SIEMENS

SITRANS

Temperature transmitter SITRANS TF280 WirelessHART

Operating Instructions

7MP1110-0AC
7MP1110-0AD

10/2010
A5E02619566-02

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

with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

CAUTION

without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE

indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

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 for the specific task, 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 adhered to. The information in the relevant documentation must be observed.

Trademarks

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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.

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Introduction 1

1.1 Purpose of this documentation

Read these instructions carefully prior to installation and commissioning. The instructions contain all the information you need for commissioning and using the device. In order to use the device correctly, first make yourself acquainted with its principle of operation.

It is aimed both at persons mechanically installing the device, connecting it electronically, configuring the parameters and commissioning it as well as service and maintenance engineers.

1.2 History

The following table shows the most important changes in the documentation compared to each previous edition.

Edition	Comment
01 10/2009	First edition
02 10/2010	Enhanced options for positioning the antenna. Range of settings for transmission rate increased.

1.3 Notes on warranty

The contents of this programming manual shall not become part of or modify any prior or existing agreement, commitment or legal relationship. All obligations on the part of Siemens AG are contained in the respective sales contract, which also contains the complete and solely applicable warranty conditions. Any statements on the device versions described in the programming manual do not create new warranties or modify the existing warranty.

The content reflects the technical status at the time of printing. We reserve the right to make technical changes in the course of further development.

1.4 Environmental protection

Recycling

Devices described in this programming manual can be recycled owing to the low content of noxious substances in their version. Please contact a certified waste disposal company for eco-friendly recycling and to dispose of your old devices.

Energy consumption

The devices are battery-operated, and have a very low power consumption. Depending on use, the battery life is several years.

Disposal of battery

Additional information is available under Returning of battery (Page 82).

General safety instructions 2

2.1 General information

This device left the factory free from safety problems. In order to maintain this status and to ensure safe operation of the device, please observe the safety information and warnings contained in these instructions.

Safety information and symbols must be observed without exception. They must not be removed and must be maintained in legible condition at all times.

2.2 Correct usage

The device may only be used for the purposes specified in these instructions.

Insofar as they are not expressly stated in these instructions, all changes to the device are the sole responsibility of the user.

2.3 Qualified Personnel

Qualified personnel are people who are familiar with the installation, mounting, commissioning, and operation of the product. These people have the following qualifications:

- They are authorized, trained or instructed in operating and maintaining devices and systems according to the safety regulations for electrical circuits, high pressures and aggressive as well as hazardous media.
- For explosion-proof devices: 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 safety regulations.

2.4 Transport/Storage

Make sure that transport damages are prevented through proper packaging!

Devices/replacement parts should be returned in their original packaging. If the original packaging is no longer available, please ensure that all shipments are properly packaged to provide sufficient protection during transport.

We cannot assume any costs for additional expenses resulting from transport damages.

Description

3

3.1 Applications

Temperature measurement

SITRANS TF280 WirelessHART is a battery-operated temperature transmitter for field use. It is used to measure the temperature under industrial conditions in the following sectors:

- Chemical industry
- Energy management
- District heating
- Water supply and treatment
- Food industry
- Iron & steel and cement industries
- Pharmaceuticals
- Biotechnology

Communication

The device communicates with other wireless HART devices by means of radio technology. The basis is application of the HART protocol V7.1. SITRANS TF280 WirelessHART therefore complies with the following requirements:

- Design of self-organizing, wireless sensor networks
- Data exchange with other wireless HART devices at distances of up to 250 m
- Subsequent installation without cabling
- Overcoming of structural hindrances along the signal path.

3.2 Product features

The device has the following features:

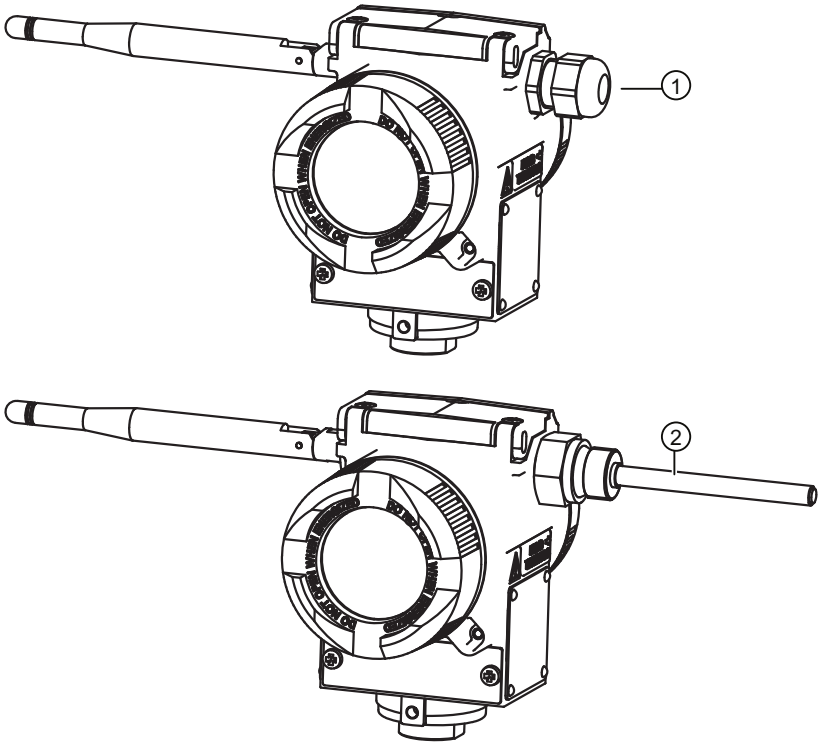
- Absence of all cabling:
  - Wireless communication via wireless HART
  - Battery operation
- Local user interface with display and keys for efficient on-site operation
- Energy saving functions
- Display with backlight
- Rotatable display: flexible selection of mounting position

  Changing the display orientation (Page 75)
- Integral HART maintenance port
- Antenna can be folded by 90°. Range of rotation: approx. 360°.
- Simple configuration with SIMATIC PDM
- Housing complies with IP65.

3.3 Design of SITRANS TF280 WirelessHART

Overview

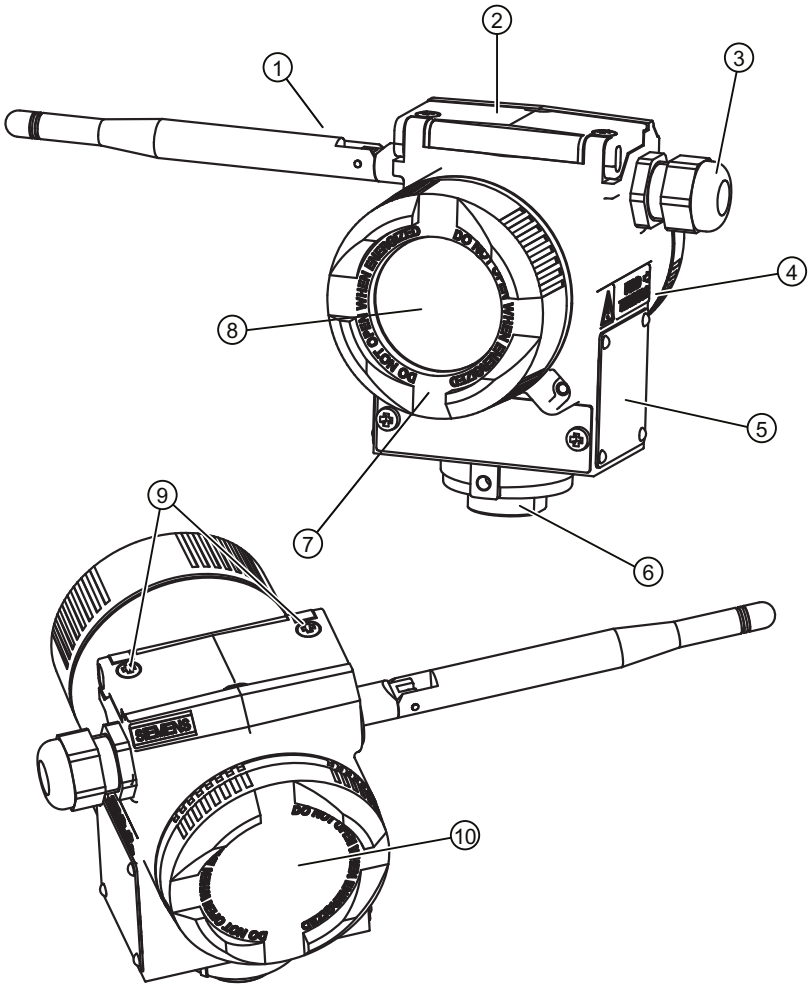
The device is available in the following basic versions:



① SITRANS TF280 with cable gland ② SITRANS TF280 with fixed Pt100 sensor

Figure 3-1 SITRANS TF280 basic versions

External design (example)



①	Antenna	⑥	Dummy plug
②	Control panel cover (local user interface)	⑦	Screw-on housing cover, front
③	Cable gland (sensor element)	⑧	Digital display (90° rotatable) (local user interface)
④	Reference to the manual	⑨	Locking screws for control panel cover
⑤	Nameplate	⑩	Screw-on housing cover, rear

Figure 3-2 SITRANS TF280 WirelessHART: Device with cable gland

Antenna

The device antenna can be folded to an angle of 90°. In addition, the antenna can be rotated approx. 360°. Two stops limit the range of adjustment.

3.4 Mode of operation

Measuring principle

The device contains a Pt100 sensor element (resistance thermometer) in accordance with IEC 751/DIN EN 60751. The temperature is measured as a change in resistance. This signal is amplified by the measuring amplifier and digitized in an analog-to-digital converter.

The digital signal is analyzed in a microcontroller and corrected with regard to linearity.

The measured value is then available to a HART master via HART FSK as well as wireless HART.

The sensor-specific calibration data are stored in an EEPROM.

3.5 Sensor

Properties

SITRANS TF280 WirelessHART applies Pt100 resistance thermometers of Class A or B. The sensor elements used correspond to IEC 60751 and exhibit the following properties:

- Exchangeable sense element: The terminal is located in the device housing next to the battery clips.
- Maximum length of sensor cable: 3 m with 2-, 3- or 4-wire connection.
- Software-based detection of sensor breaks.
- Measurement in temperature range -200 °C to +850 °C.

You can find additional information on the sensor elements under Technical data (Page 85).

3.6 Battery

The very low energy consumption of the device means that a battery service life of up to 5 years is possible. The current charging level of the battery is shown in the device's digital display. If a critical charging level is reached, the device also sends this condition as part of the "Extended Status Byte" to the host control system.

Other repair or maintenance measures are not required on the device. You can find supplementary information on this under Inserting / removing the battery (Page 28) and Alarm, error, and system messages (Page 79).

① Lithium thionyl chloride battery D-cell ② Connector
③ Positive pole

Figure 3-3 High-capacity battery

3.7 WirelessHART

3.7.1 Overview

WirelessHART	
Wireless standard	IEEE 802.15.4-2006 @ 250 kbps
Frequency band	2.4 GHz
Data transmission	Frequency spread procedure (per packet basis)
Transmission range	Up to 250 m (visual connection)
Power supply	• Battery
Network topologies	• Meshed network • Star topology • Combination of both topologies
HART specification	HART protocol V7.1 HART - IEC 61158 E DDL - IEC 61804-3

3.7.2 WirelessHART

Fundamentals

Wireless HART is a fieldbus standard of the HART Communication Foundation and permits radio-based networking of field devices.

The radio transmission is based on the wireless communication standard IEEE 802.15.4-2006 (ISM band, 2.4 GHz).

The data transmission is appropriately encrypted using the Advanced Encryption Standard (AES 128). Data transmission as well as parameterization of the field devices involved is thus protected.

The data transmission is coordinated by the TDMA procedure (Time Division Multiplex Access). Signals from different transmitters are then only transmitted on the common bus within specific time slots, or the radio stations are synchronized with a sampling rate of 10 ms.

Interferences from other radio stations also using the 2.4 GHz band are minimized by application of a frequency spread procedure.

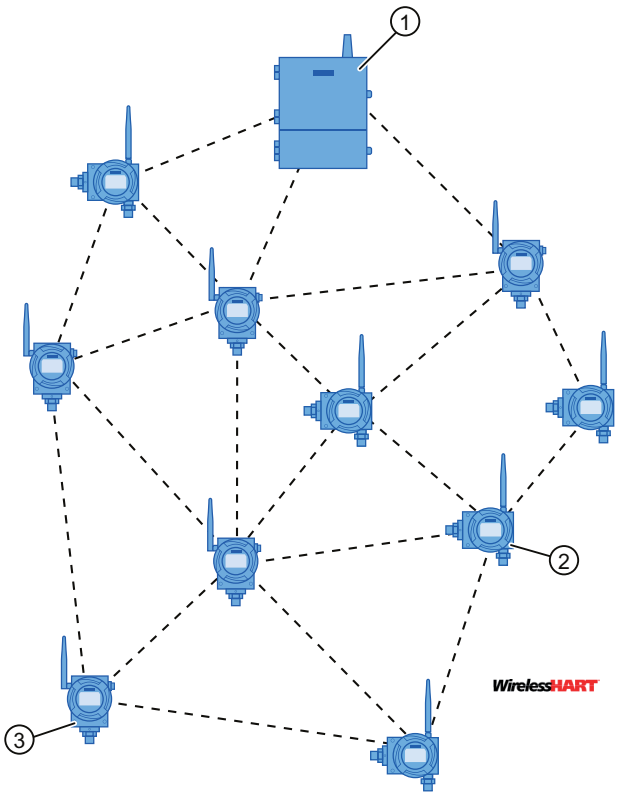
Properties

Field devices communicating using wireless HART can be connected into a meshed network:

- The wireless HART gateway obtains information from each field device involved in the wireless HART network concerning the respective adjacent devices.
- The network manager in the wireless HART gateway organizes the network on the basis of this information.

The field devices present on the network are both signal sources and repeaters. A message is passed on from the transmitting field device via the connected fields devices until the wireless HART gateway is reached. If a network station fails or if a hindrance prevents a message from being passed on, the data is automatically transmitted via alternative routes.

If an additional field device is integrated into an existing network, it must be authenticated.



① Wireless HART gateway: SIMATIC NET IE/WSN-PA Link
② SITRANS P280 WirelessHART pressure transmitter
③ SITRANS TF280 WirelessHART temperature transmitter

Figure 3-4 Meshed wireless HART network (example)

The transmission distance from station to station without barriers (line-of-sight) is up to 250 m. Significantly longer distances can be covered it the field devices of a network are spatially positioned in sequence.

3.8 HART maintenance port

The HART maintenance port is a HART communications interface via which the device can be parameterized and adjusted. You will need the following hardware and software:

- A HART communicator. Or:
- A PG / PC with HART modem, an appropriate parameterization tool (e.g. SIMATIC PDM) and the corresponding EDD.
- Appropriate cables

Note

Scope of supply

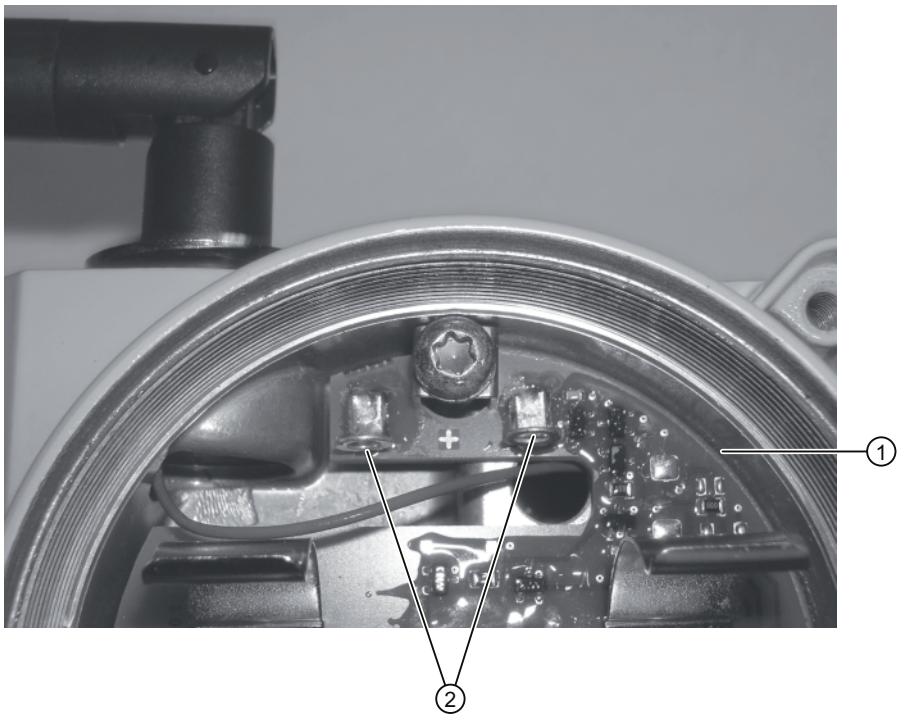
The accessories required for operation via the HART maintenance port are not included in the scope of supply of the device. Further information on SIMATIC PDM can be found on the Internet at:

SIMATIC PDM (http://www.automation.siemens.com/w2/automation-technology-process-device-manager-pdm-3695.htm)

Further information

Information on connecting/operating external devices and additional parameterization tools can be found in the respective documentation.

The following photo shows the contacts of the HART maintenance port for connecting a HART modem or HART communicator:



① Electronics area ② HART maintenance port

Figure 3-5 HART maintenance port

See also

Overview (Page 33)
Connect external devices to the HART maintenance port (Page 77)

Commissioning (hardware) 4

4.1 Commissioning overview

Requirements

- You have unpacked the device.
- There is no visible damage to the device.

Procedure

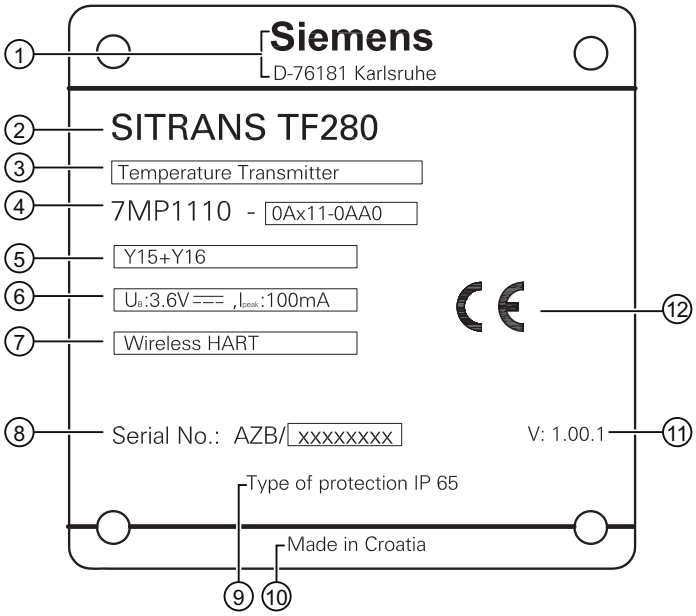
The transmitter is started up as follows:

1. Identify device (Page 22)
2. Assignment/determination of network access parameters (Page 24)
3. Temperature sensor: connection of pins (Page 25)
4. Inserting / removing the battery (Page 28)
5. Quick Start (Page 31)

4.2 Identify device

Layout of the nameplate

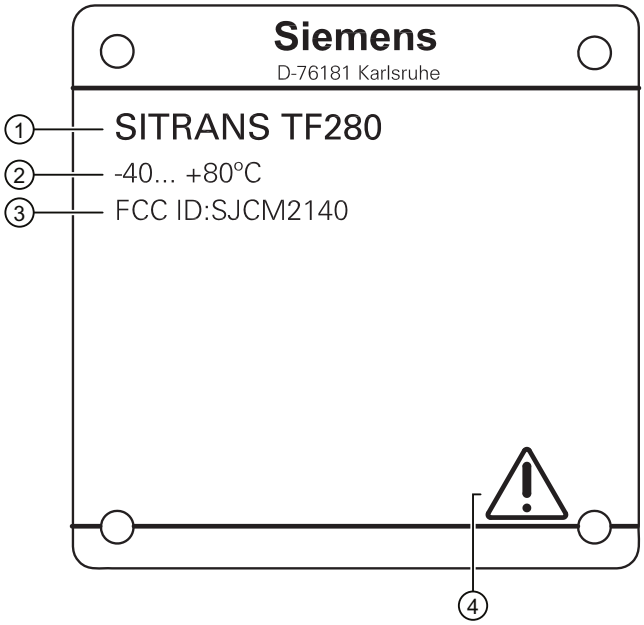
The nameplate attached to the device housing contains important information on the product and its conditions of use. It enables you to identify your device:



① Manufacturer
② Product name
③ Product group
④ Order No.
⑤
- Measuring point number (Y15)
- Measuring point info (Y16)

⑥ Electrical data
⑦ Details about field communication
⑧ Serial No. of the device
⑨ Degree of protection
⑩ Place of manufacture
⑪ Version
⑫ CE mark

Figure 4-1 SITRANS TF280 nameplate (right)



① Product name
② Permitted temperature range
③ Radio approval number
④ Refer to the Operating Instructions!

Figure 4-2 SITRANS TF280 nameplate (left)

4.3 Assignment/determination of network access parameters

Note

Gateway

The device is able to establish a connection to all common wireless HART gateways. Refer to the gateway's documentation for information on logging-in of the device on the gateway.

Procedure

If you use the IE-WSN/PA-Link wireless HART gateway from Siemens, the following applies:

1. Make sure that a firmware version ≥ 3.8 is installed on the gateway.
2. Determine the network ID of your wireless HART network which is set in the gateway.
3. Determine the network key of the existing wireless HART network which is set in the gateway. The network key consists of 32 hexadecimal characters, {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, a, b, c, d, e, f}.

   Valid network keys are, for example:

   – 44555354 - 4e455457 - 4f524b53 - 524f434b

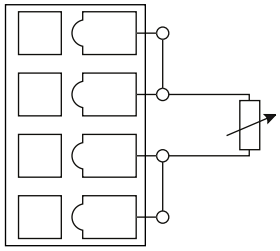
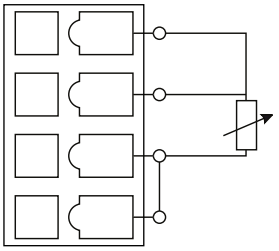
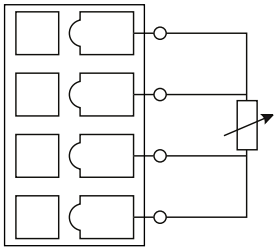
   – 195e0000 - 00000000 - 00000000 – 00000000
4. Continue with the commissioning: Temperature sensor: connection of pins (Page 25) .

4.4 Temperature sensor: connection of pins

4.4.1 Overview

Temperature measurement

The resistance thermometer can be connected to the transmitter using a 2, 3 or 4-wire system. The pin assignments are as follows:

1 x Pt100 (2-wire) 2-wire connection	1 x Pt100 (3-wire) 3-wire connection	1 x Pt100 (4-wire) 4-wire connection
		

Note

Jumpers

You must use jumpers in the case of 2- and 3-wire connections. The jumpers are not included in the scope of supply.

Make the jumpers yourself. We recommend the use of flat metal tabs.

Pt100 sensor element cables

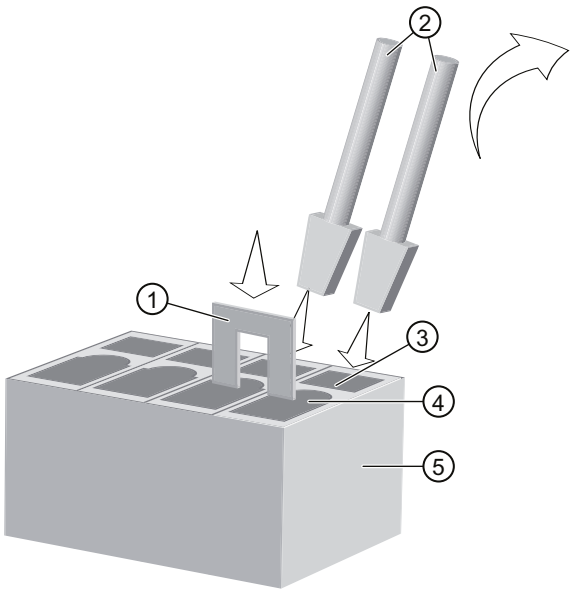
NOTICE
Achievement of IP65 protection The cable gland included in the scope of supply is designed for cables with a diameter of 6 to 12 mm. The IP65 protection is no longer guaranteed if you use cables with other diameters.

4.4.2 Connection of temperature sensor

Requirement

- The battery is not connected.

Procedure



① Jumper
② Screwdriver
③ Terminal activation
④ Terminal
⑤ Terminal block

Figure 4-3 Connection on terminal block

1. Remove insulation from cable.
2. Prepare process connection.

   If you wish to fit a separate sensor tube:
   - Unscrew cable gland
   - Screw in threaded adapter:

     Threaded adapter M20 x 1.5 → G½

     Threaded adapter M20 x 1.5 → ½"NPT

   If you wish to connect a cable sensor:
   - Unscrew sealing cap of cable gland.
3. Open electronics area. Unscrew rear housing cover.
4. Introduce cable into the electronics area.
5. With 2- and 3-wire connections: make jumper(s).

6. Connect cable in terminal block.
   - With 2- and 3-wire connections, connect terminals ④ by jumper.
   - Use jumpers ① made of flat metal tabs.
   - Insert screwdriver ② into terminal activation ③ and hold pressed to the rear.
   - Insert jumper ① into terminal ④.
7. Insert cable between contact and jumper ①.
8. Remove screwdriver.
9. Insert second jumper (2-wire connection) or connect further cables.
10. Screw separate sensor tube onto threaded adapter, and tighten. Or: Tighten sealing cap of cable gland.

4.5 Inserting / removing the battery

⚠ CAUTION

Heating-up of device housing

Depending on the process connection, the device housing may become very hot during operation.

Before replacing the battery, check the danger of burns. Wear gloves if necessary when opening the housing.

CAUTION

Battery

Use of non-approved or damaged batteries may result in damage to the device or in the environment.

Only use the battery type approved by the manufacturer. Before fitting a battery, check that it is not damaged.

Note

Qualified personnel

Fitting and removal of the battery must only be carried out by qualified personnel. Additional information is available under: Qualified Personnel (Page 9) .

Note

Positioning of battery

Selection of the mounting position influences the service life of the battery. Position the battery such that the positive pole points vertically upwards as far as possible following installation of the device.

Note

Depassivation of battery

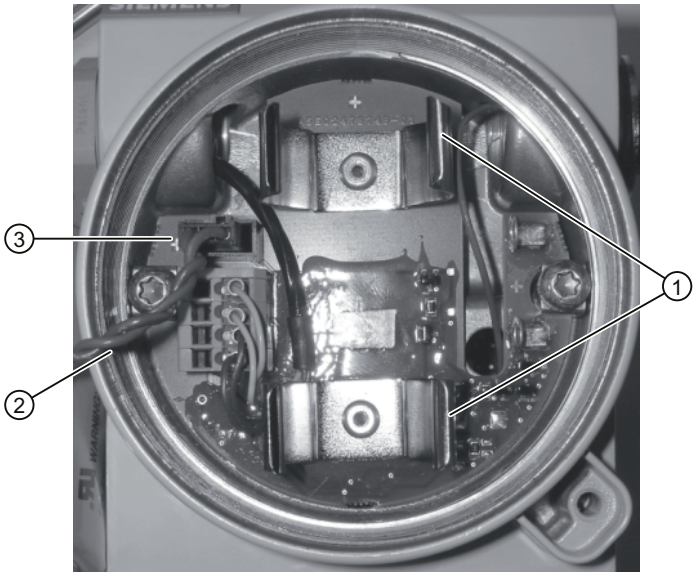
As a result of longer service lives, it is possible that your battery may become passivated. If you fit a passivated battery in your device, a low battery service life is shown in the display. Reason: Passivated batteries do not initially provide their full capacity.

During operation, the device depassivates the battery, and the display of the battery service life is corrected accordingly.

Requirements

- Battery replacement during operation: the deep sleep function is activated.

Inserting the battery



① Battery clips ② Battery cable
③ Connector

Figure 4-4 Inserting the battery

1. Open the device.

   To do this, unscrew the cover at the rear of the device.
2. Plug the battery connector ③ into the socket.
3. Insert the battery.
   - Position the battery centrally between the two clips ①.
   - Make sure when inserting that neither the battery cable nor the sensor cable is routed close to the internal thread. Following insertion of the battery, the cable ② must be routed underneath it.
   - Clip in the battery between the two holders ①.
4. Make sure the battery is securely latched in the holders. Otherwise press on the battery again.
5. Check that the battery and sensor cables are positioned sufficiently far away from the thread of the housing cover. This avoids damage when screwing on the cover.
6. Fitting of the battery has been completed. Screw the cover back into place.

Removing the battery

1. Activate the deep sleep function.
   Use of key combinations (Page 43)
2. Wait for a further 30 s.
3. Open the device.
   To do this, unscrew the cover at the rear of the device.
4. Remove the battery from its holder.
5. Hold the battery, and carefully unplug the connector.

4.6 Quick Start

Requirement

Note

Factory default settings

In the as-delivered state, the following default settings are made:

- Display language: "English"
- Password protection "Active"

Procedure

You complete commissioning using the settings in menu "1 Quick start". Your transmitter is connected to the wireless HART network in the process. The following steps are required:

1. Set display language if necessary.

   Menu: Set Setting language (Page 60).

2. Cancel the password protection. Setting: "Inactive".

   Parameter .

3. Set quick start parameters.

   Menu: Quick start (Page 62) .

Operation 5

5.1 Overview

The following two options are available to operate the transformer:

- Operation of the transmitter using external devices connected to the HART maintenance port, e.g.:
  - HART communicator
  - Engineering tool, e.g. SIMATIC PDM

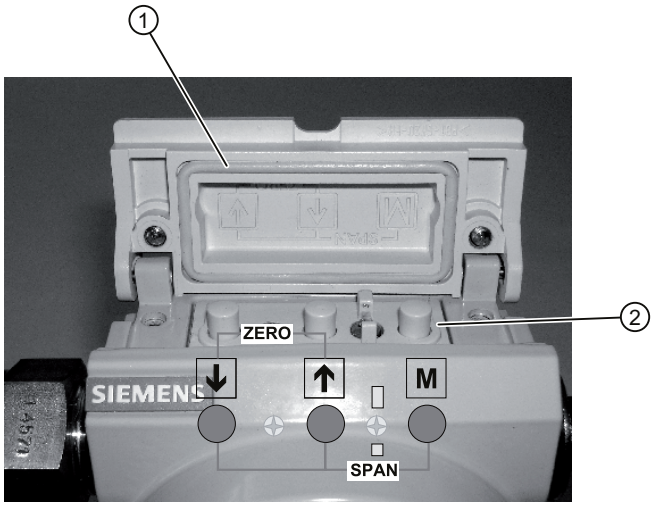
    An E^2DD is required in order to operate the device with SIMATIC PDM. You can find additional information on this on the Internet at SIMATIC PDM (http://www.automation.siemens.com/w2/automation-technology-process-device-manager-pdm-3695.htm)
- Operation on site using the local user interface (LUI).

  The local user interface consists of a digital display and three keys with which all device functions can be set with menu prompting.

This chapter contains all information you require to operate the device using the local user interface.

5.2 Keypad

Layout



① Flap with key symbols ② Keys ↓, ↑, M

Figure 5-1 Keypad

The keypad is located underneath a screwed flap which you open with a Phillips screwdriver.

Function of the keys M, ↑ and ↓

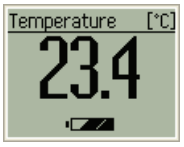
The keys are assigned the following functions:

Key	Meaning	Functions
M	MENU / ENTER	• Open selected menus. • Save a selection. • Save modified values.
↑	UP / ESCAPE	• Leave a menu following selection of first menu entry. • Select the next higher menu entry or list entry. • Increase a parameter value. • Shift cursor by one step forward in order to select a character.
↓	DOWN	• Select the next lower menu entry or list entry. • Decrease a parameter value. • Shift cursor by one step backward in order to select a character.

5.3 Digital display

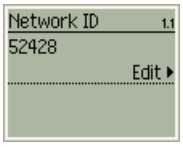
Views

The digital display provides information, navigation options, and setting options.



Measured value view

Navigation view (multi-level menu structure)



Parameter view

Note

The temperature dependency of the digital display

At ambient temperatures below -10 °C, the display reacts sluggishly to changes. At ambient temperatures above +60 °C, the display contrast is reduced.

5.4 Menu structure

Layout

The menu structure comprises main menu and submenus. The main menu comprises six menu entries:

1	"1 Quick start" (Page 44)	4	"4 Communication" (Page 54)
2	"2 Settings" (Page 46)	5	"5 Security" (Page 57)
3	"3 Diagnostics" (Page 52)	6	"6 Language" (Page 59)

"1 Quick start"

This menu contains the setting options which are essential for commissioning (commissioning with minimum configuration).

1.1	Network ID	1.4	Data transmission rate
1.2	Network key	1.5	HART modem
1.3	Device name	1.6	Connect network

"2 Settings"

You use this menu and its submenus to adjust the device to the concrete rated conditions.

2.1	Display	2.4	Cold restart
2.2	Device name	2.5	Reset device
2.3	Temp. settings		

"3 Diagnostics"

In this menu you can scan the communication and device data:

3.1	Identification	3.4	Device status
3.2	Connection info	3.5	Version
3.3	Network info		

"4 Communication"

In this menu you can make network and communication settings (HART modem):

4.1	Wireless
4.2	Maintenance port

"5 Security"

In this menu you can make security-relevant settings.

5.1	Active / inactive	5.4	Set level 0
5.2	PIN input	5.5	Time-out
5.3	Change PIN		

"6 Language"

In this menu you can select the display language. The following languages can be selected:

6.1	German
6.2	English

5.5 Use of local user interface

5.5.1 Input of alphanumeric string (input example)

Principle

Alphanumeric values, e.g. the device name, are entered character-by-character. When you open the setting option, the first character is focused and can be changed.

- Select the desired character by pressing the ↑ or ↓ key.
- The cursor is moved forward by one digit by pressing the **M** key. The selected character is applied.

Procedure

The device name "MSK-012E" is to be entered.

1. Open the parameter to be changed, in this case: "2.2 Device name" (Page 47)

2. Enter the first character:

   Select/change: Press ↑ or ↓ key until the letter "M" is displayed.

   Retain/apply: Press **M** key. Reaction: the cursor moves on.

3. Repeat step 2 until the desired string is complete. Following input of the eighth character, the cursor is positioned on the Enter symbol.

4. Leave input option. Press the **M** key.

5.5.2 Input of numeric string (input example)

Principle

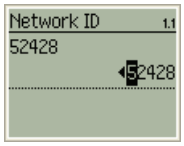
Numeric strings, e.g. the network ID, are entered character-by-character. When you open the setting option, the first number is focused:

- Increase or decrease the value by pressing the ↑ or ↓ key.
- The number is accepted and the cursor moved forward by one digit by pressing the **M** key.
- If you press the M key when the last digit has been reached, the complete string is saved and the input option closed.

Procedure

The network ID is to be set to the value "61428".

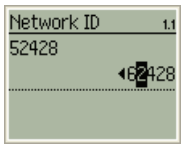
1. Open the parameter to be changed. Here: "1.1 Network ID" (Page 44)



2. Increase first number:

   Press the ↑ key 1 x. Then press the **M** key.

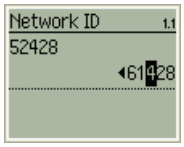
   The number has been increased, and the cursor moved on by one digit.



3. Decrease second number:

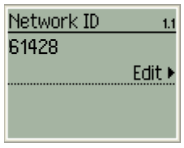
   Press the ↓ key 1 x. Then press the **M** key.

   The number has been decreased, and the cursor moved on by one digit.



4. Save complete, modified network ID:

   Press the **M** key 3 x. The input option is exited.



5.5.3 Increase/decrease parameter value (input example)

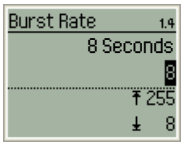
Principle

Parameter values can be increased (↑ key) or reduced (↓ key) by a fixed value within a certain range. When you open the setting option, the currently set value is focused.

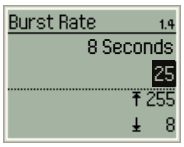
Procedure

The transmission rate is to be changed from 8 to 25 s.

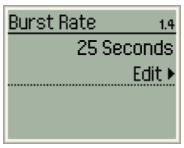
1. Open the parameter to be changed. Here: "1.4 Transmission rate" (Page 44)



2. Keep the ↑ key pressed until the parameter value "25" is set.



3. Save the desired value: Press the **M** key.



5.5.4 Set list values

5.5.4.1 Single selection

Principle

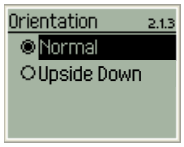
When you open the setting option, the cursor marks the currently set value.

Select a value from the list by moving the cursor using the ↑ or ↓ key. To save the change, subsequently press the **M** key.

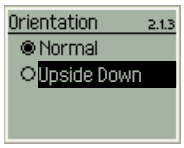
Procedure

Rotate display orientation by 180° compared to normal view.

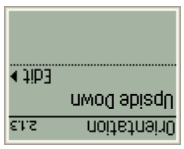
1. Open the parameter to be changed. Here: "2.1.3 Orientation" (Page 46)



2. Shift the cursor downward using the ↓ key:



3. Save changes: Press the **M** key.



5.5.4.2 Multiple selection

Principle

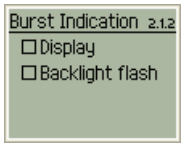
When opening, none of the selectable or previously set values is marked by the cursor. You can set all, none or only one value as the fixed setting.

None of the list entries is marked when opening. The first list entry is marked by pressing the **M** key. The checkboxes of the list can also be activated or deactivated by pressing the **M** key. To save and exit, press the ↑ key 3 x.

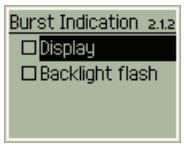
Procedure

All functions of the burst display are deactivated, and are to be switched on again.

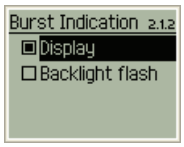
1. Open the parameter to be changed. Here: "2.1.2 Burst display" (Page 46)



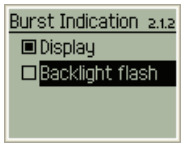
2. Set cursor to the first list entry. Press the **M** key.



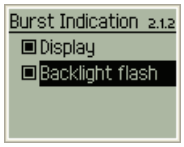
3. Select the first list value. Press the **M** key.



4. Mark the next list entry using the cursor. Press the ↓ key.



5. Accept the selected list entry. Press the **M** key.



6. The changes are automatically saved when closing. To do this, press the ↑ key 3 x.

5.5.5 Use of key combinations

Deep sleep function

- Activation/deactivation:

  Keep the **M** and ↑ keys pressed simultaneously for >10 s.

  – If you activate this function, the power consumption of the device is reduced to a minimum. The display is switched off, and the connection to the wireless HART network is interrupted.

  – If the function is deactivated, the display is switched on again and your device automatically attempts to reestablish the connection to the wireless HART network.

Backlight function

- Activation/deactivation:

  Press the ↑ and ↓ keys simultaneously.

  – The display backlight is activated, and is automatically deactivated after approx. 20 s.

5.6 Parameter descriptions

5.6.1 "1 Quick start"

5.6.1.1 "1.1 Network ID"

Factory setting:	1229
Setting range:	• 00001 ... 65535
Purpose:	Assign network ID
Description:	Commissioning requirement. Password-protected function. For security reasons, always change this during commissioning.

5.6.1.2 "1.2 Network key"

Factory setting:	-
Setting range:	• 32-digit, hexadecimal
Purpose:	Assign network key
Description:	Commissioning requirement. Must be assigned and set by the user during commissioning.

5.6.1.3 "1.3 Device name"

Factory setting:	-
Setting range:	-
Purpose:	Specify device name
Description:	The device name can contain up to 8 characters. Select the characters by pressing the ↑ or ↓ key.

5.6.1.4 "1.4 Transmission rate"

Factory setting:	60 s
Setting range:	• 8 to 255 s
Purpose:	Set transmission rate.
Description:	Setting of time intervals at which the transmitter sends measured values. Increase or decrease the parameter value by pressing the ↑ or ↓ key.
	Use the parameter "2.1.2 Burst display" (Page 46) to visualize the set transmission rate.

5.6.1.5 "1.5 HART modem"

Factory setting:	HART active
Setting range:	• Active • Inactive
Purpose:	Activate/deactivate HART maintenance port.
Description:	The HART maintenance port is always activated in the factory default setting. In order to increase the battery service life, we recommend the "Inactive" setting. Select the list entries using the ↑ or ↓ key. Accept the setting by pressing the **M** key.

5.6.1.6 "1.6 Connect network"

Requirements:	1. Wireless HART gateway is prepared. 2. The following parameters have been set: – "1.1 Network ID" (Page 44) – "1.2 Network key" (Page 44) – "1.3 Device name" (Page 44) – "1.4 Transmission rate" (Page 44) – "1.5 HART modem" (Page 45)
Factory setting:	-
Setting range:	• START
Purpose:	Connect device to wireless HART network.
Description:	Start establishment of the connection by pressing the **M** key. Establishment of the connection is displayed in the measured value view. The supplementary message is deleted when the connection has been established successfully.

5.6.2 "2 Settings"

5.6.2.1 "2.1 Display"

"2.1.1 Contrast"

Factory setting:	3 bars
Setting range:	• "-" ... "+" (6-step bar display)
Purpose:	Set contrast of digital display.
Description:	You can change the contrast setting using a vertical 6-step bar display. Press the ↑ (+) or ↓ (-) **keys.** Accept setting: Press M key.

"2.1.2 Burst display"

Requirement:	The following parameter has been set: "1.4 Transmission rate" (Page 44)
Factory setting:	-
Setting range:	Set using 2 checkboxes • Display on ("yes" / "no") • Lighting ("yes" / "no")
Purpose:	Control display response.
Description:	• Display on: If you select this setting, a measured value is output on the display each time it is transmitted. • Lighting If you activate this function, the digital display is lit for approx. 1 second each time a measured value is transmitted. You can therefore establish at night whether your device is still working.
	To change the settings: • First select the checkbox: Press **M** key. • Activate the checkbox: Press **M** key. • Change the checkbox: Press the ↑ or ↓ keys. • Leave list and save: Press ↑ key 3 x.

"2.1.3 Orientation"

Factory setting:	Normal
Setting range:	Radio buttons • Normal • Rotated by 180°
Purpose:	Change orientation of digital display.
Description:	Improves the readability of the digital display in certain mounting positions.

5.6.2.2 "2.2 Device name"

Factory setting:	-
Setting range:	-
Purpose:	Specify device name
Description:	Corresponds to following parameter: "1.3 Device name" (Page 44)

5.6.2.3 "2.3 Temp. settings"

"2.3.1 Unit"

Factory setting:	°C
Setting range:	• °C • °F
Purpose:	Set unit for temperature measurement.
Description:	Select the desired unit by pressing the ↑ or ↓ key. Accept the setting by pressing the **M** key.

"2.3.2 Lower adjustment"

Factory setting:	Current temp. = setpoint temp. [°C]
Setting range:	-.
Purpose:	• Set temperature value for lower adjustment • Customer-specific calibration / offset
Description:	Adaptation of measured temperature value to the actually present temperature by increasing or reducing the setpoint temperature. • Increase value by pressing the ↑ key, or reduce value by pressing the ↓ key (units of 0.1) • Accept the setting by pressing the **M** key. • Cancel, or confirm with "OK" (↑ + **M**)

"2.3.3 Upper adjustment"

Requirement:	Once you have set the parameter "2.3.2 Lower adjustment" (Page 48), the menu entry "Upper adjustment" is displayed.
Factory setting:	Current temp. = setpoint temp. [°C]
Setting range:	-.
Purpose:	• Set temperature value for upper adjustment (optional) • Customer-specific calibration: 2-point calibration
Description:	Adaptation of measured temperature value to the actually present temperature by increasing or reducing the setpoint temperature. • Increase value by pressing the ↑ key, or reduce value by pressing the ↓ key (units of 0.1) • Accept the setting by pressing the **M** key. • Cancel, or confirm with "OK" (↑ + **M**)

"2.3.4 Reset adjustment"

Requirement:	The following parameter settings have been changed: • "2.3.2 Lower adjustment" (Page 48) • "2.3.3 Upper adjustment" (Page 48)
Factory setting:	START
Setting range:	-.
Purpose:	Reestablishment of factory calibration: Current temp. = setpoint temp.
Description:	Start function by pressing the M key. Following resetting, the menu entry "Upper adjustment" is no longer displayed.

"2.3.5 Connections settings"

Requirement:	The sensor is wired up: Connection of temperature sensor (Page 26)
Factory setting:	2-wire
Setting range:	• 2-wire • 3-wire • 4-wire
Purpose:	Define sensor connection.
Description:	Select the desired connection version by pressing the ↑ or ↓ key. Accept the setting by pressing the **M** key.

5.6.2.4 "2.4 Cold restart"

CAUTION
Personal injury and damage to property Activation of this function during operation interrupts the connection between the transmitter or router and the network. Depending on the topology, this may result in failure of the wireless HART network and also personal injury and/or damage to property. Therefore: • Avoid inadvertent operations: Make sure that the PIN input is always activated. • Check on the gateway whether the device can be removed from the network without resulting in a failure or danger.

Requirements:	• Removal of device without danger is guaranteed • PIN input function is active
Factory setting:	-
Setting range:	START
Purpose:	• Restart device Corresponds to interruption in power supply
Description:	The network and address parameters are not deleted. Following the interruption in communication, the device attempts to reintegrate into the wireless HART network. Start this function by pressing the M key. Then: Execution depends on input of PIN!

See also

"4.1.5 Disconnect network" (Page 55)

5.6.2.5 "2.5 Reset device"

⚠ CAUTION
Personal injury and damage to property Activation of this function during operation interrupts the connection between the transmitter or router and the network. Depending on the topology, this may result in failure of the WirelessHART network and also personal injury and/or damage to property. Therefore: • Avoid inadvertent operations: Make sure that the password input is always activated. • Check on the gateway whether the device can be removed from the network without resulting in a failure or danger.

Requirements:	• Removal of device without danger is guaranteed: "4.1.5 Disconnect network" (Page 55) • Password function is active.
Factory setting:	-
Setting range:	• START
Purpose:	• Shut down device • Reset all parameters to factory settings • Delete network and address parameters
Description:	Start this function by pressing the **M** key. Then: Execution depends on input of password. If you activate this function, you shut down the device. Reconnection into a WirelessHART network requires a new startup. See: "1 Quick start" (Page 44) If you reestablish the factory state by setting this parameter, a changed PIN is also reset. In order to subsequently reconfigure the device, you require the factory-set PIN "4711". See: Protected from unauthorized access (Page 68)

5.6.3 "3 Diagnostics"

5.6.3.1 "3.1 Identification"

Factory setting:	Read only
Setting range:	-
Purpose:	Identification of device in network
Description:	Display of: • Device name • Device ID

5.6.3.2 "3.2 Connection info"

Factory setting:	Read only
Setting range:	-
Purpose:	Scan connection status
Description:	Display of: • Network status: "Connected" / "Not connected" • Adjacent stations: Number of adjacent stations of device

5.6.3.3 "3.3 Network info"

Factory setting:	Read only
Setting range:	-
Purpose:	Scan information on network
Description:	Display of: • Network ID • Network name

5.6.3.4 "3.4 Device status"

Factory setting:	Read only
Setting range:	-
Purpose:	Scan indicators of device status
Description:	Display of: • Internal temperature of device in °C or °F • Remaining battery service life in days

5.6.3.5 "3.5 Version"

Factory setting:	Read only
Setting range:	-
Purpose:	Check version
Description:	Display of: • Hardware version number • Software version number

5.6.4 "4 Communication"

5.6.4.1 "4.1 Wireless"

"4.1.1 Network ID"

Factory setting:	1229
Setting range:	• 00001 ... 65535
Purpose:	Assign network ID
Description:	Commissioning requirement. Password-protected function. Corresponds to parameter "1.1 Network ID" (Page 44) .

"4.1.2 Network key"

Factory setting:	-
Setting range:	• 32-digit, hexadecimal
Purpose:	Assign network key
Description:	Commissioning requirement. Password-protected function. Corresponds to parameter "1.2 Network key" (Page 44) .

"4.1.3 Connect network"

Requirements:	• Wireless HART gateway is prepared. • All parameters required for commissioning are set. See menu "1 Quick start" (Page 44)
Factory setting:	-
Setting range:	• START
Purpose:	Connect device to wireless HART network.
Description:	Start establishment of the connection by pressing the **M** key. Establishment of the connection is displayed in the measured value view. The supplementary message is deleted when the connection has been established successfully. Corresponds to parameter "1.6 Connect network" (Page 45) .

"4.1.4 Transmission rate"

Factory setting:	60 s
Setting range:	• 8 to 3600 s
Purpose:	Set transmission rate.
Description:	Setting of time intervals at which the transmitter sends measured values. Increase or decrease the parameter value by pressing the ↑ or ↓ key. Corresponds to parameter "1.4 Transmission rate" (Page 44) .

"4.1.5 Disconnect network"

⚠ CAUTION

Personal injury and damage to property

Activation of this function during operation interrupts the connection between the transmitter or router and the network. Depending on the topology, this may result in failure of the wireless HART network and also personal injury and/or damage to property. Therefore:

- Avoid inadvertent operations:
  Make sure that the password input is always activated.
- Check on the gateway whether the device can be removed from the network without resulting in a failure or danger.

Requirements:	• Removal of device from the wireless HART network without danger is guaranteed • PIN input function is active
Factory setting:	-
Setting range:	• START
Purpose:	Interrupt communication of device with other network stations
Description:	Preparation for removal of device. The network and address parameters are not deleted. Through activation of the parameter "4.1.3 Connect network" (Page 54) the device reestablishes the connection. Start this function by pressing the **M** key. Then: Execution depends on input of PIN!

See also

"2.4 Cold restart" (Page 50)

"2.5 Reset device" (Page 51)

5.6.4.2 "4.2 Maintenance port"

"4.2.1 HART modem"

Factory setting:	HART active
Setting range:	• Active • Inactive
Purpose:	Activate/deactivate HART maintenance port.
Description:	The HART maintenance port is always activated in the factory default setting. In order to increase the battery service life, we recommend the "Inactive" setting. Select the list entries using the ↑ or ↓ key. Accept the setting by pressing the **M** key. Corresponds to parameter "1.5 HART modem" (Page 45) .

"4.2.2 HART address"

Factory setting:	0
Setting range:	0 ... 255
Purpose:	Address device for communication via HART maintenance port
Description:	Assign a HART address for HART communication with external PG / PC or HART communicator via the HART maintenance port. Increase or decrease the address using the ↑ or ↓ keys. Accept the setting by pressing the **M** key.

"4.2.3 Number response preambles"

Factory setting:	5
Setting range:	5 ... 20
Purpose:	• Set number of response preambles • Protection of HART communication
Description:	Sending and receipt of a specific number of preambles signals that data transmission has actually commenced between PG / PC and the field device (via the HART maintenance port). The communication stations thus differentiate between data and interfering signals. Increase or decrease the number of preambles using the ↑ or ↓ keys. Accept the setting by pressing the **M** key.

5.6.5 "5 Security"

5.6.5.1 "5.1 Active / inactive"

Factory setting:	Inactive
Setting range:	• Active • Inactive
Purpose:	Activate/deactivate PIN input as security function
Description:	If you activate this function, certain parameters and functions can only be set or executed following input of a PIN.

5.6.5.2 "5.2 PIN input"

Factory setting:	-
Setting range:	-
Purpose:	• Enter master pin • Unlock device
Description:	Unlocking of device following loss of PIN. You can obtain the required master pin from the Siemens Hotline. Keep ready the information from the nameplate. Additional information is available in Chapter Troubleshooting/FAQs (Page 81)

5.6.5.3 "5.3 Change PIN"

Factory setting:	0000
Setting range:	0000 ... 9999
Purpose:	• Change factory-set PIN "4711" • Define own PIN
Description:	Your own PIN overwrites the factory-set PIN "4711". If you forget your own PIN, you must unlock the device using the master PIN, see "5.2 PIN input" (Page 57) Enter your own PIN using the ↑ or ↓ keys. Confirm input using the **M** key.

5.6.5.4 "5.4 Set level 0"

Requirement:	• "5.1 Active / inactive" (Page 57) is "Active". • "5.5 Timeout" (Page 58) is "Off". • The PIN has been entered in order to set a protected parameter: Device in safety level 1.
Factory setting:	Off
Setting range:	• Off • On
Purpose:	• Activate PIN input function again • Exclude unauthorized users • Set device to safety level 0 (no changes to configuration possible).
Description:	If you select the setting "On", the PIN input is immediately switched on again. You must enter the PIN again in order to change protected parameters. The device is then in safety level 1, and changes to the configuration are possible.

5.6.5.5 "5.5 Timeout"

Factory setting:	On
Setting range:	• Off • On
Purpose:	Limit time for changes to password-protected functions.
Description:	If you select the setting "On", you limit the time span for changes to further parameters or functions protected by a PIN. If you select the setting "Off", protected functions remain changeable following the PIN input. In order to protect your device, you must manually trigger "5.4 Set level 0" (Page 58).

5.6.6 "6 Language"

Factory setting:	English
Setting range:	• English • German
Purpose:	Language selection
Description:	With this parameter you specify the language of the menu.

5.7 Setting language

Requirements

- The device is ready for commissioning
- You are acquainted with the principles of operation: Use of local user interface (Page 38)

Procedure

Changing the language setting

- Menu: "6 Language" (Page 59)
- The default setting is "English".

5.8 Canceling the password protection

Requirements

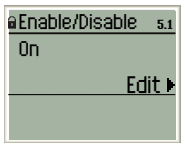
- The device is ready for commissioning
- You are acquainted with the principles of operation: Use of local user interface (Page 38)

Procedure

You must deactivate the PIN input function so that the device configuration can be changed.

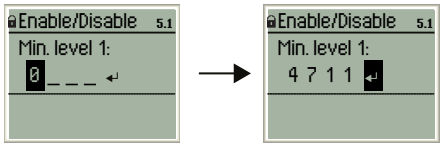
If the device is in the factory state, the PIN input function is preset.

1. Parameter. Call "5.1 Active / inactive" (Page 57).

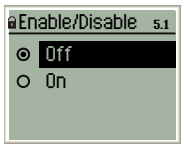


2. Begin with input of the PIN.

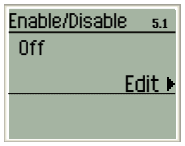
   If the device is in the factory state, enter the preset PIN "4711".



3. Select setting "Inactive", and confirm.



4. The PIN input function is canceled.



   Change further parameters, or call the measured value view.

5.9 Quick start

Requirement

- The device hardware is prepared for connection to the wireless HART network.

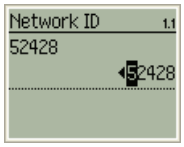
  Commissioning (hardware) (Page 21)
- You are acquainted with the principles of operation: Use of local user interface (Page 38)

Procedure

1. Enter network ID.

   Parameter: "1.1 Network ID" (Page 44)

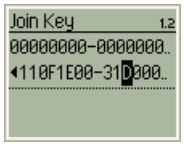
   Only use the network ID which you have saved in the gateway.



2. Enter network key.

   Parameter: "1.2 Network key" (Page 44)

   Only use the network key which you have saved in the gateway.



3. Specify device name.

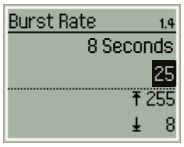
   Parameter: "1.3 Device name" (Page 44)

   Following integration of the device into the wireless HART network, the device name is available in the gateway.

   The device name can also be changed subsequently from the gateway.

4. Define transmission rate for measured values.

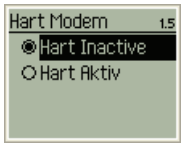
   Parameter: "1.4 Transmission rate" (Page 44)



5. Switch off HART maintenance port.

   Parameter: "1.5 HART modem" (Page 45)

   Switching-off the HART maintenance port reduces the energy consumption and thus reduces the battery service life.



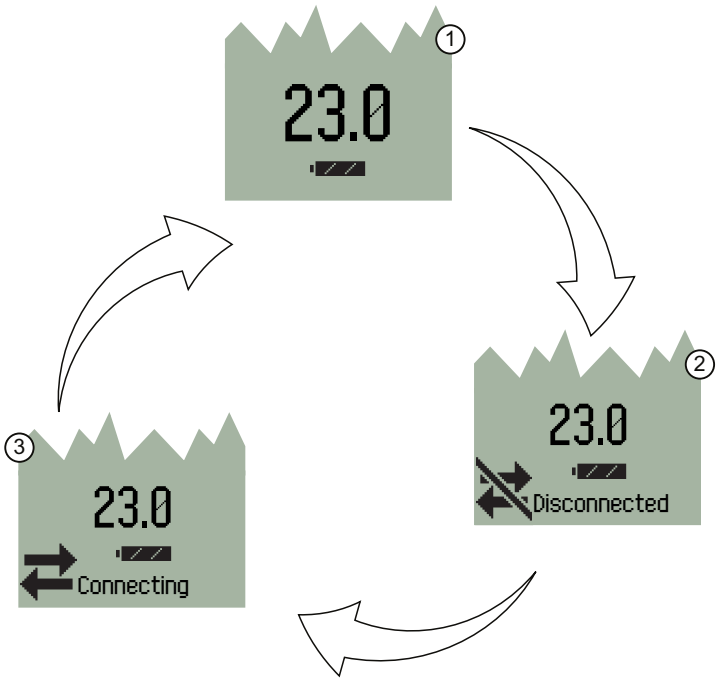
6. Establish connection to gateway.

   Parameter: "1.6 Connect network" (Page 45)

5.10 Connect/disconnect

Overview

The status of the connection to the WirelessHART network is indicated by the three connection modes ①, ② and ③.



① Connected: Establishment of connection successful. Digital display in measurement view.
② Network connection disconnected.
③ Establishment of connection being attempted ("Force join-Mode").

Figure 5-2 Connection modes

Connection mode "Wireless HART network disconnected"

Trigger:

- An existing connection to the gateway has been interrupted, e.g. by parameter "4.1.5 Disconnect network" (Page 55)

Connection mode "Connect"

The device attempts to establish a connection to the WirelessHART network. Trigger:

- Attempt to connect started via external devices:
  - HART modem
  - Control system
- The device is started up.

  Quick start: Menu "1.6 Connect network" (Page 45)

- The attempt to connect is forced.

  Connect network: Parameter "4.1.3 Connect network" (Page 54)

Connection mode "Connected"

The change to the measured value view signals that a connection to the WirelessHART network exists.

5.11 Measure temperature

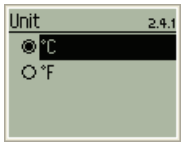
Requirement

You are acquainted with the principles of operation: Use of local user interface (Page 38)

Procedure

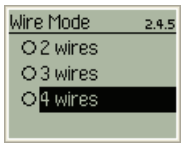
1. Select unit.

   Parameter: "2.3.1 Unit" (Page 48)



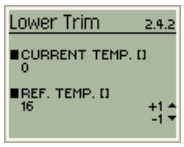
2. Set the sensor pin connections.

   Parameter: "2.3.5 Connections settings" (Page 49)



3. Sensor calibration: Set value for lower adjustment (optional).

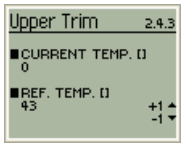
   Parameter: "2.3.2 Lower adjustment" (Page 48)



4. Sensor calibration: Set value for upper adjustment (optional).

   Setting option only displayed following change to "Lower adjustment".

   Parameter: "2.3.3 Upper adjustment" (Page 48)



5. Reset sensor calibration. Then repeat steps 3 or 3 and 4 as necessary.

   Parameter: "2.3.4 Reset adjustment" (Page 49)

5.12 Increase service life

Requirement

- You have executed the quick start function: Quick start (Page 62)
- You are acquainted with the principles of operation: Use of local user interface (Page 38)

Procedure

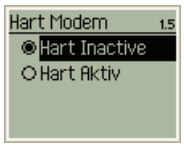
1. Switch off HART maintenance port.

   Parameter:

   – "1.5 HART modem" (Page 45)or

   – "4.2.1 HART modem" (Page 56)

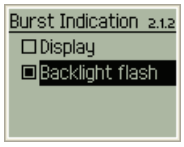
   Switching-off the HART maintenance port reduces the energy consumption and thus reduces the battery service life.



2. Set "Burst display" function.

   Parameter: "2.1.2 Burst display" (Page 46)

   The battery service life is highest if both checkboxes are deactivated.



5.13 Protected from unauthorized access

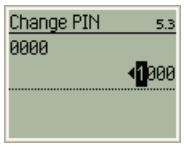
Requirement

You are acquainted with the principles of operation: Use of local user interface (Page 38)

Procedure

1. Change factory-set PIN.

   Parameter: "5.3 Change PIN" (Page 57)



2. Activate/deactivate PIN input

   Parameter: "5.1 Active / inactive" (Page 57)

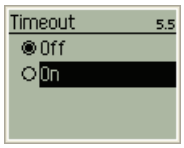
   "Active": PIN input is active.

   "Inactive": PIN input is canceled.

3. Set timeout if applicable.

   Parameter: "5.5 Timeout" (Page 58)

   "On": Time window for reactivation of PIN input. Following expiry of the timeout, the PIN input is reactivated automatically.



4. Set user privileges to level 0.

   Parameter: "5.4 Set level 0" (Page 58)

   Interrupts the timeout. Renewed input of the PIN is required in order to change the device configuration.

Note

Response when resetting the device

If you reestablish the factory state by setting the parameter "2.5 Reset device" (Page 51), the changed PIN is also reset. In order to subsequently reconfigure the device, you require the factory-set PIN "4711".

5.14 Set HART functions of the HART maintenance port

Overview

Using the procedure described below, you can prepare your transmitter for the connection of external devices to the HART maintenance port.

Requirement

You are acquainted with the principles of operation: Use of local user interface (Page 38)

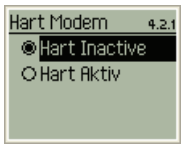
Procedure

1. Switch on HART maintenance port.

   Parameter:

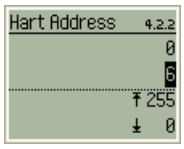
   "4.2.1 HART modem" (Page 56)

   The energy consumption is increased when the HART maintenance port is switched on. Deactivate the parameter when you have finished with the connection to the external HART device.

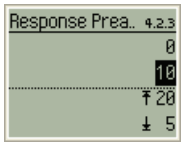
2. Define HART address for communication with the external device.

   Parameter: "4.2.2 HART address" (Page 56)

3. Define number of HART response preambles.

   Parameter: "4.2.3 Number response preambles" (Page 56)

Installing/mounting 6

6.1 Safety guidelines

⚠ WARNING
Escape of dangerous media The device can also be used in processes with dangerous media. Hot and/or toxic media under pressure may cause severe personal injury or damage to property if they escape. Observe the appropriate regulations for equipment under pressure, especially in the following cases: • Design • Installation/removal • Operation
CAUTION
Limitation of degree of protection If the device is open, IP65 protection is no longer guaranteed.
CAUTION
Damage to device through disregard of mounting guidelines The following mounting guidelines apply in order to avoid damage: • Make sure prior to mounting that the device is appropriate with regard to the process connection, media compatibility, temperature resistance and measuring range. Check that the required technical specifications agree with the data on the nameplate. Technical data (Page 85) . • The device housing must always be closed following mounting.
CAUTION
Damage to device through impermissible temperature effects A temperature outside the permissible limits will damage your device. For data on the temperature limits, refer to Ambient conditions (Page 86) . Make sure that the permissible ambient temperature at the mounting location is not exceeded. Additionally protect your device from direct heating effects.
NOTICE
Reduced accuracy through unfavorable mounting location Selection of the mounting location influences the measuring accuracy. Therefore mount the device as close as possible to the measuring point. Make sure that the mounting location is free from vibrations and other negative environmental influences.

6.2 Mounting and connection guidelines

Process connection

Make sure that the device is suitable for the respective process. Pay particular attention to the media compatibility, temperature resistance and measuring range.

Any gaskets which are required must be suitable for the process connection and resistant to the measured media.

Select the position of the process connection such that the antenna of the connected wireless HART device points vertically upwards. This guarantees optimum transmitter and receiver performance of the field device.

6.3 Mounting positions

The adjustability of the display and antenna allow flexible integration of the device in your process. Select mounting positions where the antenna points vertically upwards. This guarantees optimum linking to the wireless HART network.

The service life of the battery is increased if its positive pole also points vertically upwards.

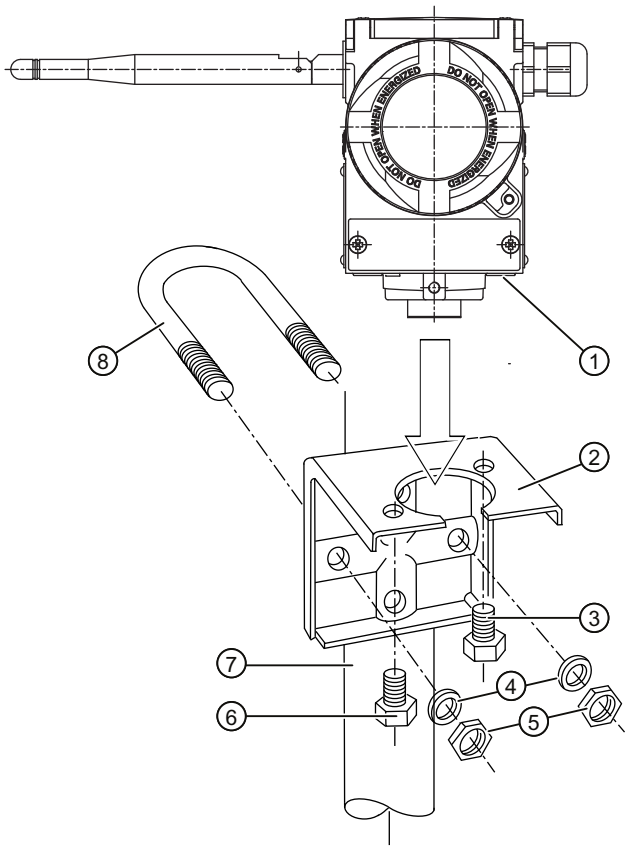
Impermissible are mounting positions and locations where the limits defined for the device are violated. For corresponding data, refer to Technical data (Page 85) .

6.4 Mounting of device using bracket

Requirements

- The sensor is connected.
- The battery has been fitted.
- All housing covers are screwed tight.

Example



① Housing with mounting holes
② Mounting bracket (90° rotatable)
③ Bolt [thread data]
④ Washer [thread data]
⑤ Nut [thread data]
⑥ Bolt [thread data]
⑦ Pole
⑧ Pole clamp

Figure 6-1 SITRANS TF 280 WirelessHART mounting example

Procedure

Note

Permitted mounting positions

The mounting holes in the bracket ② and the device housing ① determine the permitted mounting positions.

1. Secure the mounting bracket.

   Secure the mounting bracket ② with the pole clamp ⑧, washers ④ and nuts ⑤ on the pole ⑦.

2. Insert the housing ① onto the mounting bracket ②.
3. Tighten the screws ③ and ⑥ with a torque of [torque data].

6.5 Changing the display orientation

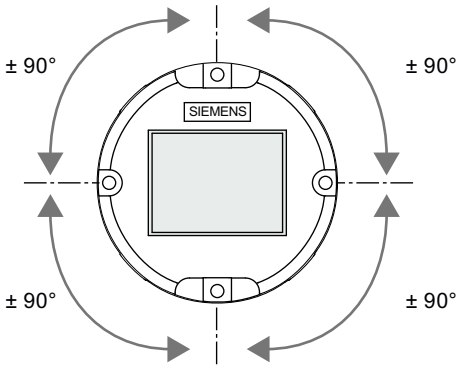
You can subsequently rotate the display unit of your device by 90°.

Requirement

- You have removed the battery.
- You are protected against electrostatic discharging.

Procedure

1. Unscrew the front cover of the housing.
2. Unscrew the M3 x 14 screws from the display unit housing.
3. Remove the display unit to the front.
4. Rotate the display unit by 90° and replace onto the base:



5. Insert the mounting screws into their holes.
   Tighten the screws with a torque of approx. 1 to 2 Nm.

Connecting

7

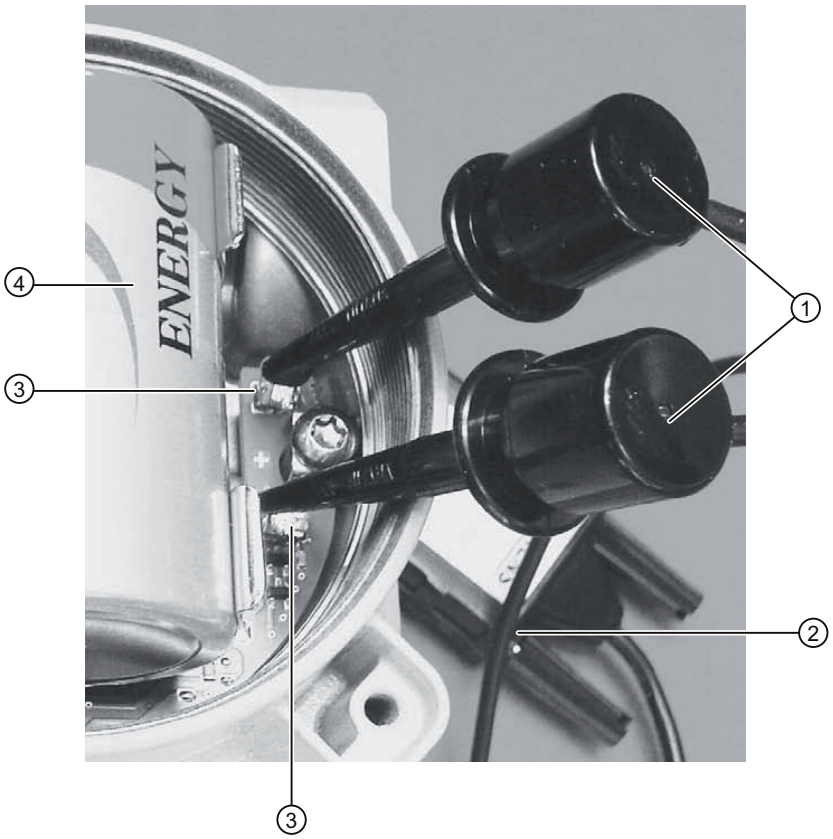
7.1 Connect external devices to the HART maintenance port

Requirement

The following conditions must be fulfilled before connecting external devices:

- The battery is fitted and supplies the transmitter with power.
- The HART maintenance port is active.
- The external device is set up for the connection.

Procedure



① Terminals
② HART modem
③ HART maintenance port
④ Battery

Figure 7-1 Terminals on the HART maintenance port

1. Open the device.

   To do this, unscrew the cover at the rear of the device.
2. Secure the terminals of the HART modem or HART communicator on the HART maintenance port.
3. Begin with changing of the settings.

   The following applies if you use a SIMATIC PDM Engineering Tool:

   – Connect the HART modem to your PG / PC.
   – Establish a connection between Engineering Tool and device.
4. Remove the connection: Carry out steps 1 to 3 in the reverse order.

Alarm, error, and system messages 8

8.1 Overview of messages and symbols

Convention

In this section, "message" is used as a general term for all information that is shown on the digital display. In particular, messages include the following:

- Alarm messages
- fault indications
- Status information

Display behavior on local user interface

Messages are shown in the measurement view of the digital display.

The digital display shows an active alarm as a combination of symbols and text. The symbol displays the type and severity of the alarm. The symbol for the most serious alarm will flash.

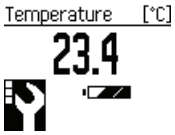


Figure 8-1 Display response of messages (example)

Characteristics of messages

The following table summarizes the possible types of messages in an overview. The number of dots assigned to the symbol defines the importance level of the message.

Icon	Message	Description/Significance
	Maintenance alarm	e.g.: Sensor breakage, memory error, device malfunction • Aging reserve of device or fitting expired • A sudden fault has occurred The measured values are invalid. Device maintenance is necessary to reestablish the functionality.
	Maintenance demanded	e.g.: Electronics fault, internal temperature error
	Maintenance required	Maintenance is recommended.
	Process value alarm	One or more process values are creating a problem. Therefore the device is not measuring any process values.
	Process value warning	There is a problem with one or more process values. Measured values are produced but they may be uncertain. Example: A process value exceeds the device specification.
	Process value tolerance	One or more process values have reached the tolerance limit. Only adjustable using an engineering tool, e.g. SIMATIC PDM.
	Data exchange	Device establishes connection to wireless HART network.
	Data exchange	Connection to wireless HART network not available.
	Write protection ON	Key locking is set, or device functions are password-protected.
	Battery exhausted	Critical battery status. Battery must be replaced.
	Low battery capacity	Charging level approx. 33%
	Sufficient battery capacity	Charging level approx. 66%
	Fully charged battery	Charging level 100%

Troubleshooting/FAQs

9

9.1 Password forgotten?

How do I get a new master PIN?

If you have changed the factory-set PIN and the device refuses to accept a different PIN, please phone your Siemens partner.

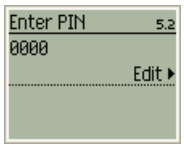
You will then be provided with a new master PIN to unlock your device. The following information is required:

- Device type
- Serial No. of the device

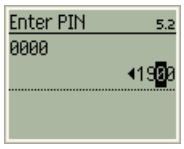
How do I unlock the device?

1. Call the input option.

   Parameter: "5.2 PIN input" (Page 57)



2. Enter master PIN and confirm.



3. Define new PIN.

   Parameter: "5.3 Change PIN" (Page 57)

9.2 Returning of battery

Procedure

NOTICE
Environmental protection The high-performance battery used contains lithium thionyl chloride. The internal components of the battery must not pollute the environment. Do not dispose of the battery in the domestic refuse.

Please contact your regional partner concerning the procedure for replacing old batteries. You can find additional information in the Internet at:

Regional contacts (http://www.automation.siemens.com/partner/guiselectcountry.asp?lang=en&regid=def&aktstep=3&contid=1)

9.3 Return process for battery-operated devices

WARNING

Remove the battery unit before returning the device

Before returning the device, remove the battery unit. Battery units must not be returned. Lithium thionyl chloride high-performance batteries belong to dangerous goods class 9: Miscellaneous hazardous materials and substances. Read the accompanying safety data sheet.

Return procedure

Attach the bill of lading, returned goods document and decontamination certificate in a firmly affixed clear plastic pouch on the outside of the packaging.

Required forms

- **Bill of lading**
- **Return document** with the following information:
  - Product (item description)
  - Number of returned devices/replacement parts
  - Reason for returning the item(s)
- **Decontamination declaration**

  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 the device/replacement part before returning it, in order to ensure that all hollow areas are free of hazardous substances. Check the item after it has been cleaned.

  Any devices/replacement parts which are returned without a decontamination declaration will be cleaned at your cost before further processing.

The form is available on the Internet.

9.4 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) 180 5050 222
  (0.14 €/min for calls from the German fixed network, different prices possible for calls from cellular phone networks)
- **Fax:** +49 (0) 180 5050 223

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

Service & Support on the Internet

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

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

There you will find:

- The latest product information, FAQs, downloads, tips and tricks.
- Our newsletter, providing you with the latest information about your products.
- A Knowledge Manager to find the right documents for you.
- Our bulletin board, where users and specialists share their knowledge worldwide.
- You can find 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)

A signpost to the documentation of the various products and systems is available at:

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

See also

Product information on SITRANS T in the Internet (http://www.siemens.de/sitranst)

Further information on wirelessHART (http://www.siemens.com/wirelesshart)

Appendix A

A.1 Technical data

A.1.1 General technical specifications

General technical specifications	
Device	
Type	SITRANS TF280 WirelessHART temperature sensor Low-power operation
Housing	• GD-AlSi12 low-copper aluminum casting • Polyester-based paint for AlSi12 housing • Nameplate made of stainless steel
Weight	1.5 kg
Operator interface	• Local user interface – Digital display – Menu control – 3 control keys
Degree of protection	IP65

A.1.2 Input

Technical specifications	
Measured variable	Temperature
Sensor type	Pt100 resistance thermometer (IEC 60751)
Sensor supply	100 µA
Measuring range	-200 °C ... +850 °C / -328 °F …+1562 °F
Measuring unit	°C or °F
Characteristic	Linear to temperature or special characteristic curve
Type of connection	Two-, three- or four-wire input

A.1.3 Output

Technical specifications	
Output	• Wireless HART, frequency 2.4 GHz • HART maintenance port

A.1.4 Measuring accuracy

Technical specifications	
Operating temperature	-40 °C ... +80 °C / -40 °F …+176 °F
Measuring accuracy	Including hysteresis and repeatability ±0.5 °C or better
Ambient temperature effect	±0.1 °C / 10 K

A.1.5 Ambient conditions

Technical specifications	
Ambient temperature (operation)	-40 ... +80 °C (-40 ... +176 °F)
Storage temperature (without battery)	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	<95 %
Climate class	4K4H, in accordance with EN 60721-3-4 (stationary use at locations not protected against weather)
EMC conditions	In accordance with DIN EN 61326
Degree of protection	IP65/NEMA 4

A.1.6 Mechanical design

Technical specifications	
Housing	Die-cast aluminum
Impact resistance	In accordance with DIN EN 60068-2-29 / 03.95
Vibration resistance	• DIN EN 60068-2-6/12.07 • 20 ≤ f ≤ 2000 Hz • 0.01 g²/Hz
Weight	Approx. 1.5 kg (without battery)
Dimensions (W x H x D)	See Dimension drawings (Page 88)

A.1.7 Communication

Technical specifications	
Communication	
Wireless standard	In conformance with wireless HART V7.1
Transmitter frequency band	2.4 GHz (ISM)
Transmission range	
Outdoors	Up to 250 m (visual connection)
Indoors	Up to 50 m (depends on hindrances)
Interface	• Wireless HART maintenance port: Input/output for HART communication with HART modem • Antenna (wireless HART)

A.1.8 Power supply

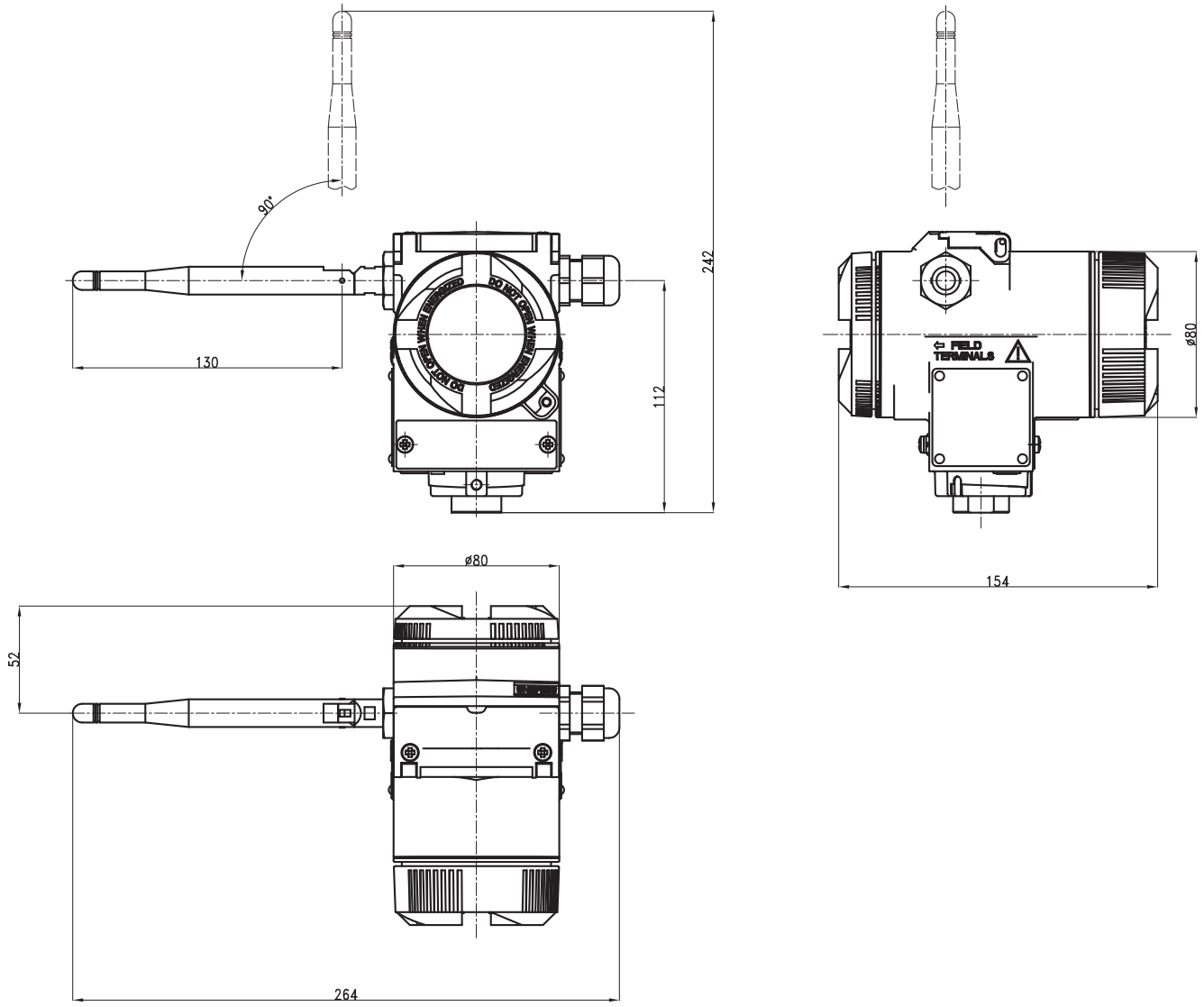
Technical specifications	
Power supply	
Battery	Lithium thionyl D-cell
Battery voltage	3.6 V DC
Max. current (I_{max})	100 mA
Battery life	Up to 5 years with optimum conditions of use and activation of all energy-saving functions

A.1.9 Certificates and approvals

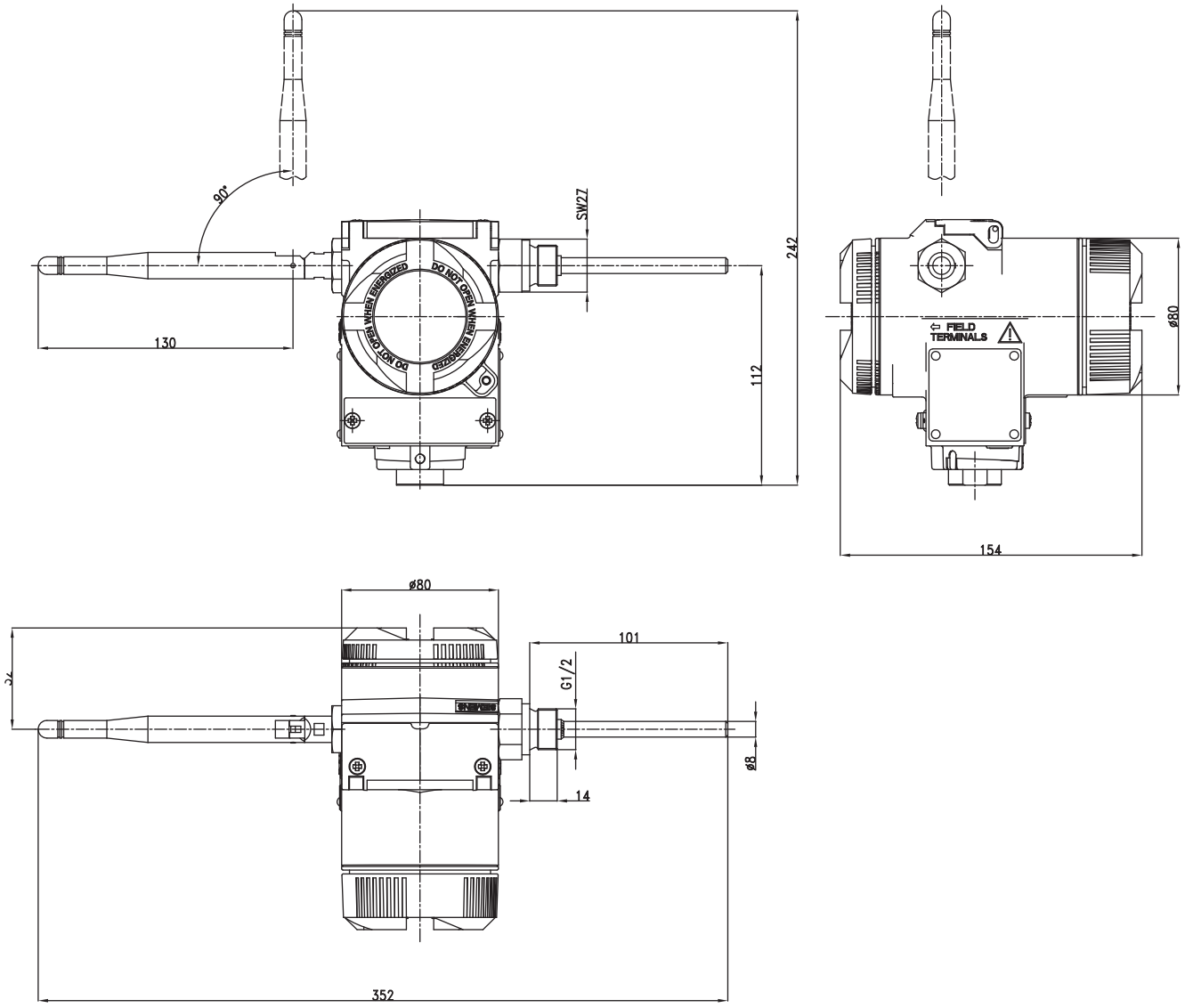
Technical specifications	
Device safety	IT standard IEC / EN 60950-1:2006
Radio module FCC ID	SJC-M2140
Explosion protection	-

A.2 Dimension drawings

A.2.1 Dimensions of SITRANS TF280 with cable gland



A.2.2 Dimensions of SITRANS TF280 with Pt100



A.3 Spare parts/accessories

Accessories	
Item	**Order No.**
Battery	**7MP1990-0AA00**
Mounting bracket	
Steel	**7MF4997-1AC**
Stainless steel	**7MF4997-1AJ**
Cover (die-cast aluminum)	
Without inspection window	**7MF4997-1BB**
With inspection window	**7MF4997-1BE**
Threaded adapter	
M20 x 1.5 → ½" NPT	**7MP1990-0BA00**
M20 x 1.5 → G½ [1)]	**7MP1990-0BB00**

[1)] In preparation.

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