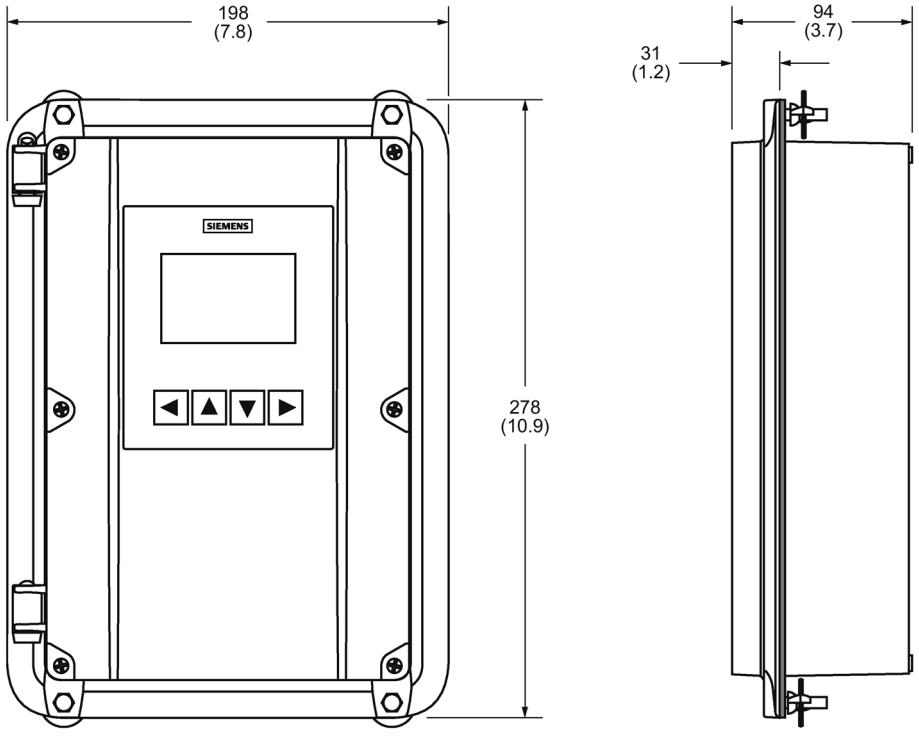


① Mounting screw holes

3. Fasten with a long screwdriver.
4. Add conduit or cable glands if applicable to application and wire as required:
   - Attach the conduit to the gland before connecting the gland to the enclosure.
   - Unscrew the glands and attach them loosely to the enclosure. Use only approved suitable-sized glands for watertight applications.
   - Thread the cables through the conduit/glands.
     To avoid interference, ensure that the power cable is kept separated from the signal cables, and then wire the cables to the terminal blocks.
   - Tighten the glands to form a good seal.
5. Screw the lid back in place noting recommended torque requirements.

4.2.4 Panel mounting

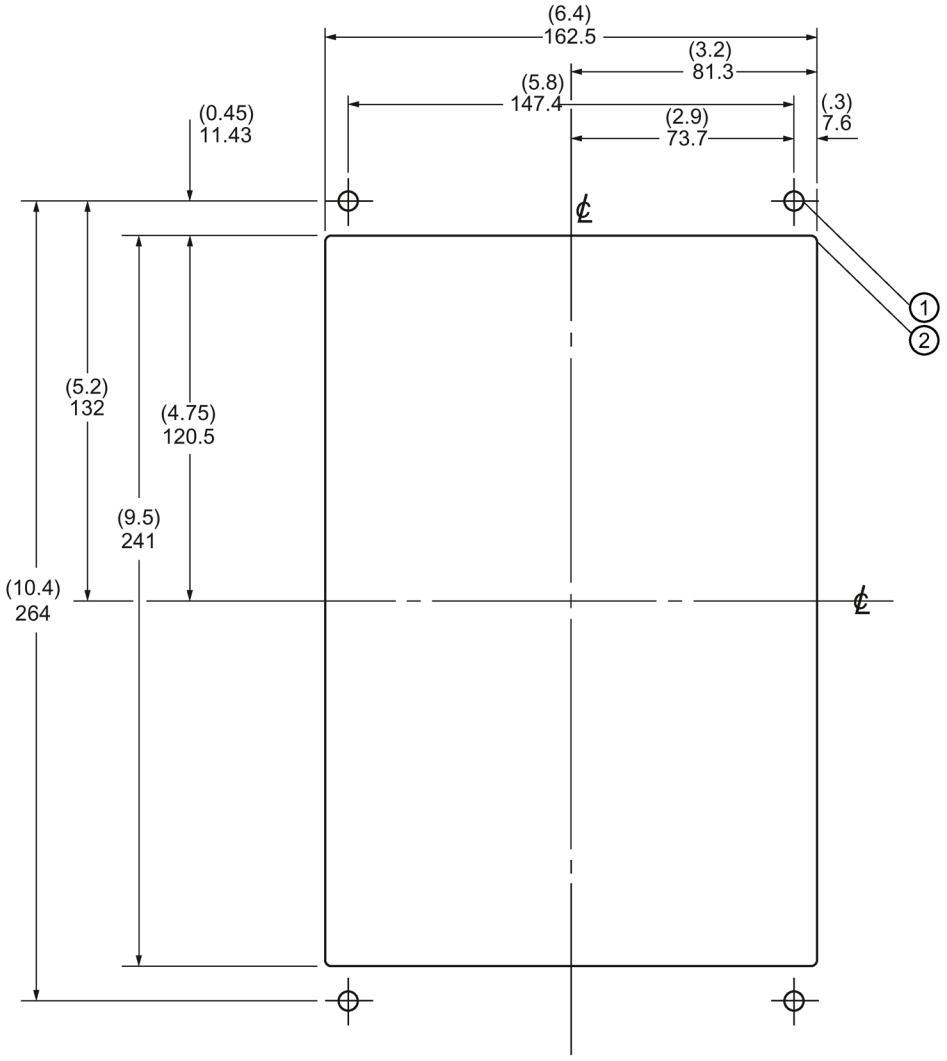
Panel mount dimensions



Dimensions in mm (inch)

Panel cutout dimensions

Installing the panel mount device requires making a cutout in the panel. The dimensions for the cutout are provided in the illustration below. A full size cutout template is provided with your device or may be downloaded from Industry Online Support (https://support.industry.siemens.com/cs/ww/en/sc/2067).



Dimensions in mm (inch)

① 6.3 mm diameter (0.25 inch)

② Min. rad. (type)

Condition

- The following have been reviewed: Basic safety notes (Page 15), and General installation notes (Page 16).
- The correct number of cable entry holes (for this installation) are available; device was ordered with pre-drilled cable entry holes, or customer has completed procedure Drilling cable entry holes (Page 18).

Procedure

1. Select a place for the device and fasten the template onto the panel (use tape or tacks).
2. Drill the four fastener holes.
3. Make the cutout using the appropriate tools.
4. Place the device into the panel and insert hexagonal fasteners through bevel slots and pre-drilled panel holes.
5. Fasten with wingnuts and hand tighten. (Use tape to hold the hexagonal heads in slots while attaching the wingnuts.)
6. Add conduit or cable glands if applicable to application and wire as required:
   - Unscrew the lid (six screws).
   - Attach the conduit to the gland before connecting the gland to the enclosure.
   - Unscrew the glands and attach them loosely to the enclosure. Use only approved suitable-sized glands for watertight applications.
   - Thread the cables through the conduit/glands.
     To avoid interference, ensure that the power cable is kept separated from the signal cables, and then wire the cables to the terminal blocks.
   - Tighten the glands to form a good seal.
   - Screw the lid back in place noting recommended torque requirements.

4.3 Installing the communication card

Communication cards are generally pre-installed. If necessary, follow these steps to install the card:

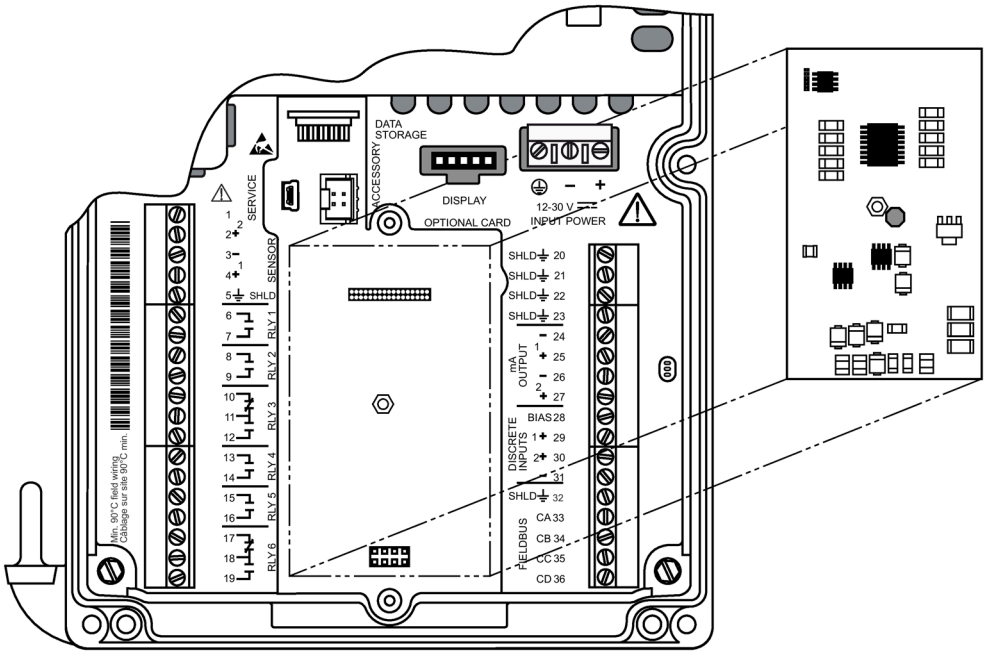
Procedure

⚠ CAUTION

Electrostatic discharge (ESD)

Some components in the device (such as communication cards, or memory cards) are sensitive to electrostatic discharge and could be damaged. Be sure to handle such components in a manner that avoids any potential damage due to ESD.

1. Disconnect power to the device.
2. Align card with the mounting post and then press-fit with the two female connectors.
3. Use the screw supplied with the card to attach it to the mounting post.
4. Wire in the communication card (see wiring instructions for optional cards in Communication (Page 36)).



4.4 Installing the memory card

Memory card is generally pre-installed. If unit does not have one, follow these steps to install the card:

Procedure

CAUTION

Electrostatic discharge (ESD)

Some components in the device (such as communication cards, or memory cards) are sensitive to electrostatic discharge and could be damaged. Be sure to handle such components in a manner that avoids any potential damage due to ESD.

1. Disconnect power to the device.
2. Align card with memory card holder.
3. Press into place.

For location of card holder see illustration in Accessing wiring compartment (Page 29).

4.5 Disassembly

⚠ WARNING

Incorrect disassembly

Injury through electric shock may result from incorrect disassembly.

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.
- Secure the remaining connections so that no damage can result if the process is started unintentionally.

Connecting

5

5.1 Basic safety notes

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

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.

5.1.1 Not initial connection

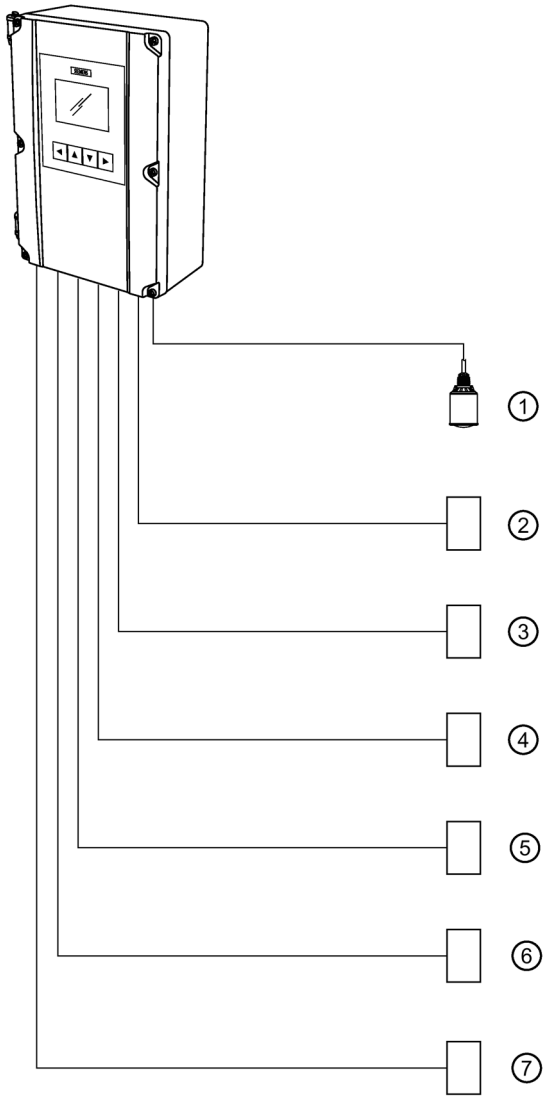
WARNING

Not initial connection

Risk of electric shock.

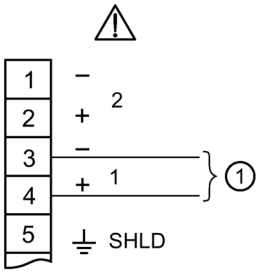
If this is not the initial connection, disconnect any power sources before adding or changing any wiring connections.

5.2 Connecting SITRANS LT500



① Remote sensor(s)
② Customer alarm, pump, or control device
③ Customer device, digital output
④ Service interface
⑤ Communication card
⑥ Display, chart recorder, or other control device
⑦ Computer running SIMATIC PDM, or FDT.

5.2.1 Sensor connections



① To sensor (measurement point 1)
Note that for SITRANS LR110, or SITRANS LR120 connection:
positive = black wire
negative = white wire

5.2.2 Wiring compartment

Terminal strips can be removed to improve ease of wiring.

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

CAUTION

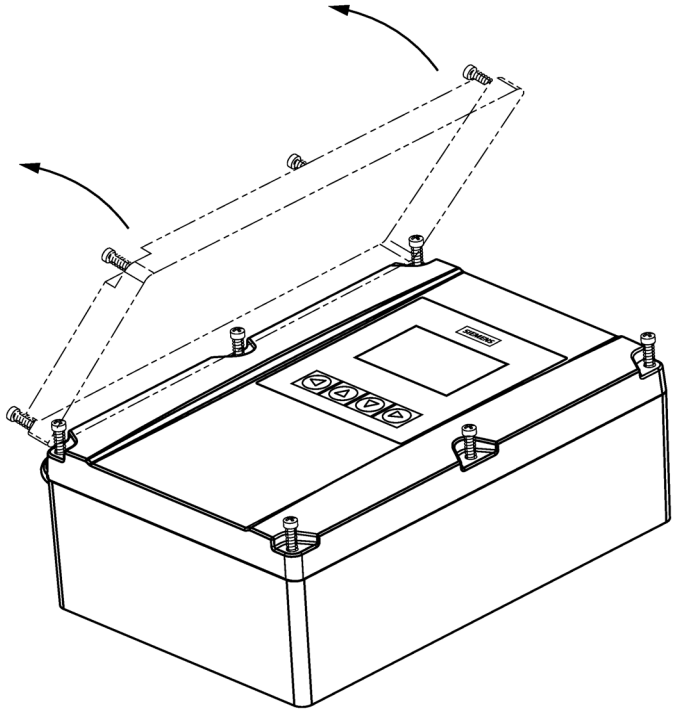
Terminal strip termination

Ensure the terminal strips are terminated to the correct location during re-installation. Failure to do so may result in damage to the device or the external equipment that is attached.

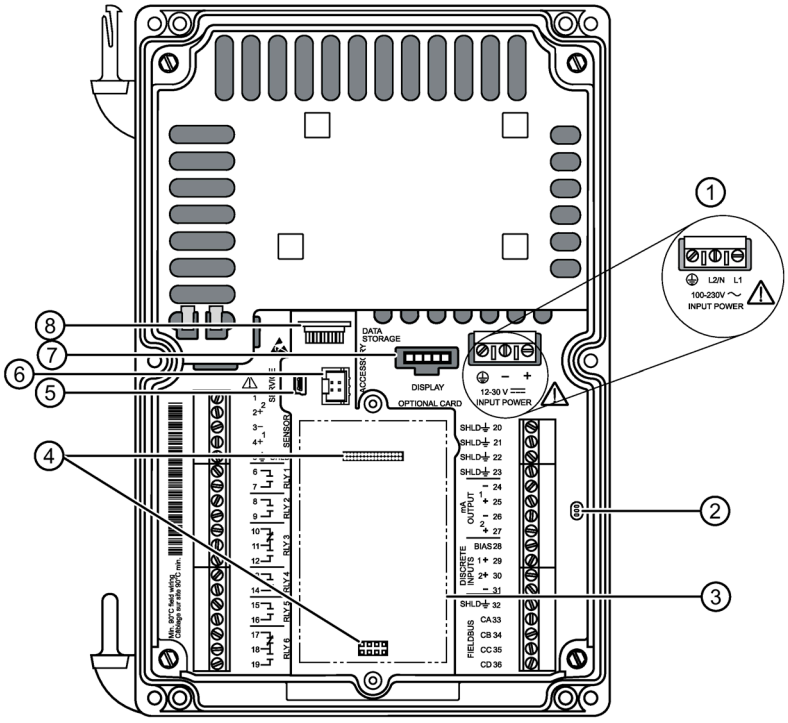
5.2.3 Accessing wiring compartment

Procedure

1. Loosen six screws on lid.
2. Lift lid up and to the left on its hinges.
3. The lid can remain open connected by hinges to access wiring compartment.



4. Make all connections as per instructions that follow.
5. When wiring complete, replace device lid.
6. Tighten lid screws to 0.7 to 0.9 Nm (6 to 8 lb-inch).



① Power supply (AC or DC)
② Diagnostic LEDs
③ Communication card (optional)
④ Female connector for optional communication card (2)
⑤ Service port
⑥ Accessory port
⑦ Display connector
⑧ Memory card holder

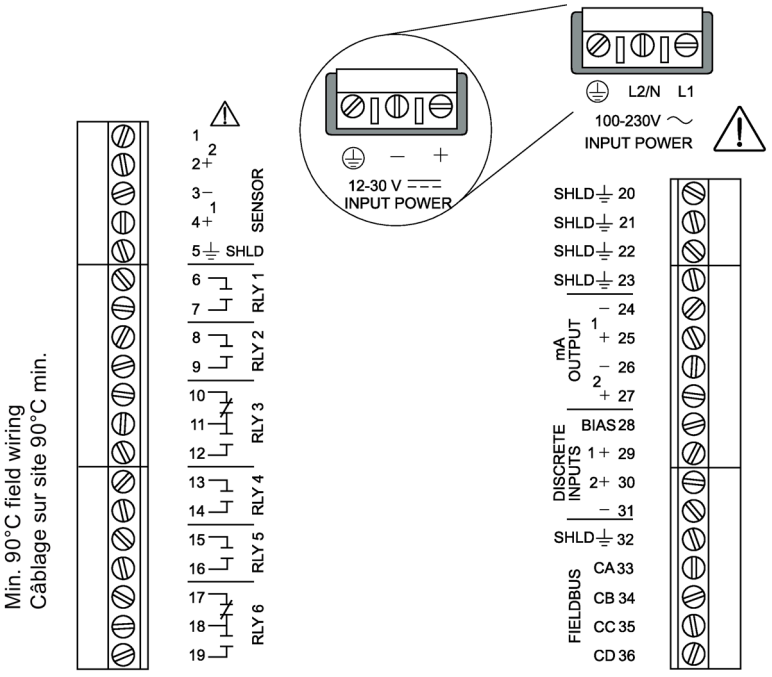
5.2.4 Terminal board

Note

Recommended torque on terminal clamping screws

- 0.56 to 0.79 Nm (5 to 7 lb/inch)

Do not overtighten.



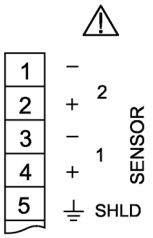
5.2.5 Cables

Connection	Cable type
Sensors, mA outputs, Input bias, Digital inputs, Communication fieldbuses	Copper conductors, twisted, with shield [1]/drain wire, 300 VAC 0.324 ... 0.823 mm^2 (22 ... 18 AWG)
Relay output, AC input	Relay to be copper conductors per local requirements to meet 250 V 5A contact rating.

[1] Preferred shielding is braided screen.

All field wiring cables must have a temperature rating of at least 90 °C.

5.2.6 Remote sensors



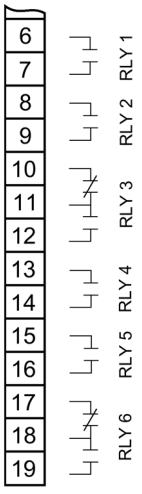
Up to two sensors (supported sensor, or generic mA sensor) can be connected.

5.2.7 Relays

Relay contacts are shown in the de-energized state. All relays are handled identically and can be configured as positive or negative logic using parameter Polarity 2.4.6.13. (per relay).

Relay ratings

- Four Form A, NO relays (1, 2, 4, 5)
- Two Form C, NO or NC relays (3, 6)
- 5A at 250 V AC, non-inductive



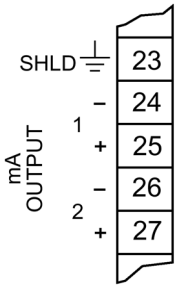
Note

Power failure

- All relays will fail in their de-energized states. Relays 1, 2, 4, and 5 are normally open and will fail open.
- Relays 3 and 6 can be wired either normally open or normally closed.

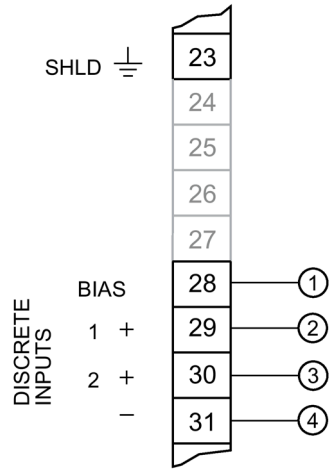
5.2.8 mA output

For more information on auxiliary mA outputs, see the complete operating instructions, and consult current output parameters in menu Inputs and outputs (2.4).



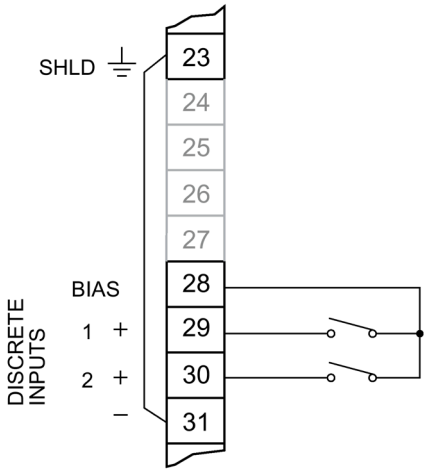
5.2.9 Digital inputs

The device has a 24 V power bias (terminal 28) for use with the digital inputs, or the digital inputs can be wired using external power.



① Bias supply for positive digital inputs
② Positive input for digital input 1
③ Positive input for digital input 2
④ Common negative for digital inputs

Digital inputs used with internal bias supply

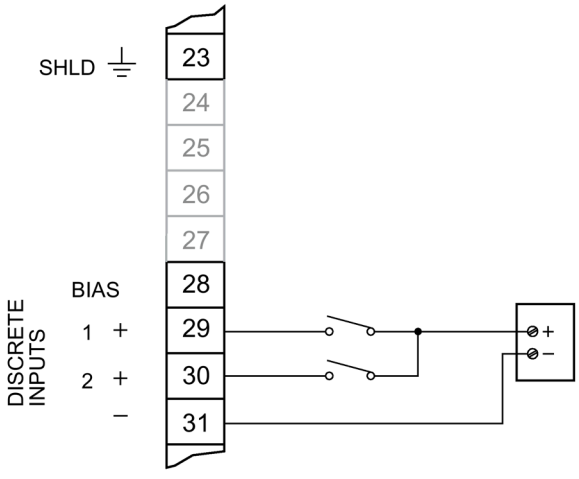


Note

Proper connection for use with internal bias supply

Terminals 23 and 31 must be connected together.

Digital inputs used with external bias supply



5.2.10 Power

⚠ WARNING

Improper power connection

Risk to personnel, system and environment can result from improper power connection.

- Before applying power to the device for the first time, ensure any connected alarm/control equipment is disabled until satisfactory system operation and performance is verified.
- This product is susceptible to electrostatic shock. Follow proper grounding procedures.
- All field wiring must have insulation suitable for rated voltages.
- Relay contact terminals are for use with equipment that has no accessible live parts. The maximum allowable working voltage between adjacent relay contacts shall be 250 V.
- The non-metallic enclosure does not provide grounding between conduit connections. Use grounding type bushings and jumpers.

AC power:

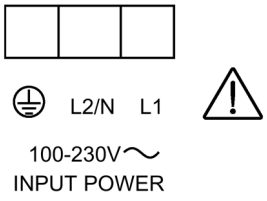
- All current-carrying conductors must be protected by a fuse or circuit breaker in the building installation, having a breaking capacity of up to 15A.
- A circuit breaker or switch in the building installation, marked as the disconnect switch, must be in close proximity to the equipment and within easy reach of the operator, and must disconnect all current-carrying conductors.

DC power:

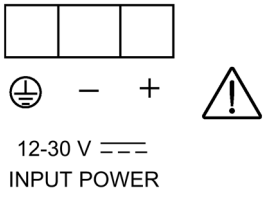
- The DC input terminals shall be supplied from a source providing electrical isolation between the input and output, in order to meet the applicable safety requirements of IEC 61010-1. For example, SELV source.

Ensure that the device is connected to a reliable ground.

AC power

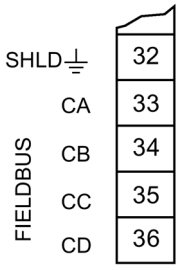


DC power



5.2.11 Communication

5.2.11.1 Communication fieldbus

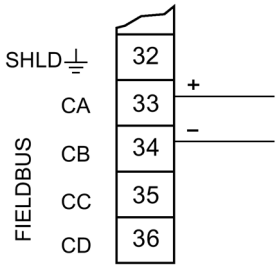


Connect, based on protocols that follow.

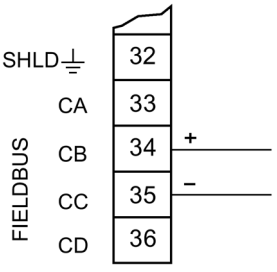
For a list of supported protocols see Communication (Page 100).

5.2.11.2 HART

Active



Passive

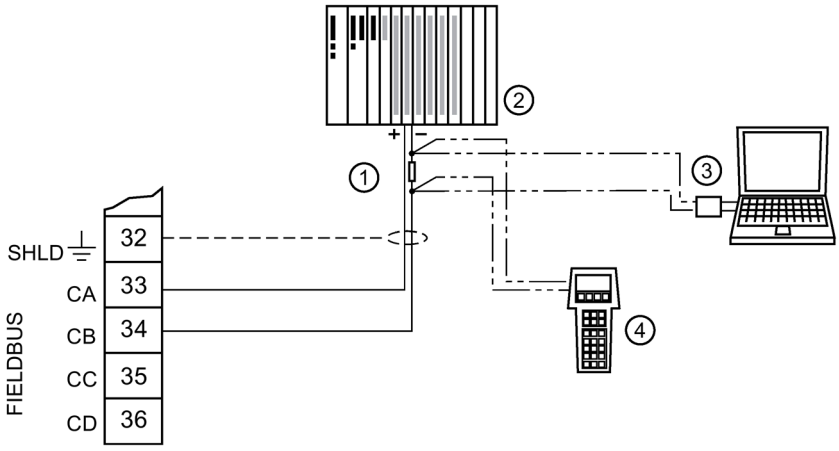


For **Active** HART connection (using LT500 integral power supply), connect terminals 33 and 34.

For **Passive** HART connection (using external power supply), connect terminals 34 and 35.

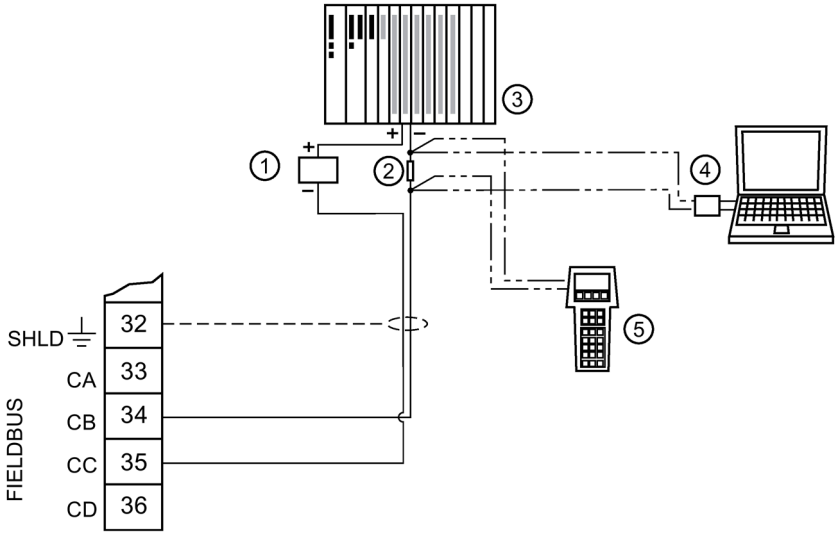
For more information, consult the mA output parameters [Current output (HART) menu 2.4.1] in the parameter assignment section of the complete operating instructions.

Typical PLC configuration with Active HART connection



① HART resistor [1)]
② PLC [2)]
③ HART modem
④ HART handheld communicator

Typical PLC configuration with Passive HART connection



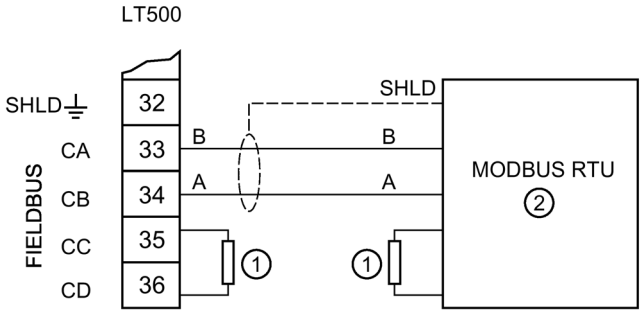
① DC power supply (14 to 30 V)
② HART resistor [1)]
③ PLC [2)]
④ HART modem
⑤ HART handheld communicator

[1)] The nominal value for the HART resistor is 250 Ohm. For more information see application guide "Working with HART", which can be downloaded from the product page of our website. Go to: Product page (www.siemens.com/sitransLT500) then under Support, click Application Guides.

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

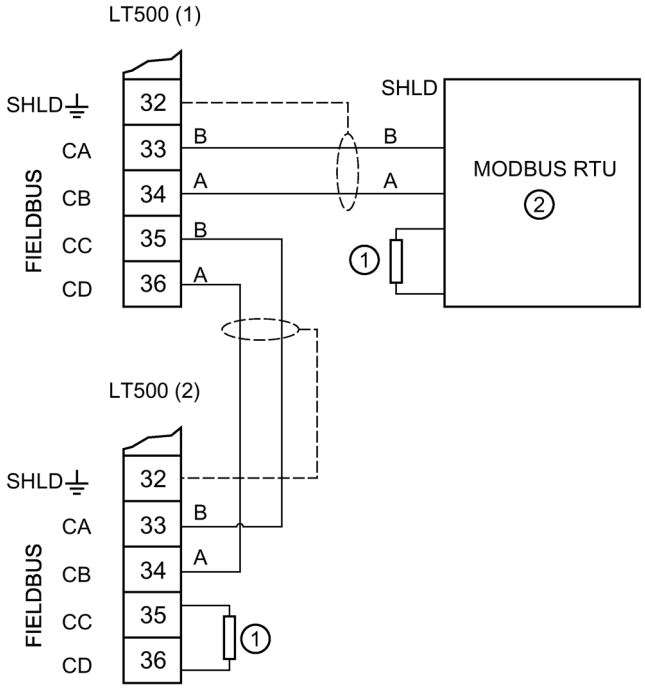
5.2.11.3 Modbus RTU

EIA-RS485 point-to-point connection to Modbus RTU master



① Termination resistors
② Modbus RTU master

EIA-RS485 multidrop connection to a Modbus RTU master



① Termination resistors
② Modbus RTU master

Note

Termination resistors

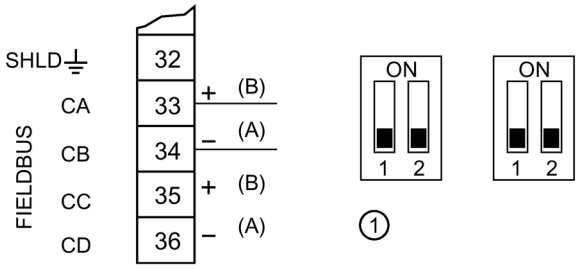
Termination resistors are typically 120R, however check the EIA-RS485 guidelines for more information.

Note

Cable type

Use cable type Belden 9841 or equivalent.

5.2.11.4 PROFIBUS PA/DP



① Termination for Profibus DP (dip switches on Profibus DP card only, normally set in OFF position as shown here)
Termination for Profibus PA to be provided externally.

\+ - Profibus PA connections

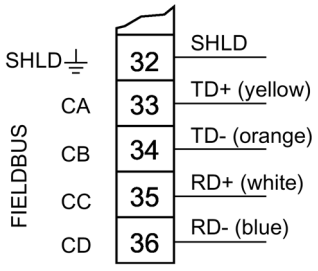
A B Profibus DP connections

Note

Cable requirements

It is recommended to use cable type A for both Profibus DP and Profibus PA, however Profibus DP and Profibus PA cables have different characteristics so the Profibus DP cable should not be used for Profibus PA, and vice versa.

5.2.11.5 PROFINET



Commissioning

6

6.1 Basic safety notes

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.

WARNING

Hazardous contact voltage

Risk of injury through hazardous contact voltage when the device is open or not completely closed.

The degree of protection specified on the nameplate or in Technical specifications (Page 95) is no longer guaranteed if the device is open or not properly closed.

- Make sure that the device is securely closed.

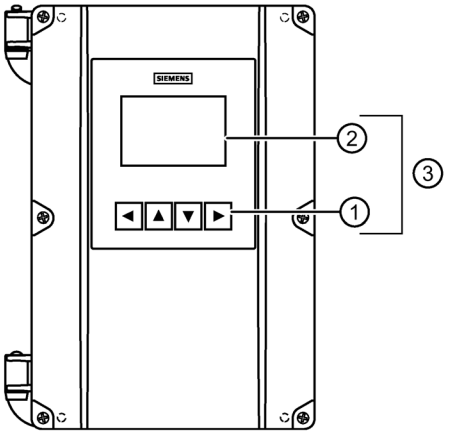
6.2 General requirements

Before commissioning it must be checked that:

- The device has been installed and connected in accordance with the guidelines provided in Installing/mounting (Page 15) and Connecting (Page 26).
- The device meets the local governing codes and good engineering practises for use in a critical application with applicable backup systems and alarms.

6.3 Local operation

The device is built for easy operation, making it possible to be commissioned quickly. Its parameters are menu-driven and can be modified through local operation, using the display and buttons, also known as the Human Machine Interface (HMI).



① Local buttons
② Graphical display
③ Local operation (HMI)

Note

Output remains active

While the device is being configured, the output remains active and continues to respond to changes in the process.

Note

Local display timeout

If no button is pressed for 10 minutes, display switches to operation view. If parameter "Backlight" is set to "Auto", display backlight goes off automatically 30 seconds after the last button press.

6.4 Device startup

Condition

- The following have been reviewed: Basic safety notes (Page 41).
- Device has been properly installed and connected, including the connection of any remote sensors.

Procedure

1. Power-on the device.
   For an initial startup, prompts for each of the following steps appear after power-on.
2. Set the language.
   The first time the device is configured, you will be prompted to set the language. The parameter "Language" always appears in English. To change the language again (after initial setup), see parameter Language in parameter assignment chapter of the complete operating instructions.
3. Set the date and time.
   The correct date and time should be set prior to configuring the device.
4. Run the "Quick commissioning wizard" or accept the default values of the device.
   Essential parameters should be considered before using the device for the first time.
   - Choose "Yes" (recommended) to start the "Quick commissioning" wizard.
   - Choose "No", you accept the default values of the device (no sensors are configured). The next HMI view will be the operation view 1.

For any subsequent startup, after power-on, the device automatically starts in operation view. A transition screen showing first the Siemens logo and then the current firmware revision of the product is displayed while the first measurement is being processed.

- If configured, measurement values in operation view will show as dashes (----) during the startup process until a valid measurement is obtained from remote sensors.
- Measurement values in operation view will also shows dashes (----) when:
  - Level difference or Level average is configured, but one of the remote sensors is disabled,
  - A process value on point 2 is configured, but the device is a single-point version.

Before initiating a Quick start wizard to configure the device, you may wish to gather the necessary parameter values. Parameter configuration charts that list all parameters and available options for each application type are available on our website.

Go to Product page (www.siemens.com/sitransLT500).

Click "Support > Application Guides".

Record data and select from options on the chart that apply to your application, then with this data on hand, complete the quick start wizards.

6.5 Local commissioning

6.5.1 Wizard order

Procedure

The quick start wizards provide an easy step-by-step procedure to help configure the device for various applications. We recommend that configuration is done in the following order:

1. First, run the appropriate "Quick commissioning" wizard for your application (Level, Space, Distance, Volume, Volume flow).
2. Set up pumps (if applicable) via the "Pump control" wizard.
3. Configure control relays (if applicable) via the "Basic control" wizard.
4. Configure alarms (if applicable) via the "Alarm" wizard.
5. Configure totalizers and samplers (if applicable) referencing the respective parameters.

It is important that alarms and other controls are configured last to avoid pump relay assignments being overridden by the "Quick commissioning" wizard.

6.5.2 Wizards

6.5.2.1 Wizard overview

Note

Important information regarding the use of commissioning wizard

- A reset to defaults should be performed before running "Quick commissioning" wizard if the device has been used in a previous application.
- Settings for quick commissioning wizard are inter-related and changes apply only after "Apply?" is set to "Yes" in final step.
  - **Exception: All local units are set immediately in the wizard, even if the wizard is cancelled in the final step.**
- Do not use quick commissioning wizard to modify individual parameters.
  Perform customization for your application only *after* "Quick commissioning" wizard has been completed.

Note

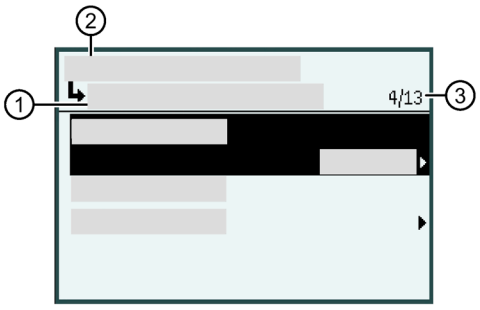
Parameter settings properly stored

In order to ensure parameter settings are properly stored in the device and to the memory card (if data logging is enabled), wait 30 seconds after any configuration change before removing power from the device.

1. From initial power up of device, after setting the language and date/time, you will be prompted to run the quick commissioning wizard. To run the wizard if this is not the initial power up, press ▶ from operation view.
2. Press ▶ to enter the "Quick start" menu, and again to start the "Quick commissioning" wizard. After reading what the wizard does in step one, press ▶ to choose a measurement point (appears only on a dual-point device), then the application for this point: Level, Space, Distance, Volume, or Volume flow.
3. Configure each parameter per step, then select "Next" to proceed. In the final step, when asked to "Apply?", choose "Yes" to save changes.
4. Next, configure a second measurement point, or "Exit" the wizard. After exiting the wizard, press ◀ button twice to return to operation view.

The wizard illustrations in this section show an overview of each commissioning wizard and of the buttons used to navigate through the wizards.

In the upper left corner of each view, the wizard name appears, followed by each step name. In the upper right corner, the view number is shown.



① Step name/Parameter name, e.g. "Units"
② Wizard name, e.g. "Quick commissioning"
③ View number/Total views in wizard, e.g. 4th view of 13

A wizard provides an easy step-by-step procedure to guide you through a quick setup of various parameters.

The following Quick start wizards are available:

- Quick commissioning
- Pump control
- Basic control
- Alarms

Use the ▲ and ▼ buttons to highlight the desired HMI wizard and press the ▶ button to enter the wizard.

The first view in each wizard (About) is a description of which settings/actions can be performed using the specific wizard.

The last view in each wizard (Apply?) allows user to apply selected settings.

Note

Parameter visibility

A full list of available parameters and settings for each are shown in the full operating instructions. However, some parameters and settings may not appear on the device, as visibility is based on the application and configuration selected.

Button	Function
◀	Leave menu without saving changes
▲	Scroll up in list of options
▼	Scroll down in list of options
▶	Select option. Confirm selection and save setting.

With the successful completion of each quick commissioning wizard, the following are set:

- Units set in the wizard are applied to device display and fieldbus
- Sensor damping is set per wizard parameter "Response rate", and all other damping (local display, current output, fieldbus) is set to zero (disabled).
- Process value per application (Level, Space, Distance, Volume, Volume flow) is set as the source for:
  - "Current output (HART)" - channel 1 (CH1) (if HART communication card installed), and "Current output 1" - channel 2 (CH2) for measurement point 1
  - "Current output 2" - channel 3 (CH3) for measurement point 2
- Process value per application are used in operation view: "View 1" and "View 3"
- Additionally, for Volume flow application:
  - Volume flow is used as the source, and sets units for totalizers
    - "Totalizer 1" (TOT1) and "Totalizer 2" (TOT2) on measurement point 1
    - "Totalizer 3" (TOT3) and "Totalizer 4" (TOT4) on measurement point 2
  - "View 2" uses Head as the source for "Totalizer 1" (TOT1)
  - "View 4" uses Head as the source for "Totalizer 3" (TOT3)

A successfully completed pump control, basic control or alarms wizard does not set any views, or other parameters, external to the wizard.

Note

Damping via commissioning wizard vs menu parameters

Upon successful completion of the wizard:

- Sensor damping is set on the supported remote sensor by wizard parameter "Response rate".
- All other damping (local display, current output, fieldbus) is set to zero (disabled).

To effect damping on a generic sensor (that is not pre-configured), or to set further damping of the device outputs, use menu parameter "Damping value" (per local display, current output, fieldbus), after completing the wizard.

- Note that this additional damping will compound the effect of any damping set by parameter "Response rate".

6.5.2.2 Quick commissioning

Quick commissioning wizards via HMI

Procedure

Quick commissioning wizard

The SITRANS LT500 provides several quick commissioning wizards that can be used for various applications.

The initial wizard steps are common for all application types. Subsequent wizard parameters will vary depending on the application you choose. For the purpose of documenting, three separate lists follow. These lists include the wizard parameters available to commission each application type (see links below).

1. From **operation view**, press ▶ button to enter **parameter view**. The first level menu "Quick start" will display. Press ▶ button to enter this menu.
2. Press ▶ button again to enter "Quick commissioning" wizard. Press ▶ button to enter **edit view** for each parameter.

   In the wizard, when there is more than one parameter per step, press ▶ button to configure each parameter, then press ▼ button to navigate to "Next" step.
3. Setup each measurement point to configure it for an application type (Level, Space, Distance, Volume, Volume flow).

   Subsequent wizard parameters will vary depending on the application you choose. See links below to step you through the wizard appropriate to your application.
4. Select "Yes" to "Apply?". This confirms all parameter changes as the final step in the quick commissioning wizard.
   For a dual-point device, complete the wizard for the second measurement point, then press "Exit" to return to **parameter view**.
5. Press ◀ button two times to return to **operation view**.

For more information about commissioning a Level, Space, or Distance application, go to Quick commissioning: Level/Space/Distance (Page 52).

For more information about commissioning a Volume application, go to Quick commissioning: Volume (Page 56).

For more information about commissioning a Volume flow application, go to Quick commissioning: Volume flow (Page 64).

Note

Important information regarding the use of commissioning wizard

- A reset to defaults should be performed before running "Quick commissioning wizard" if the device has been used in a previous application.
- Settings for quick commissioning wizard are inter-related and changes apply only after "Apply?" is set to 'Yes' in final step.
- Do not use quick commissioning wizard to modify individual parameters.
  Perform customization for your application only *after* "Quick commissioning wizard" has been completed.

Note

Output remains active

While the device is being configured, the output remains active and continues to respond to changes in the process.

Quick Commissioning wizard (menu item 1.1)

The Quick commissioning wizard will guide you through configuration of parameters essential for your application. You configure parameters essential for your application by selecting the configuration path and sub-wizards appropriate for your application.

Step: Select application

With a dual-point device, you will be prompted to set up each point individually, otherwise set the type of measurement required for the application.

This is done in the 'Select application' step.

The options available are:

- Level
- Space
- Distance
- Volume
- Volume flow

The remaining parameters to be configured in the wizard will depend on the application selected, and on the type of sensor connected.

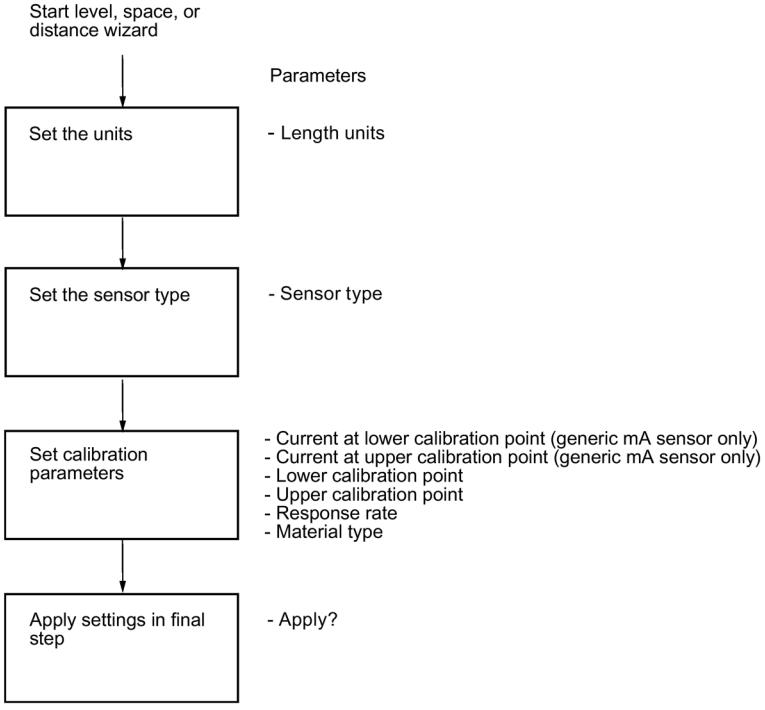
Note

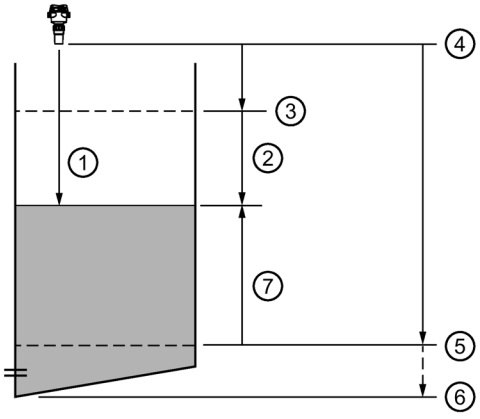
Dual-point device applications

An application setting of "Level average" or "Level difference" is only possible with a dual-point version, and must be set outside of the commissioning wizard.

- First, complete the commissioning wizard for a Level application on both points, then set the process value:
  - For the configured current output to follow "Level average" or "Level difference"
    For example, see Process value (2.4.1.4) for "Current output (HART)"
  - For a pump control application based on "Level average" or "Level difference"
    For example, see Process value (2.5.4.2) under menu "Application>Pump control"
- Next, configure the operation views to display "Level average" or "Level difference"
  For example, see 1st value (2.8.5.2) for "View 1" under menu "Local display"

Quick commissioning: Level/Space/Distance





① Distance
② Space
③ Upper calibration point
④ Sensor reference point
⑤ Lower calibration point
⑥ Far range
⑦ Level

Setting	Description	Reference point
Level	Height of material	Lower calibration point (process empty level)
Space	Distance to material surface	Upper calibration point (process full level)
Distance		Sensor reference point

Step: Length units

Note

Local units set immediately by wizard

All local units are set immediately in wizard when "Units" step completed.

- Units are an exception to the general rule for all other wizard settings: Settings for quick commissioning wizard are inter-related and changes apply only after "Apply?" is set to "Yes" in final step.
- Units for local operation are applied even if wizard is cancelled in final step. Therefore, re-run the wizard if a change must be made to units setting.

Length units

Sets the length units applied for local operation and the communication interface, on measurement point 1 and 2.

Setting	• m (meters) • cm (centimeters) • mm (millimeters) • ft (feet) • in (inches)
Default	m

Note

Process value too large to display

In some cases, it is possible that the process value is too large to show on the local display, "**#####**" will show instead.

If this occurs in a typical application:

- Adjust parameter "Units" so that a smaller value can be shown, e.g. use meters instead of millimeters.

If this occurs in a custom application:

- Adjust parameter "Custom units" so that a smaller value can be shown, e.g. use tons instead of pounds.
- Note that a change to custom units also requires a manual scaling adjustment.

Step: Sensor type

Sensor type

Sets type of sensor connected to sensor input.

Setting	• SITRANS LR110 • SITRANS LR120 • SITRANS Probe LU240 • Generic (4 ... 20 mA)
Default	The default is set to the connected sensor, or "Generic (4 ... 20 mA)" if no sensor is connected.

Note

Damping via wizard with supported remote sensor vs generic sensor

- Damping of process values in the supported remote sensor is set based on wizard parameter "Response rate".
- If a generic sensor is used, damping must be set in the sensor (pre-configured), or by using device parameter "Damping value" to effect the outputs (local display, current output, fieldbus) after completing the wizard.

Whenever the sensor (physically connected to the device) is replaced by another, a diagnostic "Sensor has changed" is shown as confirmation that the physical change of sensor was successful.

Step: Calibration

Current at lower calibration point

Sets loop current produced by the generic mA sensor when material is at lower calibration point.

Setting	4 ... 20 mA
Default	4 mA

This parameter is only visible when a generic mA sensor is connected.

Current at upper calibration point

Sets loop current produced by the generic mA sensor when material is at upper calibration point.

Setting	4 ... 20 mA
Default	20 mA

This parameter is only visible when a generic mA sensor is connected.

Lower calibration point

Sets distance from sensor reference point to lower calibration point: usually process empty level.

Setting	Sensor specific
Default	6 m

Upper calibration point

Sets distance from sensor reference point to upper calibration point: usually process full level.

Setting	Sensor specific
Default	0 m

Response rate

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

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

Setting	Slow	0.1 m/min (fill/empty rate)
	Medium	1.0 m/min (fill/empty rate)
	Fast	10.0 m/min (fill/empty rate)
Default	Slow	

Note

Rate parameters

Alarm and limit parameters for fill and empty rates work in conjunction, and are affected by parameter "Response rate" (set in the "Quick commissioning" wizard). The rate parameters automatically adjust when parameter "Response rate" is altered, but any changes made to the rate parameters following the completion of the wizard will supersede the response rate setting. See menu Rate (2.1.8).

Material type

Used to optimize performance based on material type.

Setting	• Liquid • Solid
Default	Liquid

This parameter does not appear in the quick commissioning wizard when a generic mA sensor is connected.

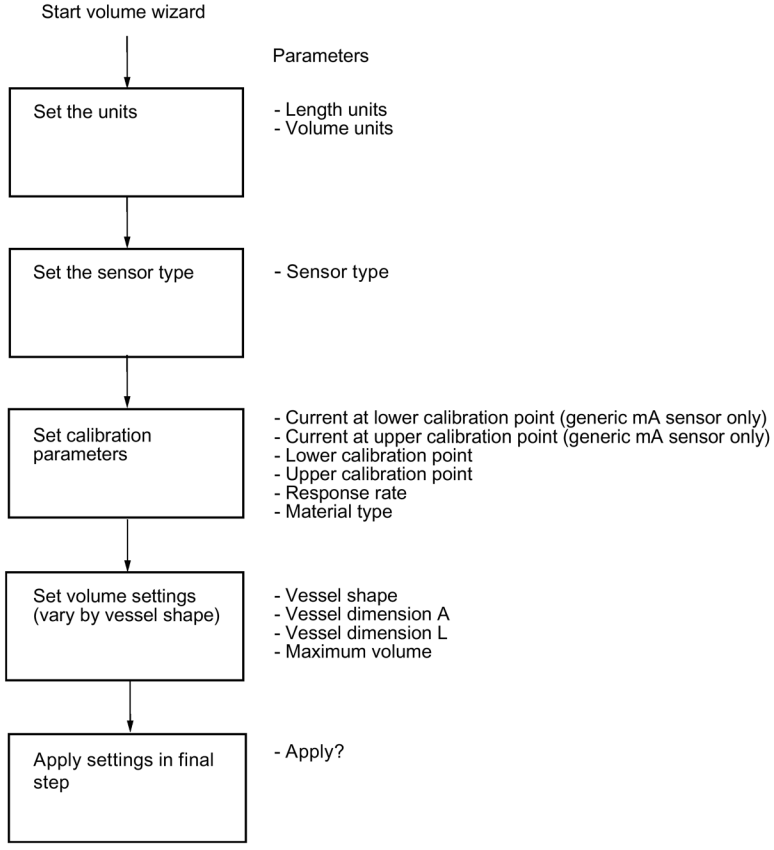
Step: Apply?

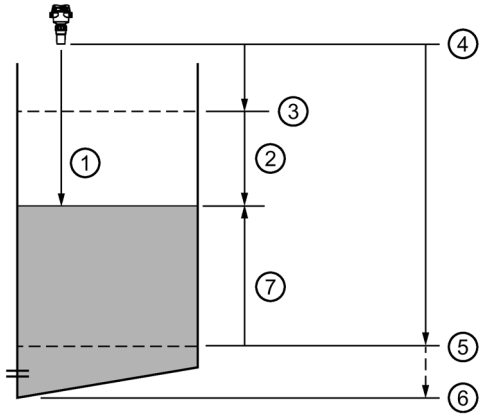
Apply?

Applies settings as last step in wizard.

Setting	Yes	Wizard completes and settings are applied.
	No	Returned to start of wizard.
Default	No	

Quick commissioning: Volume





① Distance
② Space
③ Upper calibration point
④ Sensor reference point
⑤ Lower calibration point
⑥ Far range
⑦ Level

Setting	Description	Reference point
Volume	Volume of material in Volume units (based on level)	Lower calibration point

Step: Units

Note

Local units set immediately by wizard

All local units are set immediately in wizard when "Units" step completed.

- Units are an exception to the general rule for all other wizard settings: Settings for quick commissioning wizard are inter-related and changes apply only after "Apply?" is set to "Yes" in final step.
- Units for local operation are applied even if wizard is cancelled in final step. Therefore, re-run the wizard if a change must be made to units setting.

Length units

Sets the length units applied for local operation and the communication interface, on measurement point 1 and 2.

Setting	• m (meters) • cm (centimeters) • mm (millimeters) • ft (feet) • in (inches)
Default	m

Volume units

Sets the volume units applied for local operation and the communication interface, on measurement point 1 and 2.

Setting	• l (liters) • hl (hectoliters) • m^3 (cubic meters) • gal (US gallons) • gal (UK) (imperial gallons) • bbl (US) (31.5 gallon barrels) • bbl-beer (31 US gallon barrels)	• bbl (42 US gallon barrels) • in^3 (cubic inches) • ft^3 (cubic feet) • yd^3 (cubic yards) • bu (bushels) • Custom
Default	l (liters)	

Note

Process value too large to display

In some cases, it is possible that the process value is too large to show on the local display, "**#####**" will show instead.

If this occurs in a typical application:

- Adjust parameter "Units" so that a smaller value can be shown, e.g. use meters instead of millimeters.

If this occurs in a custom application:

- Adjust parameter "Custom units" so that a smaller value can be shown, e.g. use tons instead of pounds.
- Note that a change to custom units also requires a manual scaling adjustment.

Step: Sensor type

Sensor type

Sets type of sensor connected to sensor input.

Setting	• SITRANS LR110 • SITRANS LR120 • SITRANS Probe LU240 • Generic (4 ... 20 mA)
Default	The default is set to the connected sensor, or "Generic (4 ... 20 mA)" if no sensor is connected.

Note

Damping via wizard with supported remote sensor vs generic sensor

- Damping of process values in the supported remote sensor is set based on wizard parameter "Response rate".
- If a generic sensor is used, damping must be set in the sensor (pre-configured), or by using device parameter "Damping value" to effect the outputs (local display, current output, fieldbus) after completing the wizard.

Whenever the sensor (physically connected to the device) is replaced by another, a diagnostic "Sensor has changed" is shown as confirmation that the physical change of sensor was successful.

Step: Calibration

Current at lower calibration point

Sets loop current produced by the generic mA sensor when material is at lower calibration point.

Setting	4 ... 20 mA
Default	4 mA

This parameter is only visible when a generic mA sensor is connected.

Current at upper calibration point

Sets loop current produced by the generic mA sensor when material is at upper calibration point.

Setting	4 ... 20 mA
Default	20 mA

This parameter is only visible when a generic mA sensor is connected.

Lower calibration point

Sets distance from sensor reference point to lower calibration point: usually process empty level.

Setting	Sensor specific
Default	6 m

Upper calibration point

Sets distance from sensor reference point to upper calibration point: usually process full level.

Setting	Sensor specific
Default	0 m

Response rate

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

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

Setting	Slow	0.1 m/min (fill/empty rate)
	Medium	1.0 m/min (fill/empty rate)
	Fast	10.0 m/min (fill/empty rate)
Default	Slow	

Note

Rate parameters

Alarm and limit parameters for fill and empty rates work in conjunction, and are affected by parameter "Response rate" (set in the "Quick commissioning" wizard). The rate parameters automatically adjust when parameter "Response rate" is altered, but any changes made to the rate parameters following the completion of the wizard will supersede the response rate setting. See menu Rate (2.1.8).

Material type

Used to optimize performance based on material type.

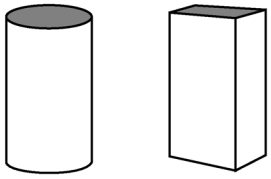
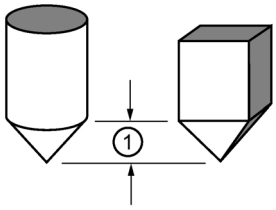
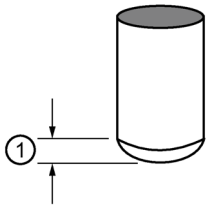
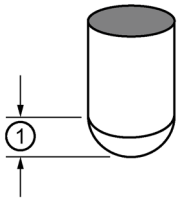
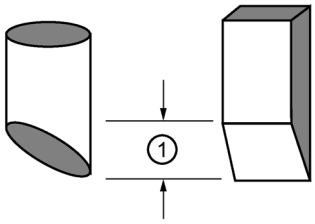
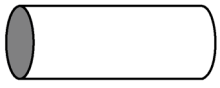
Setting	• Liquid • Solid
Default	Liquid

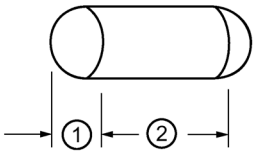
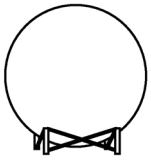
This parameter does not appear in the quick commissioning wizard when a generic mA sensor is connected.

Step: Volume setting

Vessel shape

Sets vessel shape, and allows device to calculate volume in addition to level.

	Display name/description	Vessel shape	Other parameter settings required
Setting	Linear vessel		Maximum volume
	Conical bottom vessel		Maximum volume, Vessel dimension A
	Parabolic bottom vessel		Maximum volume, Vessel dimension A
	Half sphere bottom vessel		Maximum volume, Vessel dimension A
	Flat sloped bottom vessel		Maximum volume, Vessel dimension A
	Cylinder vessel		Maximum volume

	Display name/description	Vessel shape	Other parameter settings required
	Parabolic ends vessel		Maximum volume, Vessel dimension A, Vessel dimension L
	Sphere vessel		Maximum volume
	Custom	Use for custom volume application.	
Default	Linear vessel		Maximum volume

① Vessel dimension A ② Vessel dimension L

Vessel dimension A

Sets height of vessel bottom when bottom is conical, parabolic, half spherical, or flat sloped. If horizontal parabolic ends vessel, sets depth of end.

Setting	0 ... 99999
Default	0 m

Vessel dimension L

Sets length of cylindrical section of horizontal parabolic ends vessel.

Setting	0 ... 99999
Default	0 m

Maximum volume

Sets the maximum volume of the vessel.

Enter the vessel volume corresponding to the upper calibration point.

Setting	0 ... 99999
Default	0 liters

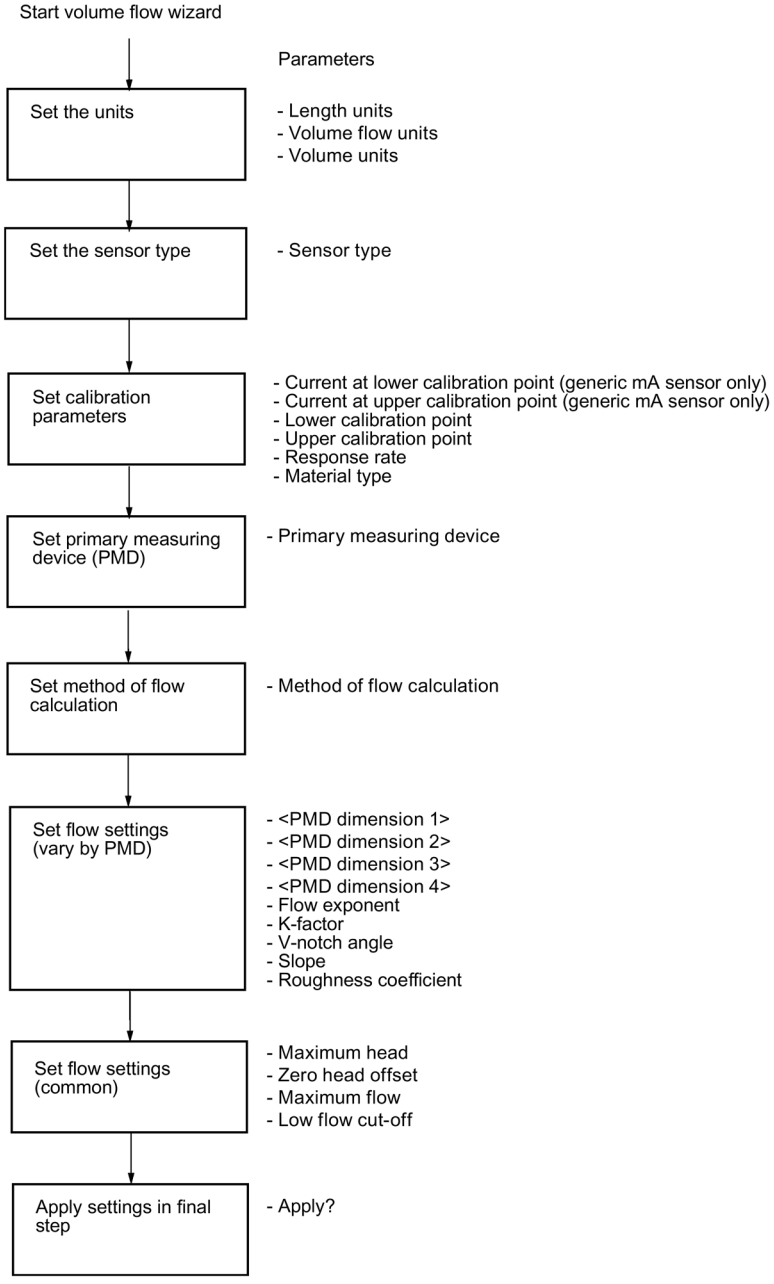
Step: Apply?

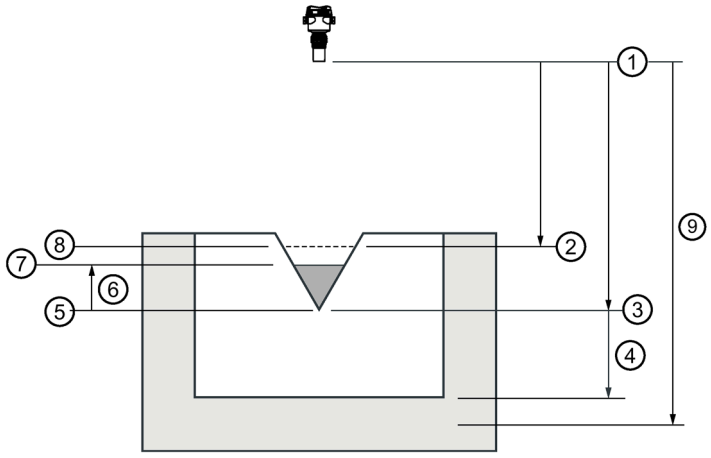
Apply?

Applies settings as last step in wizard.

Setting	Yes	Wizard completes and settings are applied.
	No	Returned to start of wizard.
Default	No	

Quick commissioning: Volume flow





① Sensor reference point
② Upper calibration point
③ Lower calibration point
④ Zero head offset
⑤ Zero head
⑥ Head
⑦ Material surface
⑧ Maximum head/Maximum flow
⑨ Far range

Setting	Description	Reference point
Volume flow	Flow rate in an open channel in Volume flow units	Zero head, zero flow

Step: Units

Note

Local units set immediately by wizard

All local units are set immediately in wizard when "Units" step completed.

- Units are an exception to the general rule for all other wizard settings: Settings for quick commissioning wizard are inter-related and changes apply only after "Apply?" is set to "Yes" in final step.
- Units for local operation are applied even if wizard is cancelled in final step. Therefore, re-run the wizard if a change must be made to units setting.

Length units

Sets the length units applied for local operation and the communication interface, on measurement point 1 and 2.

Setting	• m (meters) • cm (centimeters) • mm (millimeters) • ft (feet) • in (inches)
Default	m

Volume flow units

Sets the volume flow units applied for local operation and the communication interface, on measurement point 1 and 2.

Setting	• l/s (liters per second) • l/min (liters per minute) • l/h (liters per hour) • l/d (liters per day) • Ml/d (megaliters per day) • hl/s (hectoliters per second) • hl/min (hectoliters per minute) • hl/h (hectoliters per hour) • hl/d (hectoliters per day) • m^3/s (cubic meters per second) • m^3/min (cubic meters per minute) • m^3/h (cubic meters per hour) • m^3/d (cubic meters per day) • Mm^3/d (million cubic meters per day) • gal/s (US gallons per second) • gal/min (US gallons per minute) • gal/h (US gallons per hour) • gal/d (US gallons per day) • Mgal/d (US megagallons per day) • gal (UK)/s (imperial gallons per second) • gal (UK)/min (imperial gallons per minute) • gal (UK)/h (imperial gallons per hour) • gal (UK)/d (imperial gallons per day) • bbl-beer/s (31 US gallon barrels per second) • bbl-beer/min (31 US gallon barrels per minute) • bbl-beer/h (31 US gallon barrels per hour) • bbl-beer/d (31 US gallon barrels per day) • bbl/s (42 US gallon barrels per second) • bbl/min (42 US gallon barrels per minute)	• bbl/h (42 US gallon barrels per hour) • bbl/d (42 US gallon barrels per day) • kbbl/d (thousand 42 US gallon barrels per day) • Mbbl/d (million 42 US gallon barrels per day) • bbl (US)/s (31.5 US gallon barrels per second) • bbl (US)/min (31.5 US gallon barrels per minute) • bbl (US)/h (31.5 US gallon barrels per hour) • bbl (US)/d (31.5 US gallon barrels per day) • ft^3/s (cubic feet per second) • ft^3/min (cubic feet per minute) • ft^3/h (cubic feet per hour) • ft^3/d (cubic feet per day) • Mft^3/d (million cubic feet per day) • AF/min (acre-feet per minute) • AF/h (acre-feet per hour) • AF/d (acre-feet per day) • in^3/s (cubic inches per second) • in^3/min (cubic inches per minute) • in^3/h (cubic inches per hour) • in^3/d (cubic inches per day) • yd^3/s (cubic yards per second) • yd^3/min (cubic yards per minute) • yd^3/h (cubic yards per hour) • yd^3/d (cubic yards per day) • bu/s (bushels per second) • bu/min (bushels per minute) • bu/h (bushels per hour) • bu/d (bushels per day) • custom
Default	l/s (liters per second)	

Volume units

Sets the volume units for totalizers, applied for local operation and the communication interface.

- For measurement point 1, volume units are set for totalizer 1 and 2.
- For measurement point 2, volume units are set for totalizer 3 and 4.

Setting	• l (liters) • hl (hectoliters) • m^3 (cubic meters) • gal (US gallons) • gal (UK) (imperial gallons) • bbl (US) (31.5 gallon barrels) • bbl-beer (31 US gallon barrels)	• bbl (42 US gallon barrels) • in^3 (cubic inches) • ft^3 (cubic feet) • yd^3 (cubic yards) • bu (bushels) • Custom
Default	l (liters)	

Note

Process value too large to display

In some cases, it is possible that the process value is too large to show on the local display, "**#####**" will show instead.

If this occurs in a typical application:

- Adjust parameter "Units" so that a smaller value can be shown, e.g. use meters instead of millimeters.

If this occurs in a custom application:

- Adjust parameter "Custom units" so that a smaller value can be shown, e.g. use tons instead of pounds.
- Note that a change to custom units also requires a manual scaling adjustment.

Step: Sensor type

Sensor type

Sets type of sensor connected to sensor input.

Setting	• SITRANS LR110 • SITRANS LR120 • SITRANS Probe LU240 • Generic (4 ... 20 mA)
Default	The default is set to the connected sensor, or "Generic (4 ... 20 mA)" if no sensor is connected.

Note

Damping via wizard with supported remote sensor vs generic sensor

- Damping of process values in the supported remote sensor is set based on wizard parameter "Response rate".
- If a generic sensor is used, damping must be set in the sensor (pre-configured), or by using device parameter "Damping value" to effect the outputs (local display, current output, fieldbus) after completing the wizard.

Whenever the sensor (physically connected to the device) is replaced by another, a diagnostic "Sensor has changed" is shown as confirmation that the physical change of sensor was successful.

Step: Calibration

Current at lower calibration point

Sets loop current produced by the generic mA sensor when material is at lower calibration point.

Setting	4 ... 20 mA
Default	4 mA

This parameter is only visible when a generic mA sensor is connected.

Current at upper calibration point

Sets loop current produced by the generic mA sensor when material is at upper calibration point.

Setting	4 ... 20 mA
Default	20 mA

This parameter is only visible when a generic mA sensor is connected.

Lower calibration point

Sets distance from sensor reference point to lower calibration point: usually process empty level.

Setting	Sensor specific
Default	6 m

Upper calibration point

Sets distance from sensor reference point to upper calibration point: usually process full level.

Setting	Sensor specific
Default	0 m

Response rate

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

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

Setting	Slow	0.1 m/min (fill/empty rate)
	Medium	1.0 m/min (fill/empty rate)
	Fast	10.0 m/min (fill/empty rate)
Default	Slow	

Note

Rate parameters

Alarm and limit parameters for fill and empty rates work in conjunction, and are affected by parameter "Response rate" (set in the "Quick commissioning" wizard). The rate parameters automatically adjust when parameter "Response rate" is altered, but any changes made to the rate parameters following the completion of the wizard will supersede the response rate setting. See menu Rate (2.1.8).

Material type

Used to optimize performance based on material type.

Setting	• Liquid • Solid
Default	Liquid

This parameter does not appear in the quick commissioning wizard when a generic mA sensor is connected.

Step: Primary measuring device

Primary measuring device (PMD)

Sets the type of primary measuring device (PMD) used.

Setting	• Exponential devices • Rectangular flume BS 3680/ISO 4373 • Round nose horizontal crest weir BS 3680/ISO 4373 • Trapezoidal flume BS 3680/ISO 4373 • U-flume BS 3680/ISO 4373 • Finite crest weir BS 3680/ISO 4373 • Thin plate rectangular weir BS 3680/ISO 4373 • Thin plate V-notch weir BS 3680/ISO 4373 • Rectangular weir contracted • Round pipe • Palmer-Bowlus flume • H-flume • Custom
Default	Exponential devices

If PMD is not listed, set to "Custom" and use a volume flow calculation.

Step: Method of flow calculation

Method of flow calculation

Sets method of flow calculation.

Setting	• Absolute • Ratiometric
Default	Absolute

Set this parameter to "Ratiometric" only if the primary measuring device (PMD) supports ratiometric calculations. (Note that Palmer Bowlus Flume and H-Flume support ratiometric calculations only.) For more details on absolute and ratiometric calculations.

Step: Flow settings (vary by PMD)

Note

Two parts to "Step: Flow settings" (vary by PMD)

Part 1 - The dimensions (one to four), based on the selected PMD, are set.

Part 2 - Other required flow settings, based on the selected PMD, are set.

Only the settings required for the selected PMD are visible in the wizard on the HMI.

Step: Flow settings (common)

Maximum head (2.5.6.4.)

Sets the maximum head value associated with the PMD and works in conjunction with parameter "Maximum flow" for ratiometric calculations.

Setting	0 ... 9999999
Default	6 m

Zero head offset (2.5.6.7.)

Sets the difference (positive) between the lower calibration point and zero head (level at zero flow).

Setting	0 ... 9999999
Default	0 m

The value for this parameter is set automatically based on the configuration applied in the quick commissioning wizard.

Maximum flow (2.5.6.6.)

Sets the maximum flowrate associated with value in parameter "Maximum head".

Setting	0 ... 9999999
Default	100 l/s

Low flow cutoff (2.5.6.9.)

Sets the flow limit for low flow cut-off. Flow values below this limit are forced to zero.

Setting	0 ... 9999999
Default	0 l/s

Step: Apply?

Apply?

Applies settings as last step in wizard.

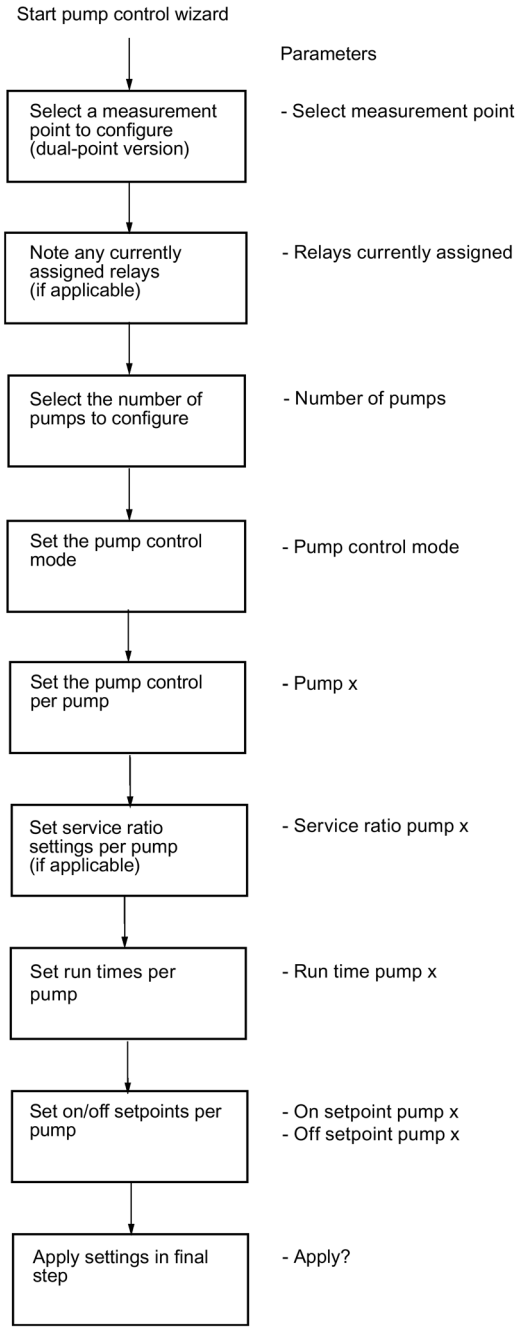
Setting	Yes	Wizard completes and settings are applied.
	No	Returned to start of wizard.
Default	No	

Note

Head calibration can improve accuracy

It is strongly recommended that a zero head calibration be performed after completion of the wizard to ensure best accuracy.

6.5.2.3 Pump control



Step: About

Provides step-by-step procedure to configure the control of one or more pumps.

This is the first step in the wizard.

Step: Select measurement point

Select measurement point

Sets the measurement point to be configured for pump control function.

This step will not appear on a single-point device.

Setting	• Measurement point 1 • Measurement point 2 • Exit
Default	Measurement point 1

Step: Relays currently assigned

Relays currently assigned

Displays any relays that are currently configured for other applications, as a reference of relay availability for the pump control function.

This step does not appear if no relays are configured for other applications.

Step: Numbers of pumps

Number of pumps

Sets the number of pumps to configure.

Setting	• 1 • 2 • 3 • 4 • 5 • 6
Default	2

Pump control mode

Pump control mode

Sets the control algorithm used to activate the relay.

Setting	• Alternate duty assist • Alternate duty backup • Service ratio duty assist • Service ratio duty backup • Fixed duty assist • Fixed duty backup
Default	Alternate duty assist

This step is only visible if previous step "Number of pumps" is set to a value greater than one.

Pump control

Note

Step is repeated per pump

The parameters in this step will need to be set for each pump used in the application.

Pump 1

Sets relay assigned to pump.

Setting	• Relay output 1 • Relay output 2 • Relay output 3 • Relay output 4 • Relay output 5 • Relay output 6
Default	Not applicable

⚠ CAUTION

Relay conflicts

If relays are assigned to another application, notification is present at the start of the wizard, but assigned relays remain available here. If a pump is assigned in the wizard to one of these relays, the assignment from the wizard will be used.

- When wizard settings are applied in the final step, any relays configured by the pump control wizard are assigned as needed, including disabling another application if there is a relay conflict.
- If an assignment is made in error, continue to the end of the wizard and select "No" in the final step "Apply?". Then re-run the wizard. (Selecting "Yes" to apply the wizard settings in this scenario, means the application will be incorrect and pumps may be assigned to relays incorrectly.)

Service ratios

Note

Step is repeated per pump

The parameter in this step will need to be set for each pump used in the application.

This step is only visible if pump control mode is set to "Service ratio duty assist" or "Service ratio duty backup".

Service ratio pump 1

Sets pump usage based on run time ratio rather than last pump used.

Setting	0 ... 255
Default	1

Pump run times

Note

Step is repeated per pump

The parameter in this step will need to be set for each pump used in the application.

This step is only visible if pump control mode is set to "Service ratio duty assist" or "Service ratio duty backup".

Runtime pump 1

Sets the amount of time the pump has been in operation.

Setting	hhhh: 0...99999 mm: 0...59
Default	0 h

Enter the run time of an existing pump to be used in this application. Leave as default of zero hours if using a new pump that has never run.

The value entered here is written to parameter "Runtime relay x" (found in menu "Pump control" (3.4.4.)), where 'x' refers to the relay assigned to the pump being configured here. If any value has been previously set in "Runtime relay x", it will be displayed here, and any value written by the wizard will supersede other values upon completion of the wizard.

Step: On/off setpoints

Note

Step is repeated per pump

The parameters in this step will need to be set for each pump used in the application.

Note

On/Off setpoints per application

The setpoints must be set correctly for the application:

- For a pump down application, *all* of the off setpoints must be less than *all* of the on setpoints,
- For a pump up application, *all* of the on setpoints must be less than *all* of the off setpoints.

On setpoint pump 1

Sets the level at which pump turns on.

Setting	-99999 ... 99999
Default	0 m

Off setpoint pump 1

Sets the level at which pump turns off.

Setting	-99999 ... 99999
Default	0 m

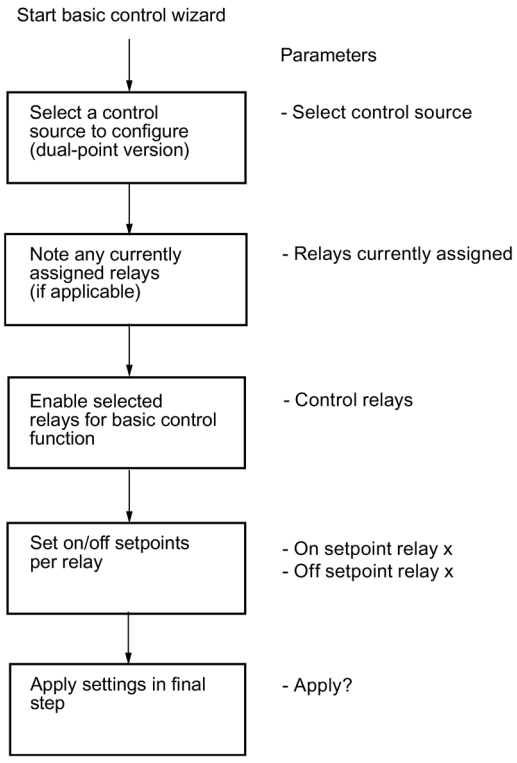
Step: Apply?

Apply?

Applies settings as last step in wizard.

Setting	Yes	Wizard completes and settings are applied.
	No	Returned to start of wizard.
Default	No	

6.5.2.4 Basic control



Step: About

Provides step-by-step procedure to configure the control of one or more relays based on a measurement.

This is the first step in the wizard.

Step: Select control source

Select control source

Sets the control source to be configured for a basic control application.

This step will not appear on a single-point device.

Setting	• Level (point 1) • Level (point 2) • Level difference • Level average • Exit
Default	Level (point 1)

Step: Relays currently assigned

Relays currently assigned

Displays any relays that are currently configured for other applications, as a reference of relay availability for the basic control function.

This step does not appear if no relays are configured for other applications.

Step: Control relays

Control relays

Enables selected relays for basic control function.

Deselecting an already programmed relay will disable it.

Setting	[ ] Relay output 1 [ ] Relay output 2 [ ] Relay output 3 [ ] Relay output 4 [ ] Relay output 5 [ ] Relay output 6
Default	[X] indicates enabled by default [ ] indicates disabled by default

Step: On/off setpoints

Note

Step is repeated per relay

The parameters in this step will need to be set for each relay used in the application.

On setpoint relay 1

Sets the level at which the relay turns on.

Setting	-99999 ... 99999
Default	0.0 m

Off setpoint relay 1

Sets the level at which the relay turns off.

Setting	-99999 ... 99999
Default	0.0 m

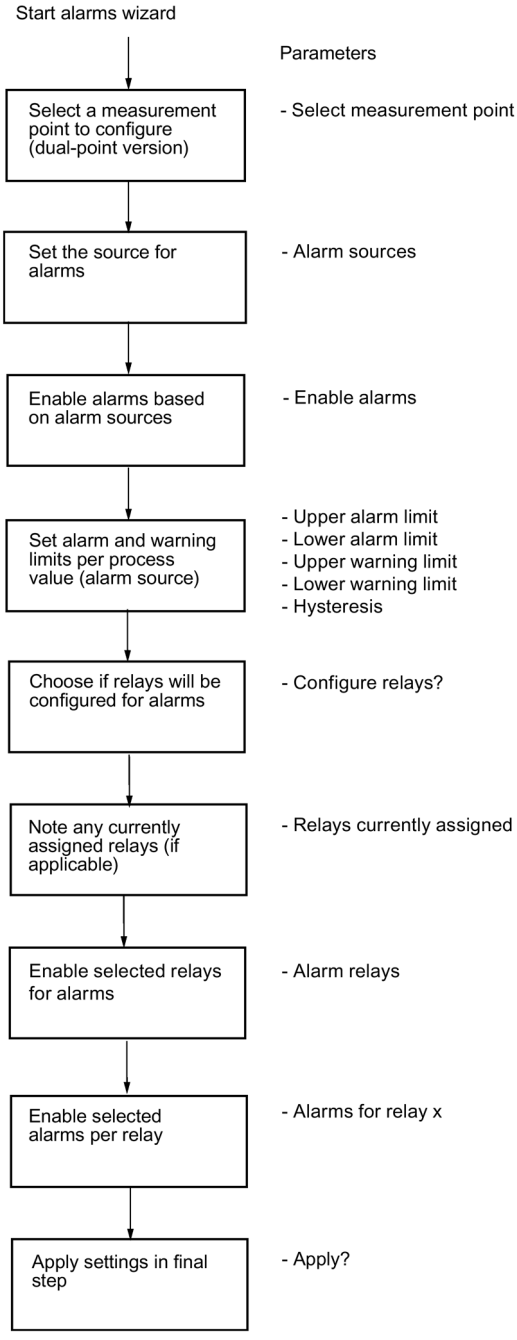
Step: Apply?

Apply?

Applies settings as last step in wizard.

Setting	Yes	Wizard completes and settings are applied.
	No	Returned to start of wizard.
Default	No	

6.5.2.5 Alarms



Step: About

Provides step-by-step procedure to configure alarms.

This is the first step in the wizard.

Step: Select measurement point

Select measurement point

Sets the measurement point to be configured for alarms.

This step will not appear on a single-point device.

Setting	• Measurement point 1 • Measurement point 2 • Exit
Default	Measurement point 1

Step: Alarm sources

Alarm sources

Sets the source for alarms.

Select setting "Sensor diagnostics" for LOE.

Setting	• Level • Space • Distance • Head • Volume • Volume flow • Sensor temperature • Sensor diagnostics
Default	Not applicable

The list of process values available in this step is based on any configuration completed via "Quick commissioning" wizards prior to running this wizard. For example, if a level application is configured via the quick commissioning wizard, only the setting "Level" will be available in this step. To set alarms for other process values, see menu Process values (2.2) (after completing the alarms wizard).

Select the setting "Sensor diagnostics" to configure alarms based on a pre-defined list of diagnostics:

	Measurement point 1	**Measurement point 2**
Sensor diagnostic message	**Diagnostic ID**	**Diagnostic ID**
Sensor not found.	0	22
Sensor not supported.	1	23
Loss of echo.	12	34
Sensor hardware failure (digital).	13	35
Sensor failure (digital).	14	36
Sensor failure (analog).	19	41

Step: Enable alarms

Enable alarms

Enables alarms based on alarm sources.

	Measurement point 1	**Measurement point 2**
Setting	[ ] 320 Level (point 1) above alarm limit	[ ] 340 Level (point 1) above alarm limit
	[ ] 321 Level (point 1) above warning limit	[ ] 341 Level (point 1) above warning limit
	[ ] 322 Level (point 1) below warning limit	[ ] 342 Level (point 1) below warning limit
	[ ] 323 Level (point 1) below alarm limit	[ ] 343 Level (point 1) below alarm limit
	[ ] 324 Space (point 1) above alarm limit	[ ] 344 Space (point 1) above alarm limit
	[ ] 325 Space (point 1) above warning limit	[ ] 345 Space (point 1) above warning limit
	[ ] 326 Space (point 1) below warning limit	[ ] 346 Space (point 1) below warning limit
	[ ] 327 Space (point 1) below alarm limit	[ ] 347 Space (point 1) below alarm limit
	[ ] 328 Distance (point 1) above alarm limit	[ ] 348 Distance (point 1) above alarm limit
	[ ] 329 Distance (point 1) above warning limit	[ ] 349 Distance (point 1) above warning limit
	[ ] 330 Distance (point 1) below warning limit	[ ] 350 Distance (point 1) below warning limit
	[ ] 331 Distance (point 1) below alarm limit	[ ] 351 Distance (point 1) below alarm limit
	[ ] 336 Head (point 1) above alarm limit	[ ] 356 Head (point 1) above alarm limit
	[ ] 337 Head (point 1) above warning limit	[ ] 357 Head (point 1) above warning limit
	[ ] 338 Head (point 1) below warning limit	[ ] 358 Head (point 1) below warning limit
	[ ] 339 Head (point 1) below alarm limit	[ ] 359 Head (point 1) below alarm limit
	[ ] 332 Volume (point 1) above alarm limit	[ ] 352 Volume (point 1) above alarm limit
	[ ] 333 Volume (point 1) above warning limit	[ ] 353 Volume (point 1) above warning limit
	[ ] 334 Volume (point 1) below warning limit	[ ] 354 Volume (point 1) below warning limit
	[ ] 335 Volume (point 1) below alarm limit	[ ] 355 Volume (point 1) below alarm limit
	[ ] 100 Volume flow (point 1) above alarm limit	[ ] 360 Volume flow (point 1) above alarm limit
	[ ] 101 Volume flow (point 1) above warning limit	[ ] 361 Volume flow (point 1) above warning limit
	[ ] 102 Volume flow (point 1) below warning limit	[ ] 362 Volume flow (point 1) below warning limit
	[ ] 103 Volume flow (point 1) below alarm limit	[ ] 363 Volume flow (point 1) below alarm limit
	[ ] 108 Sensor temperature (point 1) above alarm limit	[ ] 364 Sensor temperature (point 1) above alarm limit
	[ ] 109 Sensor temperature (point 1) above warning limit	[ ] 365 Sensor temperature (point 1) above warning limit
	[ ] 110 Sensor temperature (point 1) below warning limit	[ ] 366 Sensor temperature (point 1) below warning limit
	[ ] 111 Sensor temperature (point 1) below alarm limit	[ ] 367 Sensor temperature (point 1) below alarm limit
Default	[X] indicates enabled by default [ ] indicates disabled by default	

The alarms available in this step are based on process values selected in "Step: Alarm sources".

Step: <Process value> limits

Note

Step is repeated per process value

The parameters in this step need to be set for each process value selected as an alarm source.

All related parameters are shown below for the "Level" process value.

Settings and defaults for the limit parameters can be found in the menu Process values (2.2).

Level limits

Upper alarm limit

Sets the upper alarm limit. A diagnostic is generated if the process value exceeds this limit.

Setting	-99999 ... 99999
Default	6.0 m

Lower alarm limit

Sets the lower alarm limit. A diagnostic is generated if the process value falls below this limit.

Setting	-99999 ... 99999
Default	0.0 m

Upper warning limit

Sets the upper warning limit. A diagnostic is generated if the process value exceeds this limit.

Setting	-99999 ... 99999
Default	6.0 m

Lower warning limit

Sets the lower warning limit. A diagnostic is generated if the process value falls below this limit.

Setting	-99999 ... 99999
Default	0.0 m

Hysteresis

Sets hysteresis for alarm and warning limits. Hysteresis is distance between limits for activation and deactivation of an alarm/warning.

Setting	0 ... 99999
Default	0.1 m

Step: Configure relays?

Configure relays?

Allows user to configure relays if required for application.

Select "Yes" to assign a relay output to the alarm. Select "No" to configure alarms only for the local display, communication interface, and diagnostic log.

Setting	Yes	Continue to next step to configure relays.
	No	Skip step to configure relays, and go to last step in wizard.
Default	Yes	

NOTICE

Relay configuration overwritten by Alarms wizard

It is recommended to complete the wizard prior to any manual parameter adjustments, as relay settings configured in the Alarms wizard will supercede any relay settings previously configured outside of the wizard.

Step: Relays currently assigned

Relays currently assigned

Displays any relays that are currently configured for other applications, as a reference of relay availability for the alarms.

This step does not appear if no relays are configured for other applications.

⚠ CAUTION

Relay conflicts

Notification of relays assigned to other applications is given here, but assigned relays remain available for alarms. If one of these relays is assigned in the next step, the assignment from this wizard is used.

- When wizard settings are applied in the final step, any relays configured by the alarms wizard are assigned as needed, including disabling another application if there is a relay conflict.
- If an assignment is made in error, continue to the end of the wizard and select "No" in the final step ("Apply?"). Then re-run the wizard. (Selecting "Yes" to apply the wizard settings in this scenario, means the application will be incorrect and relays may be configured incorrectly.)

Step: Alarm relays

Alarm relays

Enables selected relays for alarms.

Setting	[ ] Relay output 1 [ ] Relay output 2 [ ] Relay output 3 [ ] Relay output 4 [ ] Relay output 5 [ ] Relay output 6
Default	[X] indicates enabled by default * [ ] indicates disabled by default

* Upon entering this step, relays will appear as enabled if they are currently assigned to any alarm or diagnostic on the current measurement point. Deselecting an already programmed relay will disable it.

Step: Alarms for relay 1

Note

Step is repeated per selected relay

This parameter must be set for each relay selected in "Step: Alarm relays".

Only the parameter for relay 1 is shown here as an example.

Alarms for relay 1

Enables selected alarms per relay.

List of available alarms is based on selections in "Step: Enable alarms", and if "Sensor diagnostics" was enabled in "Step: Alarm sources".

All alarms are disabled by default, and as each alarm is enabled for the current relay, it is no longer available for the next relay in this step.

Selections made here, including those made to a relay already configured for another application, will take effect when the wizard is completed.

Step: Apply?

Apply?

Applies settings as last step in wizard.

Setting	Yes	Wizard completes and settings are applied.
	No	Returned to start of wizard.
Default	No	

Service and maintenance 7

7.1 Basic safety notes

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

NOTICE
Penetration of moisture into the device Damage to device. • Make sure when carrying out cleaning and maintenance work that no moisture penetrates the inside of the device.

7.2 Cleaning

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.

7.3 Maintenance and repair work

WARNING

Impermissible repair of the device

- Repair must be carried out by Siemens authorized personnel only.

CAUTION

Hazardous voltage at open device

Risk of electric shock when the enclosure is opened or enclosure parts are removed.

- Before you open the enclosure or remove enclosure parts, de-energize the device.
- If maintenance measures in an energized state are necessary, observe the particular precautionary measures. Have maintenance work carried out by qualified personnel.

7.3.1 Replacing memory card

Procedure

1. Use parameter Connect/disconnect (3.7.2.2) to enable the MSD function. This step ensures no further writing to the card from the device (e.g. data logging) is permitted.
2. Isolate the device from power.
3. Open the device lid: Loosen six screws on lid. Lift lid up and to the left on its hinges.
4. Remove the memory card by pressing and releasing it.

   Recommended: Insert card that was removed into a PC and make a backup of all files.
5. Insert the replacement memory card, close the device lid, and reconnect power to device.

Value for parameter Installed (3.7.1), will display "Yes" when memory card is installed properly.

Note

Diagnostic may result when replacing memory card

- If memory card is replaced with a blank card, no diagnostic is displayed.
- If memory card is replaced with a card from another device, diagnostic ID 151 displays. This diagnostic is a notice that configurations can be copied from one device to another without overwriting data. When the memory card is once again inserted into the original device, the data is unchanged, and the memory card works with the original device.

7.4 Firmware update

Procedure

Note

Authorized personnel required

A firmware update is to be performed only by authorized and trained service personnel.

Note

Device restart required

A device restart will occur during the firmware update process.

1. Download the latest available firmware bundle from Product page (www.siemens.com/sitransLT500).
2. Save the firmware bundle to the memory card.
3. Log in to the device with access level "Expert". (See Access control in the operating chapter of the full operating instructions).
   By default, security is disabled, so must first be enabled before login with expert access level.

   Note

   Disable mass storage device (MSD) setting before firmware update

   If service cable is connected at this point, MSD should be disabled in parameter Connect/disconnect (3.7.2.2) to allow firmware update.
4. Navigate to parameter Firmware updated 3.13.
5. Select the firmware bundle version (saved in step 2) and press ▶ button. The firmware update will initiate, with a status message shown on the local display when update is complete.
6. Press ▶ button to return to operation view.

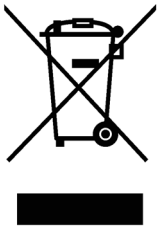
7.5 Return procedure

To return a product to Siemens, see Returns to Siemens (www.siemens.com/returns-to-siemens).

Contact your Siemens representative to clarify if a product is repairable, and how to return it. They can also help with quick repair processing, a repair cost estimate, or a repair report/cause of failure report.

NOTICE
Decontamination The product may have to be decontaminated before it is returned. Your Siemens contact person will let you know for which products this is required.

7.6 Disposal



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

Devices can be returned to the supplier within the EC and UK, or to a locally approved 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/)

Note

Special disposal required

The device includes components that require special disposal.

- Dispose of the device properly and environmentally through a local waste disposal contractor.

Technical specifications

8

Note

Device specifications

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

CAUTION

Impaired protection

The device is to be used only in the manner outlined in this instruction manual or protection provided by the equipment may be impaired.

Note

Device-specific approvals

Always refer to nameplates on the device for device-specific approvals.

8.1 Power

AC version	• 100 to 230 V AC ±15%, 50/60 Hz, 36 VA (17W) [1)] • Fuse: 2 AG, Slow Blow, 0.375 A, 250 V
DC version	• 12 to 30 V DC, 20 W [1)] • Fuse: 2 AG, Slow Blow, 2A, 250 V

[1)] Power consumption is listed at maximum.

8.2 Performance

Measurement rate	• 1/second
Remote sensor polling rate	• HART sensor mode: 1 Hz (Supported sensor) • Analog sensor mode: > 1 Hz (Generic mA sensor)
Memory	• Capacity: 8 GB (micro SD card shipped with device) • File system support: FAT32 / 8.3

Note

Memory card functions support

Only the supplied microSD card is supported for backup, restore, logging, and firmware update.

8.3 User Interfaces

Configuration	Local buttons	
Display (local)	Advanced graphical liquid crystal display	
Connectors	• USB Service port – USB version: V2.0 – USB socket: Mini-B • Accessory port	USB port used for SIMATIC PDM/SITRANS DTM, FW update, Data log extract

8.4 Outputs

mA analog active output	
• Single-point version includes one mA output • Dual-point version includes two mA outputs	• 0 to 20 mA • 4 to 20 mA • Accuracy – ± 20 uA, over 3.5 to 22.6 mA – ± 40 uA, below 3.5 mA • Resolution 3 uA, over 0.1 to 22.6 mA maximum • 750 ohm maximum • Isolated (500 V DC)
Relays [1]	
• Six, maximum [2]	• 4 control • 2 alarm control • All relays rated 5A at 250 V AC, non-inductive
Control relay	4 Form A, NO relay (numbers 1, 2, 4, 5)
Alarm relay	2 Form C, NO, or NC relay (numbers 3, 6)
Optional analog channel on the HART communication card	0 to 20 mA without HART 4 to 20 mA with HART: • Passive - 14 to 30 V (at the terminals), 500 ohm maximum • Active - 350 ohm maximum

[1] All relays are certified only for use with equipment that fails in a state at or under the rated maximums of the relays.

[2] Orderable with 1, 3, or 6 relays

8.5 Inputs

Remote sensor • Single-point version includes one input • Dual-point version includes two inputs Sensor power is always supplied by the LT500.	Terminal voltage:	• Maximum 26 V, Minimum 18 V (0 ... 22.6 mA)
	Wiring:	2 conductor, twisted, shielded, 0.5 ... 0.75 mm^2 (22 ... 18 AWG)
	Maximum cable length:	500 m (1640.42 ft)
	Sensor input communication:	• Active 4 to 20 mA • HART protocol for supported sensors See "Supported remote sensors" below.
	4 ... 20 mA sensor input:	
	• Resolution	0.025 % of full scale
	• Accuracy	0.1 % of full scale
	HART sensor input:	Resolution and accuracy are dependent on connected sensor
Digital (2)	Switching threshold, low	Logical 0 = 0 ... 0.5 V DC
	Switching threshold, high	Logical 1 = 10 ... 50 V DC
	Input current	3 mA maximum draw
	Bias voltage	24 V

Supported remote sensors

- SITRANS Probe LU240 Ultrasonic level sensor
- SITRANS LR110 Radar level sensor
- SITRANS LR120 Radar level sensor
- Generic (analog only, no HART) sensor (passive output)

Note

No external resistance should be added to remote sensor input

An internal 250 ohm resistor exists in the device. To use SIMATIC PDM, connect across remote sensor inputs.

8.6 Construction

Enclosure	
• Wall mount	• 240 mm (9.5 inch) x 175 mm (6.9 inch). Width dimension includes hinges. • Type 4X/NEMA 4X/IP65 [1)] • Polycarbonate
• Panel mount	• 278 mm (10.93 inch) x 198 mm (7.8 inch), width dimension includes flange. • Type 3/NEMA 3/IP54 • Polycarbonate
Display	Backlit HMI LCD display
Cable	• mA output cable to be two copper conductors, twisted shielded wire, 300 VAC, 0.324 ... 0.823 mm^2 (22 ... 18 AWG), nominal capacitance between adjacent conductors @ 1 kHz = 62.3 pF/m (19 pF/ft), nominal capacitance between conductor and shield @ 1 kHz = 108.3 pF/m (33 pF/ft) (Belden [2)] 8760 is acceptable)
Weight	• Wall mount: 1.22 kg (2.68 lb) • Panel mount: 1.35 kg (2.97 lb)

[1)] Use appropriate cable gland/conduit seal to maintain TYPE/IP ratings.

[2)] Belden is a registered trademark of Belden Wire & Cable Company.

8.7 Operating conditions

Location	Indoor/outdoor	
Altitude	2000 m (6,562 ft) maximum	
Vibration resistance	0.5 g at frequencies from 10 Hz to 100 Hz	
Bump/shock resistance	25 g	
Ambient temperature	Storage	-20 to +50 °C (-5 to +122 °F)
	Operating	-20 to +50 °C (-5 to +122 °F)
Relative humidity	• Wall mount: suitable for outdoor (TYPE 4X, IP65 enclosure) • Panel mount: suitable for outdoor (TYPE 3, IP54 enclosure)	
Installation category	II	
Pollution degree	4	

8.8 Communication

Communication type	Optional [1]: • HART [2] • Modbus RTU • PROFIBUS PA • PROFIBUS DP • PROFINET

[1] For a complete list of available communication cards, see latest catalog information at Product page (www.siemens.com/sitransLT500).

[2] Under severe EMI/EMC environments per IEC 61326-1, the accuracy on the HART Fieldbus mA output may decrease to a maximum of ± 250uA.

HART	**Version: 7.5**
Physical layer	HART Physical layer (2 wire half duplex, HART FSK)
Connections	See HART (Page 36)
Termination	Not applicable
Application	General purpose
Device address	0 to 63 (Set via communication or HMI)
Data rate	1.2 Kbps
Data bits	Always 8
Parity	Odd parity, 1 stop bit
Byte order	MSB

Note

Replacing HART card

The HART long address is bound to the specific card installed. If this card is replaced the master system will need to be updated.

Modbus RTU	**Version: V1.1B3**
Physical layer	EIA-RS485 (2 wire half duplex)
Connections	See Modbus RTU (Page 38)
Termination	External 120R resistor across Fieldbus connections 35 and 36
Application	General purpose
Device address	Set by Modbus or HMI range from 1 to 247
Data rate	1.2 Kbps
	2.4 Kbps
	4.8 Kbps
	9.6 Kbps
	19.2 Kbps (default)
	38.4 Kbps
	57.6 Kbps
	76.8 Kbps
	115.2 Kbps
Data bits	Always 8
Parity	Even parity, 1 stop bit (default)
	Odd parity, 1 stop bit
	No parity, 2 stop bits
	No parity, 1 stop bit
Byte order	Byte order adjustable via Modbus or HMI, default Big endian

PROFIBUS PA	**Version: Profile for Process Control Devices 4.01**
Physical layer	MBP (2 wire half duplex), IEC 61158-2
Connections	See PROFIBUS PA/DP (Page 40)
Termination	To be provided externally
Application	General purpose
Device address	0 to 126 (Set via communication or HMI)
Data rate	31.25 Kbps
Data bits	Always 8
Parity	Even parity, 1 stop bit
Byte order	MSB
Bus loading	10 mA

PROFIBUS DP	**Version: Profile for Process Control Devices 4.01**
Physical layer	EIA-RS485 (2 wire half duplex)
Connections	See PROFIBUS PA/DP (Page 40)
Termination	All DIP switches 'On' to enable internal terminations
Application	General purpose
Device address	0 to 126 (Set via communication or HMI)
Data rate	9.6 Kbps
	19.2 Kbps
	93.75 Kbps
	187.5 Kbps
	0.5 Mbps
	1.5 Mbps
	3 Mbps
	6 Mbps
	12 Mbps
Data bits	Always 8
Parity	Even parity, 1 stop bit
Byte order	MSB
Bus loading	10 mA

PROFINET	**Version: Profile for Process Control Devices 4.01**
Profile 4	Ready
Physical layer	1 Port, SDMA/CD 100Base-TX Ethernet (IEEE 802.3)
Connections	See PROFINET (Page 40)
Class	B
Redundant mode	S2 support
Application	General purpose
Device address	Station name: sitrans-lt500-pbd-xxxxxxxx
Network settings	IP address subnet mask default gateway set via communication
Data rate	100 Mbps
Parity	IEEE 802.3 Frame check sequence (32-bit CRC)
Byte order	MSB

8.9 Approvals

General	cCSAus, CE, UKCA, FM, cULus, RCM

Product documentation and support

A

A.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.

A.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).

For help creating a support request, view this video here (www.siemens.com/opensr).

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 (http://www.automation.siemens.com/partner).

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

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