



**BULLET WirelessHART® Adapter**

# BULLET

## User's Manual

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## Demand Moore Reliability

### Customer Support

Moore Industries is recognized as the industry leader in delivering top quality to its customers in products and services. We perform a sequence of stringent quality assurance checks on every unit we ship. If any Moore Industries product fails to perform up to rated specifications, call us for help. Our highly skilled staff of trained technicians and engineers pride themselves on their ability to provide timely, accurate, and practical answers to your process instrumentation questions. Our headquarters and other facilities phone numbers are listed below.

There are several pieces of information that can be gathered before you call the factory that will help our staff get the answers you need in the shortest time possible. For fastest service, gather the complete model and serial number(s) of the problem unit(s) and the job number of the original sale.

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## Warranty Disclaimer

Moore Industries ("The Company") makes no express, implied or statutory warranties (including any warranty of merchantability or of fitness for a particular purpose) with respect to any goods or services sold by the company. The company disclaims all warranties arising from any course of dealing or trade usage, and any buyer of goods or services from the company acknowledges that there are no warranties implied by custom or usage in the trade of the buyer and of the company, and that any prior dealings of the buyer with the company do not imply that the company warrants the goods or services in any way.

Any buyer of goods or services from the company agrees with the company that the sole and exclusive remedies for breach of any warranty concerning the goods or services shall be for the company, at its option, to repair or replace the goods or services or refund the purchase price. The company shall in no event be liable for any consequential or incidental damages even if the company fails in any attempt to remedy defects in the goods or services, but in such case the buyer shall be entitled to no more than a refund of all monies paid to the company by the buyer for purchase of the goods or services.

Any cause of action for breach of any warranty by the company shall be barred unless the company receives from the buyer a written notice of the alleged defect or breach within ten days from the earliest date on which the buyer could reasonably have discovered the alleged defect or breach, and no action for the breach of any warranty shall be commenced by the buyer any later than twelve months from the earliest date on which the buyer could reasonably have discovered the alleged defect or breach.

## Return Policy

For a period of thirty-six (36) months from the date of shipment, and under normal conditions of use and service, Moore Industries ("The Company") will at its option replace, repair or refund the purchase price for any of its manufactured products found, upon return to the Company (transportation charges prepaid and otherwise in accordance with the return procedures established by The Company), to be defective in material or workmanship. This policy extends to the original Buyer only and not to Buyer's customers or the users of Buyer's products, unless Buyer is an engineering contractor in which case the policy shall extend to Buyer's immediate customer only. This policy shall not apply if the product has been subject to alteration, misuse, accident, neglect or improper application, installation, or operation. THE COMPANY SHALL IN NO EVENT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.

## To return equipment to Moore Industries for repair, follow these four steps:

1. Call Moore Industries and request a Returned Material Authorization (RMA) number.

### Warranty Repair –

If you are unsure if your unit is still under warranty, we can use the unit's serial number to verify the warranty status for you over the phone. Be sure to include the RMA number on all documentation.

### Non-Warranty Repair –

If your unit is out of warranty, be prepared to give us a Purchase Order number when you call. In most cases, we will be able to quote you the repair costs at that time. The repair price you are quoted will be a "Not To Exceed" price, which means that the actual repair costs may be less than the quote. Be sure to include the RMA number on all documentation.

2. Provide us with the following documentation:
  - a) A note listing the symptoms that indicate the unit needs repair
  - b) Complete shipping information for return of the equipment after repair
  - c) The name and phone number of the person to contact if questions arise at the factory
3. Use sufficient packing material and carefully pack the equipment in a sturdy shipping container.
4. Ship the equipment to the Moore Industries location nearest you.

The returned equipment will be inspected and tested at the factory. A Moore Industries representative will contact the person designated on your documentation if more information is needed. The repaired equipment, or its replacement, will be returned to you in accordance with the shipping instructions furnished in your documentation.



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# Instruction Manual

## Marking

Bullet WirelessHART Adapter WHA-BLT-F9D0-N-A0-GP-1
---

table 1

Pepperl+Fuchs GmbH Lilienthalstraße 200, 68307 Mannheim, Germany
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table 2

## Validity

Specific processes and instructions in this instruction manual require special provisions to guarantee the safety of the operating personnel.

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismantling lies with the plant operator.

The personnel must be appropriately trained and qualified in order to carry out mounting, installation, commissioning, operation, maintenance, and dismantling of the device. The trained and qualified personnel must have read and understood the instruction manual.

## Reference to Further Documentation

Observe laws, standards, and directives applicable to the intended use and the operating location. Observe Directive 1999/92/EC in relation to hazardous areas.

The corresponding datasheets, manuals, declarations of conformity, EC-type-examination certificates, certificates, and control drawings if applicable (see datasheet) are an integral part of this document. You can find this information under [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

Due to constant revisions, documentation is subject to permanent change. Please refer only to the most up-to-date version, which can be found under [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

## Intended Use

The device is only approved for appropriate and intended use. Ignoring these instructions will void any warranty and absolve the manufacturer from any liability.

Use the device only within the specified ambient temperature range.

The device is used in control and instrumentation technology (C&I technology) for wireless data transfer from HART devices.

Take the intended use of the connected devices from the corresponding documentation.

## Improper Use

Protection of the personnel and the plant is not ensured if the device is not used according to its intended use.

## Mounting and Installation

Prior to mounting, installation, and commissioning of the device you should make yourself familiar with the device and carefully read the instruction manual.

Do not mount the device at locations where an aggressive atmosphere may be present.

Do not mount a damaged or polluted device.

Avoid electrostatic charges which could result in electrostatic discharges while installing or operating the device.

The usage of 2400 MHz equipment is bound to local restrictions. Ensure that local restrictions allow usage of this device before commissioning.

Observe the tightening torque of the screws.

The device provides a grounding terminal to which an equipotential bonding conductor with a minimum cross section of 4 mm<sup>2</sup> must be connected.

Mark permanently the selected type of protection for your specified application. Use the tick box on the nameplate for that. It is forbidden to change this marking afterwards.

Ensure that the degree of protection is not violated by the conduit.

Use seals that are suitable for the specified application.

## Requirements for Cables and Connection Lines

Install cables and cable glands in a way that they are not exposed to mechanical hazards.

Protect cables and cable glands from tensile load and torsional stress or use certified cable glands.

Unused cables and connection lines must be either connected to terminals or securely tied down and isolated.

## Requirements for Cable Glands

Only use cable glands that are suitably certified for the application.

Only use cable glands with a temperature range appropriate to the application.

For cable glands only use incoming cable diameters of the appropriate size.

Ensure that the degree of protection is not violated by the cable glands.

## Operation, Maintenance, Repair

Do not repair, modify, or manipulate the device.

If there is a defect, always replace the device with an original device.

When the device is in operation, maintain at all times a distance of at least 20 cm to the device antenna. This also applies to any other person in the vicinity of the device.

## Delivery, Transport, Disposal

Check the packaging and contents for damage.

Check if you have received every item and if the items received are the ones you ordered.

Keep the original packaging. Always store and transport the device in the original packaging.

Store the device in a clean and dry environment. The permitted ambient conditions must be considered, see datasheet.

Disposing of device, packaging, and possibly contained batteries must be in compliance with the applicable laws and guidelines of the respective country.

# Instruction Manual

## Marking

Bullet WirelesHART Adapter WHA-BLT-F9D0-N-A0-Z0-Ex1
EC-Type Examination Certificate: FM 11 ATEX 0019 X Ex II 1 G Ex ia IIC T6/T5 Ga Ex II 1 D Ex ia IIIC T95 °C Da
Certificate: FM 11 ATEX 0068 X Ex II 3 G Ex nA IIC T6/T5 Gc
FM approval: CoC3040786(C) Class I, Zone 0, (A)Ex ia IIC T6/T5 Ga Class I, Zone 2, (A)Ex nA IIC T6/T5 Gc Class I, Zone 20, (A)Ex ia IIIC T95°C Da Class I, Division 1, Groups A - D Class II, Division 1, Groups E - G Class III Class I, Division 2, Groups A - D
IECEX approval: IECEX FMG 11.0010X Ex ia IIC T6/T5 Ga Ex nA IIC T6/T5 Gc Ex ia IIIC T95°C Da

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## Validity

Specific processes and instructions in this instruction manual require special provisions to guarantee the safety of the operating personnel.

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismantling lies with the plant operator.

The personnel must be appropriately trained and qualified in order to carry out mounting, installation, commissioning, operation, maintenance, and dismantling of the device. The trained and qualified personnel must have read and understood the instruction manual.

## Reference to Further Documentation

Observe laws, standards, and directives applicable to the intended use and the operating location. Observe Directive 1999/92/EC in relation to hazardous areas.

The corresponding datasheets, manuals, declarations of conformity, EC-type-examination certificates, certificates, and control drawings if applicable (see datasheet) are an integral part of this document. You can find this information under [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

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Prior to mounting, installation, and commissioning of the device you should make yourself familiar with the device and carefully read the instruction manual.

Do not mount the device at locations where an aggressive atmosphere may be present.

Do not mount a damaged or polluted device.

Avoid electrostatic charges which could result in electrostatic discharges while installing or operating the device.

If the device has already been operated in general electrical installations, the device may subsequently no longer be installed in electrical installations used in combination with hazardous areas.

Observe the installation instructions according to IEC/EN 60079-14.

Connection or disconnection of energized non-intrinsically safe circuits is only permitted in the absence of a potentially explosive atmosphere.

If circuits with type of protection Ex i are operated with non-intrinsically safe circuits, they must no longer be used as circuits with type of protection Ex i.

The usage of 2400 MHz equipment is bound to local restrictions. Ensure that local restrictions allow usage of this device before commissioning.

Observe the respective peak values of the field device and the associated apparatus with regard to explosion protection when connecting intrinsically safe field devices with intrinsically safe circuits of associated apparatus (verification of intrinsic safety). Also observe IEC/EN 60079-14 and IEC/EN 60079-25.

Keep the separation distances between all non-intrinsically safe circuits and intrinsically safe circuits according to IEC/EN 60079-14.

Observe the compliance of the separation distances between two adjacent intrinsically safe circuits according to IEC/EN 60079-14.

If no  $L_o$  and  $C_o$  values are specified for the simultaneous appearance of lumped inductances and capacitances, the following rule applies.

- The specified value for  $L_o$  and  $C_o$  is used if one of the following conditions applies:
  - The circuit has distributed inductances and capacitances only, e. g., in cables and connection lines.
  - The total value of  $L_i$  (excluding cable) of the circuit is  $< 1 \%$  of the specified  $L_o$  value.
  - The total value of  $C_i$  (excluding cable) of the circuit is  $< 1 \%$  of the specified  $C_o$  value.
- A maximum of 50 % of the specified value for  $L_o$  and  $C_o$  is used if the following condition applies:
  - The total value of  $L_i$  (excluding cable) of the circuit is  $\geq 1 \%$  of the specified  $L_o$  value.
  - The total value of  $C_i$  (excluding cable) of the circuit is  $\geq 1 \%$  of the specified  $C_o$  value.
- The reduced capacitance for gas groups I, IIA, and IIB must not exceed the value of  $1 \mu\text{F}$  (including cable). The reduced capacitance for gas group IIC must not exceed the value of  $600 \text{ nF}$  (including cable).

Provide a transient protection. Ensure that the peak value of the transient protection does not exceed 140 % of the rated voltage.

Observe the tightening torque of the screws.

The device provides a grounding terminal to which an equipotential bonding conductor with a minimum cross section of  $4 \text{ mm}^2$  must be connected.

Observe the grounding requirements for type of protection Ex i according to IEC/EN 60079-14.

The associated apparatus must provide a characteristic which is limited by a resistor.

Mark permanently the selected type of protection for your specified application. Use the tick box on the nameplate for that. It is forbidden to change this marking afterwards.

The device contains aluminum. Thereby the device is considered to constitute an ignition hazard by impact effect or friction. Avoid impact effect or friction during mounting and operating.

Ensure that the degree of protection is not violated by the conduit.

Use seals that are suitable for the specified application.

## Requirements for Cables and Connection Lines

Observe the permissible cable type and cable length given in the respective hazardous area certificate.

Regarding the verification of intrinsic safety, observe the maximum permissible external capacitance of this device and the other devices in the circuit.

External capacitance $C_o$	22 $\mu\text{F}$
----------------------------	------------------

table 3

Install cables and cable glands in a way that they are not exposed to mechanical hazards.

Protect cables and cable glands from tensile load and torsional stress or use certified cable glands.

Unused cables and connection lines must be either connected to terminals or securely tied down and isolated.

## Requirements for Cable Glands

Only use cable glands that are suitably certified for the application.

Only use cable glands with a temperature range appropriate to the application.

For cable glands only use incoming cable diameters of the appropriate size.

Ensure that the degree of protection is not violated by the cable glands.

## Operation, Maintenance, Repair

Do not repair, modify, or manipulate the device.

If there is a defect, always replace the device with an original device.

When the device is in operation, maintain at all times a distance of at least 20 cm to the device antenna. This also applies to any other person in the vicinity of the device.

## Delivery, Transport, Disposal

Check the packaging and contents for damage.

Check if you have received every item and if the items received are the ones you ordered.

Keep the original packaging. Always store and transport the device in the original packaging.

Store the device in a clean and dry environment. The permitted ambient conditions must be considered, see datasheet.

Disposing of device, packaging, and possibly contained batteries must be in compliance with the applicable laws and guidelines of the respective country.

# Instruction Manual

## Marking

Bullet WirelessHART Adapter WHA-BLT-F9D0-N-A0-Z1-1
EC-Type Examination Certificate: FM 12 ATEX 0021 X Ex II 2 G Ex db IIC T6/T5 Gb Ex II 2 D Ex tb IIIC T95°C Db
FM approval: Coc3041762(C) Class I, Zone 1, (A)Ex db IIC T6/T5 Gb Class I, Zone 21, (A)Ex tb IIIC T95°C Db Class I, Division 1, Groups A - D Class II, Division 1, Groups E - G Class III
IECEX approval: IECEx FMG 12.0005X Ex db IIC T6/T5 Gb Ex tb IIIC T95°C Db

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Prior to mounting, installation, and commissioning of the device you should make yourself familiar with the device and carefully read the instruction manual.

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Do not mount a damaged or polluted device.

Avoid electrostatic charges which could result in electrostatic discharges while installing or operating the device.

If the device has already been operated in general electrical installations, the device may subsequently no longer be installed in electrical installations used in combination with hazardous areas.

Observe the installation instructions according to IEC/EN 60079-14.

The usage of 2400 MHz equipment is bound to local restrictions. Ensure that local restrictions allow usage of this device before commissioning.

Provide a transient protection. Ensure that the peak value of the transient protection does not exceed 140 % of the rated voltage.

Observe the tightening torque of the screws.

The device provides a grounding terminal to which an equipotential bonding conductor with a minimum cross section of 4 mm<sup>2</sup> must be connected.

Mark permanently the selected type of protection for your specified application. Use the tick box on the nameplate for that. It is forbidden to change this marking afterwards.

The device contains aluminum. Thereby the device is considered to constitute an ignition hazard by impact effect or friction. Avoid impact effect or friction during mounting and operating.

Ensure that the degree of protection is not violated by the conduit.

Use seals that are suitable for the specified application.

## Requirements for Cables and Connection Lines

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# 1 Introduction

## 1.1 Contents

This document contains information that you need in order to use your product throughout the applicable stages of the product life cycle. These can include the following:

- Product identification
- Delivery, transport, and storage
- Mounting and installation
- Commissioning and operation
- Maintenance and repair
- Troubleshooting
- Dismounting
- Disposal

### **Note!**

You can obtain detailed BULLE part number and ordering information from the BULLE data sheet which is available for download from the Moore Industries web site, [www.miinet.com](http://www.miinet.com).

## 1.2 Target Group, Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismounting lies with the plant operator.

Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismounting of the product. The personnel must have read and understood the instruction manual and the further documentation.

Prior to using the product make yourself familiar with it. Read the document carefully.

## 1.3 Symbols Used

This document contains symbols for the identification of warning messages and of informative messages.

### Warning Messages

You will find warning messages in instances, whenever dangers may arise from your actions. It is mandatory that you observe these warning messages for your personal safety and in order to avoid property damages.

Depending on the risk level, the warning messages are displayed in descending order as follows:



#### ***Danger!***

This symbol indicates an imminent danger.

Non-observance will result in personal injury or death.



#### ***Warning!***

This symbol indicates a possible fault or danger.

Non-observance may cause personal injury or serious property damage.



#### ***Caution!***

This symbol indicates a possible fault.

Non-observance could interrupt the device and any connected systems and plants, or result in their complete failure.

### Informative Symbols



#### ***Note!***

This symbol brings important information to your attention.



#### **Action**

This symbol indicates a paragraph with instructions. You are prompted to perform an action or a sequence of actions.

## 2 Product Specifications

### 2.1 Use and Application

The Bullet *WirelessHART* Adapter enables up to 8 HART field devices or analog field devices (with no HART capability) to communicate with host applications by means of *WirelessHART* technology. The adapter can be attached directly to a spare connection of a field device or anywhere on the 4 ... 20 mA current loop. Once a HART field device is equipped with an adapter, it communicates its primary variable (PV) over the existing wire and simultaneously communicates the primary variable (PV), secondary variable (SV), tertiary variable (TV), quaternary variable (QV) as well as diagnostic and alarm data over the *WirelessHART* network.

The adapter can be supplied by the existing current loop or by an external power supply, such as, a battery.

- When loop powered, the adapter saves users the long-term cost of battery maintenance, replacement and disposal programs. The patent pending StepVolt™ technology enables you to set the insertion voltage in steps from 1 ... 2.5 V.
- When battery powered, the adapter provides battery power management by switching the attached field devices on and off as needed.



The device is used in control and instrumentation technology (C&I technology) for wireless data transfer from HART devices.

The device is only approved for appropriate and intended use. Ignoring these instructions will void any warranty and absolve the manufacturer from any liability.

Protection of the personnel and the plant is not ensured if the device is not being used according to its intended use.

Take the intended use of the connected devices from the corresponding documentation.

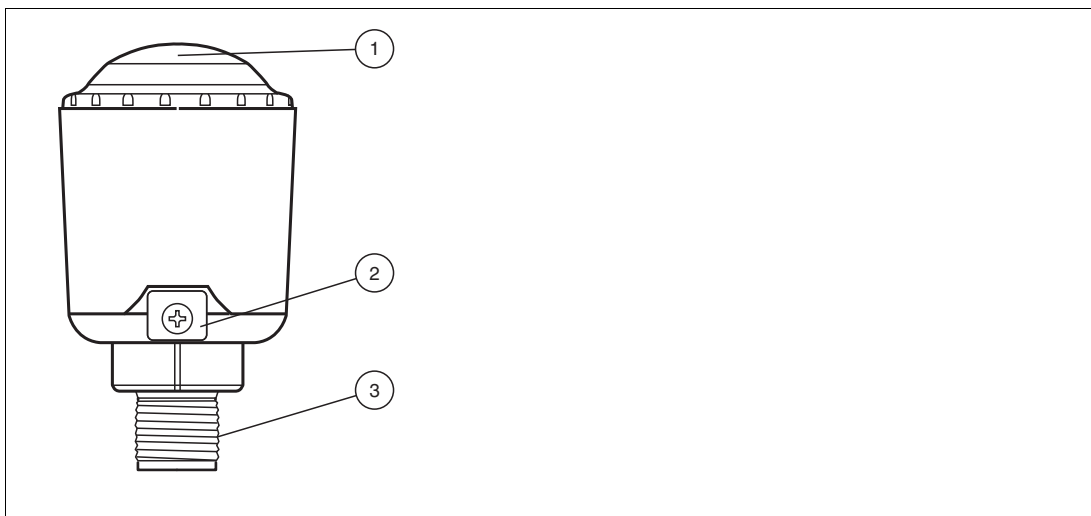
Use the device only within the specified ambient and operating conditions.

The usage of 2400 MHz equipment is bound to local restrictions. Ensure that local restrictions allow usage of this device before commissioning.

Country	Guideline
Bulgaria	General authorization required for outdoor use and public service.
Italy	If used outside of own premises, general authorization is required.
Japan	The device is granted pursuant to the Japanese Radio Law and the Japanese Telecommunications Business Law. The device must not be modified (otherwise the granted designation number will become invalid).
Latvia	The outdoor usage of the 2.4 GHz band requires an authorization from the Electronic Communications Office.
Norway	May be restricted in the geographical area within a radius of 20 km from the center of Ny-Alesund.
Romania	Use on a secondary basis. Individual license required.

## 2.2 Indicators and Operating Elements

The adapter has both a radio interface to communicate with the *WirelessHART* network and a wired HART interface to communicate with HART field devices and analog field devices (with no HART capability) on the 4 ... 20 mA current loop.



1. Encapsulated antenna
2. Grounding point
3. Male 1/2 inch NPT thread for installation on field device

## 2.3 Scope of Delivery

Check the packaging and contents for damage.

Check if you have received every item and if the items received are the ones you ordered.

- Bullet *WirelessHART*® Adapter

11010z-x0M0  
z = 0,1,2 and x=8 or P  
Refer to data sheet for more information

## 2.4 Storage and Disposal

Keep the original packaging. Always store and transport the device in the original packaging.

Store the device in a clean and dry environment. The permitted ambient conditions (see datasheet) must be considered.

Disposing of device, packaging, and possibly contained batteries must be in compliance with the applicable laws and guidelines of the respective country.

## 3 Configuration

### 3.1 Wired Configuration

Configure the adapter on the shop floor using a **wired connection** prior to its installation in the field.

1. Define basic settings, such as, wireless communication parameters and identification parameters using a HART modem.
2. Make the adapter join the *WirelessHART* network.
3. Once the adapter has joined the *WirelessHART* network, configure the burst settings and other application settings using a HART modem.
4. Disconnect the HART modem and install the adapter in the field.



#### **Caution!**

Loss of type of protection

If circuits with type of protection Ex i are operated with non-intrinsically safe circuits, they must no longer be used as circuits with type of protection Ex i.

When configuring an adapter with type of protection Ex i, use a HART modem with type of protection Ex i to communicate with the adapter.



#### **Caution!**

Damage due to overcurrent

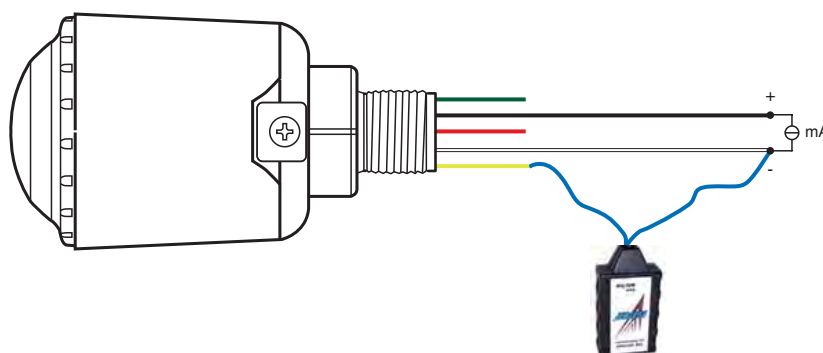
A current that exceeds the operating specifications of the device can cause damage to the device.

Ensure that the supplied current never exceeds 32 V DC.



#### Setup for Wired Configuration

1. Connect the black conductor (Direct Power) to the positive terminal (+) of the power supply and the white conductor (Return) to the negative terminal (-) of the power supply.
2. Connect the HART modem to the yellow conductor (HART) and white conductor (Return) of the adapter. The HART connection is polarity independent.
3. Make sure the red conductor (Loop Power) of the adapter is not connected to the power supply or ground connection.



4. Turn on the power supply. Make sure the adapter is supplied with 7 ... 32 V DC.  
↳ The adapter is ready to be configured.

## 3.2 Configuration via Device Type Manager (DTM)

Once the adapter is connected to a HART modem, you can configure the adapter using a PC that has an FDT frame application installed, for example, PACTware™. Furthermore, the HART communication DTM and the DTM of the adapter must be installed on the PC.




### Install Components

1. Download the latest version of PACTware, from <http://www.miinet.com/> and the HART communication DTM and the DTM of the adapter on the BULLET product page.
2. and the HART communication DTM and the DTM of the adapter at <http://www.miinet.com/InterfaceSolutionDownloadCenter/Products.aspx?product=244>



### Create New Project?

1. Start PACTware.
2. Select **File > New** or click  **Create New Project**.
  - ↳ A new, unnamed project appears in the main window. The project initially consists of the entry **HOST PC**.



### Update Device Catalog

1. Select **View > Device Catalog**.
  - ↳ The **Device Catalog** window opens.
2. Click **Update Device Catalog** to update the device catalog.
3. Click **Yes** to continue.
  - ↳ The device catalog has been updated and newly installed components, such as the HART communication DTM and the DTM of the adapter have been integrated into the catalog.

### 3.2.1 HART Communication DTM

A communication DTM is an interface between the FDT frame application and the DTM of the device.

For the PC to communicate with the device via the HART modem, a HART communication DTM has to be added to the PACTware project.



#### Add HART Communication DTM

1. Select **HOST PC** in the project view of your PACTware project.
2. Choose **Device > Add device** or click the **Add device** icon on the toolbar.



↳ The **Device for** window appears.

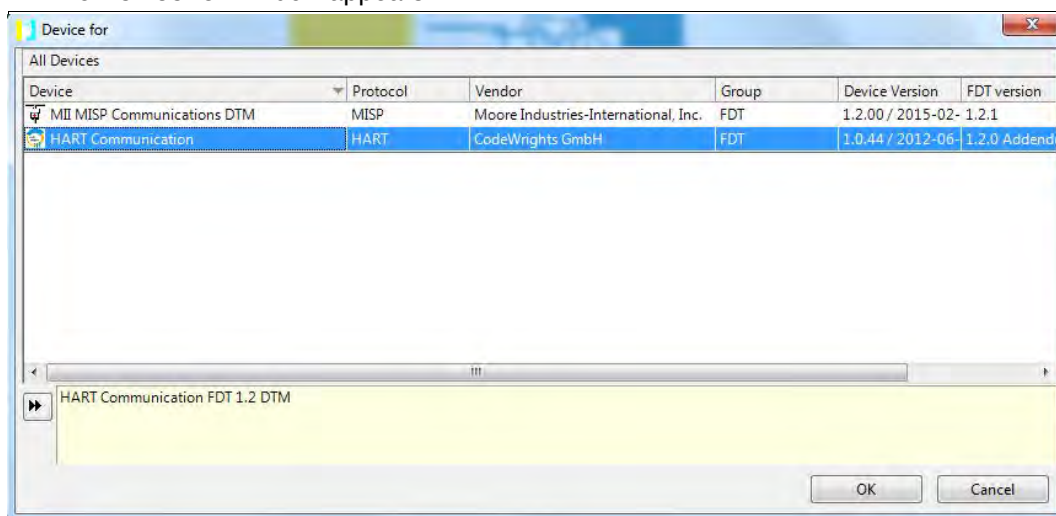


Figure 3.1 Device selection

3. Select **HART communication**.
4. Click **OK**.

↳ The HART communication DTM is added to the project.

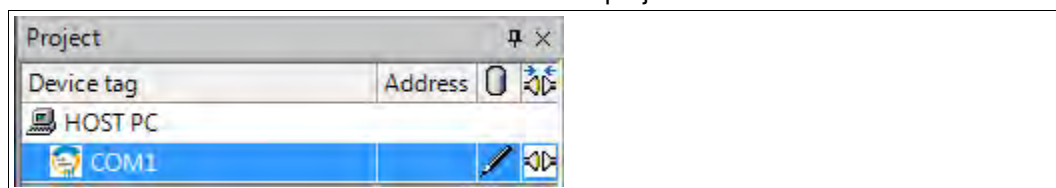


Figure 3.2 Project view

5. To edit the parameters, double-click the HART communication DTM.

↳ The parameter window appears.



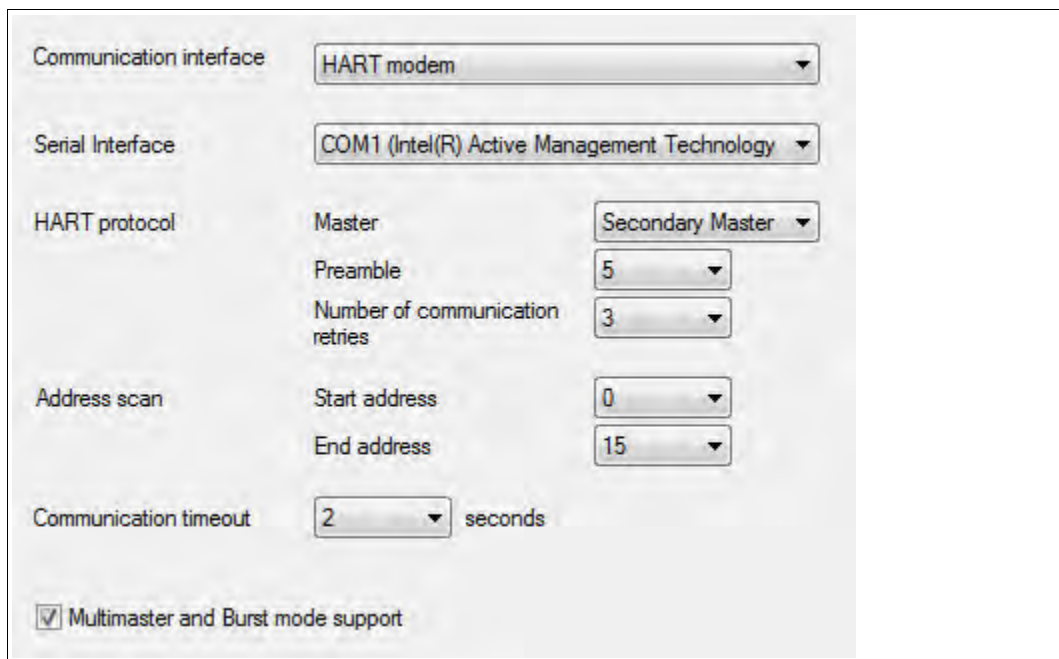


Figure 3.3 Parameter window

6. Set the parameters according to the following table.
7. Click **OK** to save the changes and to close the parameter window.

Parameter	Description	Default
<b>Communication interface</b>	Set this parameter to <b>HART modem</b> .	HART modem
<b>Port</b>	Select the COM port that your HART modem is connected to.	COM1
<b>Master</b>	The adapter is configured as a primary master. Therefore the device used to configure the adapter should be configured as secondary master. Set this parameter to <b>Secondary Master</b> .	Primary Master
<b>Preamble</b>	Number of preambles for HART communication.	5
<b>Number of communication retries</b>	The number of retries in case of an error.	3
<b>Start address</b>	Defines the address range, in which the HART communication DTM searches for HART devices connected to the HART modem. The default polling address of the adapter is 15.	0
<b>End address</b>		0
<b>Communication timeout</b>	If no communication takes place during this time frame, the connection is reestablished unless the number of communication retries is used up.	2
<b>Multimaster and Burst mode support</b>	Enables support for multiple masters and burst mode.	Activated

### 3.2.2 Adapter DTM

After you have added a communication DTM, add the adapter DTM to the PACTware project.

#### Add Adapter DTM

1. In the project view, right-click the HART communication DTM.

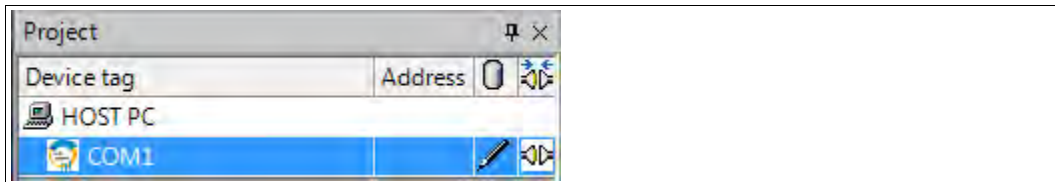


Figure 3.4 Project view

2. To add the adapter DTM, choose **Add device** from the context menu.

↳ The **Device for** window opens.

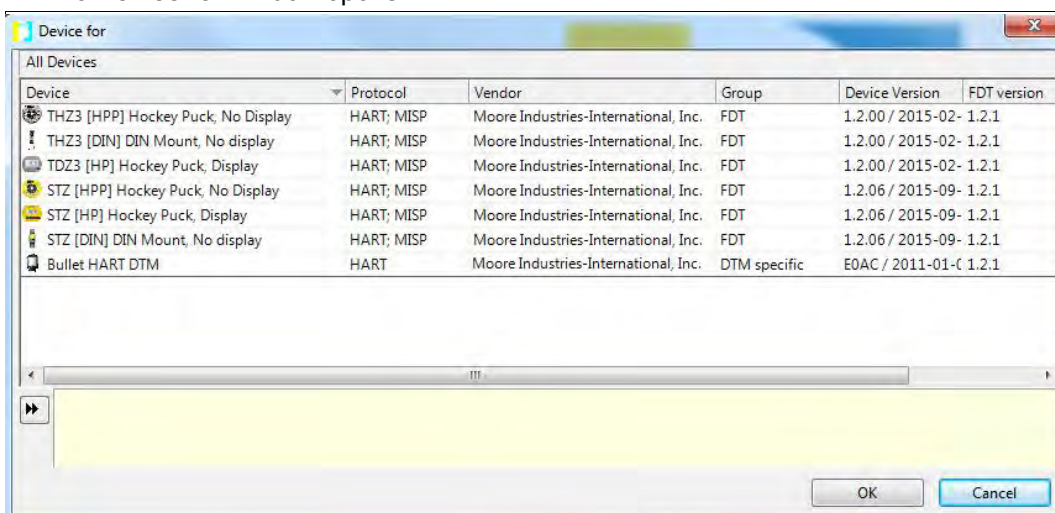


Figure 3.5 Device selection

3. Select **Bullet HART DTM**.
4. Click **OK**.

↳ The adapter is added to the project. Now you can configure the adapter as if you had a wired connection.

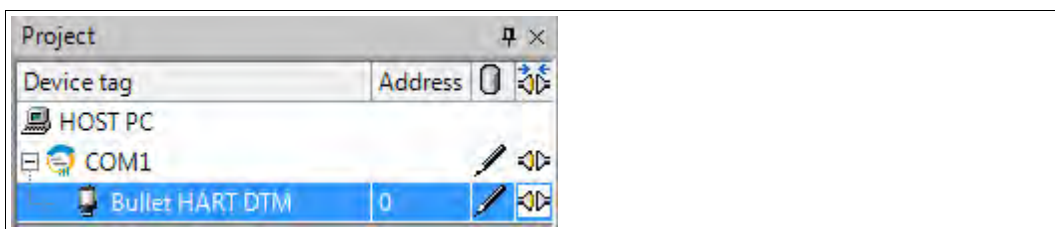


Figure 3.6 Project view

5. Right-click the adapter DTM.
6. Select **Additional Functions > Communication**.
7. Select the polling address **15** and click **Apply**.

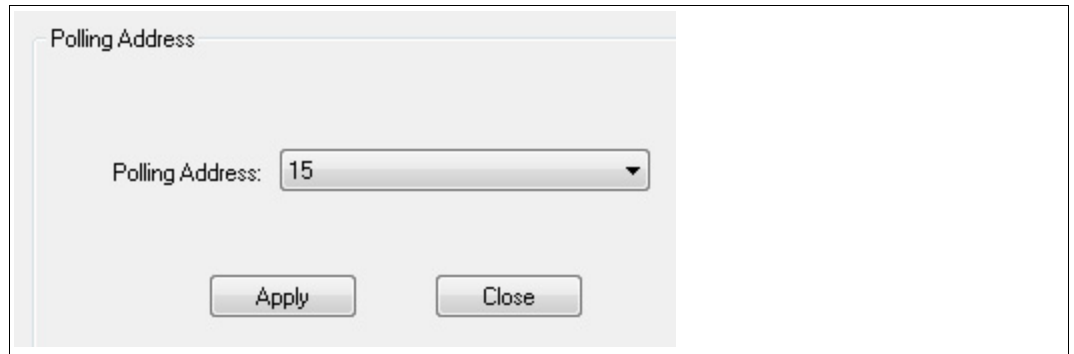


Figure 3.7 Set polling address

8. Click **Close**.

### 3.2.3 Online and Offline Parameterization (DTM)

The concept of online and offline parameterization applies only to configuration via DTM and PACTware.

- **Offline Parameterization** (not connected to device)

If there is no active connection to the device, you can edit and save the data that is stored locally in PACTware. You can transfer the local data to the device, as soon as a connection to the device has been established.

- **Online Parameterization** (connected to device)

If there is an active connection to the device, you can directly edit the data that is stored on the device. Parameter changes are immediately stored on the device.



**Note!**

Data that is edited and stored on the device during online parameterization is **not** automatically synchronized with the offline data in the PACTware project. If you change device parameters in online mode, the data in PACTware differs from the data on the device. To make sure the data in PACTware matches the data on the device after online parameterization, load the data from the device into the PACTware project.



#### Offline Parameterization

1. Right-click the device in the PACTware project view.
2. Choose **Parameter > Offline Parameterization**.
  - ↳ The window containing the offline data record appears.
3. Modify a parameter by typing in a new value or choosing a new value from the drop-down list.
4. To accept the new value, press **Enter**.
5. After all parameter changes have been made, save your project by choosing **File > Save**.
6. To write the new offline configuration to the device, right-click the device in the project view and choose **Connect**.
  - ↳ A connection to the device is established.
7. Right-click the device again and choose **Store to device**.
  - ↳ The new configuration is stored in the device.



## Online Parameterization



### Note!

Some options are only available during online parameterization. These options are pointed out in the relevant sections.

1. Right-click the device in the PACTware project view.
2. Select **Connect**.
  - ↳ A connection to the device is established.
3. Right-click the device in the PACTware project view.
4. Select **Parameter > Online Parameterization**.
  - ↳ The window containing the online data opens and the data is read from the device.
5. Modify a parameter by typing in a new value or choosing a new value from the drop-down list.
6. To accept the new value, press **Enter**.
  - ↳ The new value is stored in the device immediately.
7. After all parameter changes have been made, you can load the online configuration into the PACTware project. To do this, right-click on the device entry in the project view and choose **Load from device**.
8. Save your project by choosing **File > Save**.

### 3.2.4

## Setup Wizard

The setup wizard enables you to define basic parameters, such as, network ID and join key.



### Note!

This submenu is available only during online parameterization.



## Run Setup Wizard

1. Right-click the adapter DTM.
2. Select **Connect**.

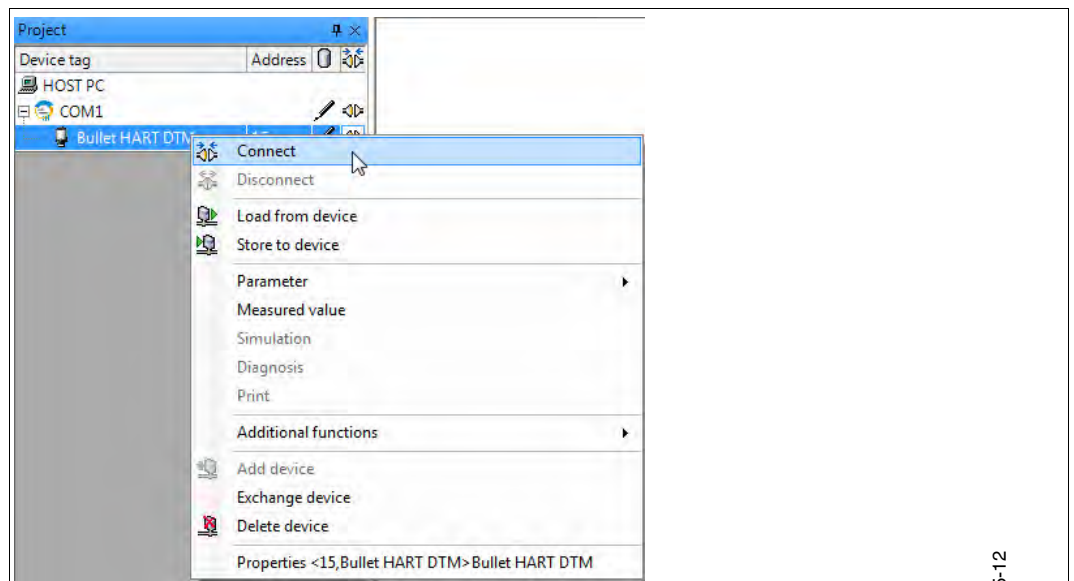


Figure 3.8 Connect to device

2015-12

3. To edit the parameters, double-click the adapter DTM.

↳ The **Online Parameterization** window opens with the **Adapter Overview** screen.

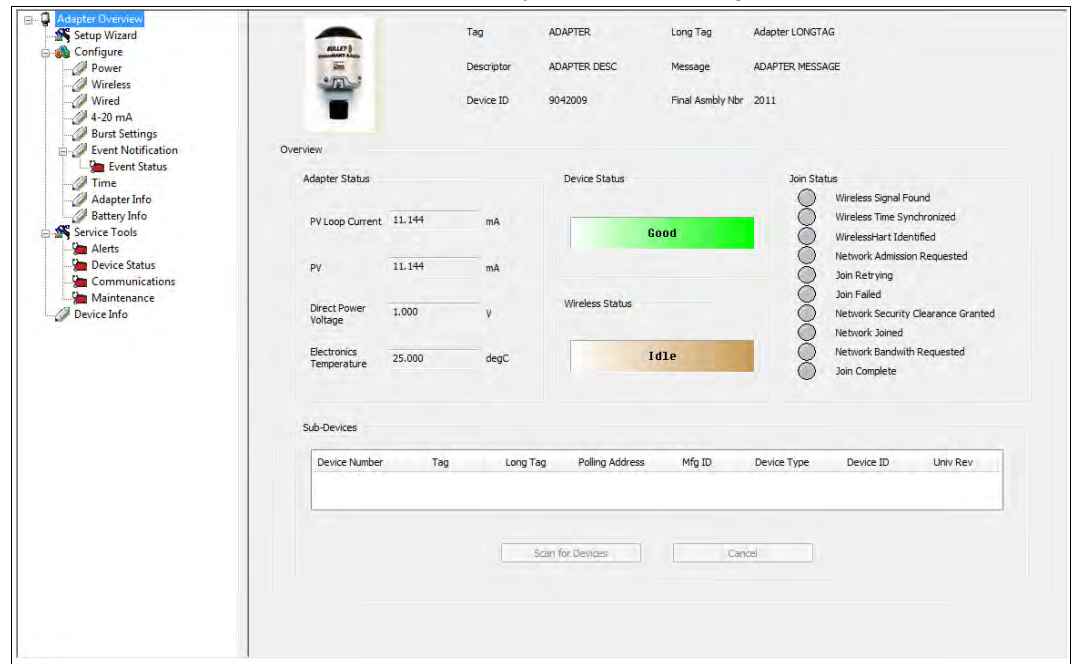


Figure 3.9 Adapter Overview

4. Select **Setup Wizard**.

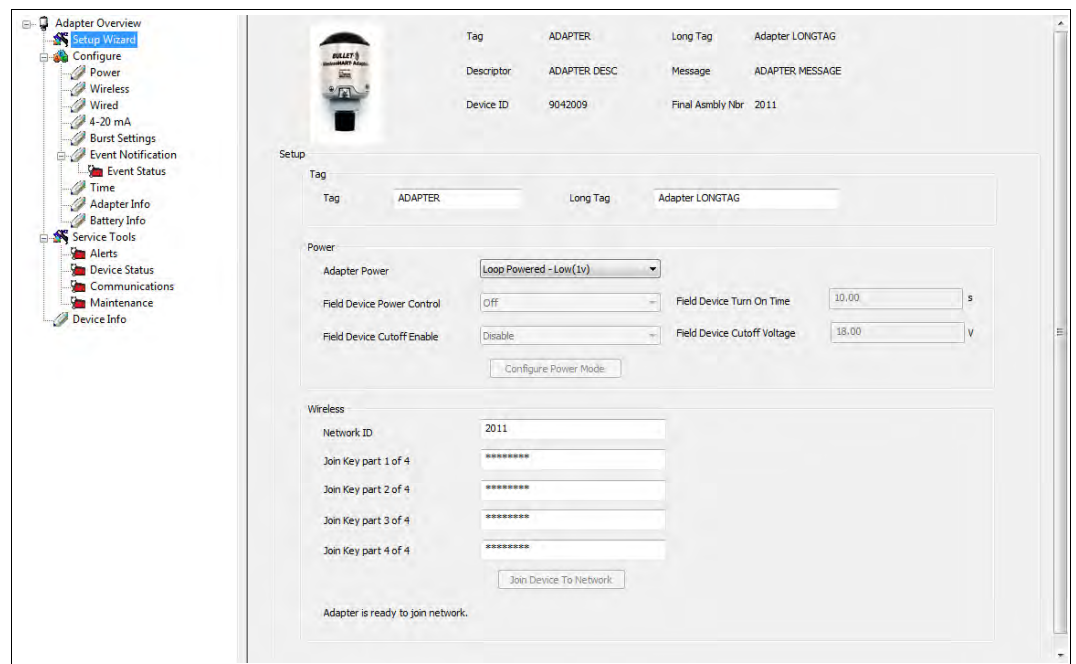


Figure 3.10 Setup Wizard

5. The setup wizard enables you to define the tag, the long tag, the way the adapter is supplied, as well as the network settings. For more information on the available options, see the following chapters.

### 3.2.5 Power

This submenu enables you to define the way the adapter is supplied.



**Note!**

This submenu is available only during online parameterization.

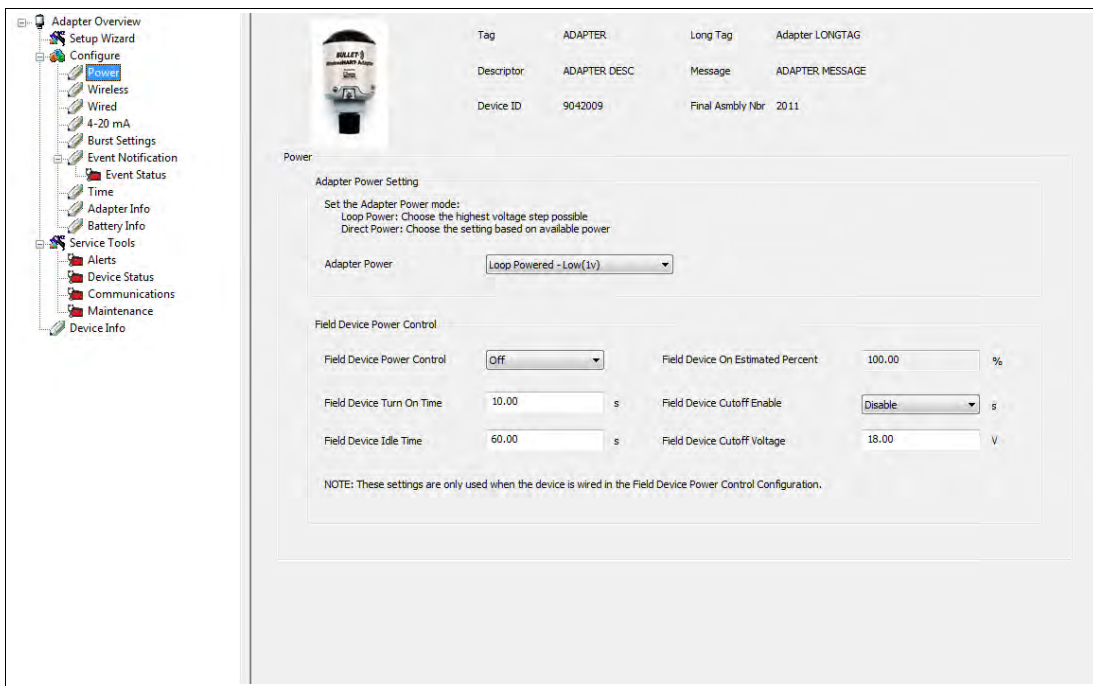


Figure 3.11 Power options

### Adapter Power Setting

By default, the adapter is loop powered with an insertion voltage drop of 1 V DC.

The following options are available.

Option	WirelessHART Packets per Second (as reported by HART command 777)	Description
Loop Powered - 1.0 V	4.25	StepVolt™ settings when loop powered
Loop Powered - 1.5 V	12.65	
Loop Powered - 2.0 V	19.66	
Loop Powered - 2.5 V	26.66	
Direct Powered - Max Bandwidth	101.40	Provides maximum bandwidth, assuming the powers supply supplies 32 V
Direct Powered - Power Save	26.66	Limits the number of <i>WirelessHART</i> data packets, assuming the power supply is limited
Direct Powered - Battery	26.66	Assumes that the power supply is a battery and enables the battery management functions, such as, battery life calculations and alerts

2015-12

The adapter can be supplied by an external DC powers supply and wired in series with the 4 ... 20 mA current loop at the same time. If the adapter is configured in any of the **Direct Power** options and wired in series with the current loop, there will be an insertion voltage drop of 1.0 V DC.



### **Warning!**

Field device failure due to insufficient power supply

If the adapter has an internal failure and stops regulating the StepVolt™ value, the maximum insertion voltage drop can rise up to 4.935 V DC.



### **Note!**

The adapter will power up and operate with any configuration. This enables you to change the configuration of an incorrectly configured device. However, you should change the power options before the adapter joins the *WirelessHART* network. Once the adapter joins the *WirelessHART* network it might reset itself due to insufficient power supply.

## **Field Device Power Control**

If the adapter is directly powered by an external current source, the adapter can activate a terminator of 250 Ω between the HART and the RETURN conductors. In some installations this can eliminate the need for an external terminator.

The **Field Device Power Control** option allows you to control the power supply for the field devices by switching them on and off. The following options are available.

- **Off**

Power supply for field devices is switched off.

- **On**

Power supply for field devices is switched on.

- **Switching**

Power supply for field devices is automatically switched on and off by the adapter.

When **Switching** is enabled, the adapter switches the field devices on and off as needed. This can be used to switch off a field device between measurements, of example, if the field device is supplied by a limited power supply, such as, a battery.

When used in combination with burst mode, the adapter schedules measurements from the field devices, and turns them on when a scheduled measurement is needed. After all measurements have been read from the field devices, the adapter turns off the supply for the field devices.

Note that the **Field Device Turn On Time** must be sufficiently long, in order to obtain accurate measurements from the field devices. Otherwise, the field device may not have enough time to power up, initialize and respond with a correct measurement value before the power supply is switched off again.

The **Field Device Idle Time** is the duration for which a field device remains powered after an unscheduled event. Such events could be a HART query from a handheld or the detection of another HART master trying to communicate with the field device. This option prevents the adapter from switching off the field device when another master communicates with the field device.

**Field Device On Estimated Percent** displays the estimated time that the field device is supplied during normal operation. The calculation is based on the **Field Device Turn On Time** and the burst mode settings of the adapter.

**Field Device Cutoff Enable** enables the adapter to turn off the power supply for field devices when the power of the power supply drops below the value that is defined in the **Field Device Cutoff Voltage** field. To use this option, **Field Device Power Control** must be set to **On** or **Switching**.

Note that there is a built-in 0.5 V hysteresis for the **Field Device Cutoff Voltage**.



**Note!**

**Battery-Powered Operation**

If the adapter is loop powered, the adapter and field devices are continuously powered on. If the adapter is directly powered, the adapter can switch the field devices on and off, which results in a prolonged battery life.

In order to manage the battery power, the **Field Device Power Control** option must be set to **On**. This enables you to define the **Field Device Turn On Time** and **Field Device Idle Time** as required by the field device for correct operation and as required by the application.

See chapter 3.2.13

### 3.2.6 Wireless

This submenu enables you to define the network settings for joining the *WirelessHART* network.



**Note!**

This submenu is available only during online parameterization.

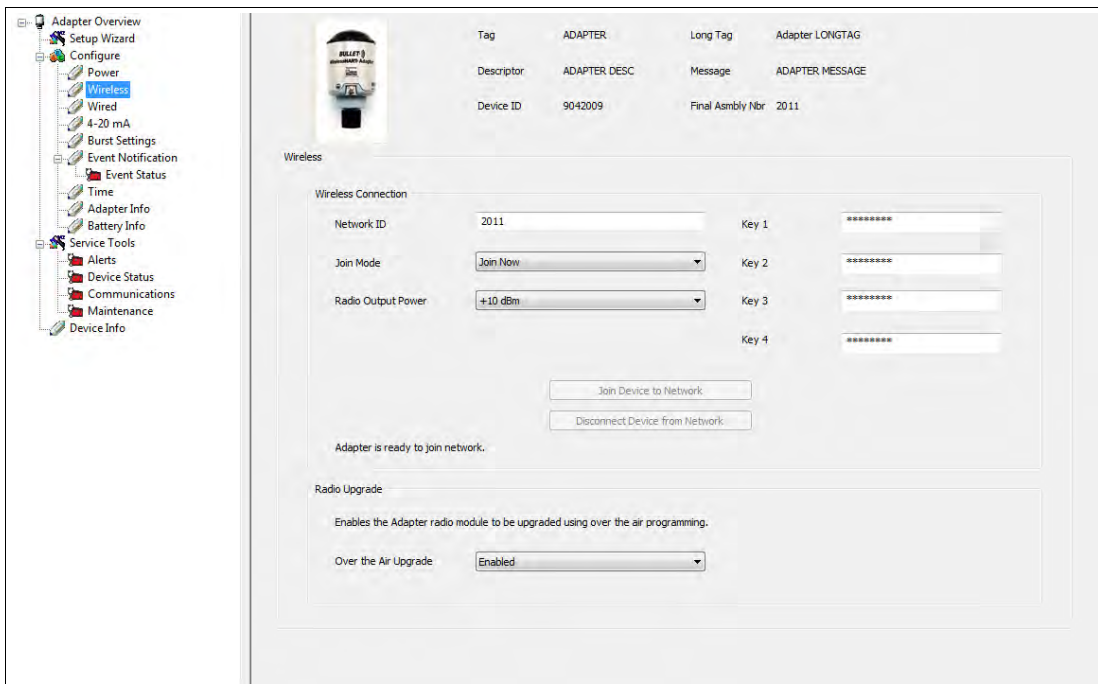


Figure 3.12 Wireless options

### Wireless Connection

The **Network ID** is the identifier of the *WirelessHART* network to join.

The **Join Key** is a 32 character hexadecimal password that is used to access the *WirelessHART* network.



The **Join Mode** defines when the adapter should connect itself to the *WirelessHART* network. The following options are available.

- **Don't attempt to join**  
Do not connect to the *WirelessHART* network.
- **Join Now**  
Manually connect to the *WirelessHART* network.
- **Attempt to join immediately on powerup or reset**  
Automatically connect to the *WirelessHART* network.



**Danger!**

Explosion hazard

If the emitted power level is too high, a potentially explosive atmosphere can ignite

- Respect the limitations for explosion-hazardous areas.
- Respect local restrictions for usage of 2400 MHz equipment. If in doubt, consult your national regulations expert.

The **Radio Output Power** defines the power level of the radio transmitter. This option can be set to either **0 dBm** (1.3 mW) or **+10 dBm** (10 mW).

**Radio Upgrade**

If **Over the Air Upgrade** is enabled, the device data can be updated over the *WirelessHART* network.

3.2.7

**Wired**

This submenu enables you to define the settings for communicating with HART field devices.



**Note!**

This submenu is available only during online parameterization.

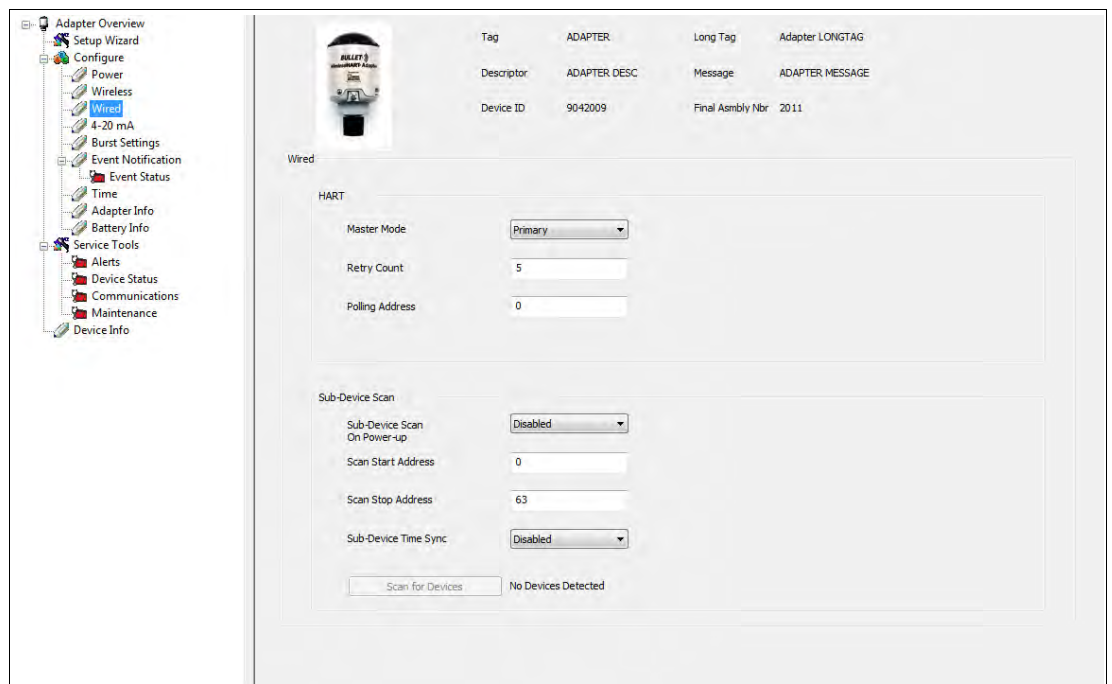


Figure 3.13 Wired options

## HART

The **Master Mode** defines whether the adapter acts as a primary or a secondary master when communicating with HART field devices.

The **Retry Count** defines how often the adapter retries to communicate with HART field devices as a HART master.

The **Polling Address** defines the HART polling address that is used to communicate with the adapter over a wired HART connection, for example, using a HART modem.

## Sub-Device Scan

When **Sub-Device Scan On Power-up** is enabled, the adapter scans the 4 ... 20 mA current loop for HART field devices on power-up and after a reset. The HART field devices that have been detected are added to the list of sub-devices and can be accessed over the *WirelessHART* network.

We recommend, that you leave this option enabled. If disabled, the host must support scanning for sub-devices or you must initiate the scan manually by clicking **Scan for Devices**. Furthermore, each time the adapter is powered-up or reset, the list of sub-devices is lost and the network must be rescanned.



### Note!

The scan for sub-devices is performed only during power-up or reset of the adapter. If an additional field device is added to the current loop while the adapter is in normal operation, you must reset the adapter or initiate the scan manually by clicking **Scan for Devices** to detect the new field device.

**Scan Start Address** designates the first HART polling address that is used when scanning for sub-devices.

**Scan Stop Address** designates the last HART polling address that is used when scanning for sub-devices.

If **Sub-Device Time Sync** is enabled, the adapter can synchronize the sub-device time with the *WirelessHART* network time for HART devices supporting HART 7 or greater. If the sub-device does not support a real-time clock, this option has no effect. Synchronization is performed once a day.

### 3.2.8 4 ... 20 mA

When the adapter is connected to an analog field device (with no HART capability), the adapter can measure the current on the 4 ... 20 mA current loop. The adapter can convert the measured value into another engineering unit and communicate the result as primary variable (PV) over the *WirelessHART* network.



**Note!**

This submenu is available only during online parameterization.

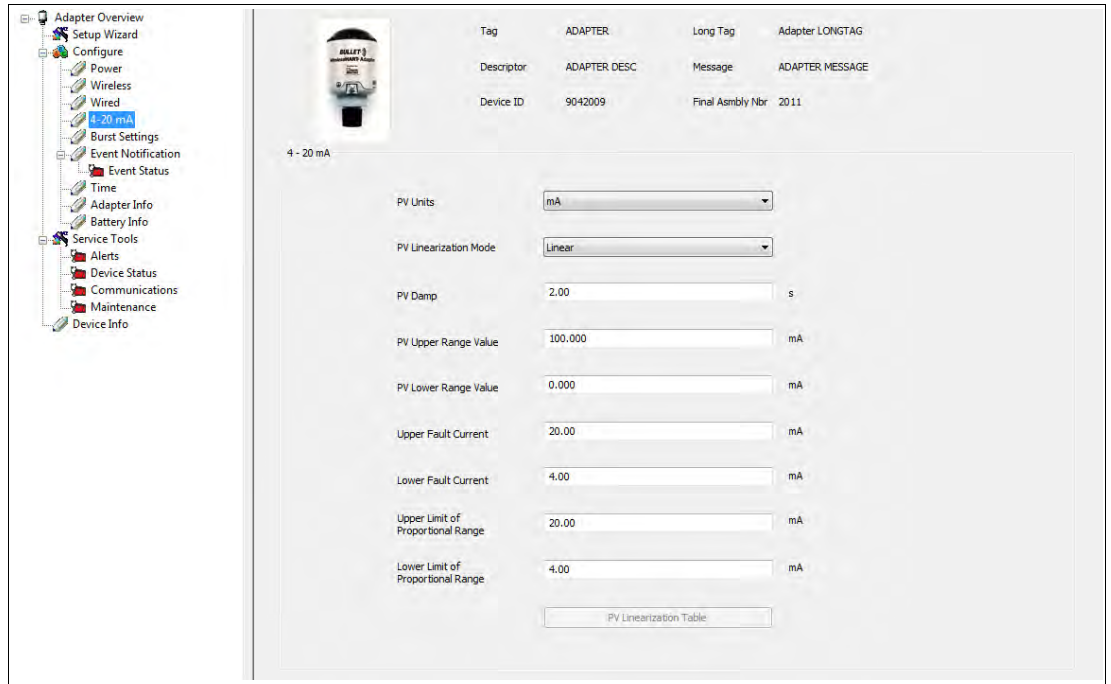


Figure 3.14 4 ... 20 mA options

### 4 ... 20 mA

**PV Units** defines the unit that the primary variable (PV) is reported as.

The **PV Linearization Mode** enables you to define different linearization tables for the measured values. The following options are available.

- **Linear**

A basic linear calculation will be performed to convert the measured values. The **PV Upper Range Value** and the **PV Lower Range Value** correspond to the 4 ... 20 mA points.

- **Special Curve**

This option enables you to define individual linearization tables. Click **PV Linearization Table** to enter data pairs for mapping a current value of the 4 ... 20 mA current loop to another engineering unit. The table must have at least two data pairs and can have up to 32 pairs.

**PV Damp** defines the attenuation value in seconds that is applied to the PV.

If the current on the 4 ... 20 mA current loop exceeds the **Upper Fault Current**, the adapter sets a HART loop current alarm.

If the current on the 4 ... 20 mA current loop falls below the **Lower Fault Current**, the adapter sets a HART loop current error.

If the current on the 4 ... 20 mA current loop exceeds the **Upper Limit of Proportional Range**, the adapter sets a HART loop current warning.

If the current on the 4 ... 20 mA current loop falls below the **Lower Limit of Proportional Range**, the adapter sets a HART loop current warning.

### 3.2.9 Burst Settings

Burst settings enable the adapter to publish data in regular intervals without being polled by a host.



**Note!**

This submenu is available only during online parameterization.

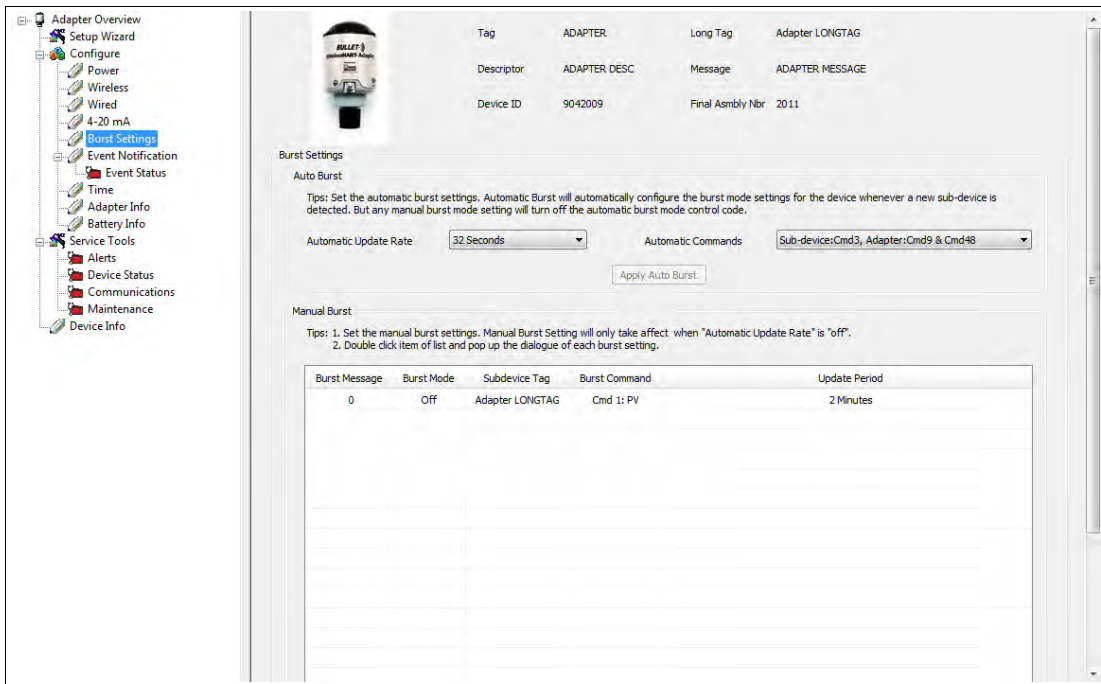


Figure 3.15 Burst options

### Auto Burst

When automatic configuration is enabled, the adapter automatically configures the burst messages for the adapter and all of the connected sub-devices.

The **Automatic Update Rate** enables you to define a fixed update rate. The following options are available.

- **Off**  
Disable automatic configuration of burst settings.
- **1 ... 32 seconds**  
Select an update rate between 1 and 32 seconds in which all of the burst messages will be published to the *WirelessHART* gateway.
- **1 ... 60 minutes**  
Select an update rate between 1 and 60 minutes in which all of the burst messages will be published to the *WirelessHART* gateway.

Select the commands that will be used for automatic configuration from the **Automatic Commands** drop-down list.

Click **Apply Auto Burst** to enable automatic configuration.



**Note!**

If automatic configuration is enabled while a manual configuration has already been activated, the manual configuration is overwritten.

If a manual configuration is activated while an automatic configuration has already been enabled, the automatic configuration is disabled.

**Manual Burst**

To define the burst settings manually, double-click a row in the **Manual Burst** table. In the **Burst Message Setting** window you can define the commands, trigger options, and update periods for each burst message.

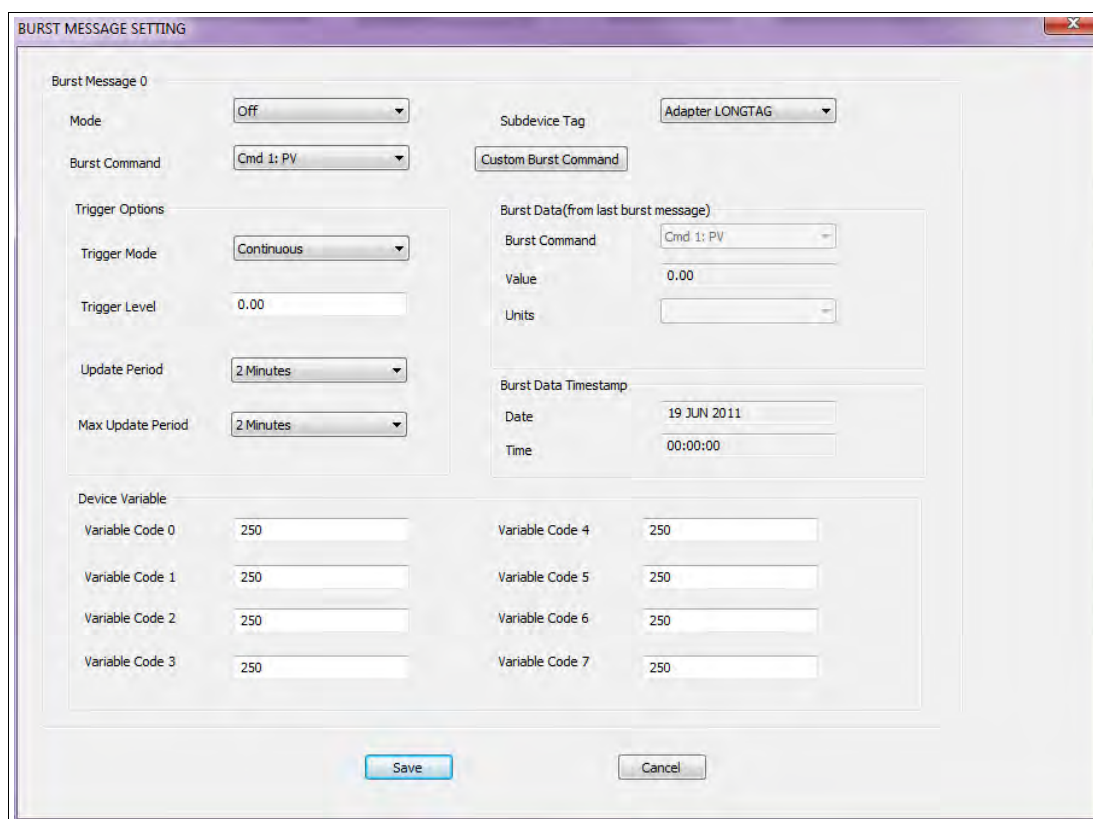


Figure 3.16 **Burst Message Setting** window

Click **Apply Manual Burst** to activate the manual configuration.

### 3.2.10 Event Notification

The adapter detects and logs different event messages. This submenu enables you to activate or deactivate selected standard events and device-specific events.



**Note!**

This submenu is available only during online parameterization.

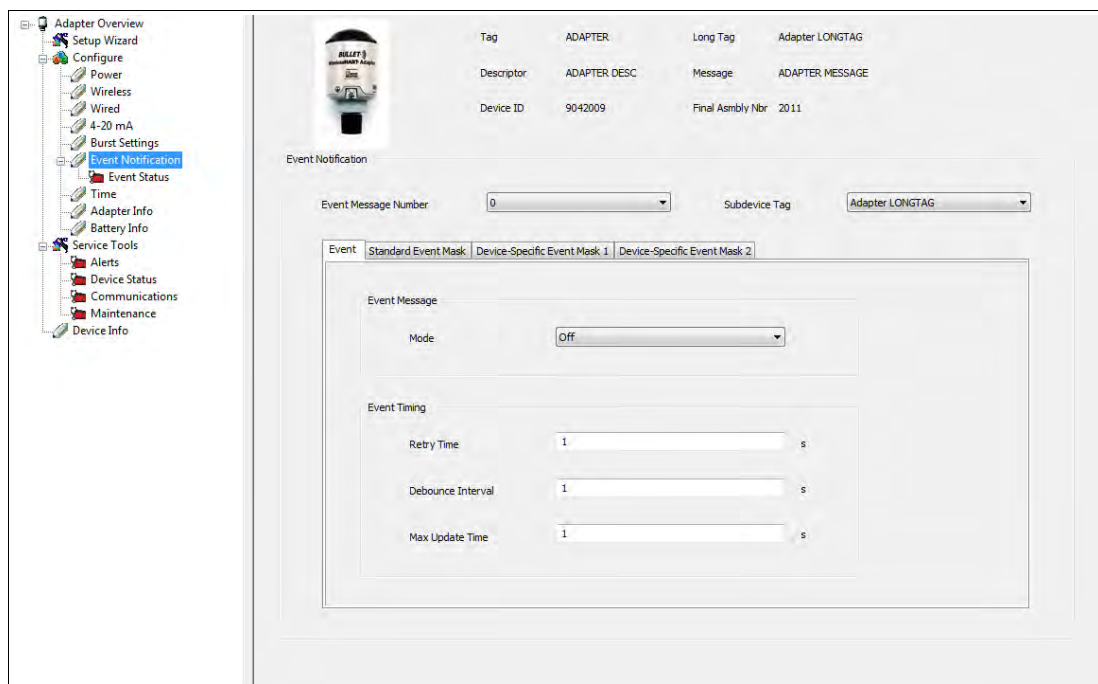


Figure 3.17 Event notification options

Select **Event Status** in the navigation area on the left, to see the current status of the selected events.

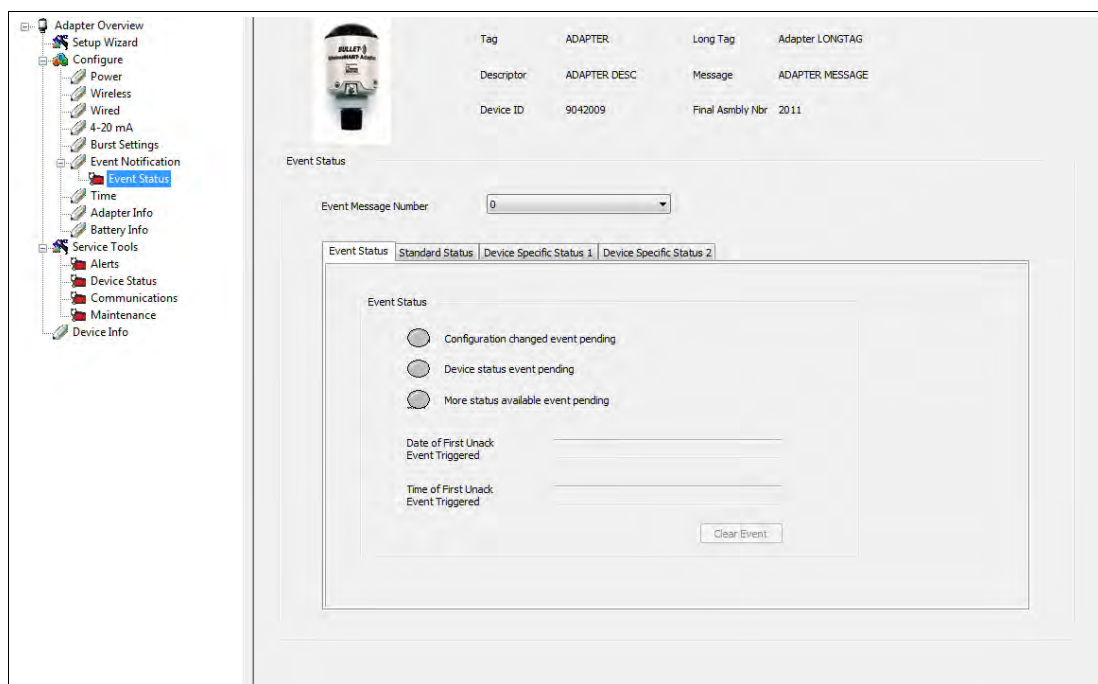


Figure 3.18 Event status overview

### 3.2.11 Time

This submenu displays the current time of the internal clock of the adapter as well as the uptime of the adapter.



**Note!**

This submenu is available only during online parameterization.

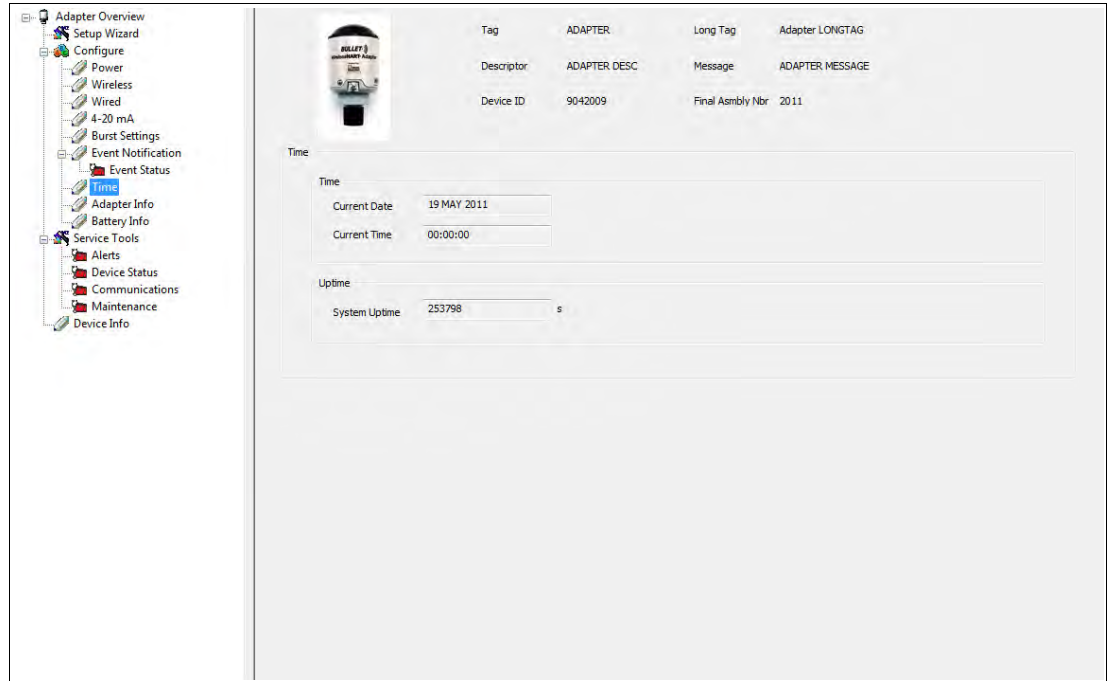


Figure 3.19 Current time and uptime

## 3.2.12 Adapter Info

This submenu enables you to define the identification parameters to identify the adapter within the *WirelessHART* network.



### Note!

This submenu is available only during online parameterization.

Tag	ADAPTER	Long Tag	Adapter LONGTAG
Descriptor	ADAPTER_DESC	Message	ADAPTER_MESSAGE
Device ID	9042009	Final Assembly Nbr	2011

Adapter Information

Adapter Information

Tag:  Long Tag:

Descriptor:  Message:

Final Assembly Num:  Date:

Country:  SI Unit Control:

Electronics Temperature:

Write Protected

Tips: If "Write Protected" is enable, only read operations are allowed, any writing operations will be prohibited.

Write Protected:

Figure 3.20 Adapter identification options

### Adapter Information

The **Tag** identifies the field device within the process plant. Enter up to 8 characters.

The **Long Tag** identifies the device in a *WirelessHART* network. Enter up to 32 characters.

The **Descriptor** contains a description of the device. Enter up to 16 characters.

The **Message** field enables you to define a device-specific message. Enter up to 32 characters.

The **Final Assembly Num** field enables you to enter an identifier for the connected field device.

The **Date** field enables you to enter a date. Use the following date format dd/mm/yyyy.

The **Country** field enables you to define the country of installation.

The **SI Unit Control** field enables you to select whether you want to use only SI units, for example, for converting a current value on the 4 ... 20 mA current loop into another engineering unit.

The **Electronics Temperature** field enables you to define whether you want to use the Celsius, Fahrenheit, or Kelvin scale for temperatures.

### Write Protected

If **Write Protected** is enabled, the configuration of the adapter cannot be changed. The factory default setting is **Disabled**. If you changed this option, click **Apply** to apply the current setting.



### 3.2.13 Battery Info

If the adapter is supplied by an external battery, this submenu enables you to define basic battery settings and to monitor battery consumption.

To determine the remaining battery life, the adapter employs the battery voltage and the battery coulomb discharge rate. Both variables are continuously monitored.



**Note!**

This submenu is available only during online parameterization.

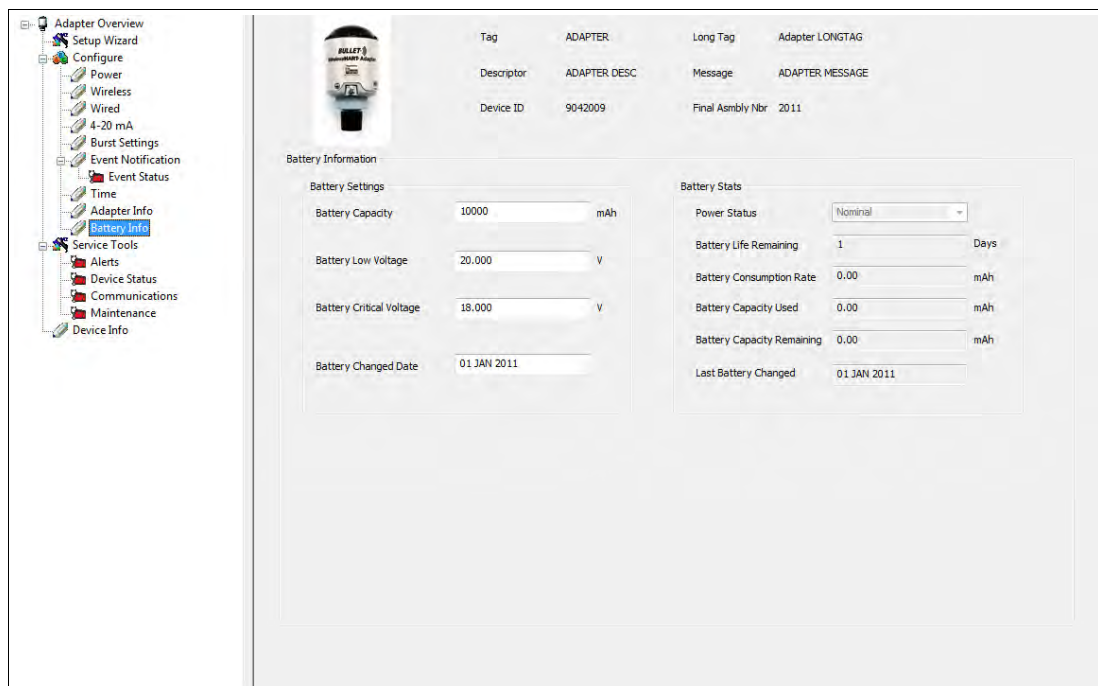


Figure 3.21 Battery options

### Battery Settings

Enter the capacity of the battery in mAh in the **Battery Capacity** field. This value is used by the Coulomb algorithm to determine the remaining battery life in days.

If the voltage falls below the **Battery Low Voltage**, the power status is set to **Low** and the remaining battery life is set to 25 days or less. This value is used as an independent check beside the Coulomb algorithm.

If the voltage falls below the **Battery Critical Voltage**, the power status is set to **Critical** and the remaining battery life is set to 0 days. This value is used as an independent check beside the Coulomb algorithm.

Enter the date of the battery change in the **Battery Changed Date** field. Use the following date format dd/mm/yyyy. The battery counter is reset on this date.

### Battery Stats

WirelessHART defines 3 power status levels for battery powered devices.

1. **Nominal**

The power supply is operating correctly.

2. **Low**

The power supply should be exchanged when the low indication is set.

3. **Critical**

The power supply should be exchanged immediately. Otherwise, an interruption of the power supply will happen in the immediate future.

The current battery ratings are displayed below the **Power Status**.

### 3.2.14

### Alerts

The adapter detects and logs system events when something has occurred that could affect system operation. All alerts are mapped into HART command 48 status bits.



**Note!**

This submenu is available only during online parameterization.

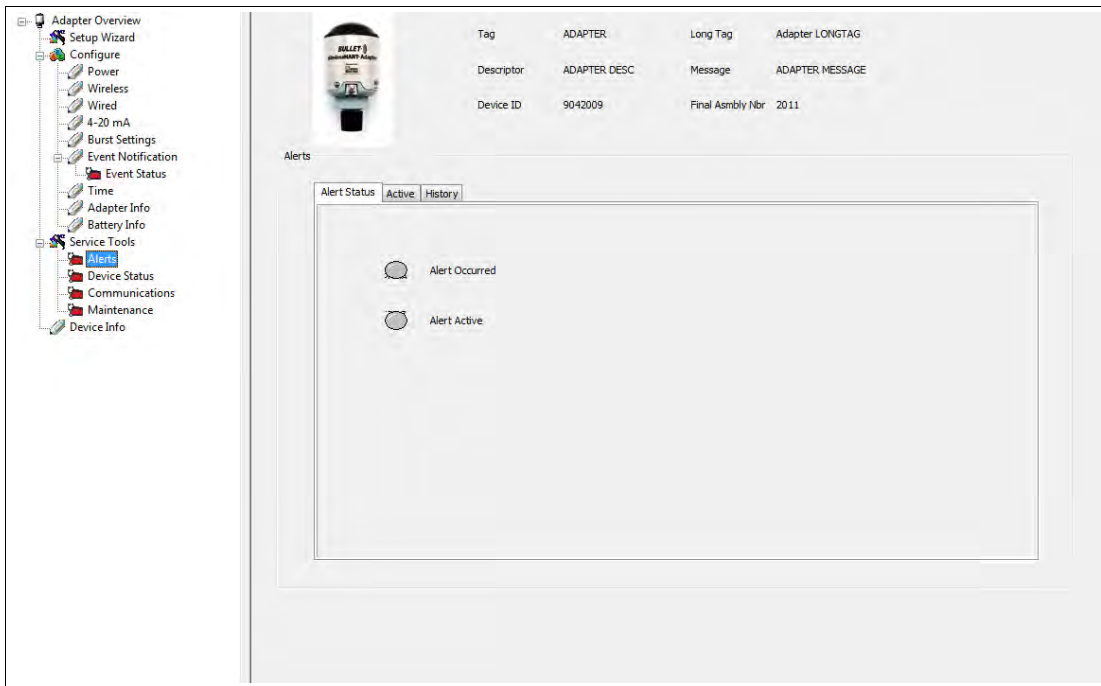


Figure 3.22 Alerts

Alerts are divided into active and historic alerts.

- Active alerts are displayed on the **Active** tab. The condition that caused the alert is still present. Active alerts cannot be cleared. A corrective action must be taken to eliminate the alert, for example, if the power status of an external battery is **Low**, the battery must be exchanged to clear the alert.
- Historic alerts are displayed on the **History** tab. The condition that caused the alert is no longer present, or the alert is a one-time event. The **Start Date** and **Start Time** indicate when the condition first occurred and the **Stop Date** and **Stop Time** indicate when the condition stopped, or the last time that the condition was detected.

Click **Clear** to eliminate the alert history.

### Alerts

Alert	Description	Corrective Action
Direct Power Out of Range	The adapter is configured for direct power (external power supply) and the voltage on the input is out of range.	Check the external power supply.
Loop Power Out of Range	The adapter is configured to be loop powered and the voltage on the input is out of range.	Check the current on the 4 ... 20 mA current loop.
Temperature Out of Range	The <b>Electronics Temperature</b> is out of range. See chapter 3.2.14	Check whether the adapter is used within the specified ambient conditions.
Power Mode Misconfigured	The power supply detected on the inputs does not match the configuration.	Check the power options. See chapter 3.2.5
Watchdog Reset	The microprocessor inside of the adapter has experienced a watchdog reset event.	Clear the alert. Report the event to customer support.
Stack Overflow	The microprocessor inside of the adapter has experienced a stack overflow event.	Clear the alert. Report the event to customer support.
Duplicate HART Master Detected	A HART master has been detected that has the same master type as the adapter. This prevents the adapter from communicating with the connected sub-devices.	Check the <b>Master Mode</b> of the adapter. If using a HART Handheld, make sure it is not set for the same master type as the adapter. See chapter 3.2.7
HART Devices Count Exceeded	A HART master has been detected that has the same master type as the adapter. This prevents the adapter from communicating with the connected sub-devices.	Check the <b>Master Mode</b> of the adapter. If using a HART Handheld, make sure it is not set for the same master type as the adapter. See chapter 3.2.7
HART Sub-Device Lost	A sub-device has stopped communicating with the adapter and has been dropped from the sub-device list.	If the sub-device was removed intentionally, clear the alert. Otherwise, check the wiring of the sub-device.

Alert	Description	Corrective Action
Burst Packets are Being Dropped	One or more burst data packets have been dropped.	Check whether the <i>WirelessHART</i> network has granted the requested bandwidth for the burst messages. If not, you can either adjust the <i>WirelessHART</i> network settings or adjust the burst times of the adapter. If the burst messages were intended for the connected sub-devices, make sure there are no other HART masters on the connection, as these can cause burst message delays.
Field Device Power Control	This alert is set, whenever <b>Field Device Power Control</b> is set to <b>Switching</b> and the <b>Field Device On Estimated Percent</b> is 100 because the burst settings keep the sub-device always powered on. See chapter 3.2.5	If the <b>Switching</b> option is not required, change this option. Otherwise, reduce the burst times for the connected sub-device and check the variation of the <b>Field Device On Estimated Percent</b> value.
Wireless Capacity Denied	The <i>WirelessHART</i> network has denied a request for wireless bandwidth.	Check the burst settings and reduce the requested bandwidth.
Burst Message Configuration Issue	A burst message is configured to a command that is not supported by the selected sub-device.	Change the command number of the burst message to a command that is supported by the sub-device.
Wired Device in Burst Mode	A connected sub-device is configured for wired burst mode, which may conflict with burst settings of the adapter.	Disable wired burst mode of the connected sub-device.
Adapter Failed to Join the Network	The adapter has failed to join the <i>WirelessHART</i> network.	Check the network ID and join key. See chapter 3.2.6
Radio Malfunction	The radio module inside the adapter is malfunctioning.	Report this issue to Customer Support.
Variable Simulation	One or more of the device variables are being simulated.	Check the simulation settings for the variables.
Field Device Cutoff Occurred	This alert is set, whenever <b>Field Device Cutoff Enable</b> is enabled and the voltage of the external power supply drops below the <b>Field Device Cutoff Voltage</b> . See chapter 3.2.5	Check the external power supply.
Low Battery	This alert is set, whenever the adapter is configured to use an external battery and the battery voltage drops below the <b>Battery Low Voltage</b> or the calculated remaining battery life is 25 days or less.	Replace the external battery.

### 3.2.15 Device Status

This submenu provides a detailed overview of all device data.



**Note!**

This submenu is available only during online parameterization.

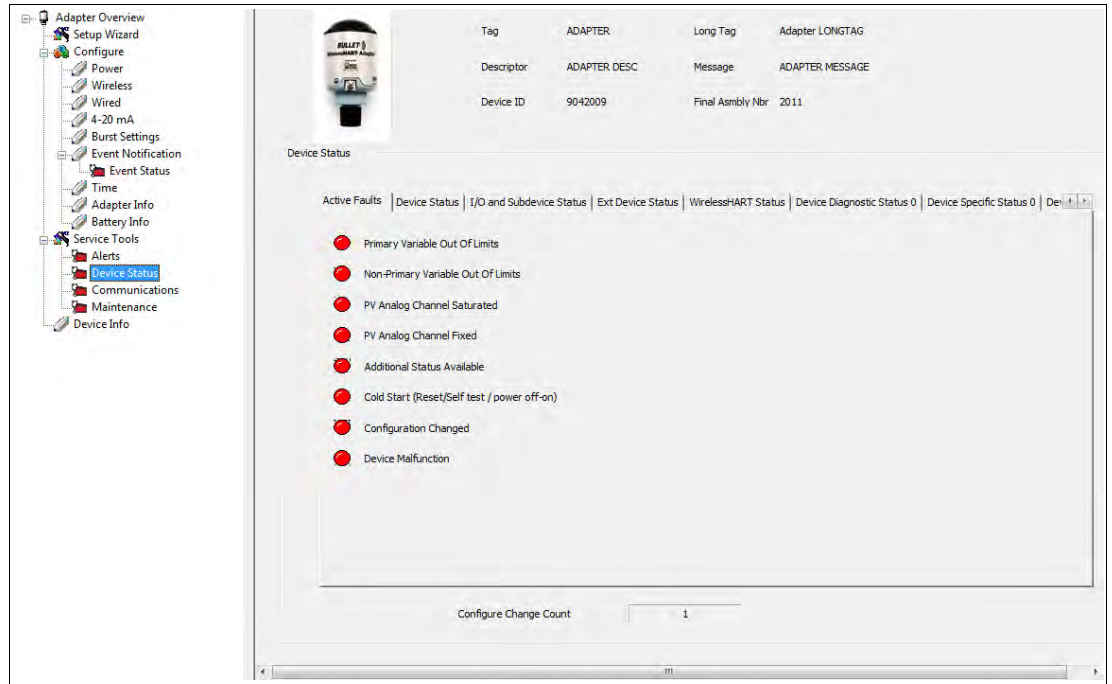


Figure 3.23 Device status overview

### 3.2.16 Communications

This submenu provides a detailed overview of all communication data.



**Note!**

This submenu is available only during online parameterization.

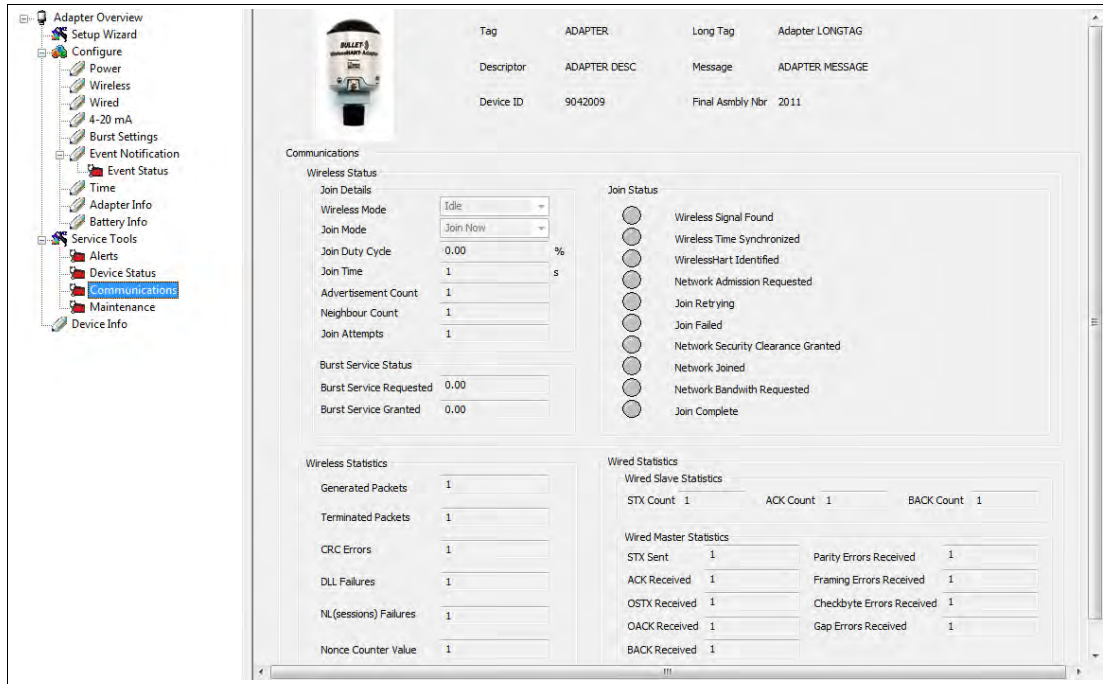


Figure 3.24 Communication overview

### 3.2.17 Maintenance

This submenu enables you to perform basic maintenance tasks, such as, disconnecting the adapter from the *WirelessHART* network, or resetting the adapter to the factory default settings.



**Note!**

This submenu is available only during online parameterization.

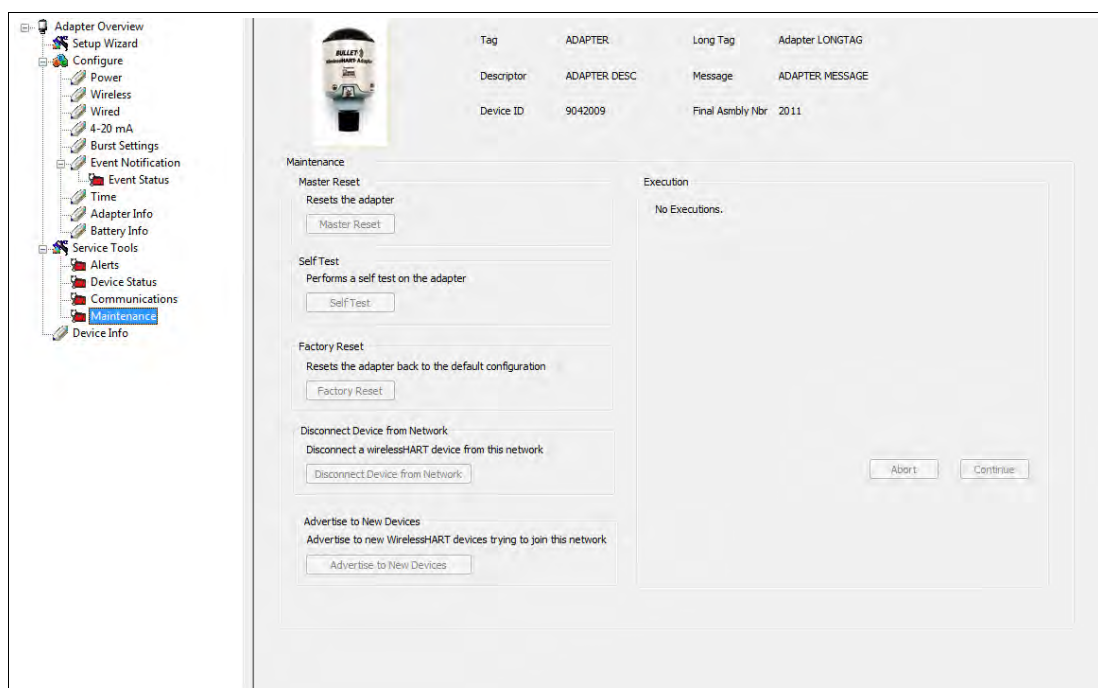


Figure 3.25 Maintenance overview



**Note!**

The password for resetting the adapter to the factory default settings is: mactek

#### Factory Default Settings

Parameter	Default Value
Adapter Power Mode	Loop Powered - 1.0 V
Field Device Power Control	Off
Field Device Turn On Time	10.0 s
Field Device Idle Time	60.0 s
Field Device Cutoff Enable	Disabled
Field Device Cutoff Voltage	18.0 V
Battery Low Voltage	20.0 V
Battery Critical Voltage	18.0 V
Battery Capacity	10000 mAh
WirelessHART Network ID	1229
WirelessHART Join Key	44555354 4E455457 4F524B53 524F434B
WirelessHART Join Mode	Don't Join

Parameter	Default Value
Radio Output Power	+10 dBm
Over the Air Upgrade	Enabled
HART Master Mode	Primary Master
HART Retry Count	3
HART Polling Address	15
HART Scan On Power Up	Enabled
HART Polling Scan Start Address	0
HART Polling Scan Stop Address	15
HART Sub-Device Time Sync	Enabled
HART Respinse Preambles	5
Write Protect	Off
HART Lock State	Cleared
Electronics Temperature Units	degC
PV Linearization Mode	Linear
PV Units	mA
PV Damping Value	0.0 s
PV Upper Range Value (20 mA)	20.0 mA
PV Lower Range Value (4 mA)	4.0 mA
PV Upper Limit of Prop Range	20.5 mA
PV Lower Limit of Prop Range	3.8 mA
Upper Fault Current	21.0 mA
Lower Fault Current	3.6 mA



### 3.2.18 Device Info

This submenu lists device-specific information, such as, the serial number, MAC ID, and firmware version.



**Note!**

This submenu is available only during online parameterization.

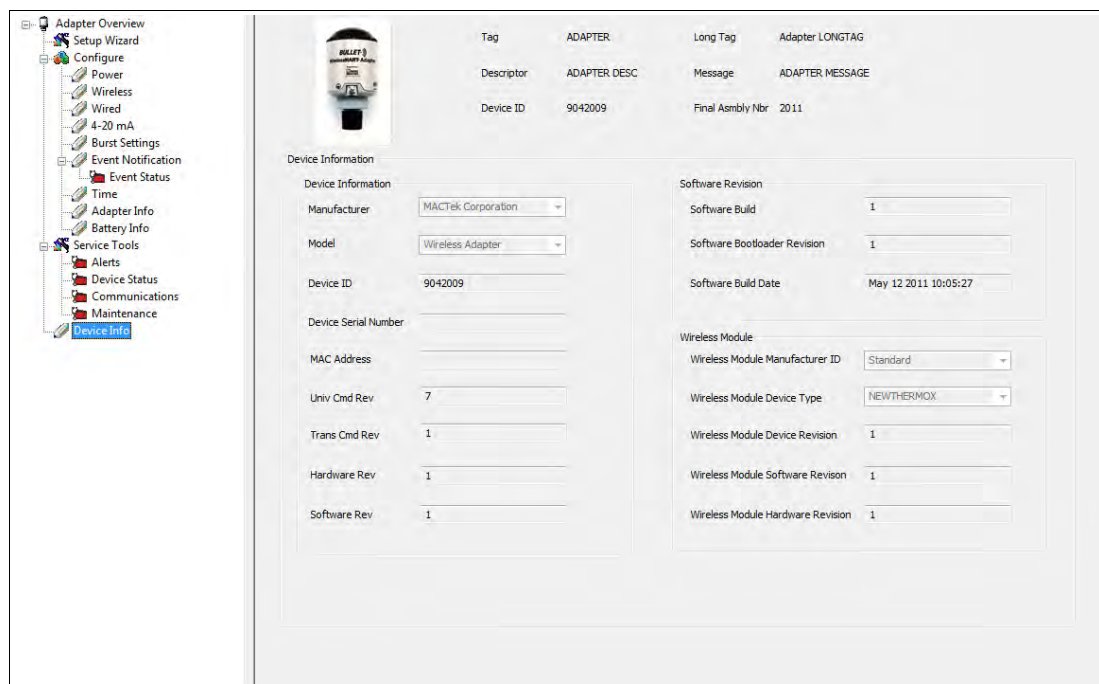


Figure 3.26 Device info overview

### 3.3 Configuration via Device Description (DD)

You can also configure the adapter by integrating it into a process control system. The exact procedure how to integrate a device depends on the process control system. The BULLETT Configuration Software and Device Drivers (DD) are available for download on the Moore Industries web site at [www.miinet.com](http://www.miinet.com).



#### Set HART tags

1. Select **Configure** from the main menu.
2. Select **Manual Setup > Device Information**.
3. Enter the HART tag.
4. Enter the HART long tag.
5. Click **Send resp. Transfer** to transfer the updated information to the adapter.



#### Set power configuration settings

1. Select **Configure** from the main menu.
2. Select **Guided Setup > Configure Power Mode**.
3. Follow the instructions and select the proper power configuration for the application.



### Configure burst settings

1. Select **Configure** from the main menu.
2. Select **Manual Setup > Burst Settings**.
3. We recommend that you set **Automatic Burst Mode** to the desired update rate. You can also set **Automatic Burst Mode** to disabled. If not using automatic configuration, manually set the burst configuration for each burst message. Note that in this case, sub-devices must already have been detected before you can set the burst configuration manually.
4. Click **Send** resp. **Transfer** to transfer the updated information to the adapter.



### Configure *WirelessHART* network settings

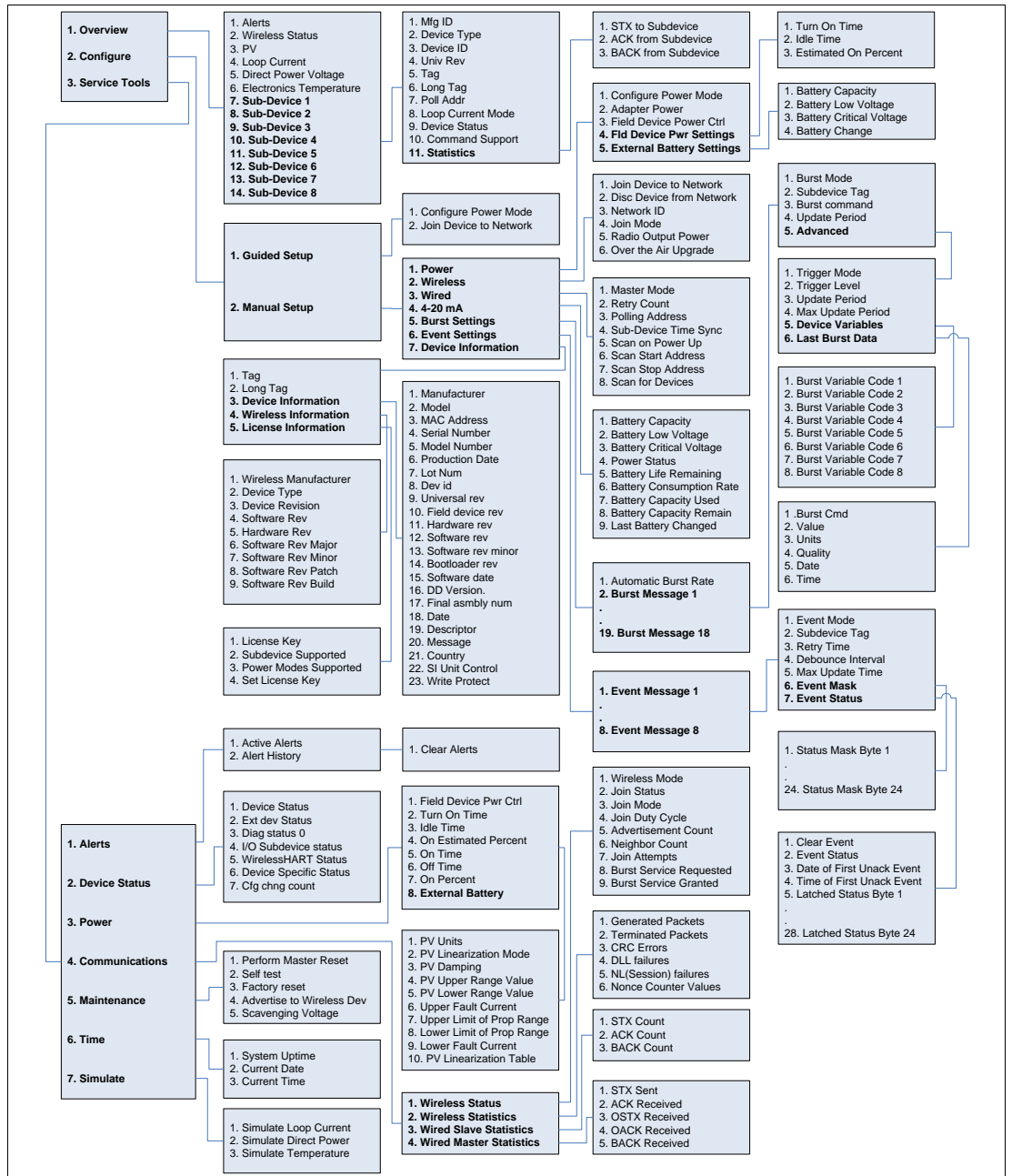
1. Select **Configure** from the main menu.
2. Select **Guided Setup > Join Device to Network**.
3. Follow the instructions and enter the *WirelessHART* network ID and join key.
4. After confirming these settings, the adapter attempts to join the *WirelessHART* network.



### Monitor *WirelessHART* network join status

1. Select **Service Tools** from the main menu.
2. Select **Communications > Wireless Status**.
3. Monitor the progress of the *WirelessHART* join. If the **Join Status** is set to **Join Failed**, check whether network ID and join key are correct.

### Device Description Overview



## 4 Installation

### 4.1 Mounting Considerations

#### 4.1.1 Positioning the Device

We recommend that you install the *WirelessHART* gateway before installing other *WirelessHART* devices. This way, you can check for proper operation of new devices as they are installed. Please refer to the manual of the *WirelessHART* gateway for further information.

##### **Guidelines for Planning a *WirelessHART* Network**

- A line-of-sight between communication partners always is desirable. If a line-of-sight is not possible, the obstacles should not be massive and the partners should be more to the edge of an obstacle to allow the wave to "bend" around it (diffraction effect).
- Consider moving objects that could affect the device's antenna range.
- Install wireless devices at least 1 m above the ground.
- Make sure that the device's antenna is aligned vertically for best results.
- Make sure that a minimum of 2 other *WirelessHART* devices are well within the antenna range of the device.
- Do not position *WirelessHART* devices directly below or above each other. They would be outside each other's antenna range.
- Install *WirelessHART* devices at least 1 m away from each other.
- Antennas must be at least 6 cm away from any wall or any metallic material running parallel to it.
- Position the device as far away as possible from metal surfaces or walls containing metal. There should be as little metal close to the device as possible.
- Do not position other 2.4 GHz devices like cordless phone bases or WLAN routers near *WirelessHART* devices. Keep in mind other wireless networks using the same frequency spectrum (WLAN, Bluetooth, etc.). Wireless technologies used in an industrial environment must be able to coexist without disrupting each other. If multiple networks operate in one plant, a frequency management should be applied as part of administration.

### 4.1.2 Examples for Good and Poor Positioning

The adapter has an internal antenna which radiates out from the top cap in a 360° pattern.

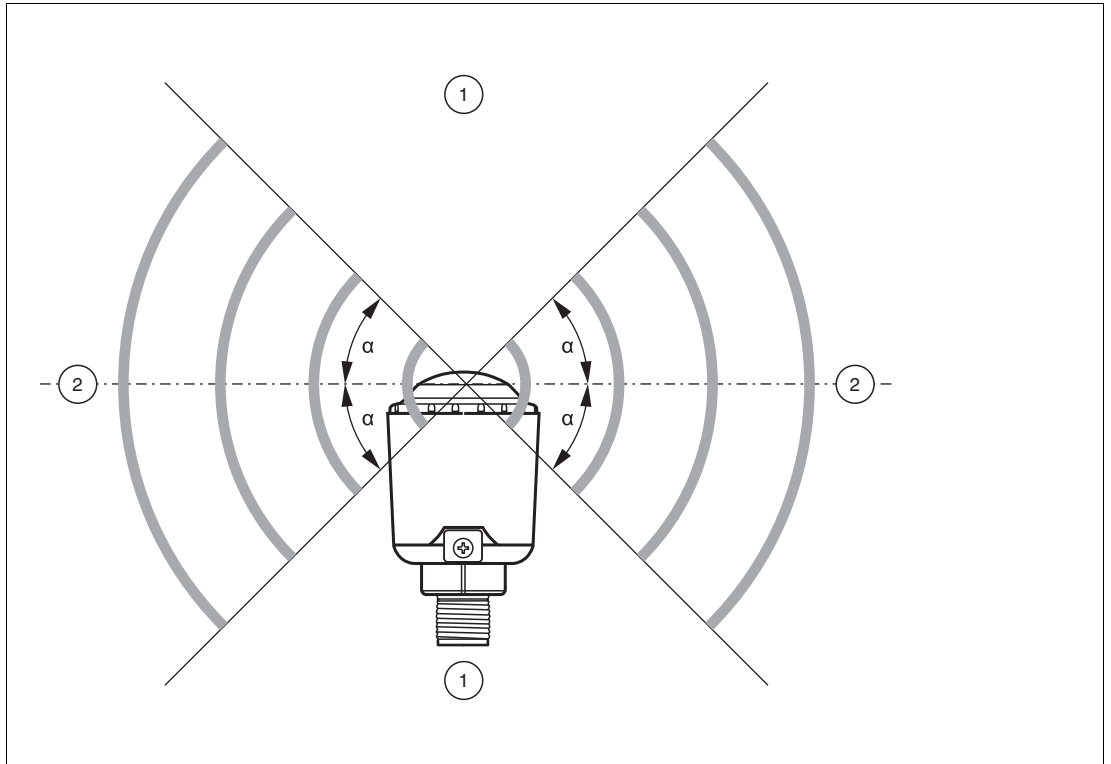


Figure 4.1 Schematic representation of wave propagation

- 1. Weaker signal above and below the adapter
- 2. Stronger signal sideways

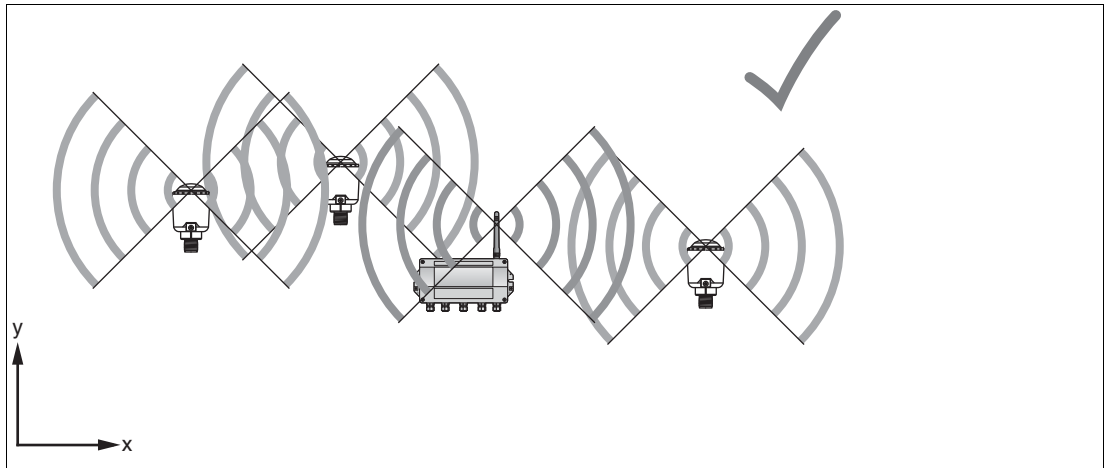


Figure 4.2 Good positioning: Devices are within each other's antenna range

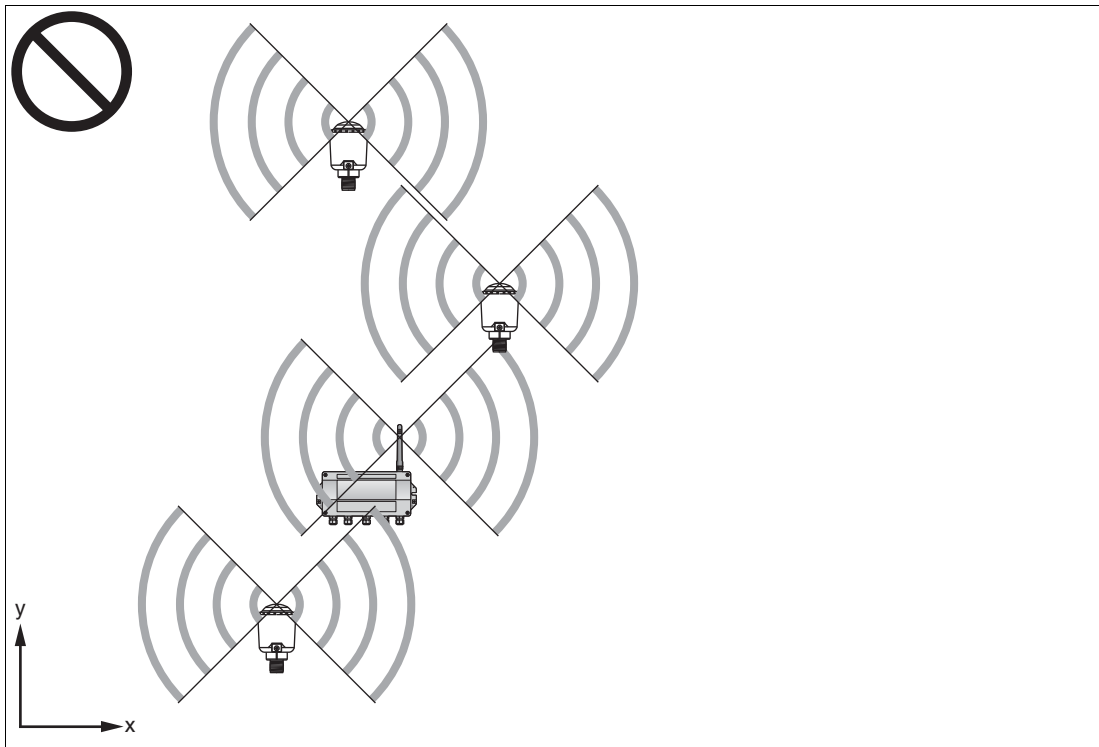


Figure 4.3 Poor positioning: Devices are not within each other's antenna range

### 4.1.3 Installation Options

The adapter can be mounted in three different ways:

#### 1. Installation on Field Device

The adapter is attached to the field device using standard installation components that meet the required type of protection and equipment protection level.

#### 2. Separate from Field Device and Connected by Cable

The adapter can be placed anywhere on the current loop and does not need to be positioned directly next to the associated field device. The connection to the field device is made using standard installation components that meet the required type of protection and equipment protection level.

This installation method is recommended in the following situations:

- If there is insufficient space at the measuring point to mount the adapter directly to the field device.
- If the signal reception at the measuring point is too weak for correct operation.
- If the measuring point is subject to vibration above the permissible limits.

#### 3. Additional Stand-Alone Router

*WirelessHART* is a mesh network, which means that each node in the network will route messages on behalf of other nodes in the network. This is done to expand the overall range of the network and to form multiple redundant paths. By placing the adapter at key locations in a *WirelessHART* network, this routing function can be offloaded from other devices, for example, to preserve battery life of battery powered nodes.

## 4.2 Explosion-Hazardous and Non-Explosion Hazardous Areas

Different models are available that have been approved for different operating locations. The nameplate on the housing clearly indicates the device marking for each model. Verify that the selected model of the adapter is appropriate for the intended installation.

Model Number	Operating Location
110100-x0M0	Installation in general industrial areas
110102-x0M0	Installation in Zone 1, 21 Installation in Class I, Div. 1
110101-x0M0	Installation in Zone 0, 20 Installation in Zone 1, 21 Installation in Class I, Div. 1

Note: x=P or 8



### **Danger!**

Explosion hazard

Devices that have been operated in general industrial areas, lose all approvals for installations in combination with hazardous areas.

- If the device has been operated in non-explosion hazardous areas, the device must no longer be used in combination with hazardous areas.
- If circuits with type of protection Ex ic are operated with non-intrinsically safe circuits, they must no longer be used as circuits with type of protection Ex ic.

## 4.3 Wiring

### 4.3.1 Field Wiring



### **Danger!**

Explosion hazard

Unused cables and non-insulated metal parts may lead to ignition sparks that ignite a potentially explosive atmosphere.

- Install cables and connection lines in a way that they are protected from ultraviolet radiation.
- Install cables and connection lines in a way that they are not exposed to mechanical hazards.
- When installing the conductors the insulation must reach up to the terminal.
- Ensure that unused terminal screws are properly tightened down.
- When using stranded conductors, crimp wire end ferrules on the conductor ends.
- Use the shortest possible cable lengths and avoid small core cross-sections.
- Unused cables and connection lines must be connected to earth or be adequately insulated by means of terminals suitable for the type of protection.
- Insulation by tape alone is not permitted.
- Keep the separation distances between all non-intrinsically safe circuits and intrinsically safe circuits according to IEC/EN 60079-14.



**Danger!**

Explosion hazard

Non-intrinsically safe circuits may lead to ignition sparks that ignite a potentially explosive atmosphere.

Connect or disconnect non-intrinsically safe circuits only in the absence of a potentially explosive atmosphere.

The following table describes the cables exiting the adapter.

Color	Wire Gauge	Description
Green / Yellow	14 AWG	Internal Ground Connection
Black	20 AWG	Direct Power
Red	20 AWG	Loop Power
Yellow	20 AWG	HART
White	20 AWG	Return

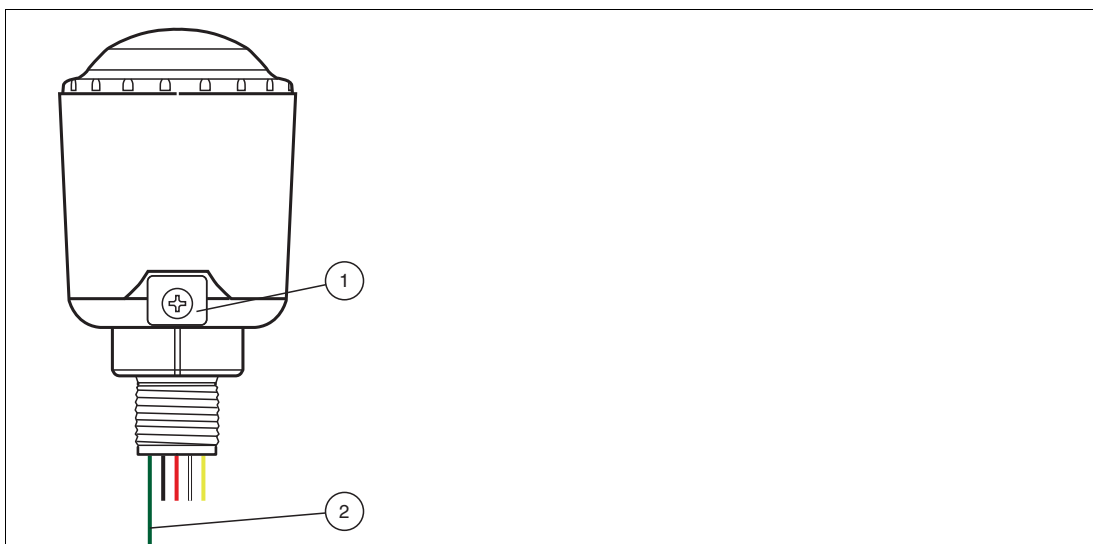
**Direct Power:** The adapter is supplied by an external power supply, for example, a battery, or a solar panel. The direct power connection is between the black conductor (Direct Power) and the white conductor (Return).

**Loop Power:** The adapter is supplied by the 4 ... 20 mA current loop. The loop power connection is between the red conductor (Loop Power) and the white conductor (Return).

**HART:** The HART connection is polarity independent. The HART connection is between the yellow conductor (HART) and the white conductor (Return).

4.3.2 Grounding

The adapter provides an external and internal ground connection.



- 1. External Grounding Connection
- 2. Internal Grounding Connection



**Danger!**

Explosion hazard

Unused cables and non-insulated metal parts pose an ignition hazard.

- Install cables and connection lines in a way that they are protected from ultraviolet radiation.
- Install cables and connection lines in a way that they are not exposed to mechanical hazards.
- When installing the conductors the insulation must reach up to the terminal.
- Ensure that unused terminal screws are properly tightened down.
- When using stranded conductors, crimp wire end ferrules on the conductor ends.
- Use the shortest possible cable lengths and avoid small core cross-sections.
- Unused cables and connection lines must be connected to earth or be adequately insulated by means of terminals suitable for the type of protection.
- Insulation by tape alone is not permitted.
- Keep the separation distances between all non-intrinsically safe circuits and intrinsically safe circuits according to IEC/EN 60079-14.

**Danger!**

Explosion hazard

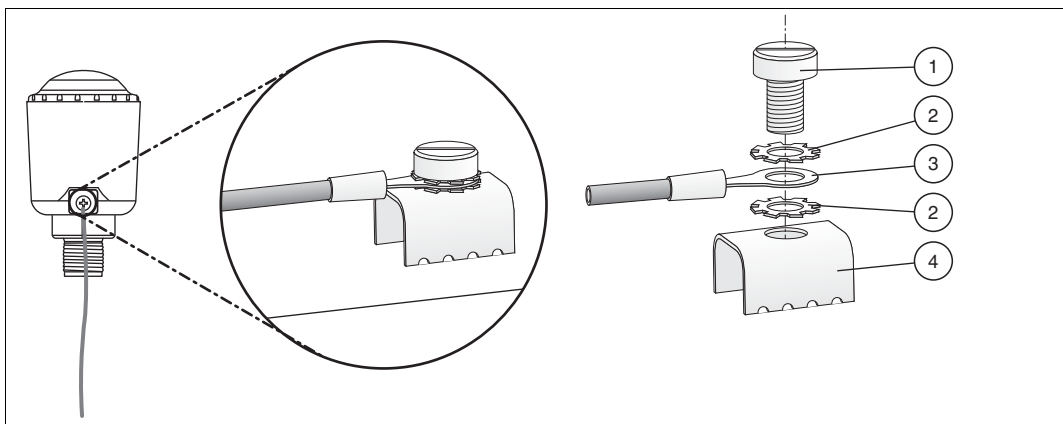
Non-intrinsically safe circuits may lead to ignition sparks that ignite a potentially explosive atmosphere.

Connect or disconnect non-intrinsically safe circuits only in the absence of a potentially explosive atmosphere.

**Connecting the external ground connection**

The external ground connection accepts wire gauges up to 10 AWG.

1. Connect the ground cable to a cable lug.
2. Position the cable lug over the grounding terminal so that the cable points downwards.
3. Screw the cable lug to the grounding terminal using two toothed lock washers.
4. Tighten the screw so that the cable lug cannot move.



1. Stainless steel screw
2. Toothed lock washer
3. Cable lug
4. Grounding terminal



## Connecting the internal ground connection

The internal ground connection is attached to the metal housing and exits the ½ inch NPT thread as a 14 AWG conductor (green / yellow).

Connect the green / yellow conductor to the internal grounding terminal of the field device or junction box that the adapter is attached to.

## 4.4 Installation on Field Device

The adapter is equipped with a male ½ inch NPT thread that allows direct connection to a field device or junction box. In connection with other thread types, such as M20, you need a connection adapter.



### **Note!**

When loop powered, the adapter cannot control the current on the 4 ... 20 mA current loop. Make sure that the current on the current loop is limited to within the operating specifications.



### **Danger!**

Explosion hazard

Accessories and other installation components pose an ignition hazard if they do not meet the required type of protection and equipment protection level.

For installations in explosion-hazardous areas, all materials related to the installation must be approved by a recognized approval agency, notified body, or national certification body as suitable for use in that classified area, for that specific type of protection, and temperature class.



### **Danger!**

Explosion hazard

Improper installations may lead to ignition sparks that ignite a potentially explosive atmosphere.

- Installations in explosion-hazardous areas must comply with approval for use in that classified area and the markings on the nameplate.
- Use the device only within the specified ambient conditions.
- Keep the separation distances between all non-intrinsically safe circuits and intrinsically safe circuits according to IEC/EN 60079-14.
- Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismantling of the device. The personnel must have read and understood the instruction manual.



### **Danger!**

Explosion hazard

Non-intrinsically safe circuits may lead to ignition sparks that ignite a potentially explosive atmosphere.

Connect or disconnect non-intrinsically safe circuits only in the absence of a potentially explosive atmosphere.

**Danger!**

Explosion hazard

Unused cables and non-insulated metal parts may lead to ignition sparks that ignite a potentially explosive atmosphere.

- Install cables and connection lines in a way that they are protected from ultraviolet radiation.
- Install cables and connection lines in a way that they are not exposed to mechanical hazards.
- When installing the conductors the insulation must reach up to the terminal.
- Ensure that unused terminal screws are properly tightened down.
- When using stranded conductors, crimp wire end ferrules on the conductor ends.
- Use the shortest possible cable lengths and avoid small core cross-sections.
- Unused cables and connection lines must be connected to earth or be adequately insulated by means of terminals suitable for the type of protection.
- Insulation by tape alone is not permitted.
- Keep the separation distances between all non-intrinsically safe circuits and intrinsically safe circuits according to IEC/EN 60079-14.

**Caution!**

Damage due to wear

Aluminum galling can damage the device.

Apply an electrically conductive thread lubricant to the NPT threads to prevent the potential of aluminum galling.

**Caution!**

Damage due to overcurrent

A current that exceeds the operating specifications of the device can cause damage to the device.

Ensure that the supplied current never exceeds 32 V DC.

**Mounting the adapter on a field device**

1. Apply an electrically conductive thread lubricant to the NPT threads.
2. Apply gaskets where needed on either side of the pipe fittings.
3. Connect the adapter according to one of the following configuration diagrams.
4. Insert the adapter into a spare connection of the field device.
5. Use a spanner to fasten the adapter in place (torque 5 Nm + 1 Nm).
6. Connect the external ground connection in accordance with the grounding concept of your application. See chapter 4.3.2

**Loop Power: Configuration 1**

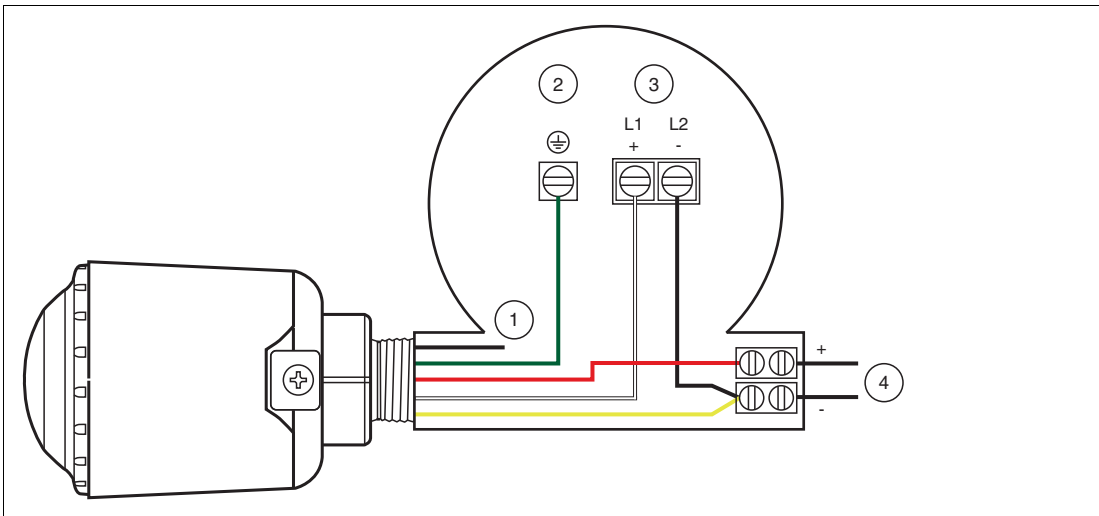


Figure 4.4 Loop powered adapter connected to the positive terminal (+) of the current loop and the positive terminal (+) of the field device's current loop connection.

1. Insulated black conductor (Direct Power)
2. Ground connection of the field device
3. Current loop connection of the field device
4. Current loop

**Loop Power: Configuration 2**

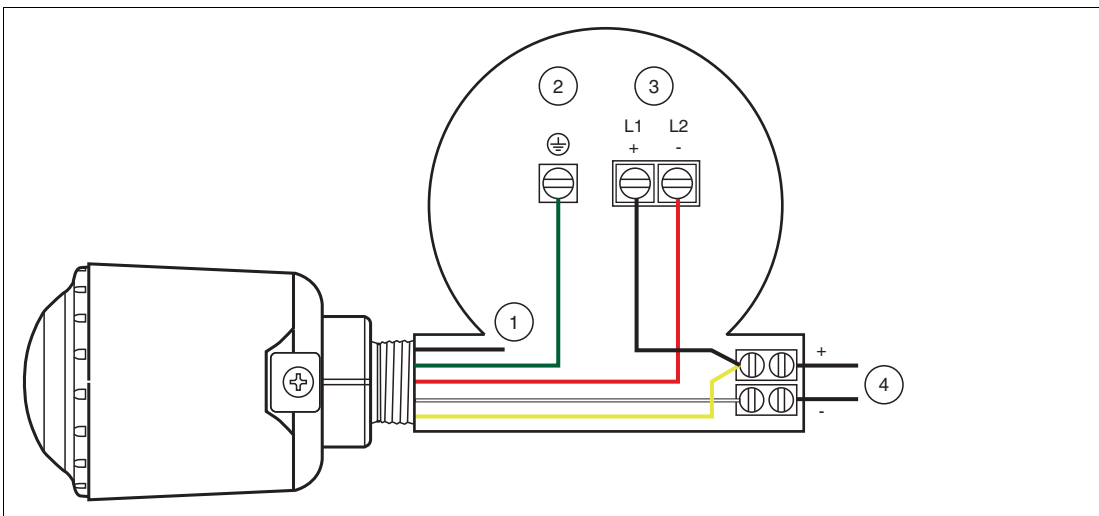


Figure 4.5 Loop powered adapter connected to the negative terminal (-) of the current loop and the negative terminal (-) of the field device's current loop connection.

1. Insulated black conductor (Direct Power)
2. Ground connection of the field device
3. Current loop connection of the field device
4. Current loop

**Direct Power**

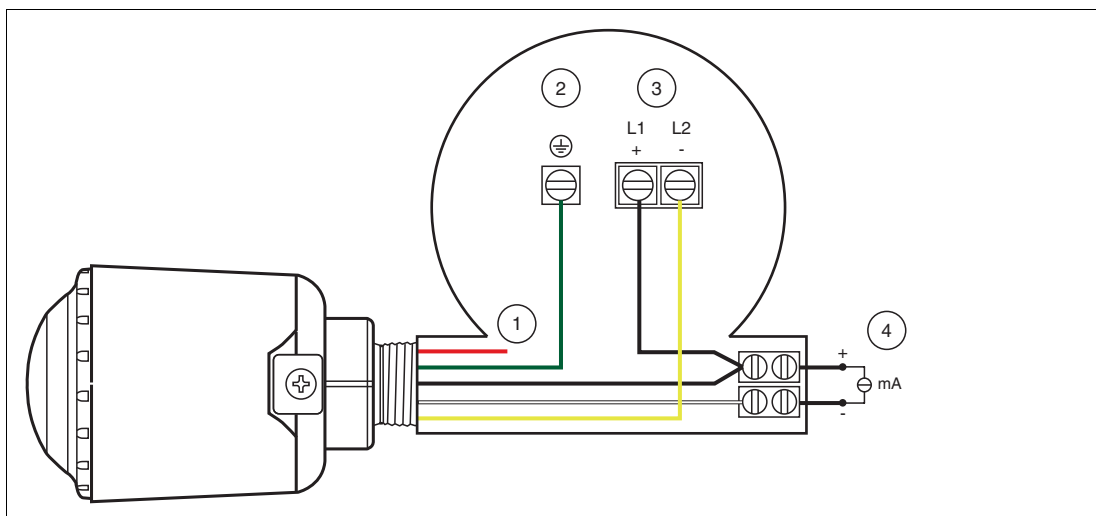


Figure 4.6 Directly powered adapter connected to the positive terminal (+) of the power supply and the negative terminal (-) of the power supply.

1. Insulated red conductor (Loop Power)
2. Ground connection of the field device
3. Current loop connection of the field device
4. External DC power supply (7 ... 32 V DC)

**4.5 Installation as Stand-Alone Router**

By placing the adapter at key locations in a *WirelessHART* network, you can improve the overall network robustness and offloaded packet routing from other devices, for example, to preserve battery life of battery powered devices. The adapter can be placed anywhere on the current loop, or it can be used as stand-alone router that is powered by an external power supply.



**Danger!**

Explosion hazard

Accessories and other installation components pose an ignition hazard if they do not meet the required type of protection and equipment protection level.

For installations in explosion-hazardous areas, all materials related to the installation must be approved by a recognized approval agency, notified body, or national certification body as suitable for use in that classified area, for that specific type of protection, and temperature class.

**Danger!**

Explosion hazard

Improper installations may lead to ignition sparks that ignite a potentially explosive atmosphere.

- Installations in explosion-hazardous areas must comply with approval for use in that classified area and the markings on the nameplate.
- Use the device only within the specified ambient conditions.
- Keep the separation distances between all non-intrinsically safe circuits and intrinsically safe circuits according to IEC/EN 60079-14.
- Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismantling of the device. The personnel must have read and understood the instruction manual.

**Danger!**

Explosion hazard

Non-intrinsically safe circuits may lead to ignition sparks that ignite a potentially explosive atmosphere.

Connect or disconnect non-intrinsically safe circuits only in the absence of a potentially explosive atmosphere.

**Danger!**

Explosion hazard

Unused cables and non-insulated metal parts may lead to ignition sparks that ignite a potentially explosive atmosphere.

- Install cables and connection lines in a way that they are protected from ultraviolet radiation.
- Install cables and connection lines in a way that they are not exposed to mechanical hazards.
- When installing the conductors the insulation must reach up to the terminal.
- Ensure that unused terminal screws are properly tightened down.
- When using stranded conductors, crimp wire end ferrules on the conductor ends.
- Use the shortest possible cable lengths and avoid small core cross-sections.
- Unused cables and connection lines must be connected to earth or be adequately insulated by means of terminals suitable for the type of protection.
- Insulation by tape alone is not permitted.
- Keep the separation distances between all non-intrinsically safe circuits and intrinsically safe circuits according to IEC/EN 60079-14.

**Caution!**

Damage due to wear

Aluminum galling can damage the device.

Apply an electrically conductive thread lubricant to the NPT threads to prevent the potential of aluminum galling.

**Caution!**

Damage due to overcurrent

A current that exceeds the operating specifications of the device can cause damage to the device.

Ensure that the supplied current never exceeds 32 V DC.

**Mounting the adapter on a junction box**

1. Apply an electrically conductive thread lubricant to the NPT threads.
2. Connect the adapter according to the following configuration diagram.
3. Insert the adapter into a spare connection of the junction box.
4. Use a wrench to fasten the adapter in place (torque 5 Nm + 1 Nm).
5. Connect the external ground connection in accordance with the grounding concept of your application. See chapter 4.3.2

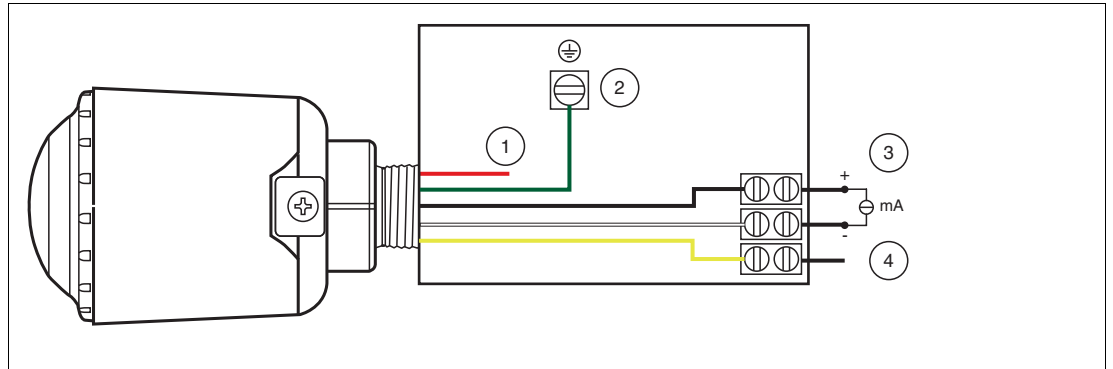
**Stand-Alone Router**

Figure 4.7 Directly powered adapter connected to the positive terminal (+) of the power supply and the negative terminal (-) of the power supply.

1. Insulated red conductor (Loop Power)
2. Ground connection of the junction box
3. External DC power supply (7 ... 32 V DC)
4. To HART terminator

## 5 Operation

### 5.1

#### HART Variables

The adapter appears as a HART device on both the wired HART network and the *WirelessHART* network and supports 4 HART variables. The variables can be read using standard HART commands.

HART Variable	Expression
Primary variable (PV)	Loop Current (mA)
Secondary variable (SV)	Direct Power Voltage (V)
Tertiary variable (TV)	Internal Temperature (°C)
Quaternary variable (QV)	Storage Voltage (V) (internal to the adapter)



## 6 Troubleshooting

### Wireless Communication Faults

Fault	Possible Cause(s)	Corrective Action(s)
PACTware cannot find the adapter when communicating over the <i>WirelessHART</i> gateway.	The adapter has not yet joined the network.	The joining process may take a while. Check the join status in the gateway's instrument list. Alternatively, check the join status of the adapter using a HART modem connected to the adapter.
	The adapter carries the wrong network ID or join key.	Check the wireless communication parameters of the adapter using a HART modem connected to the adapter. The adapter and the gateway must have the same network ID and join key.
The adapter does not join the network.	The adapter carries the wrong network ID or join key.	Check the wireless communication parameters of the adapter using a HART modem connected to the adapter. The adapter and the gateway must have the same network ID and join key.
	The adapter resets itself due to insufficient power supply.	Check the power settings of the adapter. See chapter 3.2.5
	There are no neighboring <i>WirelessHART</i> devices within the adapter's antenna range.	Check whether the adapter is placed at the right location. <ul style="list-style-type: none"> <li>■ Add another adapter to the <i>WirelessHART</i> network, for example, as stand-alone router.</li> <li>■ Change the mounting position of the adapter, as the adapter can be placed anywhere on the current loop.</li> </ul>
Adapter disappears sporadically from the <i>WirelessHART</i> network.	There are not enough neighboring <i>WirelessHART</i> devices within the adapter's antenna range.	Check whether the adapter is placed at the right location. <ul style="list-style-type: none"> <li>■ Add another adapter to the <i>WirelessHART</i> network, for example, as stand-alone router.</li> <li>■ Change the mounting position of the adapter, as the adapter can be placed anywhere on the current loop.</li> </ul>

**Wired Communication Faults**

Fault	Possible Cause(s)	Corrective Action(s)
PACTware cannot find the adapter when communicating over a HART modem.	The HART communication DTM is not connected to the right COM port.	Change the COM port in the HART communication DTM. See chapter 3.2.1
	Some PCs assign fixed COM ports to USB ports. The HART modem is plugged into a different USB port than during setup.	<ul style="list-style-type: none"> <li>■ Plug the HART modem into the USB port used during setup.</li> <li>■ Change the COM port in the HART communication DTM. See chapter 3.2.1</li> </ul>
	The adapter's polling address cannot be found by the HART communication DTM.	Use polling address 15 in the adapter DTM. See chapter 3.2.2
Adapter does not detect a connected field device.	The adapter is not properly wired to the field device.	Check whether the wiring is correct for the selected type of supply (loop power or direct power) see chapter 4
A field device powered by the adapter does not start up.	The voltage of the external power supply has dropped below the <b>Field Device Cutoff Voltage</b> .	Check the battery status and if required, replace the battery see chapter 3.2.13
	The <b>Field Device Power Control</b> option is enabled and the <b>Field Device Turn On Time</b> or <b>Field Device Idle Time</b> are not configured properly.	<ul style="list-style-type: none"> <li>■ Check whether the <b>Field Device Turn On Time</b> is sufficiently long, in order to obtain accurate measurements from the field devices.</li> <li>■ Check whether the <b>Field Device Idle Time</b> is sufficiently long, in order to prevent the adapter from switching off the field device when another master communicates with the field device.</li> </ul> <p>See chapter 3.2.5</p>
Adapter does not restart after disconnecting and reconnecting the power supply.	The power supply was reconnected before the adapter was fully discharged.	Wait approximately 1 minute before reconnecting the power supply.

---

# 7 Control Drawings & Certifications

## ***Bullet – Wireless HART Adapter***

---

### ***Documentation***

*No revision to drawing without prior FM approval.*

*For installations in the US, the associated apparatus and field device must be FM approved.*

*For installations in Canada, the associated apparatus and field device must be Canadian certified.*

*For Zone installations, the associated apparatus and field device must be ATEX / IEC certified.*

*For installations in EU, control room equipment connected to intrinsically safe associated apparatus shall not use or generate more than the marked Um of the associated apparatus.*

*Resistance between intrinsically safe ground and earth ground must be less than 1.0 Ohm.*

Due to constant revisions, documentation is subject to permanent change. Please refer only to the most up-to-date version, which can be found under [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismantling lies with the plant operator.

Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismantling of the device. The personnel must have read and understood the instruction manual.

The device is only approved for appropriate and intended use. Ignoring these instructions will void any warranty and absolve the manufacturer from any liability.

Protection of the personnel and the plant is not ensured if the device is not being used according to its intended use.

### ***General***

Make sure to consider all applicable laws, standards or directives especially national standards and guidelines such as NEC, CEC, IEC 60079-14 and/or IEC 60079-25.

The usage of 2400 MHz equipment is bound to local restrictions. Ensure that local restrictions allow usage of this device before commissioning.

The device must not be repaired, changed or manipulated.

If there is a defect, always replace the device with an original device from Pepperl+Fuchs.

The device is used in control and instrumentation technology (C&I technology) for wireless data transfer from HART devices.

Take the intended use of the connected devices from the corresponding documentation.

Use the device only within the specified ambient temperature range.

Do not mount the device at locations where an aggressive atmosphere may be present.

Do not mount a damaged or polluted device.


Avoid electrostatic charges which could result in electrostatic discharges while installing or operating the device.

Provide a transient protection. Ensure that the peak value of the transient protection does not exceed 140 % of the rated voltage.

When the device is in operation, maintain at all times a distance of at least 20 cm to the device antenna. This also applies to any other person in the vicinity of the device.

Install cables and cable glands in a way that they are not exposed to mechanical hazards.

Protect cables and cable glands from tensile load and torsional stress, or use certified cable glands.

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Worldwide		sheet 1 of 8

Unused cables and connection lines must be either connected to terminals or securely tied down and isolated. If cable glands are needed for installation, the following points must be considered:

- The cable glands used must be suitably certified for the application
- The temperature range of the cable glands must be chosen according to the application.
- The cable glands fitted must not reduce the degree of protection.

If the device has already been operated in general electrical installations, the device may subsequently no longer be installed in electrical installations used in combination with hazardous areas.

All separation distances between non-intrinsically safe circuits and intrinsically safe circuits need to be observed. All separation distances between adjacent intrinsically safe circuits need to be observed.

Intrinsically safe circuits must be wired and separated in accordance with Article 504.20 of the National Electrical Code (ANSI/NFPA 70) for USA and Section 12 and Appendix F of the Canadian Electrical Code (CEC Part I, C22.1-12 or later) for Canada, and other local codes, as applicable.

Connection or disconnection of energized non-intrinsically safe circuits is only permitted in the absence of a potentially explosive atmosphere.

If circuits with type of protection Ex i are operated with non-intrinsically safe circuits, they must no longer be used as circuits with type of protection Ex i.

The entity concept allows interconnection of intrinsically safe apparatus with associated apparatus not specifically examined in combination as a system when the approved values of  $U_o$  ( $V_{oc}$ ) and  $I_o$  ( $I_{sc}$ ) for the associated apparatus are less than or equal to  $U_i$  ( $V_{max}$ ) and  $I_i$  ( $I_{max}$ ) for the intrinsically safe apparatus.

Capacitance and inductance of the field wiring between intrinsically safe equipment and the associated apparatus shall be calculated and must be included in the system calculations. Cable capacitance  $C_{cable}$  plus intrinsically safe equipment capacitance  $C_i$  must be less than the capacitance  $C_o$  ( $C_a$ ), marked on any connected associated apparatus. The same applies for the values for inductance ( $L_{cable}$ ,  $L_i$  and  $L_o$  or  $L_a$ , respectively). Where the cable capacitance and inductance per foot are not known, the following values shall be used:  $C_{cable} = 60$  pF/ft.,  $L_{cable} = 0.2$   $\mu$ H/ft.

Where multiple circuits extend from the same piece of associated apparatus, they must be installed in separate cables or in one cable having suitable insulation. Refer to Article 504.30(B) of the National Electrical Code (ANSI/NFPA 70) and Instrument Society of America Recommended Practice ISA RP12.6 for installing intrinsically safe equipment in USA and refer to Section 12 and Appendix F of the National Electrical Code (CEC Part I, C22.1-12 or later) for installing intrinsically safe equipment in Canada.

## ***Delivery, Transport, Disposal***


Check the packaging and contents for damage.

Check if you have received every item and if the items received are the ones you ordered.

Keep the original packaging. Always store and transport the device in the original packaging.

Store the device in a clean and dry environment. The permitted ambient conditions (see datasheet) must be considered.

Disposing of device, packaging, and possibly contained batteries must be in compliance with the applicable laws and guidelines of the respective country.

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	Worldwide	WHA-BLT-F9D0-N-A0-**-**-*1
		sheet 2 of 8

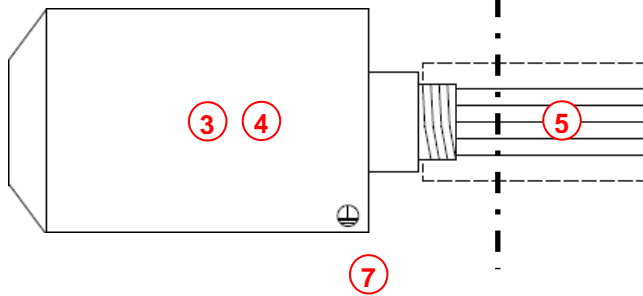
# WHA-BLT-F9D0-N-A0-Z0-Ex1

(Bullet – intrinsically safe Wireless HART Adapter)

## AREA CLASSIFICATIONS

NON-HAZARDOUS LOCATION  
or  
HAZARDOUS LOCATION  
CLASS I, DIVISION 1, GROUPS A, B, C, D  
CLASS II, DIVISION 1, GROUPS E, F, G  
CLASS III, DIVISION 1  
or  
CLASS I, DIVISION 2, GROUPS A, B; C; D  
or  
CLASS I, ZONE 0, 1 and 2, GROUP IIC

NON-HAZARDOUS LOCATION  
or  
HAZARDOUS LOCATION



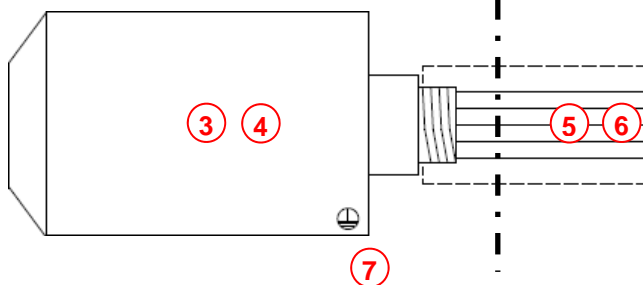
# WHA-BLT-F9D0-N-A0-Z1-1

(Bullet – explosion proof Wireless HART Adapter)

## AREA CLASSIFICATIONS

NON-HAZARDOUS LOCATION  
or  
HAZARDOUS LOCATION  
CLASS I, DIVISION 1, GROUPS A, B, C, D  
CLASS II, DIVISION 1, GROUPS E, F, G  
CLASS III, DIVISION 1  
or  
CLASS I, DIVISION 2, GROUPS A, B; C; D  
or  
CLASS I, ZONE 1 and 2, GROUP IIC

NON-HAZARDOUS LOCATION  
or  
HAZARDOUS LOCATION  
CLASS I, DIVISION 1 or Zone 1 or  
CLASS I, DIVISION 2 or Zone 2



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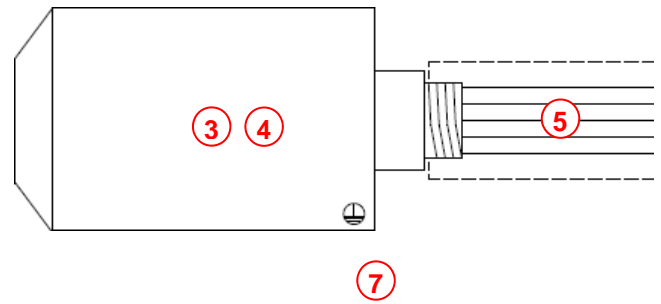
# WHA-BLT-F9D0-N-A0-GP-1


(Bullet – general purpose Wireless HART Adapter)

## AREA CLASSIFICATIONS

HAZARDOUS LOCATION

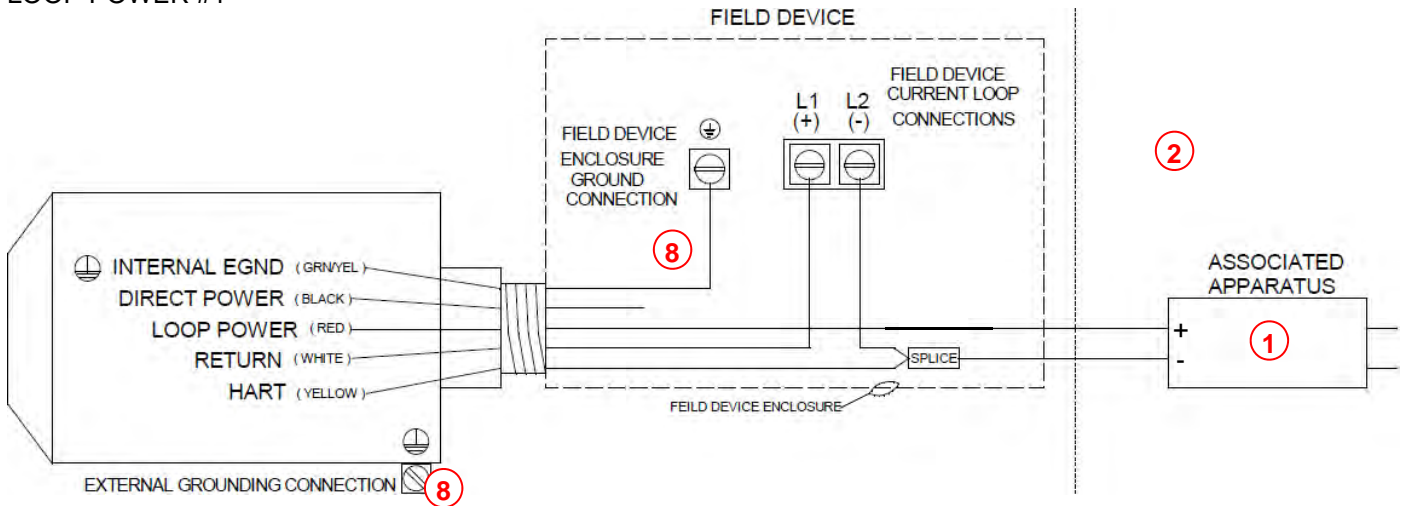
NON-HAZARDOUS LOCATION



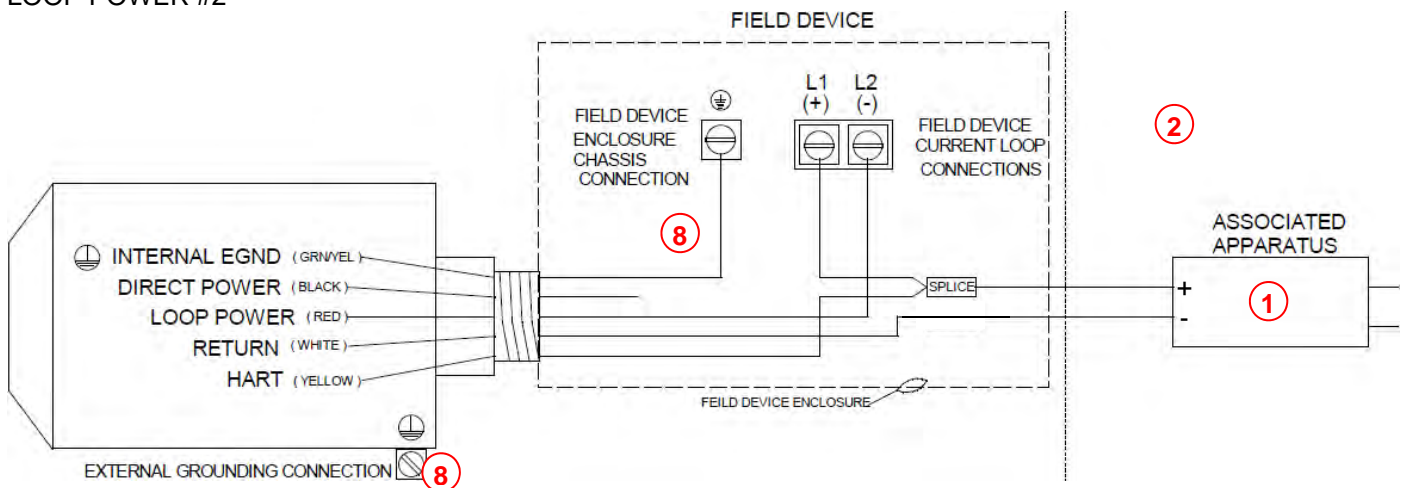
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# Interconnections

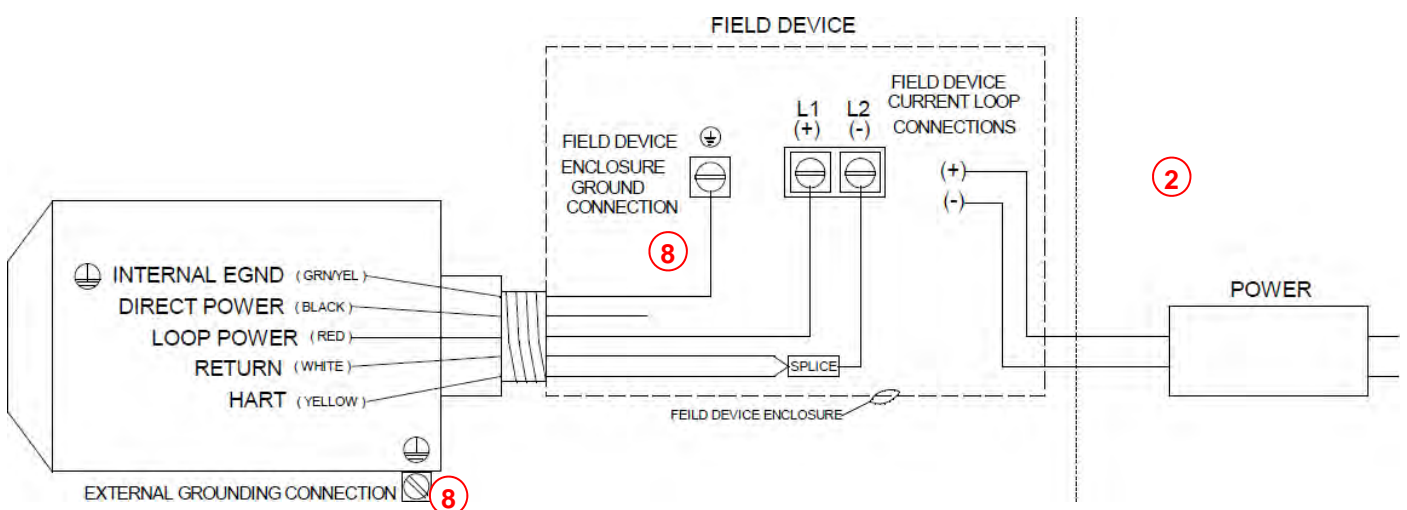
LOOP POWER #1



LOOP POWER #2



LOOP POWER #3 – ACTIVE DEVICE



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2017-Jun-22

**PEPPERL+FUCHS**

Control Drawing

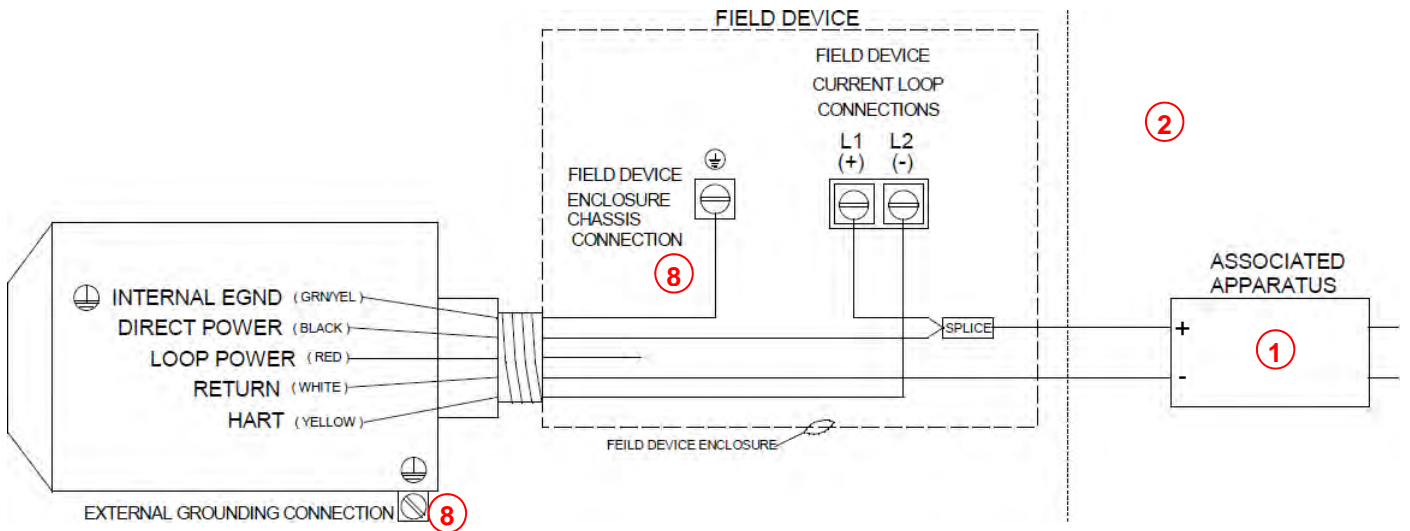
**116-0425**

Worldwide

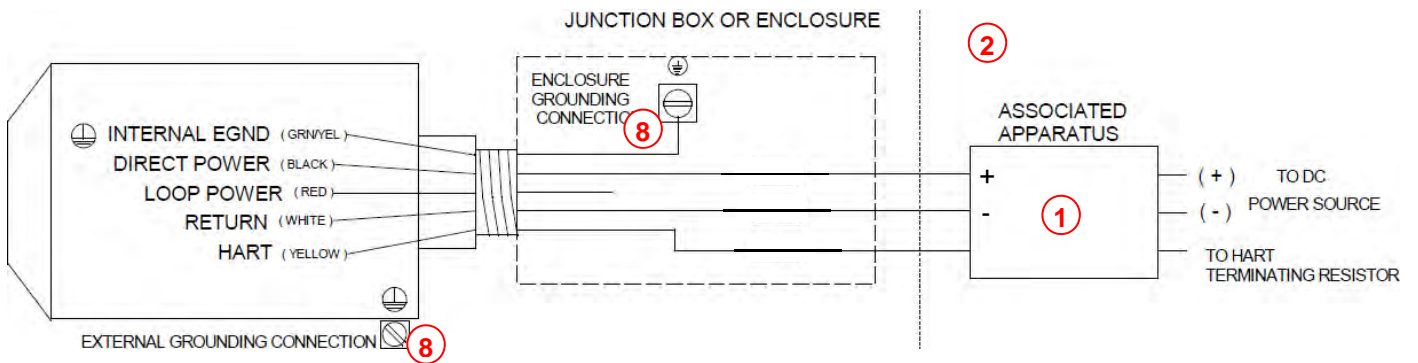
WHA-BLT-F9D0-N-A0-\*\*-\*1

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DIRECT POWER #1 – FIELD DEVICE CONTROL



DIRECT POWER #2 - REPREATER



All interconnections allow multi-drop (several field devices), see data sheet and manual for more information.

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## Special conditions of safe use

- ① [ The associated apparatus must provide resistively limited characteristics.
- ② [ Provide a transient protection. Ensure that the peak value of the transient protection does not exceed 140 % of the rated voltage.
- ③ [ Using the tick box provided on the nameplate, the user shall permanently mark the type of protection chosen for the specific installation. Once the type of protection has been marked it shall not be changed.
- ④ [ The equipment contains aluminum and is considered to constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact and friction.
- ⑤ [ Dust-tight conduit seals must be used to ensure the degree of protection.  
The flying leads of the apparatus shall be suitably protected against mechanical damage and terminated within an NRTL Approved, Listed or Recognized terminal or junction facility suitable for the location and conditions of use.  
Unused cables and connection lines must be either connected to terminals or securely tied down and isolated.
- ⑥ [ The Class I, Zone 1 AEx d IIC configuration requires the use of an NRTL Approved, Listed or Recognized cable seal, suitable for the location and conditions of use, installed at the apparatus and prior to the terminal or junction facility.
- ⑦ [ The ambient temperature range is  $-40\text{ °C} < T_a < +85\text{ °C}$  for temperature class T5 and ordinary location and  $-40\text{ °C} < T_a < +75\text{ °C}$  for temperature class T6.
- ⑧ [ The device provides a grounding terminal to which an equipotential bonding conductor with a minimum cross section of  $4\text{ mm}^2$  must be connected. The tightening torque for all screws is 1.1 Nm.

**WARNING** – *Explosion Hazard – Do not disconnect equipment unless power has been switched off or the area is known to be nonhazardous.*

**AVERTISSEMENT** – *RISQUE D'EXPLOSION - Ne pas déconnecter l'appareil si sous tension ou en présence d'une atmosphère explosive.*


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Table 1 – ELECTRICAL PARAMETERS								
MODEL TYPE	FIELD CONNECTIONS	$U_{\text{ext\_power}}$ [V]	$I_{\text{ext\_power}}$ [mA]	ENTITY PARAMETERS				
				$U_i$ ( $V_{\text{max}}$ ) [V]	$I_i$ ( $I_{\text{max}}$ ) [mA]	$P_i$ ( $P_{\text{max}}$ ) [mW]	$C_i$ [nF]	$L_i$ [ $\mu$ H]
WHA-BLT-F9D0-N-A0-Z0-Ex1	See INTERCONNECTIONS above	See $U_i$	See $I_i$	30	120	900	negligible	596
WHA-BLT-F9D0-N-A0-Z1-1	See INTERCONNECTIONS above	7 – 32	< 25	n.a.	n.a.	n.a.	n.a.	n.a.
WHA-BLT-F9D0-N-A0-GP-1	See INTERCONNECTIONS above	7 - 32	< 25	n.a.	n.a.	n.a.	n.a.	n.a.

Important for the determination (verification) of intrinsic safety:

The values of  $L_o$  and  $C_o$  of the associated apparatus are allowed if one of the following conditions is met:


- The total  $L_i$  of the external circuit (excluding the cable) is < 1% of the  $L_o$  ( $L_a$ ) value or
- The total  $C_i$  of the external circuit (excluding the cable) is < 1% of the  $C_o$  ( $C_a$ ) value.

The values of  $L_o$  and  $C_o$  of the associated apparatus shall be reduced to 50% when both of the following conditions are met:

- the total  $L_i$  of the external circuit (excluding the cable) is  $\geq$  1% of the  $L_o$  ( $L_a$ ) value and
- the total  $C_i$  of the external circuit (excluding the cable) is  $\geq$  1% of the  $C_o$  ( $C_a$ ) value.

Note: the reduced capacitance of the external circuit (including cable) shall not be greater than 1 $\mu$ F for IIA and IIB and 600nF for IIC.

When  $C_o$  ( $C_a$ ) of the associated apparatus is > 22  $\mu$ F, then total cable capacitance shall be limited to 22  $\mu$ F.

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	Worldwide	WHA-BLT-F9D0-N-A0-**-*1
		sheet 8 of 8

# 1 EU-TYPE EXAMINATION CERTIFICATE



2 **Equipment or Protective systems intended for use in Potentially Explosive Atmospheres - Directive 2014/34/EU**

3 **EU-Type Examination Certificate No:** FM17ATEX0046X

4 **Equipment or protective system:** WHA-BLT Series BULLET® WirelessHART® Adapter  
(Type Reference and Name)

5 **Name of Applicant:** Pepperl+Fuchs GmbH

6 **Address of Applicant:** Lilienthalstrasse 200  
D-68307 Mannheim  
Germany

7 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and documents therein referred to.

8 FM Approvals Ltd, notified body number 1725 in accordance with Article 17 of Directive 2014/34/EU of 26 February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report number:

3062160 dated 11<sup>th</sup> August 2017

9 Compliance with the Essential Health and Safety Requirements, with the exception of those identified in item 15 of the schedule to this certificate, has been assessed by compliance with the following documents:

EN 60079-0:2012+A11:2013, EN 60079-1:2014, EN 60079-11:2012 and EN 60079-31:2014

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.

11 This EU-Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment or protective system shall include:



**WHA-BLT-F9D0-N-A0-Z0-Ex1. BULLET® WirelessHART® Adaptor.**

II 1 G Ex ia IIC T6...T5 Ga  
T5 for Ta = -40°C to +85°C; T6 for Ta = -40°C to +75°C  
II 1 D Ex ia IIIC T95°C Ta = -40°C to +85°C Da



Digitally signed by Nicholas Ludlam  
DN: cn=Nicholas Ludlam, o=FM  
Approvals, ou,  
email=nicholas.ludlam@fmapprova  
ls.com, c=GB  
Date: 2017.08.16 11:30:44 +01'00'

**Nicholas Ludlam**  
**Deputy Certification Manager, FM Approvals Ltd.**

Issue date: 16<sup>th</sup> August 2017

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

FM Approvals Ltd. 1 Windsor Dials, Windsor, Berkshire, UK. SL4 1RS  
T: +44 (0) 1753 750 000 F: +44 (0) 1753 868 700 E-mail: [atex@fmapprovals.com](mailto:atex@fmapprovals.com) [www.fmapprovals.com](http://www.fmapprovals.com)

# SCHEDULE

to EU-Type Examination Certificate No. FM17ATEX0046X

12 The marking of the equipment or protective system shall include (continued):

**WHA-BLT-F9D0-N-A0-Z1-1. BULLET® WirelessHART® Adaptor.**

II 2 G Ex db IIC T6...T5 Gb  
T5 Ta = -40°C to +85°C ; T6 Ta = -40°C to +75°C  
II 2 D Ex tb IIC T95°C Ta = -40°C to +85°C Db

13 **Description of Equipment or Protective System:**

The Model WHA-BLT-F9D0 Series BULLET® WirelessHART® Adaptor is intended to be installed into a 4-20 mA current loop with electrical equipment using HART communications. The HART electrical signals are converted and delivered as wireless transmission. The electronics, except for the antenna board, are completely encapsulated and located inside of a painted metallic cylindrical housing with a polymeric dome cover. The antenna board protrudes through the encapsulation and is located under the polymeric dome cover. The bottom side of the housing is sealed with potting material where pig-tail wires protrude through the potting for installation. The housing also contains threads for installing into a cable gland or terminal / junction facility.

Operation Temperature Ranges:

The ambient operating temperature range of the BULLET® WirelessHART® Adaptor is -40°C to 85°C. A lower ambient temperature range of -40°C to +75°C is specified for Temperature Class T6

Electrical data:

The BULLET® WirelessHART® Adaptor has the following electrical ratings;

In type of protection intrinsic safety, Energy limitation parameters:  
Ui = 30V, Ii = 120mA, Pi = 0.9W, Ci = 0, Li = 595.96µH.

All other protection techniques, the electronic connection has the following values:  
7-32 V and 4-25 mA

**WHA-BLT-F9D0-N-A0-Z0-Ex1. BULLET® WirelessHART® Adaptor.**

**WHA-BLT-F9D0-N-A0-Z1-1. BULLET® WirelessHART® Adaptor.**

14 **Specific Conditions of Use:**

***For WHA-BLT-F9D0-N-A0-Z0-Ex1. BULLET® WirelessHART® Adaptor.***

*1. For Zone 0 installation only, the equipment contains aluminum and is considered to constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact and friction.*

***For WHA-BLT-F9D0-N-A0-Z1-1. BULLET® WirelessHART® Adaptor.***

- 1. The flying leads of the apparatus shall be suitably protected against mechanical damage and terminated within a suitable ATEX Certified Ex d or Ex e terminal or junction facility.*
- 2. The Ex db IIC configuration requires the use of an ATEX Certified cable seal, suitable for the location and conditions of use, installed at the apparatus and prior to the terminal or junction facility.*

15 **Essential Health and Safety Requirements:**

The relevant EHSRs that have not been addressed by the standards listed in this certificate have been identified and assessed in the confidential report identified in item 8.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

# **SCHEDULE**

to EU-Type Examination Certificate No. FM17ATEX0046X

**16 Test and Assessment Procedure and Conditions:**

This EU-Type Examination Certificate is the result of testing of a sample of the product submitted, in accordance with the provisions of the relevant specific standard(s), and assessment of supporting documentation. It does not imply an assessment of the whole production.

Whilst this certificate may be used in support of a manufacturer's claim for CE Marking, FM Approvals Ltd accepts no responsibility for the compliance of the equipment against all applicable Directives in all applications.

This Certificate has been issued in accordance with FM Approvals Ltd's ATEX Certification Scheme.

**17 Schedule Drawings**

A list of the significant parts of the technical documentation is annexed to this certificate and a copy has been kept by the Notified Body.

**18 Certificate History**

Details of the supplements to this certificate are described below:

<b>Date</b>	<b>Description</b>
16 <sup>th</sup> August 2017	Original Issue.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

# CERTIFICATE OF CONFORMITY



1. **HAZARDOUS LOCATION ELECTRICAL EQUIPMENT PER CANADIAN REQUIREMENTS**
2. **Certificate No:** FM17CA0102X
3. **Equipment:** WHA-BLT Series BULLET® WirelessHART® Adapter  
**(Type Reference and Name)**
4. **Name of Listing Company:** Pepperl+Fuchs GmbH
5. **Address of Listing Company:** Lilienthalstrasse 200  
D-68307 Mannheim  
Germany
6. The examination and test results are recorded in confidential report number:  
  
3062160 dated 11<sup>th</sup> August 2017
7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:  
  
CSA-C22.2 No. 0.4:2017, CSA-C22.2 No. 0.5:2016, CSA-C22.2 No. 25:R2014,  
CSA-C22.2 No. 30:R2016, CSA-C22.2 No. 94:R2011, CSA-C22.2 No. 157:R2016,  
CAN/CSA-C22.2 No. 60079-0:2015, CAN/CSA-C22.2 No. 60079-1:2016,  
CAN/CSA-C22.2 No. 60079-11:2014, CAN/CSA-C22.2 No. 60079-31:2015,  
CSA-C22.2 No. 60529:2016, and CAN/CSA-C22.2 No. 61010-1:R2017
8. If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.
9. This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.
10. **Equipment Ratings:**  
  
Intrinsically Safe (Entity) for use in Class I, II, and III, Division 1, Groups A, B, C, D, E, F, and G T6 (-40°C ≤ Ta ≤ 75°C) and T5 (-40°C ≤ Ta ≤ 85°C); in accordance with Control Drawing No. 116-0425; Intrinsically Safe (Entity) for use in Zone 0, Ex ia IIC Temperature Class T6 (-40°C ≤ Ta ≤ 75°C) and T5 (-40°C ≤ Ta ≤ 85°C); in

**Certificate issued by:**

J.E. Marquedant  
VP, Manager, Electrical Systems

11 August 2017

Date

To verify the availability of the Approved product, please refer to [www.approvalguide.com](http://www.approvalguide.com)

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

FM Approvals LLC, 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA  
T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: [information@fmapprovals.com](mailto:information@fmapprovals.com) [www.fmapprovals.com](http://www.fmapprovals.com)

# SCHEDULE

Canadian Certificate Of Conformity No: FM17CA0102X

accordance with Control Drawing No. 116-0425; Intrinsically Safe (Entity) for use in Zone 20, Ex ia IIC T95°C (-40°C ≤ Ta ≤ 85°C) in accordance with Control Drawing No. 116-0425. Explosionproof for Class I, Division 1, Groups A, B, C and D T6 (-40°C ≤ Ta ≤ 75°C) and T5 (-40°C ≤ Ta ≤ 85°C); Flameproof for Class I, Zone 1, Ex db IIC T6 (-40°C ≤ Ta ≤ 75°C) and T5 (-40°C ≤ Ta ≤ 85°C); Dust-ignitionproof for Class II, III, Division 1, Groups E, F, & G T6 (-40°C ≤ Ta ≤ 75°C) and T5 (-40°C ≤ Ta ≤ 85°C); and Zone 21, Ex tb IIC T95°C (-40°C ≤ Ta ≤ 85°C) indoors and outdoors Type 6P and IP67 hazardous locations.

11. The marking of the equipment shall include:



12. **Description of Equipment:**

The Model WHA-BLT-F9D0 Series BULLET® WirelessHART® Adaptor is intended to be installed into a 4-20 mA current loop with electrical equipment using HART communications. The HART electrical signals are converted and delivered as wireless transmission. The electronics, except for the antenna board, are completely encapsulated and located inside of a painted metallic cylindrical housing with a polymeric dome cover. The antenna board protrudes through the encapsulation and is located under the polymeric dome cover. The bottom side of the housing is sealed with potting material where pig-tail wires protrude through the potting for installation. The housing also contains threads for installing into a cable gland or terminal / junction facility. The enclosure meets Type 6P and IP67 environmental protection.

### Operation Temperature Ranges:

The ambient operating temperature range of the BULLET® WirelessHART® Adaptor is -40°C to 85°C. A lower ambient temperature range of -40°C to +75°C is specified for Temperature Class T6

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

# SCHEDULE



Canadian Certificate Of Conformity No: FM17CA0102X

Electrical data:

The BULLET® WirelessHART® Adaptor has the following electrical ratings;

In type of protection intrinsic safety, Energy limitation parameters:

Ui = 30V, li = 120mA, Pi = 0.9W, Ci = 0, Li = 595.96µH.

All other protection techniques, the electronic connection has the following values:

7-32 V and 4-25 mA

**WHA-BLT-F9D0-N-A0-Z0-Ex1. BULLET® WirelessHART® Adaptor.**

**WHA-BLT-F9D0-N-A0-Z1-1. BULLET® WirelessHART® Adaptor.**

**13. Specific Conditions of Use:**

***For WHA-BLT-F9D0-N-A0-Z0-Ex1. BULLET® WirelessHART® Adaptor.***

*1. For Division 1 or Zone 0 installation only, the equipment contains aluminum and is considered to constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact and friction.*

***For WHA-BLT-F9D0-N-A0-Z1-1. BULLET® WirelessHART® Adaptor.***

*1. The flying leads of the apparatus shall be suitably protected against mechanical damage and terminated within a Canadian Certified terminal or junction facility suitable for the location and conditions of use.*

*2. The Class I, Zone 1 Ex db IIC configuration requires the use of a Canadian Certified cable seal, suitable for the location and conditions of use, installed at the apparatus and prior to the terminal or junction facility.*

**14. Test and Assessment Procedure and Conditions:**

This Certificate has been issued in accordance with FM Approvals Canadian Certification Scheme.

**15. Schedule Drawings**

A copy of the technical documentation has been kept by FM Approvals.

**16. Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
11 <sup>th</sup> August 2017	Original Issue.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA

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# CERTIFICATE OF CONFORMITY

- ELECTRICAL EQUIPMENT PER CANADIAN REQUIREMENTS**
- Certificate No:** FM17NCA0004
- Equipment:** WHA-BLT-F9D0-N-A0-GP-1. BULLET® WirelessHART® Adapter  
**(Type Reference and Name)**
- Name of Listing Company:** Pepperl+Fuchs GmbH
- Address of Listing Company:** Lilienthalstrasse 200  
D-68307 Mannheim  
Germany
- The examination and test results are recorded in confidential report number:  
3062160 dated 11<sup>th</sup> August 2017
- FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:  
CSA-C22.2 No. 94:R2011, CSA-C22.2 No. 60529:2016,  
CSA-C22.2 No. 61010-1:R2017
- This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.
- Equipment Ratings:**  
Suitable for use in unclassified (non-hazardous) locations. Enclosure rating: Type 6P and IP67

## Certificate issued by:



J.E. Marquedant  
VP, Manager, Electrical Systems

11 August 2017  
Date

To verify the availability of the Approved product, please refer to [www.approvalguide.com](http://www.approvalguide.com)

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

# SCHEDULE



Canadian Certificate Of Conformity No: FM17NCA0004

**10. Description of Equipment:**

The Model WHA-BLT-F9D0-N-A0-GP-1 BULLET® WirelessHART® Adaptor is intended to be installed into a 4-20 mA current loop with electrical equipment using HART communications. The HART electrical signals are converted and delivered as wireless transmission. The electronics, except for the antenna board, are completely encapsulated and located inside of a painted metallic cylindrical housing with a polymeric dome cover. The antenna board protrudes through the encapsulation and is located under the polymeric dome cover. The bottom side of the housing is sealed with potting material where pig-tail wires protrude through the potting for installation. The housing also contains threads for installing into a cable gland or terminal / junction facility.

Operation Temperature Ranges:  
The ambient operating temperature range is -40°C to 85°C.

Electrical data:  
7-32 V and 4-25 mA

Environmental ratings:  
Type 6P and IP67

**Model Code: WHA-BLT-F9D0-N-A0-GP-1. BULLET® WirelessHART® Adaptor.**

**11. Test and Assessment Procedure and Conditions:**

This Certificate has been issued in accordance with FM Approvals Canadian Certification Requirements.

**12. Schedule Drawings**

A copy of the technical documentation has been kept by FM Approvals.

**13. Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
11 <sup>th</sup> August 2017	Original Issue.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

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# CERTIFICATE OF CONFORMITY



- HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS**
- Certificate No:** FM17US0191X
- Equipment:** WHA-BLT Series BULLET® WirelessHART® Adapter  
**(Type Reference and Name)**
- Name of Listing Company:** Pepperl+Fuchs GmbH
- Address of Listing Company:** Lilienthalstrasse 200  
D-68307 Mannheim  
Germany
- The examination and test results are recorded in confidential report number:  
  
3062160 dated 11<sup>th</sup> August 2017
- FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:  
  
FM Class 3600:2011, FM Class 3610:2015, FM Class 3615:2006, FM Class 3616:2011,  
FM Class 3810:2005, ANSI/ISA 60079-0:2013, ANSI/UL 60079-1:2015, ANSI/ISA 60079-11:2014,  
ANSI/UL 60079-31:2015, ANSI/NEMA 250:2014 and ANSI/IEC 60529:R2011
- If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.
- This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.
- Equipment Ratings:**  
  
Intrinsically Safe (entity) for use in Class I, II and III, Division 1, Groups A, B, C, D, E, F and G T6 (-40°C ≤ Ta ≤ 75°C) and T5 (-40°C ≤ Ta ≤ 85°C); in accordance with Control Drawing No. 116-0425; Intrinsically safe (Entity) for use in Class I, Zone 0, AEx ia IIC T6 (-40°C ≤ Ta ≤ 75°C) and T5 (-40°C ≤ Ta ≤ 85°C) in accordance with Control Drawing No. 116-0425; Intrinsically Safe (Entity) for use in Zone 20, AEx ia IIIC T95°C (-40°C ≤ Ta ≤

**Certificate issued by:**

J. E. Marquedant  
VP, Manager, Electrical Systems

11 August 2017

Date

To verify the availability of the Approved product, please refer to [www.approvalguide.com](http://www.approvalguide.com)

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# SCHEDULE

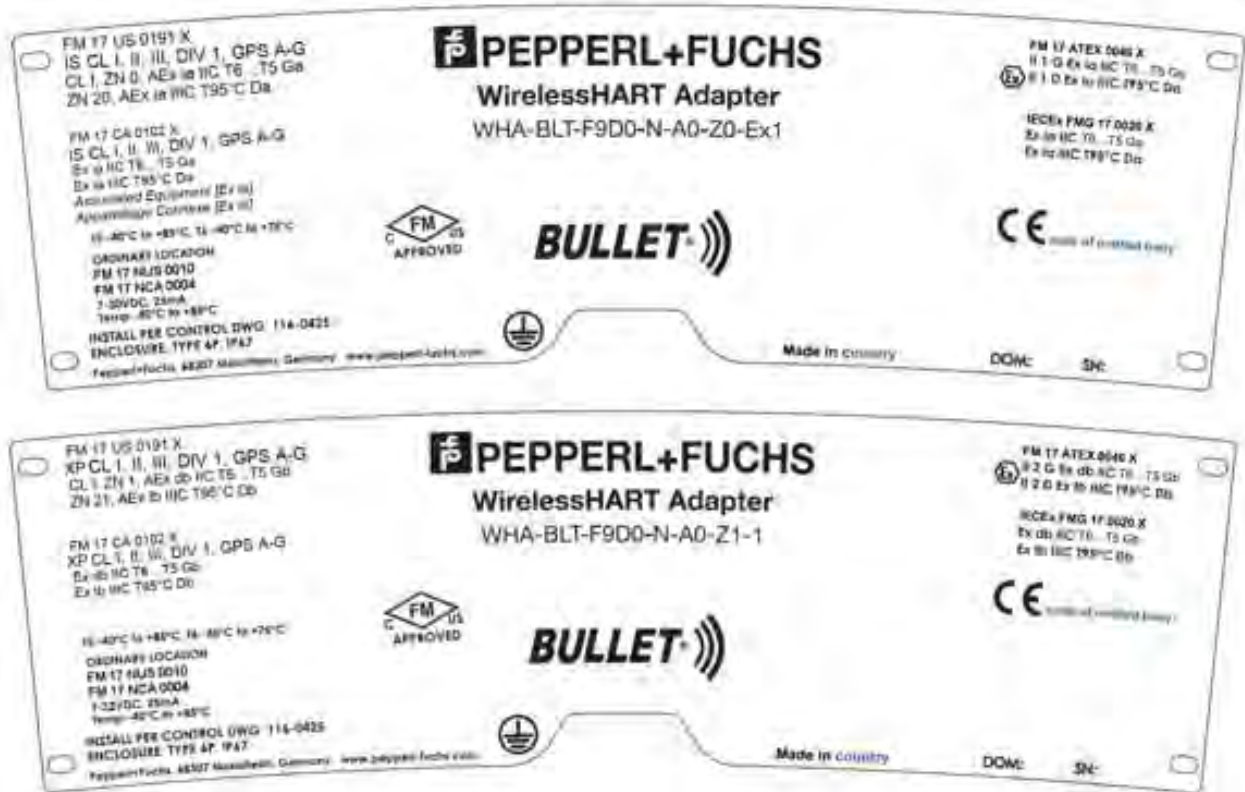


Member of the FM Global Group

US Certificate Of Conformity No: FM17US0191X

85°C) in accordance with Control Drawing No. 116-0425. Explosionproof for Class I, Division 1, Groups A, B, C and D T6 (-40°C ≤ Ta ≤ 75°C) and T5 (-40°C ≤ Ta ≤ 85°C); Flameproof for Class I, Zone 1, AEx db IIC T6 (-40°C ≤ Ta ≤ 75°C) and T5 (-40°C ≤ Ta ≤ 85°C); Dust-ignitionproof for Class II, III, Division 1, Groups E, F, & G T6 (-40°C ≤ Ta ≤ 75°C) and T5 (-40°C ≤ Ta ≤ 85°C); and Zone 21, AEx tb IIIC T95°C (-40°C ≤ Ta ≤ 85°C); indoor and outdoor Type 6P and IP67 hazardous (classified) locations.

11. The marking of the equipment shall include:



12. **Description of Equipment:**

The Model WHA-BLT-F9D0 Series BULLET® WirelessHART® Adaptor is intended to be installed into a 4-20 mA current loop with electrical equipment using HART communications. The HART electrical signals are converted and delivered as wireless transmission. The electronics, except for the antenna board, are completely encapsulated and located inside of a painted metallic cylindrical housing with a polymeric dome cover. The antenna board protrudes through the encapsulation and is located under the polymeric dome cover. The bottom side of the housing is sealed with potting material where pig-tail wires protrude through the potting for installation. The housing also contains threads for installing into a cable gland or terminal / junction facility. The enclosure meets Type 6P and IP67 environmental protection.

### Operation Temperature Ranges:

The ambient operating temperature range of the BULLET® WirelessHART® Adaptor is -40°C to 85°C. A lower ambient temperature range of -40°C to +75°C is specified for Temperature Class T6

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# SCHEDULE



US Certificate Of Conformity No: FM17US0191X

## Electrical data:

The BULLET® WirelessHART® Adaptor has the following electrical ratings;

In type of protection intrinsic safety, Energy limitation parameters:

Ui = 30V, li = 120mA, Pi = 0.9W, Ci = 0, Li = 595.96µH.

All other protection techniques, the electronic connection has the following values:

7-32 V and 4-25 mA

**WHA-BLT-F9D0-N-A0-Z0-Ex1. BULLET® WirelessHART® Adaptor.**

**WHA-BLT-F9D0-N-A0-Z1-1. BULLET® WirelessHART® Adaptor.**

## 13. Specific Conditions of Use:

### **For WHA-BLT-F9D0-N-A0-Z0-Ex1. BULLET® WirelessHART® Adaptor.**

1. For Division 1 or Zone 0 installation only. The equipment contains aluminum and is considered to constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact and friction.

### **For WHA-BLT-F9D0-N-A0-Z1-1. BULLET® WirelessHART® Adaptor.**

1. The flying leads of the apparatus shall be suitably protected against mechanical damage and terminated within an NRTL Approved, Listed or Recognized terminal or junction facility suitable for the location and conditions of use.

2. The Class I, Zone 1 AEx db IIC configuration requires the use of an NRTL Approved, Listed or Recognized cable seal, suitable for the location and conditions of use, installed at the apparatus and prior to the terminal or junction facility.

## 14. Test and Assessment Procedure and Conditions:

This Certificate has been issued in accordance with FM Approvals US Certification Requirements.

## 15. Schedule Drawings

A copy of the technical documentation has been kept by FM Approvals.

## 16. Certificate History

Details of the supplements to this certificate are described below:

Date	Description
11 <sup>th</sup> August 2017	Original Issue.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA

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# CERTIFICATE OF CONFORMITY



1. **ELECTRICAL EQUIPMENT PER US REQUIREMENTS**

2. **Certificate No:** FM17NUS0010

3. **Equipment:** WHA-BLT-F9D0-N-A0-GP-1. BULLET® WirelessHART®  
**(Type Reference and Name)** Adapter

4. **Name of Listing Company:** Pepperl+Fuchs GmbH

5. **Address of Listing Company:** Lilienthalstrasse 200  
D-68307 Mannheim  
Germany

6. The examination and test results are recorded in confidential report number:

3062160 dated 11<sup>th</sup> August 2017

7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:

FM Class 3810:2005, ANSI/NEMA 250:2014, ANSI/IEC 60529:R2011

8. This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.

9. **Equipment Ratings:**  
Suitable for use in unclassified (non-hazardous) locations. Enclosure rating: Type 6P and IP67

10. **Description of Equipment:**

The Model WHA-BLT-F9D0-N-A0-GP-1 BULLET® WirelessHART® Adaptor is intended to be installed into a 4-20 mA current loop with electrical equipment using HART communications. The HART electrical

**Certificate issued by:**

J. E. Marquedant  
VP, Manager, Electrical Systems

11 August 2017

Date

To verify the availability of the Approved product, please refer to [www.approvalguide.com](http://www.approvalguide.com)

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**

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T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: [information@fmapprovals.com](mailto:information@fmapprovals.com) [www.fmapprovals.com](http://www.fmapprovals.com)

# SCHEDULE



to US Certificate Of Conformity No: FM17NUS0010

signals are converted and delivered as wireless transmission. The electronics, except for the antenna board, are completely encapsulated and located inside of a painted metallic cylindrical housing with a polymeric dome cover. The antenna board protrudes through the encapsulation and is located under the polymeric dome cover. The bottom side of the housing is sealed with potting material where pig-tail wires protrude through the potting for installation. The housing also contains threads for installing into a cable gland or terminal / junction facility.

Operation Temperature Ranges:  
The ambient operating temperature range is -40°C to 85°C.

Electrical data:  
7-32 V and 4-25 mA

Environmental ratings:  
Type 6P and IP67

**Model Code: WHA-BLT-F9D0-N-A0-GP-1. BULLET® WirelessHART® Adaptor.**

**11. Test and Assessment Procedure and Conditions:**

This Certificate has been issued in accordance with FM Approvals US Certification Requirements.

**12. Schedule Drawings**

A copy of the technical documentation has been kept by FM Approvals.

**13. Specific Conditions of Use:**

None

**14. Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
11 <sup>th</sup> August 2017	Original Issue.

**THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE**



## IECEX Certificate of Conformity

**INTERNATIONAL ELECTROTECHNICAL COMMISSION**  
**IEC Certification Scheme for Explosive Atmospheres**  
 for rules and details of the IECEX Scheme visit [www.iecex.com](http://www.iecex.com)

Certificate No.:	IECEX FMG 17.0020X	issue No.:0	Certificate history:
Status:	Current		
Date of Issue:	2017-08-11	Page 1 of 3	
Applicant:	<b>Pepperl+Fuchs GmbH</b> Lilienthalstrasse 200 68307 Mannheim <b>Germany</b>		
Equipment: Optional accessory:	<b>WHA-BLT-F9D0-N-A0-Z1-* Series BULLET® WirelessHART® Adaptor</b>		
Type of Protection:	<b>Intrinsic Safety "ia"; Flameproof "d", Protection by Enclosure "tb"</b>		
Marking:	For WHA-BLT-F9D0-N-A0-Z1-Ex1: Ex ia IIC T6...T5 Ga T6 Ta = -40°C to 75°C, T5 Ta = -40°C to 85°C; Ex ia IIIC T95°C Da Ta = -40°C to +85°C. For WHA-BLT-F9D0-N-A0-Z1-1: Ex db IIC T6...T5 Gb T6 Ta = -40°C to 75°C, T5 Ta = -40°C to 85°C; Ex tb IIIC T95°C Db.		
Approved for issue on behalf of the IECEX Certification Body:	J. E. Marquedant		
Position:	VP, Manager - Electrical Systems		
Signature: (for printed version)	_____		
Date:	_____		

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the [Official IECEX Website](http://www.iecex.com).

Certificate issued by:

**FM Approvals LLC**  
 1151 Boston-Providence Turnpike  
 Norwood, MA 02062  
 United States of America







## IECEX Certificate of Conformity

Certificate No.: IECEx FMG 17.0020X

Date of Issue: 2017-08-11

Issue No.: 0

Page 2 of 3

Manufacturer: **Pepperl+Fuchs GmbH**  
Lilienthalstrasse 200  
68307 Mannheim  
Germany

Additional Manufacturing location(s):

**Pepperl+Fuchs Inc.**  
1600 Enterprise Pkwy  
Twinsburg, Ohio 44087  
United States of America

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

**STANDARDS:**

The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

**IEC 60079-0 : 2011** Explosive atmospheres - Part 0: General requirements  
Edition: 6.0  
**IEC 60079-1 : 2014-06** Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"  
Edition: 7.0  
**IEC 60079-11 : 2011** Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "I"  
Edition: 6.0  
**IEC 60079-31 : 2013** Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "I"  
Edition: 2

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

**TEST & ASSESSMENT REPORTS:**

*A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in*

Test Report:

[US/FMG/ExTR17.0017/00](#)

Quality Assessment Report:

[DE/PTB/QAR06.0008/08](#)

[US/UL/QAR07.0005/12](#)



## IECEX Certificate of Conformity

Certificate No.: IECEx FMG 17.0020X

Date of Issue: 2017-08-11

Issue No.: 0

Page 3 of 3

### Schedule

#### EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

**Model WHA-BLT-F9D0-N-A0-Z1-Ex1. BULLET® WirelessHART® Adaptor.** Energy Limitation Parameters:  $U_i = 30V$ ,  $I_i = 120mA$ ,  $P_i = 0.9W$ ,  $C_i = 0$ ,  $L_i = 595.96\mu H$ .

**Model WHA-BLT-F9D0-N-A0-Z1-1. BULLET® WirelessHART® Adaptor.**

#### SPECIFIC CONDITIONS OF USE: YES as shown below:

1. For Zone 0 installation only. The equipment contains aluminum and is considered to constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact and friction.
2. The flying leads of the apparatus shall be suitably protected against mechanical damage and terminated within a suitable IECEx Certified Ex d or Ex e terminal or junction facility.
3. The Ex d IIC configuration requires the use of an IECEx Certified cable seal, suitable for the location and conditions of use, installed at the apparatus and prior to the terminal or junction facility.

Pepperl+Fuchs GmbH  
Lilienthalstraße 200  
68307 Mannheim  
Germany  
Phone +49 621 776-0  
Fax +49 621 776-1000

No. / Nr.: DOC-3837A  
Date / Datum: 2018-02-01

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www.pepperl-fuchs.com



### Declaration of conformity / Konformitätserklärung

We, Pepperl+Fuchs GmbH declare under our sole responsibility that the **products** listed below are in conformity with the listed **European Directives** and **standards**.

Die Pepperl+Fuchs GmbH erklärt hiermit in alleiniger Verantwortung, dass die unten gelisteten **Produkte** den genannten **Europäischen Richtlinien** und **Normen** entsprechen.

### Products / Produkte

Product / Produkt	Item number	Description / Beschreibung
WHA-BLT-F9D0-N-A0-GP-1	916970 916974 916975	WirelessHART Adapter

### Directives and Standards / Richtlinien und Normen

EU-Directive EU-Richtlinie	Standards Normen
RE 2014/53/EU (L153/62-106)	EN 300 328 V2.1.1:2016-11 EN 301 489-1 V2.2.0:2017-3 EN 301 489-17 V3.2.0:2017-3
RoHS 2011/65/EU (L174/88-110)	EN 50581:2012-09

### Affixed CE Marking / Angebrachte CE-Kennzeichnung



### Signatures / Unterschriften

Mannheim, 2018-02-01

ppa. Michael Kessler i.v. Gerrit Lohmann

ppa. Michael Kessler  
Executive Vice President Components & Technology

i.V. Gerrit Lohmann  
Manager Product Group Remote Systems

### ANNEX R&TTE / RE

#### Key for Issuer ID / Schlüssel zur Aussteller ID

ID	Issuer / Aussteller
0976	CKC LABORATORIES, INC. Clouds Rest 5473A 95338 Mariposa, CA United States

Pepperl+Fuchs GmbH  
Lilienthalstraße 200  
68307 Mannheim  
Germany  
Phone +49 621 776-0  
Fax +49 621 776-1000

No. / Nr.: DOC-3836B  
Date / Datum: 2018-02-01

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### Products / Produkte

Product / Produkt	Item number	Description / Beschreibung
WHA-BLT-F9D0-N-A0-Z0-Ex1	916968 916976 916977	WirelessHART Adapter

### Directives and Standards / Richtlinien und Normen

EU-Directive EU-Richtlinie	Standards Normen
RE 2014/53/EU (L153/62-106)	EN 300 328 V2.1.1:2016-11 EN 301 489-1 V2.2.0:2017-3 EN 301 489-17 V3.2.0:2017-3
ATEX 2014/34/EU (L96/309-356)	EN 60079-0: 2012+A11:2013 EN 60079-11: 2012
RoHS 2011/65/EU (L174/88-110)	EN 50581:2012-09

### Affixed CE Marking / Angebrachte CE-Kennzeichnung



### Signatures / Unterschriften

Mannheim, 2018-02-01

ppa. M. Kessler i.v. G. Lohmann

ppa. Michael Kessler  
Executive Vice President Components & Technology

i.V. Gerrit Lohmann  
Manager Product Group Remote Systems

### ANNEX RED

#### Key for Issuer ID / Schlüssel zur Aussteller ID

ID	Issuer / Aussteller
0976	CKC LABORATORIES, INC. Clouds Rest 5473A 95338 Mariposa, CA United States

### ANNEX ATEX

#### Notified Body QM-System / Notifizierte Stelle des QM-Systems:

UL INTERNATIONAL DEMKO A/S (0539)  
Lyskær, 8 - Postboks 514  
2730 HERLEV  
Denmark

### Marking and Certificates / Kennzeichnung und Zertifikate

Products / Produkte	WHA-BLT-F9D0-N-A0-Z0-Ex1	
Marking Kennzeichnung	Certificate Zertifikat	Issuer ID Aussteller ID
Ex II 1 G Ex II 1 D	FM 17 ATEX 0046 X	1725

#### Key for Issuer ID / Schlüssel zur Aussteller ID

ID	Issuer / Aussteller
0539	UL INTERNATIONAL DEMKO A/S (0539) Lyskær, 8 - Postboks 514 2730 HERLEV Denmark
1725	FM Approvals Ltd. 1 Windsor Dials Windsor, Berkshire UK. SL4 1RS

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No. / Nr.: DOC-3835B  
Date / Datum: 2018-02-01

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We, Pepperl+Fuchs GmbH declare under our sole responsibility that the **products** listed below are in conformity with the listed **European Directives** and **standards**.

Die Pepperl+Fuchs GmbH erklärt hiermit in alleiniger Verantwortung, dass die unten gelisteten **Produkte** den genannten **Europäischen Richtlinien** und **Normen** entsprechen.

### Products / Produkte

Product / Produkt	Item number	Description / Beschreibung
WHA-BLT-F9D0-N-A0-Z1-1	916969 916978 916971	WirelessHART Adapter

### Directives and Standards / Richtlinien und Normen

EU-Directive EU-Richtlinie	Standards Normen
RE 2014/53/EU (L153/62-106)	EN 300 328 V2.1.1:2016-11 EN 301 489-1 V2.2.0:2017-3 EN 301 489-17 V3.2.0:2017-3
ATEX 2014/34/EU (L96/309-356)	EN 60079-0:2012+A11:2013 EN 60079-1:2014 EN 60079-31:2014
RoHS 2011/65/EU (L174/88-110)	EN 50581:2012-09

### Affixed CE Marking / Angebrachte CE-Kennzeichnung



### Signatures / Unterschriften

Mannheim, 2018-02-01

ppa. M. Kessler i.v. G. Lohmann

ppa. Michael Kessler  
Executive Vice President Components & Technology

i.V. Gerrit Lohmann  
Manager Product Group Remote Systems

### ANNEX RED

#### Key for Issuer ID / Schlüssel zur Aussteller ID

ID	Issuer / Aussteller
0976	CKC LABORATORIES, INC. Clouds Rest 5473A 95338 Mariposa, CA United States

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#### Notified Body QM-System / Notifizierte Stelle des QM-Systems:

UL INTERNATIONAL DEMKO A/S (0539)

Lyskær, 8 - Postboks 514

2730 HERLEV

Denmark

### Marking and Certificates / Kennzeichnung und Zertifikate

Products / Produkte	WHA-BLT-F9D0-N-A0-Z1-1	
Marking Kennzeichnung	Certificate Zertifikat	Issuer ID Aussteller ID
⊕ II 2 G ⊕ II 2 D	FM 17 ATEX 0046 X	1725

#### Key for Issuer ID / Schlüssel zur Aussteller ID

ID	Issuer / Aussteller
0539	UL INTERNATIONAL DEMKO A/S (0539) Lyskær, 8 - Postboks 514 2730 HERLEV Denmark
1725	FM Approvals Ltd. 1 Windsor Dials Windsor, Berkshire UK. SL4 1RS

# Smart HART® Product Solutions

## STZ Functional Safety Dual Input Smart HART® Temperature Transmitter



Part of Moore Industries' FS Functional Safety Series, the SIL 2 and SIL 3 capable STZ Functional Safety Dual Input Smart HART® Temperature Transmitters for your SIS (Safety Instrumented System) configures quickly and easily to accept a single or dual input from a wide array of sensors and analog devices located in hazardous and nonhazardous areas.

### Features:

- exida® certified to IEC 61508:2010
- Comprehensive FMEDA certified safety data
- AIS option
- Dual sensor input
- HART 7 compliant & HART Access Control
- 20-bit input resolution delivers exceptional digital accuracy
- HART & DTM Programmable
- Device Intelligence
- Resistance and Potentiometer Devices
- Direct Millivolt sources
- Accepts 14 RTD types, 9 thermocouple types

## HIM Smart HART® Loop Interface and Monitor



The HIM HART® Loop Interface and Monitor unlocks the full potential of new and in-place Smart HART® multivariable transmitters and valves. The HIM allows up to three additional analog process variable measurements from a smart device with no additional process penetrations or wiring.

### Features:

- Converts HART to 4-20mA Signals
- Works with every Smart HART® Device
- High/Low process and loop diagnostic alarms
- Immune to supply pressure variation
- Sets up as a Primary or Secondary Master, or in "Listen" Mode
- Normal or Burst HART Modes
- "Break Out" up to three analog signals
- Isolated output channels



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# Smart HART® Product Solutions

## SSX/SST Safety Series Isolator and Splitter

Part of Moore Industries' FS Functional Safety Series, the exida® approved, SIL 3 capable 2-wire (loop powered) SSX and 4-wire (line/mains powered) SST Safety Isolators and Splitters provide isolation and signal conversion for your SIS (Safety Instrumented System) needs. These units protect and enhance loops and also pass valuable HART® data from the field transmitter to host systems and vice-versa.

The SSX is a 2-wire isolator, drawing power from the output side of the loop. The SST is a 4-wire unit powered by 24DC, 117AC or 230AC and is designed for applications where line/mains power is readily available, such as the back of a panel or inside of a control room.

### Features:

- exida® Certified IEC 61508:2010
- Comprehensive FMEDA Certified Safety Data
- Valuable HART data not lost - Built-in HART Pass-through Technology
- Split signals Between Two Locations
- RFI/EMI Protection
- Transmitter Excitation
- Rugged Metal DIN Housing



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