

Operating Instructions

WirelessHART adapter SWA70

Smart WirelessHART interface module with supply voltage for field devices



Change history

Product version	Operating Instructions	Changes	Comments
1.00.xx	BA061S/04/DE/03.09	Original	-
1.01.xx	BA061S/04/EN/11.09	All chapters	Additions
		Chapter 2	Storage
		Chapter 4	Pipe mounting
		Chapter 5	Assignment of terminals, 2 additional connection diagrams
		Chapter 7	Connected HART field devices, connection of the HART modem and installation of the modem driver, installation of the adapter DTM, update of FieldCare DTM catalog
		Chapter 8	Configuring the burst mode
		Chapter 9	Completely new
		Chapter 10	Disposal
		Chapter 11	Troubleshooting
Chapter 12	Technical data		
1.02.xx	BA061S/04/EN/07.10	Chapter 8	Diagram with overview of burst mode
		Chapter 8	Diagram with overview of event notification table, Device-Specific Event Mask
		Chapter 11	Fault elimination: Addition of problem 3
		General information	Updating of screenshots, small editorial changes
1.02.xx	BA00061S/04/EN/13.10	Chapter 2.2	Order number: Approval
		Chapter 8.4.3	Device-Specific Event Mask: byte 6, bit 0
		Chapter 12.6	Fig. 12-1: Housing dimensions of SWA70
1.02.xx	BA00061S/04/EN/14.11	Chapter 1.3	Hazardous area
		Chapter 1.5, 12.5, 12.8	Additional telecommunications certificates
		Chapter 2.2	Additions, fig. 2-1: Nameplate
		Chapter 2.3	New
		Chapter 4.5.1	Revised incl. fig. 4-4
		Chapter 4.5.2	Fig. 4-5
		Chapter 5.2.2	Direct mounting, remote mounting
Chapter 7.3	Edited		
2.00.xx	BA00061S/04/DE/15.12	All chapters revised	New power supply units: Wide-range power unit, intrinsically safe power unit and solar module connection
		Chapter 2.4	New radio approvals: "Brazilian ANATEL radio approval" and "Mexican COFETEL radio approval"
		Chapter 5	New
		Chapter 6.2	New
		Chapters 7-9	New DTM version SWA70 V2.xx
2.00.xx	BA00061S/04/DE/16.13	General information	Updating of screenshots, editorial changes
		Chapter 2.1.2	Scope of delivery

Product version	Operating Instructions	Changes	Comments
		Chapter 5.1.1	Warning
		Chapter 5.1.6	Connection of M12 socket
		Chapter 5.3.2, 5.3.3, 5.3.5	Note
		Chapter 6.2.2	LED
		Chapter 8.3.1	Order number parameter
		Chapter 8.3.3	Wake-up detection parameter
		Chapter 8.3.6	Configuring the burst mode
		Chapter 12.3	Cable specification
2.00.xx	BA00061S/04/DE/17.13	Chapter 2.2	Fig. 2-1 updated
		Chapter 2.3	Housing AISI 316 L
		Chapter 5.1	Warning and notice
		Chapter 5.1.2	Warning and fig. 5-2 updated
		Chapter 11	Fault elimination: Addition of problem 3
		Chapter 12.3	Power connection: current consumption and power consumption
		Chapter 12.6	Mechanical construction: Weight and degree of protection
2.00.xx	BA00061S/04/DE/18.14	General information	Editorial changes
		Chapter 12.5	Telecommunication approval
2.30.xx	BA00061S/04/EN/19.15	General information	Simplified document structure. "Technical data" chapter transferred to Technical Information (TI)
2.40.xx	BA00061S/04/DE/20.16	General information	Editorial changes
		Chapter 4.3	New chapter: Positioning of the SWA70
2.40.xx	BA00061S/04/DE/21.18	Chapter 1.1	Note added
2.40.xx	BA00061S/04/EN/22.22	General information	Document including chapter structure and illustrations completely revised

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1 About this document

1.1 Purpose of this document

These Operating Instructions contain all the information that is required in the various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal.

1.2 Symbols

1.2.1 Safety symbols

 DANGER

This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

 WARNING

This symbol alerts you to a potentially dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

 CAUTION

This symbol alerts you to a potentially dangerous situation. Failure to avoid this situation can result in minor or medium injury.

NOTICE

This symbol alerts you to a potentially harmful situation. Failure to avoid this situation can result in damage to the product or something in its vicinity.

1.2.2 Symbols for certain types of information

Symbol	Meaning
	Permitted Procedures, processes or actions that are permitted.
	Preferred Procedures, processes or actions that are preferred.
	Forbidden Procedures, processes or actions that are forbidden.
	Tip Indicates additional information.
	Reference to documentation
	Reference to page
	Reference to graphic
	Notice or individual step to be observed
	Series of steps
	Result of a step
	Help in the event of a problem
	Visual inspection

1.2.3 Symbols in graphics

Symbol	Meaning	Symbol	Meaning
1, 2, 3,...	Item numbers		Series of steps
A, B, C, ...	Views	A-A, B-B, C-C, ...	Sections
	Hazardous area		Safe area (non-hazardous area)

1.2.4 Electrical symbols

Symbol	Meaning
	Direct current
	Alternating current
	Direct current and alternating current
	Ground connection A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.
	Potential equalization connection (PE: protective earth) Ground terminals that must be connected to ground prior to establishing any other connections. The ground terminals are located on the interior and exterior of the device: <ul style="list-style-type: none"> ▪ Interior ground terminal: potential equalization is connected to the supply network. ▪ Exterior ground terminal: device is connected to the plant grounding system.

1.3 List of abbreviations

Term	Description
DTM	Device Type Manager
FieldCare	Scalable software tool for device configuration and integrated plant asset management solutions
PLC	Programmable logic controller (PLC)

1.4 Documentation

 For an overview of the scope of the associated Technical Documentation, refer to the following:

- *Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from the nameplate
- *Endress+Hauser Operations app*: Enter serial number from nameplate or scan matrix code on nameplate.

WirelessHART adapter SWA70

- Technical Information TI00026S
- Operating Instructions BA00061S
- Brief Operating Instructions KA00063S
- Competence Brochure CP00013S

1.4.1 Supplementary device-dependent documentation

All explosion-protection data are provided in separate Ex documentation. The relevant Ex documentation is delivered with the Ex devices as standard.

 If there is additional documentation for the device version, the documentation code of this supplementary documentation is specified on the nameplate.

You can also find the Ex documentation via the Product Configurator under www.endress.com.

1.5 Registered trademarks

HART®

Registered trademark of the FieldComm Group, Austin, Texas, USA

WirelessHART®

Registered trademark of the FieldComm Group, Austin, Texas, USA

2 Basic safety instructions

2.1 Requirements for the personnel

The personnel for installation, commissioning, diagnostics and maintenance must fulfill the following requirements:

- ▶ Trained, qualified specialists must have a relevant qualification for this specific function and task.
- ▶ Are authorized by the plant owner/operator.
- ▶ Are familiar with federal/national regulations.
- ▶ Before starting work, read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).
- ▶ Follow instructions and comply with basic conditions.

The operating personnel must fulfill the following requirements:

- ▶ Are instructed and authorized according to the requirements of the task by the facility's owner-operator.
- ▶ Follow the instructions in this manual.

2.2 Intended use

2.2.1 All versions

The WirelessHART adapter SWA70 is an intelligent interface module designed for the wireless transmission of 4 to 20 mA/HART signals from connected field devices to a WirelessHART gateway.

Wireless signals, such as WirelessHART, must not be used for safety applications involving control functions.

 For information on the intended use of connected field devices and the WirelessHART gateway, see the relevant Operating Instructions.

Incorrect use

Non-intended use can compromise safety. The manufacturer is not liable for damage caused by improper or non-intended use.

2.2.2 Non-explosion-proof versions

Non-explosion-proof versions of the WirelessHART adapter must only be used in non-hazardous areas.

2.2.3 Explosion-proof versions

The WirelessHART adapter SWA70 is available in various explosion-proof versions.

Depending on the approval, the intrinsically safe and dust Ex versions may be used in the corresponding potentially hazardous areas. Field devices that are to be connected to an explosion-protected version of the WirelessHART adapter must also have the appropriate Ex approval and be suitable for use in hazardous areas.

Once a WirelessHART adapter has been used in a non-Ex system, it may no longer be installed in an Ex-system. Using the adapter in a non-hazardous area can potentially overload the protective circuits, leading to malfunctions.

2.3 Workplace safety

When working on and with the device:

- ▶ Wear the required personal protective equipment as per national regulations.

2.4 Operational safety

Damage to the device!

- ▶ Operate the device in proper technical condition and fail-safe condition only.
- ▶ The operator is responsible for the interference-free operation of the device.

Modifications to the device

Unauthorized modifications to the device are not permitted and can lead to unforeseeable dangers!

- ▶ If modifications are nevertheless required, consult with the manufacturer.

Repair

To ensure continued operational safety and reliability:

- ▶ Carry out repairs on the device only if they are expressly permitted.
- ▶ Observe federal/national regulations pertaining to the repair of an electrical device.
- ▶ Use only original spare parts and accessories.

2.5 Product safety

This measuring device is designed in accordance with good engineering practice to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which it is safe to operate.

It meets general safety standards and legal requirements. It also complies with the EU directives listed in the device-specific EU Declaration of Conformity. The manufacturer confirms this by affixing the CE mark to the device.

2.6 IT security

We only provide a warranty if the device is installed and used as described in the Operating Instructions. The device is equipped with security mechanisms to protect it against any inadvertent changes to the device settings.

IT security measures in line with operators' security standards and designed to provide additional protection for the device and device data transfer must be implemented by the operators themselves.



The operator is responsible for data backup.

3 Product description

3.1 Product design

3.1.1 WirelessHART

WirelessHART adds wireless capabilities to the HART protocol, while ensuring compatibility with existing HART field devices, commands and tools.

A WirelessHART network comprises:

- WirelessHART field devices
- Wired field devices with a connected WirelessHART adapter
- Gateways responsible for communication between devices and host applications
- Network and safety manager responsible for configuring, managing and monitoring network

NOTICE

Safety applications with control functions via WirelessHART signal

Undesirable behavior of safety application

- ▶ Do not use a wireless signal such as WirelessHART in a safety application with a control function.

3.1.2 WirelessHART adapter SWA70

The WirelessHART adapter SWA70 is an intelligent interface module designed for the wireless transmission of 4 to 20 mA/HART signals from connected field devices to a WirelessHART gateway.

Versions

The WirelessHART adapter is available in the standard version with a plastic housing or in a hazardous area version with an aluminum, stainless steel or plastic housing.

If a field device is connected to a hazardous area version, the field device must also have the relevant Ex approval.

Supported functions

The WirelessHART adapter supports the following functions:

- Supply voltage for a HART field device or a 4 to 20 mA field device
- "Wide-range power unit" version: supplies up to four HART field devices in the Multidrop mode
- Scaling of the current signal from a connected 4 to 20 mA field device
- Burst mode and event notifications for the WirelessHART adapter and connected HART field devices

3.1.3 Function

The WirelessHART adapter SWA70 can be retrofitted to any 2-wire or 4-wire HART field device as well as to 4 to 20 mA field devices.

The WirelessHART adapter is integrated into a WirelessHART network via a WirelessHART gateway. The WirelessHART gateway transmits information from the WirelessHART adapter and the field device to a host application.

The gateway can be the Endress+Hauser WirelessHART-FieldGate SWG50 or a compatible WirelessHART gateway, for example.

For more information, contact your Endress+Hauser sales organization:

www.addresses.endress.com

Power supply for WirelessHART adapter and field device

The WirelessHART adapter is powered by a battery pack, a wide-range power supply or a DC power unit, which are available as inserts. The DC power unit can be powered by a solar system, for example. A high-performance battery with a long service life is used as the battery pack.

The field device can be powered by either the WirelessHART adapter, a separate DC power unit or a remote I/O.

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

Operation options WirelessHART adapter

The WirelessHART adapter is operated as follows:

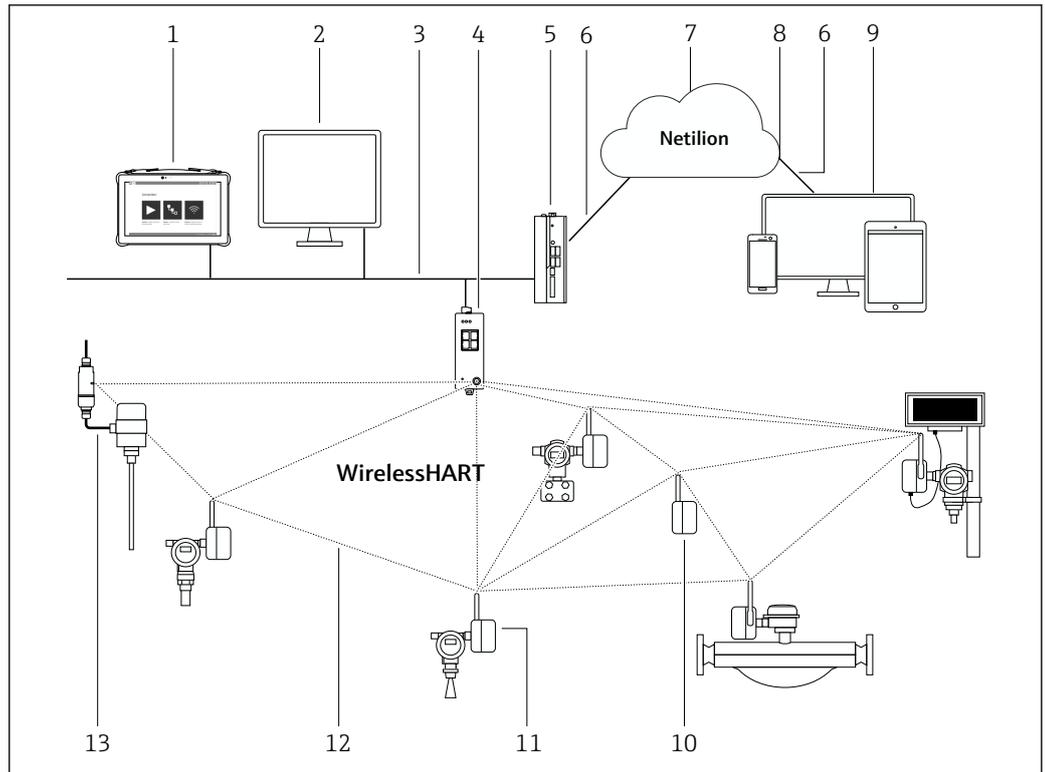
- Local operation via Endress+Hauser tablet PC Field Xpert SMTxx, even in hazardous areas
- Local configuration with FieldCare SFE500 or DeviceCare via DTM for SWA70
- Remote configuration with FieldCare SFE500 via WirelessHART-FieldGate SWG50 and DTM for SWA70 and SWG50

The field devices connected to the WirelessHART adapter can be connected to the Netilion Cloud via the Endress+Hauser FieldEdge SGC500 and the Endress+Hauser WirelessHART-FieldGate SWG50.



Detailed information on Netilion Cloud: <https://netilion.endress.com>

3.2 System design

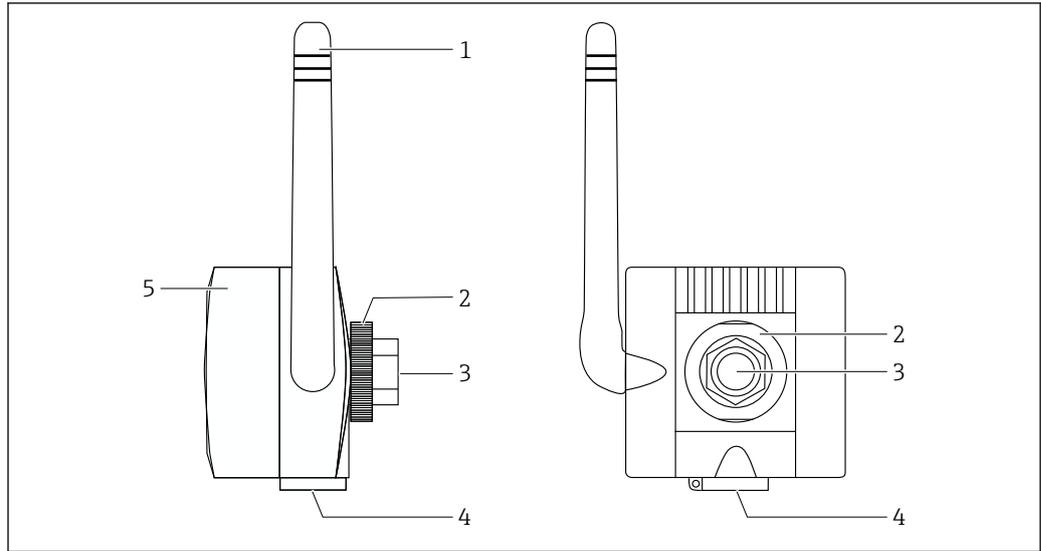


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1 Example of WirelessHART network architecture with WirelessHART adapter SWA70

- 1 Endress+Hauser Field Xpert e.g. SMTxx
- 2 Host application / FieldCare SFE500
- 3 Ethernet communication
- 4 WirelessHART gateway, e.g. FieldGate SWG50
- 5 FieldEdge SGC500
- 6 https Internet connection
- 7 Netilion Cloud
- 8 Application Programming Interface (API)
- 9 Internet browser-based Netilion Service app or user application
- 10 WirelessHART adapter SWA70 as a repeater
- 11 HART field device with WirelessHART adapter SWA70
- 12 Encrypted wireless connection via WirelessHART
- 13 HART field device with FieldPort SWA50

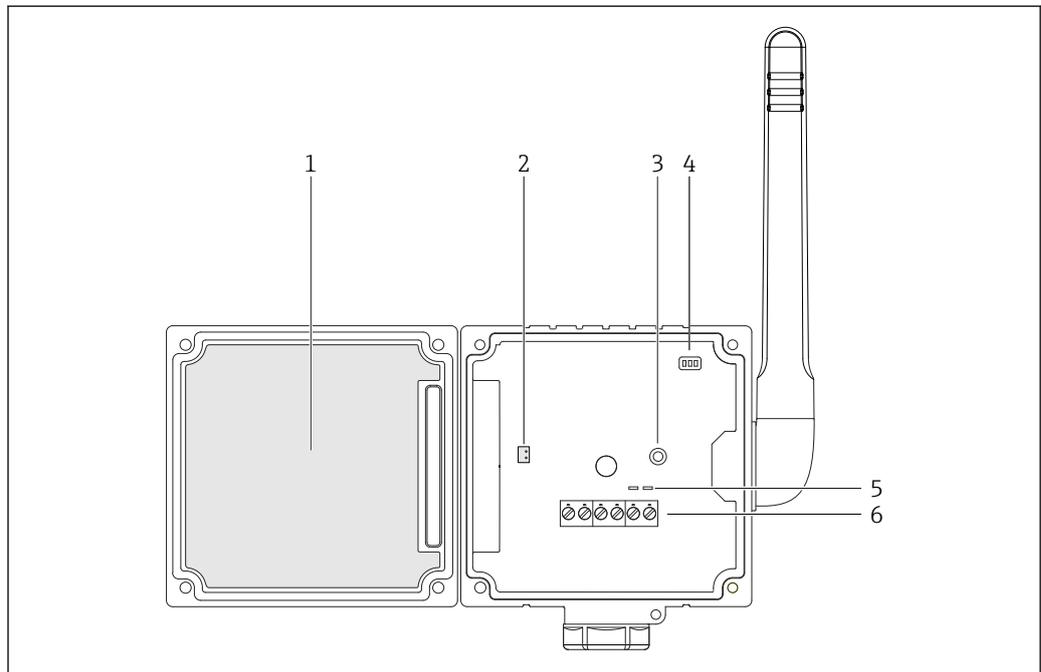
3.3 Design of WirelessHART adapter SWA70



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2 Design of WirelessHART adapter SWA70

- 1 Antenna
- 2 Locking nut
- 3 Rear cable entry for direct installation on field device, internal thread M20x1.5
- 4 Lower cable entry for remote mounting of field device or for WirelessHART adapters with wide-range power unit or DC power unit for die external supply voltage, internal thread M20x1.5
- 5 Cover, depending on version with battery pack, wide-range power unit or DC power unit



A0053671

3 Opened WirelessHART adapter SWA70

- 1 Power supply unit: Battery pack, wide-range power unit or DC power unit
- 2 Socket for connector plug of the power supply unit
- 3 Push button
- 4 LEDs
- 5 Lugs for HART modem
- 6 Terminals 1 to 6

4 Incoming acceptance and product identification

4.1 Incoming acceptance

Visual inspection

- Check the packaging for visible damage arising from transportation
- Open the packaging carefully
- Check the contents for visible damage
- Check that the delivery is complete and nothing is missing
- Retain all the accompanying documents

 The device may not be put into operation if the contents are found to be damaged beforehand. In this case, please contact your Endress+Hauser Sales Center: www.addresses.endress.com

Return the device to Endress+Hauser in the original packaging where possible.

WARNING

Damaged battery pack

Chemical, toxicological and physical hazard.

- ▶ Observe the behavioral rules in the safety data sheet.

4.2 Scope of delivery

The scope of delivery depends on the power supply version and mounting option ordered.

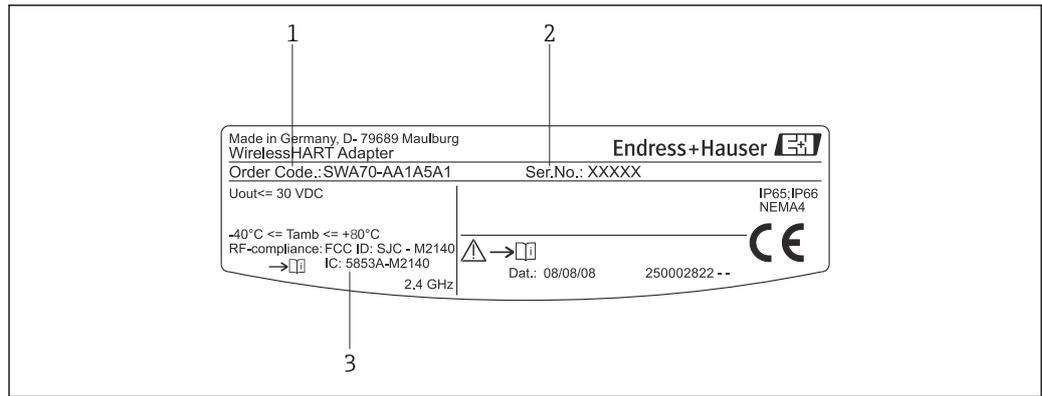
 You select the power supply version via order code 40 "Power supply" and the mounting option via order code 50 "Version".

Power supply version	Mounting option		
	Prepared for installation on device	Prepared for installation remotely from device	Prepared for installation as a router
Battery pack	<ul style="list-style-type: none"> ▪ Adapter SWA70 ▪ Connection adapter ▪ 2-wire cable for field device connection 	<ul style="list-style-type: none"> ▪ Adapter SWA70 ▪ Wall / pipe mounting bracket ▪ M20 cable gland 	<ul style="list-style-type: none"> ▪ Adapter SWA70 ▪ Wall / pipe mounting bracket
Wide-range power unit	<ul style="list-style-type: none"> ▪ Adapter SWA70 ▪ M12 socket, Ferrite sleeve ▪ Connection adapter ▪ 2-wire cable for field device connection 	<ul style="list-style-type: none"> ▪ Adapter SWA70 ▪ M12 socket, Ferrite sleeve ▪ Wall / pipe mounting bracket ▪ M20 cable gland 	<ul style="list-style-type: none"> ▪ Adapter SWA70 ▪ M12 socket, Ferrite sleeve ▪ Wall / pipe mounting bracket
DC power unit	<ul style="list-style-type: none"> ▪ Adapter SWA70 ▪ M12 socket, Ferrite sleeve ▪ Connection adapter ▪ 2-wire cable for field device connection 	<ul style="list-style-type: none"> ▪ Adapter SWA70 ▪ M12 socket, Ferrite sleeve ▪ Wall / pipe mounting bracket ▪ M20 cable gland 	<ul style="list-style-type: none"> ▪ Adapter SWA70 ▪ M12 socket, Ferrite sleeve ▪ Wall / pipe mounting bracket

4.3 Product identification

4.3.1 Nameplate

The nameplate of the device is lasered onto the housing.



A0045814

- 1 Order number
- 2 Serial number
- 3 Information on radio technology and approvals

- i** Additional information about the device is available as follows:
- **Device Viewer** (www.endress.com/deviceviewer): Enter the serial number from the nameplate
 - **Endress+Hauser Operations app**: Enter serial number from nameplate or scan matrix code on nameplate.

4.3.2 Manufacturer's address

Endress+Hauser SE+Co. KG

Hauptstraße 1

79689 Maulburg

Germany

www.endress.com

4.4 Storage and transport

4.4.1 General information

- The components are packed in such a way that they are fully protected against shock when in storage and during transportation.
- Store the components in the original packaging in a dry place.
- Where possible, only transport the components in the original packaging.
- Protect the components from strong vibrations and shocks.

4.4.2 Storage temperature

- WirelessHART adapter without battery pack: -40 to 85 °C (-40 to +185 °F)
- WirelessHART adapter with disconnected battery pack: -40 to +25 °C (-40 to +77 °F)
- Battery pack BU 191: -40 to +25 °C (-40 to +77 °F)
- WirelessHART adapter with wide-range power unit: -40 to +85 °C (-40 to +185 °F)
- WirelessHART adapter with DC power unit: -40 to +85 °C (-40 to +185 °F)

4.4.3 Battery pack

⚠ WARNING

Incorrect storage or improper transport

Chemical, toxicological and physical hazard.

- ▶ Ensure that the connector plug of the battery pack is **not** inserted into the socket on the main circuit board. Ideally, remove the battery pack from the WirelessHART adapter.
- ▶ Comply with the safety instructions provided in the safety data sheet.
- ▶ Observe the transport temperature range.

5 Overview of mounting and connection

5.1 Overview

The installation depends on the power supply version and mounting option ordered.

Power supply version	Mounting option		
	Prepared for installation on device	Prepared for installation remotely from device	Prepared for installation as a router
	Direct mounting	Remote mounting	Remote mounting
Battery pack	<ul style="list-style-type: none"> ▪ Overview: Section → 21 ▪ Mounting: → 24 ▪ Connection: → 28 and → 32 	<ul style="list-style-type: none"> ▪ Overview: → 22 ▪ Mounting: → 25 ▪ Connection: → 30 → 32 	<ul style="list-style-type: none"> ▪ Mounting: → 25 ▪ Connection:
Wide-range power unit	<ul style="list-style-type: none"> ▪ Overview: → 21 ▪ Mounting: → 24 ▪ Connection: → 37, → 39 and → 40 	<ul style="list-style-type: none"> ▪ Overview: → 22 ▪ Mounting: → 25 ▪ Connection: → 37, → 39 and → 40 	<ul style="list-style-type: none"> ▪ Mounting: → 25 ▪ Connection: → 37
DC power unit	<ul style="list-style-type: none"> ▪ Overview: → 21 ▪ Mounting: → 24 ▪ Connection: → 45, → 46 and → 48 	<ul style="list-style-type: none"> ▪ Overview: → 22 ▪ Mounting: → 25 ▪ Connection: → 45, → 46 and → 48 	<ul style="list-style-type: none"> ▪ Mounting: → 25 ▪ Connection: → 45

5.2 Mounting options

The following mounting options are available for the WirelessHART adapter.

Prepared for installation on device

The WirelessHART adapter is mounted directly on a field device.

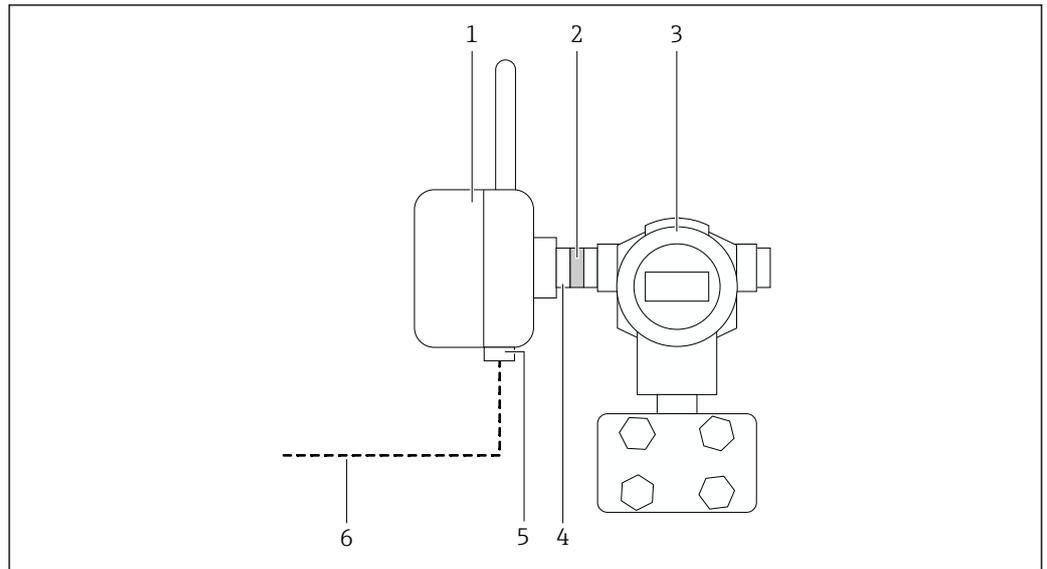
Prepared for installation remotely from device + wall / pipe mounting bracket, M20 cable gland

The WirelessHART adapter and the associated field device are mounted separately. The WirelessHART adapter is mounted via a mounting bracket. The mounting bracket is included in the delivery.

Prepared for installation as router + wall / pipe mounting bracket

No field device is connected to the WirelessHART adapter. With this option, the WirelessHART adapter assumes the function of a repeater. The WirelessHART adapter is mounted via a mounting bracket. The mounting bracket is included in the delivery.

5.3 Direct mounting: Version with battery pack

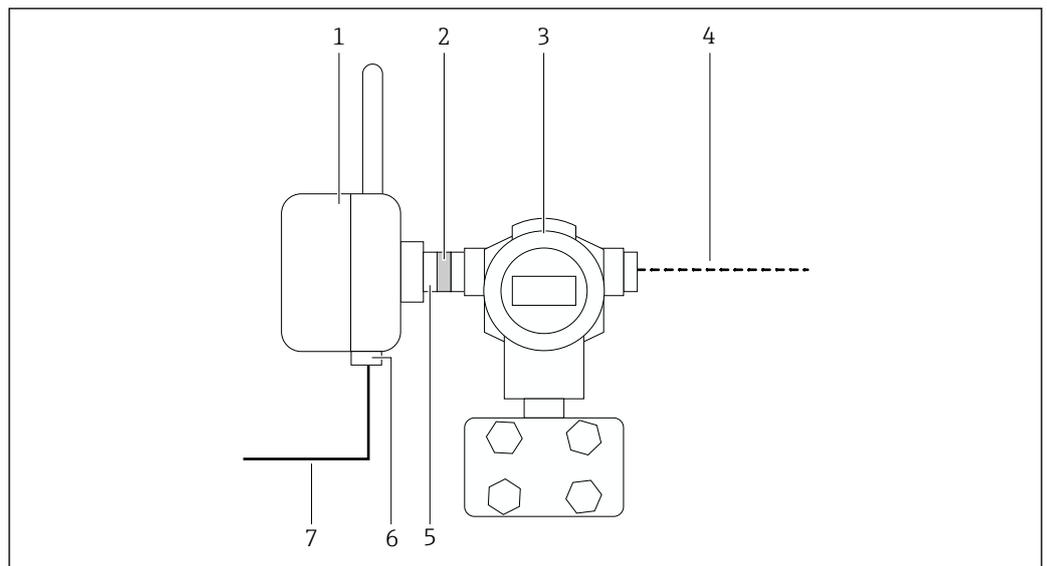


A0053260

4 Direct mounting for version with battery pack

- 1 WirelessHART adapter with battery pack
- 2 Double-threaded connection adapter
- 3 Example of field device
- 4 Rear cable entry for field device connection
- 5 Lower cable entry
- 6 Possible cable routing for integration in a closed-control loop

5.4 Direct mounting: Version with wide-range power unit or DC power unit

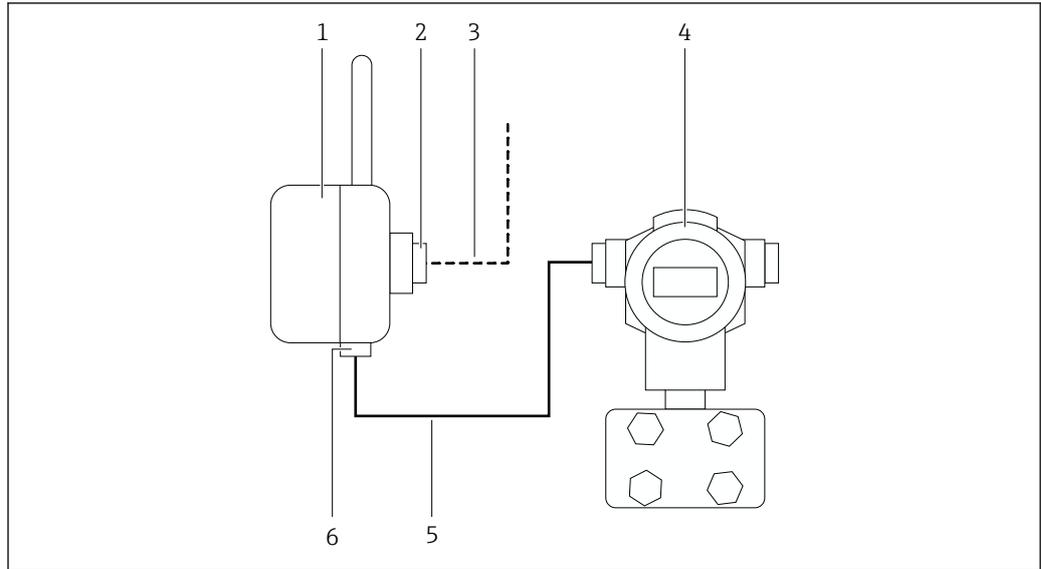


A0053261

5 Direct mounting for version with wide-range power unit or DC power unit

- 1 WirelessHART adapter with wide-range power unit or DC power unit
- 2 Double-threaded connection adapter
- 3 Example of field device
- 4 Possible cable routing for integration in a closed-control loop
- 5 Rear cable entry for field device connection
- 6 Lower cable entry
- 7 Supply voltage for WirelessHART adapter

5.5 Remote mounting: Version with battery pack

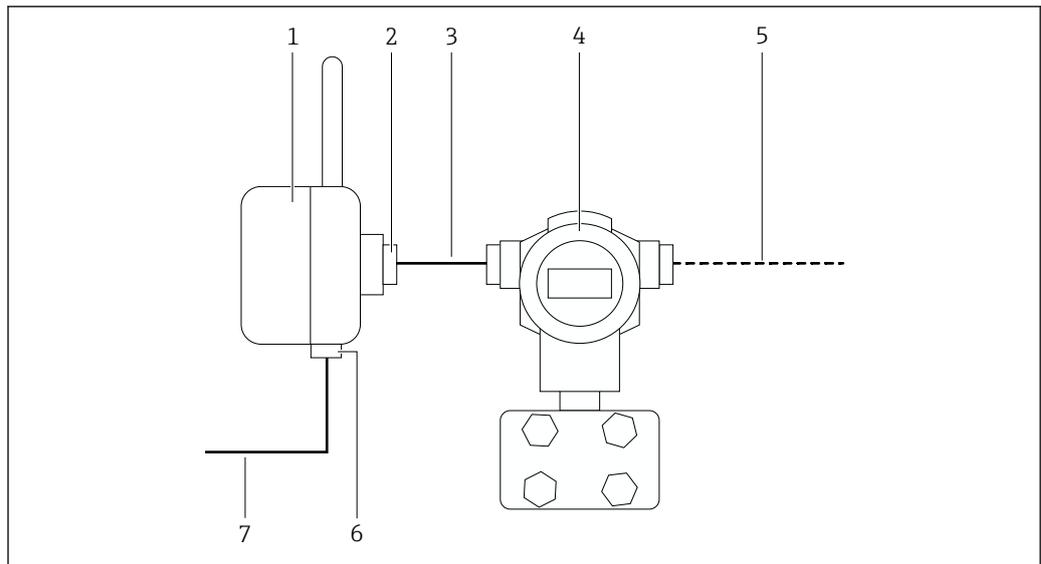


A0053263

6 Remote mounting for version with battery pack

- 1 WirelessHART adapter with battery pack
- 2 Rear cable entry
- 3 Possible cable routing for integration in a closed-control loop
- 4 Example of field device
- 5 Connecting cable between WirelessHART adapter and field device
- 6 Lower cable entry

5.6 Remote mounting: Version with wide-range power unit or DC power unit



A0053264

7 Remote mounting for version with wide-range power unit or DC power unit

- 1 WirelessHART adapter with battery pack
- 2 Rear cable entry
- 3 Connecting cable between WirelessHART adapter and field device
- 4 Example of field device
- 5 Possible cable routing for integration in a closed-control loop
- 6 Lower cable entry
- 7 Supply voltage for WirelessHART adapter

6 Mounting

6.1 Planning instructions for WirelessHART networks

- Ideally, mount WirelessHART network devices at least 1 m above the floor.
- Mount WirelessHART network devices at least 1 m apart from each other.
- Align the antennas of the WirelessHART network devices completely vertically.
- Maintain a distance of at least 6 cm between the antenna and components such as walls, pipes, posts, and parallel metal surfaces.
- Moving objects can affect the range of antennas.
- If possible, mount at least two other WirelessHART network devices in the transmission and reception range. Avoid mounting the WirelessHART devices on top of each other, as this would place the WirelessHART network devices outside their transmission and reception ranges.
- A clear line of sight between communication partners is recommended. If a clear line of sight is not possible, the obstacle should be as thin as possible, and the communication partners should be mounted as close to the edge of the obstacle as possible.
- Mount WirelessHART network devices as far away as possible from metal surfaces or walls with iron reinforcement. The less metal there is near the WirelessHART network devices, the better the WirelessHART network devices will function.
- Do not install any other 2.4 GHz devices, such as radio telephone base stations or WLAN routers, near the WirelessHART network devices. Other wireless networks with the same frequency spectrum (e.g., WLAN, Bluetooth) should be taken into account. Wireless technologies in industrial applications should be able to coexist without mutual interference.

-  Follow the steps below to check the correct operation of new WirelessHART network devices immediately after mounting:
- First mount the WirelessHART gateway and put it into operation.
 - Then install the other WirelessHART network devices and put them into operation.

6.2 Mounting instructions

- Pay attention to the range.
- Align the antenna of the WirelessHART adapter so it is completely vertical.
- Observe a distance of at least 6 cm from walls and pipes. Pay attention to the expansion of the Fresnel zone.
- Do not place the antenna of the WirelessHART adapter between the field device housing and a wall or post.
- Pay attention to the effect of vibrations at the mounting location.

For an optimal wireless network with several WirelessHART adapters, you should ideally avoid obstacles such as walls between the adapters.

For better connectivity, mount the WirelessHART adapter within line of sight of a WirelessHART network device.

6.3 Lightning arrester

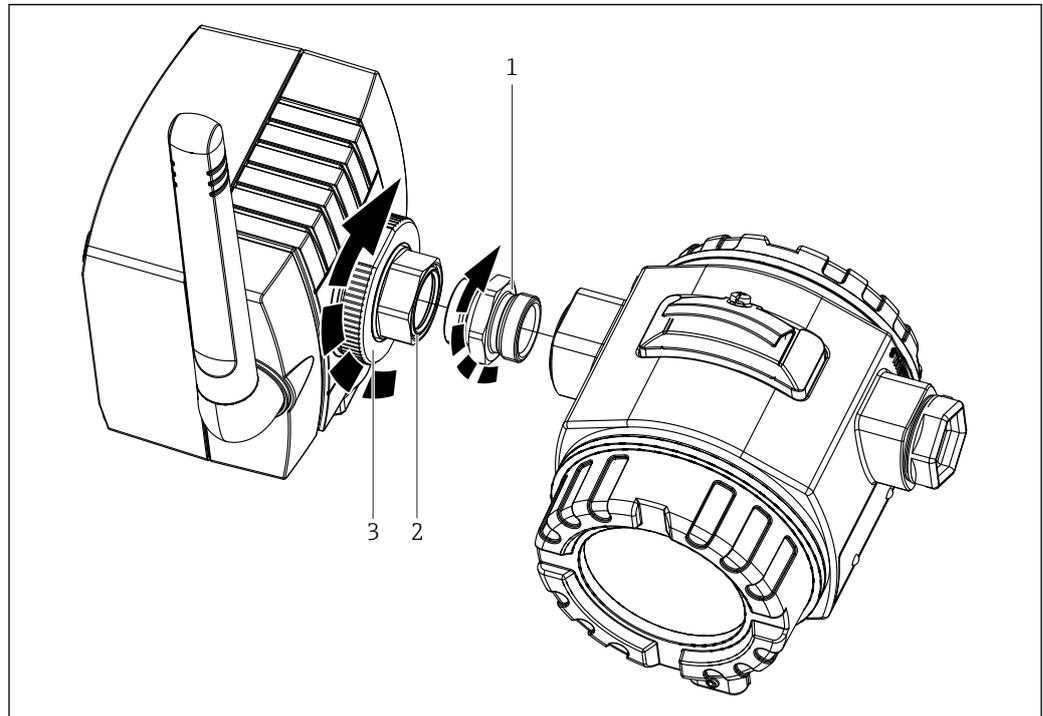
- Do not mount WirelessHART adapter SWA70 at the highest point in the plant.
- WirelessHART adapter SWA70 with metal housing: connect protective ground to one of the protective ground connections of the housing. The WirelessHART adapter is equipped with one protective conductor terminal on the inside of the housing and one on the outside of the housing. The minimum cross-section of the protective ground 2.5 mm².

6.4 Direct mounting (mounting the SWA70 on a field device)

- i** This chapter is relevant for the mounting option "Prepared for installation on the device" and WirelessHART adapter with wide-range power unit or DC power unit.
- For the mounting option "Prepared for installation on the device" and WirelessHART adapter with battery pack, see the Chapter "Connecting the field device for direct mounting" → 28. With this combination, you should ideally complete the wiring between field device and WirelessHART adapter during the mounting process.

Tools required:

- Wrench with AF 24
- Wrench with AF 42



- 8** *Mounting SWA70 on a field device (arrow tips point in direction "Closed". arrow ends point in direction "Open")*

- 1 Double-threaded connection adapter
- 2 Rear cable entry for direct installation on field device, internal thread M20x1.5
- 3 Locking nut

- i** If you loosen the locking nut, you can turn the connection adapter without the WirelessHART adapter.

Mounting SWA70 on a field device

1. Prepare the connection adapter for mounting. Place one of the supplied seals on each threaded side.
2. Screw the connection adapter into the connection of the field device. Torque: 5 Nm
3. Remove the sealing cap from the rear cable entry on the WirelessHART adapter.
4. Release the locking nut.
5. Place the WirelessHART adapter with the rear cable entry onto the connection adapter.
6. Tighten the connection adapter. Torque: 5 Nm
7. Align the WirelessHART adapter.

8. Tighten the locking nut. Torque: 7 Nm
9. Counter-tighten the locking nut and connection adapter.

6.5 Remote mounting (mounting the SWA70 separate from the field device)

i This chapter is relevant for all WirelessHART adapters of the mounting option "Prepared for installation remotely from the device" or the mounting option "Prepared for installation as router".

The WirelessHART adapter and the associated field device are mounted separately. The WirelessHART adapter is mounted on a wall, pole or other object using a mounting bracket. The mounting bracket is included in the delivery. A connecting cable is required for the electrical connection between the WirelessHART adapter and the field device. The connecting cable is not included in the scope of delivery.

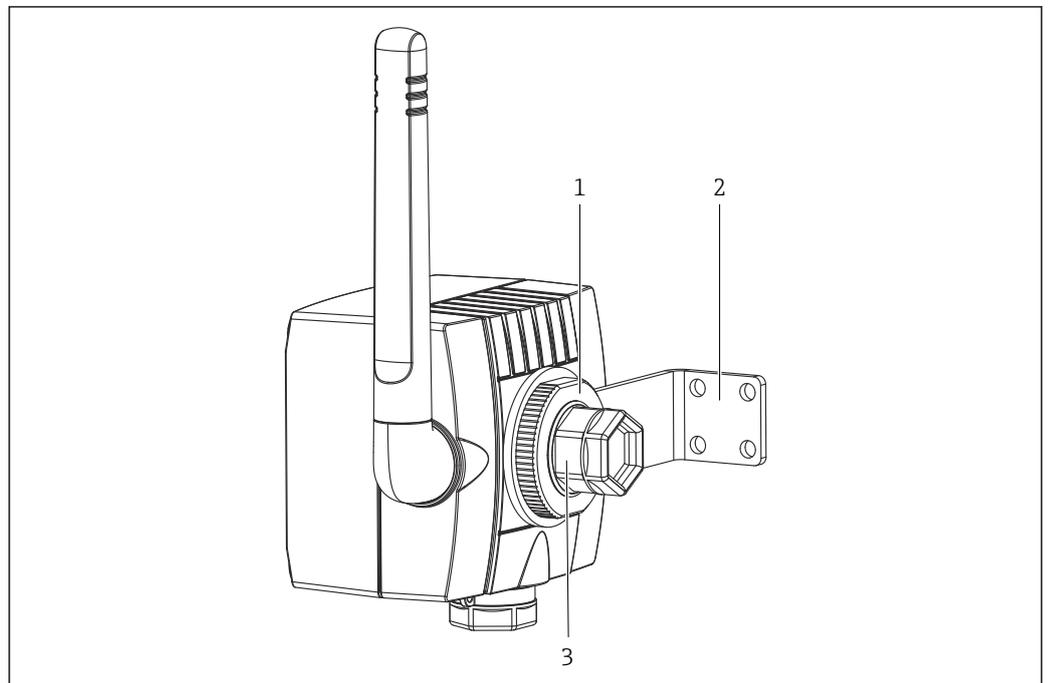
Remote mounting of the WirelessHART adapter may be required in the following cases:

- There is no room on the field device for the WirelessHART adapter.
- The radio signal reception on the field device is insufficient.
- The vibration on the field device exceeds the recommended range.

6.5.1 Wall mounting

Tools required:

- Wrench with AF 8
- Wrench with AF 24
- Wrench with AF 42
- Allen key size 4



9 *Mounting SWA70 on a wall, separate from the field device*

- 1 *Locking nut*
- 2 *Retaining bracket for the wall/pipe mounting bracket*
- 3 *Rear cable entry with seal cap*

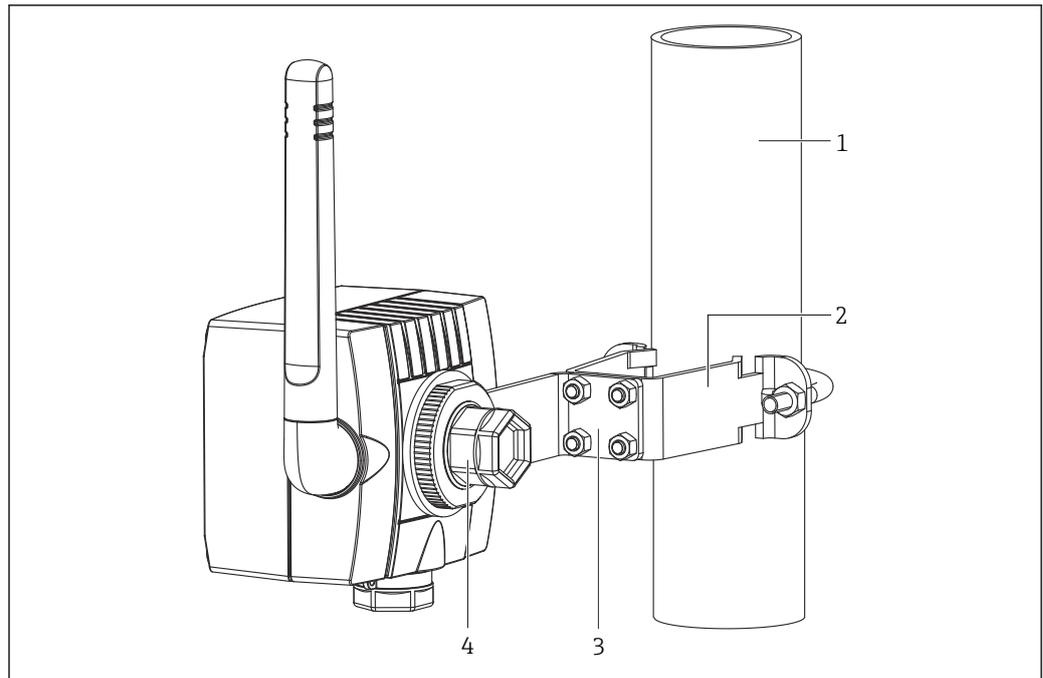
A0046180

Mounting SWA70 on a wall

1. Mount the retaining bracket on a suitable location on the wall.
2. Unscrew the locking nut from the WirelessHART adapter. Turn the locking nut in a counterclockwise direction for this purpose.
3. Guide the rear cable entry of the WirelessHART adapter through the opening of the retaining bracket. In doing so, ensure that the antenna of the WirelessHART adapter is as far away from the wall as possible.
4. Screw the locking nut onto the rear cable entry clockwise, leaving it loose enough to still align the WirelessHART adapter.
5. Align the WirelessHART adapter so that the antenna is vertical.
6. Fasten the rear cable entry with a spanner while simultaneously tightening the locking nut. Torque: 7 Nm

6.5.2 Pipe mounting**Tools required:**

- Wrench with AF 8
- Wrench with AF 24
- Wrench with AF 42
- Allen key size 4



A0046182

10 Mounting SWA70 on a pipe, separate from the field device

- 1 Pipe with a maximum diameter of 65 mm
- 2 Retainer for the wall/pipe mounting bracket
- 3 Retaining bracket for the wall/pipe mounting bracket
- 4 Rear cable entry with seal cap

Mounting SWA70 on a pipe

1. Mount the retainer on the desired location on the pipe. Torque: minimum 5 Nm
2. Mount the retaining bracket on the retainer. Torque: minimum 4 Nm
3. Unscrew the locking nut from the WirelessHART adapter. Turn the locking nut in a counterclockwise direction for this purpose.

4. Guide the rear cable entry of the WirelessHART adapter through the opening of the retaining bracket. In doing so, ensure that the antenna of the WirelessHART adapter is as far away from the pipe as possible.
5. Screw the locking nut onto the rear cable entry clockwise, leaving it loose enough to still align the WirelessHART adapter.
6. Align the WirelessHART adapter so that the antenna is vertical.
7. Fasten the rear cable entry with a spanner while simultaneously tightening the locking nut. Torque: 7 Nm

6.6 Post-mounting check

Is the WirelessHART adapter undamaged (visual inspection)?	<input type="checkbox"/>
Does the WirelessHART adapter meet the required specifications? For example: <ul style="list-style-type: none"> ▪ Ambient temperature ▪ Humidity ▪ Explosion protection 	<input type="checkbox"/>
WirelessHART adapter with metal housing: Is the WirelessHART adapter grounded correctly? →  23	<input type="checkbox"/>
Are the requirements for protection against lightning fulfilled? →  23	<input type="checkbox"/>
Is the WirelessHART adapter's antenna aligned correctly?	<input type="checkbox"/>
Is the WirelessHART adapter mounted far enough away from walls, pipes, posts and parallel metal surfaces?	<input type="checkbox"/>
Are all the securing screws tightened for the optional mounting bracket tightened securely?	<input type="checkbox"/>
Is the locking nut firmly tightened?	<input type="checkbox"/>
If directly mounted on the field device: Is the connection adapter firmly tightened?	<input type="checkbox"/>
Are the measuring point identification and labeling correct (visual inspection)?	<input type="checkbox"/>

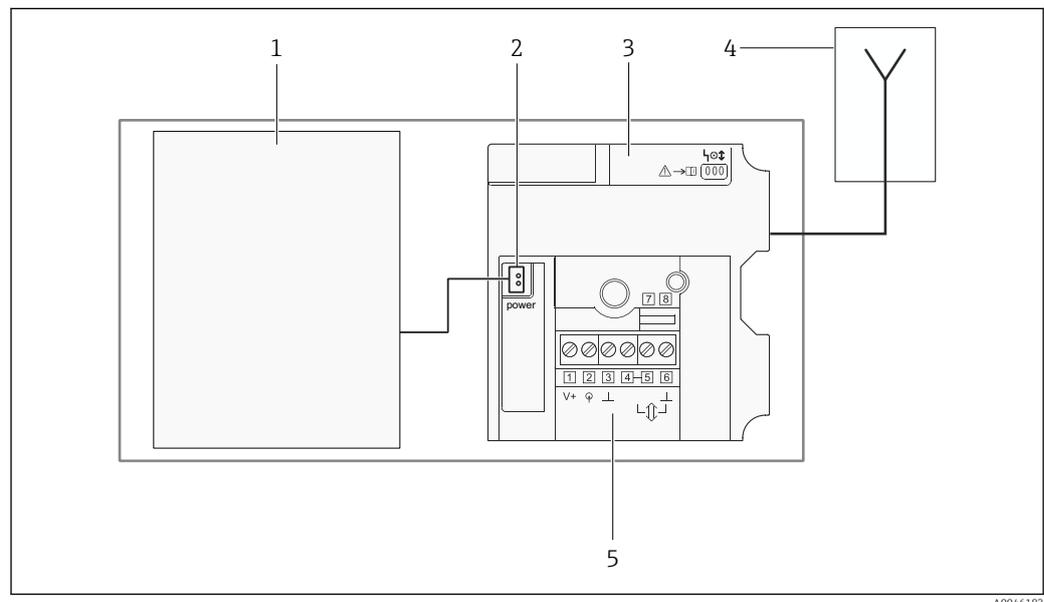
7 Electrical connection of SWA70 with battery pack

7.1 Connecting requirements

 Technical data such as cable specification: Technical Information SWA70 (TI00026S)

7.2 Overview of SWA70 connection with battery pack

The WirelessHART adapter with battery pack is powered by the internal battery pack.



 11 Block circuit diagram of SWA70 with battery unit

- 1 Battery pack
- 2 Internal DC supply voltage
- 3 Main circuit board for WirelessHART adapter
- 4 Antenna
- 5 Connection of field device, connection diagrams: →  32

 Permitted connection values: →  102

 Due to the internal communication resistor, the supply voltage of the field device varies depending on the current and the set operating voltage ("Operating Voltage" parameter →  84).

7.3 Connecting the field device to SWA70

7.3.1 Connecting the field device for direct mounting

 **DANGER**

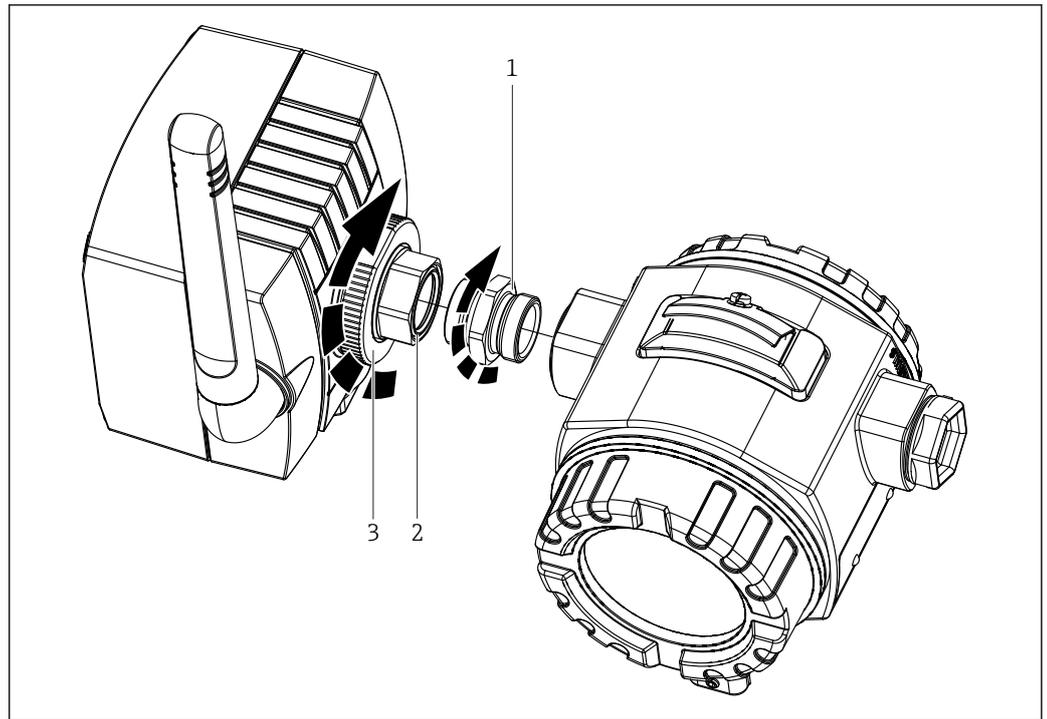
Opening the WirelessHART adapter housing in hazardous areas

Explosion Hazard

- ▶ Follow the associated Safety Instructions (XA, etc.).

Tools required:

- Torx T10 wrench for the housing screws
- Flat-blade screwdriver 2.5 mm for screws on the terminal block



12 Mounting SWA70 on a field device (arrow tips point in direction "Closed". arrow ends point in direction "Open")

- 1 Double-threaded connection adapter
- 2 Rear cable entry for direct installation on field device, internal thread M20x1.5
- 3 Locking nut

i If you loosen the locking nut, you can turn the connection adapter without the WirelessHART adapter.

1. Prepare the connection adapter for mounting. Place one of the supplied seals on each threaded side.
2. Screw the connection adapter into the connection of the field device. Torque: 5 Nm
3. Feed the 2-wire cable through the connection adapter and connect it to the field device according to the "Field device" documentation and the SWA70 connection diagram. SWA70 connection diagrams: → 32
4. Remove the sealing cap from the rear cable entry on the WirelessHART adapter.
5. Loosen the locking nut on the WirelessHART adapter.
6. Loosen the housing screws of the WirelessHART adapter and open the housing.
7. Feed the 2-wire cable through the rear cable entry of the WirelessHART adapter into the housing.
8. Place the WirelessHART adapter with the rear cable entry onto the connection adapter.
9. Tighten the connection adapter. Torque: 5 Nm
10. Align the WirelessHART adapter.
11. Tighten the locking nut. Torque: 7 Nm
12. Counter-tighten the locking nut and connection adapter.

13. Connect the field device to the WirelessHART adapter. Connection diagrams:
→  32
14. Insert the connector plug of the battery pack into the socket on the main circuit board.
 - ↳ The WirelessHART adapter is supplied with power. The green LED on the main PCB lights up in green.
The WirelessHART adapter starts the operating software and performs a self-test.
The assignment of the terminals is determined during initial commissioning. Otherwise, the assignment at the terminals is checked for any changes.
15. Close the WirelessHART adapter housing and tighten the housing screws. Torque: 0.6 Nm

7.3.2 Connecting the field device for remote mounting

DANGER

Opening the WirelessHART adapter housing in hazardous areas

Explosion Hazard

- ▶ Follow the associated Safety Instructions (XA, etc.).

 We recommend carrying out the wiring between the WirelessHART adapter and field device via the lower cable entry.

NOTICE

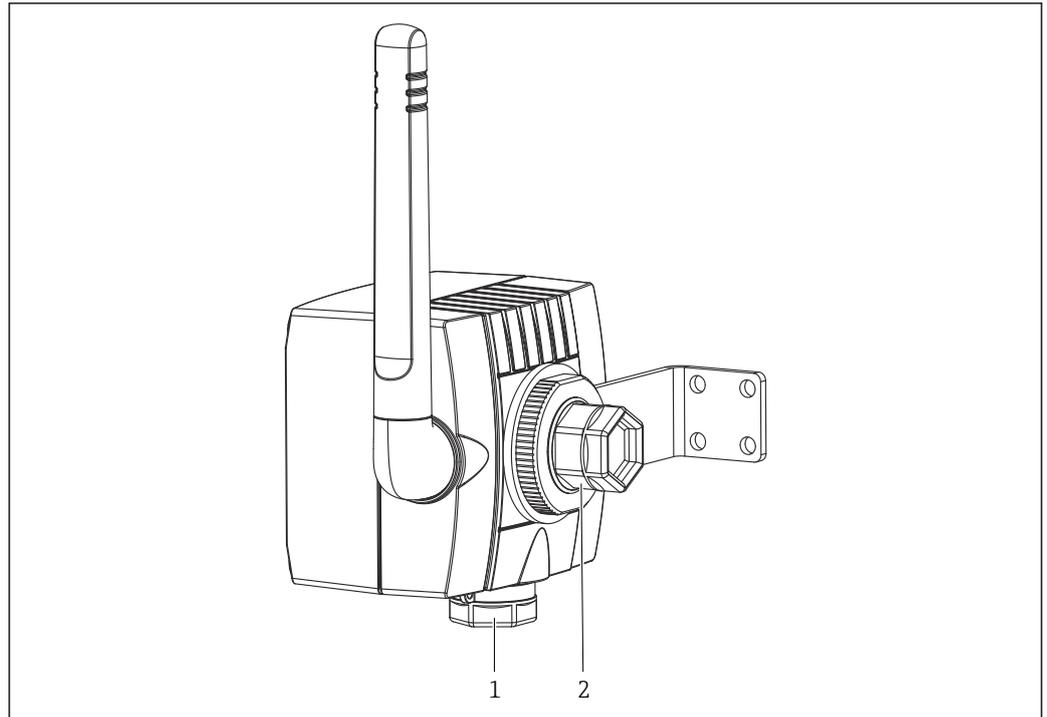
Moisture ingress can occur if the rear cable entry is used.

Possible device damage

- ▶ Protect the WirelessHART adapter and cable from moisture.
- ▶ Prevent water entering the housing through the cable.

Tools required:

- Torx T10 wrench for the housing screws
- Flat-blade screwdriver 2.5 mm for screws on the terminal block



A0053108

13 Cable entries on the SWA70

- 1 Lower cable entry
- 2 Rear cable entry

1. Remove the sealing cap from the lower cable entry.
2. Screw the cable gland M20 into the thread of the lower cable entry. Torque: 3.25 Nm
3. Loosen the strain relief of the cable gland by turning the coupling nut slightly counterclockwise.
4. Loosen the housing screws of the WirelessHART adapter and open the housing.
5. Feed the cable through the cable entry of the WirelessHART adapter into the housing.
6. Connect the field device to the WirelessHART adapter. Connection diagrams:
→ 32
7. Close the WirelessHART adapter housing and tighten the housing screws. Torque: 0.6 Nm
8. Insert the connector plug of the battery pack into the socket on the main circuit board.
 - ↳ The WirelessHART adapter is supplied with power. The green LED on the main PCB lights up in green.
 - The WirelessHART adapter starts the operating software and performs a self-test.
 - The assignment of the terminals is determined during initial commissioning.
 - Otherwise, the assignment at the terminals is checked for any changes.
9. Connect the field device in accordance with the "Field device" documentation.

7.4 Connection diagrams for versions with battery pack

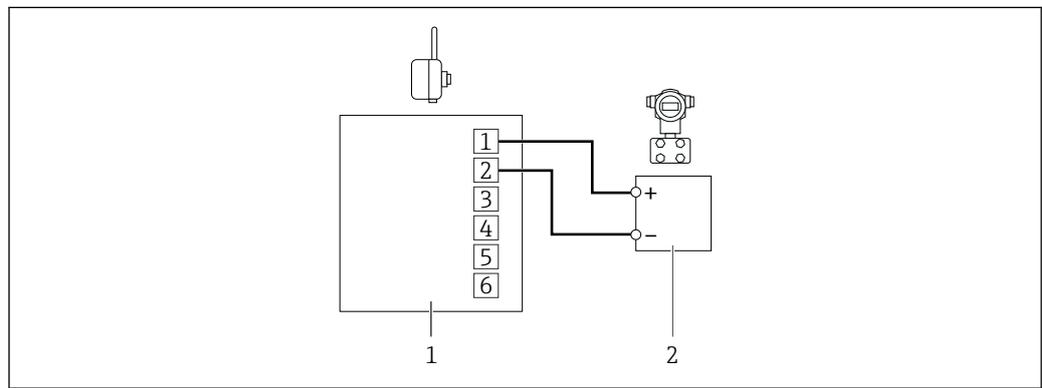
The WirelessHART adapter with battery pack can be electrically connected to a field device in the following ways:

- 2-wire field device supplied by the SWA70 battery pack
- 4-wire field device
- Field device in a closed-control loop with a communication resistor
- Field device in a closed-control loop without a communication resistor

7.4.1 2-wire field device supplied by the SWA70 battery pack

The following functions are possible with this type of connection:

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



14 SWA70 with battery pack - Connection of a 2-wire field device powered by the battery pack of the SWA70

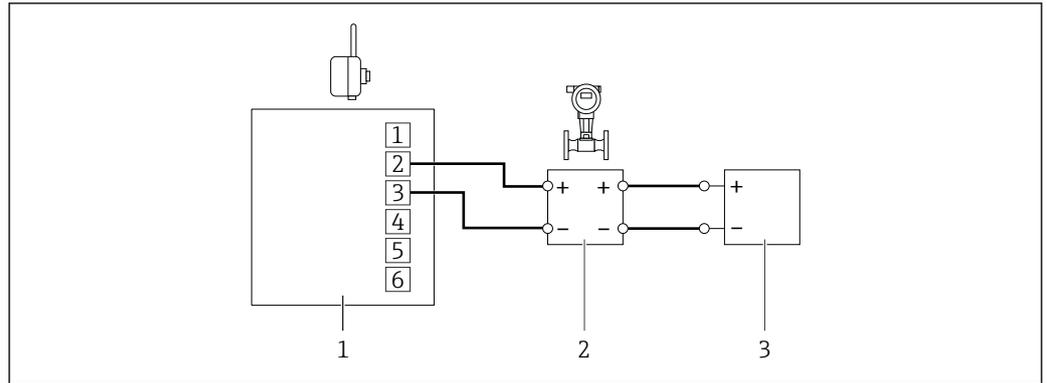
- 1 WirelessHART adapter
2 2-wire field device (example)

i If you operate the HART field device in Multidrop mode, you will extend the battery life. For Multidrop mode, you must set an address "> 0" for the field device. If the HART field device has the "Fixed Loop Current Mode" function, you must also activate this function.

7.4.2 4-wire field device

The following functions are possible with this type of connection:

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



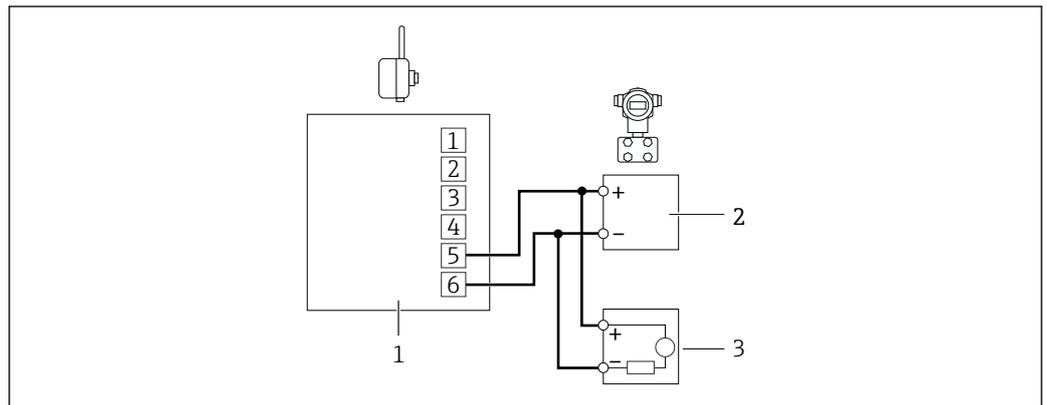
A0053822

15 SWA70 with battery pack – Connecting a 4-wire field device

- 1 WirelessHART adapter
- 2 4-wire field device with active current output (example)
- 3 Supply voltage for 4-wire field device

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

The following function is possible with this type of connection:
Digital HART communication if supported by the field device



A0053824

16 SWA70 with battery pack – connection of a field device in a closed-control loop with communication resistor

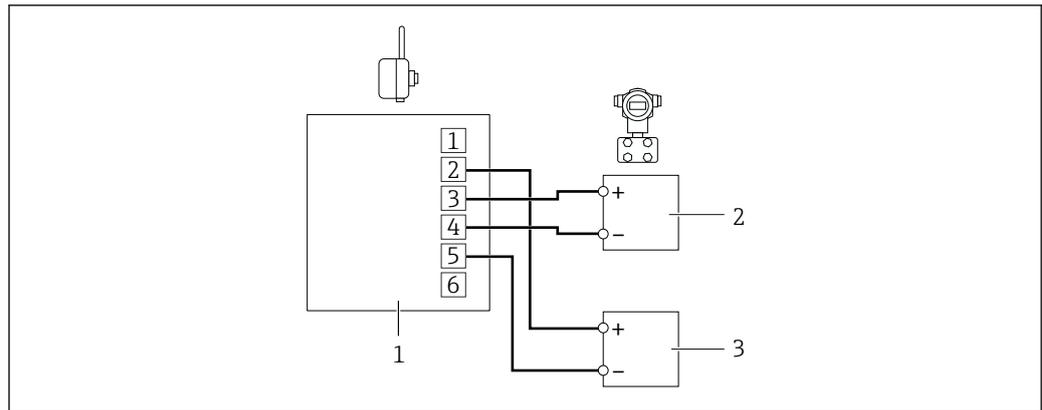
- 1 WirelessHART adapter
- 2 Field device (example)
- 3 PLC, remote I/O, or DC voltage power unit with communication resistor

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

The following functions are possible with this type of connection:

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

For an installation with a 2-wire cable, we recommend the following type of connection.

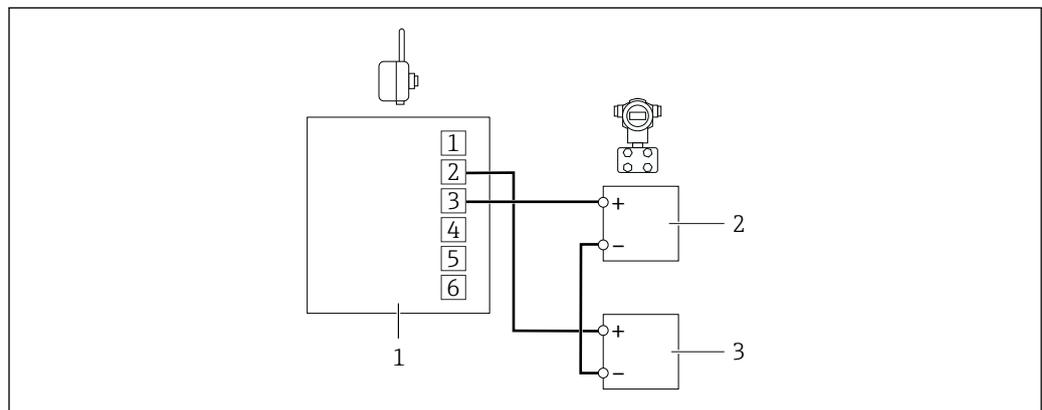


A0053825

17 SWA70 with battery pack – connection of a field device in a closed-control loop without communication resistor, with 2-wire cable

- 1 WirelessHART adapter
- 2 Field device (example)
- 3 PLC, remote I/O, or DC voltage power unit without communication resistor

For an installation with only one signal cable, e.g. where the return line is via the earth, we recommend the following type of connection.



A0053826

18 SWA70 with battery pack – connection of a field device in a closed-control loop without communication resistor

- 1 WirelessHART adapter
- 2 Field device (example)
- 3 PLC, remote I/O, or DC voltage power unit without communication resistor

i The connection is established via the internal resistance of 270 Ohm.

The two types of connection in this chapter are electrically identical: terminal 4 is connected internally to terminal 5.

7.5 Post-connection check

Has the wiring been performed according to the connection diagram?	<input type="checkbox"/>
Is the connector plug of the battery pack properly plugged into the socket on the main circuit board?	<input type="checkbox"/>
Is the green LED on the main circuit board lit?	<input type="checkbox"/>
Is the cable gland for the lower cable entry properly fitted?	<input type="checkbox"/>
Is the locking nut firmly tightened?	<input type="checkbox"/>

If directly mounted on the field device: Is the connection adapter firmly tightened?	<input type="checkbox"/>
Are all the housing screws tightened?	<input type="checkbox"/>

8 Electrical connection of SWA70 with wide-range power unit

8.1 Connecting requirements



Technical data such as cable specification: Technical Information SWA70 (TI00026S)

8.2 Cable specification

Direct mounting

Use the 2-wire 0.25 mm² cable supplied.

Remote mounting

- Standard installation cable 0.25 mm²
- Connection of M12 socket 0.75 mm²

In the presence of strong electromagnetic interference, such as from machinery or radio equipment, we recommend using a shielded cable.

Connect the shielding in accordance with local regulations. There are no special requirements for the WirelessHART adapter with respect to connecting the shielding.

8.3 Safety during electrical connection

DANGER

Contact with live parts

Risk of fatal injury from electric shock

- ▶ The work must only be carried out by electrical technicians.
- ▶ Before opening the WirelessHART adapter, switch off the supply voltage and ensure it is secured to prevent accidental reactivation. Check that no voltage is present.
- ▶ Do **not** wire the WirelessHART adapter when energized.
- ▶ Ground the WirelessHART adapter with a metal housing. To do this, connect the protective ground to one of the protective conductor terminals on the housing. The WirelessHART adapter is equipped with one protective conductor terminal on the inside of the housing and one on the outside of the housing. Use a 2.5 mm² protective ground.

DANGER

Opening the WirelessHART adapter housing in hazardous areas

Explosion Hazard

- ▶ Follow the associated Safety Instructions (XA, etc.).

NOTICE

Missing or incorrect back-up fuse

Possible device damage

- ▶ Protect the WirelessHART adapter with an external back-up fuse. The back-up fuse must meet the following requirements: 1 A slow-blow, designed for min. 250 V AC and approved for the application.

NOTICE

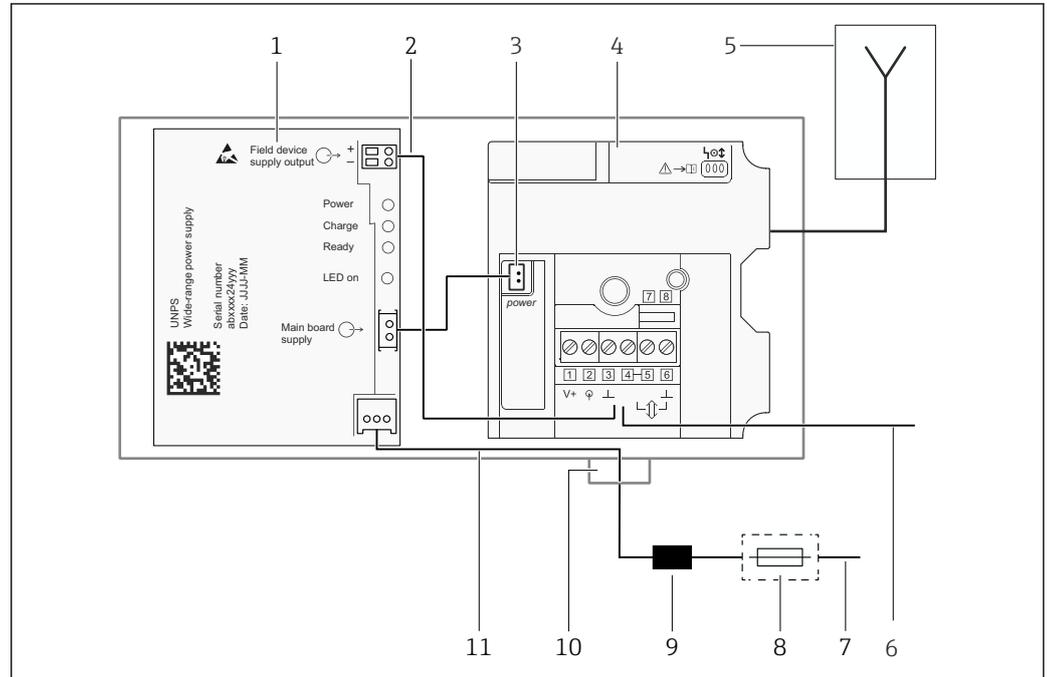
Interference emissions (EMC)

Possible device damage

- ▶ Feed the supply voltage cable through the ferrite sleeve supplied. Fasten the ferrite sleeve at a distance of 5 cm to 30 cm from the WirelessHART adapter.
- ▶ A mains filter must be connected upstream if Class B for EMC interference emissions must be met in the destination country during operation.

8.4 Overview of SWA70 connection with wide-range power unit

An M12 socket is included in the scope of delivery. Connect the cable for the supply voltage for the WirelessHART adapter to this M12 socket.



19 Block circuit diagram of SWA70 with wide-range power unit

- 1 Wide-range power unit
- 2 Customer wiring for connection type "2-wire field device with supply voltage via internal power supply (→ 40)" and "2-wire field devices in Multidrop mode (→ 42)"
- 3 Internal DC supply voltage
- 4 Main circuit board for WirelessHART adapter
- 5 Antenna
- 6 Connection of field device, connection diagrams: → 40
- 7 Supply voltage for WirelessHART adapter
- 8 Suitable back-up fuse (provided by customer)
- 9 Ferrite sleeve, 5 to 30 cm distance to the WirelessHART adapter
- 10 M12 socket for supply voltage connection
- 11 "Supply voltage" internal wiring

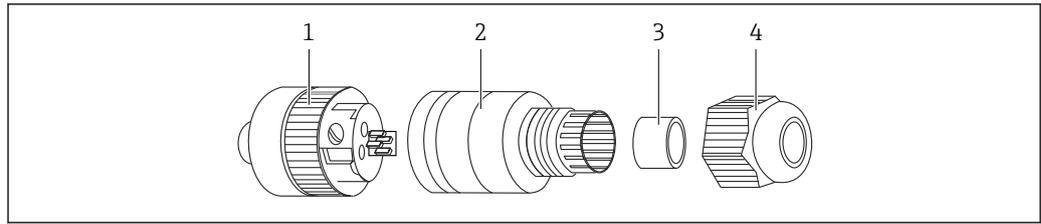
i Permitted connection values: → 102

i Due to the internal communication resistor, the supply voltage of the field device varies depending on the current and the set operating voltage ("Operating Voltage" parameter → 84).

8.5 Connecting the supply voltage on the SWA70 (M12 socket)

An M12 socket is included in the scope of delivery. Connect the cable for the supply voltage for the WirelessHART adapter to this M12 socket.

8.5.1 Mounting and wiring the M12 socket



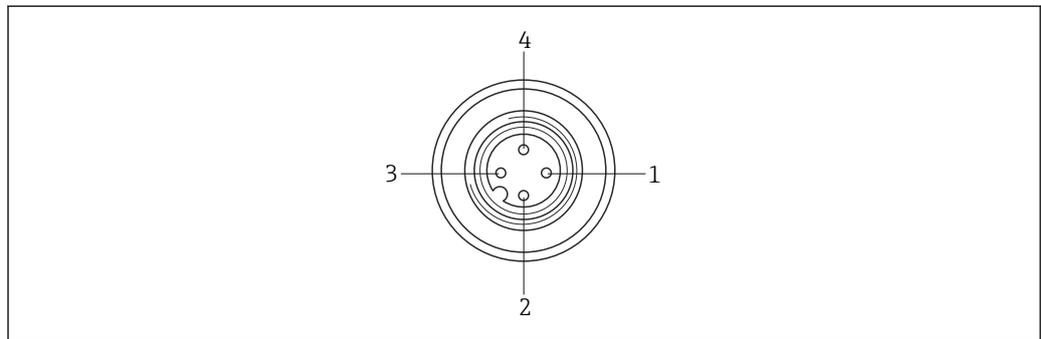
A0046276

20 M12 socket

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

1. Insert the seal into the coupling sleeve as shown in the diagram.
2. Feed the cable through the coupling nut and then through the coupling sleeve.
3. Connect the cable according to the PIN assignment.
4. Tighten the screws in the socket insert.
5. Screw the socket insert to the coupling sleeve. To do this, turn the knurled screw while holding the coupling sleeve firmly.
6. Tighten the coupling nut.

PIN assignment for M12 socket



A0046408

21 PIN assignment for M12 socket

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

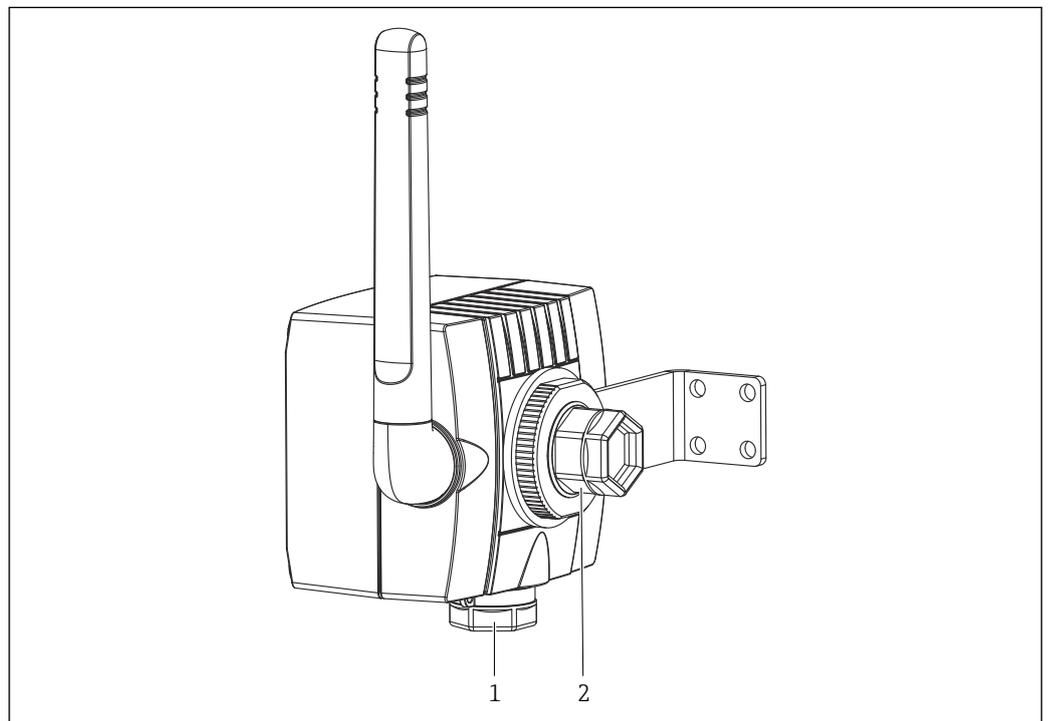
8.6 Connecting the field device to SWA70

8.6.1 Connecting the field device for direct mounting or remote mounting

i Connection of the field device to the WirelessHART adapter is independent of the mounting option. The field device is connected to the WirelessHART adapter via the rear cable entry of the WirelessHART adapter. The lower cable entry of the WirelessHART adapter is used to connect the WirelessHART adapter to the supply voltage.

Tools required:

- Torx T10 wrench for the housing screws
- Flat-blade screwdriver 2.5 mm for screws on the terminal block
- Wrench with AF 25 for cable entry



22 Use of the cable entries on the SWA70 with the "wide-range power unit" version

- 1 Lower cable entry for supply voltage WirelessHART adapter
 2 Rear cable entry for connecting the field device to the WirelessHART adapter

NOTICE

Moisture ingress can occur if the rear cable entry is used.

Possible device damage

- ▶ Protect the WirelessHART adapter and cable from moisture.
- ▶ Prevent water entering the housing through the cable.

For direct mounting, connect the field device to the WirelessHART adapter using the supplied 2-wire cable. For remote mounting, connect the field device to the WirelessHART adapter using a customer cable.

1. Loosen the housing screws of the WirelessHART adapter and open the housing.
2. Feed the cable through the rear cable entry of the WirelessHART adapter into the housing.
3. Connect the field device to the WirelessHART adapter. Connection diagrams:
 → 40

4. Close the WirelessHART adapter housing and tighten the housing screws. Torque: 0.6 Nm
5. Connect the field device in accordance with the "Field device" documentation.

8.7 Connection diagrams for versions with wide-range power unit

The following options are available for electrically connecting a field device with the WirelessHART adapter with a wide-range power unit:

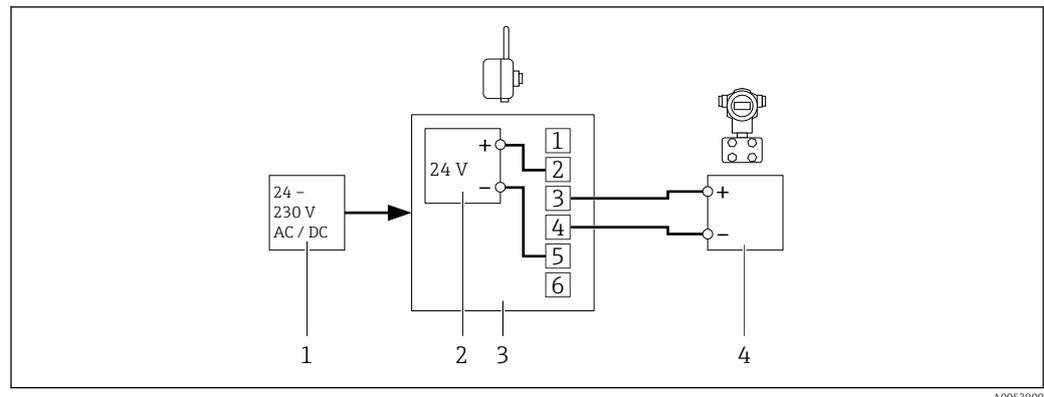
- 2-wire field device powered via the wide-range power unit of the SWA70
- 4-wire field device
- Field device in a closed-control loop with a communication resistor
- Field device in a closed-control loop without a communication resistor
- 2-wire field devices in Multidrop mode

8.7.1 2-wire field device powered via the wide-range power unit of the SWA70

The following functions are possible with this type of connection:

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

 You can remove the wide-range power supply unit from the housing to connect it to the supply voltage.



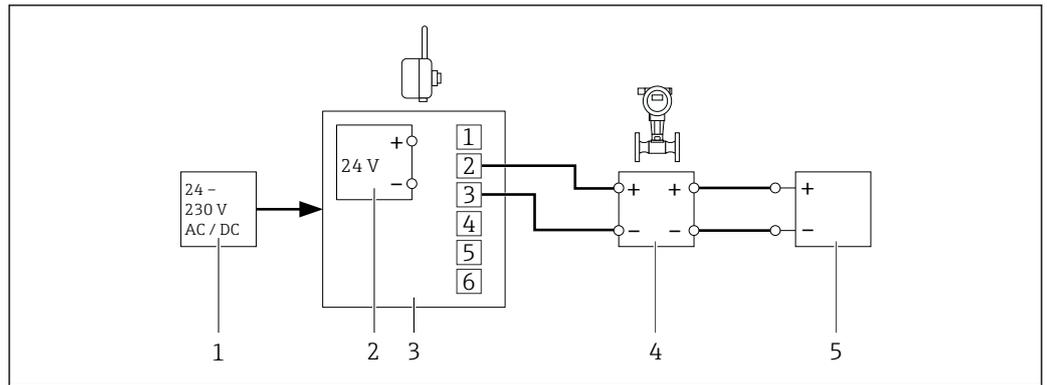
 23 SWA70 with wide-range power unit – Connection of a 2-wire field device powered by the wide-range power unit of the SWA70

- 1 External supply voltage for the WirelessHART adapter 24 to 230 V AC or 24 to 230 V DC
- 2 Terminals "Field device supply output" of wide-range power unit
- 3 WirelessHART adapter
- 4 2-wire field device (example)

8.7.2 4-wire field device

The following functions are possible with this type of connection:

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



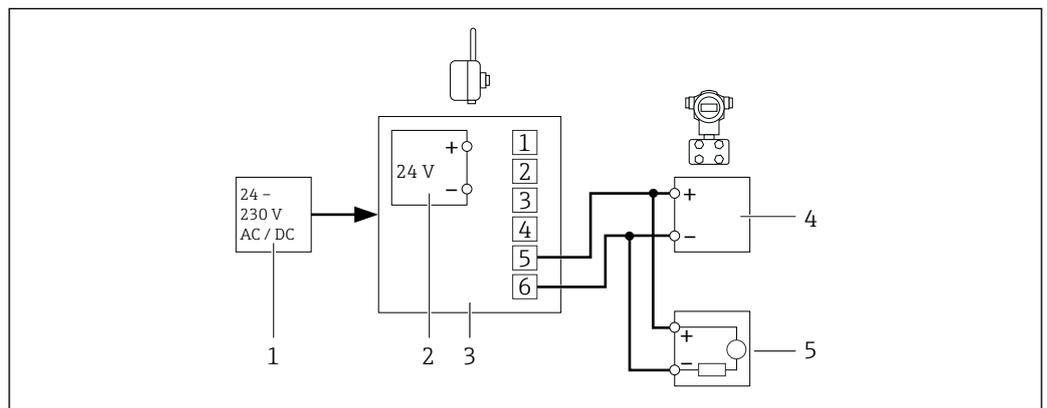
A0053903

24 SWA70 with wide-range power unit - connection of a 4/4-wire field device

- 1 External supply voltage for the WirelessHART adapter 24 to 230 V AC or 24 to 230 V DC
- 2 Terminals "Field device supply output" of wide-range power unit (not relevant for this type of connection)
- 3 WirelessHART adapter
- 4 4-wire field device with active current output (example)
- 5 Supply voltage for 4-wire field device

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

The following function is possible with this type of connection:
Digital HART communication if supported by the field device



A0053901

25 SWA70 with wide-range power unit - connection of a field device in a closed-control loop with a communication resistor

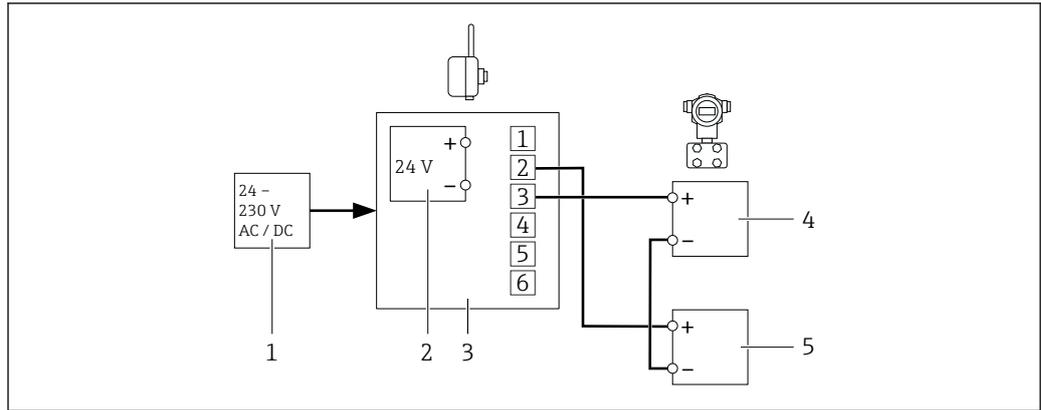
- 1 External supply voltage for the WirelessHART adapter 24 to 230 V AC or 24 to 230 V DC
- 2 Terminals "Field device supply output" of wide-range power unit (not relevant for this type of connection)
- 3 WirelessHART adapter
- 4 Field device (example)
- 5 PLC, remote I/O, or DC voltage power unit with communication resistor

i Using the **Wake-up Detection** parameter on the **Wired Communication** page, you can restrict the terminals via which the communication is "heard (read)". This restriction ensures that configuration mode is not executed unnecessarily thereby saving energy.

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

The following functions are possible with this type of connection:

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



A0053902

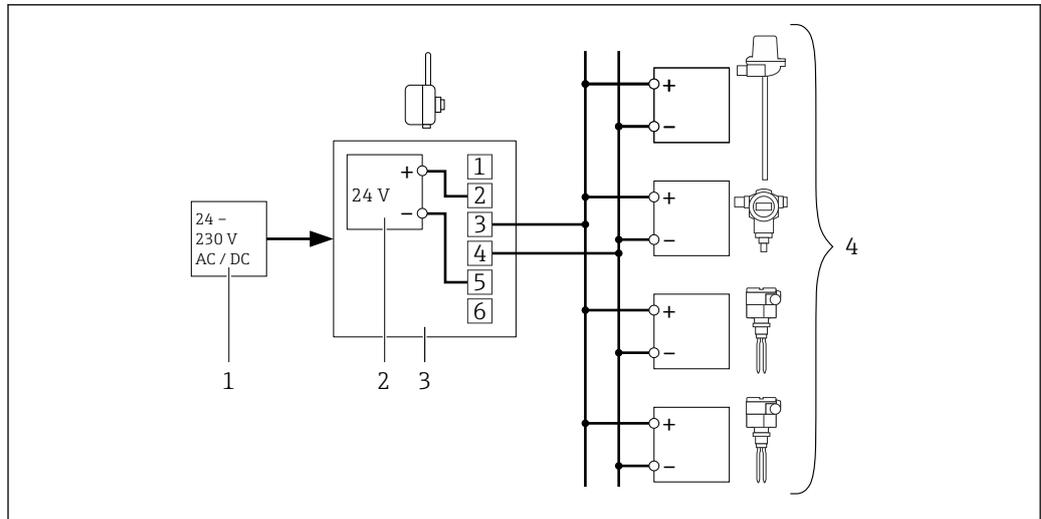
26 SWA70 with wide-range power unit - connection of a field device in a closed-control loop without a communication resistor

- 1 External supply voltage for the WirelessHART adapter 24 to 230 V AC or 24 to 230 V DC
- 2 Terminals "Field device supply output" of wide-range power unit (not relevant for this type of connection)
- 3 WirelessHART adapter
- 4 Field device (example)
- 5 PLC, remote I/O, or DC voltage power unit without communication resistor

8.7.5 2-wire field devices in Multidrop mode

The following function is possible with this type of connection:
Digital HART communication in Multidrop mode

i You can remove the wide-range power supply unit from the housing to connect it to the supply voltage.



A0053904

27 SWA70 with wide-range power unit - connection of 2-wire field devices in Multidrop mode

- 1 External supply voltage for the WirelessHART adapter 24 to 230 V AC or 24 to 230 V DC
- 2 Terminals "Field device supply output" of wide-range power unit
- 3 WirelessHART adapter
- 4 2-wire field devices (examples)

8.8 Post-connection check

Is the supply voltage for the WirelessHART adapter correctly protected? → 36	<input type="checkbox"/>
Is the supply voltage cable routed through the supplied ferrite sleeve? → 19, 37	<input type="checkbox"/>

WirelessHART adapter with metal housing: Is the WirelessHART adapter grounded correctly? →  23	<input type="checkbox"/>
Is the M12 socket properly fitted and wired? →  37	<input type="checkbox"/>
Is the M12 socket correctly screwed into the lower cable entry?	<input type="checkbox"/>
Has the wiring been performed according to the connection diagram?	<input type="checkbox"/>
Is the locking nut firmly tightened?	<input type="checkbox"/>
If directly mounted on the field device: Is the connection adapter firmly tightened?	<input type="checkbox"/>
Are all the housing screws tightened?	<input type="checkbox"/>

9 SWA70 electrical connection with DC power unit

9.1 Connecting requirements

 Technical data such as cable specification: Technical Information SWA70 (TI00026S)

9.2 Safety during electrical connection

DANGER

Contact with live parts

Risk of fatal injury from electric shock

- ▶ The work must only be carried out by electrical technicians.
- ▶ Before opening the WirelessHART adapter, switch off the supply voltage and ensure it is secured to prevent accidental reactivation. Check that no voltage is present.
- ▶ Do **not**wire the WirelessHART adapter when energized.
- ▶ Ground the WirelessHART adapter with a metal housing. To do this, connect the protective ground to one of the protective conductor terminals on the housing. The WirelessHART adapter is equipped with one protective conductor terminal on the inside of the housing and one on the outside of the housing. Use a 2.5 mm² protective ground.

DANGER

Opening the WirelessHART adapter housing in hazardous areas

Explosion Hazard

- ▶ Follow the associated Safety Instructions (XA, etc.).

NOTICE

Missing or incorrect back-up fuse

Possible device damage

- ▶ Protect the WirelessHART adapter with an external back-up fuse. The back-up fuse must meet the following requirements: 1 A slow-blow, designed for min. 250 V AC and approved for the application.

NOTICE

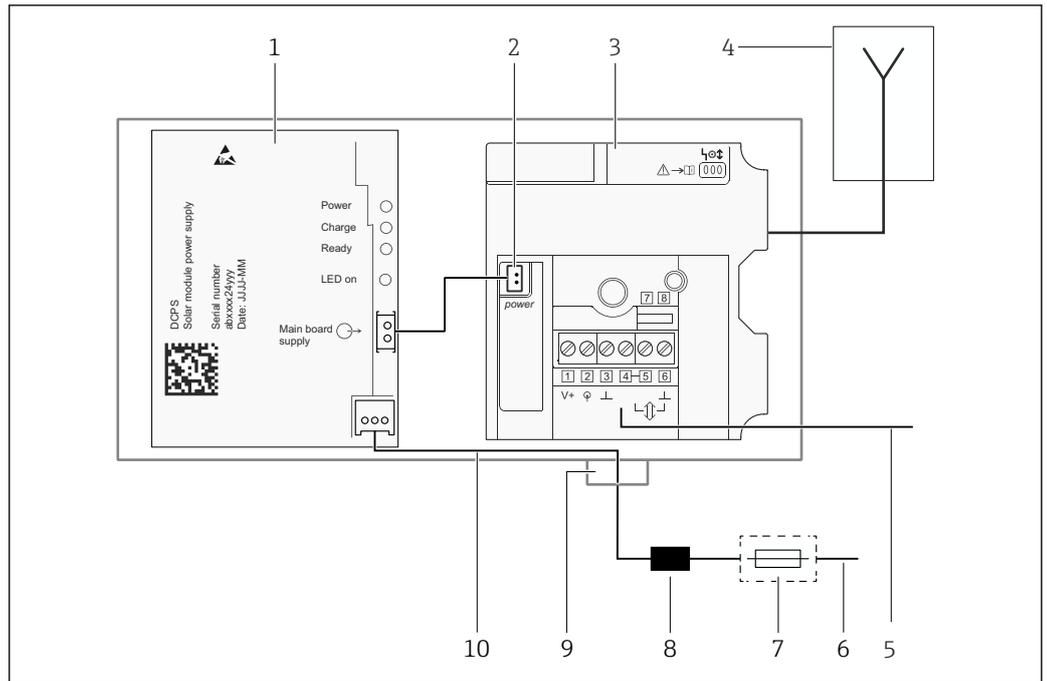
Interference emissions (EMC)

Possible device damage

- ▶ Feed the supply voltage cable through the ferrite sleeve supplied. Fasten the ferrite sleeve at a distance of 5 cm to 30 cm from the WirelessHART adapter.
- ▶ A mains filter must be connected upstream if Class B for EMC interference emissions must be met in the destination country during operation.

9.3 Overview of SWA70 connection with DC power unit

An M12 socket is included in the scope of delivery. Connect the cable for the supply voltage for the WirelessHART adapter to this M12 socket.



A0046405

28 Block circuit diagram for SWA70 with DC power unit

- 1 DC power unit
- 2 Internal DC supply voltage
- 3 Main circuit board for WirelessHART adapter
- 4 Antenna
- 5 Connection of field device, connection diagrams: → 48
- 6 Supply voltage for WirelessHART adapter
- 7 Suitable back-up fuse (provided by customer)
- 8 Ferrite sleeve, 5 to 30 cm distance to WirelessHART adapter
- 9 M12 socket for supply voltage connection
- 10 "Supply voltage" internal wiring

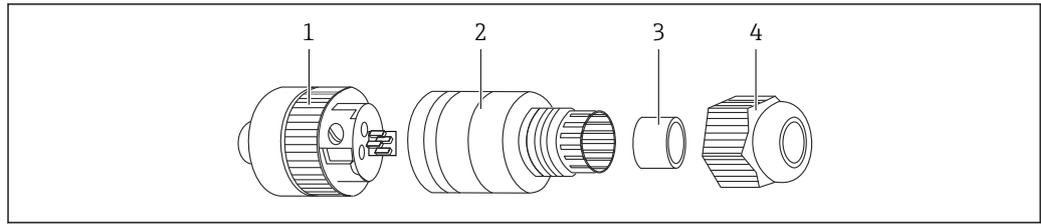
Permitted connection values: → 102

Due to the internal communication resistor, the supply voltage of the field device varies depending on the current and the set operating voltage ("Operating Voltage" parameter → 84).

9.4 Connecting the supply voltage on the SWA70 (M12 socket)

An M12 socket is included in the scope of delivery. Connect the cable for the supply voltage for the WirelessHART adapter to this M12 socket.

9.4.1 Mounting and wiring the M12 socket



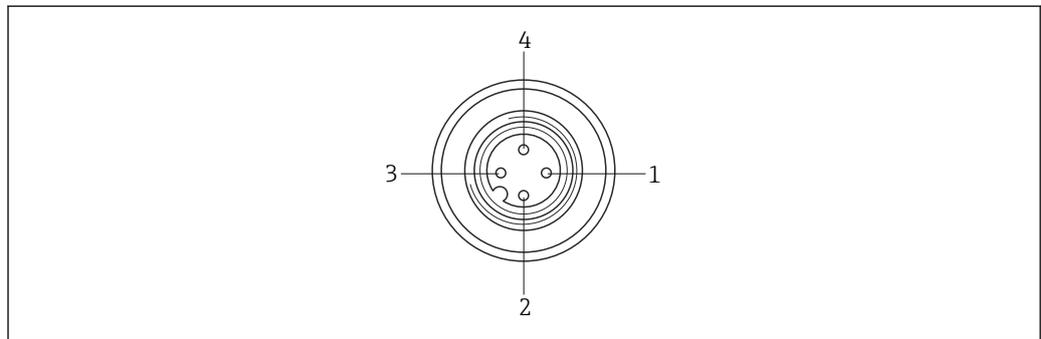
A0046276

29 M12 socket

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

1. Insert the seal into the coupling sleeve as shown in the diagram.
2. Feed the cable through the coupling nut and then through the coupling sleeve.
3. Connect the cable according to the PIN assignment.
4. Tighten the screws in the socket insert.
5. Screw the socket insert to the coupling sleeve. To do this, turn the knurled screw while holding the coupling sleeve firmly.
6. Tighten the coupling nut.

PIN assignment for M12 socket



A0046408

30 PIN assignment for M12 socket

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

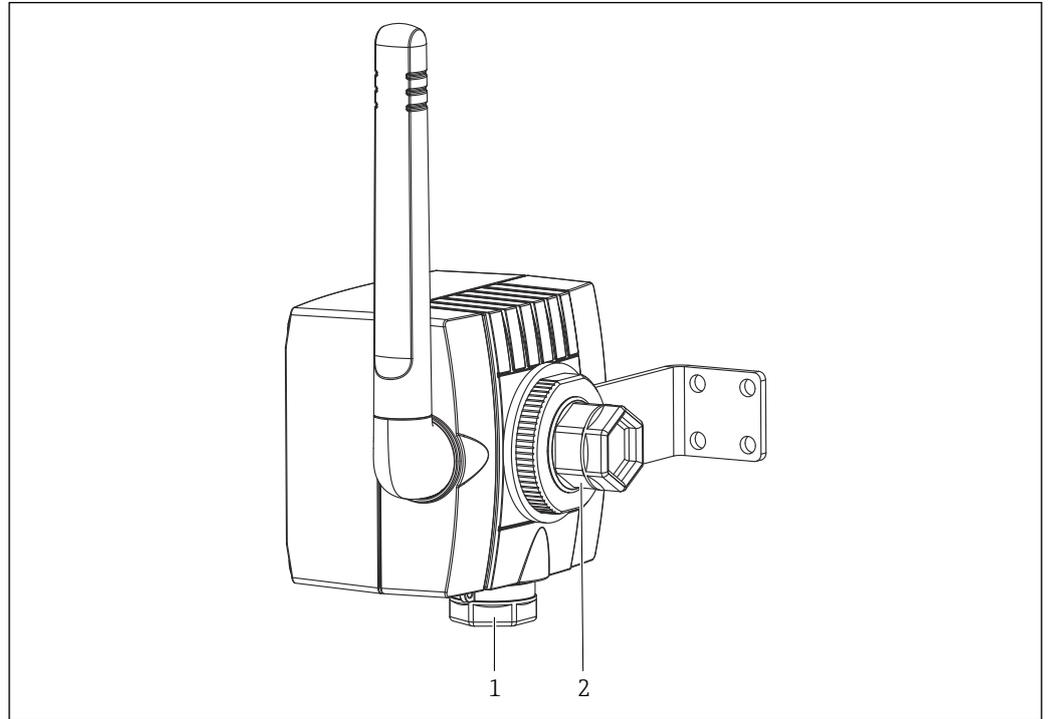
9.5 Connecting the field device to SWA70

9.5.1 Connecting the field device for direct mounting or remote mounting

i Connection of the field device to the WirelessHART adapter is independent of the mounting option. The field device is connected to the WirelessHART adapter via the rear cable entry of the WirelessHART adapter. The lower cable entry of the WirelessHART adapter is used to connect the WirelessHART adapter to the supply voltage.

Tools required:

- Torx T10 wrench for the housing screws
- Flat-blade screwdriver 2.5 mm for screws on the terminal block
- Wrench with AF 25 for cable entry



A0053108

 31 Using the cable entries on the SWA70 with the "DC power unit" version

1 Lower cable entry for supply voltage WirelessHART adapter

2 Rear cable entry for connecting the field device to the WirelessHART adapter

NOTICE**Moisture ingress can occur if the rear cable entry is used.**

Possible device damage

- ▶ Protect the WirelessHART adapter and cable from moisture.
- ▶ Prevent water entering the housing through the cable.

For direct mounting, connect the field device to the WirelessHART adapter using the supplied 2-wire cable. For remote mounting, connect the field device to the WirelessHART adapter using a customer cable.

1. Loosen the housing screws of the WirelessHART adapter and open the housing.
2. Feed the cable through the rear cable entry of the WirelessHART adapter into the housing.
3. Connect the field device to the WirelessHART adapter. Connection diagram:
→  48
4. Close the WirelessHART adapter housing and tighten the housing screws. Torque: 0.6 Nm
5. Connect the field device in accordance with the "Field device" documentation.

9.6 Connection diagrams for versions with DC power unit

The following options are available for electrically connecting a field device with the WirelessHART adapter with a DC power unit:

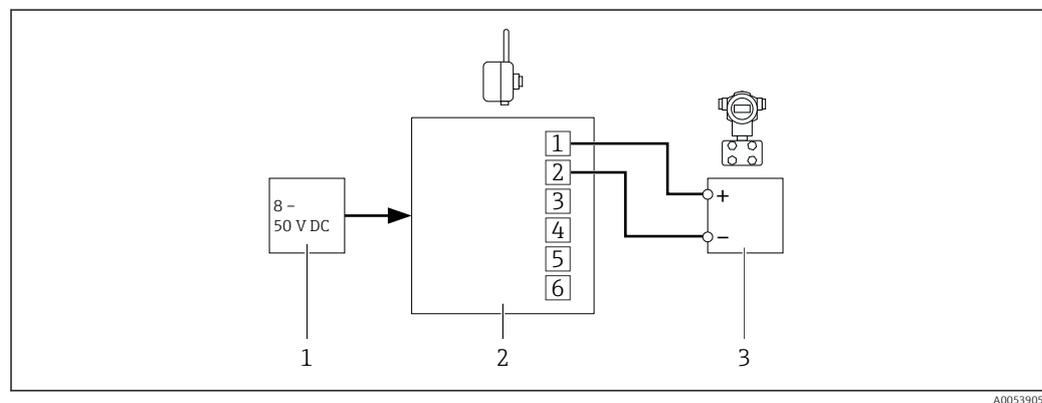
- 2-wire field device powered via the DC power unit of the SWA70
- 4-wire field device
- Field device in a closed-control loop with a communication resistor
- Field device in a closed-control loop without a communication resistor

9.6.1 2-wire field device powered via the DC power unit of the SWA70

The following functions are possible with this type of connection:

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

 You can remove the DC power unit from the housing to connect it to the supply voltage.



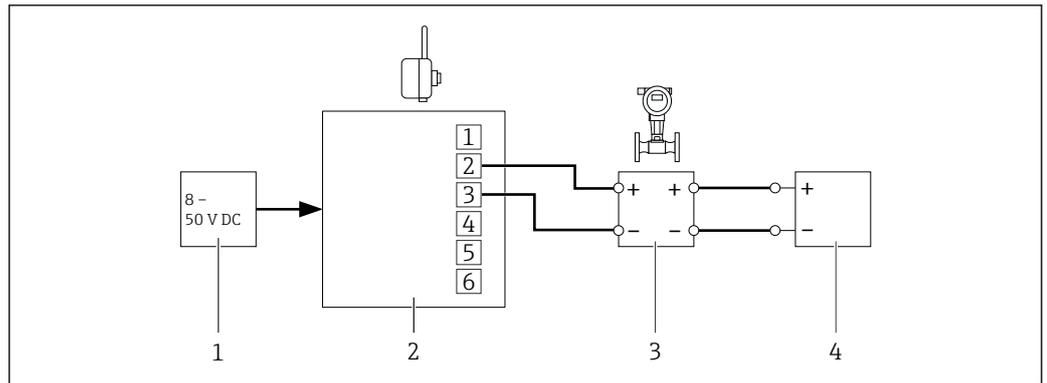
 32 SWA70 with DC power unit - Connection of a 2-wire field device powered by the DC power unit of the SWA70

- 1 External supply voltage for the WirelessHART adapter 8 to 50 V DC
- 2 WirelessHART adapter
- 3 2-wire field device (example)

9.6.2 4-wire field device

The following functions are possible with this type of connection:

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



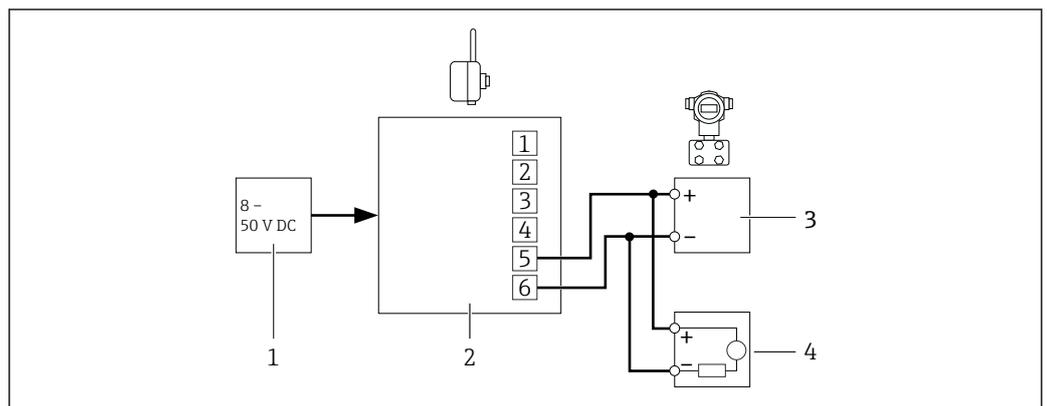
A0053906

33 SWA70 with DC power unit - connection of a 4-wire field device

- 1 External supply voltage for the WirelessHART adapter 8 to 50 V DC
- 2 WirelessHART adapter
- 3 4-wire field device with active current output (example)

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

The following function is possible with this type of connection:
Digital HART communication if supported by the field device



A0053907

34 SWA70 with DC power unit - connection of a field device in a closed-control loop without a communication resistor

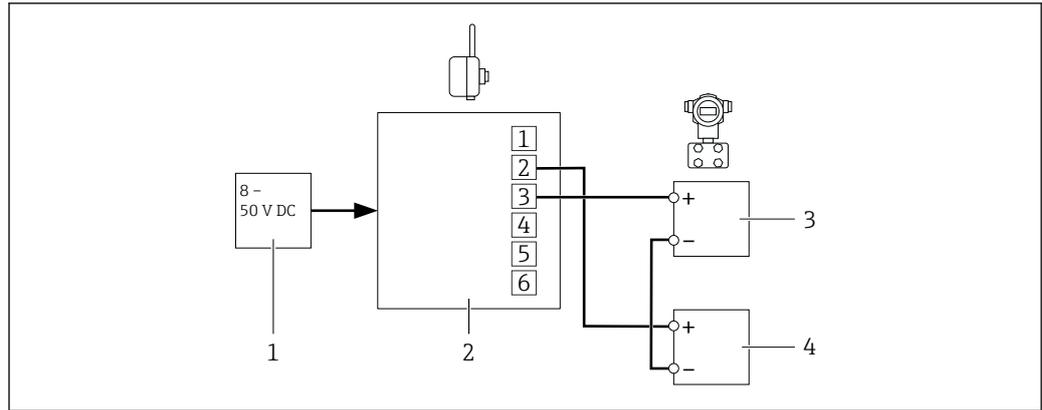
- 1 External supply voltage for the WirelessHART adapter 8 to 50 V DC
- 2 WirelessHART adapter
- 3 Field device (example)
- 4 PLC, remote I/O, or DC voltage power unit with communication resistor

i Using the **Wake-up Detection** parameter on the **Wired Communication** page, you can restrict the terminals via which the communication is "heard (read)". This restriction ensures that configuration mode is not executed unnecessarily thereby saving energy.

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

The following functions are possible with this type of connection:

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



A0053908

35 SWA70 with DC power unit – Connection of a field device in a closed-control loop without communication resistor

- 1 External supply voltage for the WirelessHART adapter 8 to 50 DC
- 2 WirelessHART adapter
- 4 Field device (example)
- 5 PLC, remote I/O, or DC voltage power unit without communication resistor

9.7 Post-connection check

Is the supply voltage for the WirelessHART adapter correctly protected? → 44	<input type="checkbox"/>
Is the supply voltage cable routed through the supplied ferrite sleeve? → 28, 45	<input type="checkbox"/>
WirelessHART adapter with metal housing: Is the WirelessHART adapter grounded correctly? → 23	<input type="checkbox"/>
Is the M12 socket properly fitted and wired? → 45	<input type="checkbox"/>
Is the M12 socket correctly screwed into the lower cable entry?	<input type="checkbox"/>
Has the wiring been performed according to the connection diagram?	<input type="checkbox"/>
Is the locking nut firmly tightened?	<input type="checkbox"/>
If directly mounted on the field device: Is the connection adapter firmly tightened?	<input type="checkbox"/>
Are all the housing screws tightened?	<input type="checkbox"/>

10 Operation options

10.1 Overview of operation options

You have the following operation options for the WirelessHART adapter SWA70:

- An Endress+Hauser Field Xpert SMTxx tablet PC
- The Endress+Hauser FieldCare SFE500 field device configuration tool

Additionally, some functions are available directly on the WirelessHART adapter via the main circuit board of the WirelessHART adapter and via the wide-range power unit and the DC power unit →  55.

10.2 Operation via Field Xpert

You have the following operation options with a Field Xpert SMTxx:

- Remote configuration via WirelessHART using a WirelessHART gateway, the DTM for the WirelessHART gateway and the DTM for the WirelessHART adapter SWA70.
- Local configuration using a modem and the DTM for the WirelessHART adapter SWA70

If a DTM is available for the HART field device, it is also possible to configure it via the Field Xpert SMT.

10.3 Operation via FieldCare

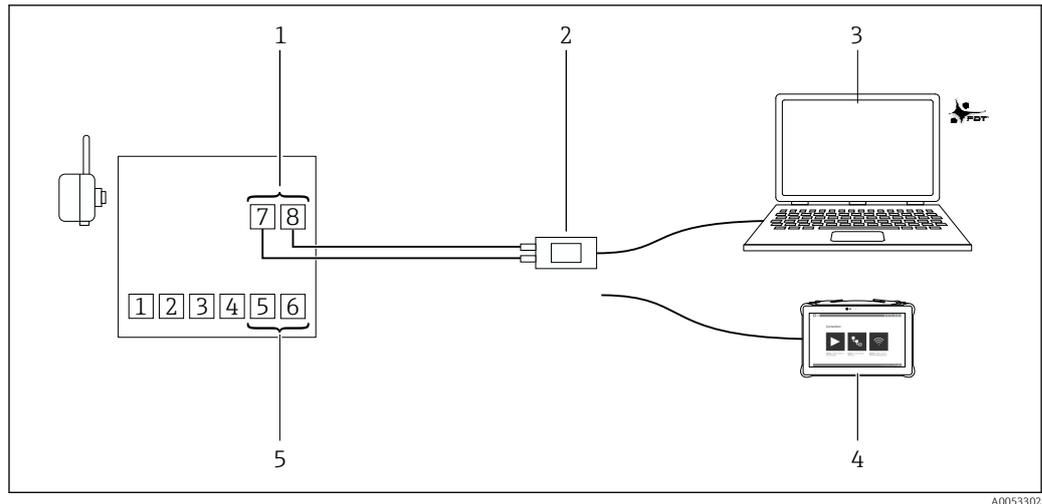
You have the following operation options with FieldCare SFE500:

- Remote configuration via WirelessHART using a WirelessHART gateway, the DTM for the WirelessHART gateway and the DTM for the WirelessHART adapter SWA70.
- Local configuration using a modem and the DTM for the WirelessHART adapter SWA70

If a DTM is available for the HART field device, it is also possible to configure it via FieldCare.

10.4 Local operation via Field Xpert or FieldCare

Local operation via Field Xpert or FieldCare takes place via a modem such as Commubox FXA195.



36 Connection example of a modem for local operation of the SWA70 via Field Xpert SMTxx or FieldCare SFE500

- 1 WirelessHart adapter lugs 7 and 8 for connecting the USB/HART modem
- 2 Endress+Hauser Commubox FXA195 USB/HART modem with activated communication resistor
- 3 PC with FieldCare SFE500
- 4 Tablet PC Field Xpert SMT
- 5 WirelessHART adapter terminals 5 and 6, alternative connection option for the USB/HART modem

If you connect the HART modem to lugs 7 and 8 or to terminals 5 and 6, you can configure the WirelessHART adapter via FieldCare or Field Xpert.

If you also want to configure the connected HART field device via FieldCare or Field Xpert using a HART modem, you must connect the HART modem either to terminals 1 and 2 or to terminals 2 and 3. Simultaneous communication with the WirelessHART adapter and the HART field device is only possible via these types of communication. → 102

Note that you must adapt the address range in the HART communication DTM to the address of the HART field device.

11 Commissioning

11.1 Commissioning the SWA70

Requirements

- Post-mounting check has been completed →  27
- Post-connection check has been completed
 - Battery pack: →  34
 - Wide-range power supply: →  42
 - DC power unit: →  50

1. Prepare the connected HART field device or connected HART field devices →  53.
2. Where necessary, prepare FieldCare for the WirelessHART adapter →  54.
3. Configure the WirelessHART adapter.

 4 to 20 mA field devices do not require preparation. You can configure scaling and linearization via the SWA70-DTM.

11.2 Preparing the connected HART field devices

To connect the HART field device to the WirelessHART adapter, you must configure the following parameters for the HART field device:

- **Device Tag**

Used to identify the measuring point.

- **Long Tag (as of HART version 6.0)**

Used to identify the field device in the network.

For older HART versions, use the **Message** parameter.

- **HART Address:**

- Types of connection: field device in a closed-control loop

If the HART field device is connected in a circuit with a PLC or a remote I/O, you must not change the address. In most cases, this address will be 0.

- Battery pack: 2-wire field device with supply voltage via the WirelessHART adapter

If you operate the HART field device in Multidrop mode with this type of communication, you will extend the battery life. The current signal is frozen at 4 mA in Multidrop mode. For Multidrop mode, you must set an address "> 0" for the HART field device. If the HART field device has the "Fixed Loop Current Mode" function, you must also activate this function.

- Wide-range power unit: 2-wire field devices in Multidrop mode

With this type of communication, you can connect up to four HART field devices to the WirelessHART adapter. The current signal is frozen at 4 mA in Multidrop mode. For Multidrop mode, you must set an address "> 0" for the HART field device. If several HART field devices are connected, you must assign each HART field device its own address "> 0" e.g. 1, 2, 3, 4.

 To set the above parameters, you can enable the configuration mode for the connected field device on the WirelessHART adapter. To do this, press the push button on the main circuit board of the WirelessHART adapter. Further information: →  55

11.3 Preparing FieldCare for configuring the SWA70

Requirements

The WirelessHART adapter is connected to the FieldCare.

- Remote configuration: Via WirelessHART using a WirelessHART gateway, the DTM for the WirelessHART gateway and the DTM for the WirelessHART adapter SWA70
- Local configuration using a modem and the DTM for the WirelessHART adapter SWA70:
→  51

1. Enable the "Prefer FDT1.2.1 scanning" option in FieldCare. Path: FieldCare > Extras > Options > "Scanning" tab > " section Scan Result
2. Integrate the WirelessHART adapter SWA70 into a FieldCare project in accordance with the Operating Instructions for FieldCare.
3. Configure the WirelessHART adapter SWA70.



For detailed information on operation with FieldCare , see BA00065S

12 Operation

12.1 Operation via the main circuit board

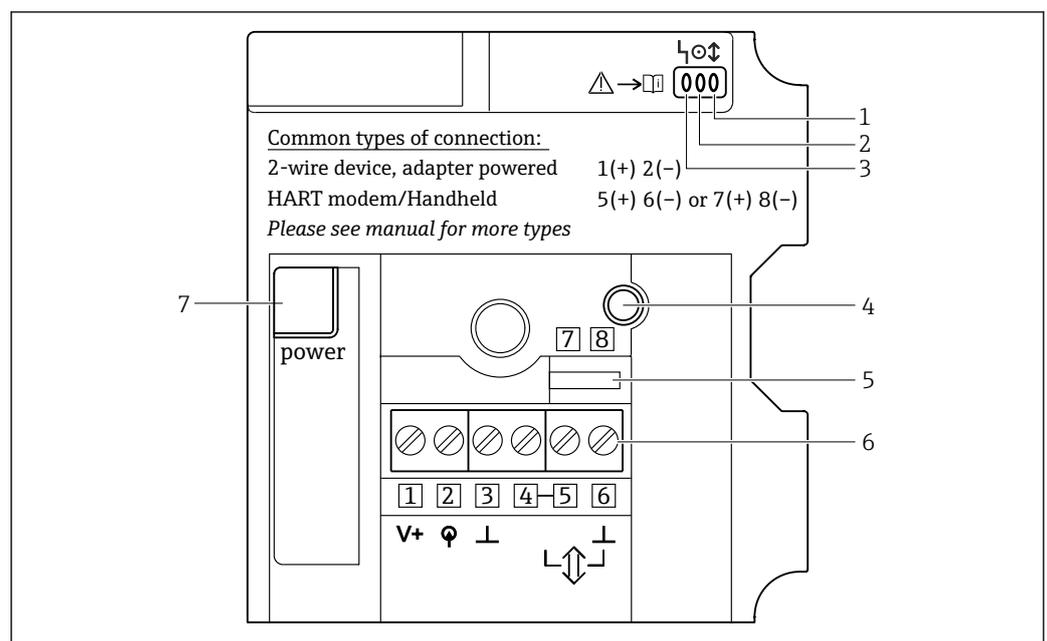
⚠ DANGER

Opening the WirelessHART adapter housing in hazardous areas
Explosion Hazard

- ▶ Follow the associated Safety Instructions (XA, etc.).

12.1.1 Overview of display and operating elements

The following display and operating elements are located on the main circuit board of the WirelessHART adapter:



37 Display and operating elements on the main circuit board

- 1 Yellow LED: communication status
- 2 Green LED: battery status
- 3 Red LED: active communication and fault
- 4 Push button
- 5 Lugs for HART modem
- 6 Terminals 1 to 6
- 7 Socket for connector plug of the power supply unit

12.1.2 Operation via push button

During operation when the power supply unit is connected

You can perform various functions by pressing the push button. The connector plug of the power supply unit must be plugged into the socket on the main circuit board.

Press duration	Function
≤0.2 s	No function assigned
> 0.2 to 5 s	Activate the status indicator of the LEDs → 56 The status indicator remains active while the connection to the network is being set up.

Press duration	Function
> 5 to 10 s	Activate connection to the network. Activate the connection via the push button. The yellow LED flashes 3 Hz as soon as the connection setup is activated. The yellow LED goes out either when the connection is set up or after a timeout.
> 10 to 15 s	Enable configuration mode for the connected field device. Use the push button to activate the configuration mode. The red LED flashes 3 Hz as soon as the configuration mode is enabled. The field device is supplied with power for a set time. During this time, you can configure the field device via the display, for example. A time of 300 seconds is set at the factory ("Configuration Time" parameter, "Field Power Device" page → 82). If there is no HART communication during the set time or if the push button is pressed again for between 10 and 15 seconds, the configuration mode for the connected field device is canceled. The red LED goes off.
>15 s	No function assigned

Resetting the configuration to base settings

1. On the main circuit board, remove the power supply unit plug connector.
2. Press and hold the push button.
3. Connect the power supply unit to the main circuit board.
4. Wait until the red LED flashes at 2.5 Hz.
5. Release the push button.

The configuration is reset to the factory setting.

Resetting configuration and firmware to base settings

1. On the main circuit board, remove the power supply unit plug connector.
2. Press and hold the push button.
3. Connect the power supply unit to the main circuit board.
4. Wait until the red LED flashes for the second time. The LED flashes at 2.5 Hz the first time and at 1.25 Hz the second time.
5. Release the push button.

The firmware and configuration are reset to the factory setting.

12.1.3 Feedback via LEDs

If you press the push button briefly, the three LEDs display the current status.

Yellow LED: communication status

Yellow LED	Communication status
Lit	The WirelessHART adapter is connected to a WirelessHART network. An alternative communication path is available.
Flashes at 1 Hz	The WirelessHART adapter is connected to a WirelessHART network. An alternative communication path is not available.
Flashes at 3 Hz	Connection setup The connection is being established, e.g. for 40 minutes after connecting the battery pack. You can configure the length of time using the "Configuration Time" parameter on the "Field Device Power" page → 82.
Off	The WirelessHART adapter is not connected to any WirelessHART network.

Green LED: battery status

Green LED	Battery status
Lit	Normal The service life of the battery pack is at least one month.
Flashes at 1 Hz	Warning The service life of the battery pack is less than one month.
Flashes at 3 Hz	Alarm The WirelessHART adapter can still be operated. It is no longer possible to supply the field device with power. This means that a connection to the field device and its measurement can no longer be guaranteed.
Off	The battery pack is empty or not connected.

Red LED: active communication, error message

Red LED	Status
Flashes: 50 ms on, 950 ms off	Communication mode active Communication with the WirelessHART adapter is possible.
Lit	Internal error Error cannot be rectified by the user.
Flashes at 1 Hz	External error Error can be rectified by the user. You can view external errors in the diagnostics function of the DTM or the EDD. e.g. <ul style="list-style-type: none"> ▪ Temperature is outside the specified range ▪ Measured value is outside the configured range 4 to 20 mA
Flashes at 3 Hz	Short-circuit Short-circuit at terminals 1 and 2
Off	No error

12.2 Operation of wide-range power unit and DC power unit

DANGER

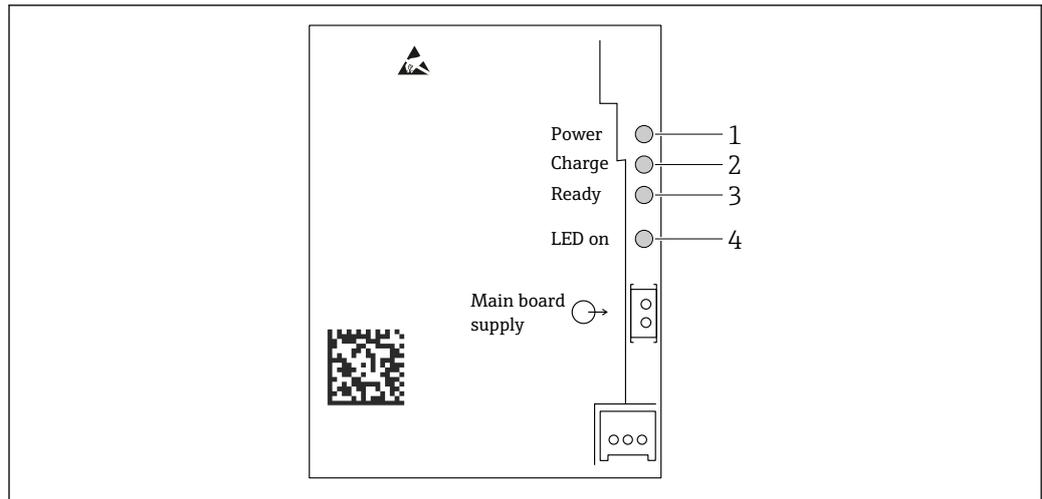
Opening the WirelessHART adapter housing in hazardous areas

Explosion Hazard

- ▶ Follow the associated Safety Instructions (XA, etc.).

12.2.1 Overview of display and operating elements

The following display and operating elements are located on the wide-range power unit and DC power unit:



A0053301

38 Display and operating elements on the wide-range unit and DC power unit

- 1 Green LED: Power
- 2 Yellow LED: Charge
- 3 Green LED: Ready
- 4 Push button "LED on"

12.2.2 Push button and LEDs

If you press the "LED on" push button, the corresponding LEDs light up depending on the current output voltage which is currently available.

The LEDs indicate the level of output voltage that is available for the field device, for example. The level of the output voltage changes after the device is switched on or after the supply voltage returns.

Green LED Ready	Yellow LED Charge	Green LED Power	Description
On	Off	On	Normal operating mode
Off	Off	Off	No external supply voltage available
On	On	Off	Buffer has been partially charged
On	On	On	70% of the buffer capacity has been charged. The LED Charge is switched off once the buffer reaches 100% again.

13 DTM description for SWA70

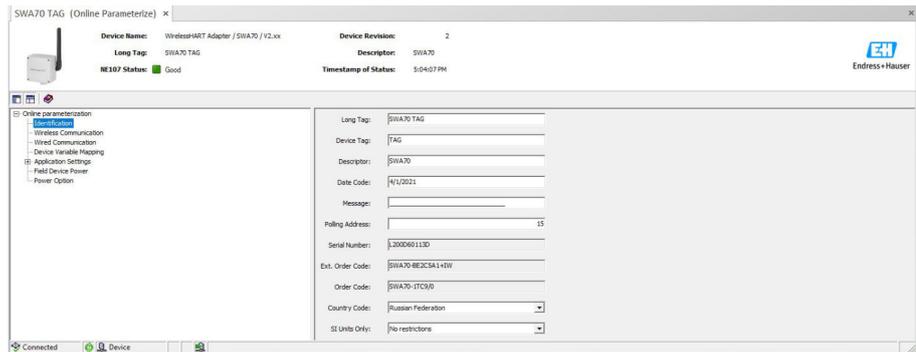
13.1 Identification

Use this page to configure the parameters necessary to identify the WirelessHART adapter SWA70.

The factory settings are displayed in the relevant fields.

Navigation

Online parameterization > Identification



"Identification" parameter description page

Parameter	Description
Long Tag	<p>Requirement Devices from HART version 6.0</p> <p>Description Enter a tag for the SWA70. This parameter is used for unique identification of the SWA70 in the network and in the plant. The parameter is used to set the burst mode and the event notification.</p> <p>User entry Max. 32 characters from the ISO Latin 1 character set</p> <p>Factory setting –</p> <p> The tag must be unique in the WirelessHART network.</p>
Device Tag	<p>Description Enter a tag for the SWA70.</p> <p>User entry Max. 8 characters from the packed ASCII character set</p> <p>Factory setting –</p>
Descriptor	<p>Description Enter the description for the SWA70, e.g. function or location.</p> <p>User entry Max. 16 characters from the packed ASCII character set</p> <p>Factory setting –</p>
Date Code	<p>Description Enter the date of a specific event, such as the last change.</p> <p>User entry DD.MM.YYYY</p>

Parameter	Description
Message	<p>Description Enter the message that can be used as desired.</p> <p>User entry Max. 32 characters from the packed ASCII character set</p> <p>Factory setting -</p>
Polling Address	<p>Description Enter the HART address of the SWA70 on the wired interface.</p> <p>User entry 0 to 63</p> <p>Factory setting 15</p> <p>Additional information Since the "Long Tag" parameter and the MAC address are used to identify the SWA70 in the wireless network, you can assign the same device address to different SWA70 devices.</p>
Serial Number	<p>Description Shows the serial number of the SWA70.</p>
Ext. Order Code	<p>Description Shows the detailed order number of the SWA70.</p>
Order Code	<p>Description Shows the order code of the SWA70.</p>
Country Code	<p>Description Select the country where the SWA70 is operated.</p> <p>Factory setting Germany</p> <p>Additional information</p> <ul style="list-style-type: none"> ▪ The selected country controls the signal strength in accordance with national restrictions and thus the possible settings for the "Radio Power" parameter. ▪ The country code determines the setting of the SI unit. The "SI Units Only" parameter is set in accordance with national restrictions.
SI Units Only	<p>Description Select the system of units for all the unit parameters of the SWA70.</p> <p>Options</p> <ul style="list-style-type: none"> ▪ Unit codes limited to the SI Units only: Parameters are displayed in SI units (metric). ▪ No restrictions: Parameters are displayed in SI units and US units (metric/imperial). <p>Factory setting No restrictions</p>

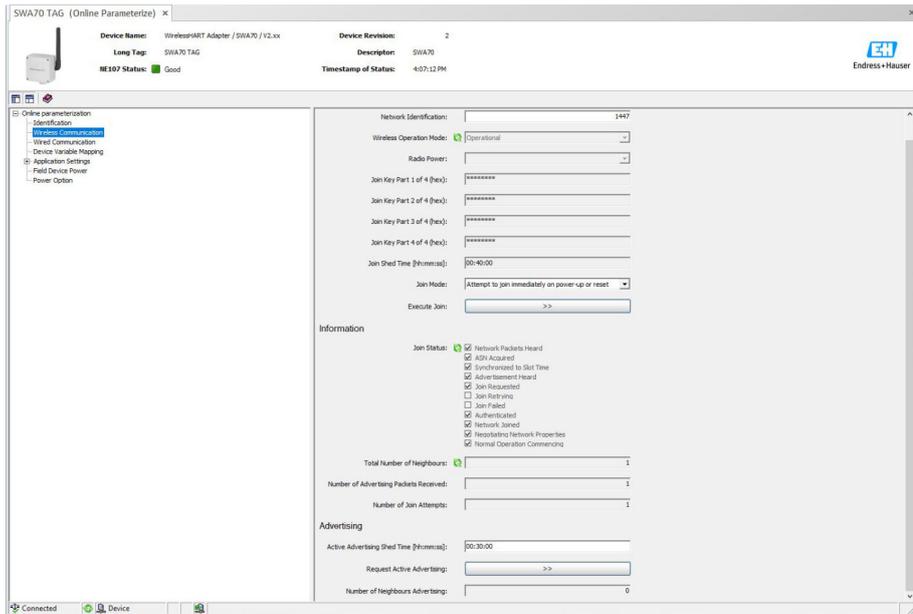
 You can use the following characters for parameters for which you should enter characters from the packed ASCII character set: @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\] ^ _ SP ! " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 7 8 9 ; : < = > ?

13.2 Wireless Communication

Use this page to configure parameters necessary to integrate the WirelessHART adapter SWA70 into a wireless network.

Navigation

Online parameterization > Wireless Communication



Configure wireless communication and establish connection

1. Configure parameters in the **Join** section.
2. Click on the >> button for the **Execute Join** parameter.
 - ↳ The settings are downloaded and stored in the SWA70.

 Use the "Join Status" parameter to follow the progress of the connection.

"Wireless Communication" parameter description page

Parameter	Description
Network Identification	<p>Description Enter the identification number of the network to which the SWA70 should connect.</p> <p>User entry 0 to 65535</p> <p>Factory setting 1447</p>
Wireless Operation Mode	<p>Description Shows the status while the connection is being established or of the existing connection of the SWA70 to the network.</p> <p>Possible notifications</p> <ul style="list-style-type: none"> ▪ Idle: Waiting ▪ Active Search: Active search for neighbor ▪ Negotiating: Connection parameters are being negotiated with network manager ▪ Quarantined: Denied by network manager and temporary exclusion from network ▪ Operational: Connection established ▪ Suspended: Permanent exclusion ▪ Deep Sleep/Ultra-Low Power/Passive Search: SWA70 is inactive
Radio Power	<p>Description Select strength of radio signal.</p> <p>Options</p> <ul style="list-style-type: none"> ▪ 0 dBm ▪ 10 dBm <p>Factory setting 10 dBm</p>

Parameter	Description
Join Key Part 1 of 4	<p>Description Enter join key part 1 of 4.</p> <p>User entry 8 hexadecimal numbers</p> <p>Factory setting 456E6472</p>
Join Key Part 2 of 4	<p>Description Enter join key part 2 of 4.</p> <p>User entry 8 hexadecimal numbers</p> <p>Factory setting 65737320</p>
Join Key Part 3 of 4	<p>Description Enter join key part 3 of 4.</p> <p>User entry 8 hexadecimal numbers</p> <p>Factory setting 2B204861</p>
Join Key Part 4 of 4	<p>Description Enter join key part 4 of 4.</p> <p>User entry 8 hexadecimal numbers</p> <p>Factory setting 75736572</p>
Join Shed Time [hh:mm:ss]	<p>Description Enter the time for an active connection attempt. The time starts after you enter the values for the "Join Key" parameter and "Network Identification" correctly. After the active time has elapsed, the SWA70 attempts to connect to the network. This additional connection attempt is made at a lower rate of intensity.</p> <p>User entry HH:MM:SS</p> <p>Factory setting 00:40:00</p>
Join Mode	<p>Description Select the event upon which the SWA70 connects to the network.</p> <p>Options</p> <ul style="list-style-type: none"> ▪ Do not attempt to join: Do not establish a connection. ▪ Join now: A connection is established once you click on the >> button for the "Execute Join" parameter. ▪ Attempt to join immediately on power-up or reset: Establish connection directly after a restart. <p>Factory setting Do not attempt to join</p>
Execute Join	<p>Description Click button to write the set parameters to the SWA70 and to use them.</p> <p>Additional information If the "Join now" option is selected for the "Join Mode" parameter, the SWA70 attempts to connect to the network.</p>

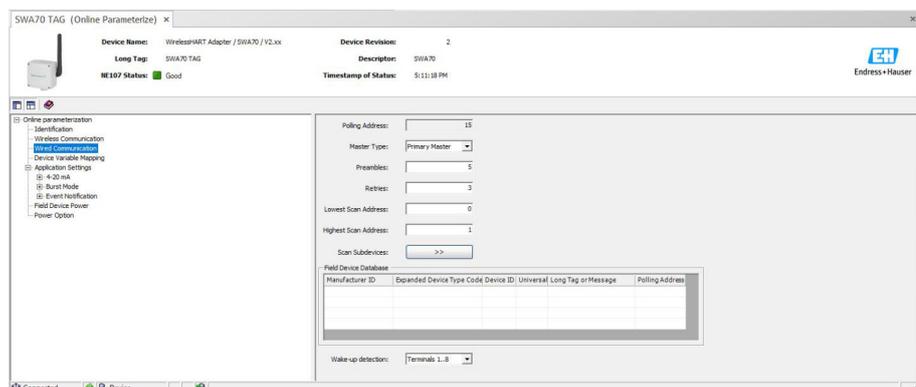
Parameter	Description
Join Status	<p>Description Displays the current status while attempting to join.</p> <p>Possible notifications</p> <ul style="list-style-type: none"> ■ Network packets heard: Network packets received ■ ASN Acquired: ASN acquired ■ Synchronized to slot time: Time synchronized with the network ■ Advertisement heard: Advertising packet for sending received. ■ Join requested: Join requested ■ Retrying join: Repeating attempt to join ■ Join failed: Join failed ■ Authenticated: Authenticated ■ Network joined: Network connection established ■ Negotiating network properties: Negotiating network parameters ■ Normal operation commencing: Normal operation starts. Fully connected.
Total Number of Neighbours	<p>Description Shows the number of neighboring WirelessHart devices to which a connection has been established.</p>
Number of Advertising Packets Received	<p>Description Shows the number of advertising packets to join the network sent by neighboring devices or WirelessHART gateways and received by the SWA70.</p>
Number of Join Attempts	<p>Description Shows the number of connection attempts that the SWA70 made until the connection was established.</p>
Active Advertising Shed Time [hh:mm:ss]	<p>Description Enter the time for an active join request. During this time, the SWA70 attempts to enable other SWA70 devices to connect to the network faster. To enable this parameter, click the >> button for the "Request Active Advertising" parameter.</p> <p>User entry HH:MM:SS</p> <p>Factory setting 00:40:00</p>
Request Active Advertising	<p>Description Clicking the >> button enables the "Active Advertising Shed Time [hh:mm:ss]" parameter.</p>
Number of Neighbours Advertising	<p>Description Shows the number of neighbors transmitting advertising packets for sending.</p>

13.3 Wired Communication

Use this page to configure the parameters required for HART communication between the WirelessHART adapter SWA50 and the connected HART field devices.

Navigation

Online parameterization > Wired Communication



"Wired communication" parameter description page

Parameter	Description
Polling Address	<p>Description Shows the HART address of the SWA70.</p> <p>Factory setting 15</p>
Master Type	<p>Description Select the HART master type for the SWA70.</p> <p>Options</p> <ul style="list-style-type: none"> ■ Primary master ■ Secondary master <p>Factory setting Secondary master</p> <p> In addition to the SWA70, only one other HART master is permitted in the HART loop. This other HART master and the SWA70 may not be of the same master type.</p>
Preambles	<p>Description Enter the number of preambles.</p> <p>User entry 5 to 50</p> <p>Factory setting 5</p>
Retries	<p>Description Enter the number of attempts to establish communication between the SWA70 and the HART field device.</p> <p>User entry 2 to 5</p> <p>Factory setting 3</p>
Lowest Scan Address	<p>Description Enter the lowest HART address. The SWA70 uses this HART address to start scanning for connected HART field devices.</p> <p>User entry 0 to 63, but smaller than the value for the "Highest Scan Address" parameter</p> <p>Factory setting 0</p>
Highest Scan Address	<p>Description Enter the highest HART address. The SWA70 scans for connected HART field devices up to this HART address.</p> <p>User entry 0 to 63, but greater than the value for the "Lowest Scan Address" parameter</p> <p>Factory setting 1</p> <p>Additional information</p> <ul style="list-style-type: none"> ■ A HART field device that provides a 4 to 20 mA output in a closed-control loop has the address 0. ■ A single HART field device that is powered by the SWA70 usually has the address 1. This ensures that the field device operates in Multidrop mode. The current signal of each subscriber is frozen at 4 mA. ■ Specify the highest address if multiple field devices are connected in Multidrop mode. You can connect up to 4 field devices in Multidrop mode.

Parameter	Description
Scan Subdevices	<p>Description If you click on the >> button for the "Scan Subdevices" parameter, the system searches for HART field devices that are connected to the SWA70. The HART field devices found are displayed in the DTM of the SWA70.</p> <p>Additional information</p> <ul style="list-style-type: none"> ▪ If the assignment to the SWA70 connection terminals is changed during operation, for example by connecting another field device, scanning must restart. ▪ Note that scanning takes place automatically as soon as power is supplied to SWA70. The table is filled automatically.
Field Device Database	<p>Description Shows the HART information of the HART field device that is connected to the SWA70.</p>
Wake-up-Detection	<p>Requirement This parameter only applies for the "Field device in a closed-control loop" type of connection.</p> <p>Description Specify the terminals via which communication is "monitored (read)". This restriction ensures that configuration mode is not executed unnecessarily thereby saving energy.</p> <p>Options</p> <ul style="list-style-type: none"> ▪ Terminals 1 to 4 ▪ Terminals 5 to 8 ▪ Terminals 1 to 8 <p>Factory setting Terminals 1 to 8</p>

13.4 Device Variable Mapping

The WirelessHART adapter SWA70 can output the value and status of different variables. Use this page to configure the three variables SV, TV and QV that are displayed in the network. The primary variable PV is permanently linked to the loop current of the field device (Field Device Loop Current).

You can adapt the scaling and the unit for the primary variable using the 4-20 mA page.

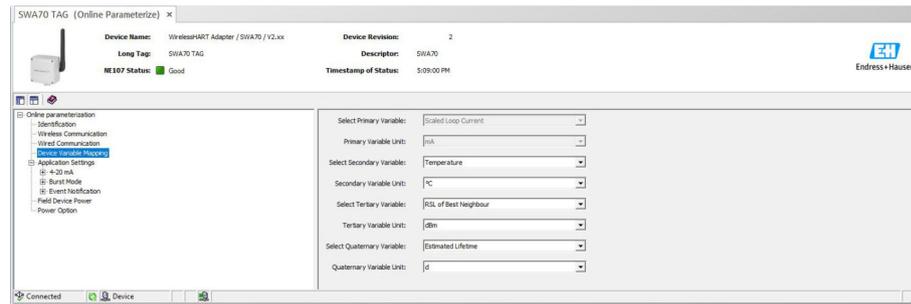
Variables for selection

Option	Description
Field Device Loop Current	Loop current of field device
Battery Voltage ¹⁾	Current battery voltage
Battery Voltage With Load ¹⁾	Battery voltage with load
Battery Voltage Without Load During Battery Test ¹⁾	Battery voltage without load during battery test
Consumed Energy ¹⁾	Energy taken from the battery
Estimated Lifetime ¹⁾	Estimated battery lifetime in days
Normalized Consumed Energy ¹⁾	Energy taken from the battery since the last battery replacement under standard conditions
RSL of Best Neighbour	Signal strength of neighbor with highest signal strength
RSL of Second Best Neighbour	Signal strength of neighbor with second-highest signal strength
Temperature	Current temperature measured by the WirelessHart adapter
Temperature Min	Lowest temperature measured by the SWA70 since the last reset.
Temperature Max	Highest temperature measured by the SWA70 since the last reset.

1) Only suitable for SWA70 with battery unit

Navigation

Online parameterization > Device Variable Mapping



"Device Variable Mapping" parameter description page

Parameter	Description
Select Primary Variable	<p>Description The primary variable is permanently linked to the loop current of the field device (Field Device Loop Current).</p>
Primary Variable Unit	<p>Description The unit for the primary variable is permanently linked to the "mA" unit.</p>
Select Secondary Variable	<p>Description Select the secondary variable.</p> <p>Options See the "Variables for selection" table.</p> <p>Factory setting Temperature</p>
Secondary Variable Unit	<p>Description Select the unit for the secondary variable.</p> <p>Options The options depend on the variable selected.</p> <p>Factory setting °C</p>
Select Tertiary Variable	<p>Description Select the tertiary variable.</p> <p>Options See the "Variables for selection" table.</p> <p>Factory setting RSL of Best Neighbour</p>
Tertiary Variable Unit	<p>Description Select the unit for the tertiary variable.</p> <p>Options The options depend on the variable selected.</p> <p>Factory setting dBm</p>
Select Quaternary Variable	<p>Description Select the quaternary variable.</p> <p>Options See the "Variables for selection" table.</p> <p>Factory setting Estimated Lifetime</p>
Quaternary Variable Unit	<p>Description Select the unit for the quaternary variable.</p> <p>Options The options depend on the variable selected.</p> <p>Factory setting d (Days)</p>

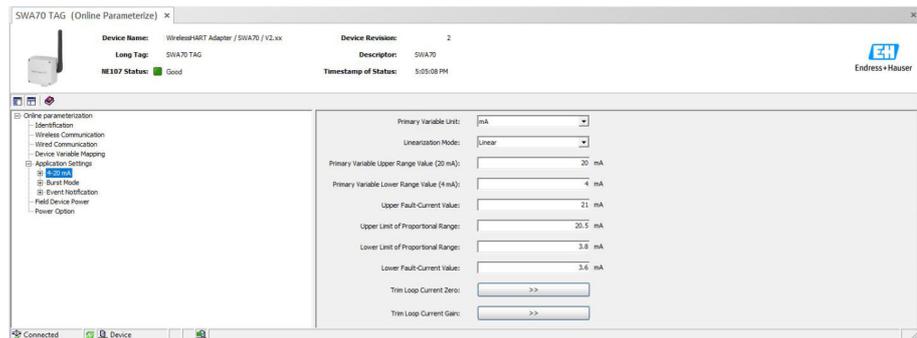
13.5 4-20 mA

If a HART field device is connected to the WirelessHART adapter SWA70, all parameters are read via the HART signal.

However, you can also connect a 4 to 20 mA field device to the WirelessHART adapter. In this case, the SWA70 measures the loop current and transmits it digitally. You can use the DTM for the SWA70 to adjust the 4 to 20 mA signal and perform linearization if necessary. Additionally, you can enter full scale values for the proportional value range as well as limit values for warnings and alarms. If the entered limit values are exceeded or not reached, the SWA70 will send a warning or alarm signal and, if necessary, an event notification → 76.

Navigation

Online parameterization > Application settings > 4-20 mA



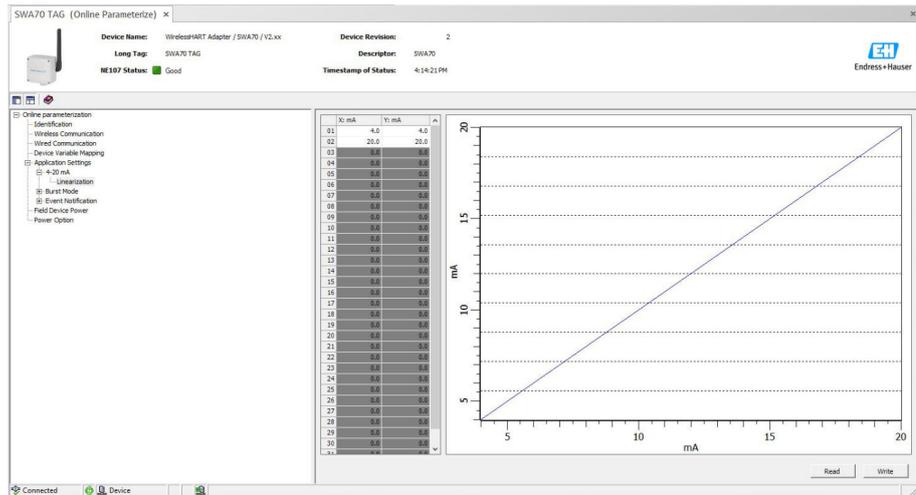
"4-20 mA" parameter description page

Parameter	Description
Primary Variable Unit	<p>Requirement</p> <p>Description Select the unit for the linearized value. The linearized value is calculated using the measured loop current. The loop current is assigned to the first variable (PV).</p> <p>Factory setting mA</p>
Linearization Mode	<p>Description Select the linearization mode for the loop current.</p> <p>Options</p> <ul style="list-style-type: none"> ■ Linear: Proportional scaling over the set range ■ Special Curve: Scaling according to the "Linearization" table <p>Factory setting Linear</p>
Primary Variable Upper Range Value (20 mA)	<p>Description Enter full scale value. This entered value is assigned to the loop current value of 20 mA.</p> <p>Factory setting 20 mA</p>
Primary Variable Lower Range Value (4 mA)	<p>Description Enter lower range value. This entered value is assigned to the loop current value of 4 mA.</p> <p>Factory setting 4 mA</p>

Parameter	Description
Upper Fault-Current Value	<p>Description Enter the value for the upper alarm limit. If the loop current exceeds the value entered, an alarm is reported. For a message to be issued, the corresponding check box must be activated on the page "Event notification", tab "Device-Specific Event Mask" (byte 3, bit 0 to 3) →  76.</p> <p>Factory setting 22 mA</p>
Upper Limit of Proportional Range	<p>Description Enter the value for the upper warning limit. If the loop current exceeds the value entered, a warning is issued. For a message to be issued, the corresponding check box must be activated on the page "Event notification", tab "Device-Specific Event Mask" (byte 3, bit 0 to 3) →  76.</p> <p>Factory setting 20.5 mA</p>
Lower Limit of Proportional Range	<p>Description Enter the value for the lower warning limit. If the loop current drops below the value entered, a warning is reported. For a message to be issued, the corresponding check box must be activated on the page "Event notification", tab "Device-Specific Event Mask" (byte 3, bit 0 to 3) →  76.</p> <p>Factory setting 3.8 mA</p>
Lower Fault-Current Value	<p>Description Enter the value for the lower alarm limit. If loop current is below the entered value, an alarm is reported. For a message to be issued, the corresponding check box must be activated on the page "Event notification", tab "Device-Specific Event Mask" (byte 3, bit 0 to 3) →  76.</p> <p>Factory setting 3.6 mA</p>
Trim Loop Current Zero	<p>Description The loop current must be 4 mA for equalization. The 4 mA is either simulated in the connected field device or specified in another way. If you click the >> button, the current loop current value is adopted as 4 mA.</p> <p> The HART modem must be connected to terminals 1 and 2.</p>
Trim Loop Current Gain	<p>Description The loop current must be 20 mA for equalization. The 20 mA is either simulated in the connected field device or specified in another way. If you click the >> button, the current loop current value is adopted as 20 mA.</p> <p> The HART modem must be connected to terminals 1 and 2.</p>

13.5.1 Linearization

If, for the **Linearization Mode** parameter, you have selected the **Special Curve** option, you must make further settings on the **Linearization** page.



You must adhere to the following points:

- You must enter at least 2 value pairs.
- You can enter a maximum of 32 value pairs.
- The X values must increase strictly monotonically.
- The Y-values must either increase or decrease strictly monotonically.
- The full scale values of the value range must correspond to those on the page **4-20 mA**. X1 must be identical to the value entered for the "Primary Variable Lower Range Value(4 mA)" parameter. The highest X-value must be identical to the "Primary Variable Upper Range Value(20 mA)" parameter.

Notes

- Fields marked in red indicate errors.
- The graph shows the linearization curve.

"Linearization" parameter description page

Parameter	Description
X1 to X32	Enter input values in mA.
Y1 to Y32	Enter output values in the selected unit for the Primary Variable Unit parameter.
Read	When you click the Read button, the values are read from the SWA70 and transferred to the linearization table.
Write	When you click the Write button, the Linearization table values are written to the SWA70.

13.6 Burst Mode

General information

In burst mode, slave devices can periodically send information such as process values without a request from the master.

The WirelessHART adapter SWA70 is responsible for requesting this information from the connected HART field devices and sending it to the WirelessHART gateway. In addition, the SWA70 can send its own process value, i.e. the device variables, to the WirelessHART gateway.

In a typical configuration, the four device variables are transmitted from the connected HART field devices to the WirelessHART gateway at regular intervals. You can use burst command numbers 3 and 48 for this purpose. We recommend that you set the same interval for both commands. The SWA70 wakes the HART field devices, adopts the device variables and transmits them at the configured interval.

You can connect up to 4 HART field devices to one SWA70. You can configure burst commands for these 4 HART field devices.

We recommend configuring a second burst mode for the SWA70 so that the SWA70 information is also available for host applications in the WirelessHARTgateway.

You can configure the device variables on the "Device Variable Mapping" page →  65.

-  ■ If FieldCare or another configuration tool communicates with the SWA70 via a modem such as the FXA 195, the sending of burst modes is interrupted.
- Some HART field devices are also able to send burst modes. In this case, we recommend enabling the burst mode in the SWA70 only. The burst settings of the SWA70 are not synchronized with the burst settings of the HART field device.

"Burst Mode" page and "Burst Mode 1" to "Burst Mode 10" pages

The "Burst Mode" page provides an overview of the burst modes that are configured. You can define up to 10 different burst modes via the "Burst Mode 1" to "Burst Mode 10" pages.

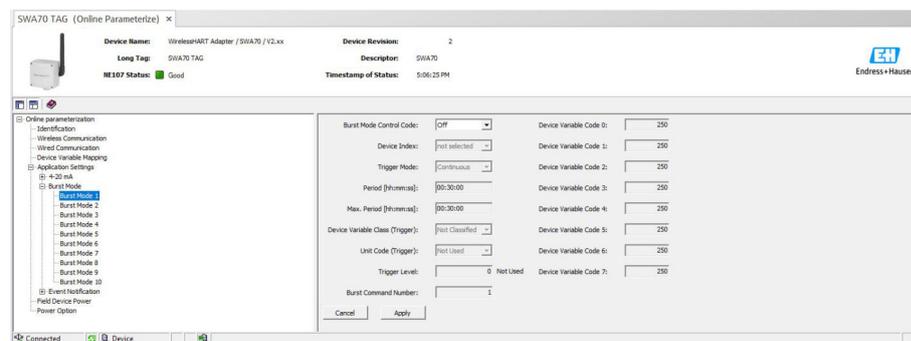
You can also configure the burst modes in offline mode. This burst mode becomes effective as soon as the SWA70 connects to the network.

Navigation

- Online parameterization > Application Settings > Burst Mode > Burst Mode 1
- Online parameterization > Application Settings > Burst Mode > Burst Mode 2
- Online parameterization > Application Settings > Burst Mode > Burst Mode ...

Burst modes for the WirelessHART adapter SWA70 – Factory setting

Burst Mode	Factory setting
1 to 8	No factory configuration
9	Every 5 minutes, the SWA70 transmits its own process values in accordance with HART command 3
10	Every 5 minutes, the SWA70 transmits its own diagnostic data according to HART command 48



Configuring the burst mode

1. Open the page for configuring a burst mode, e.g. **Burst Mode 1** page.
2. Select the **On** option for the **Burst Mode Control Code** parameter.
 - ↳ The gray input fields become white. Entries can be made.
3. For the **Device Index** parameter, select either "SWA70" or a connected HART field device. If the field device is not listed, go to the "Wired Communication" page and click the "Scan Subdevices" button there.
4. For the **Trigger Mode** parameter, select the mode.
 - ↳ Depending on the selection, other entry fields will turn white.

5. If you have selected the "Continuous" or "On Change" option for the "Trigger Mode" parameter, configure the "Period" parameter. If you have selected the "Window", "Rising" or "Falling" option for the "Trigger Mode" parameter, configure the "Period", "Max. Period", "Device Variable Class", "Unit Code" and "Trigger Level" parameters. For more information, see the following table.
6. Select the number for the burst command in the **Burst Command Number** parameter.
7. Click the **Apply** button.
 - ↳ The settings are downloaded and stored in the SWA70.
8. Confirm prompt with **OK**.
 - ↳ Once the SWA70 is connected to the network, the burst mode takes immediate effect.
If the SWA70 is not connected to the network, a message is displayed. Select **OK** to confirm the message. The burst mode becomes effective as soon as the SWA70 connects to the network.

"Burst Mode X" parameter description page

Parameter	Description
Burst Mode Control Code	<p>Description Enabling and disabling burst mode.</p> <p>Options</p> <ul style="list-style-type: none"> ▪ Off: Burst mode disabled. The input fields are grayed out and write-protected. ▪ On: Burst mode enabled. The input fields are white. Entries can be made. <p>Factory setting</p> <ul style="list-style-type: none"> ▪ Burst mode 9 and 10: On ▪ Burst mode 1 to 8: Off
Device Index	<p>Requirement Burst Mode Control Code: On</p> <p>Description Select the device for which the burst mode is effective.</p> <p>Options</p> <ul style="list-style-type: none"> ▪ SWA70 ▪ Connected field device (Long Tag or) Message ▪ Not selected <p>Factory setting SWA70</p> <p>Additional information The "Long Tag" parameter is used for field devices from version HART 6. For field devices with the version HART 5, the Message parameter is used, since HART 5 does not support the "Long Tag" parameter.</p>

Parameter	Description
Trigger Mode	<p>Requirement Burst Mode Control Code: On</p> <p>Description Select the event that triggers a burst mode.</p> <p> The "Window" option only works with burst commands 9 and 33.</p> <p>Options</p> <ul style="list-style-type: none"> ▪ Continuous: A burst mode is triggered continuously at intervals. You can use the "Period [hh:mm:ss]" parameter to set the interval. ▪ Window →  74: After the period for the faster transmission rate (Period), the SWA70 checks whether the process value is within or outside the defined window. If the process value is within the defined window, the burst mode is triggered with the slower transmission rate (Max. Period). If the process value is outside the defined window, the burst mode is triggered with the faster transmission rate (Period). Define the window using the "Trigger Level" parameter. ▪ Rising: If the process value exceeds the value entered for the "Trigger Level" parameter, a burst mode is triggered with the faster transmission rate (Period). If the process value remains below the value entered for the "Trigger Level" parameter, a burst mode is triggered with the slower transmission rate (Max. Period). ▪ Falling →  75: If the process value drops below the value entered for the "Trigger Level" parameter, a burst mode is sent with the faster transmission rate (Period). If the process value remains above the value entered for the "Trigger Level" parameter, a burst mode is triggered with the slower transmission rate (Max. Period). ▪ On Change: If a value of the HART command changes, a burst mode is triggered with the time set for the "Period" parameter. <p>Factory setting Continuous</p>
Trigger Mode Examples	<p>Example 1</p> <ul style="list-style-type: none"> ▪ Trigger Mode: Continuous ▪ Period [hh:mm:ss]: 00:10:00 ▪ Burst Command Number: 3 ▪ Result: The field device sends all the measured values every ten minutes. <p>Example 2</p> <p>Setting</p> <ul style="list-style-type: none"> ▪ Trigger Mode: Falling ▪ Period [hh:mm:ss]: 00:05:00 ▪ Max. Period [hh:mm:ss]: 01:00:00 ▪ Device Variable Class (Trigger): Volume ▪ Unit Code (Trigger): 1 for liters ▪ Trigger Level: 200 ▪ Burst Command Number: 3 ▪ Requirement (configured on field device): "Unit first variable" is "l" for liters ▪ Result: A burst mode is triggered once per hour as long as the value exceeds 200 liters. If the value is less than 200 liters, a burst mode is triggered every 5 minutes.

Parameter	Description
Period [hh:mm:ss]	<p>Requirement Burst Mode Control Code: On</p> <p>Description</p> <ul style="list-style-type: none"> ▪ Parameter "Trigger Mode": Continuous: Enter the time span that must elapse between two burst modes. ▪ Parameter "Trigger mode": Window, Rising and Falling Enter the fast transmission rate. ▪ Parameter "Trigger Mode": On Change Enter the time after which a burst message is sent if the process value has changed. <p>Factory setting 00:30:00</p> <p> For SWA70 with battery pack: The shorter the time entered, the shorter the service life of the battery.</p>
Max. Period [hh:mm:ss]	<p>Requirement</p> <ul style="list-style-type: none"> ▪ Burst Mode Control Code: On ▪ Trigger Mode: Window, Rising or Falling <p>Description Enter the interval for the "slow" transmission rate of the burst mode. Whether the burst mode is triggered with the "slow" or the "fast" transmission rate depends on the "Trigger Level" parameter. See this table, "Trigger Level" parameter.</p> <p>Factory setting 1:00:00</p>
Device Variable Class (Trigger)	<p>Requirement</p> <ul style="list-style-type: none"> ▪ Burst Mode Control Code: On ▪ Trigger mode: Window, Rising or Falling <p>Description Indicates the measurement classification</p> <p>Factory setting Not Classified</p>
Unit Code (Trigger)	<p>Requirement</p> <ul style="list-style-type: none"> ▪ Burst Mode Control Code: On ▪ Trigger mode: Window, Rising or Falling <p>Description Select the unit of the measured value.</p> <p>Factory setting Not Classified</p>
Trigger Level	<p>Requirement</p> <ul style="list-style-type: none"> ▪ Burst Mode Control Code: On ▪ Trigger mode: Window, Rising or Falling <p>Description for "Trigger Mode": "Window" →  74</p> <ul style="list-style-type: none"> ▪ Enter the value used to change the transmission rate of the burst mode. You set the transmission rate using the "Period" and "Max. Period" parameters. With this "Window" option, the "Trigger Level" acts as a window. The window is centered around the last value transmitted. ▪ Example: <ul style="list-style-type: none"> ▪ Trigger level = 10 ▪ Last value transferred = 100 ▪ Result window = 90 bis 110 <p>Description for "Trigger Mode": "Rising" or "Falling" →  75</p> <ul style="list-style-type: none"> ▪ Enter the value used to change the transmission rate of the burst mode. You set the transmission rate using the "Period" and "Max. Period" parameters. ▪ For these options, the "Trigger Level" is an absolute value. <p>Factory setting 0</p>

Parameter	Description
Burst Command Number	<p>Requirement Burst Mode Control Code: On</p> <p>Description Select or enter the burst command number. Description of burst commands: →  74. For more information, see HART specification.</p> <p>Selection/user entry</p> <ul style="list-style-type: none"> ▪ Device Index: SWA70 Select 1, 2, 3, 9, 33 or 48 from a drop-down list ▪ Device Index: Long Tag of the connected field device All burst commands that are supported by the connected field device are possible. <p>Factory setting 1</p> <p>Additional information</p> <ul style="list-style-type: none"> ▪ You can set any commands for connected field devices. These can be found in the relevant Operating Instructions. ▪ If in doubt, use command 3 and 48.
Device Variable Code 0 to Device Variable Code 7	<p>Requirement</p> <ul style="list-style-type: none"> ▪ Burst Mode Control Code: On ▪ Burst Command Number: 9 or 33 <p>Description Select the device variables that are transmitted with the burst mode.</p> <p>Selection/user entry</p> <ul style="list-style-type: none"> ▪ Device Index "SWA70": Device variable code from drop-down list ▪ Device Index "Connected field device": Enter device variable code. <p>Factory setting 250</p> <p>Additional information Refer to the documentation for the field device for the device variables of the connected field device.</p>

Description of burst command for a field device connected to SWA70 (extract)

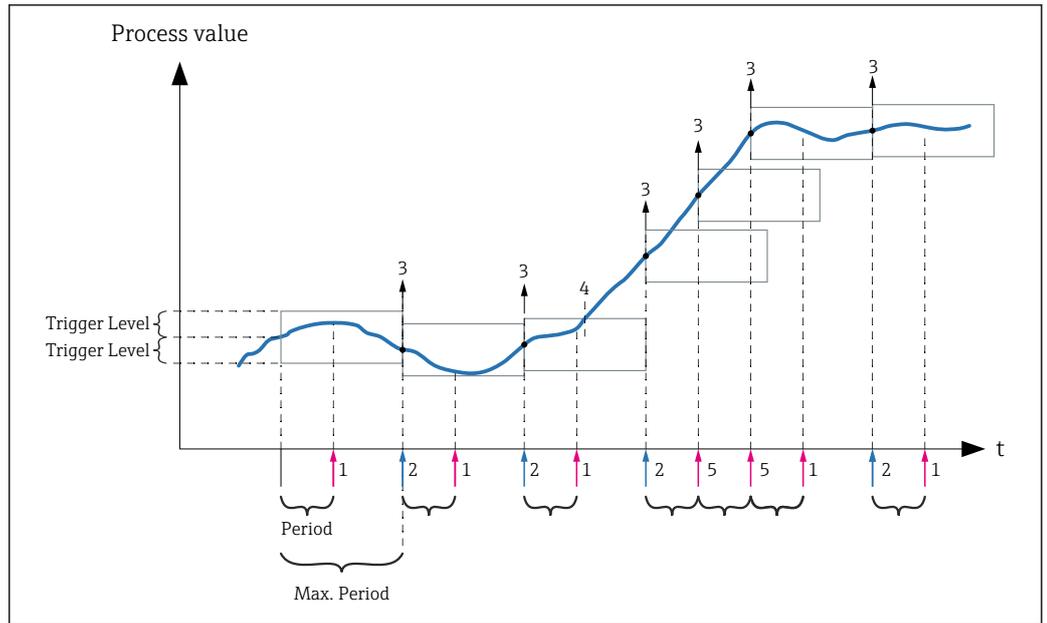
Burst command	Description
1	Transmits the value and unit of the "Primary variable" (PV).
2	Transmits the value of the 4 to 20 mA signal and the corresponding value as a percentage, e.g. 4 mA and 0% or 12 mA and 50%.
3	Transmits the value of the 4 to 20 mA signal and up to 4 predefined device variables and their corresponding unit. Device variables: PV, SV, TV and QV.
9	The fields Device Variable Code 0 to Device Variable Code 7 are enabled. Transmits the value, unit and status of up to 8 device variables.
33	The fields Device Variable Code 0 to Device Variable Code 3 are enabled. Transmits the value and unit of up to 4 device variables.
48	Transmits the additional device status. For this burst command, the "Continuous" option must be selected for the "Trigger Mode" parameter.

Trigger Mode: Window

 The "Window" option only works with burst commands 9 and 33.

After the period for the faster transmission rate (Period), the WirelessHART adapter checks whether the process value is inside or outside the defined window. If the process value is within the defined window, the burst mode is triggered with the slower transmission rate (Max. Period). If the process value is outside the defined window, the burst mode is triggered with the faster transmission rate (Period).

Define the window using the "Trigger Level" parameter. When a value is transferred, the window is recentered around this transferred value.



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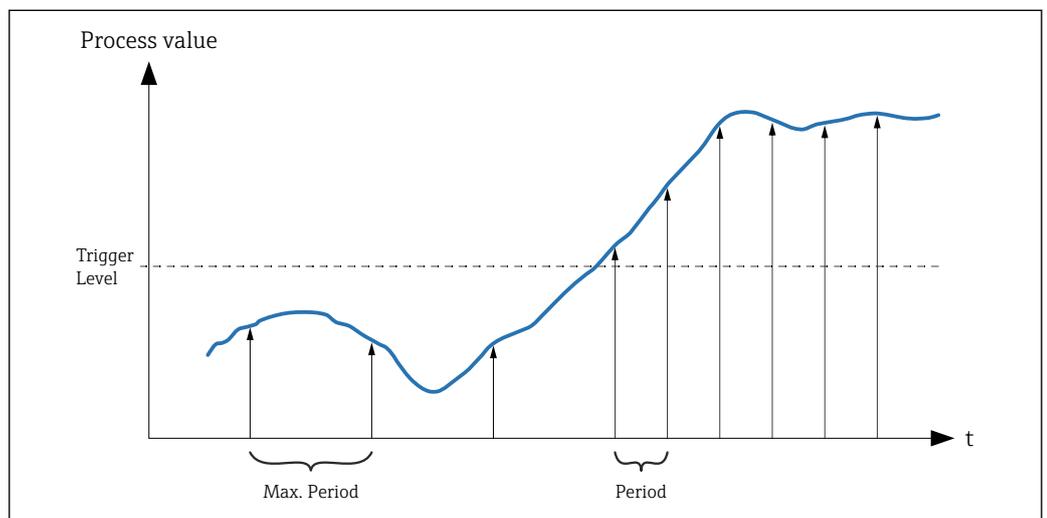
39 Example of Trigger Mode: Window

- 1 The period for the faster transmission interval (Period) has expired. The process value is within the defined window. No burst mode is triggered.
- 2 The period for the slower transmission interval (Max. Period) has expired. A burst mode is triggered.
- 3 The burst mode is triggered.
- 4 The burst mode is not triggered because the process value only left the defined window after the faster transmission interval (Period) elapsed.
- 5 The process value already left the window before the faster transmission interval (Period) elapsed. The burst mode is triggered with the faster transmission interval.

Trigger Mode: Raising

If the process value exceeds the value entered for the "Trigger Level" parameter, a burst mode is sent with the faster transmission rate (Period).

If the process value remains below the value entered for the "Trigger Level" parameter, a burst mode is sent with the slower transmission rate (Max. Period).



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40 Example of Trigger Mode: Raising

13.7 Event Notification

General information

The event notification is a special application similar to the burst mode (burst message). An event notification is sent as soon as there are changes in the device configuration or device status, irrespective of whether data are already being sent by burst modes. You can use the status in the device status byte, the extended device status byte and in command 48 for the event notification. You can define a certain number of bits that trigger an event notification.

Event notifications have a lower priority than burst modes (burst messages). The event notifications are given a time stamp when a notification is triggered for the first time. You can define up to 5 different event notifications.

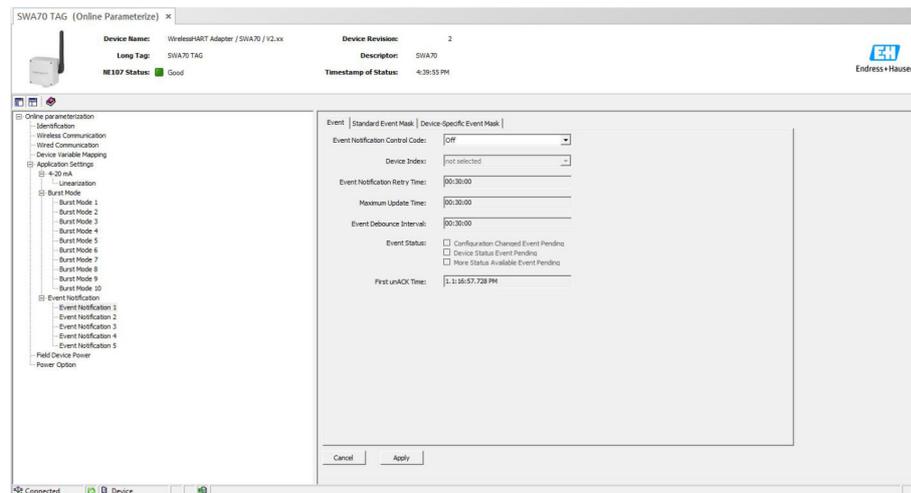
"Event Notification Control Code" page and "Event Notification Control Code 1" to "Event Notification Control Code 5" pages

The "Event Notification Control Code" page provides an overview of the event notifications that are configured. You can define 5 different event notifications using the pages "Event Notification Control Code 1" to "Event Notification Control Code 5".

You can also configure event notifications in the offline mode. The event notifications take effect as soon as the WirelessHART adapter SWA70 connects to the network.

Navigation

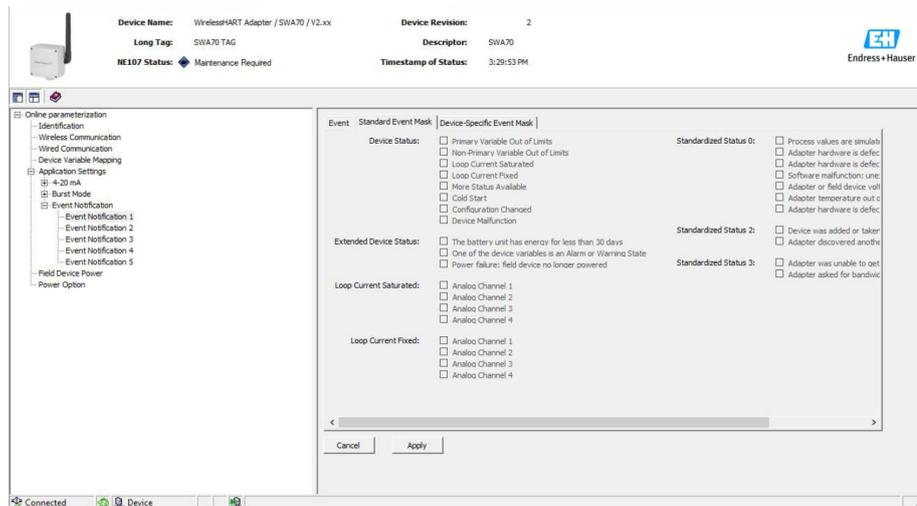
- Online parameterization > Application Settings > Event Notification > Event Notification 1
- Online parameterization > Application Settings > Event Notification > Event Notification ...



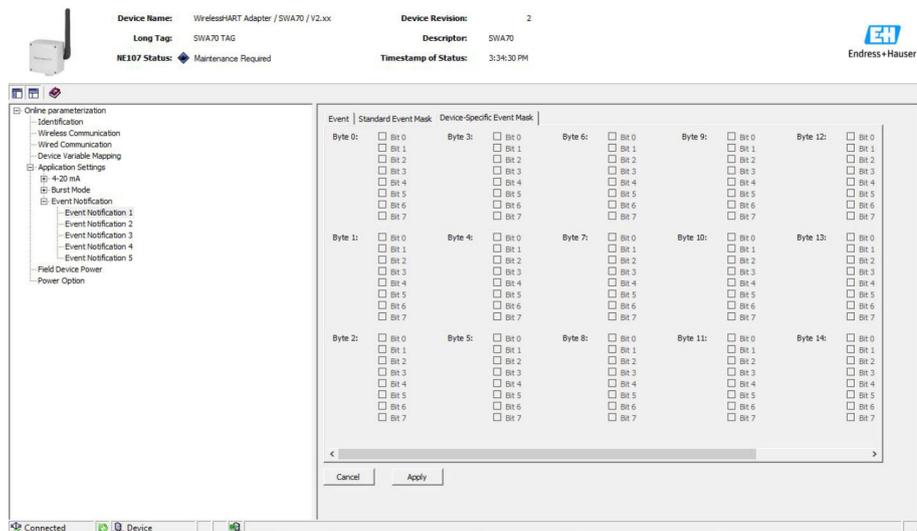
Configuring the event notification

1. Open the page for configuring an event notification, e.g. **Event Notification Control Code 1** page.
2. Select the **On** option in the "Event" tab for the **Event Notification Control Code** parameter.
 - ↳ The gray input fields become white. Entries can be made.
3. For the **Device Index** parameter, select either "SWA70" or a connected HART field device. If the field device is not listed, go to the "Wired Communication" page and click the "Scan Subdevices" button there.
4. Configure the other parameters in the "Event" tab.

5. Activate the desired event notifications in the "Standard Event Mask" tab. To do so, check the check box in front of the particular event. Multiple notifications can be selected.



6. Activate the desired event notifications in the "Device-Specific Event Mask" tab. To do so, check the check box in front of the particular event. Multiple notifications can be selected. Refer to the Operating Instructions for the device selected in the "Device Index" parameter.



7. Click the **Apply** button.
 - ↳ The settings are downloaded and stored in the SWA70.
8. Click the **OK** button.
 - ↳ Once the SWA70 is connected to the network, the event takes immediate effect. If the SWA70 is not connected to the network, a message is displayed. Select **OK** to confirm the message. The event takes effect as soon as the SWA70 connects to the network.

Parameter description "Event Notification", "Event" tab

Parameter	Description
Event Notification Control Code	<p>Description Enable and disable the event monitoring mode.</p> <p>Options</p> <ul style="list-style-type: none"> ▪ Off: Event monitoring mode is disabled. The input fields are grayed out and write-protected. ▪ On: Event monitoring mode enabled. Entries can be made. <p>Factory setting Off</p> <p>Additional information The event monitoring parameters are written to the SWA70 once you click the "Apply" button.</p>
Device Index	<p>Requirement Event Notification Control Code: On</p> <p>Description Select the device for which the event monitoring parameters are active.</p> <p>Options</p> <ul style="list-style-type: none"> ▪ SWA70 ▪ Connected field device (Long Tag) ▪ Not selected <p>Factory setting SWA70</p>
Event Notification Retry Time	<p>Requirement Event Notification Control Code: On</p> <p>Description Enter the time between two attempts to transmit the event notification. Transmission is repeated until the SWA70 gets confirmation of receipt.</p> <p>User entry</p> <ul style="list-style-type: none"> ▪ 00:00:01 ▪ 00:00:02 ▪ 00:00:04 ▪ 00:00:08 ▪ 00:00:16 ▪ 00:00:32 ▪ Any time possible from 00:01:00 <p>Factory setting 00:30:00</p>
Maximum Update Time	<p>Requirement Event Notification Control Code: On</p> <p>Description Enter the maximum time that is used if no event change occurs. If an event has not occurred, the SWA70 sends an event notification after this time. If an event notification occurs during this time, the timer is restarted.</p> <p>User entry</p> <ul style="list-style-type: none"> ▪ 00:00:01 ▪ 00:00:02 ▪ 00:00:04 ▪ 00:00:08 ▪ 00:00:16 ▪ 00:00:32 ▪ Any time possible from 00:01:00 <p>Factory setting 00:30:00</p>
Event Debounce Interval	<p>Requirement Event Notification Control Code: On</p> <p>Description Enter the time specifying how long an event must last before the event notification is sent.</p>

Parameter	Description
Event Status	<p>Requirement Event Notification Control Code: On</p> <p>Description Indicates whether and which event notifications have been sent and are not yet confirmed. If the check box is ticked, the event notification has been sent but not yet confirmed.</p> <p>Monitored events</p> <ul style="list-style-type: none"> ▪ Configuration changed ▪ Device status ▪ Additional status information available <p>Factory setting All check boxes disabled</p>
First unACK Time	<p>Requirement Event Notification Control Code: On</p> <p>Description Shows how long the event notification listed under the "Event Status" parameter has been active.</p> <p>Factory setting 00:00:00</p>

Parameter description "Event Notification", "Standard Event Mask" tab

Parameter	Description
Device Status	<p>Options</p> <ul style="list-style-type: none"> ▪ Primary variable out of limits: Primary variable (PV) outside limit values ▪ Non-primary variable out of limits: Non-primary variable (SV, TV, QV) outside limit values ▪ Loop current saturated: Loop current saturated (S) ▪ Loop current fixed: Fixed value for loop current ▪ More status available: Additional status information available ▪ Cold start: Cold start ▪ Configuration changed: Changed configuration ▪ Device malfunction: Device failure
Extended Device Status	<p>Options</p> <ul style="list-style-type: none"> ▪ The battery unit has energy for less than 30 days: The battery pack has power for less than 30 days. ▪ One of the device variables is an Alarm or Warning State: One of the device variables is in the alarm or warning state. ▪ Power failure: field device no longer powered: Fault: The field device is no longer being supplied with power.
Loop Current Saturated	See DTM.
Loop Current Fixed	See DTM.
Standardized Status 0	See DTM.
Standardized Status 1	See DTM.
Standardized Status 2	See DTM.
Standardized Status 3	See DTM.

Parameter description "Event-Notification", "Device-Specific Event Mask" tab



Monitoring of device-specific events

- HART field device: See the Operating Instructions of the connected HART field device
- WirelessHART adapter SWA70: See the following table.

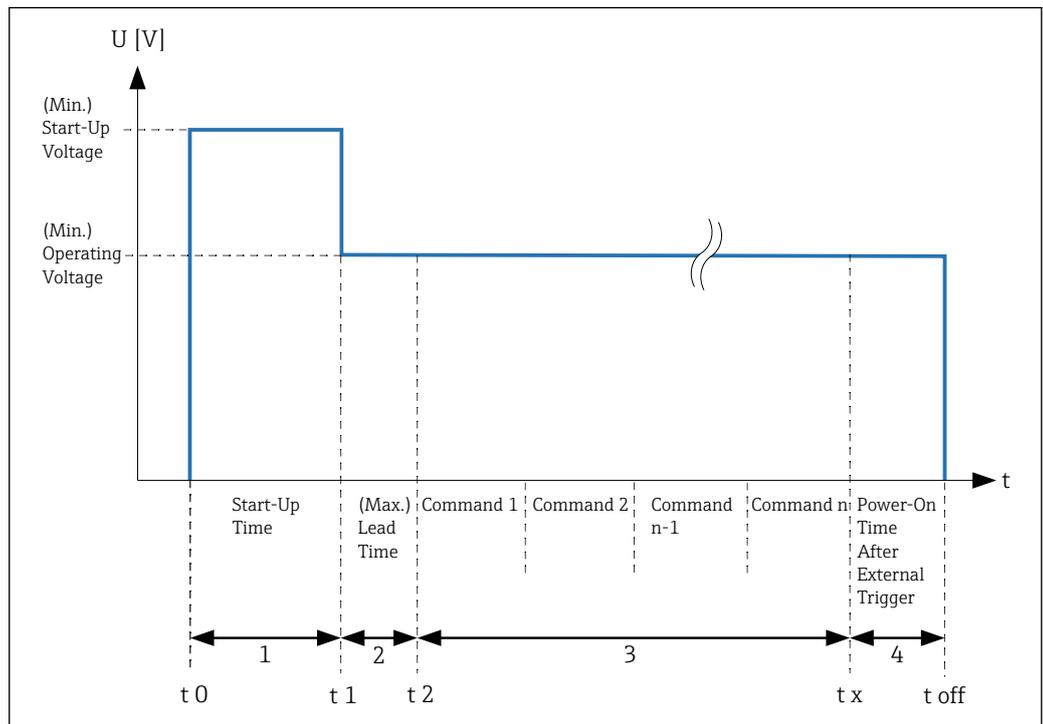
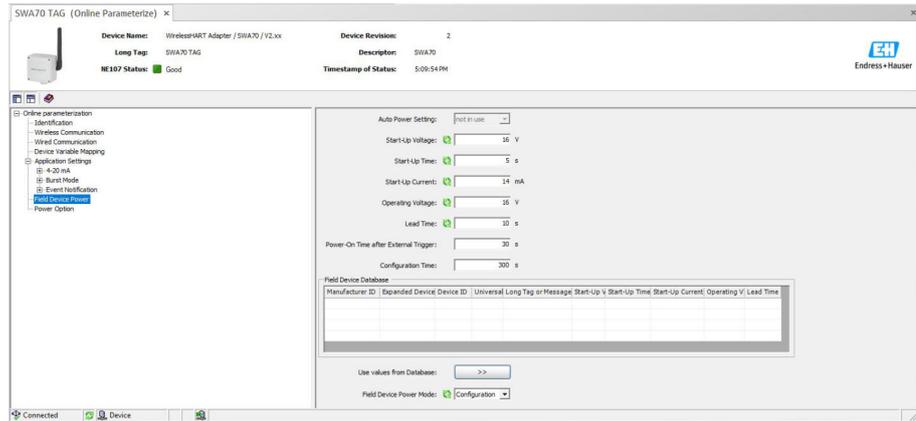
Byte	Bit	Description
0	0	No attempt to connect has been made so far.
	1	The WirelessHART adapter is not connected to a WirelessHART network.
	2	No alternative path to a neighbor is available.
	3	The WirelessHART adapter does not have a network password.
	4	The WirelessHART adapter could not connect to the network.
	5 to 7	–
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	The initial voltage was not supplied.
	4	The operating voltage was not supplied.
	5	The WirelessHART adapter is in configuration mode.
	6	The WirelessHART adapter is scanning 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	The number of write attempts to the FLASH memory has reached a critical level.
	5	The number of write attempts to the FLASH memory has reached a maximum level.
	6	Start current has exceeded the defined start current.
	7	The hardware of the WirelessHART adapter is defective.
3	0	The loop current has reached the configured lower warning limit.
	1	The loop current has reached the configured upper warning limit.
	2	The loop current has reached the configured lower alarm limit.
	3	The loop current has reached the configured upper alarm limit.
	4	There is no valid firmware update in the lower memory bank.
	5	There is no valid firmware update in the upper memory bank.
	6	There is an entry in the burst table or under event notification without an associated field device.
	7	The supply parameters used are based on field device feedback.
4	0	The first wired device has additional status information.
	1	The first wired device is not working correctly.
	2	The second wired device has additional status information.
	3	The second wired device is not working correctly.
	4	The third wired device has additional status information.
	5	The third wired device is not working correctly.
	6	The fourth wired device has additional status information.
	7	The fourth wired device is not working correctly.

13.8 Field Device Power

You can extend the service life of the battery pack for the WirelessHART adapter by adjusting the parameters on this page to match the power requirement of the connected HART field device. Refer to the documentation for the HART field device for the values to be entered here. These parameters also enable more reliable prediction of battery service life.

For some Endress+Hauser field devices, the values for these parameters are provided with the DTM in a database.

 To minimize power consumption, we recommend a HART communication between field device and SWA70 with a fixed current value in 4 mA Multidrop mode.



 41 Parameter "Field Device Power"

- 1 Device is initializing
- 2 HART synchronization
- 3 HART communication
- 4 Additional configuration time

Parameter description "Field Device Power"

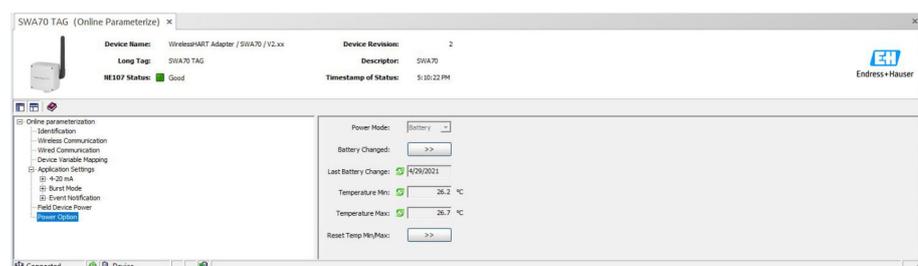
Parameter	Description
Auto Power Setting	<p>Description Shows whether the optimal settings for the connected field device have been automatically detected.</p> <p>Possible notifications</p> <ul style="list-style-type: none"> ■ In Use: The optimal settings for the power supply of the connected HART field device were automatically detected. ■ Not in Use: Either the connected HART field device does not support the "Auto Power Setting" function or several HART field devices are connected.
Start-Up Voltage ¹⁾ (Min. Start-Up Voltage) (Min. start-up voltage)	<p>Description Enter the value for the minimum start-up voltage required (Start-Up Voltage) for the start-up phase (Start-Up Time). The minimum start-up voltage is the minimum voltage required by the connected HART field device to switch on, even at minimum current consumption..</p> <p>User entry 8 to 23 V, resolution: 0.1 V (depending on "(Max.) Start-up Current")</p> <p>Factory setting 16 V</p>
Start-Up Time ¹⁾ (start-up time)	<p>Description Enter the value for the start-up time (Start-Up Time) of the HART field device. The start-up time is the period during which the start-up voltage (Start-Up Voltage) and the start-up current (Start-Up Current) are provided to the connected HART field device. Operation with HART communication is only possible after this time.</p> <p>User entry 0 to 1800 s, resolution: 1 s (Decimal values from 0 to 1 seconds can be entered. These decimal values are rounded up to 1 second for short-circuit detection.)</p> <p>Factory setting 5 s</p>
Start-Up Current ¹⁾ (Max. Start-Up Current) (max. start-up current)	<p>Description Enter the value for the maximum start-up current (Start-Up Voltage). The maximum start-up current is the maximum current required by the HART field device during the start-up phase (Start-Up Time).</p> <p>User entry 3 to 50 mA, resolution: 0.1 mA (depending on "(Max.) Start-up Voltage")</p> <p>Factory setting 14 mA</p>
Operating Voltage ¹⁾ (Min. Operating Voltage) (Min. operating voltage)	<p>Description Enter the minimum operating voltage for the HART field device. The minimum operating voltage is the minimum voltage required by the connected HART field device in normal operation.</p> <p>User entry 8 to 23 V, resolution: 0.1 V</p> <p>Factory setting 16 V</p>
Lead Time ¹⁾ (Max. Lead Time) (Max. lead time)	<p>Description Enter the value for the maximum lead time of the HART field device. The maximum lead time is the maximum time required by the connected HART field device to provide valid measured values after power-up.</p> <p>User entry 0 to 1800 s, resolution: 1 s</p> <p>Factory setting 10 s</p>

Parameter	Description
Power-On Time after External Trigger	<p>Requirement Field Device Power Mode: Automatic</p> <p>Description Enter the time period for which the connected HART field device is supplied with power after communication.</p> <p>Factory setting 1 s</p>
Configuration Time	<p>Requirement Field Device Power Mode: Configuration</p> <p>Description Enter the time span for the configuration time. For this configuration time, the connected HART field device is supplied with power during a configuration, e.g. via a display.</p> <p>Factory setting 300 s</p>
Field Device Database ¹⁾	<p>Description Shows values in tabular form that you need for the configuration of this page Field Device Power. The SWA70 queries the values from the connected HART field device via a HART command. If the HART field device supports this command, the values are transferred to the table.</p>
Use Value from Database	When you click the > > button, the parameters are written to the SWA70.
Field Device Power Mode	<p>Description Select the power mode.</p> <p>Options</p> <ul style="list-style-type: none"> ■ Off: There is no communication between SWA70 and the connected HART field device. The SWA70 is used, for example, as a repeater between other WirelessHART network devices. ■ Automatic: If the connected HART field device is addressed via radio technology, the field device is supplied with power for the set time after each communication. Use the "Power-On Time after External Trigger" parameter to set the time span. This procedure avoids constant switching on and off. ■ Configuration: With this option, the connected HART field device is supplied with voltage for the set period of time and then switches back to "Automatic" mode. Use the "Configuration Time" parameter to set the time span. This behavior corresponds to pressing the push button on the SWA70 main circuit board for 10 to 15 seconds.

1) If the SWA70 is used with the battery pack with the "2-wire field device with power supply via WirelessHART Adapter" type of connection, this parameter must be configured.

13.9 Power Option

This page contains information about the power supply to the WirelessHART adapter SWA70 and about the measured temperature.



Parameter description "Power option"

Parameter	Description
Power Mode	<p>Description Indicates whether the SWA70 is powered via a battery or external source.</p> <p>Possible notifications</p> <ul style="list-style-type: none"> ■ Battery ■ External Power ■ Undefined
Battery Changed	<p>Prerequisite Only for SWA70 with battery pack</p> <p>Description After replacing the battery pack, you must click the >> button for the "Battery Changed" parameter. The "Last Battery Change" parameter is then set to the current date and the battery consumption counter is reset.</p>
Last Battery Change	<p>Prerequisite Only for SWA70 with battery pack</p> <p>Description Displays the date on which the >> button was last clicked for the "Battery Changed" parameter.</p>
Temperature Min	Displays the lowest measured temperature that the SWA70 has been exposed to since the last reset. You can reset the value using the "Reset Temp Min/Max" parameter.
Temperature Max	Displays the highest measured temperature that the SWA70 has been exposed to since the last reset. You can reset the value using the "Reset Temp Min/Max" parameter.
Reset Temp Min/Max	When you click the >> button, the "Temperature Min" and "Temperature Max" parameters are reset.

14 Diagnostics

14.1 Calling up diagnostics

Call up diagnostics in Field Xpert

- ▶ Select the **Diagnosis** menu in **DTM functions**.
 - ↳ The "Diagnosis" window is opened.

Call up diagnostics in FieldCare

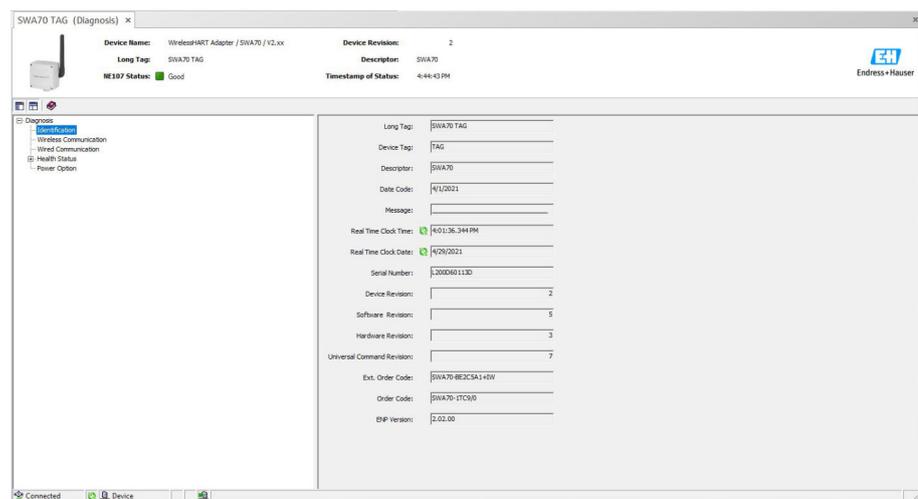
1. Click on the **SWA70** in the network view.
2. Open the context menu.
3. Select the **Diagnosis** menu.
 - ↳ The "Diagnosis" window is opened.

14.2 Identification

This page shows information about the WirelessHART adapter SWA70.

Navigation

Diagnosis > Identification



"Identification" parameter description page

Parameter	Description
Long Tag	Shows the long character string that was entered for the SWA70. This parameter is used for unique identification of the SWA70 in the network and in the plant. The parameter is used to set the burst mode and the event notification.
Device Tag	Shows the device tag that was entered for the SWA70.
Descriptor	Shows the description that was entered for the SWA70. This parameter is used for the description of the SWA70, e.g. function or location.
Date Code	Shows the date that was entered for the SWA70. The date is used to identify a particular event, e.g. the last change.
Message	Shows the message entered. The message can be used as desired. The message is transmitted via the HART protocol at the request of the master.
Real Time Clock Time	Shows the network system time.

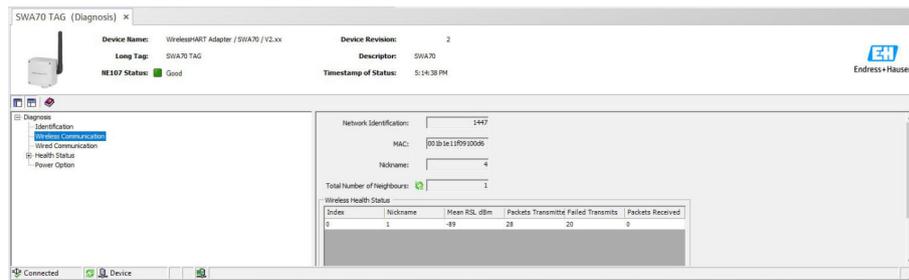
Parameter	Description
Real Time Clock Date	Shows the network system date.
Serial Number	Shows the serial number of the SWA70.
Device Revision	Shows the device version of the SWA70.
Software Revision	Shows the software version of the SWA70.
Hardware Revision	Shows the hardware version of the SWA70.
Universal Command Revision	Shows the HART protocol version supported by the SWA70.
Ext. Order Code	Shows the detailed order number of the SWA70.
Order Code	Shows the order code of the SWA70.
ENP Version	Shows the version of the SWA70 electronic nameplate.

14.3 Wireless Communication

This page shows information about the operation of the WirelessHart adapter SWA70. The information is updated every five minutes.

Navigation

Diagnosis > Wireless Communication



"Wireless Communication" parameter description page

Parameter	Description
Network Identification	Shows the identification number of the network to which the SWA70 connects.
MAC	Shows the MAC address of the SWA70.
Nickname	Shows the short name of the SWA70 for internal use in the network.
Total Number of Neighbours	Shows the number of WirelessHart devices that are in the vicinity of the SWA70 and to which a connection has been established.
Wireless Health Status	<p>Shows important parameters for network communication</p> <ul style="list-style-type: none"> ■ Index: ID of neighboring device ■ Nickname: Short name of neighboring device ■ Mean RSL dBm: Average signal strength of neighbor since the SWA70 established a connection to the network ■ Packets Transmitted: Number of packets sent by the SWA70 since a connection was established to the network ■ Failed Transmits: Number of packets sent by the SWA70 that have not reached their destination after retries since a connection was established to the network ■ Packets Received: Number of packets received by the SWA70 since a connection was established to the network <p>These parameters show the values since the last time the SWA70 successfully connected to the WirelessHart network. The values are reset if the connection is lost.</p>

14.4 Wired Communication

This page displays information about the HART field devices that are connected to the WirelessHart adapter SWA70.

Navigation

Diagnosis > Wired Communication



"Wired Communication" parameter description page

Parameter	Description
Number of Devices	Shows the following: <ul style="list-style-type: none"> 0: No HART field device is connected to the SWA70. 1 to 4: Number of HART field devices connected to the SWA70.
Wired Communication Status	Shows important parameters for network communication <ul style="list-style-type: none"> Index: ID of connected HART field devices Long Tag or Message: Long tag of the connected HART field devices STX Count: Number of feedback messages that the SWA70 has received from the connected HART field devices ACK Count: Number of feedback messages that the SWA70 has received from HART field devices BACK Count: Number of burst modes

14.5 Health Status

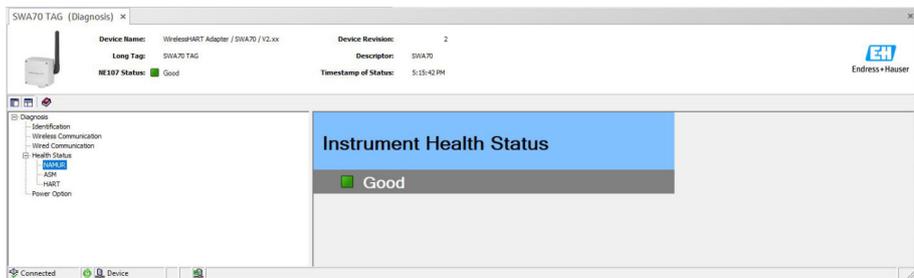
This page shows diagnostic information for the WirelessHART adapter SWA70 in accordance with the following guidelines and following specification:

- NAMUR guideline NE 107
- ASM guidelines
- HART specification

14.5.1 NAMUR NE 107

Navigation

Diagnosis > Health Status > NAMUR

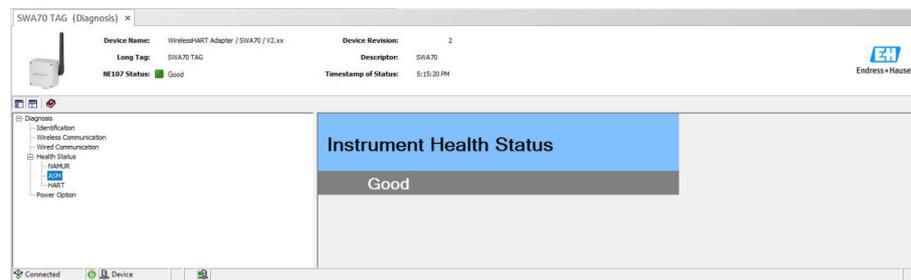


Possible device status

Device status	Translation
Good	Good
Failure (F)	Failure
Maintenance required (M)	Maintenance required
Out Of Specification (S)	Out of specification
Function Check (C)	Function check

14.5.2 ASM**Navigation**

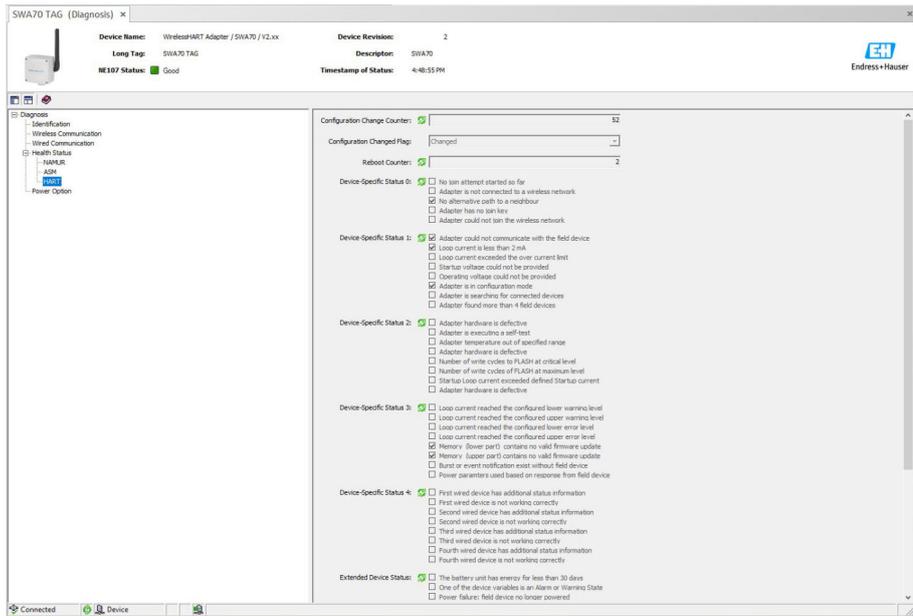
Diagnosis > Health Status > ASM

*Possible device status*

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

14.5.3 HART**Navigation**

Diagnose > Health Status > HART



 If a check box is selected, the statement is true.

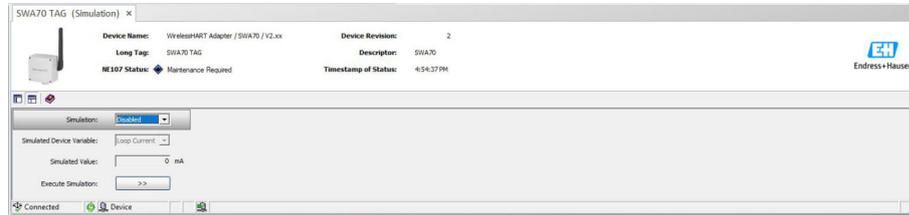
Possible device status

Parameter	Description
Configuration Change Counter	Shows the number of configuration changes
Configuration Changed Flag	Shows a change in the configuration since the last communication
Reboot Counter	Shows the number of SWA70 restarts
Real Clock Time	Shows the system time

15 Other DTM functions

15.1 Simulation

Use this page to simulate a selected device variable with the entered value.



1. For the **Simulation** parameter, select the option **Enabled**.
↳ Simulation mode is activated.
2. For the **Simulated Device Variable** parameter, select the device variable to be simulated.
3. For the **Simulated Value** parameter, enter the value to be simulated.
4. Click on the >> button for the **Execute Simulation** parameter.
↳ The selected device variable is simulated with the specified value.

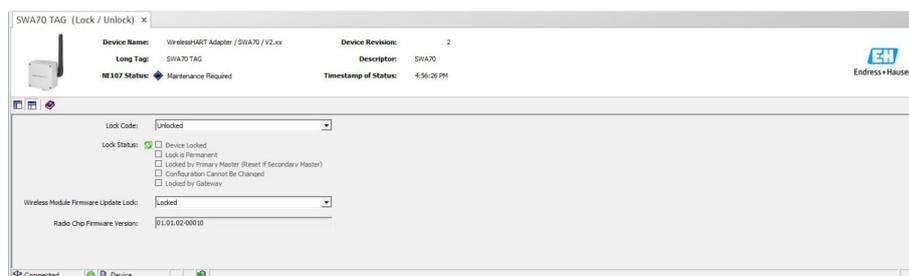
 To end the simulation, you must deactivate the simulation mode again.

"Simulation" parameter description page

Parameter	Description
Simulation	Activate or deactivate simulation mode. Options <ul style="list-style-type: none"> ■ Disabled: Simulation mode is deactivated. ■ Enabled: Simulation mode is activated.
Simulated Device Variable	See the "Device Variable Mapping" →  65 chapter.
Simulated Value	Enter the value to be simulated.
Execute Simulation	The simulation starts when you click the >> button.

15.2 Lock / Unlock

Use this page to protect the WirelessHART adapter SWA70 against unauthorized access via the DTM.



"Lock / Unlock" parameter description page

Parameter	Description
Lock Code	Select the type of locking for the DTM to the SWA70. Options <ul style="list-style-type: none"> ▪ Unlocked: The SWA70 is unprotected. All parameters can be changed. ▪ Lock Temporary: The SWA70 is locked. A restart of the SWA70 or a power outage disables the lock. ▪ Lock Permanent: The SWA70 is permanently locked. A restart of the SWA70 or a power outage do not disable the lock. The lock can be lifted via the "Lock Code" parameter. ▪ Lock All: The SWA70 is permanently locked for all masters. <p>If you select another option for the "Lock Code" parameter, the new option takes immediate effect.</p>
Lock Status	Shows the current access status of the DTM to the SWA70. If a check box is selected, the statement is true. Possible notifications <ul style="list-style-type: none"> ▪ Device Locked: SWA70 is locked ▪ Lock is Permanent: Permanently locked ▪ Locked by Primary Master (Reset if Secondary Master): The SWA70 was locked by the primary master. To unlock the device, the secondary master must restart. ▪ Configuration cannot be changed: Configuration cannot be changed ▪ Locked by Gateway: The SWA70 is locked by the gateway
Wireless Module Firmware Update Lock	Options <ul style="list-style-type: none"> ▪ Unlocked: The firmware of the radio module of the SWA70 can be downloaded. ▪ Locked: The firmware of the SWA70 cannot be downloaded.
Radio Chip Firmware Version	Shows the firmware version of the radio module

Lock Code	Lock Status
Unlocked	–
Lock Temporary	Device Locked
Lock Permanent	Lock is Permanent
Lock All	Device Locked, Locked is permanent and Configuration can not be changed
–	Locked by Primary Master (Reset if Secondary Master) Locking was triggered by the primary master.
Lock All	Configuration cannot be changed
–	Locked by Gateway Locking was triggered by a gateway.

15.3 Update Firmware



 Before the update, the "Unlocked" option must be selected on the "Lock/Unlock" page for the "Wireless Module Firmware Update Lock" parameter.

Update via local storage location

1. For the **Update Via** parameter, select the **Local Path** option.
2. For the **FW Update File (Path)** parameter, enter the path and file name.
3. For the **Update Firmware** parameter, click the >> button.
 - ↳ The firmware update is carried out.

Update via FTP server

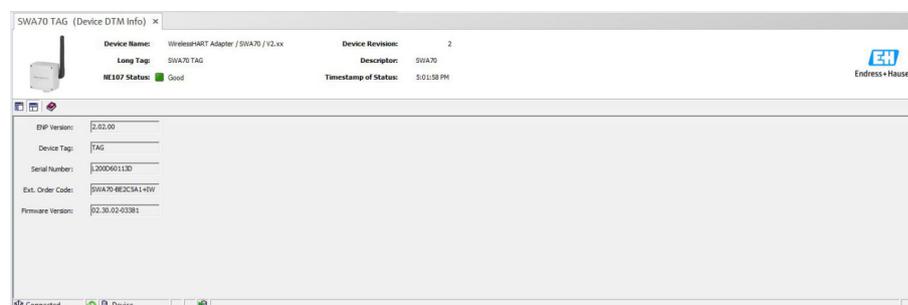
1. For the **Update Via** parameter, select the **Local FTP Server** option.
2. For the **FW Update File (Path)** parameter, enter the URL of the FTP server.
3. For the parameters **FTP User** and **FTP Password**, enter the user names and the password.
4. For the **Update Firmware** parameter, click the >> button.
 - ↳ The firmware update is carried out.

"Update Firmware" parameter description page

Parameter	Description
Update Via	Choose the storage location for the firmware update. Options <ul style="list-style-type: none"> ■ Local Path ■ FTP server Firmware is loaded via FTP server or a local directory.
FW Update File (Path)	The input depends on the option selected for the "Update Via" parameter. If "Local Path" has been selected, you must enter the path and the file name. If "FTP Server" has been selected, you must enter the URL of the FTP server.
FTP User	Enter the user name for the FTP server.
FTP Password	Enter the user password for the FTP server.
Update Firmware	The firmware is updated when you click the >> button.
Firmware Version	Shows the current firmware version of the SWA70
Radio Chip Firmware Version	Shows the current firmware version of the radio module

15.4 Device DTM Info

This page displays standardized information about the WirelessHART adapter SWA70.

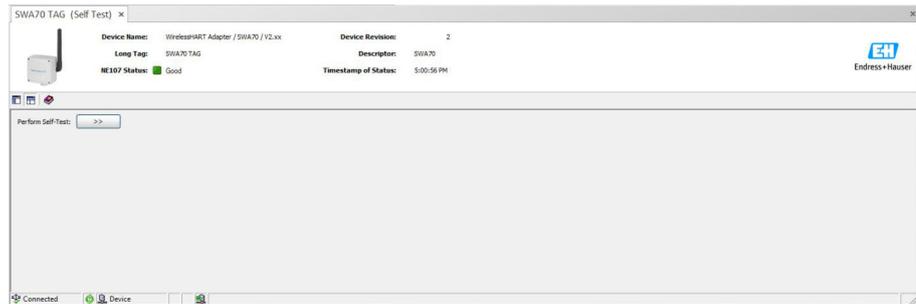
*"Device DTM Info" parameter description page*

Parameter	Description
ENP Version	Shows the version of the SWA70 electronic nameplate
Device Tag	Shows the SWA70 device tag entered

Parameter	Description
Serial Number	Shows the serial number of the SWA70
Ext. Order Code	Shows the detailed order number of the SWA70.
Firmware version	Shows the firmware version of the SWA70

15.5 Performing a self-test (Self test)

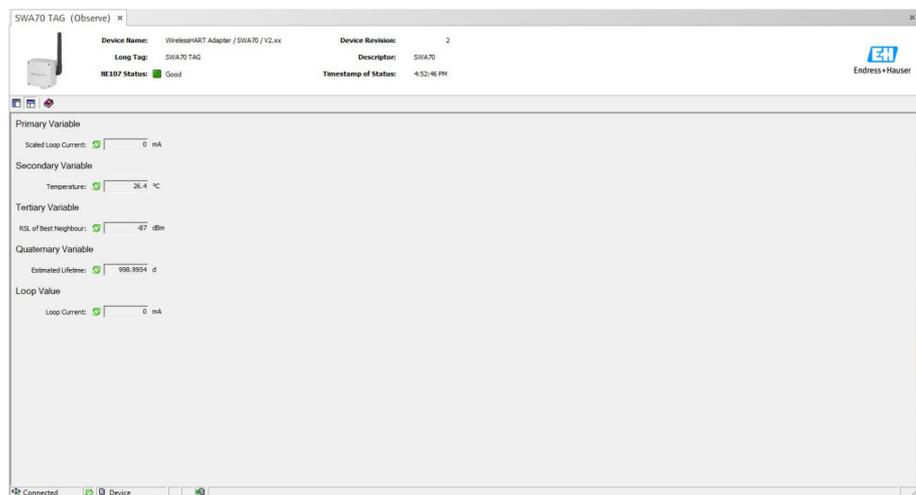
Use this page to test the WirelessHART adapter.



- ▶ For the **Perform Self-Test** parameter, click the >> button.
 - ↳ The "Health Status" is updated .

15.6 Observe

Use this page to observe the four variables PV, SV, TV and QV. You can configure the variables via the "Device Variable Mapping" → 65page.



15.7 Reset

Use this page to reset all the parameters to the factory setting or the parameters "Temperature min" and "Temperature max" of page "Power Option".



16 Diagnostics and troubleshooting

16.1 General troubleshooting

Fault	Cause	Measure
Communication between FieldCare/Field Xpert and WirelessHART adapter takes place via a HART modem. FieldCare / Field Xpert cannot find the WirelessHART adapter.	An incorrect address range is set in the HART communication DTM.	For the WirelessHART adapter, the address 15 is factory-set for the "Polling Address" parameter → 59. The WirelessHART adapter's address must be in the selected area.
	The same USB or COM port that was set during the parameterization of the HART modem was not selected on the PC.	Use the correct USB or COM port on the PC and HART modem. Reconfigure the HART CommDTM.
The WirelessHART adapter is designed to power a 2-wire field device. The field device is not powered.	The connection plug of the power supply unit is not plugged into the "Power" socket on the main circuit board.	Check whether that the connector plug of the power supply unit is plugged in → 16. Additionally for SWA70 with battery pack: <ul style="list-style-type: none"> Check battery pack → 56. Replace the battery pack. Check the battery state by shaking.  The battery pack is working if you can hear liquid. After a short circuit, the battery pack is no longer functional, even if you can hear liquid.
	The parameters for the power supply are incorrectly configured.	Check parameters on the "Field Device Power" page and correct if → 81 necessary.
The WirelessHART adapter cannot find the field device. There is no communication between the WirelessHART adapter and field device. The WirelessHART adapter powers a 2-wire field device.	The field device does not support a HART protocol.	Parameters can only be read by a HART field device.
	The WirelessHART adapter was started without a field device connected to terminals 1 and 2.	Connect the field device to terminals 1 and 2 of the WirelessHART adapter. Then perform a restart or disconnect and reconnect the supply voltage.
	Incorrect address range set in SWA70-DTM.	Check address range. "Lowest Scan Address" and "Highest Scan Address": → 63
	The supply voltage is switched off again before the field device can communicate.	Increase the "Lead Time" parameter in 10-second steps → 81.
The WirelessHART adapter cannot find the field device. There is no communication between the WirelessHART adapter and field device. The WirelessHART adapter is connected to a 4-wire field device or integrated in a closed-control loop.	Incorrect address range set in SWA70-DTM.	Check address range. "Lowest Scan Address" and "Highest Scan Address": → 63
	The 4-wire field device was incorrectly connected.	Connect the 4-wire field device correctly. <ul style="list-style-type: none"> Battery pack: → 32 Wide-range power supply: → 40 DC power unit: → 48

Fault	Cause	Measure
	The PLC, the remote I/O and a connected HART modem dominate communication in the closed-control loop. The WirelessHART adapter automatically switches to slave mode.	<ul style="list-style-type: none"> ▪ Remove HART modem. ▪ If the PLC or remote I/O is configured as "Primary Master", configure the WirelessHART adapter as "Secondary Master".
FieldCare / Field Xpert cannot find any connected HART field device. A field device is connected to terminals 1 and 2, or terminals 2 and 3. The HART modem is connected to lugs 7 and 8 or terminals 5 and 6.	If the HART modem is connected to lugs 7 and 8 or terminals 5 and 6, the HART communication is not forwarded to terminals 1 and 2 or terminals 2 and 3 →  102.	Connect the HART modem either to terminals 1 and 2 or to terminals 2 and 3, so that communication can take place simultaneously with the WirelessHART adapter and the HART field device. Adapt the address range in the HART communication DTM to the address of the field device.
The WirelessHART adapter cannot connect to the WirelessHART network.	The connection to the WirelessHART network is still in process.  It can take several minutes to establish a connection.	Check the current status of the connection →  56. Where necessary, re-establish the connection to WirelessHART network. →  55
	The WirelessHART adapter is not mounted correctly.	Check mounting →  23 and →  23.
	The WirelessHART adapter is not operating.	<ul style="list-style-type: none"> ▪ Check whether that the connector plug of the power supply unit is plugged in →  16. ▪ Check the status of the battery pack: →  57 ▪ Check the wide-range power unit/DC power unit: →  58 The yellow LED is lit as long as the buffer of the power supply unit is being charged.
	The identification numbers for the network and/or the network password are configured differently for the WirelessHART adapter and the WirelessHART gateway.	Check parameters. For the WirelessHART adapter, see the "Network Identification" and/ or "Join Key Part X of Y" parameters: →  60
The WirelessHART adapter sporadically loses its connection to the WirelessHART network.	The WirelessHART adapter has too few neighbors.	Check parameter "Total Number of Neighbours" . Path: Diagnosis> Wireless Communication  The WirelessHART adapter should have at least two neighbors in a stable network. In an environment with a lot of noise, three neighbors are recommended.

Fault	Cause	Measure
The WirelessHART adapter fails to restart after you unplug and reconnect the plug connector "Power".	The SWA70's internal energy store is not discharging quickly enough, for example because no loads are connected.	In this case, the SWA70 must be shut down completely in order to discharge the internal energy store. Shut down SWA70 as follows: <ol style="list-style-type: none"> 1. Disconnect the power supply unit connector plug from the "Power" socket. 2. Press the push button on the main circuit board for 3 seconds. 3. Wait one minute. 4. Insert the connector plug into the "Power" socket.
Following battery replacement, the WirelessHART adapter displays an incorrectly estimated battery life.	Battery change not confirmed.	On the "Power Option" page, for the "Battery Changed" parameter, click the >> button → 83.

16.2 Diagnostic messages

The diagnostic messages listed are displayed as follows:

- As an event notification, if the event was activated in a configuration tool on the "Event Notification" page, in the "Device-Specific Event Mask" tab → 76.
- In the Netilion Cloud, if the WirelessHART adapter is connected to the Netilion Cloud.

If a diagnostic event has occurred, the status signal appears in Netilion together with the corresponding symbol for the event level according to NAMUR NE 107.

- Failure (F)
- Function check (C)
- Out of specification (S)
- Maintenance required (M)

Message	Measure	Status signal
The WirelessHART adapter could not connect to the WirelessHART network.	<ul style="list-style-type: none"> ■ Make sure another Wireless HART network participant is within reach. ■ Check the "Join Key" parameter and correct if necessary. ■ Check the "Network ID" parameter and correct if necessary. ■ Check that the network is compatible with WirelessHART. 	F
The hardware of the WirelessHART adapter is defective.	Replace the WirelessHART adapter.	F
The number of write attempts to the FLASH memory has reached a critical level.	Ensure that configuration changes are not made constantly, for example by automation. If the write interval is not reduced, the FLASH memory may become damaged.	F
The temperature of the WirelessHART adapter is outside the specified range.	Only use the WirelessHART adapter in accordance with specifications.	S
The loop current exceeds the upper current limit value.	<ul style="list-style-type: none"> ■ Check wiring to field device. ■ Repair field device. 	M
The initial voltage was not supplied.	<ul style="list-style-type: none"> ■ Check the "Startup Voltage" parameter and correct if necessary. ■ Check the "Startup Current" parameter and correct if necessary. ■ Check ambient conditions. 	M
The operating voltage was not supplied.	Check the "Operation Voltage" parameter and correct if necessary.	M

Message	Measure	Status signal
The WirelessHART adapter has found more than four field devices.	<ul style="list-style-type: none">▪ Only connect a maximum of 4 field devices to the WirelessHART adapter.▪ Reduce the scan range.	M
Start current has exceeded the defined start current.	<ul style="list-style-type: none">▪ Check the "Startup Current" parameter and correct if necessary.▪ Repair or replace field device.	M
There is an entry in the burst table or under event notification without an associated field device.	<ul style="list-style-type: none">▪ Configure the burst mode or event notification for the field device with a new polling address (Polling Address).▪ Check wiring to field device.▪ Repair or replace field device.	M

17 Maintenance

17.1 General maintenance

No special maintenance tasks are required for the WirelessHART adapter with wide-range power unit or DC power unit.

For the WirelessHART adapter with battery pack, the battery unit must be replaced when the battery life has expired.

We recommend carrying out periodic visual inspections on all versions.

17.2 Replacing the battery pack

You can order a battery pack on www.endress.com the product page **SWA70**.

Battery pack

- Order number: 71092238
- Approvals: ATEX, FM, CSA, IEC



Opening the WirelessHART adapter housing in hazardous areas

Explosion Hazard

- ▶ Follow the associated Safety Instructions (XA, etc.).

Tools required:

Torx T10 wrench for the housing screws

Replacing the battery pack

1. Loosen the housing screws of the WirelessHART adapter and open the housing.
2. Remove the connector plug of the battery pack from the socket on the main circuit board.
3. At the same time, press both clips of the battery pack together and remove the battery pack.
4. Insert the battery pack into the battery compartment.
 - ↳ The battery pack audibly clicks into the battery compartment.
5. Insert the connector plug of the battery pack into the socket on the main circuit board.
 - ↳ The WirelessHART adapter is supplied with power.
The WirelessHART adapter starts the operating software and performs a self-test.
The assignment of the terminals is determined during initial commissioning.
Otherwise, the assignment at the terminals is checked for any changes.
6. In the DTM, click >> button on the "Power option" page for the "Battery Changed" parameter.
 - ↳ The "Last Battery Change" parameter is set to the current date and the battery consumption counter is reset.

18 Repair

18.1 General information

Repairs may only be performed by Endress+Hauser staff or by individuals authorized and trained by Endress+Hauser.

18.2 Return

 For WirelessHART adapters with a battery pack, you should ideally remove the battery before returning the device.

In the event of a fault, follow the instructions provided by the Endress+Hauser Service Department. It may be necessary to return the WirelessHART adapter including the battery pack.

Pay attention to the safety data sheet for the battery pack.

The requirements for safe device return can vary depending on the device type and national legislation.

1. Refer to the web page for information:
<https://www.endress.com/support/return-material>
↳ Select the region.
2. If returning the device, pack the device in such a way that it is reliably protected against impact and external influences. The original packaging provides the best protection.

18.3 Disposal

 The WirelessHART adapter with battery pack contains a high-performance lithium-thionyl chloride battery pack.

You must dispose of this battery pack separately and properly. Please contact your local environmental protection authority for information on recycling and disposal schemes in your country.

Pay attention to the safety data sheet for the battery pack.

 If required by the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), the product is marked with the depicted symbol in order to minimize the disposal of WEEE as unsorted municipal waste. Do not dispose of products bearing this marking as unsorted municipal waste. Instead, return them to the manufacturer for disposal under the applicable conditions.

19 Accessories



For detailed information on "Accessories", see the Technical Information TI00026S.

20 Technical data



For detailed information on the "technical data": see the Technical Information TI00026S.

20.1 Power supply

20.1.1 Supply voltage

The following power supply versions are available for the WirelessHART adapter.

Battery pack BU191

Special high-performance lithium-thionyl chloride battery pack, long battery life

Wide-range power unit

24 to 230 V AC/DC $\pm 10\%$, 50/60 Hz

DC power unit

8 to 50 V DC, solar-powered for example

In the event of an external power supply failure, wireless communication is maintained for at least one hour thanks to an internal power supply system.

20.1.2 Battery data

Nominal capacity of battery

19 Ah at 20 °C

Battery voltage

7.2 V DC

Lithium content

10 g

20.1.3 Battery life

Up to 10 years, depending on update rate of process variables, field device type and environmental conditions

20.1.4 Power consumption

Wide-range power unit

- Max. active power 7 W
- Max. reactive power 12 VA with AC voltage

DC power unit

< 2.2 W

20.1.5 Current consumption

Wide-range power unit

< 350 mA

DC power unit

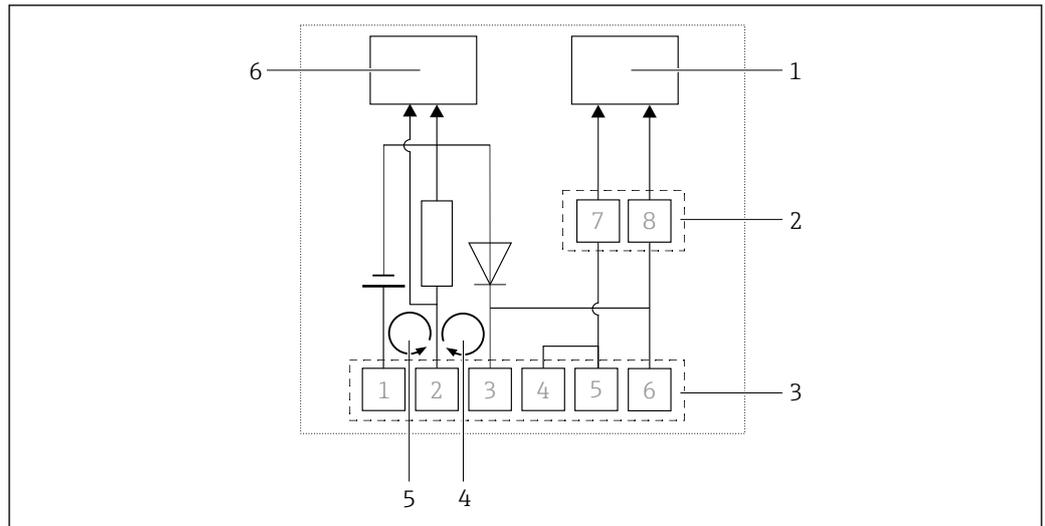
< 250 mA



1 A slow-blow back-up fuse must be provided by the customer.

20.1.6 Terminals and terminal assignment

The WirelessHART adapter is equipped with screw terminals 1 to 6 and lugs 7 and 8.



A0039217

42 Function of WirelessHART adapter terminals

- 1 HART communication
- 2 Lugs 7 and 8
- 3 Screw terminals 1 to 6
- 4 Loop current measurement between terminal 2 and terminal 3
- 5 Loop current measurement between terminal 2 and terminal 1
- 6 Loop current measurement and HART communication

Application	Terminal assignment	Notes	Connection data
Power supply for 2-wire field device	1 (+) and 2 (-)	<ul style="list-style-type: none"> ▪ Current measurement and, if necessary, HART communication ▪ Loop current flows through the WirelessHART adapter 	<ul style="list-style-type: none"> ▪ 4 to 20 mA (as per NAMUR NE43) ▪ Supply voltage for 8 to 23 V field device, configurable, see the following diagram ▪ Integrated load: 270 Ohm
Integration of WirelessHART adapter into a current loop	2 (+) and 3 (-)	<ul style="list-style-type: none"> ▪ Current measurement and, if necessary, HART communication ▪ Loop current flows through the WirelessHART adapter 	<ul style="list-style-type: none"> ▪ 4 to 20 mA (as per NAMUR NE43) ▪ Integrated load: 270 Ohm
Integration of WirelessHART adapter into a current loop	5 and 6	<ul style="list-style-type: none"> ▪ Integration of HART communication ▪ Loop current does not flow through the WirelessHART adapter 	<ul style="list-style-type: none"> ▪ Input impedance for HART communication: > 10 kOhm at 1700 Hz ▪ DC input impedance: infinite
Configuration of WirelessHART adapter via HART modem	7 and 8	Temporary connection of HART modem via lugs	<ul style="list-style-type: none"> ▪ Input impedance for HART communication: > 10 kOhm at 1700 Hz ▪ DC input impedance: infinite

20.1.7 Field device power supply

Current

- 4 to 20 mA signal as per NAMUR recommendation NE 43 or
- 4 mA when connected to just one field device in the Multidrop mode

Failure current

$$I \leq 3.6 \text{ mA or } I \geq 21 \text{ mA}$$

Protection

Short-circuit protection, triggered if currents > 25 mA

Supply voltage

8 to 23 V DC, configurable in the DTM using the "Operating Voltage" parameter

20.1.8 Connection of externally powered field devices to terminals 2 to 6

Max. permitted input current, terminals 2 to 6

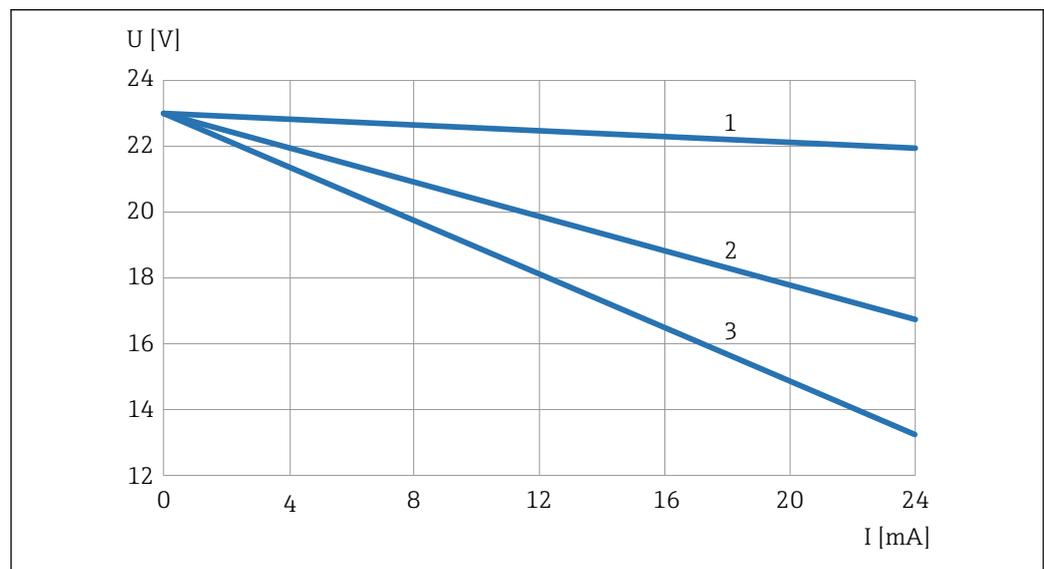
100 mA

Max. permitted input voltage, terminals 2 to 6

30 V DC

Only the connection of power supply units with protection class II is permitted.

20.1.9 Supply voltage at field device via SWA70



43 Supply voltage at field device as a factor of the loop current

- 1 4 to 20 mA- field device supplied by SWA70 Non-Ex version
- 2 HART field device powered by SWA70 non-Ex versions
- 3 4 to 20 mA field device or HART field device powered by SWA70 Ex-versions

For the SWA70 variant with a battery pack, the values are lower due to the internal resistance of the battery pack.

20.1.10 Grounding

- Polyester housing F32: not required
- Aluminum housing F33: screw for protective ground
- AISI 316L housing F39: screw for protective ground

i Pay attention to information on lightning protection → 23.

20.1.11 Cable entry

Rear cable entry

The rear cable entry is located on the front.

- Seal cap supplied
- Internal thread M20x1.5 for optional connection adapter

Lower cable entry

The lower cable entry is located on the underside.

- Cable gland or dummy plug, internal thread M20x1.5
- For "wide-range power unit" and "DC power unit" version: M12 socket



More information: , Design, dimensions

20.1.12 Cable specification

- Standard installation cable 0.25 mm²
- For version "prepared for installation on device": 0.25 mm² cable supplied
- For "wide-range power unit" and "DC power unit" version for connection to M12 socket:
0.75 mm²



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