SIEMENS

SITRANS

Pressure transmitter SITRANS LH100 (7MF1572..) Transmitter for hydrostatic level

Compact Operating Instructions

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.

AWARNING

indicates that death or severe personal injury ${\color{black} {\bf may}}$ 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.

1 Introduction

1.1 Purpose of this documentation

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

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

See also

Technical support (Page 38)

1.2 Checking the consignment

- 1. Check the packaging and the device for visible damage caused by inappropriate handling during shipping.
- 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.



Using a damaged or incomplete device

Danger of explosion in hazardous areas.

• Do not use damaged or incomplete devices.

1.3 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.



Insufficient protection during storage

The packaging only provides limited protection against moisture and infiltration.

Provide additional packaging as necessary.

Special conditions for storage and transportation of the device are listed in "Technical data" (Page 35).

1.4 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.

2 Safety instructions

2.1 Prerequisites for safe 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.

Symbol	Explanation
\triangle	Consult operating instructions

2.1.1 Laws and directives

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

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

Further provisions for hazardous area applications are for example:

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

2.1.2 Conformity with European directives

The CE mark on the device is a sign of conformity with the following European directives:

Electromagnetic Compatibility EMC

2004/108/EC

Directive of the European Parliament and of the Council on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing

Directive 89/336/EEC.

Atmosphère explosible ATEX

94/9/EC

Directive of the European Parliament and the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended

for use in potentially explosive atmospheres.

The standards applied can be found in the EC declaration of conformity for the device.

2.2 Improper device modifications



Improper device modifications

Danger to personnel, system and environment can result from modifications to the device, particularly in hazardous areas.

• Only carry out modifications that are described in the instructions for the device. Failure to observe this requirement cancels the manufacturer's warranty and the product approvals.

2.3 Requirements for special applications

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

Note

Operation under special ambient conditions

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

2.4 Use in hazardous areas

Qualified personnel for hazardous area applications

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

- They are authorized, trained or instructed in operating and maintaining devices and systems according to the safety regulations for electrical circuits, high pressures, aggressive, and hazardous media.
- They are authorized, trained, or instructed in carrying out work on electrical circuits for hazardous systems.
- They are trained or instructed in maintenance and use of appropriate safety equipment according to the pertinent safety regulations.



Unsuitable device for the hazardous area

Danger of explosion.

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

See also

Technical specifications (Page 35)



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

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

- Connect the device with type of protection "Intrinsic safety" solely to an intrinsically safe circuit.
- Observe the specifications for the electrical data on the certificate and in Chapter "Technical data (Page 35)".

3 Description

3.1 Application range

The pressure transmitter LH100 is a submersible sensor for hydrostatic level measurement. The pressure transmitter measures the liquid levels in tanks, containers, channels and dams.

The pressure transmitter is available for various measuring ranges and optionally with explosion protection. A cable box and an anchor clamp are available as accessories to make installation easier.

The pressure transmitter is used, for example, in the following industrial areas:

- Water supply
- For use in pressureless/open tanks and wells

3.2 Structure

The pressure transmitter has a built-in ceramic sensor which is equipped with a Wheatstone resistance bridge.

The pressure transmitter is equipped with electronics that is installed, together with the sensor, in a stainless steel enclosure. There is also a vent pipe in the connecting cable.

The measuring diaphragm is effectively protected against external influences by a protective cover.

The sensor, the electronics and the connecting cable are housed in an enclosure with small dimensions.

The pressure transmitter is compensated for a wide temperature range.

3.3 Design of the nameplate

The nameplate bearing the order number and other important information, such as design details and technical data, is on the pressure transmitter.

You must also observe the information in the relevant certificate for a transmitter version for use in hazardous areas.

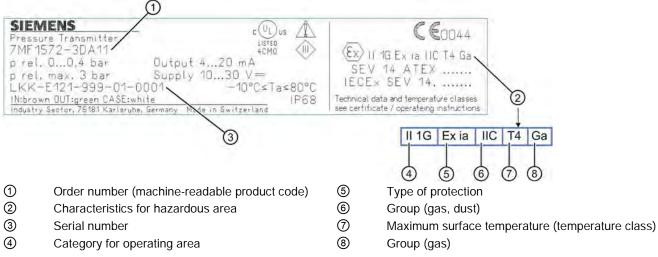


Figure 3-1 Example of a nameplate

3.4 Mode of operation

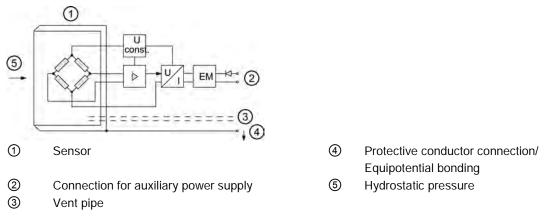


Figure 3-2 Pressure transmitter, mode of operation and connection diagram

Hydrostatic pressure, which is proportional to immersion depth, acts on the diaphragm ⑤ on one side of the sensor ①. This pressure is compared with the atmospheric pressure. Pressure compensation is carried out using the vent pipe ③ in the connecting cable.

The hydrostatic pressure of the liquid column acts on the diaphragm of the sensor and transmits the pressure to the Wheatstone resistance bridge in the sensor.

The output voltage signal of the sensor is fed to the electronics, where it is converted into an output current signal of 4 mA to 20 mA.

The protective conductor connection/equipotential bonding (4) is connected to the enclosure.

4 Installing/mounting

4.1 Basic safety instructions



Wetted parts unsuitable for the process media

Danger of injury or damage to device.

Hot, toxic and corrosive media could be released if the process medium is unsuitable for the wetted parts.

Ensure that the material of the device parts wetted by the process medium is suitable for the medium. Refer to the
information in "Technical data".

See also

Technical specifications (Page 35)

Note

Material compatibility

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



WARNING

Exceeded maximum ambient or process media temperature

Danger of explosion in hazardous areas.

Device damage.

Make sure that the maximum permissible ambient and process media temperatures of the device are not exceeded.
 Refer to the information in Chapter "Technical specifications (Page 35)".



WARNING

Open cable inlet or incorrect cable gland

Danger of explosion in hazardous areas.

• Close the cable inlets for the electrical connections. Only use cable glands or plugs which are approved for the relevant type of protection.

See also

Technical specifications (Page 35)

NOTICE

Using a device with frozen process medium

Damage to the device through ice formation.

Prevent ice formation on the pressure transmitter. The process medium must not freeze.

4.1.1 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 Chapter "Technical specifications (Page 35)", for example installation torques requirements.



Loss of degree of protection

Damage to device if the enclosure is open or not properly closed. The degree of protection specified on the nameplate or in Chapter "Technical specifications (Page 35)" is no longer guaranteed.

• Make sure that the device is securely closed.

See also

Installing/mounting (Page 27)

4.2 Installation

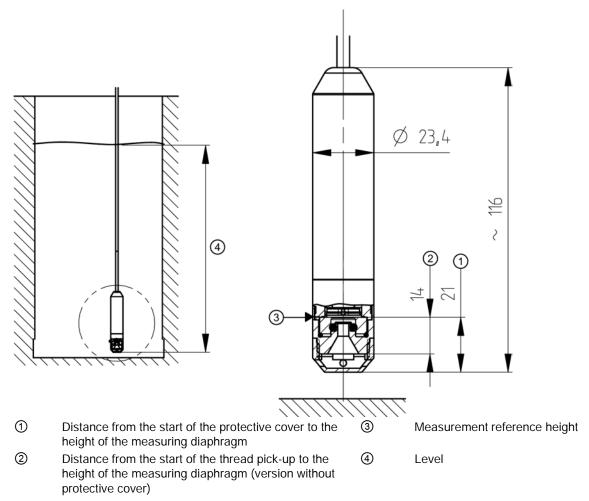


Figure 4-1 Mounting the pressure transmitter, dimensions in mm

- 1. Install the pressure transmitter suspended downward on the cable.
- 2. To prevent measuring errors, fasten the pressure transmitter for moved process media.
- 3. Fasten the pressure transmitter by means of a guide tube or an additional weight on the transmitter (max. tensile force on connecting cable 250 N).
- 4. Fasten the cable above the container with the anchor clamp.
- 5. Connect the cable itself with the cable box.
- 6. Mount the cable box at a location appropriate to its degree of protection (IP66) in the vicinity of the measuring point.
- 7. To ensure proper functioning, make sure that the entry openings on the protective cover of the pressure transmitter do not get soiled and that the process medium does not freeze.

4.3 Setting up the measuring points

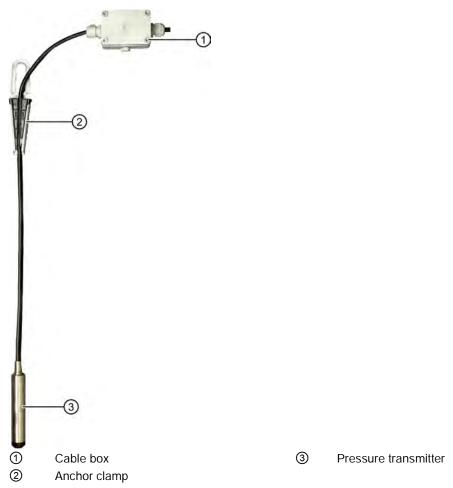


Figure 4-2 Basic procedure for setting up the measuring points

4.4 Establishing the measuring range

Calculating the measuring range with process media with a density # 1000 kg/m3 (process medium # water)

 $p = \rho * g * h$

with:

 ρ = density of the process medium

g = local gravitational acceleration

h = maximum level

5 Connecting

5.1 Basic safety instructions



WARNING

Unsuitable cables and/or cable glands

Danger of explosion in hazardous areas.

- Only use suitable cables and cable glands complying with the requirements specified in Chapter "Technical data (Page 35)".
- Tighten the cable glands in accordance with the torques specified in Chapter "Technical data (Page 35)".
- When replacing cable glands use only cable glands of the same type.
- After installation check that the cables are seated firmly.



WARNING

Improper power supply

Danger of explosion in hazardous areas and loss of device safety as a result of incorrect power supply, e.g. using direct current instead of alternating current.

- Connect the device in accordance with the specified power supply and signal circuits. The relevant specifications can be found in the certificates, in Chapter "Technical specifications (Page 35)" or on the nameplate.
- Always power the device with limited energy. Observe the following standards on limited energy: UL61010-1 3rd Edition, Section 9.3 or LPS (Low Power Supply) in accordance with UL60950-1 or Class 2 in accordance with UL1310 or UL1585.



WARNING

Unsafe extra-low voltage

Danger of explosion in hazardous areas due to voltage flashover.

• Connect the device to an extra-low voltage with safe isolation (SELV).



WARNING

Lack of equipotential bonding

Danger of explosion through compensating currents or ignition currents through lack of equipotential bonding.

Ensure that the device is potentially equalized.

Exception: It may be permissible to omit connection of the equipotential bonding for devices with type of protection "Intrinsic safety Ex i".



WARNING

Unprotected cable ends

Danger of explosion through unprotected cable ends in hazardous areas.

• Protect unused cable ends in accordance with IEC/EN 60079-14.



WARNING

Connecting device in energized state

Danger of explosion in hazardous areas.

• Connect devices in hazardous areas only in a de-energized state.

Exceptions:

- Circuits of limited energy may also be connected in the energized state in hazardous areas.
- Exceptions for type of protection "Non-sparking nA" (Zone 2) are regulated in the relevant certificate

Note

Electromagnetic compatibility (EMC)

You can use this device in industrial environments, households and small businesses.

For metal housings there is an increased electromagnetic compatibility compared to high-frequency radiation. This protection can be increased by grounding the housing, see Chapter "Connecting (Page 31)".

Note

Improvement of interference immunity

- Lay signal cables separately to cables with voltages > 60 V.
- Use cable with twisted wires.
- Keep the device and the cables at a distance from strong electromagnetic fields.

5.2 Connecting the device

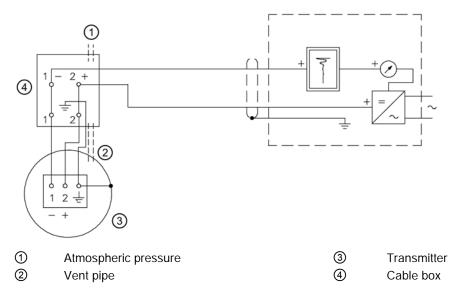


Figure 5-1 Pressure transmitter, connection diagram

The pressure transmitter is connected to the cable box.

- 1. Connect the cable of the pressure transmitter to the terminals 1 (-), 2 (+) and the grounding.
- 2. The vent pipe must be connected to the atmosphere inside the box.



Figure 5-2 Pressure transmitter, electrical connection

6 Commissioning

6.1 Basic safety instructions



Improper commissioning in hazardous areas

Device failure or danger of explosion in hazardous areas.

- Do not commission the device until it has been mounted completely and connected in accordance with the information in Chapter "Technical specifications (Page 35)".
- Before commissioning take the effect on other devices in the system into account.

6.2 Calibrating

The pressure transmitter was calibrated to the measuring range at the manufacturer and cannot be re-calibrated.

7 Maintenance and servicing

7.1 Basic safety instructions

Note

The device is maintenance-free.



Impermissible repair of explosion protected devices

Danger of explosion in areas subject to explosion hazard.

Repair must be carried out by Siemens authorized personnel only.



Use of a computer in a hazardous area

If the interface to the computer is used in the hazardous area, there is a danger of explosion.

Ensure that the atmosphere is explosion-free (hot work permit).

7.2 Calibrating

The pressure transmitter was calibrated to the measuring range at the manufacturer and cannot be re-calibrated.

7.3 Maintenance and repair work



WARNING

Impermissible accessories and spare parts

Danger of explosion in areas subject to explosion hazard.

- Only use original accessories or original spare parts.
- Observe all relevant installation and safety instructions described in the instructions for the device or enclosed with the
 accessory or spare part.

NOTICE

Faulty measurement caused by dirt

The pressure transmitter can become soiled by the process medium.

• Prevent any dirt accumulating on the entry openings on the protective cover of the pressure transmitter.

7.4 Return procedure

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

Required forms

- Delivery note
- Return document (http://www.siemens.com/processinstrumentation/returngoodsnote) with the following information:
 - Product (item description)
 - Number of returned devices/replacement parts
 - Reason for returning the item(s)
- Decontamination declaration (http://www.siemens.com/sc/declarationofdecontamination)

With this declaration you warrant "that the device/replacement part has been carefully cleaned and is free of residues. The device/replacement part does not pose a hazard for humans and the environment."

If the returned device/replacement part has come into contact with poisonous, corrosive, flammable or water-contaminating substances, you must thoroughly clean and decontaminate the device/replacement part before returning it in order to ensure that all hollow areas are free from hazardous substances. Check the item after it has been cleaned. Any devices/replacement parts returned without a decontamination declaration will be cleaned at your expense before further processing.

The forms can be found on the Internet as well as in the documentation which comes with the device.

7.5 Disposal



Devices identified by this symbol may not be disposed of in the municipal waste disposal services under observance of the Directive 2002/96/EC on waste electronic and electrical equipment (WEEE).

They can be returned to the supplier within the EC or to a locally approved disposal service. Observe the specific regulations valid in your country.

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.

8 Technical specifications

Source procesure input	ecilications		
Gauge pressure input			
Measured variable	Hydrostatic level		
Measuring range, max. operating pressure (according	Measuring range	Maximum operating pressure MAWP (PS)	Maximum test pressure
to 97/23/EC Pressure Equipment Directive) and max. test pressure (according to DIN 16086)	0,0 2.5 bar	7.5 bar	7.5 bar
2-wire output			
Output signal	4 20 mA		
Load	Resistor R [Ω]		
	$R_{\text{max}} = \frac{U_{\text{H}} - 7 \text{ V}}{0,02 \text{ A}}$		
U _H	Auxiliary power supply	ı in V	
Measuring accuracy (according	to EN 60770-2)		
Reference conditions	Rising characteris	tic curve	
	Start-of-scale 0 ba	ar	
	 Room temperatur 	e 25 °C (77 °F)	
Measurement deviation with limit setting, including hysteresis and repeatability	0.3% of full-scale valu	ue (typical)	
Effect of ambient temperature			
Zero point and measuring range			
 < 6 mH₂O (3 to 18 ftH₂O) 	0.45%/10 K (0.45%/	18 °F) of full-scale value	
• ≥ 6 mH2O (≥ 18 ftH2O)	0.3%/10 K (0.3%/18 °	F) of full-scale value	
Long-term stability			
Zero point and measuring range			
• < 6 mH ₂ 0 (3 to 18 ftH ₂ 0)	0.25% of full-scale va	lue/year	
• ≥ 6 mH ₂ 0 (≥ 18 ftH ₂ 0)	0.2% of full-scale value	ue/year	
Effect of auxiliary power supply	In percent per change 0.01% per 1 V	e in voltage	
Rated conditions			
Installation conditions			
Ambient conditions			
Ambient temperature	-10 +80 °C (-4	+176 °F)	
- Altitude	max. 2 000 m mean	•	
 Relative humidity 	level.	supply at an altitude of mor	re than 2 000 m (6562 ft.) above sea
N. I	0 100 %		
Note	•	ature class in hazardous are	as.
Storage temperature	-40 +80 °C (-40	. +1/6 °F)	
 Degree of protection according to EN 60529 	IP68		

Rated conditions	
Electromagnetic compatibility	
Interference emission and interference immunity	To EN 61326-1 and EN 61326-2-3
Process medium conditions	
 Process medium temperature 	-10 +80 °C (-4 +176 °F)
Pressure transmitter construct	ion
Weight	
Pressure transmitter	Approx. 0.2 kg (0.44 lb)
Material	
Wetted parts materials	
Housing	Stainless steel, mat. no. 1.4404 or AISI 316L
Sensor	Ceramic Al ₂ O ₃ (96%)
Cable	PE-HD
Protective cover	PPE
Sealing material	FPM, EPDM (for drinking water)
Electric connection	Cable PE-HD: Lengths 2, 5, 10, 15, 20, 30 m
Torque for cable gland nut	Plastic
made of	2.5 Nm (1.8 ft lb)
Cable box 7MF1572-8AA cons	struction (accessory)
Field of application	For connecting the transmitter cable
Weight	0.2 kg (0.44 lb)
Electric connection	2 x 3-way (28 to 18 AWG)
Cable entry	2 x Pg 9
Enclosure material	Polycarbonate
Vent pipe for atmospheric pressure	
Screw for bearer wire	
Rated conditions	
Degree of protection according to EN 60 529	IP66
Anchor clamp 7MF1572-8AB	construction (accessory)
Field of application	For fastening the transmitter
Weight	0.16 kg (0.35 lb)
Electric connection	Galvanized steel, polyamide

Auxiliary power U _H					
Terminal voltage at transmitter	(a) 10 V DC to 30 V DC				
Current consumption	< 20 mA				
Reverse polarity protection	Yes				

8.1 Certificates and approvals

Certificates and approvals	
Drinking water	ACS, WRAS
Explosion protection	
Intrinsic safety "i"	
Marking	🕟 II 1 G Ex ia IIC T4 Ga

9 Dimension drawings

Pressure transmitter

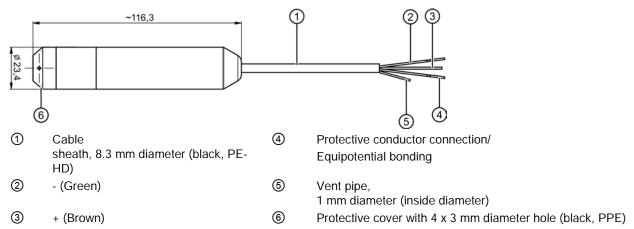


Figure 9-1 Pressure transmitter, dimensions in mm

Cable box

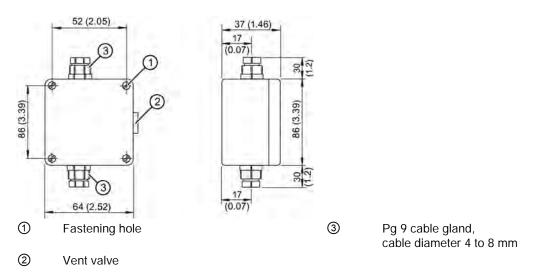


Figure 9-2 Cable box, dimensions in mm (inches)

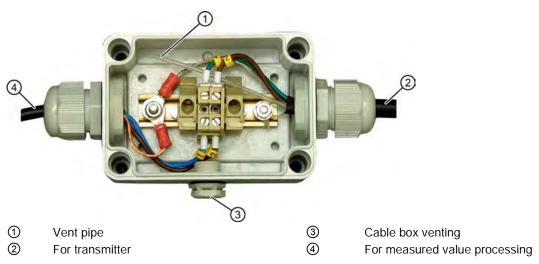
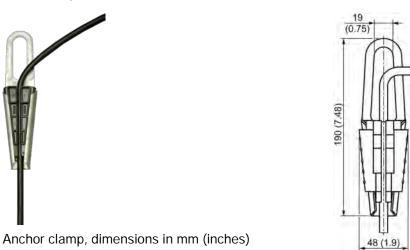


Figure 9-3 Cable box, open

Anchor clamp



B Appendix A

B.1 Technical support

Technical Support

You can contact Technical Support for all IA and DT products:

- Via the Internet using the Support Request: Support request (http://www.siemens.com/automation/support-request)
- E-mail (mailto:support.automation@siemens.com)
- Phone: +49 (0) 911 895 7 222
- **Fax:** +49 (0) 911 895 7 223

Further information about our technical support is available on the Internet at Technical support (http://www.siemens.com/automation/csi/service)

Industry Online Support

In addition to our documentation, we offer a comprehensive knowledge base on the Internet at:

Service&Support (http://www.siemens.com/automation/service&support)

There you will find:

- The latest product information, FAQs, downloads, tips and tricks.
- Our newsletter with the latest information about our products.
- A Knowledge Manager to find the right documents for you.
- Our bulletin board, where users and specialists share their knowledge worldwide.
- Your local contact partner for Industry Automation and Drives Technologies in our partner database.
- Information about field service, repairs, spare parts and lots more under "Services."

Additional Support

Please contact your local Siemens representative and offices if you have any questions about the products described in this manual and do not find the right answers.

Find your contact partner at:

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

Documentation for various products and systems is available at:

Instructions and manuals (http://www.siemens.com/processinstrumentation/documentation)

See also

Product information on SITRANS P in the Internet (http://www.siemens.com/sitransp)

Process instrumentation catalog (http://www.siemens.com/processinstrumentation/catalogs)

B.2 Certificate

The certificates can be found on the enclosed CD and on the Internet under:

Certificates (http://www.siemens.com/processinstrumentation/certificates)

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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.

Siemens AG Industry Sector Postfach 48 48 90026 NÜRNBERG

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