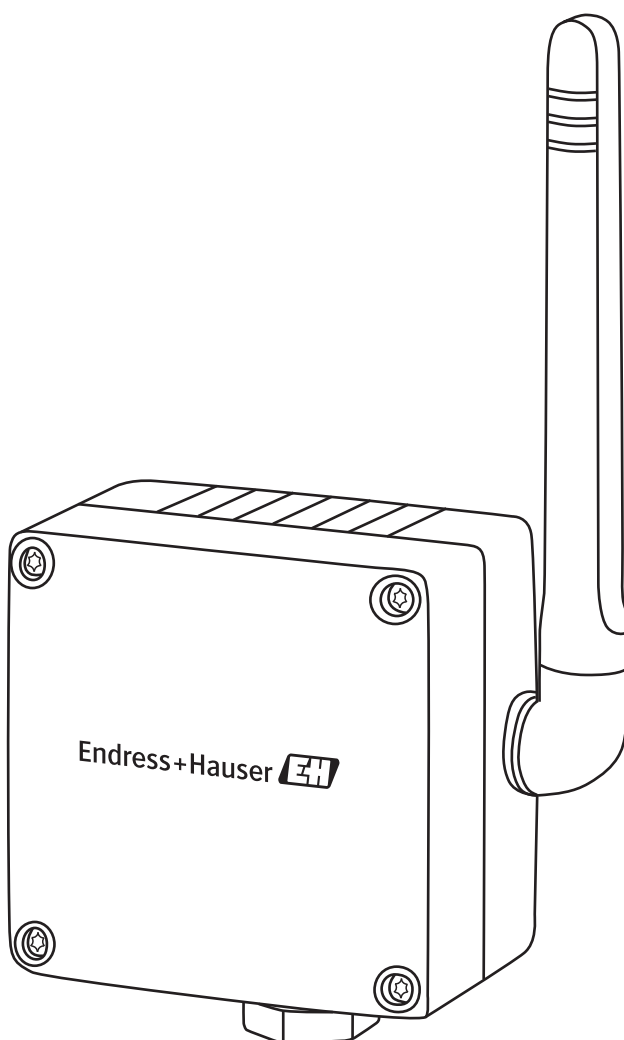Operating Instructions

WirelessHART adapter SWA70

Smart wireless module
with power supply for field devices

WirelessHART

Endress+Hauser

People for Process Automation

Table of contents

Revision history

Product version	Manual	Changes	Remarks
1.00.xx	BA061S/04/en/03.09	Original	–
1.01.xx	BA061S/04/en/11.09	All sections	Amendments
		Section 2	Storage
		Section 4	Pipe mounting
		Section 5	Terminal assignment, 2 additional wiring diagrams
		Section 7	Connected HART field devices, connection of the HART modem and installation of the modem driver, installation of the adapter DTM, FieldCare DTM catalog update
		Section 8	Setting the burst mode
		Section 9	Completely new
		Section 10	Disposal
		Section 11	Troubleshooting
		Section 12	Technical data
1.02.xx	BA061S/04/en/07.10	Section 8	Graphic with overview of burst mode
		Section 8	Graphic with overview of event notification Table for device-specific event screen
		Section 11	Troubleshooting: Problem 3 amended
		General	Updated screenshots, minor editorial changes
1.02.xx	BA00061S/04/en/13.10	Section 2.2	Order number: approval
		Section 8.4.3	Device-specific event mask: byte 6, bit 0
		Section 12.6	Fig. 12-1: Housing dimensions of SWA70
1.02.xx	BA00061S/04/en/14.11	Section 1.3	Hazardous area
		Section 1.5, 12.5, 12.8	Additional telecommunication approvals
		Section 2.2	Amendments, Fig. 2-1: Nameplate
		Section 2.3	New
		Section 4.5.1	Reworked incl. Fig. 4-4
		Section 4.5.2	Fig. 4-5
		Section 5.2.2	Direct mounting, remote mounting
		Section 7.3	Changed
2.00.xx	BA00061S/04/en/15.12	All sections reworked	New power supply units: "wide range power unit", "intrinsically safe power unit" and "solar module connection".
		Section 2.4	New radio approvals: "Brazilian ANATEL radio approval" and "Mexican COFETEL radio approval"
		Section 5	New
		Section 6.2	New
		Sections 7 to 9	New DTM version SWA70 V2.xx.

Product version	Manual	Changes	Remarks
2.00.xx	BA00061S/04/en/16.13	General	Updated screenshots, editorial changes
		Section 2.1.2	Scope of delivery
		Section 5.1.1	Warning
		Section 5.1.6	Connecting the M12 socket
		Section 5.3.2, 5.3.3, 5.3.5	Note
		Section 6.2.2	LED
		Section 8.3.1	Order Code parameter
		Section 8.3.3	Wake-up Detection parameter
		Section 8.3.6	Setting the burst mode
		Section 12.3	Cable specification
2.00.xx	BA00061S/04/en/17.13	Section 2.2	Fig. 2-1 updated
		Section 2.3	Housing AISI 316L
		Section 5.1	Warning notice and note
		Section 5.1.2	Warning notice and Fig. 5-2 updated
		Section 11	Troubleshooting: Problem 3 amended
		Section 12.3	Power supply: current consumption and power consumption
		Section 12.6	Mechanical construction: weight and degree of protection
2.00.xx	BA00061S/04/en/18.14	General Section 12.5	Editorial changes Telecommunication approval
2.30.xx	BA00061S/04/en/19.15	General	Simplified document structure. "Technical data" section included in Technical Information (TI).
2.40.xx	BA00061S/04/en/20.16	General Section 4.3	Editorial changes New Section: Positioning the SWA70

Note!

NOTE
- For the valid connection data for the Ex versions, see the separate document "Safety instructions (XA)". For the valid XA, see the nameplate.

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1 Safety instructions

1.1 Designated use

The WirelessHART adapter SWA70 is a smart wireless module designed for the wireless transmission of 4 to 20 mA HART signals from connected field devices to a WirelessHART Fieldgate SWG70.

Information about the designated use of the connected field devices and the Fieldgate is provided in the devices' individual operating manuals.

1.2 Installation, commissioning and operation

The WirelessHART adapter can be operated safely in compliance with the current technical safety standards and the applicable EU guidelines. Field devices connected to the WirelessHART adapter must also be operated in accordance with the current technical safety standards and the applicable EU guidelines.

The WirelessHART adapter can be a source of danger if it is not installed correctly or if it is used in applications for which it is not intended.

The WirelessHART adapter may only be installed, connected to the electricity supply, commissioned, operated and maintained by trained, qualified specialists authorized to perform such work by the facility's owner-operator. The specialist staff must have read and understood these Operating Instructions and must follow the instructions they contain. The devices may not be modified or repaired in any way.

These specifications also apply for the battery unit.

Note!

`NOTE` Changes or modifications to the WirelessHART adapter that have not been expressly approved by Endress+Hauser will render invalid the user's right to operate the equipment.

1.3 Operational safety

Applications

The WirelessHART adapter meets the requirements of the EU guidelines for the various range of applications envisaged for the device. The permitted operating conditions must be observed. See the Technical Information document for "WirelessHART Adapter SWA70" (TI00026S).

Hazardous area

A hazardous-area version (Ex version) of the WirelessHART adapter is available for use in hazardous areas.

- The non-hazardous area version (non-Ex version) of the WirelessHART adapter is only suitable for use outside hazardous areas.
- Depending on the particular approval, the intrinsically-safe and dust ignition-proof versions of the device can be deployed in the corresponding hazardous areas.
  The field devices that are connected to the hazardous-area versions of the WirelessHART adapter must also be suitable for use in hazardous areas.
- If a WirelessHART adapter has been used in a non-Ex system it may no longer be installed in an Ex system. This is because of the risk that the protective circuits might have become overloaded accidentally and then not work correctly in the Ex system.

Please note the following if you use components in hazardous areas:

- Make sure that the operating staff in charge of installing and maintaining the device are suitably trained and qualified.
- Ensure that all the system components have the appropriate safety certificates.
- Heed information provided in the device safety certificates, and comply with local and national regulations.

Battery unit

The WirelessHART adapter is designed to power a field device. In the battery version, power is supplied via a high-power lithium-thionyl chloride battery unit. This has implications for operational safety and storage. Please refer to the hazardous materials regulations described in the Safety Data Sheet (www.endress.com).

Operation

⚠ CAUTION

Caution!

A distance of at least 20 cm must be maintained at all times between the device antenna and the body of the user or any other person in the vicinity irrespective of the application or use.

Maintenance

⚠ WARNING

Warning!

- The housing of the WirelessHART adapter may not be opened in hazardous areas if dust is present. The battery unit can only be replaced in a dusty atmosphere if adequate ventilation ensures the environment is free of dust.
- Any tampering with the antenna, electronics or battery unit invalidates Endress+Hauser's warranty along with the telecommunications approval and hazardous area approval.

The housing of the hazardous-area version may be opened in the presence of gases in hazardous areas for the purpose of commissioning the device and replacing the power supply unit.

The housing may be opened outside hazardous areas for the purpose of commissioning the device and replacing the power supply unit.

WirelessHART adapters with an electronically controlled power supply unit do not require any maintenance. In the case of WirelessHART adapters with a battery unit, the battery unit is the only component that may be replaced. The WirelessHART adapter may not be repaired.

If the device is faulty or malfunctions, return the device to Endress+Hauser. Follow the instructions outlined in "Return" on page 88. In the case of devices with a battery unit, the battery unit must be removed before the device is returned.

1.4 Declaration of Conformity

All the Declarations of Conformity can be found on www.endress.com

CE mark

The WirelessHART adapter SWA70 meets the legal requirements of the relevant EC guidelines. Endress+Hauser confirms that the WirelessHART adapter SWA70 has been successfully tested by affixing to it the CE mark. An EC Declaration of Conformity has been issued for the hazardous area versions and non-hazardous area versions.

1.5 Technical improvement

Endress+Hauser reserves the right to make technical improvements to the hardware and software anytime without prior notice. Such improvements are not documented if they do not affect the operation of the device. A new version of the Operating Instructions is created if the improvements affect operation.

1.6   Conventions used in this manual

Typographical emphasis and special symbols have been used to provide a clear structure to the contents of these Operating Instructions and to highlight important information.

Pay particular attention to the safety conventions and icons used in these Operating Instructions.

Safety instructions

Symbol	Meaning
⚠ DANGER	**Danger!** This symbol alerts you to dangerous situations. Failure to heed the instructions will result in a serious or fatal injury.
⚠ WARNING	**Warning!** This symbol alerts you to dangerous situations. Failure to heed the instructions can result in a serious or fatal injury.
⚠ CAUTION	**Caution!** This symbol alerts you to dangerous situations. Failure to heed the instructions can result in a mild to medium injury.
NOTE	**Note!** This symbol refers you to procedural information and other facts that do not result in physical injury.

Type of protection

Symbol	Meaning
	Explosion-protected, type-examined equipment If the device has this symbol embossed on its nameplate, it can be used in a hazardous area or a non-hazardous area, depending on the approval.
	Hazardous area This symbol is used in the drawings of these Operating Instructions to indicate hazardous areas. – Devices located in hazardous areas, or cables for such devices, must have appropriate explosion protection.
	Safe area (non-hazardous area) This symbol is used in the drawings of these Operating Instructions to indicate non-hazardous areas. – Devices in the non-hazardous area also have to be certified if connecting cables lead into the hazardous area.

Electrical symbols

Symbol	Meaning
	Direct current A terminal to which DC voltage is applied or through which direct current flows.
	Alternating current A terminal to which alternating voltage (sine-wave) is applied or through which alternating current flows.
	Ground connection A grounded terminal which, as far as the operator is concerned, is already grounded via a grounding system.
	Protective ground connection A terminal which must be connected to ground prior to connecting any other terminals.
	Equipotential connection A connection that has to be connected to the plant grounding system: This may be a potential equalization line or a star grounding system depending on national practice or company codes of practice.

2   Identification

2.1   Unpacking the product

2.1.1   Visual inspection

When unpacking the product:

- Check the packaging for visible signs of damage in transit.
- Remove the packaging carefully in order to prevent any damage.
- Keep the original packaging in case you need to transport the WirelessHART adapter another time.
- Keep the documentation supplied with the adapter in a safe place.

2.1.2   Scope of delivery

Check that the delivery is undamaged and that nothing is missing before you start commissioning.

The delivery comprises:

- WirelessHART adapter
- For versions "prepared for battery unit": battery unit for WirelessHART adapter
- For versions with electronically controlled power supply unit: M12 socket, ferrite sleeve
- Quick Guide

Optional:

- Wall/pipe mounting bracket
- Cable for electrically connecting the WirelessHART adapter to a field device
- Double-threaded connection adapter: M20 or G 1/2 with two seals, NPT 1/2 or NPT 3/4 with one seal
- Cable gland with one seal
- FieldCare Device Setup DVD
- Folder containing important documents (including safety documents)

⚠ WARNING

Warning!
- If you discover that the battery unit is damaged, proceed as described in the Safety Data Sheet.
- If you discover that the WirelessHART adapter is damaged, the device may not be put into operation.
  In this case, contact your Endress+Hauser sales partner. Where possible, return the device to Endress+Hauser in its original packaging.

2.1.3 Storage and transportation

While the WirelessHART adapter is a robust device, appropriate precautions must be taken to ensure proper storage and transportation:

Storage

Comply with permitted storage temperature range. See the Technical Information document for "WirelessHART Adapter SWA70" (TI00026S).

WirelessHART adapter with battery unit: store the WirelessHART adapter with the battery unit disconnected.

Store the WirelessHART adapter and/or battery unit as follows:

- Store in a cool, aerated and dry environment
- Do not store near sources of heat, naked flames, food and beverages.

Transportation

When transporting the WirelessHART adapter it must be protected against strong vibrations or shock.

Warning!

⚠ **WARNING**

- High-power lithium-thionyl chloride batteries are classified as a Class 9 hazardous material (HAZMAT Class 9: Miscellaneous). Please refer to the hazardous materials regulations provided in the Safety Data Sheet.

2.2 Nameplate

The nameplate is located on the side of the WirelessHART adapter, and contains all the important information such as the order code, serial number and radio approvals. Additional information about the radio approval is provided on a separate adhesive label.
See figure 2-2 on page 13.
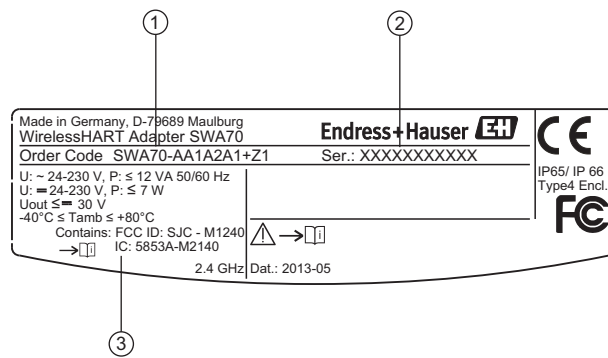
Fig. 2-1: Nameplate (example)

1 Order number
2 Serial number
3 Radio and approval information

Radio approvals
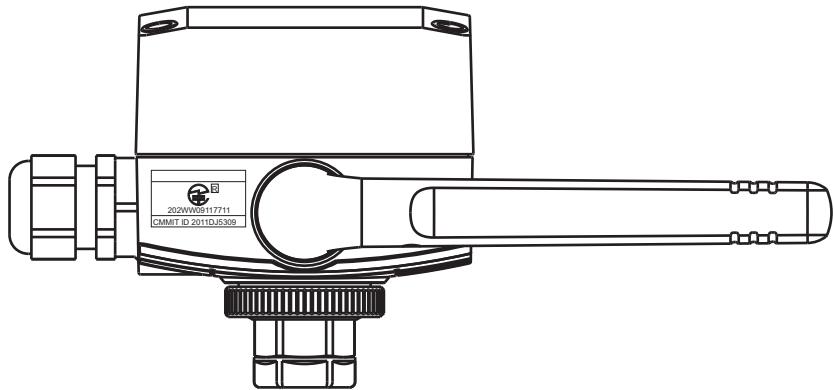
Fig. 2-2: Position of adhesive label containing radio approval information (example)

2.3   Ordering information

Detailed information about the product structure is available:

- In the Product Configurator on the Endress+Hauser website: www.endress.com →
  Select country → Products → System components & recorders →
  Wireless communication → WirelessHART adapter SWA70 →
  Product page function: Configure this product
- From your Endress+Hauser Sales Center: www.addresses.endress.com

3 Function and system design

The WirelessHART adapter is a smart wireless module that connects HART and 4 to 20 mA field devices to a WirelessHART network. The WirelessHART adapter sends the measurement and diagnostics information acquired from the field device to the WirelessHART Fieldgate in the form of radio signals. The Fieldgate receives this information and makes it available in the system network.
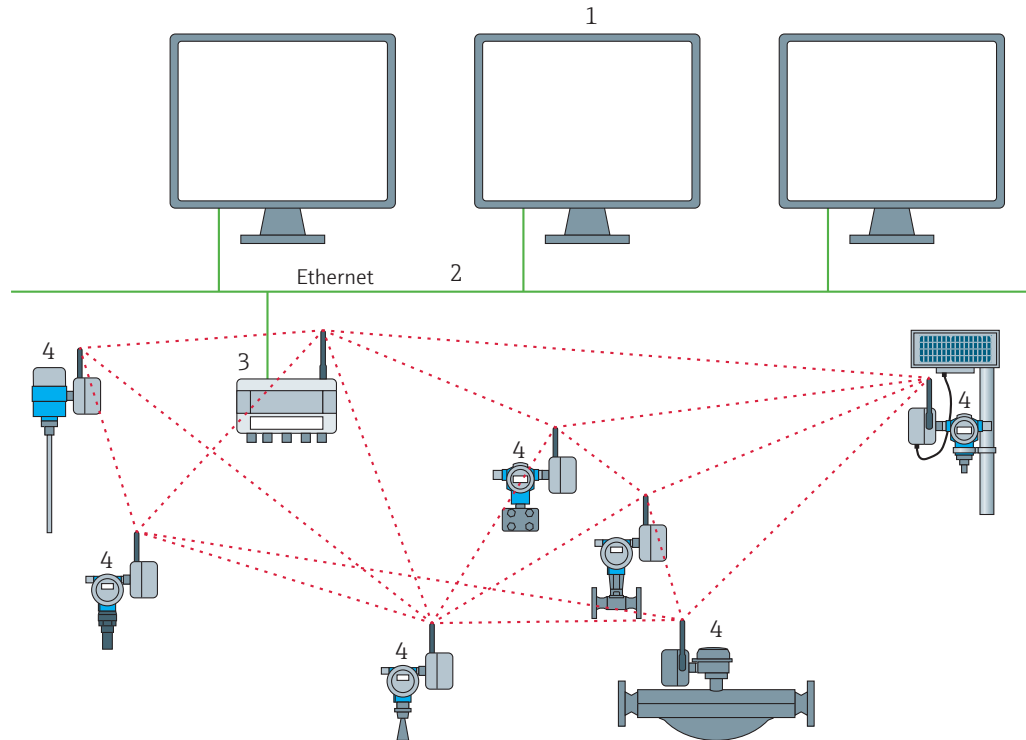
Fig. 3-1: WirelessHART network

1	Host applications	3	WirelessHART Fieldgate
2	Ethernet	4	Field devices with wireless

The WirelessHART network is self-organizing. After installation and configuration, every WirelessHART adapter is able to recognize its neighbors. It detects the strength of the radio signal, receives frequency, timing and path information, and then establishes a connection to neighbors in the wireless network. In this way, the network is organized without the need for the user to make any settings.

The standard version of the WirelessHART adapter has a plastic housing, and the hazardous-area version (Ex version) is available with either an aluminum housing, steel 316L or plastic housing. If a field device is connected to an Ex version, it too must have an appropriate approval for use in hazardous areas (Ex approval).

The WirelessHART adapter can be powered in one of three ways: with a battery unit, a wide range power unit, or a DC power unit. The field device can be powered either via the power supply of the WirelessHART adapter or via a separate DC voltage power unit or remote I/O. Two-wire and four-wire field devices can be connected.

The WirelessHART adapter can also be used as a repeater. In this case, the adapter does not supply power to any field device.

4   Installation

4.1   Overview

The WirelessHART adapter can be installed mechanically in three different ways:

- Directly on the field device
- At a distance from the field device, but connected by a cable (remote mounting)
- As a repeater, i.e. without a field device

Various replaceable connection adapters can be screwed onto the cable entry of the WirelessHART adapter depending on the use and the field device connection.

Depending on the order, the following installation accessories may be supplied with the WirelessHART adapter:

- Connection adapter for mounting on a field device with M20 connection
- Connection adapter for mounting on a field device with G 1/2 connection
- Connection adapter for mounting on a field device with NPT 1/2 connection
- Connection adapter for mounting on a field device with NPT 3/4 connection
- Cable gland for remote mounting with a cable
- Mounting bracket as an accessory for mounting on a wall or pipe

4.2   Installation conditions

The WirelessHART adapter is approved for use in locations exposed to weather conditions. See the Technical Information document for "WirelessHART Adapter SWA70" (TI00026S).

Note!

`NOTE`

In order to avoid attenuation of the electromagnetic waves and any resulting impairment in the operation of the WirelessHART adapter, the following must be observed when mounting the adapter:

- When mounting the adapter at a distance from the field device (remote mounting), the antenna must be at least 6 cm away from a wall or post.
- The antenna of the WirelessHART adapter should never be located between a wall/post and the housing.
- There must be a distance of at least 6 cm between the antenna and any metal material running parallel to it.
- Align the antenna so that it is completely vertical.
- If multiple WirelessHART adapters are used, ideally there should not be any walls or similar constructs between the adapters in order to guarantee an optimum wireless network.

4.3   Positioning the SWA70

Install the WirelessHART gateway first, before installing other WirelessHART devices. This way you can check for proper operation of new devices as they are installed. Nevertheless, consider the location of future WirelessHART devices that will be routed through the WirelessHART gateway to ensure good connectivity.

Guidelines for Planning a WirelessHART Network
- A line-of-sight between communication partners always is desirable. If a line-of-sight is not possible, the obstacles should not be massive and the partners should be more to the edge of an obstacle to allow the wave to "bend" around it (diffraction effect).
- Install wireless devices at least 1m above the ground.
- Make sure that the device's antenna is aligned vertically for best results.
- Make sure that a minimum of 2 other WirelessHART devices are well within the antenna range of the device.

- Do not position WirelessHART devices directly below or above each other. They would be outside each other's antenna range.
- Install WirelessHART devices at least 1 m away from each other.
- Antennas must be at least 6 cm away from any wall or any metallic material running parallel to it.
- Position the device as far away as possible from metal surfaces or walls containing metal. There should be as little metal close to the device as possible.
- Do not position other 2.4 GHz devices like cordless phone bases or WLAN routers near WirelessHART devices. Keep in mind other wireless networks using the same frequency spectrum (WLAN, Bluetooth, etc.). Wireless technologies used in an industrial environment must be able to coexist without disrupting each other.

4.4 Protection against lightning

Take the following measures to protect the WirelessHART adapter from a lightning strike:

- Do not mount the WirelessHART Adapter at the highest point in the plant.
- WirelessHART Adapter with metal housing: connect protective ground to protective ground connection of the housing. The protective ground connection is located on the inside and outside of the housing. Protective ground in 2.5 mm^2.

4.5 Design

For housing dimensions, see the Technical Information document for "WirelessHART Adapter SWA70" (TI00026S).
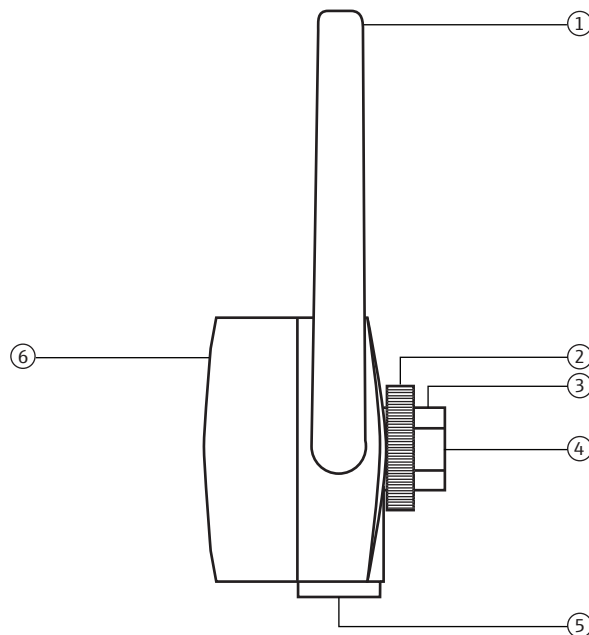
Fig. 4-1: Side view of the housing

1	Antenna	5	Secondary cable entry for remote mounting or for WirelessHART adapters with controlled power supply units for external power supply, internal thread M20x1.5
2	Fixing nut		
3	Cable entry		
4	Primary cable entry for installation on field device, internal thread M20x1.5	6	Cover of adapter with battery compartment

4.6   Mounting on the field device

You require the following tools to mount the WirelessHART adapter on the field device:

- Wrench 24 mm across flats
- Wrench 42 mm across flats
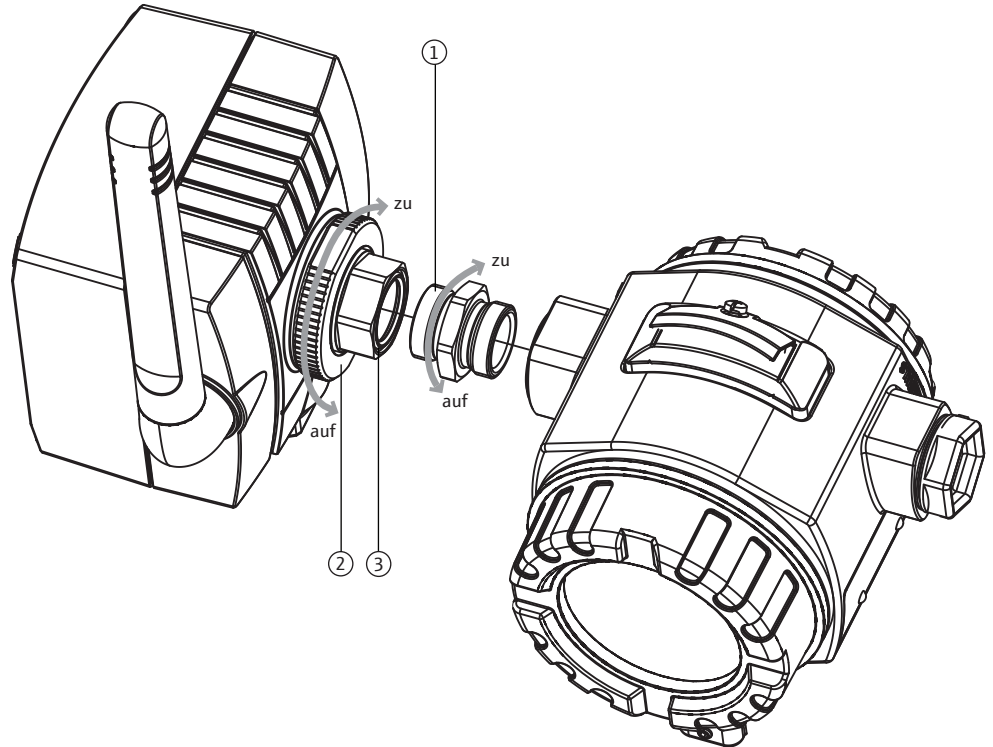
Fig. 4-2: Mounting on the device

1	Double-threaded connection adapter	3	Cable entry
2	Fixing nut		

Note!

NOTE   • By loosening the fixing nut you can rotate the cable entry without having to turn the
housing of the WirelessHART adapter.

Proceed as follows to mount the WirelessHART adapter on the field device:

1. Remove the sealing cap on the cable entry.

2. Fit a seal on either side of the double-threaded connection adapter as far as the end of
   the thread.

3. Using the 24mm wrench, screw the connection adapter into the field device coupling
   (torque 5 Nm).

4. Release the fixing nut of the WirelessHART adapter.

5. Fit the cable entry of the WirelessHART adapter onto the connection adapter screwed
   into the field device and tighten the cable entry using the 24mm wrench (torque 5 Nm).

6. Align the adapter if necessary.

7. While holding the cable entry with the 24mm wrench, tighten the fixing nut using the
   42mm wrench (torque 7 Nm).

4.7   Remote mounting

Remote mounting - where the field device and adapter are mounted at a distance from one another - can be required in various situations, such as when:

• There is not enough space to mount the adapter on the field device.
• Signal reception at the field device is too weak for correct operation.
• The field device is subject to vibration above the recommended limit.

The WirelessHART adapter can be mounted on a wall, post or other object using the "wall/pipe mounting bracket". In this case, the WirelessHART adapter and the field device are connected via a connecting cable and cable glands.

The "wall/pipe mounting bracket" and the cable glands are accessories. The connecting cable is not included in the scope of delivery.

4.7.1   Wall mounting

You require the following tools to mount the WirelessHART adapter on the wall:

• Wrench 24 mm across flats
• Wrench 42 mm across flats
• Wrench 8 mm across flats
• Size 4 Allen screw
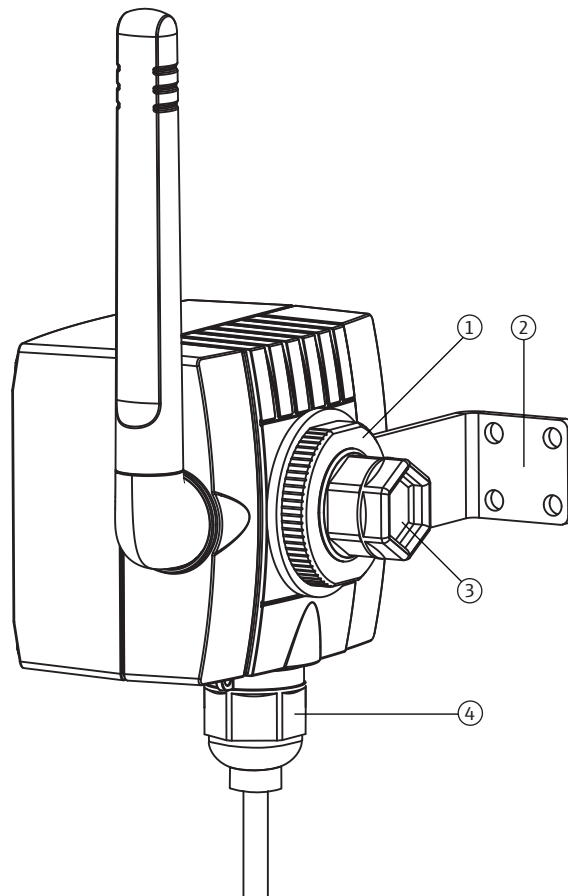
Fig. 4-3: Remote mounting with angle bracket for wall mounting

1	Fixing nut	3	Sealing cap on cable entry (primary cable outlet).
2	Angle bracket	4	Cable gland on secondary cable outlet for remote mounting or for WirelessHART adapters with controlled power supply units for external power supply

Proceed as follows to mount the WirelessHART adapter on a wall:

1. Screw the angle bracket onto the wall at a suitable point.
2. Unscrew the fixing nut in a counterclockwise direction.
3. Guide the cable entry of the WirelessHART adapter through the opening of the angle bracket in such a way that the antenna is as far away from the wall as possible.
4. Fit the fixing nut on the cable entry and tighten the fixing nut in a clockwise direction so that the WirelessHART adapter sits loosely.
5. Align the adapter in such a way that the antenna is vertical at the end of the mounting procedure.
6. Hold the cable entry in position with a wrench and tighten the fixing nut.
7. Preferably use the secondary cable outlet to connect to the field device.

4.7.2   Pipe mounting

You require the following tools to mount the WirelessHART adapter on a pipe:

- Wrench 42 mm across flats
- Wrench 24 mm across flats
- Wrench 10 mm across flats
- Wrench 8 mm across flats
- Size 4 Allen screw
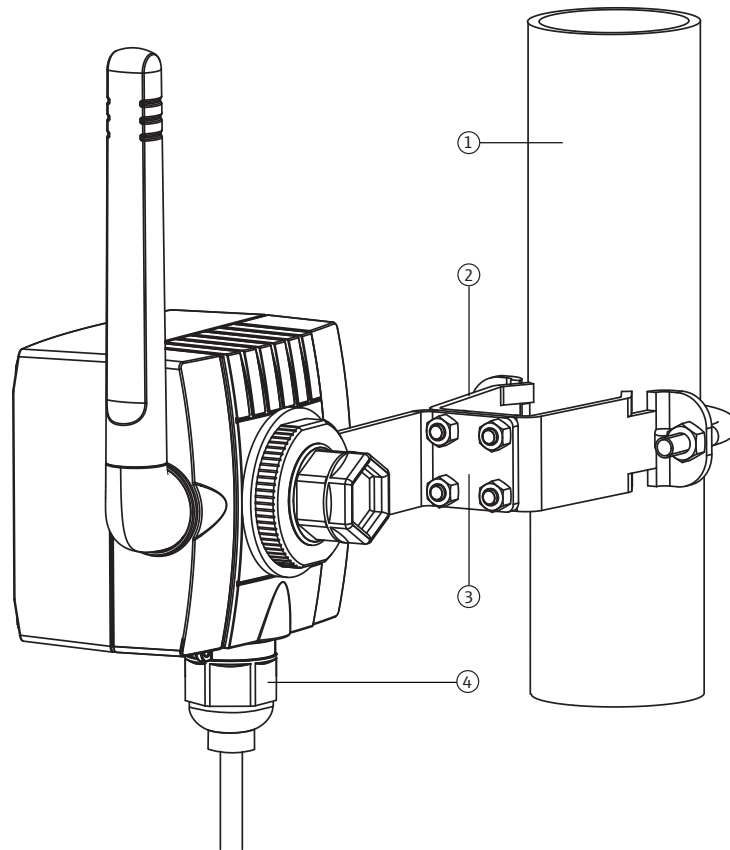
Fig. 4-4: Remote mounting on a pipe with a mounting bracket

1	Pipe with a maximum diameter of 65mm	3	Angle bracket
2	Fixing bracket	4	Cable gland on secondary cable outlet for remote mounting or for WirelessHART adapters with controlled power supply units for external power supply

Proceed as follows to mount the WirelessHART adapter on a pipe using the "wall/pipe mounting bracket":

1. Screw the fixing bracket onto the pipe at a suitable point and tighten the nuts (minimum torque 5 Nm).

2. Screw the angle bracket onto the fixing bracket with the four Allen screws supplied (torque 4 Nm).

3. Fasten the WirelessHART adapter on the angle bracket. See "Wall mounting" on page 18.

4.8   Post-installation check

After mounting the WirelessHART adapter, perform the following final checks:

- Is the WirelessHART adapter damaged (visual inspection)?
- Does the WirelessHART adapter meet the specifications for the place of operation, including the ambient temperature, relative humidity etc.?
- WirelessHART adapter with metal housing: has the WirelessHART been correctly grounded?
- Is the antenna correctly aligned?
- Has the WirelessHART adapter been mounted at a sufficient distance from a wall, pipe or post?
- Has the wall/pipe mounting bracket been correctly mounted?
- Are the cable entry and fixing nut securely tightened?
- Have the lightning protection measures indicated in chapter 4.3 been taken into consideration?

5 Electrical installation of SWA70 with battery unit

For the technical data, such as the cable specification, see the Technical Information document for "WirelessHART Adapter SWA70" (TI00026S).

5.1 Power supply via battery unit

The WirelessHART adapter with the battery unit is powered by the internal battery.
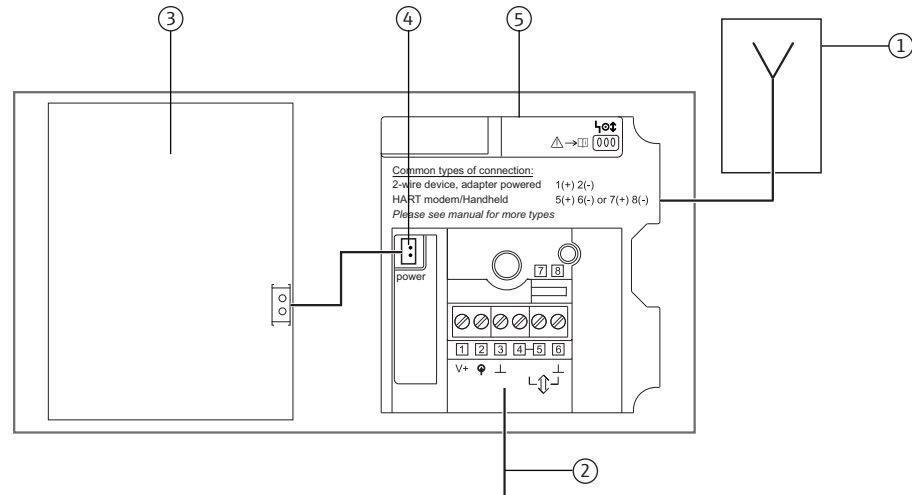
Fig. 5-1: Block circuit diagram of power supply via battery unit

1	Antenna	3	Battery unit
2	Field device connection, see chapter "Connecting the field device" on page 23.	4	Internal DC power supply
		5	WirelessHART adapter main PCB

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5.2 Connecting the field device

You can mount the WirelessHART adapter either directly on the field device or at a distance from the field device on a wall or post using a bracket.See "Wall mounting" on page 18. See "Pipe mounting" on page 20.

Mounted directly on the field device

Proceed as follows to mount directly on the field device:

1. Open the housing of the WirelessHART adapter.

2. Guide the cable through the cable entry.

3. Wire the cable with the appropriate terminals of the WirelessHART adapter. See "Wiring diagrams for battery unit" on page 25.

4. Wire the field device as described in the operating manual for the field device in question.

5. If the field device is not put into operation immediately after wiring, close the housing of the WirelessHART adapter and the connection compartment of the field device. Tighten the housing screws of the WirelessHART adapter with a torque of 0.6 Nm.

Remote mounting

For WirelessHART adapters with a battery unit, we recommend you perform the wiring between the WirelessHART adapter and the field device via the secondary cable entry. The secondary cable entry is located on the bottom of the WirelessHART adapter.

Note!

| NOTE |

- If the primary cable entry must be used, make sure that the water does not flow along the cable and enter the housing.

Secondary cable entry with cable gland M20x1.5
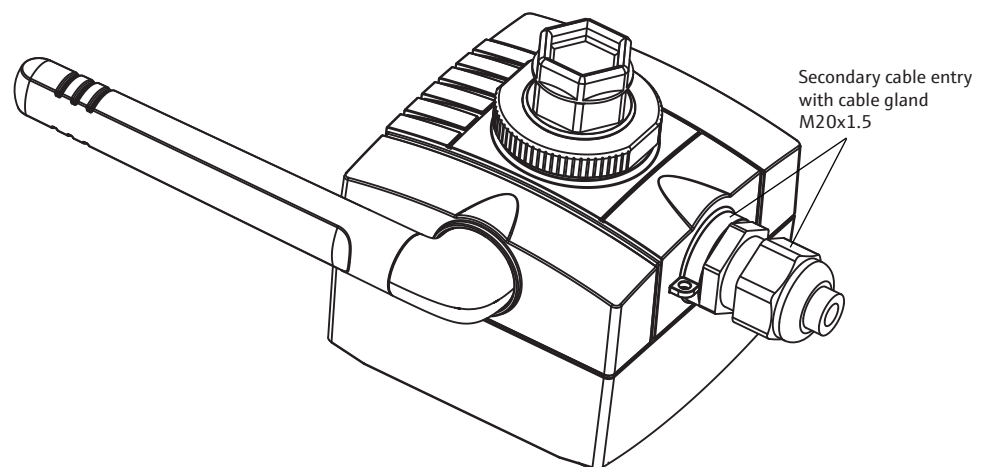
Fig. 5-2: Cable insertion through the secondary cable entry

Proceed as follows to insert a cable into the housing through the secondary cable entry:

1. Remove the sealing cap from the secondary cable entry of the WirelessHART adapter.

2. Screw the M20x1.5 cable gland into the thread of the cable entry (torque 3.25 Nm).

3. Turn the coupling nut slightly in the counterclockwise direction to release the tension on the cable gland.

4. Open the housing of the WirelessHART adapter.

5. Guide the cable through the cable gland and into the housing.

6. Wire the cable with the appropriate terminals of the WirelessHART adapter.
   See "Post-connection check" on page 47.

7. Tighten the coupling nut of the cable gland (torque 3.5 Nm).

8. If the field device is not put into operation immediately after wiring, close the housing of
   the WirelessHART adapter and the connection compartment of the field device. Tighten
   the housing screws of the WirelessHART adapter with a torque of 0.6 Nm.

5.3   SWA70 terminals

For the permitted connection data, see the Technical Information document for
"WirelessHART Adapter SWA70" (TI00026S).

Note!

`NOTE`

- On account of the internal communication resistor, the power supply of the field device
  varies depending on the set current and terminal voltage.

For connection purposes, the WirelessHART adapter contains a terminal block with screw
terminals 1-6 and the 2 terminals 7 and 8.

Fig. 5-3: Assignment of terminals

Terminals	Description
1 and 2	• Field device power supply • 4 to 20 mA/HART input
2 and 3	4 to 20 mA/HART input
4 or 5	High-impedance HART input/output terminals
3 or 6	High-impedance HART input/output terminals and ground
7 and 8	HART modem connection

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5.4 Wiring diagrams for battery unit

For the WirelessHART adapter with a battery unit, the following options are available to electrically connect a field device as a:

- Two-wire field device with power supplied by the adapter: see page 25.
- Four-wire field device: see page 26.
- Field device in a closed-control loop with a communication resistor: see page 27.
- Field device in a closed-control loop without a communication resistor: see page 28.

5.4.1 Two-wire field device with power supplied by the adapter

The following functions are possible with this connection version:

- Power supply to the field device
- Current measurement in the 4 to 20 mA range
- Digital HART communication if this is supported by the field device.

Connect the WirelessHART adapter as illustrated below:
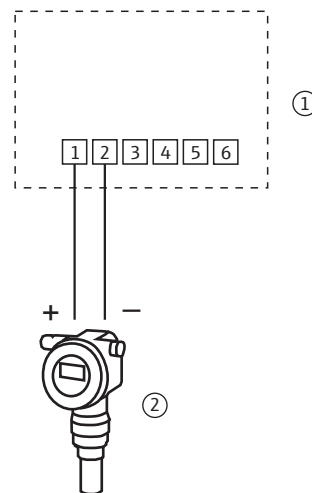
Fig. 5-4: WirelessHART adapter with battery unit –
connection of a two-wire field device with power supplied by the adapter

1   WirelessHART adapter terminals   2   Field device

Note!

NOTE   To extend the battery life, we recommend you operate the HART field device in the multidrop mode. For this purpose, set the address of the field device to 1.

5.4.2 Four-wire field device

The following functions are possible with this connection version:

- Current measurement in the 4 to 20 mA range
- Digital HART communication if this is supported by the field device.

Connect the WirelessHART adapter as illustrated below:
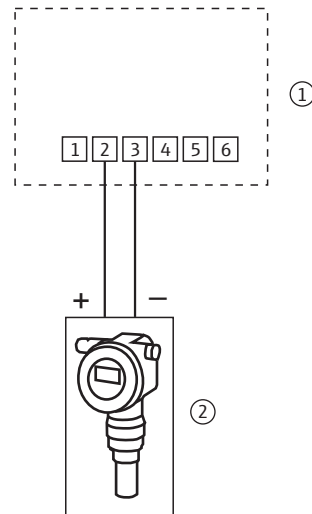
Fig. 5-5: WirelessHART adapter with battery unit –
connection of a four-wire field device

1　WirelessHART adapter terminals　　　　　　2　Four-wire field device

5.4.3 Field device in a closed-control loop with a communication resistor

The WirelessHART adapter can be connected to an existing installation comprising a HART field device and a power supply system that includes a communication resistor.

The following functions are possible with this connection version:

- Digital HART communication in multidrop mode

Connect the WirelessHART adapter as illustrated below:
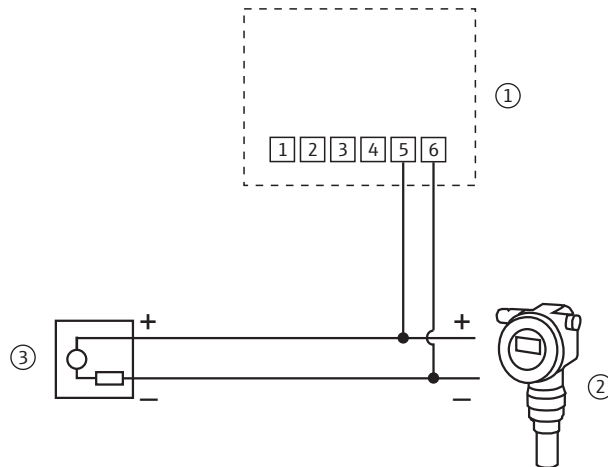
Fig. 5-6: WirelessHART adapter with battery unit –
connection of a field device in a closed-control loop with a communication resistor

1	WirelessHART adapter terminals	3	PLC, remote I/O or DC voltage power unit with a communication resistor
2	Field device		

5.4.4   Field device in a closed-control loop without a communication resistor

The following functions are possible with this connection version:

• Current measurement in the 4 to 20 mA range
• Digital HART communication if this is supported by the field device.

The following connection version is recommended if installing with a two-wire cable:
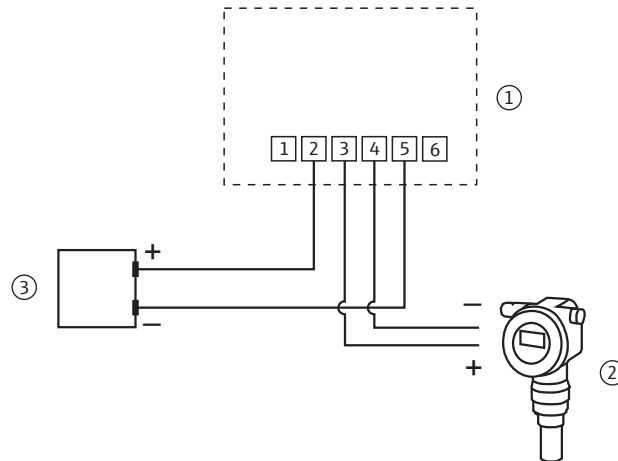
*Fig. 5-7: WirelessHART adapter with battery unit – connection of a field device
in a closed-control loop without a communication resistor, with a two-wire cable*

1   WirelessHART adapter terminals   3   PLC, remote I/O or DC voltage power unit without
2   Field device   a communication resistor

If installing with just one signal cable (e.g. common ground for return cable), connect the WirelessHART adapter as illustrated below:
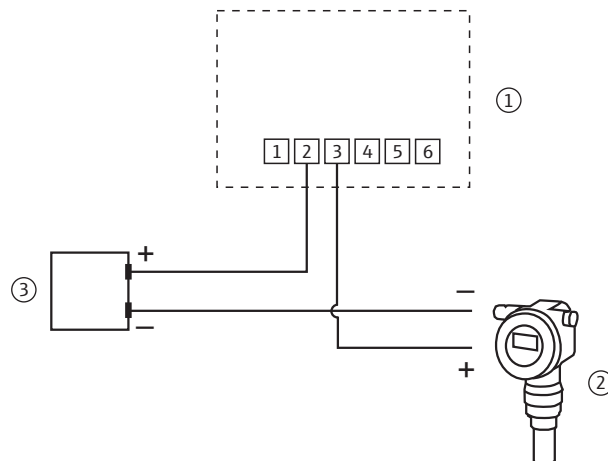
*Fig. 5-8: WirelessHART adapter with battery unit –
connection of a field device in a closed-control loop without a communication resistor, with one signal cable*

1   WirelessHART adapter terminals   3   PLC, remote I/O or DC voltage power unit without
2   Field device   a communication resistor

NOTE

Note!
- The connection is established via the internal 270 Ω resistor.
- The connection circuits in fig. 5-7 and fig. 5-8 are electrically identical as terminal 4 is connected internally to terminal 5.

5.5　Post-connection check

After wiring the WirelessHART adapter, perform the following final checks:

- Is the assignment of the terminals correct?
- Is the cable gland sealed tightly?

6 Electrical installation of SWA70 with wide range power unit

For the technical data, such as the cable specification, see the Technical Information document for "WirelessHART Adapter SWA70" (TI00026S).

6.1 Power supply via wide range power unit

Danger!

⚠ DANGER

Risk of electric shock! Any contact with live parts presents a potentially life-threatening hazard.

- Work must only be performed by certified electrical technicians.
- Before opening the WirelessHART adapter, switch off the power supply and prevent it from being switched on again. Check that the unit is not live.
- Do not wire the WirelessHART adapter if it is live.
- Ground the WirelessHART adapter with the metal housing. For this, connect the 2.5 mm^2 protective conductor to the protective ground connection. The protective ground connection is located on the inside and outside of the housing.

Warning!

⚠ WARNING

- The WirelessHART adapter must be protected at the customer's site by an external 1A slow-blow backup fuse, designed for min. 250 V AC, and approved for the particular application.

Note!

NOTE

- Guide the power supply cable through the ferrite sleeve supplied. Fix the ferrite sleeve at a distance of 5 cm to 30 cm to the adapter.
- If EMC emissions Class B are required for the operation in the country of destination, a line filter must be added.

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The WirelessHART adapter with the wide range power unit is connected to the power supply via the M12 connector. See "Connecting the M12 socket" on page 32.

Fig. 6-1: Block circuit diagram of power supply via wide range power unit

1 Antenna	5 Preferred connection for field devices, up to four field devices possible in multidrop. See figure 6-9 on page 39.
2 Alternative connection via Pin 2 and Pin 3, see figure 6-7 on page 37 or Pin 5 and Pin 6, see figure 6-6 on page 36.	6 Internal DC power supply
3 Suitable back-up fuse, provided by the customer onsite	7 WirelessHART adapter main PCB
4 Connection for power supply of wide range power unit	

6.2 Connecting the M12 socket

A WirelessHART adapter with the wide range power unit is connected to the power supply via the M12 connector. An M12 socket is included in the delivery.

Disassembly and assembly

Fig. 6-2: Disassembling and assembling the M12 socket

1 Socket insert with terminals   3 Seal
2 Coupling sleeve   4 Coupling nut

1. Insert the seal into the narrower of the two openings of the coupling sleeve.

2. Guide the cable through the coupling nut and coupling sleeve.

3. Connect the cable in accordance with the PIN assignment. Tighten the screws in the socket insert.

**PIN assignment
of M12 socket**
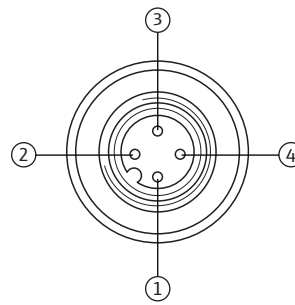
Fig. 6-3: PIN assignment of M12 socket

Power supply version	PIN assignment			
	1	2	3	4
Wide range power unit 24-230 V AC	L	n.c.	N	n.c.
Wide range power unit 24-230 V DC	+	n.c.	–	n.c.

4. Screw together the socket insert and the coupling sleeve. For this purpose turn the knurled head screw while holding the coupling sleeve steady.

5. Screw down the coupling nut.

6.3 Connecting the field device

You require the following tools for the electrical installation of the WirelessHART adapter:

- Torx T10 for the housing screws
- Flat-blade screwdriver with a blade width of 2.5 mm for the screws on the terminal block
- Wrench 25 mm across flats for the cable entry

6.3.1 Cable specification

NOTE

Note!
- When mounting the adapter directly on the field device, use the twin-core cable included in the delivery. You can use a commercially available instrument cable for remote mounting. If severe electromagnetic interference can be expected from machines or wireless devices, for instance, we recommend the use of a shielded cable.
- Connect the shielding in accordance with local regulations. With regard to the shielding connection, no special requirements must be met for the WirelessHART adapter.

6.3.2 Wiring

You can mount the WirelessHART adapter either directly on the field device or at a distance from the field device on a wall or post using a bracket. See "Wall mounting" on page 18. See "Pipe mounting" on page 20.

As the secondary cable entry is always used for the power supply on WirelessHART adapters with a wide range power unit, the primary cable entry must always be used for wiring between the WirelessHART adapter and the field device.

NOTE

Note!
- For the primary cable entry make sure that the water does not flow along the cable and enter the housing.

Proceed as follows to mount directly on the field device:

1. Open the housing of the WirelessHART adapter.

2. Guide the cable through the cable entry.

3. Wire the cable with the appropriate terminals of the WirelessHART adapter.
   See "Wiring diagrams for wide range power unit" on page 35.

4. Wire the field device as described in the operating manual for the field device in question.

5. If the field device is not put into operation immediately after wiring, close the housing of the WirelessHART adapter and the connection compartment of the field device. Tighten the housing screws of the WirelessHART adapter with a torque of 0.6 Nm.

6.4 SWA70 terminals

For the permitted connection data, see the Technical Information document for "WirelessHART Adapter SWA70" (TI00026S).

Note!

NOTE

- On account of the internal communication resistor, the power supply of the field device varies depending on the set current and terminal voltage.

For connection purposes, the WirelessHART adapter contains a terminal block with screw terminals 1-6 and the 2 terminals 7 and 8.

Fig. 6-4: Assignment of terminals

Terminals	Description
1 and 2	■ Field device power supply ■ 4 to 20 mA/HART input
2 and 3	4 to 20 mA/HART input
4 or 5	High-impedance HART input/output terminals
3 or 6	High-impedance HART input/output terminals and ground
7 and 8	HART modem connection

6.5 Wiring diagrams for wide range power unit

For the WirelessHART adapter with a wide range power unit, the following options are available to electrically connect a field device as a:

- Two-wire field device with power supplied by internal power supply system: see page 35.
- Field device in a closed-control loop with a communication resistor: see page 36.
- Field device in a closed-control loop without a communication resistor: see page 37.
- Four-wire field device: see page 38.
- Field devices in multidrop: see page 39.

6.5.1 Two-wire field device with power supplied by internal power supply system

The following functions are possible with this connection version:

- Power supply to the field device
- Current measurement in the 4 to 20 mA range
- Digital HART communication if this is supported by the field device.

Note!

NOTE
- To make the installation easy, the wide range power unit can be removed from the housing to connect it to the power supply.

Connect the WirelessHART adapter as illustrated below:
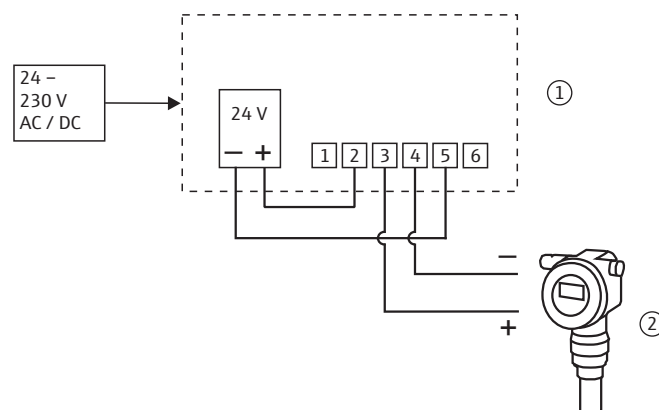
Fig. 6-5: WirelessHART adapter with wide range power unit –
connection of a two-wire field device with power supplied by an internal power supply system

1	WirelessHART adapter terminals	2	Field device

6.5.2 Field device in a closed-control loop with a communication resistor

The following functions are possible with this connection version:

- Digital HART communication if this is supported by the field device.

The WirelessHART adapter can be connected to an existing installation comprising a HART field device and a power supply system that includes a communication resistor. Digital HART communication is possible.

Note!

| NOTE |

- The terminals for listening to the communication can be defined or restricted in the Wake-up Detection parameter (page 60). By restricting the terminal it is possible to prevent the WirelessHART adapter from entering the configuration mode.

Connect the WirelessHART adapter as illustrated below:
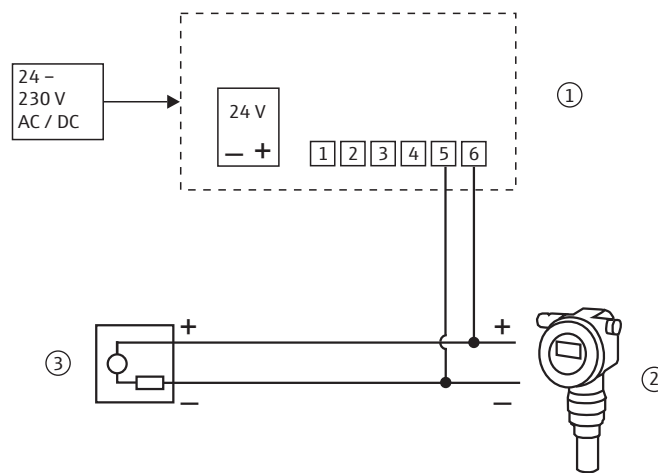
Fig. 6-6: WirelessHART adapter –
connection of a field device in a closed-control loop with a communication resistor

1   WirelessHART adapter terminals
2   Field device

3   PLC, remote I/O or DC voltage power unit with a communication resistor

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6.5.3 Field device in a closed-control loop without a communication resistor

The following functions are possible with this connection version:

- Current measurement in the 4 to 20 mA range
- Digital HART communication if this is supported by the field device.

Connect the WirelessHART adapter as illustrated below:

Fig. 6-7: WirelessHART adapter with wide range power unit –
connection of a field device in a closed-control loop without a communication resistor

1   WirelessHART adapter terminals   3   PLC, remote I/O or DC voltage power unit
2   Field device   without a communication resistor

6.5.4   Four-wire field device

The following functions are possible with this connection version:

- Current measurement in the 4 to 20 mA range
- Digital HART communication if this is supported by the field device.

Connect the WirelessHART adapter as illustrated below:
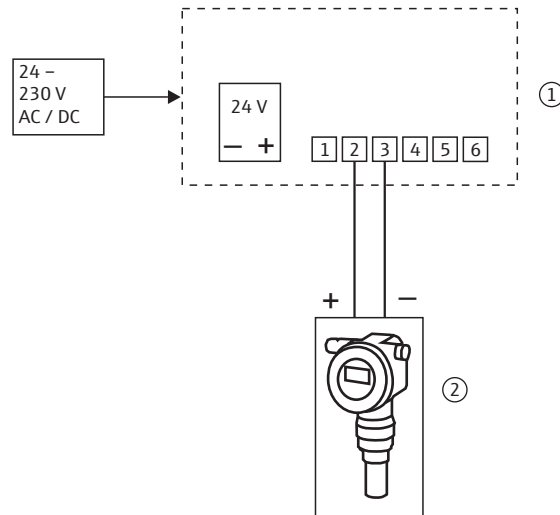
*Fig. 6-8: WirelessHART adapter with wide range power unit –
connection of a four-wire field device*

1   WirelessHART adapter terminals 1 to 6   2   Four-wire field device

6.5.5 Field devices in multidrop

The following functions are possible with this connection version:

- Digital HART communication in multidrop mode

Note!

NOTE
- To make the installation easy, the wide range power unit can be removed from the housing to connect it to the power supply.

If you want to operate field devices in the HART multidrop mode, connect the field devices as illustrated below. You can connect up to 4 field devices.
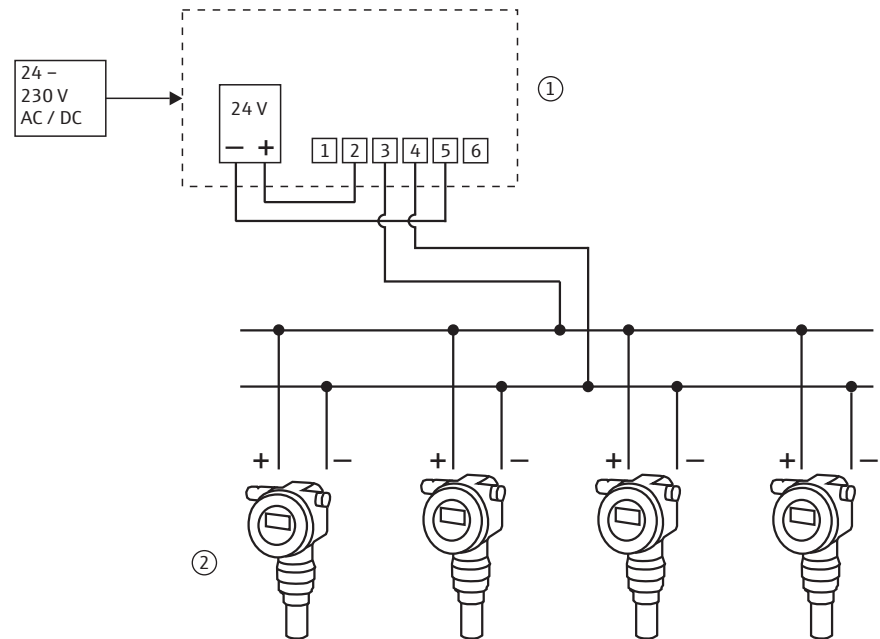
Fig. 6-9: WirelessHART adapter with wide range power unit –
multidrop connection via internal power supply

| 1 | WirelessHART adapter terminals | 2 | Field devices |

6.6 Post-connection check

After wiring the WirelessHART adapter, perform the following final checks:

- Is the assignment of the terminals correct?
- Is the cable gland sealed tightly?

7 Electrical installation of SWA70 with DC power unit

For the technical data, such as the cable specification, see the Technical Information document for "WirelessHART Adapter SWA70" (TI00026S).

7.1 Power supply via DC power unit

The WirelessHART adapter with the DC power unit is connected to the power supply via the M12 connector. See "Connecting the M12 socket" on page 41.

Warning!

⚠ **WARNING**

- The WirelessHART adapter must be protected at the customer's site by an external 1A slow-blow backup fuse, designed for min. 250 V AC, and approved for the particular application.
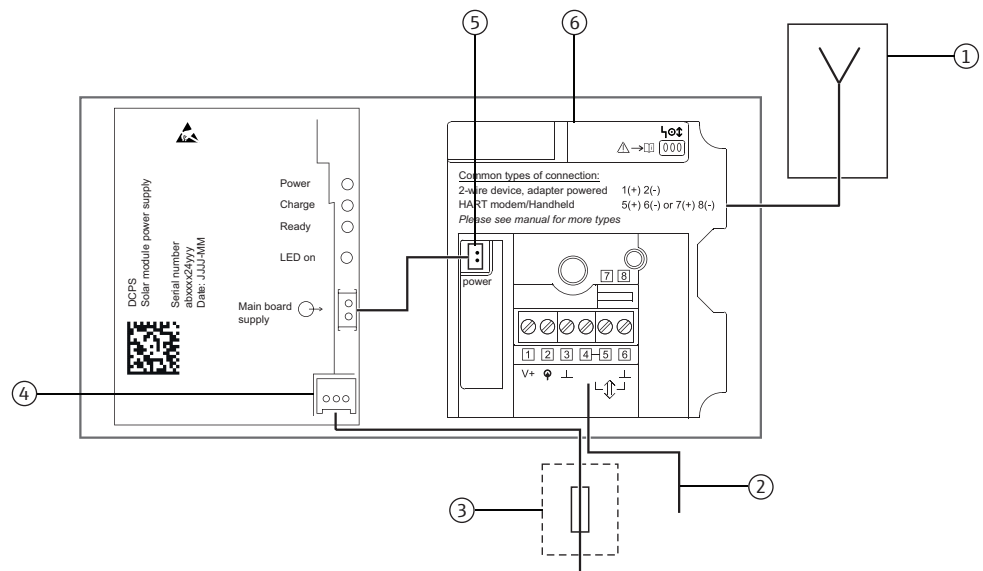
Fig. 7-1: Block circuit diagram of power supply via DC power unit

1	Antenna	3	Suitable back-up fuse, provided by the customer onsite
2	Field device connection, see chapter "Wiring diagrams for DC power unit" on page 44.	4	Connection for power supply of solar module
		5	Internal DC power supply
		6	WirelessHART adapter main PCB

7.2 Connecting the M12 socket

A WirelessHART adapter with the DC power unit is connected to the power supply via the M12 connector. An M12 socket is included in the delivery.

Disassembly and assembly
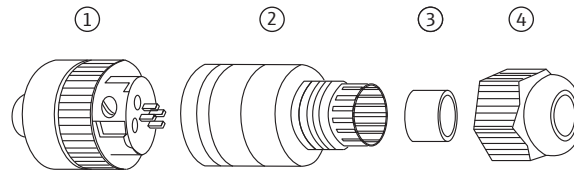
Fig. 7-2: Disassembling and assembling the M12 socket

1	Socket insert with terminals	3	Seal
2	Coupling sleeve	4	Coupling nut

1. Insert the seal into the narrower of the two openings of the coupling sleeve.

2. Guide the cable through the coupling nut and coupling sleeve.

3. Connect the cable in accordance with the PIN assignment. Tighten the screws in the socket insert.

PIN assignment of M12 socket
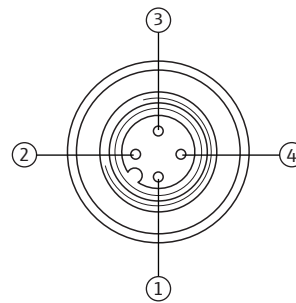
Fig. 7-3: PIN assignment of M12 socket

Power supply version	PIN assignment			
	1	2	3	4
DC power unit, 8-50 V DC	n.c.	n.c.	–	+

4. Screw together the socket insert and the coupling sleeve. For this purpose turn the knurled head screw while holding the coupling sleeve steady.

5. Screw down the coupling nut.

7.3 Connecting the field device

You require the following tools for the electrical installation of the WirelessHART adapter:

- Torx T10 for the housing screws
- Flat-blade screwdriver with a blade width of 2.5 mm for the screws on the terminal block
- Wrench 25 mm across flats for the cable entry

7.3.1 Cable specification

Note!

NOTE
- When mounting the adapter directly on the field device, use the twin-core cable included in the delivery. You can use a commercially available instrument cable for remote mounting. If severe electromagnetic interference can be expected from machines or wireless devices, for instance, we recommend the use of a shielded cable.
- Connect the shielding in accordance with local regulations. With regard to the shielding connection, no special requirements must be met for the WirelessHART adapter .

7.3.2 Wiring

You can mount the WirelessHART adapter either directly on the field device or at a distance from the field device on a wall or post using a bracket.See "Wall mounting" on page 18. See "Pipe mounting" on page 20.

As the secondary cable entry is always used for the power supply on WirelessHART adapters with a DC power unit, the primary cable entry must always be used for wiring between the WirelessHART adapter and the field device.

Note!

NOTE
- For the primary cable entry make sure that the water does not flow along the cable and enter the housing.

Proceed as follows to mount directly on the field device:

1. Open the housing of the WirelessHART adapter.

2. Guide the cable through the cable entry.

3. Wire the cable with the appropriate terminals of the WirelessHART adapter.
   See "Wiring diagrams for DC power unit" on page 44.

4. Wire the field device as described in the operating manual for the field device in question.

5. If the field device is not put into operation immediately after wiring, close the housing of the WirelessHART adapter and the connection compartment of the field device. Tighten the housing screws of the WirelessHART adapter with a torque of 0.6 Nm.

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7.4 SWA70 terminals

For the permitted connection data, see the Technical Information document for "WirelessHART Adapter SWA70" (TI00026S).

Note!

NOTE
- On account of the internal communication resistor, the power supply of the field device varies depending on the set current and terminal voltage.

For connection purposes, the WirelessHART adapter contains a terminal block with screw terminals 1-6 and the 2 terminals 7 and 8.

Fig. 7-4: Assignment of terminals

Terminals	Description
1 and 2	• Field device power supply • 4 to 20 mA/HART input
2 and 3	4 to 20 mA/HART input
4 or 5	High-impedance HART input/output terminals
3 or 6	High-impedance HART input/output terminals and ground
7 and 8	HART modem connection

7.5 Wiring diagrams for DC power unit

For the WirelessHART adapter with a DC power unit, the following options are available to electrically connect a field device as a:

- Two-wire field device with power supplied by adapter: see page 44.
- Four-wire field device: see page 45.
- Field device in a closed-control loop with a communication resistor: see page 46.
- Field device in a closed-control loop without a communication resistor: see page 47.

Note!

NOTE
- To ensure smooth, unhindered operation, the solar module and field device must either be powered by different sources or powered by the same source with two galvanically isolated outputs.

7.5.1 Two-wire field device with power supplied by adapter

The following functions are possible with this connection version:

- Power supply to the field device
- Current measurement in the 4 to 20 mA range
- Digital HART communication if this is supported by the field device.

Connect the WirelessHART adapter as illustrated below:

Fig. 7-5: WirelessHART adapter with DC power unit –
connection of a two-wire field device with power supplied by the adapter

| 1 | WirelessHART adapter terminals | 2 | Field device |

7.5.2   Four-wire field device

The following functions are possible with this connection version:

• Current measurement in the 4 to 20 mA range
• Digital HART communication if this is supported by the field device.

Connect the WirelessHART adapter as illustrated below:
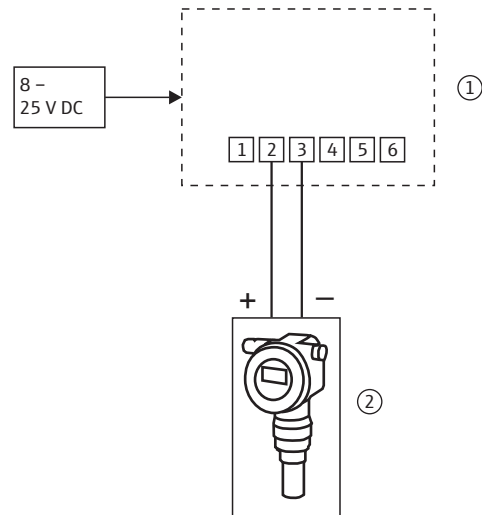
Fig. 7-6: WirelessHART adapter with DC power unit –
connection of a four-wire field device

1	WirelessHART adapter terminals	2 Four-wire field device with galvanic isolation

7.5.3 Field device in a closed-control loop with a communication resistor

The WirelessHART adapter can be connected to an existing installation comprising a HART field device and a power supply system that includes a communication resistor.

The following functions are possible with this connection version:

- Digital HART communication if this is supported by the field device.

Connect the WirelessHART adapter as illustrated below:
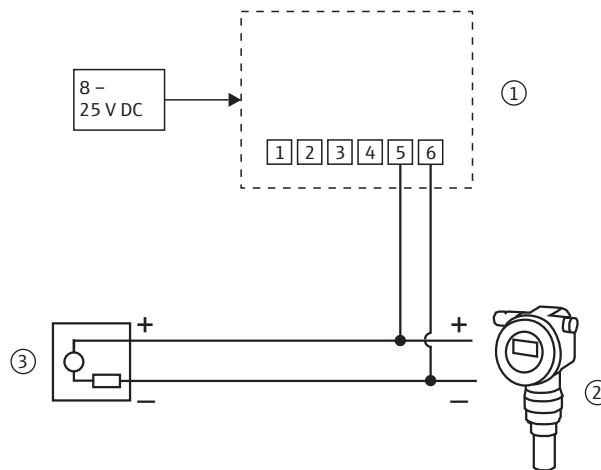
Fig. 7-7: WirelessHART adapter with DC power unit –
connection of a field device in a closed-control loop with a communication resistor

1	WirelessHART adapter terminals	3	PLC, remote I/O or DC voltage power unit with a communication resistor
2	Field device		

7.5.4   Field device in a closed-control loop without a communication resistor

The following functions are possible with this connection version:

- Current measurement in the 4 to 20 mA range
- Digital HART communication if this is supported by the field device.

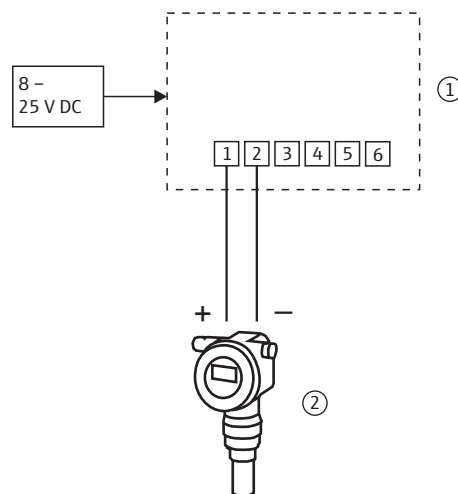Connect the WirelessHART adapter as illustrated below:

Fig. 7-8: WirelessHART adapter with DC power unit –
connection of a field device in a closed-control loop without a communication resistor

1	WirelessHART adapter terminals	3	PLC, remote I/O or DC voltage power unit without
2	Field devices		a communication resistor

7.6   Post-connection check

After wiring the WirelessHART adapter, perform the following final checks:

- Is the assignment of the terminals correct?
- Is the cable gland sealed tightly?

8   Operation

8.1   Display and operating elements – main PCB

Warning!

⚠ **WARNING**

- The housing of the WirelessHART adapter may not be opened in hazardous areas if dust is present. The housing may only be opened in a dusty atmosphere if adequate ventilation ensures the environment is free of dust. See "Operational safety" on page 7.

The following display and operating elements are visible inside the WirelessHART adapter:
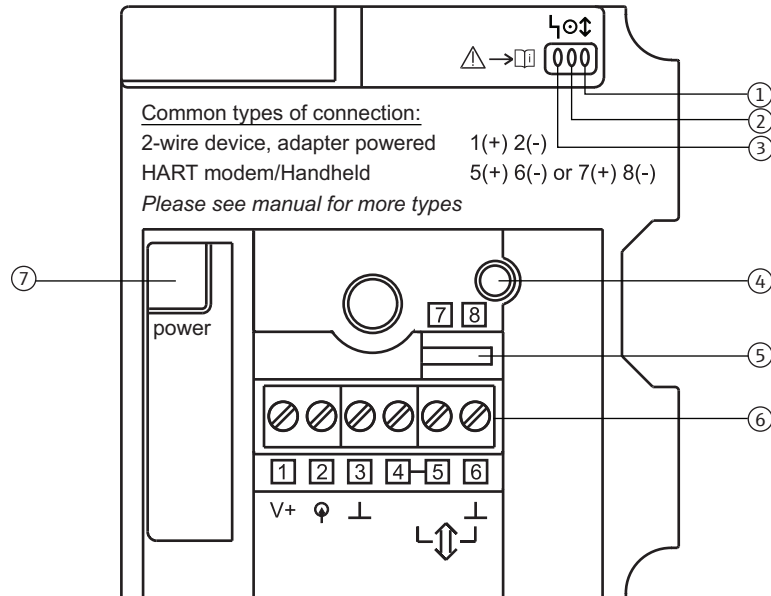
Fig. 8-1: Display and operating elements on the PCB cover

1	Yellow light emitting diode: communication status	5	Terminals for HART modem
2	Green light emitting diode: battery status	6	Terminals 1 to 6
3	Red light emitting diode: active communication, error messages	7	Socket for connector of the electronically controlled power supply unit or the battery unit
4	Push button		

8.1.1 Push button

Pressing the push button executes a range of functions depending on how long the button is actually pressed. A power supply unit must be connected.

When operating with connected power supply unit

Time pressed	Function
≤ 0.2 s	No function
> 0.2 to 5 s	LEDs light up to indicate the status of the adapter (see chap. 8.1.2) – When the adapter attempts to join the network, the LEDs continue to indicate the status until the connection has been made.
5 to 10 s	Joins the adapter to the wireless network – Once the button has been pressed for 5 seconds, the yellow light emitting diode flashes at 3 Hz
10 to 15 s	Activates the mode for configuring the connected field device – Once the button has been pressed for 10 seconds, the red light emitting diode flashes at 3 Hz – If HART communication does not take place in the configurable time frame (e.g. 300 seconds), or if the push button is pressed again for 10 to 15 s, the user quits the mode for configuring the connected field device. The red light emitting diode goes out.
> 15 s	No function

Resetting the configuration to the default settings

Prerequisite: The power supply unit must be disconnected.

1. Press the push button.

2. Press and hold the push button and reconnect the power supply unit. The red LED is lit.

3. Press and hold the push button for 10 to 15 seconds. The red LED flashes at 2.5 Hz. The configuration is reset to the manufacturer's default settings.

Resetting the configuration and firmware to the default settings

Prerequisite: The power supply unit must be disconnected.

1. Press the push button.

2. Press and hold the push button and reconnect the power supply unit. The red LED is lit/ flashes at 2.5 Hz/is lit.

3. Press and hold the push button for 20 to 25 seconds. The red LED flashes at 1.25 Hz. The firmware and configuration are reset to the factory settings.

8.1.2 Display

If the push button is pressed briefly, the three light emitting diodes indicate the current status.

Yellow light emitting diode: communication status

Yellow light emitting diode	Communication status	Meaning
Lit	Connected, alternative path [1]	Adapter is connected to the network – An alternative communication path exists
Flashes at 1 Hz	Connected, no alternative path [1]	Adapter is connected to the network – An alternative communication path does not exist
Flashes at 3 Hz	Joining	Currently attempting to join the network, e.g. for 40 min once the battery unit is connected – The length of the joining period can be configured.
Off	Not connected	The device has not joined the network

1) Alternative communication path: information is sent by a neighboring adapter.

Green light emitting diode: battery status

Green LED	Battery status	Meaning
Lit	Normal	The battery unit will last for at least one more month
Flashes at 1 Hz	Warning	The battery unit will last for less than one month
Flashes at 3 Hz	Alarm	Measurement at the field device has been stopped – A connection is not guaranteed – The WirelessHART adapter can still be operated but it is no longer possible to power the field device
Off	Empty battery	Battery unit is empty or not connected

Red light emitting diode: active communication, error message

Red light emitting diode	Status	Meaning
Flashes: 50 ms on, 950 ms off	Communication mode active	It is possible to communicate with the WirelessHART adapter
Lit	Internal fault	Fault caused by the device. – It cannot be corrected by the user.
Flashes at 1 Hz	External fault	It might be possible for the user to correct the fault. – External faults can be viewed in the diagnostics function of the DTM or DD – Examples: a) Temperature is outside the specified range b) Measured value is outside the configured range e.g. 4 to 20 mA
Flashes at 3 Hz	Short-circuit	Short-circuit at terminals 1 and 2
Off	No fault	

8.2 Operating and display elements – electronically controlled power supply units

One push button and three light emitting diodes can be found on the electronically controlled power supply unit.
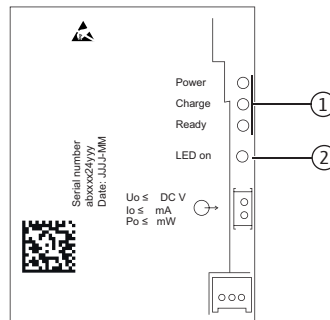

Fig. 8-2: Operating and display elements, electronically controlled power supply units

1 Light emitting diodes 2 Push button

8.2.1 Push button

When you press the push button, the appropriate LEDs light up depending on the output voltage currently present.

8.2.2 Light emitting diodes

The light emitting diodes indicate the level of power that is available for the field device, for instance. The level of the power supply changes after the power supply has been switched on or returns.

LED 1 (green) Ready	LED 2 (yellow) Charge	LED 3 (green) Power	Meaning
ON	OFF	ON	Normal operating mode
OFF	OFF	OFF	No external power supply.
ON	ON	OFF	Buffer has been partially charged.
ON	ON	ON	70% of the buffer has been charged. LED 2 switches off as soon as the buffer is fully charged (100 %).

8.3 Operating the field device

Operate your field devices as specified in the operating manual for the devices in question.

8.4 Local configuration and remote configuration

The WirelessHART adapter is configured externally. There are various ways of doing this:

- Local configuration with FieldCare or DeviceCare via modem and DTM for SWA70
- Local operation with FieldXpert also in the hazardous area
- Remote configuration with FieldCare via WirelessHART Fieldgate SWG70 and DTM for SWA70 and SWG70
- Remote configuration with a software and a gateway based on the device description (DTM or DD)

For more information see chapter "Configuration and online parameterization" on page 55.

When commissioning for the first time, the WirelessHART adapter must be configured via a point-to-point connection using a HART modem, e.g. with FieldCare and a HART modem. Connect the HART modem to terminals 5 and 6 or to terminals 7 and 8 of the WirelessHART adapter.
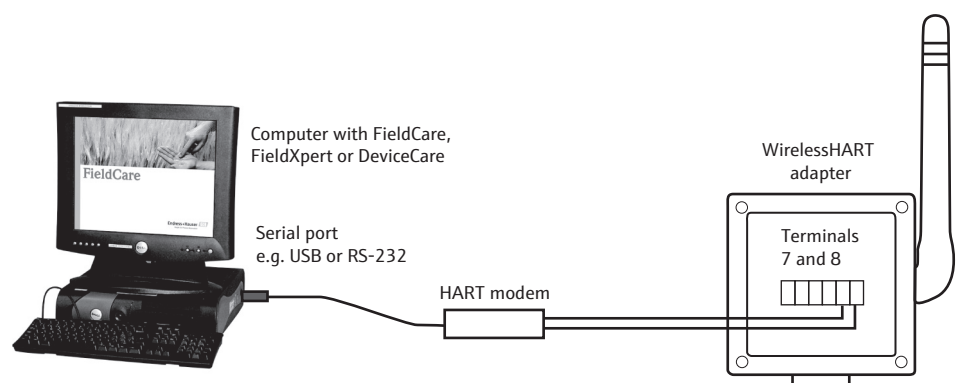

Fig. 8-3: Connecting a WirelessHART adapter to a computer via a modem

9   Commissioning

9.1   Connected HART field devices

We recommend you commission the connected HART field device before commissioning the WirelessHART adapter. In addition to configuring the field device, the following parameters must also be configured:

- **HART address** = 1
  The field device is set to the multidrop mode and the current signal is frozen at 4 mA for the "two-wire field device with power supplied by the WirelessHART adapter" configuration.
  If more than one field device is connected to the WirelessHART adapter, each field device must be assigned its own individual address between 1 and 14, such as 1, 2, 3, 4 for instance. Up to four connected field devices are allowed to operate in the multidrop mode with an external power supply.
- **Device Tag**: This is used to identify the measuring point.
- **Long Tag**: This is used to identify the field device in the network.
  The **Long Tag** parameter is available with HART Version 6.0 and higher. In older versions, the **Message** parameter is used for this purpose.

Start commissioning as indicated below for the "two-wire field device with power supplied by the WirelessHART adapter" configuration. You can perform commissioning via the display, Field Xpert or FieldCare.

1. Keep pressing the push button on the WirelessHART adapter until the red light emitting diode flashes.

2. Power is supplied to the field device for 5 minutes. You can specify the length of time in the **Configuration Time** parameter in the SWA70 DTM.
   See "Field device power" on page 74.

Note!

`NOTE`
- You may not change the address if the field device is connected in a circuit with a PLC or a remote I/O. This address is 0 in most instances.
- It is not necessary to assign different HART addresses to different WirelessHART adapters. The address that is used in the wireless network contains the serial number of the WirelessHART adapter and is therefore unique.
- 4 to 20 mA field devices do not require preconfiguration. Scaling and linearization are configured in the SWA70 DTM.

9.2　Inserting and connecting the battery unit

You must first open the housing to insert the battery unit. Please pay attention to the operational safety instructions. See "Operational safety" on page 7.

The battery unit only needs to be inserted for the "WirelessHART adapter with battery unit" device version. The other versions are fully assembled when delivered.

Warning!

⚠ WARNING
- The housing of the WirelessHART adapter may not be opened in hazardous areas if dust is present. The housing may only be opened in a dusty atmosphere if adequate ventilation ensures the environment is free of dust.

You require a Torx T10 **to open the housing.**
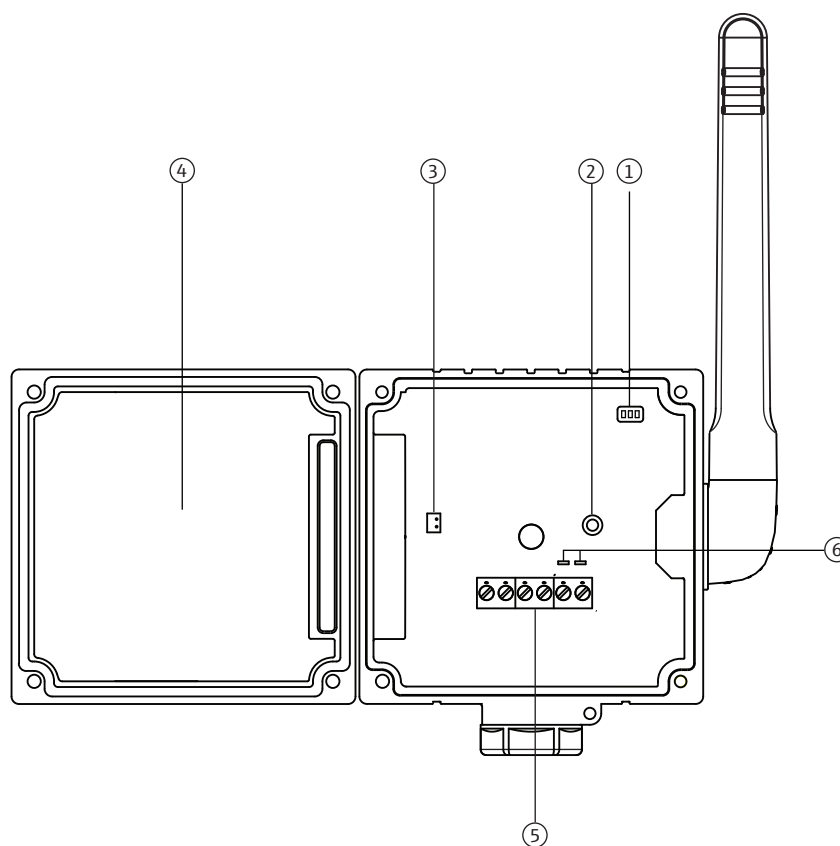
Fig. 9-1: Battery compartment with housing open

1	Light emitting diodes	4	Battery compartment
2	Push button	5	Terminals 1 to 6
3	Socket for battery connector	6	Terminals for HART modem

Proceed as follows to connect the battery unit:

1. Insert the battery unit into the battery compartment, making sure that the battery unit engages with a click.

2. Insert the battery connector into the socket on the PCB cover.

Once voltage is supplied to the WirelessHART adapter, the adapter's operating software starts up. A WirelessHART adapter self-test is performed to check whether the assignment of the terminals has been modified. If the device is being commissioned for the first time, the assignment of the terminals is determined.

9.3   Checks during commissioning

When commissioning the WirelessHART adapter, perform the following checks:

- Has the battery unit or the electronically controlled power supply unit been inserted correctly?
- Is the connecting cable plugged in correctly?
- Is the device ready for operation and do the light emitting diodes light up when the push button is pressed briefly?

If the field device is not put into operation immediately after commissioning, close the housing of the WirelessHART adapter and the connection compartment of the field device. Tighten the housing screws of the WirelessHART adapter with a torque of 0.6 Nm.

10   Configuration and online parameterization

The configuration and parameterization are described using the example of Endress+Hauser's "FieldCare" asset management tool.

10.1   Identification

The parameters that are required to identify the WirelessHART adapter can be configured in the SWA70 DTM. The default settings appear in the individual input boxes.

1. Click **Identification** in the DTM navigation tree.
   – You can enter text in the white fields. Press **Enter** to save your changes.
   – The gray fields are read-only.
   – An explanation of the individual parameters is provided in the "Identification parameters" table below. Mandatory fields are highlighted in bold.
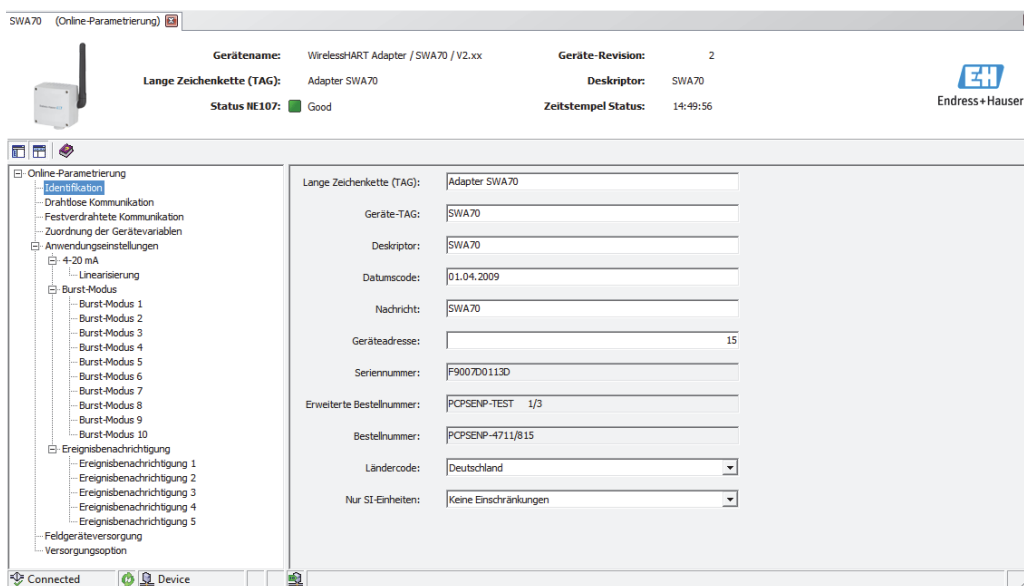
Identification parameters

| Parameter	Meaning	Example	Default
Long Tag	For devices with HART version 6.0 and higher: unique identification of the WirelessHART adapter in the network and the plant. The parameter is used to configure the burst mode and event notification. – Max. 32 characters, ISO-Latin-1 string	WA001	
Device Tag	For reasons of compatibility, we recommend entering similar information for the Device Tag and the Long Tag. – Max. 8 characters, Packed-ASCII string*	WA001	
Descriptor	String comprising a maximum of 16 characters which the user can use to describe the function or the location of the WirelessHART adapter, for example. – Packed-ASCII string with maximum 16 characters*	Area 2 Tank 3	
Date Code	Date in dd.mm.yyyy format – The date of the last change can be entered, for example	10.03.2009	01.04.2009
Message	Max. 32-character message that can be used randomly as required. – Max. 16 characters, Packed-ASCII string*		

Parameter	Meaning	Example	Default
Device address	HART address of the WirelessHART adapter on the wired interface – Range: 0-63 The "Long Tag" and the "MAC Address" are used to identify the WirelessHART adapter in the wireless network. Therefore, it is not necessary to assign different "polling addresses" to different WirelessHART adapters.	15	15
Serial number	Serial number of the WirelessHART adapter		
Ext. Order Code	Extended order number		
Order number	Compact notation of the WirelessHART adapter order code		
Country Code	Code for the country in which the WirelessHART adapter is operated. – Controls the signal strength; if the WirelessHART adapter is not already connected to a network, the signal strength is set to 0 dBm in accordance with national restrictions. – Controls the setting of the SI unit: The "SI Units Only" parameter is set in accordance with national restrictions.	United States	Germany
SI Units Only	Set of options for all the unit parameters of the WirelessHART adapter – Unit codes limited to the SI Units only: only SI units are displayed. – No restrictions: metric and US units are displayed.	Unit codes limited to the SI Units only.	No restrictions
*Valid character set: @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z	\ ] ^ _ SP ! " # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ?		

10.2   Wireless communication

The parameters that are required to integrate the WirelessHART adapter into a wireless network can be configured in the SWA70 DTM.

1. Click **Wireless Communication** in the DTM navigation tree.
   - You can enter text in the white fields. Press **Enter** to save your changes.
   - The gray fields are read-only.
   - An explanation of the individual parameters is provided in the "Wireless communication parameters" table below. Mandatory fields are highlighted in bold.
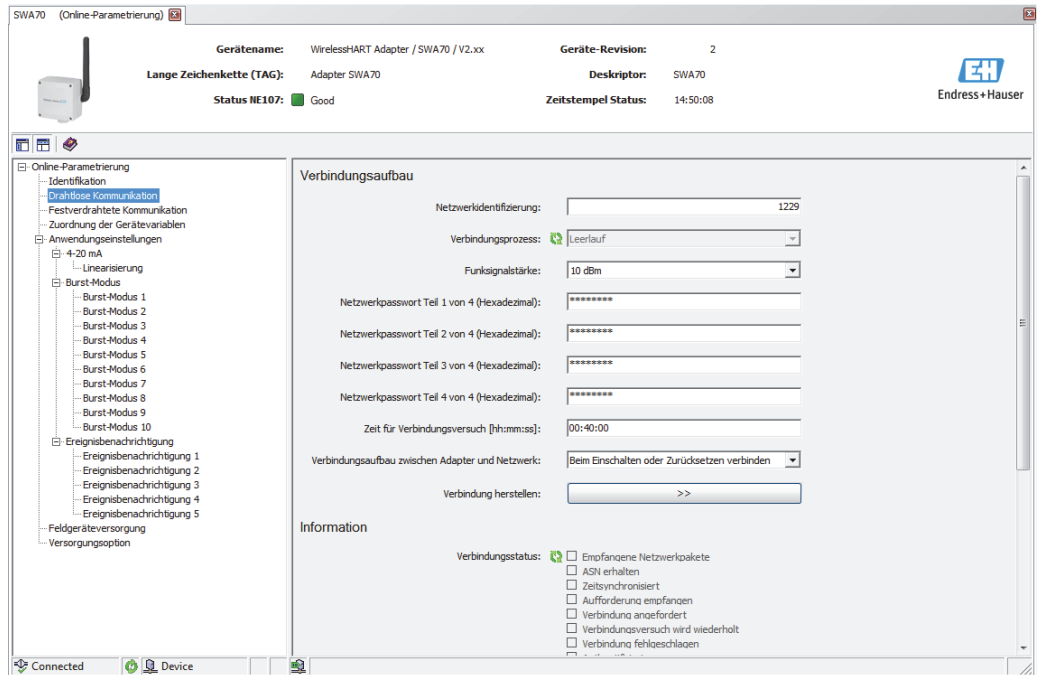
2. Configure the parameters **Network Identification, Radio Power, Join Key Part 1 of 4** to **Join Key Part 4 of 4, Join Shed Time, Join Mode**.

3. Press the **Execute Join** button to download the network settings and save them in the WirelessHART adapter.
   - The joining status can be tracked in the **Join Status** parameter.
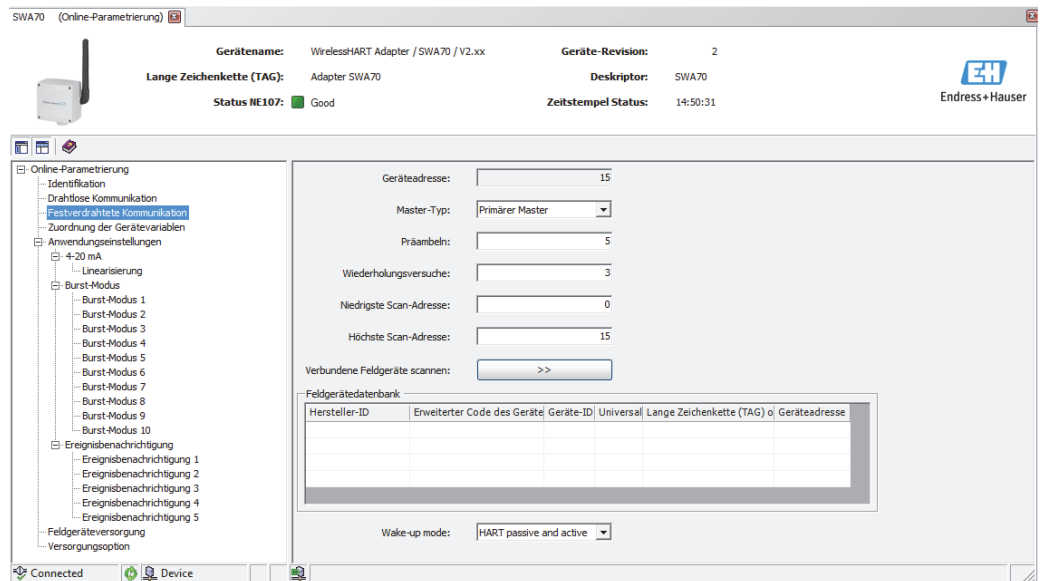
Wireless communication parameters

Parameter	Meaning	Example	Default
Network Identification	Identification number of the network the WirelessHART adapter is joining – Range: 0 to 65535	43	1447
Wireless Operation Mode	Indicates the operation mode of the WirelessHART adapter • Idle: waiting • Active Search: searching for neighbors • Negotiating: connection parameters are being exchanged with the network manager • Quarantined: network manager has denied connection. Adapter temporarily excluded from the network • Operational: adapter is connected • Suspended: permanently excluded from the network • Deep sleep/Ultra-Low Power/Passive Search: adapter is inactive		
Radio Power	RF power level – 0 or 10 dBm – National restriction to 0 dBm is possible (e.g. in Japan)	10 dBm	10 dBm
Join Key Part 1 of 4	Network password, 8 character hexadecimal, Part 1 of 4	33333333	456E6472

Parameter	Meaning	Example	Default
Join Key Part 2 of 4	Network password, 8 character hexadecimal, Part 2 of 4	33333333	65737320
Join Key Part 3 of 4	Network password, 8 character hexadecimal, Part 3 of 4	33333333	2B204861
Join Key Part 4 of 4	Network password, 8 character hexadecimal, Part 4 of 4	33333333	75736572
Join Shed Time [hh.mm.ss]	Time in hh.mm.ss that the adapter is given to attempt to join the network after the "Join Key" and "Network Identification" information has been entered correctly. – When this time elapses, the WirelessHART adapter continues its attempt to join the network but with less intensity.	00:40:00	00:40:00
Join Mode	Way in which the WirelessHART adapter joins the network: • Do not attempt to join: do not join the network. The parameters are saved. • Join now: join the network now. Once the WirelessHART adapter has successfully joined the network, it automatically switches to "Attempt to join immediately on power-up or reset". • Attempt to join immediately on power-up or reset: join as soon as the device is restarted.	Join now	Attempt to join immediately on power-up or reset
Execute Join	Pressing this button writes the parameters configured above to the WirelessHART adapter. These parameters are then used. – If the "Join Mode" parameter is set to "Join now", the WirelessHART adapter attempts to join the network.		
Join Status	Provides information about the current status when the adapter is attempting to join the network. • Network Packets Heard: network packets received. • ASN Acquired: "Absolute Slot Number (ASN)" has been received. • Synchronized to Slot Time: synchronized with the network. • Advertisement Heard: received advertising packets to send data. • Join Requested: requested to join network. • Join Retrying: retry joining the network. • Join Failed: attempt to join network has failed. • Authenticated: authenticated • Network Joined: adapter has joined the network • Negotiating Network Properties: exchanging network parameters • Normal Operation Commencing: fully connected		
Total Number of Neighbors	Indicates the number of WirelessHART devices in the vicinity of the adapter to which a connection has been made.		
Number of Advertising Packets Received	When the adapter joins the network, indicates the number of advertising packets which were sent by the neighboring devices and/or network managers and received by the WirelessHART adapter.		
Number of Join Attempts	Indicates the number of attempts the WirelessHART adapter made to join the network		
Active Advertising Shed Time [hh.mm.ss]	Time in hh.mm.ss during which the WirelessHART adapter attempts to allow other adapters to join the network more quickly.	00:40:00	00:00:00
Request Active Advertising	Pressing this button activates the "Active Advertising Shed Time" in the WirelessHART adapter.		
Number of Neighbors Advertising	Indicates the number of neighbors that transmit advertising packets to send data.		

10.3   Wired communication

The parameters that are required to set up wired HART communication between the WirelessHART adapter and one or more HART field devices can be configured in the SWA70 DTM.

1. Click **Wired Communication** in the DTM navigation tree.
   - You can enter text in the white fields. Press **Enter** to save your changes.
   - The gray fields are read-only.
   - An explanation of the individual parameters is provided in the "Wired communication parameters" table below. Mandatory fields are highlighted in bold.


Wired communication parameters

Parameter	Meaning	Example	Default
Device address	HART address of the WirelessHART adapter	63	
Master Type	In a current loop, different HART master types must be assigned, for instance, to a device configurator - such as the Field Xpert - and the WirelessHART adapter. – Primary Master is the default setting. – There is a Primary Master and a Secondary Master – If a device configurator or another master/host is connected, it must be set to the Secondary Master.	Primary Master	Primary Master
Preambles	Number of preambles sent at start of the HART frame to synchronize wired communication. – Range: 5 to 20 – All connected devices require this setting	5	5
Retries	Number of times the WirelessHART adapter tries to establish communication with the connected field device before it reports a communication error.	3	3
Lowest Scan Address	Address as of which the WirelessHART adapter starts scanning for connected field devices.	0	0
Highest Scan Address	Address up to which the WirelessHART adapter scans for connected field devices. – A HART device providing a 4 to 20 mA output in a control loop will have the address 0. – Normally a single HART field device that is powered by the WirelessHART adapter will have the address 1. This ensures it works in multidrop mode. The current signal of each user is frozen at 4 mA. – Enter the highest address if several field devices (max. 4) are connected in the multidrop mode.	1	1

Parameter	Meaning	Example	Default
Scan Subdevices	Pressing this button starts the search for connected field devices. – The field devices found are displayed in the SWA70 DTM. – If the terminal assignment of the WirelessHART adapter changes during operation, scanning must be performed again. – Please note that scanning is performed as soon as power is supplied to the WirelessHART adapter. The table is then populated automatically.		
Field Device Database	List of the field devices that are connected and recognized.		
Wake-up Detection	Specify the terminals that listen to the communication. By restricting the terminal it is possible to prevent unnecessary execution of the configuration mode and save energy. – Terminals 1 to 4 – Terminals 5 to 8 – Terminals 1 to 8 This parameter is only relevant for the "Field device in a closed-control loop" version.		

10.4   Device variable mapping

The WirelessHART adapter can output the value and the status of different variables. Four variables can be shown in the network. They can be displayed and configured in the SWA70 DTM.

1. Click **Device Variable Mapping** in the DTM navigation tree.
   - You can enter text in the white fields. Press **Enter** to save your changes.
   - The gray fields are read-only.
   - An explanation of the individual parameters is provided in the "Device variable mapping parameters" table below. Mandatory fields are highlighted in bold.
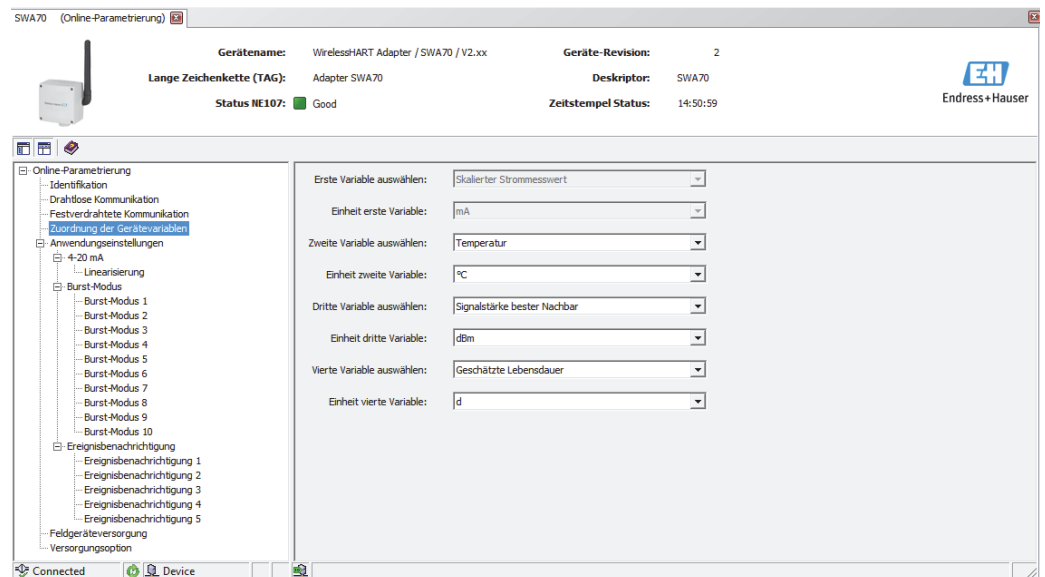
2. The primary variable is permanently linked to the scaled loop current. The scaling and unit can be changed in the DTM navigation tree in the **Application Settings/4-20 mA menu.**
   The following variables can be selected as the secondary, tertiary and quaternary variable:
   - Battery Voltage: current battery voltage
   - Battery Voltage With Load: battery voltage with a load
   - Battery Voltage Without Load During Battery Test
   - Consumed Energy: energy drawn from the battery
   - Estimated Lifetime: estimated lifetime in days
   - Normalized Consumed Energy: energy consumed under normalized conditions
   - RSL of Best Neighbor: signal strength of the "best" neighbor
   - RSL of Second Best Neighbor: signal strength of the "second-best" neighbor
   - Temperature: current temperature
   - Temperature Min: minimum temperature that has been measured by the WirelessHART adapter. The value can be reset.
   - Temperature Max: maximum temperature that has been measured by the WirelessHART adapter. The value can be reset.

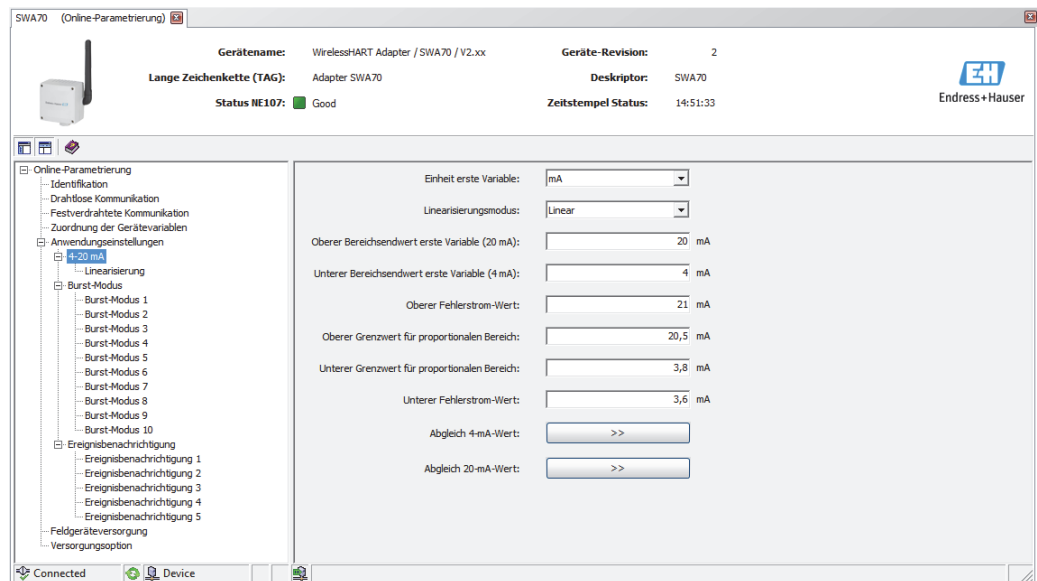The choice of unit matches the set variable.

Device variable mapping parameters

Parameter	Meaning	Example	Default
Select Primary Variable	Primary variable – The primary variable is permanently linked to the loop current.	Scaled Loop Current	Scaled Loop Current
Primary Variable Unit	Unit of the primary variable	mbar	mA
Select Secondary Variable	Secondary variable	Temperature	Temperature
Secondary Variable Unit	Unit of the secondary variable	°C	°C
Select Tertiary Variable	Tertiary variable	RSL of Best Neighbor	RSL of Best Neighbor
Tertiary Variable Unit	Unit of the tertiary variable	dB	dB
Select Quaternary Variable	Quaternary variable	Estimated Lifetime	Estimated Lifetime
Quaternary Variable Unit	Unit of the quaternary variable	d	d

10.5   4-20 mA (application setting)

When a HART device is connected to the WirelessHART adapter, all the parameters are read via the digital signal. However, it is also possible to connect a 4–20 mA device to the WirelessHART adapter. The WirelessHART adapter then measures the loop current and can transmit it digitally. It is possible to adjust the 4 to 20 signal in the SWA70 DTM and perform linearization if necessary. In addition, you can enter limit values that specify the proportional value range and the alarm signals. If the values entered are exceeded or undershot, the WirelessHART adapter issues a warning or an alarm, and an event notification where warranted. See "Event notification (application setting)" on page 69.

1. Click **Application Settings/4-20 mA in the DTM navigation tree** to display the appropriate parameters.
   – You can enter text in the white fields. Press **Enter** to save your changes.
   – The gray fields are read-only.
   – An explanation of the individual parameters is provided in the "4-20 mA parameters" table below. Mandatory fields are highlighted in bold.

4-20 mA parameters

Parameter	Meaning	Example	Default
Primary Variable Unit	The unit of the primary variable	℃	mA
Linearization Mode	Determines how the value of the input current is converted • Linear: proportional scaling over the set range • Special Curve: scaling according to the "Linearization" table	Special Curve	Linear
Primary Variable Upper Range Value (20 mA)	Upper range value of the input current which corresponds to the 20 mA value	100 ℃	20 mA
Primary Variable Lower Range Value (4 mA)	Lower range value of the input current which corresponds to the 4 mA value	-20 ℃	4 mA
Input Damping	Damping factor of the input current (0-255 s) – Damping is disabled if the setting is 0 s.	0	0
Upper Fault-Current Value	A fault is reported if this value is exceeded.	22 mA	22 mA
Upper Limit of Proportional Range	A warning is issued if this value is exceeded.	20.5 mA	20.5 mA
Lower Limit of Proportional Range	A warning is issued if this value is undershot.	3.8 mA	3.8 mA
Lower Fault-Current Value	A fault is reported if this value is undershot	3.6 mA	3.6 mA
Trim Loop Current Zero	Pressing the button calls up a method for adjusting the 4 mA value. – For this purpose you must simulate 4 mA in the connected field device or set a 4 mA current in some other way.		
Trim Loop Current Gain	Pressing the button calls up a method for adjusting the 20 mA value. – For this purpose you must simulate 20 mA in the connected field device or set a 20 mA current in some other way.		

Linearization

If the **Special Curve** option is selected in the **Linearization Mode** parameter, you must make additional settings in the **Linearization** window.
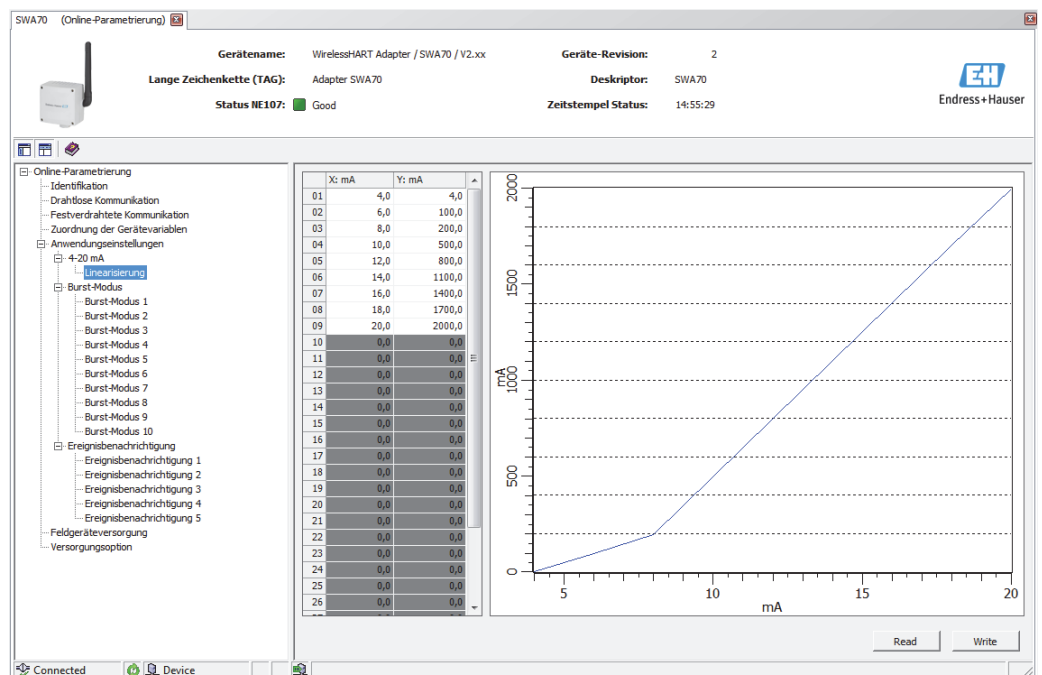
Comply with the following rules:

- You can enter between 2 and 32 value pairs.
- The X values must rise monotonically. The Y values must rise or fall monotonically. Red fields indicate an error.
- The full scale values of the value range must correspond to those in the **4-20 mA** window**.**

A graphic shows the linearization curve.

Parameter	Meaning	Example
X1 to X32	Input value X1 to X32 for linearization in mA	
Y1 to Y32	Output values Y1 to Y32 for linearization in the selected unit for the "Primary Variable Unit" parameter	
Read	Press the button to read values from the WirelessHART adapter and transfer them to the linearization table.	
Write	Press the button to write the values from the linearization table to the WirelessHART adapter.	

10.6   Burst mode (application setting)

With the burst mode, slave devices can periodically send information, such as process values, without being prompted to do so by the master. The WirelessHART adapter is responsible for requesting this information from a field device that is connected to the WirelessHART adapter and forwarding this information to the Fieldgate. In addition, the WirelessHART adapter is also able to send its own process values - i.e. the device variables - to the Fieldgate.See "Device variable mapping" on page 61.

Note!

| NOTE |

- If FieldCare or another configuration tool is communicating with the WirelessHART adapter via a modem, the transmission of burst information is interrupted, as is the measurement of the loop current.
- Some HART field devices are also able to send burst information. In this case, the burst mode should only be enabled in the WirelessHART adapter since the adapter burst setting cannot be synchronized with the burst setting of the field device.

1. Click **Application Settings/Burst Mode in the DTM navigation tree.** An overview indicates which burst modes are configured.
    - You can define up to 10 different burst mode messages via the **Burst Mode 1** to **Burst Mode 10** windows.

2. Click **Burst Mode 1** to display the corresponding parameters.
    - You can enter text in the white fields. Press **Enter** to accept your changes.
    - Press **Apply** to save the changes in the WirelessHART adapter.
    - The gray fields are read-only.
    - An explanation of the individual parameters is provided in the "Burst mode" table below. Mandatory fields are highlighted in bold.
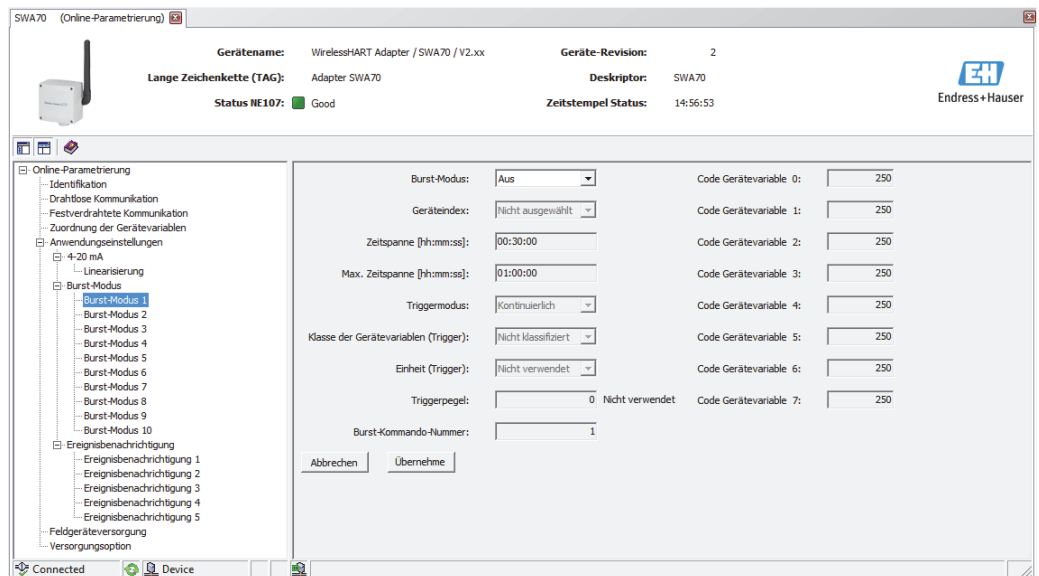
In a typical configuration, the **Primary Variable**, **Secondary Variable**, **Tertiary Variable** and **Quaternary Variable** process values are sent by the connected HART field device to the Fieldgate at regular intervals. You can use burst command no. 3 and 48 for this purpose. We recommend you set the same time frame for both commands.
The WirelessHART adapter "wakes" the field device, accepts the measured values and sends them at the set interval.

We recommend configuring a second burst set for the adapter so that the information of the WirelessHART adapter is also available for host applications in the Fieldgate. The **Primary Variable**, **Secondary Variable**, **Tertiary Variable** and **Quaternary Variable** device variables are configured in the "Device Variable Mapping" window. See "Device variable mapping" on page 61.

Setting the burst mode Proceed as follows to set the burst mode:

1. Open the **Burst Mode 1** window, for example.

2. Via the **Burst Mode** parameter select the **Wireless** option.
   - The gray fields become white. It is possible to enter data.

3. Under **Device Index** select the connected field device from the list.
   - If the field device is not listed, press the **Scan Subdevices** button in the **Wired Communication** window.

4. Select the **Trigger Mode.** The **Continuous default setting is a typical setting.**
   - Additional trigger fields turn white if a setting other than **Continuous** is selected. It is possible to enter data. An example of this can be found in the "Process monitoring parameters" table.
   - For **Period** it is possible to enter a period after which a burst message is triggered in an event, e.g. 2 minutes for a temperature alarm or 2 hours for the defined remaining operating life of the battery unit.
   - The value entered in the **Max. Period** field determines the maximum time that can elapse between two burst messages if the trigger condition is not met.

5. For **Period** enter the interval (hh:mm:ss) at which the WirelessHART adapter should send the process values.
   – Please note that the shorter the interval, the more battery power is consumed.

6. Accept the default setting of 1 hour for **Max. Period.**

7. Enter the **Burst Command Number**. Command 3 is a typical setting. Here the primary variable, secondary variable, tertiary variable and quaternary variable are sent.
   – If you select command **9** or **33**, the **Device Variable Code 0-7** fields are enabled. Further information can be found in the "Process monitoring parameters" table.
   – If you select command **48**, the device status is sent periodically.

8. Press **Apply** to save the settings in the WirelessHART adapter.
   – Press **OK** to confirm.
   – The burst mode takes effect immediately if the WirelessHART adapter is connected to the network.
   – If the WirelessHART adapter is not connected to the network, a message appears to this effect. Press **OK** to confirm. The burst mode takes effect when the WirelessHART adapter joins the network. This means that you can also configure the burst mode offline.

Burst mode parameters

Parameter	Meaning	Example	Default
Burst mode	Specifies whether the burst mode is active. • Off: the burst mode is not active, the input boxes are grayed out and write-protected. • Wireless: the burst mode is active, data can be entered in the input boxes. • The process monitoring parameters are written to the WirelessHART adapter when the "Apply" button is pressed.	Wireless	Off
Device Index	Specifies the field device or WirelessHART adapter for which the process monitoring parameters apply. • The "Long Tag" entry is used for field devices with version HART6 and higher. • "Message" is used for field devices with HART 5 as these devices do not support the "Long Tag" entry.	Tank 5	
Period (hh:mm:ss)	If the "Trigger Mode" is set to "Continuous" this parameter specifies the length of time that elapses between two burst messages. If another option was selected for the "Trigger Mode" this period is used to specify the fastest rate. Refer to fig. 10-1 and fig. 10-2.	00:10:00	00:30:00
Max. Period (hh:mm:ss)	If the "Trigger Mode" is set to a value other than "Continuous", this function is used to set the maximum period in seconds that can elapse between two burst messages if the condition ("Trigger Level") is not met. Refer to fig. 10-1 and fig. 10-2.	01:00:00	01:00:00

| Parameter	Meaning	Example	Default
Trigger Mode	Determines the event that triggers a burst message from the device. Options: • Continuous: a burst message is sent continuously at intervals. The interval is set via the "Period" parameter. • Window: a burst message is sent after the set "Period" if the process value deviates from the last communicated value by more than the specified trigger level. In the case of smaller deviations, the process value is sent at the set "Max. Period". See figure 10-1 on page 68. • Rising: a burst message is sent after the set "Period" if the process value rises above the specified trigger level. If the process value remains below the trigger level, it is sent after the set "Max. Period". See figure 10-2 on page 69. • Falling: a burst message is sent after the set "Period" if the process value falls below the specified trigger level. If the process value remains above the trigger level, it is sent after the set "Max. Period". • On Change: a burst message is sent after the set "Period" if a value of the HART command changes. Examples • Example 1: Setting: Trigger Mode: Continuous, Period: 00:10:00, Burst Command Number: 3 Result: a field device sends all the measured values every ten minutes. • Example 2: Settings: Trigger Mode: Falling, Period: 00:05:00, Max. Period: 01:00:00, Device Variable Class (Trigger): Volume, Unit Code (Trigger): l for liter, Trigger Level: 200, Burst Command Number: 3 Prerequisite (configured at field device): "Primary Variable Unit" is "l" for liter Result: a burst message is triggered once an hour as long as the value is above 200 liters. If the value is below 200 liters, a burst message is triggered every 5 minutes.	Continuous	Continuous
Device Variable Class (Trigger)	Specifies the classification of the measurement. This field is triggered either via the setting for "Period" or the "Max. Period".	Volume	Not Classified
Unit Code (Trigger)	Unit of the measured value	l	Not Classified
Trigger Level	Specifies the threshold for switching from "Period" to the "Max. Period", i.e. from the fast to the slow setting. – The switching mode is specified in the "Trigger Mode" .	200	0
Burst Command Number	Burst Command Number; more detailed information is provided in the HART Specification. • 1: transmits the value of the "Primary Variable" and the unit • 2: transmits the value of the 4 to 20 mA signal and the corresponding value as a percentage • 3: transmits the value of the 4 to 20 mA signal and up to 4 predefined process variables ("Primary Variable", "Secondary Variable", "Tertiary Variable", "Quaternary Variable") and the associated unit • 9: transmits the value, unit and status of up to 8 field device variables • 33: transmits the value and unit of up to 4 field device variables • 48: transmits the complete device status Note: • You can set any commands you want for connected field devices. Please refer to the specific operating manual for the commands. • If in doubt, use commands 3 and 48. • If command 48 is used only the "Continuous" trigger mode can be used.	3	1

Parameter	Meaning	Example	Default
Device Variable Code 0-7	For selecting the device variables to be transmitted in the burst message if command 9 or 33 have been selected as the burst command number. • Select the field device variable that is to be transmitted. This is only possible for the WirelessHART adapter. • If you want to set the burst mode for a connected field device, refer to the operating manual of the field device for information about the assignment of the device variables.		
Cancel	Press the button to reset the values to the default settings.		
Apply	Press the button to write the values to the WirelessHART adapter.		

The graphic below illustrates how burst messages are sent for the "Window" trigger mode. A burst message is sent after the set "Period" if the process value deviates from the last communicated value by more than the defined "trigger window". In the case of smaller deviations, the process value is sent at the set "Max. Period".
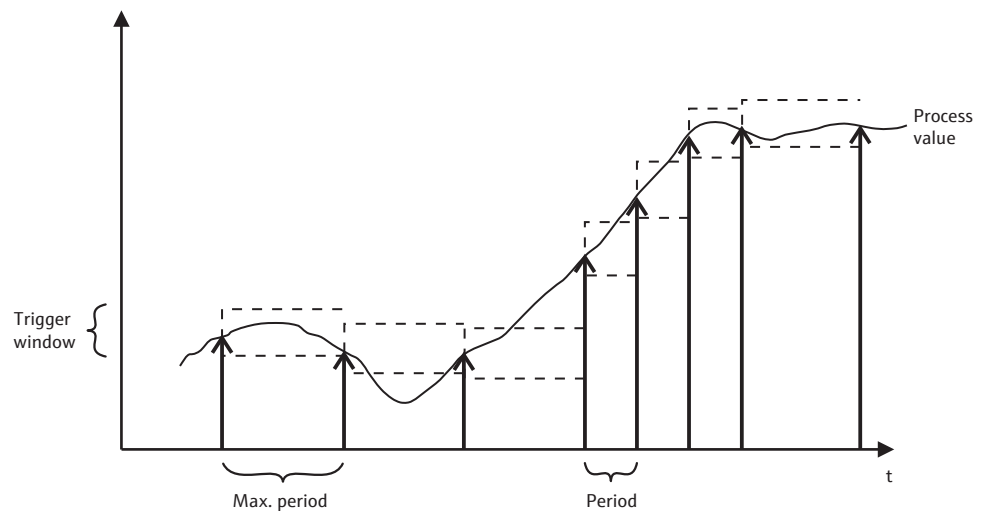
Fig. 10-1: Transmission of burst messages for the "Window" trigger mode

The graphic below illustrates how burst messages are sent for the "Rising" trigger mode. A burst message is sent after the set "Period" if the process value rises above the specified trigger level. If the process value remains below the trigger level, it is sent after the set "Max. Period".
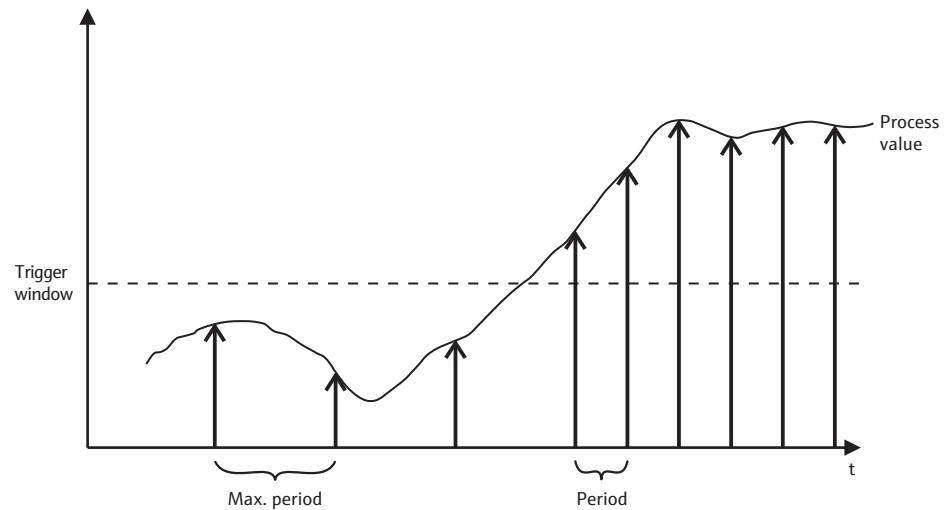
Fig. 10-2: Transmission of burst messages for the "Rising" trigger mode

10.7   Event notification (application setting)

Event notification is a special application similar to the burst mode. An event notification is sent if there are changes in the device configuration or device status, regardless of whether data are already being sent by burst mode commands. The status included in the device status byte, the extended device status byte and in command 48 can be used for event notification. It is possible to specify a specific number of bits that will trigger event notification. Event notifications have a low priority, but carry a time stamp in order to record the first time when notification was triggered. Up to 5 different event notifications can be defined in the **Event Notification 1** to **Event Notification 5** windows.

1. Click **Application Settings/Event Notification** in the DTM navigation tree to display the window with an overview of the event notifications.
   - **Wireless** indicates that the specific event notification has already been configured.
   - **Off** indicates that the specific event notification has not been configured.
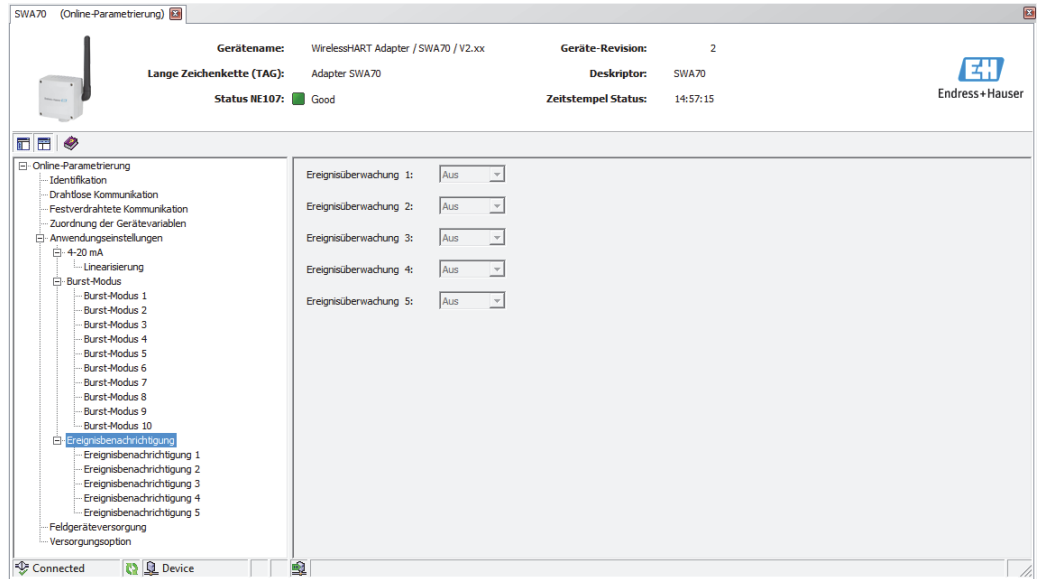
2. Click **Application Settings/Event Notification** in the DTM navigation tree and then select
   Event Notification 1.
   - You can enter text in the white fields. Press **Enter** to save your changes.
   - The gray fields are read-only.
   - An explanation of the parameters is provided in the following "Event notification
   parameters" table. Mandatory fields are highlighted in bold.

Event notification parameters

Parameter	Meaning	Example	Default
"Event" tab			
Event Notification Control Code	Specifies whether the event notification mode is active. • Off: the event notification mode is not active. The input boxes are grayed out and write-protected. • Wireless: the event notification mode is active. It is possible to enter data in the input boxes. The event notification parameters are written to the WirelessHART adapter when the "Apply" button is pressed.	Wireless	Off
Device Index	Specifies the field device or WirelessHART adapter for which the event notification parameters apply. • "Long Tag" • For field devices with HART 5 version: message	Tank 5	
Event Notification Retry Time	Period in hh:mm:ss between the transmission of event notifications that have not been acknowledged. – The system continues to transmit the event notifications until the WirelessHART adapter gets confirmation of receipt.	00:10:00	00:30:00
Maximum Update Time	Maximum time in hh:mm:ss that is used if no event change occurs – If no event occurs, the WirelessHART adapter sends event notification after this length of time.	01:00:00	00:30:00
Event Debounce Interval	The amount of time in hh:mm:ss that an event must last before the event notification is sent out.	00:10:00	00:30:00
Event Status	Indicates whether event notification has been sent and not yet acknowledged. • "Configuration Changed" event is pending: the "Configuration Changed" event has not yet been acknowledged. • "Device Status" event is pending: the "Device Status" event has not yet been acknowledged. • "More Status Available" event is pending: the "More Status Available" event has not yet been acknowledged.		

Parameter	Meaning	Example	Default
"Event" tab			
First unACK Time	Indicates (in hh:mm:ss) how long the event notification shown under "Event Status" has been pending		
"Standard Event Mask" tab			
	Tick the appropriate check boxes to activate the desired event notification. – The event notifications indicated on this tab are standardized.		
"Device-Specific Event Mask" tab			
Byte, bit	This tab contains the device-specific, non-standardized event notifications – They are described in the operating manual for the particular field device and can be enabled accordingly.		

3. Configure the event notification parameters in the **Event** tab.

4. In the **Standard Event Mask** tab, click the standard events that you want to monitor.
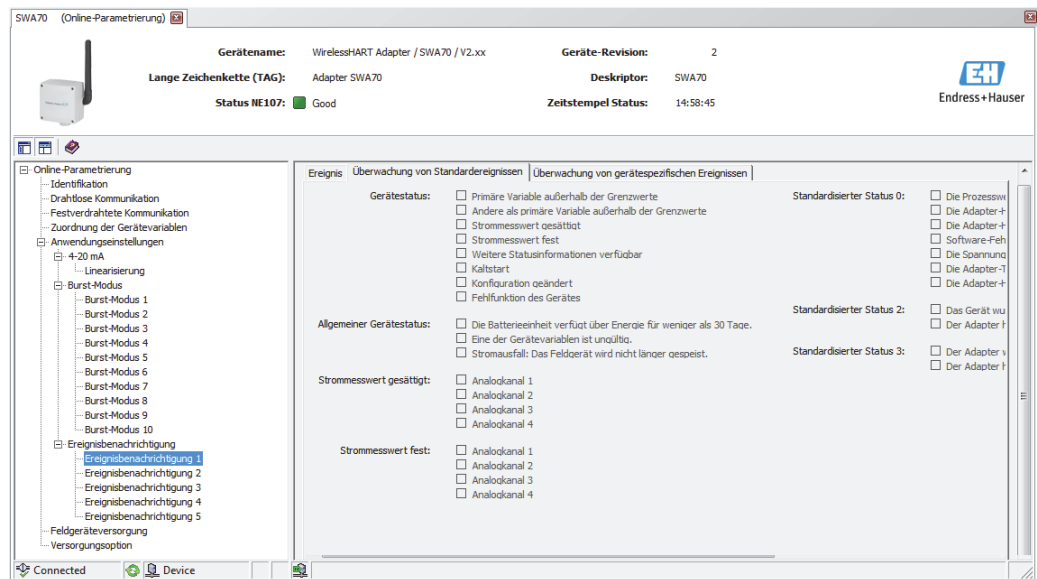
5. Select the **Device-Specific Event Mask** tab to monitor the device-specific events of the connected field device or the WirelessHART adapter.
   – Check the operating manual of the connected field device before you select check boxes on the **Device-Specific Event Mask** tab.
   – An explanation of the parameters is provided in the following "Parameters for monitoring device-specific events" table. Mandatory fields are highlighted in bold.
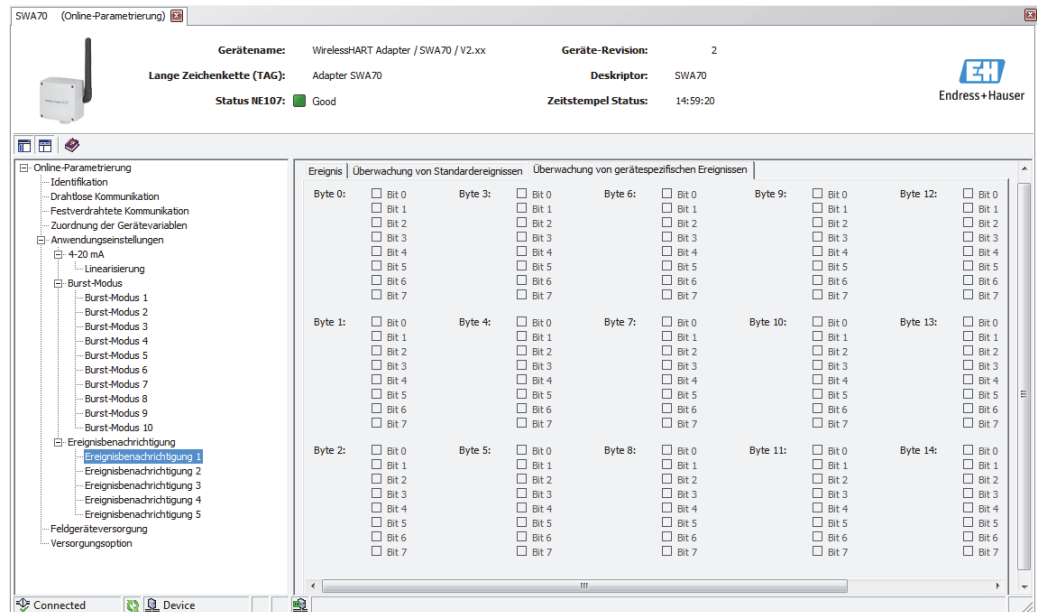
6. Press **Apply** to save the settings in the WirelessHART adapter.
   – Press **OK** to confirm.
   – The event is monitored immediately if the WirelessHART adapter is connected to the network.
   – If the WirelessHART adapter is not connected to the network, a message appears to this effect. Press **OK** to confirm. The event takes effect when the WirelessHART adapter joins the network.
   – If the WirelessHART adapter is not connected to the network, you can also configure event notification in the offline mode.

Device-specific event mask parameters

Byte	Bit	Meaning
0	0	No join attempt started so far.
	1	The WirelessHART adapter is not connected to a WirelessHART network.
	2	No alternative path to a neighbor.
	3	The WirelessHART adapter does not have a join key.
	4	The WirelessHART adapter could not connect to the WirelessHART network.
1	0	The WirelessHART adapter could not communicate with a field device.
	1	The loop current is less than 2 mA.
	2	The loop current exceeds the upper current limit value.
	3	Startup voltage was not provided.
	4	Operating voltage was not provided.
	5	The WirelessHART adapter is in the configuration mode.
	6	The WirelessHART adapter scans for connected devices.
	7	The WirelessHART adapter has found more than four field devices.
2	0	The hardware of the WirelessHART adapter is defective.
	1	The WirelessHART adapter is performing a self-test.
	2	The temperature of the WirelessHART adapter is outside the specified range.
	3	The hardware of the WirelessHART adapter is defective.
	4	Number of write attempts to FLASH at a critical level.
	6	Not used
	5	Number of write attempts to FLASH at a maximum level.
	7	The hardware of the WirelessHART adapter is defective.
3	0	The loop current has reached the configured lower warning level.
	1	The loop current has reached the configured upper warning level.
	2	The loop current has reached the configured lower alarm level.
	3	The loop current has reached the configured upper alarm level.
	4	Memory (lower part) contains no valid firmware update.
	5	Memory (upper part) contains no valid firmware update.
	6	There is an entry in the burst table or under event notification without an associated field device.
4	0	First wired device has additional status information.
	1	First wired device is not working correctly.
	2	Second wired device has additional status information.
	3	Second wired device is not working correctly.
	4	Third wired device has additional status information.
	5	Third wired device is not working correctly.
	6	Fourth wired device has additional status information.
	7	Fourth wired device is not working correctly.
5	0 - 7	Not used
6	0	Set: the battery unit has energy for less than 30 days and should be changed. Reset: the battery unit has energy for more than 33 days.
	1	One of the device variables is not valid.
	2	Failure of power supply unit: field device is no longer powered.
7	0 - 7	Not used
8	0	Process values are simulated.
	1	The hardware of the WirelessHART adapter is defective.
	2	The hardware of the WirelessHART adapter is defective.
	3	Software error: unexpected conditions.
	4	The voltage of the WirelessHART adapter or the field device is too low.
	5	Not used
	6	The hardware of the WirelessHART adapter is defective.
9	0 - 7	Not used
10	0 - 7	Analog output is saturated.
11	0	A device was added to or removed from the list of field devices.
	1	The WirelessHART adapter has discovered another master of same type.

| Byte	Bit	Meaning
12	0	The WirelessHART adapter was unable to get the required bandwidth.
	1	Not used
	2	The WirelessHART adapter asked for bandwidth and is awaiting a response.
	3	Firmware update in progress.

10.8 Field device power

The life of the battery unit can be optimized by aligning the power supply of the WirelessHART adapter with the energy requirements of the connected device. Knowledge of the energy requirements makes it possible to more reliably predict the battery service life. The power supply parameters for the field device must be taken from the field device operating manual. For some Endress+Hauser field devices the optimum power supply parameters are provided in a database supplied with the DTM.

Note!

NOTE

To minimize power consumption, we recommend HART communication between the field device and the WirelessHART adapter with a fixed analog current value of 4 mA in multidrop mode.

1. Click **Field Device Power** in the DTM navigation tree to display the appropriate parameters.
   - You can enter text in the white fields. Press **Enter** to save your changes.
   - The gray fields are read-only.
   - The meaning of the individual parameters is illustrated in "fig. 10-3" and explained in the "Field device power" table.
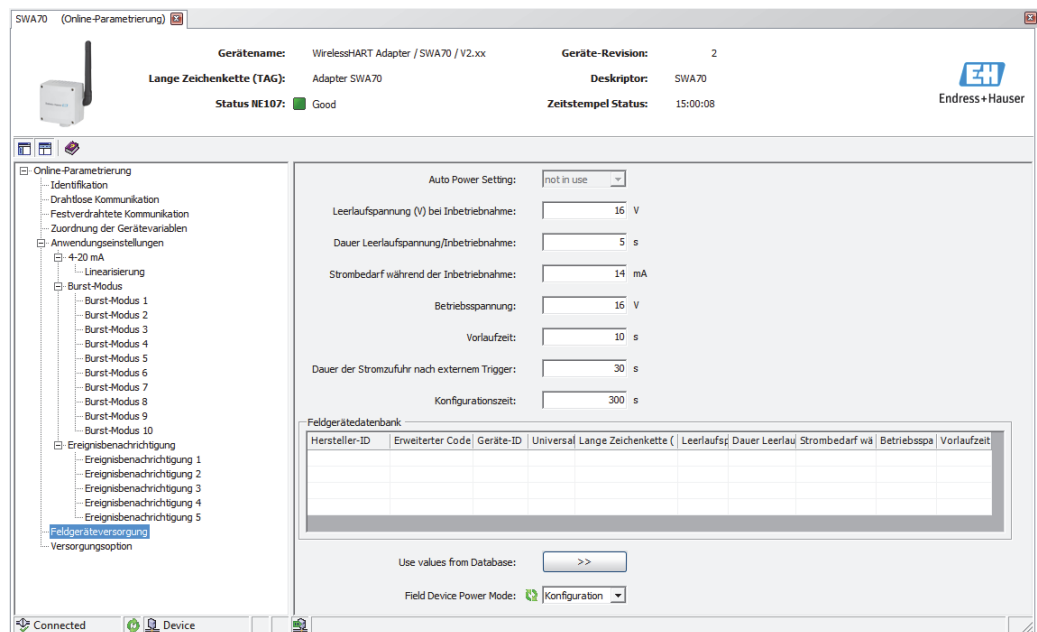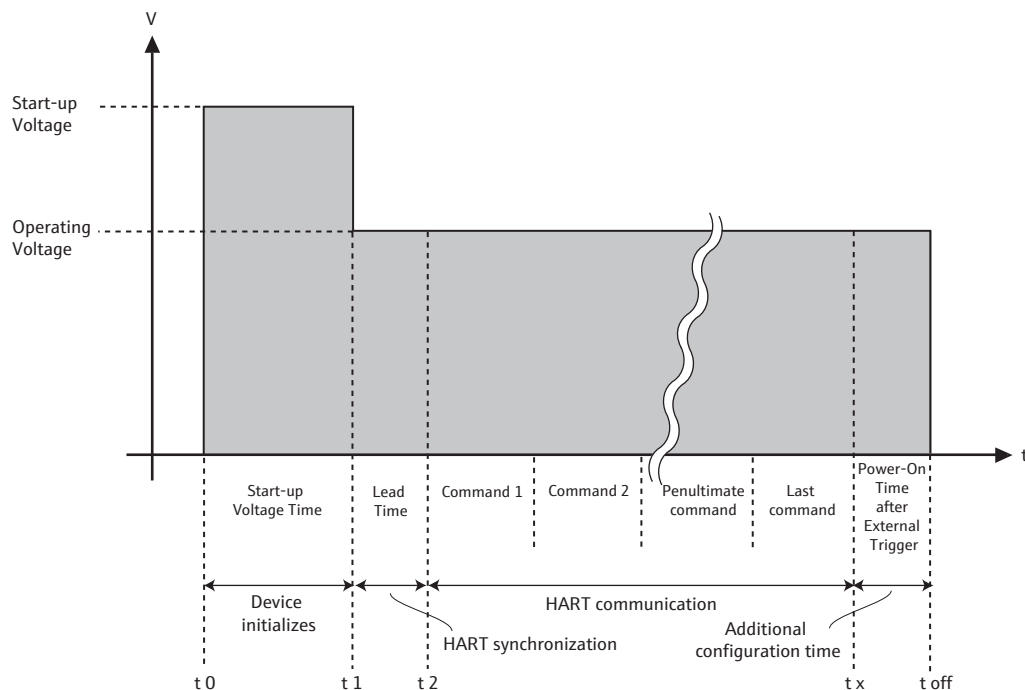
Fig. 10-3: Field device power parameters

If the WirelessHART adapter powers the field device as described in the section entitled "Two-wire field device with power supplied by the adapter", the mandatory fields highlighted in bold must be filled in.

Parameters: field device power

Parameter	Meaning	Example	Default
Auto Power Setting	This is a read-only parameter. • Not in Use: this option is displayed if the connected field device does not support this function or if several field devices are connected. In Use: the optimum settings for the power supply of the connected field device are detected automatically.	Not in Use	
Start-Up Voltage	Terminal voltage required by the connected field device on start up, in the range from 8 to 23 V, in increments of 0.1 V (see figure 10-3 on page 75).	14 V	16 V
Start-Up Time	Time in seconds during which the field device needs the "Start-Up Voltage".	5 s	5 s
Start-Up Current	Current in milliampere that is used by the field device for the duration of the "Start-Up Time".	14 mA	14 mA
Operating Voltage	Terminal voltage in Volts which the field device requires during normal operation after the "Start-Up Time".	12 V	16 V
Lead Time	Time in seconds which the field device requires after the "Start-Up Time" to provide valid measured values.	10 s	10 s
Power-On Time after External Trigger	Time in seconds that the field device remains powered after communication. – Only applies for the "Automatic" event mode.	1 s	30 s
Configuration Time	Time in seconds that the field device is powered for configuration, e.g. via a display. – Only applies for the "Configuration" event mode.	300 s	300 s
Field Device Database	For field devices whose parameters are known from a database provided: refer to the tables for the values you need for the "Start-up Voltage", "Start-Up Time", "Start-Up Current", "Operating Voltage" and "Lead Time" parameters.	–	
Use Value from Database	Press this button to write the parameters to the WirelessHART adapter.		

Parameter	Meaning	Example	Default
Field Device Power Mode	Specifies the power mode. • Off: no communication takes place with any connected field device. The WirelessHART adapter acts as a router between other WirelessHART devices. • Automatic: if commands are sent via wireless to the connected field device, it receives power after each communication as defined in the "Power-On Time after External Trigger". This process prevents the power from being constantly switched on and off. • Configuration: if "Configuration" is selected, the connected field device is powered for the "Configuration Time" and afterwards returns to the "Automatic" mode. The same thing happens when the push button on the WirelessHART adapter is pressed for 10-15 seconds.	Automatic	

10.9   Power option

The power options provide information about the power supply unit connected.

1. Click **Power Option** in the DTM navigation tree to display the appropriate parameters.
   – You can enter text in the white fields. Press **Enter** to save your changes.
   – The gray fields are read-only.
   – An explanation of the individual parameters is provided in the "Power option" table.
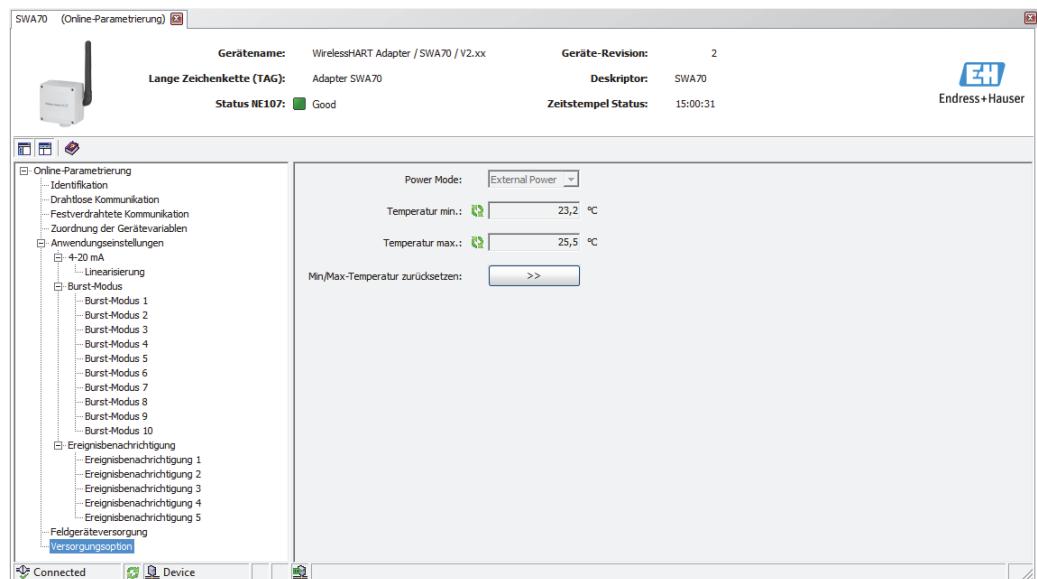
Parameters: power option

Parameter	Meaning	Example	Default
Power Mode	Indicates whether the adapter is powered by a battery or externally.		
Battery Changed	This parameter only appears for battery-powered devices. When the battery unit is replaced, this button must be pressed so that the date for the "Last Battery Change" in the WirelessHART adapter is set to the present date and the expected lifetime calculation is reset.		
Last Battery Change	This parameter only appears for battery-powered devices. Displays the date when the "Battery Changed" button was last pressed. – If the WirelessHART adapter is not connected to the network during initial commissioning, the date is set to 01.01.1970. – The date is updated when the adapter connects to the network manager for the first time.		
Temperature Min	Lowest temperature in degrees Celsius to which the WirelessHART adapter has been exposed. The value can be reset.	-10 ℃	
Temperature Max	Highest temperature in degrees Celsius to which the WirelessHART adapter has been exposed. The value can be reset.	50 ℃	
Reset Temp Min/Max	Press this button to reset the minimum and maximum temperature values.		

11 Additional DTM functions

11.1 Invoking the diagnostic parameters

For the purpose of diagnostics various parameters can be called up with the **Diagnosis** function.

In the network view right-click the WirelessHART adapter and select **Diagnosis** in the context menu. The **Diagnosis** window opens.

11.1.1 Identification

The **Identification** window contains information about the hardware and software of the WirelessHART adapter. An explanation of the individual parameters is provided in the "Identification parameters" table below.
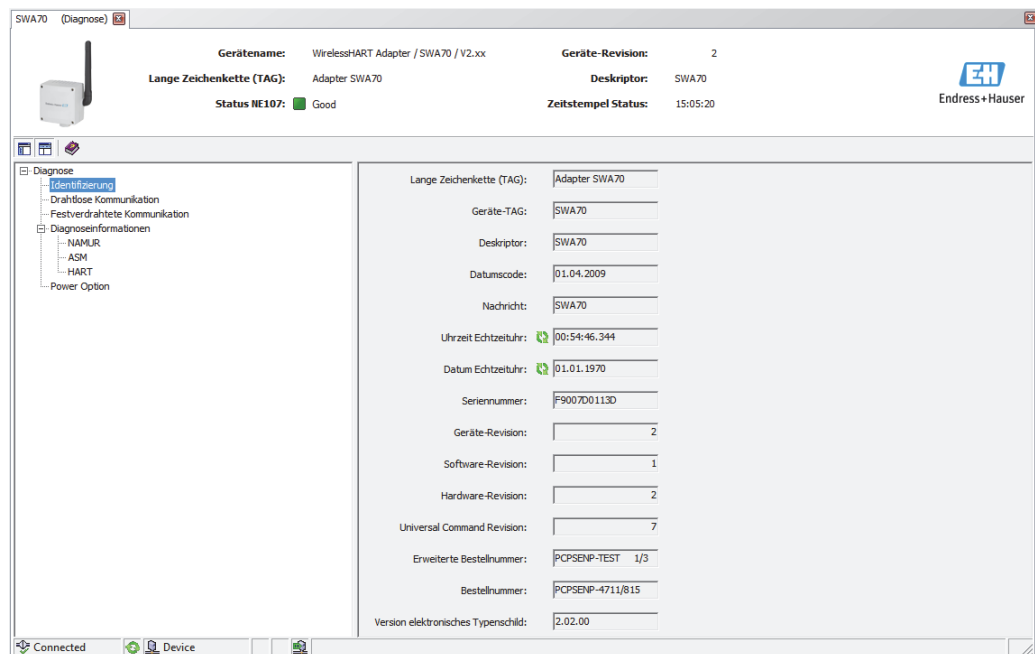
Identification parameters

Parameter	Meaning
Long Tag	This is used to identify the WirelessHART adapter in the network and the plant
Device Tag	This is used to identify the WirelessHART adapter in the network and the plant
Descriptor	Helps the user describe the function or location of the WirelessHART adapter
Date Code	Date in dd.mm.yyyy, indicating the date of the last change, for instance
Message	Message that can be used as required
Real Time Clock Time	Network system time
Real Time Clock Date	Network system date
Serial Number	Serial number of the WirelessHART adapter
Device Revision	Device version of the WirelessHART adapter
Software Revision	Software version of the WirelessHART adapter
Hardware Revision	Hardware version of the WirelessHART adapter
Universal Command Revision	Version of the HART protocol that is supported by the WirelessHART adapter
Order Code	Order code of the WirelessHART adapter
Ext. Order Code	Extended order code
ENP Version	Version of the electronic nameplate of the WirelessHART adapter

11.1.2   Wireless communication

The **Wireless Communication** window contains information about the operation of the WirelessHART adapter. This information is updated every five minutes. An explanation of the individual parameters is provided in the "Wireless communication parameters" table below.

Wireless communication parameters

Parameter	Meaning
Network Identification	Identification number of the network the WirelessHART adapter is joining
MAC	Media Access Control (MAC) address
Nickname	Nickname of the WirelessHART adapter for internal use in the network
Total Number of Neighbors	Number of WirelessHART devices that were found in the vicinity of the WirelessHART adapter and to which a connection has been made.
Wireless Health Status	Key parameters for network communication • Index: ID of the neighboring device • Nickname: nickname of the neighboring device • Mean RSL dBm: mean signal strength of the neighbor since the time when the WirelessHART adapter joined the network • Packets Transmitted: number of packets that have been sent by the WirelessHART adapter since the adapter joined the network • Failed Transmits: number of packets that have been sent by the WirelessHART adapter and did not reach their intended destination (after retries) since the adapter joined the network • Packets Received: number of packets which the WirelessHART adapter has received since the adapter joined the network

11.1.3 Wired communication

The **Wired Communication** window contains information about the HART field device that is connected to the WirelessHART adapter. An explanation of the individual parameters is provided in the "Wired communication parameters" table below.
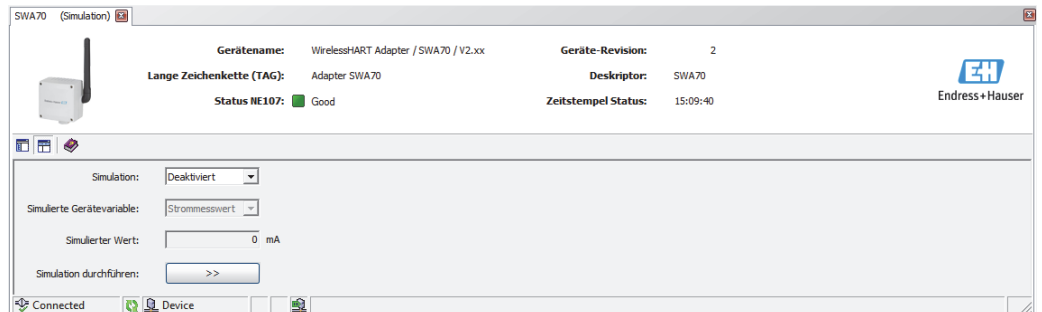

Wired communication parameters

Parameter	Meaning
Number of Devices	Number of HART field devices that are connected to the WirelessHART adapter
Wired Communication Status	Key parameters for network communication • Index: ID of the neighboring device • Long Tag or Message: long tag of the neighboring device • STX Count: number of data transmissions that have been triggered by the WirelessHART adapter • ACK Count: number of feedback messages which the WirelessHART adapter has received from HART devices • BACK Count: number of burst messages

11.1.4 Instrument health

The **Health Status** window contains information about the health of the device. This information is displayed in three different ways in accordance with the following guidelines:

• NAMUR guideline NE 107
• ASM guidelines
• HART Specification

NAMUR NE 107

Open the **NAMUR** window to see the current device health status classified according to the following scheme:

• Good
• Failure (F)
• Maintenance required (M)
• Out of Specification (S)
• Function Check (C)

ASM

Open the **ASM** window to see the current device health status classified according to the following scheme:

- Good
- Faults in the sensor or actuator element
- Faults in the electronics
- Installation faults, fault during start-up
- Faults due to process influence, faults due to non-compliance with specified operating conditions
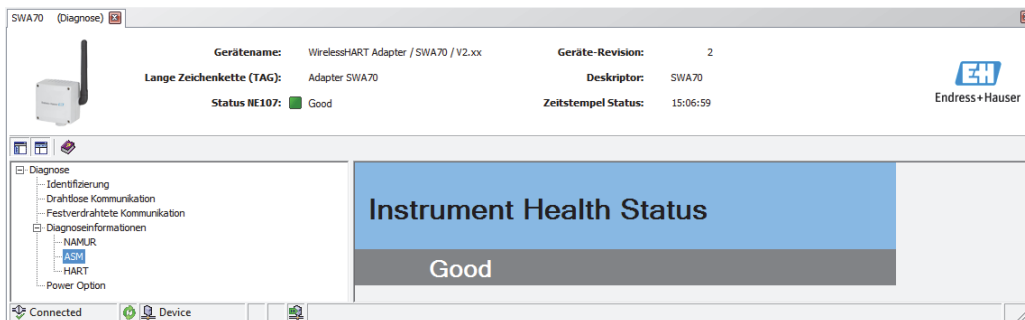
HART

Open the **HART** window to see the current device health status classified according to the "HART diagnosis parameters" table. Ticked check boxes indicate active conditions:
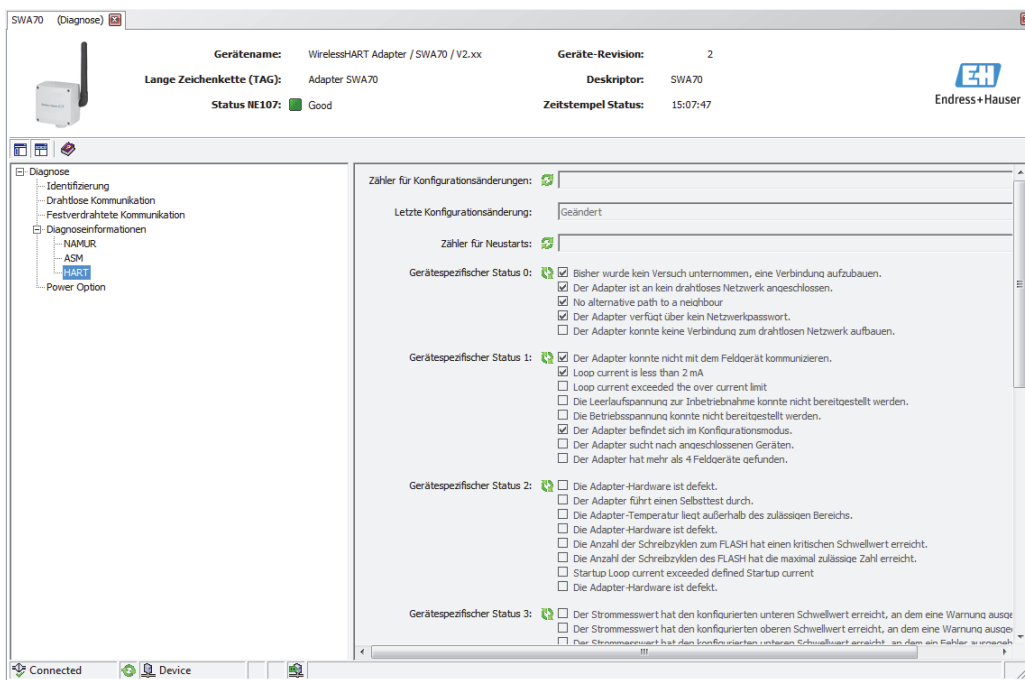
HART diagnosis
parameters

Parameter	Meaning
Configuration Change Counter	Counts the changes in the configuration
Configuration Changed Flag	Flags a change in the configuration since the last communication
Reboot counter	Counts the number of reboots
Device-Specific Status 0	Displays the network status
Device-Specific Status 1	Displays the status for wired communication
Device-Specific Status 2	Displays the status for internal wireless communication
Device-Specific Status 3	Displays the status of the current signal for the connected field device
Device-Specific Status 4	Indicates a malfunction in the field device
Extended Device Status	Indicates the general status of the field device
Standardized Status 0	Indicates the status of the WirelessHART adapter
Analog Channel Saturated	Indicates that the current signal for the connected field device exceeds the end of range value for the input current

Parameter	Meaning
Standardized Status 2	Displays the standardized status for the wired HART connection
Standardized Status 3	Displays the standardized status of the network
Real Time Clock Time	Displays the time

Refer also to the table "Device-specific event mask parameters" on page 73.

11.1.5 Power Option

The **Power Option** window contains information about the battery unit of the WirelessHART adapter. An explanation of the individual parameters is provided in the "Power Option parameters" table below.
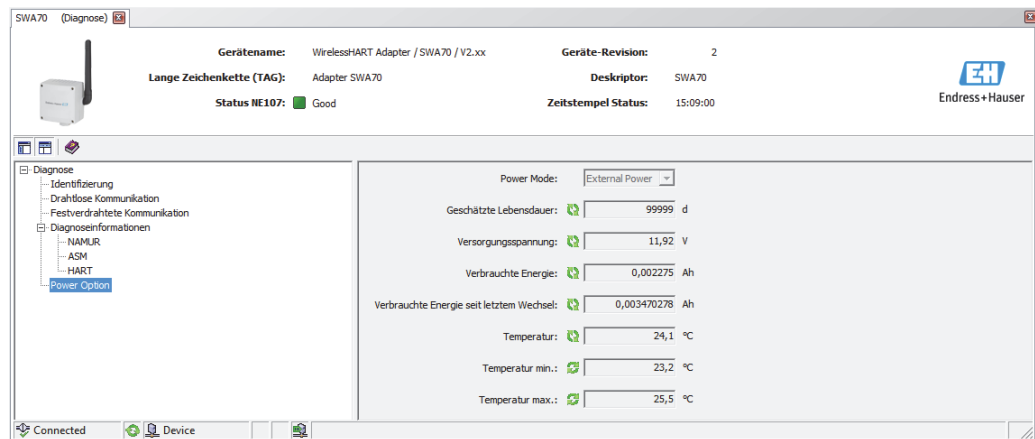
Power Option parameters

Parameter	Meaning
Estimated Lifetime	Estimated battery life in days under the current conditions
Battery Voltage	Current battery voltage
Consumed Energy	The charge drawn from the battery
Energy consumed since the last change	Energy consumed under normalized conditions
Temperature	Current temperature of the WirelessHART adapter
Temperature Min	Minimum temperature of the WirelessHART adapter since the last time the temperature was reset
Temperature Max	Maximum temperature of the WirelessHART adapter since the last time the temperature was reset

11.2   Simulation

The **Simulation** function makes it possible to simulate adapter parameters. If the simulation is activated by selecting the **Disabled** value in the **Simulation** parameter, adapter variables can be chosen from a list. After assigning a value, simulation can be started by pressing the **Execute Simulation** button.

Simulation parameters

Parameter	Meaning
Simulation	• Disabled: simulation mode is disabled • Enabled: simulation mode is enabled
Simulated Device Variable	List of adapter variables that can be simulated • Battery Voltage • Battery Voltage With Load: battery voltage with a load • Battery Voltage Without Load During Battery Test • Consumed Energy: charge drawn from the battery • Estimated Lifetime: estimated lifetime of the battery • Scaled Loop Current • Normalized Consumed Energy: energy consumed since the last battery change • RSL of Best Neighbor: signal strength of the "best" neighbor • RSL of Second Best Neighbor: signal strength of the "second-best" neighbor • Temperature • Temperature Min: minimum temperature since the last reset • Temperature Max: maximum temperature since the last reset
Simulated Value	Field for entering the simulated value
Execute Simulation	Press the button to start the simulation

11.3   Access control

The **Lock/Unlock** function allows the user to protect the WirelessHART adapter from unauthorized access. An explanation of the individual parameters is provided in the "Access control parameters" table below.

Access control parameters

Parameter	Meaning
Lock Code	• Unlocked: the WirelessHART adapter is not protected. All the parameters can be edited. • Lock Temporary: the WirelessHART adapter is locked. A device reset or power loss will unlock the adapter. • Lock Permanent: the WirelessHART adapter is permanently locked. A device reset or power loss will not unlock the adapter. • Lock All: all the masters are locked. In the case of all of the locks, it is possible to unlock the adapter again by changing the "Lock Code" parameter.
Lock Status	The selected check boxes indicate the access status of the WirelessHART adapter • Device Locked: locked • Lock is Permanent: permanently locked • Locked by Primary Master (Reset if Secondary Master): the WirelessHART adapter has been locked by the Primary Master. A Secondary Master must be restarted to unlock the adapter. • Configuration cannot be changed: it is not possible to modify the configuration. • Locked by Gateway: the lock was triggered by the gateway.
Wireless Module Firmware Update Lock	• Unlocked: the firmware of the WirelessHART adapter's radio module can be downloaded. • Locked: the firmware of the WirelessHART adapter cannot be downloaded.
Radio Chip Firmware Version	Firmware version of the radio module

11.4 Updating the firmware

The **Update Firmware** function allows users to download new firmware for the WirelessHART adapter from an FTP server. To be able to do so, the **Wireless Module Firmware Update Lock** parameter in the **Lock/Unlock** window must first be set to **Unlocked**. An explanation of the individual parameters is provided in the "Firmware update parameters" table below.
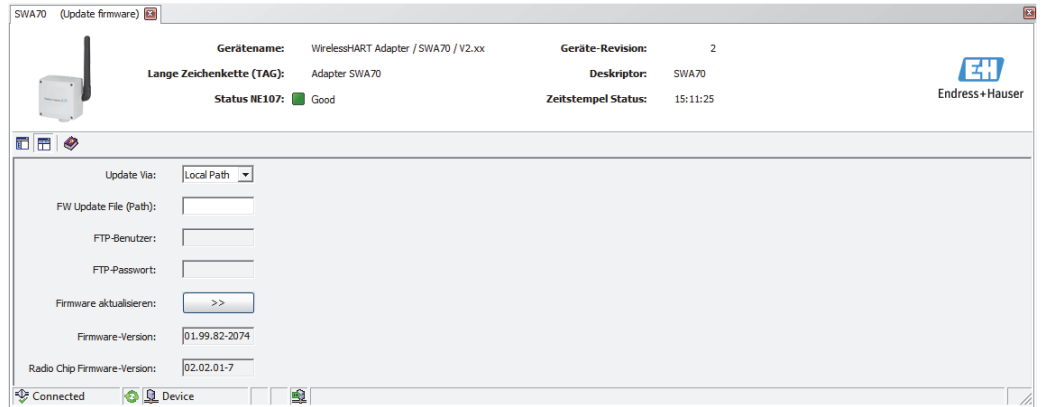
Firmware update parameters

Parameter	Meaning
Update Via	Choose whether the firmware is uploaded via the FTP server or a local directory
FW Update File (Path)	URL of the FTP server or path and file name on a local storage medium
FTP User	User name for the FTP server
FTP Password	User password for the FTP server
Update Firmware	Press this button to update the firmware
Firmware Version	Current version of the firmware of the WirelessHART adapter
Radio Chip Firmware Version	Firmware version of the radio module

11.5 Device DTM information

The **Device DTM Info** function displays standardized information about the WirelessHART adapter which is operated by the DTM. An explanation of the individual parameters is provided in the "Device DTM info parameters" table below.
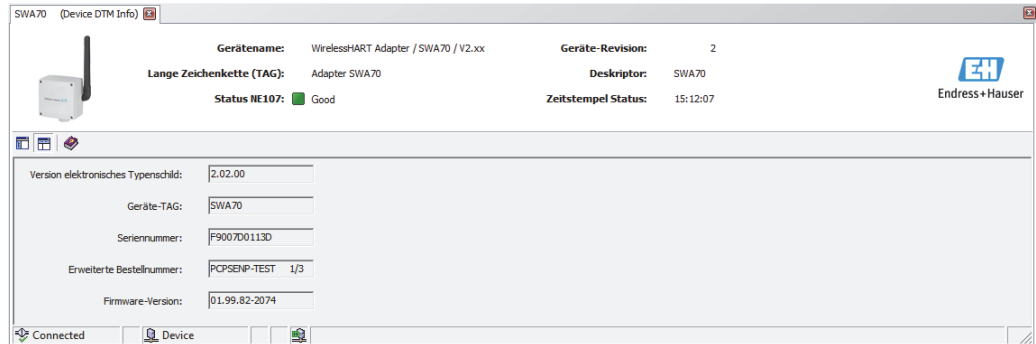
Device DTM info parameters

Parameter	Meaning
ENP Version	Version of the electronic nameplate of the WirelessHART adapter
Device Tag	Is used to identify the field device in the network
Serial Number	Serial number of the WirelessHART adapter
Ext. Order Code	Order code of the WirelessHART adapter
Firmware Version	Current version of the firmware of the WirelessHART adapter

11.6 Self-test

The **Perform Self-Test** function causes the WirelessHART adapter to perform a self-test. The result is displayed in the **Diagnosis** window as described in Section 9.3 "Invoking the diagnostic parameters".
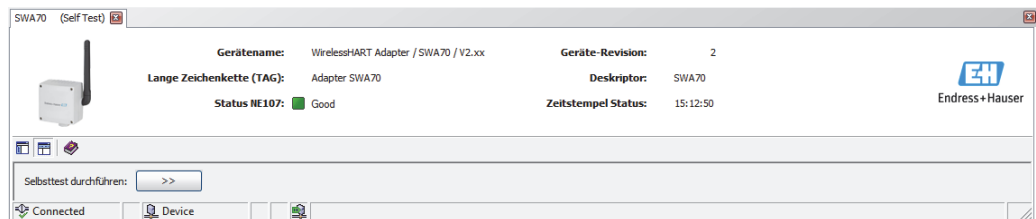
12 Maintenance and repair

With the exception of replacing the battery unit, no special maintenance work is required for the WirelessHART adapter.

12.1 Replacing the battery unit

You can order the power supply units from your local Endress+Hauser sales partner. See "Accessories and spare parts" on page 89.

You must first open the housing to replace the power supply unit. Follow the instructions in the "Operational safety" on page 7. When disposing of the battery unit, pay attention to the information in the section "Battery unit" on page 88.

You require the following tool: Torx T10.

Warning!

⚠ **WARNING**
- The housing of the WirelessHART adapter may not be opened in hazardous areas if dust is present. The battery unit can only be replaced in a dusty atmosphere if adequate ventilation ensures the environment is free of dust.
- The battery unit may be replaced in the presence of gas in a hazardous area.

Proceed as follows to replace the battery unit:

1. Switch off the power supply. Make sure that the unit is not live.
2. Open the housing of the WirelessHART adapter by unscrewing the four housing screws.
3. Remove the connecting cable for the power supply unit from the socket on the PCB cover.
4. Simultaneously press the two clips of the power supply unit towards the middle of the power supply unit and remove the unit.
5. Insert the new power supply unit into the compartment. In doing so, ensure that the two clips make an audible click when engaging in the indentations at the top and bottom of the compartment.
6. Insert the connecting cable for the power supply unit into the socket on the PCB cover.

Note!

NOTE
- Please note that after replacing a battery unit the "Battery Changed" button must be pressed in the DTM so that the date for the "Last Battery Change" in the WirelessHART adapter is set to the present date. See "Field device power" on page 74.

12.2   Return

The measuring device must be returned if repairs or a factory calibration are required, or if the wrong device has been ordered or delivered. According to legal regulations Endress+Hauser, as an ISO-certified company, is required to follow certain procedures when handling returned products that are in contact with the medium.

To ensure safe, swift and professional device returns, please refer to the procedure and conditions for returning devices provided on the Endress+Hauser website www.services.endress.com/return-material

In the case of devices with a battery unit, the battery unit must be removed before the device is returned.

⚠ WARNING

Warning!
- If Endress+Hauser requests you to return the battery unit, please pay attention to the Safety Data Sheet and the local transportation conditions.

12.3   Disposal

12.3.1   WirelessHART adapter

Dispose of the WirelessHART adapter in accordance with the regulations that apply in your country.

In the case of device versions with a battery unit, pay attention to the information in the following section to dispose of the battery unit.

12.3.2   Battery unit

When disposing of the battery unit, please observe national regulations governing the disposal of lithium-thionyl chloride high-power batteries in your country, and pay attention to the Safety Data Sheet (Material Safety Data Sheet).

The battery unit is non-hazardous when used according to the recommendations of the manufacturer. It does, however, contain hazardous substances.

In Germany there is a law that regulates the return of used batteries. You can return your battery unit to Batterien-Montage-Zentrum GmbH (BMZ), a company specializing in batteries. (www.bmz-gmbh.de). Please observe the German regulations when returning battery units in Germany. The sender bears the costs incurred.

12.4   Contact addresses at Endress+Hauser

Contact addresses can be found on our homepage: www.addresses.endress.com/worldwide. If you have any questions, please contact your Endress+Hauser branch office.

12.5   Accessories and spare parts

Various accessories, which can be ordered separately from Endress+Hauser, are available for the WirelessHART adapter:

- 71092238: battery unit SWA70
- 71093078: mounting bracket, wall/pipe; steel 316L
- 71093795: cable gland
- 71093797: adapter set M20/M20
- 71093798: adapter set M20/G 1/2
- 71093799: adapter set M20/NPT 1/2
- 71093800: adapter set M20/NPT 3/4

13 Troubleshooting

Error messages are displayed in the **Diagnosis** window of the DTM as described in the "Invoking the diagnostic parameters" section. See "Invoking the diagnostic parameters" on page 78.

The table below lists problems which might occur during commissioning and operation of the WirelessHART adapter.

	Problem	Solution

1	FieldCare is communicating with the adapter via a HART modem. FieldCare cannot find the WirelessHART adapter when communicating via a HART modem.	• The wrong address range has been selected in the HART communication DTM. 15 is the default address for the WirelessHART adapter.
		  – Select the address range such that the address of the WirelessHART adapter is in this range.
		• The computer has not used the same USB or COM port that was specified when configuring the HART modem.
		  – Configure the HART communication DTM again or use the correct port.

2	The WirelessHART adapter should supply power to a two-wire field device. Power is not supplied to the field device.	• The power supply unit is not plugged in.
		  – Check the "power" connector.
		• The battery unit is empty or not plugged in.
		  – Check the "power" connector and replace the battery unit if necessary.
		  – A simple check is to shake the battery unit: if you hear liquid this means that the battery unit still has life. Following a short-circuit, however, the battery no longer works even if liquid can be heard.
		• The power supply parameters have not been configured correctly.
		  – Refer to the operating manual of the connected field device for the appropriate values or ask the manufacturer.
		  – Set the correct values in the SWA70-DTM.

3	The WirelessHART adapter supplies power to a two-wire field device. The WirelessHART adapter is unable to find the field device and/or the two devices do not communicate with one another.	• The field device does not support the HART protocol.
		  – The parameters can only be read by a HART field device.
		• The wrong address range has been selected in the SWA70 DTM.
		  – Check whether the address range is correct. See "Wired communication" on page 59.
		• The power supply is switched off before the field device can communicate
		  – Increase the "Lead Time" power supply parameter in increments of 10 seconds until the error no longer occurs.
		• The WirelessHART adapter was started without connecting the field device to terminals 1 and 2.
		  – Connect the field device to the WirelessHART adapter at terminals 1 and 2. Start the WirelessHART adapter. For this, either perform a reset or disconnect and then reconnect the power supply.

	Problem	Solution
4	The WirelessHART adapter is connected to a four-wire field device or a control loop. The WirelessHART adapter is unable to find the field device and/or the WirelessHART adapter and field device do not communicate with one another.	• The wrong address range has been selected in the SWA70 DTM. – Check whether the address range is correct. See "Wired communication" on page 59. • The wrong connection polarity was selected for a four-wire field device. – Make the connection correctly. See "Four-wire field device" on page 26. • The PLC or remote I/O and a connected modem dominate communication in a control loop. The WirelessHART adapter automatically switches to the slave mode. – Remove the modem and make sure that the WirelessHART adapter is configured as the "Secondary Master" if the PLC or remote I/O is configured as the "Primary Master".
5	A field device is connected via terminals 1 and 2 or 2 and 3 and the HART modem is connected to terminals 7 and 8. FieldCare is unable to find a connected HART field device.	• If the modem is connected to terminals 5 and 6 or terminals 7 and 8, HART communication is not forwarded to terminals 1 and 2 or 2 and 3 (desired implementation) – Connect the modem to terminals 1 and 2 or 2 and 3 so communication can be established simultaneously with the WirelessHART adapter and the field device. In the HART communication DTM, the address range must be adapted to suit the address of the field device.
6	The WirelessHART adapter cannot join the network.	• Check the following points if the WirelessHART adapter does not connect to the Fieldgate. It can take a few minutes for the adapter to join the network. – Check whether the power supply unit is connected correctly. – Check whether the electronically controlled power supply unit is operational. The yellow LED 3 is lit as long as the buffer of the power supply unit is charging. See "Light emitting diodes" on page 51. – Check whether the Fieldgate and the WirelessHART adapter have the same network ID and the same network access key. – Check that the WirelessHART adapter is mounted correctly. See "Installation" on page 15. – Check whether the WirelessHART adapter attempts to join the network. If not, start a new connection attempt by pressing the push button for 5 to 10 seconds. The attempt to join the network is indicated as described in the "Display" section. See "Display" on page 49.
7	Adapter disappears sporadically from the network	• In the "Wireless Communication" window check the number of neighbors in the "Diagnosis" function. See "Wireless communication" on page 79. – The WirelessHART adapter should have at least two neighbors in a stable network. Three neighbors are recommended in a noisy environment.
8	The WirelessHART adapter does not restart after disconnecting and connecting the "power" connector.	• The WirelessHART adapter shuts down when the internal power storage units are discharged and the "power" connector is plugged out. Proceed as follows: 1 Disconnect the connector of the power supply unit from the socket. 2 Press the push button for three seconds. 3 Wait for one minute. 4 Plug the battery connector back in.

14   Technical data

www.endress.com
For the technical data, see the Technical Information document for "WirelessHART Adapter SWA70" (TI00026S).

W@M Device Viewer
Alternatively you can download all the related technical documentation via the W@M Device Viewer. Enter the serial number of the WirelessHART on the website "www.endress.com/deviceviewer". You can find the serial number on the nameplate.

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