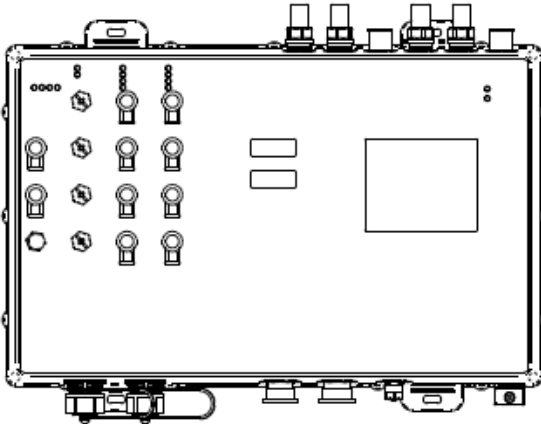


# User Manual

## Installation

### Managed IP67 Wireless Switch

### BATOne



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Installation BATOne

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# Safety instructions



## WARNING

### **UNCONTROLLED MACHINE ACTIONS**

To avoid uncontrolled machine actions caused by data loss, configure all the data transmission devices individually.

Before you start any machine which is controlled via data transmission, be sure to complete the configuration of all data transmission devices.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

### ■ General safety instructions

You operate this device with electricity. Improper usage of the device entails the risk of physical injury or significant property damage. The proper and safe operation of this device depends on proper handling during transportation, proper storage and installation, and careful operation and maintenance procedures.

- Before connecting any cable, read this document, and the safety instructions and warnings.
- Operate the device with undamaged components exclusively.
- The device is free of any service components. In case of a damaged or malfunctioning the device, turn off the supply voltage and return the device to Hirschmann for inspection.
- Internal fuses are triggered only in the case of a detected error in the device. In case of damage or malfunction of the device, turn off the supply voltage and return the device to the plant for inspection.

### ■ Qualification requirements for personnel

- Only allow qualified personnel to work on the device.

Qualified personnel have the following characteristics:

- ▶ Qualified personnel are properly trained. Training as well as practical knowledge and experience make up their qualifications. This is the

prerequisite for grounding and labeling circuits, devices, and systems in accordance with current standards in safety technology.

- ▶ Qualified personnel are aware of the dangers that exist in their work.
- ▶ Qualified personnel are familiar with appropriate measures against these hazards in order to reduce the risk for themselves and others.
- ▶ Qualified personnel receive training on a regular basis.

■ Installation site requirements

- Install this device in an operating site with restricted access, to which maintenance staff have exclusive access.

■ Certified usage

- Use the product only for the application cases described in the Hirschmann product information, including this manual.
- Operate the product only according to the technical specifications.  
[See Technical data on page 39.](#)
- Connect to the product only components suitable for the requirements of the specific application case.

■ Requirements for connecting electrical wires

Before connecting the electrical wires, **always** verify that the requirements listed are complied with.

**All of the following requirements are complied with:**

- ▶ The electrical wires are voltage-free.
- ▶ The cables used are permitted for the temperature range of the application case.

---

*Table 1: General requirements for connecting electrical wires*

■ Requirements for connecting data lines

Before connecting the electrical wires, **always** verify that the requirements listed are complied with.

**All of the following requirements are complied with:**

- ▶ The voltage connected complies with the requirements for a safety extra-low voltage (Environment A - SELV) as per IEC/EN 60950-1.

---

*Table 2: Requirements for connecting data lines*



## WARNING

### ELECTRIC SHOCK

Use only Safety Extra Low Voltage circuit.

**Failure to follow this instruction can result in death, serious injury, or equipment damage.**

- Requirements for connecting the signal contact  
Before connecting the signal contact, **always** verify that the requirements listed are complied with.

#### All of the following requirements are complied with:

- ▶ The voltage connected complies with the requirements for a safety extra-low voltage (SELV) as per IEC/EN 60950-1.
- ▶ The connected voltage is limited by a current limitation device or a fuse. Observe the electrical threshold values for the signal contact.  
[See Technical data on page 39.](#)

Table 3: Requirements for connecting the signal contact

- Requirements for connecting the grounding  
Before connecting the grounding, **always** verify that the requirements listed are complied with.

Device variant	Requirements
All variants	The wire diameter of the ground conductor in the power supply cable is the same size as or bigger than the wire diameter of the power supply cables, however of at least 0.75 mm <sup>2</sup> (AWG18). When connecting the provided cable lug, use a professional crimping tool specified for the wire size. Follow the instructions of the crimping tool. The pull out force of the crimped connection is at least 135 N according to the technical standard IEC 60352-2.


Table 4: Requirements for connecting the grounding

- Requirements for connecting the supply voltage  
Before connecting the supply voltage, **always** verify that the requirements listed are complied with.



Device variant	Requirements
All variants	<p><b>All</b> of the following requirements are complied with:</p> <ul style="list-style-type: none"> <li>▶ The supply voltage corresponds to the voltage specified on the type plate of the device.</li> <li>▶ The supply voltage conforms to overvoltage category I or II.</li> <li>▶ The supply voltage has an easily accessible disconnecting device (e. g., a switch or a plug). This disconnecting device is clearly identified. So in the case of an emergency, it is clear which disconnecting device belongs to which power supply -cable.</li> <li>▶ A fuse is located in the outer conductor of the power supply. The neutral conductor is on ground potential at both voltage inputs. Otherwise, a fuse is also located in the neutral conductor. Regarding the properties of this fuse: <a href="#">See Technical data on page 39.</a></li> <li>▶ The power supply cable is suitable for the voltage, the current and the physical load. The wire diameter is at least 0.75 mm<sup>2</sup>(North America: AWG18).</li> </ul>

Table 5: Requirements for connecting the supply voltage



## WARNING

---

### ELECTRIC SHOCK

Use only Safety Extra Low Voltage circuit.

**Failure to follow this instruction can result in death, serious injury, or equipment damage.**

- Supply voltage
 

The supply voltage is connected to the device casing through protective elements exclusively.
- Shielding ground
  - ▶ The overall shield of a connected shielded twisted-pair cable is connected to the metal housing as a conductor.
    - Beware of possible short circuits when connecting a cable section with conductive shielding braiding.
- Grounding the device
 

Grounding the device is by means of a separate ground connection on the device.

  - Ground the device before connecting any other cables.
  - Disconnect the grounding only after disconnecting all other cables.

- Use toothed washers to ensure good electrical conductivity at the connection.
- Device casing
  - Only technicians authorized by the manufacturer are permitted to open the housing.
  - Install the device in the vertical position, with the antenna connections pointing upwards.
  - At ambient air temperatures > 140 °F (+60 °C):  
The surfaces of the device housing may become hot. Avoid touching the device while it is operating.
  - To preserve the suitability of your device for IP65/67, proceed as follows:
    - Remove the provided transport protection caps and the transport protection screws from the device.
    - Seal unused sockets and plugs with your desired type of protection screws which you can order separately.
- Lightning protection
  - Refer to the information in the “WLAN Outdoor Guide” on “Lightning and overvoltage protection”.  
You can download the manual from the Internet on the Hirschmann product pages (<http://www.hirschmann.com>).
  - Install over voltage protector devices on every outdoor Ethernet cable.
  - Protect antennas installed outside with lightning protection devices (for example lightning conductors).
  - Take lightning protection measures which mitigate the effects of lightning strikes.
  - ▶ The installation of the device occurs in accordance with valid standards (such as VDE 0185 and IEC 62305), and in accordance with the lightning protection procedures recognized and proven for the application and the environment.
- National and international safety regulations
  - Verify that the electrical installation meets local or nationally applicable safety regulations.
  - When installing antennas, observe the regulations of the country in which you are operating the WLAN device with regard to the general operating permission and the maximum emission levels.
  - Install and operate this equipment with a minimum distance of 19.7 inches (50 cm) between the antenna and your body.

■ LED or laser components

LED or LASER components according to IEC 60825-1 (2014):

CLASS 1 LASER PRODUCT

CLASS 1 LED PRODUCT

■ Recycling note

After usage, this device must be disposed of properly as electronic waste, in accordance with the current disposal regulations of your county, state, and country.

# About this manual

The “Installation” user manual contains a device description, safety instructions, a description of the display, and the other information that you need to install the device.

The documentation for your device is made up of the following documents:

- ▶ General safety instructions
- ▶ Installation user manual

# Key

The symbols used in this manual have the following meanings:

- ▶ Listing
- Work step
- Subheading

# 1 Description

## 1.1 General description

The BATOne devices are designed for the special requirements of industrial automation. They meet the relevant industry standards, provide very high operational reliability, even under extreme conditions, and also long-term reliability and flexibility.

The BATOne are dual-band industrial high-performance wireless LAN access points or clients complying with IEEE 802.11a/b/g/h/n. They provide a high radio output with a bandwidth of up to 450 Mbit/s. The devices support MIMO (Multiple Input Multiple Output) and Multipath. The bandwidth is increased by using the multipath transmission by means of reflections. Each WLAN module has 3 antennas for sending and receiving, to ensure stable network coverage with few shadow areas.

The redundancy concept allows the network to be reconfigured quickly.

There are convenient options for managing the device. Administer your devices via:

- ▶ Web browser
- ▶ SSH
- ▶ Telnet
- ▶ HiDiscovery (Software for putting the device into operation)
- ▶ Management software (for example LANconfig/LANmonitor)
- ▶ V.24 interface (locally on the device)

The devices comply with the degrees of protection IP65/67.

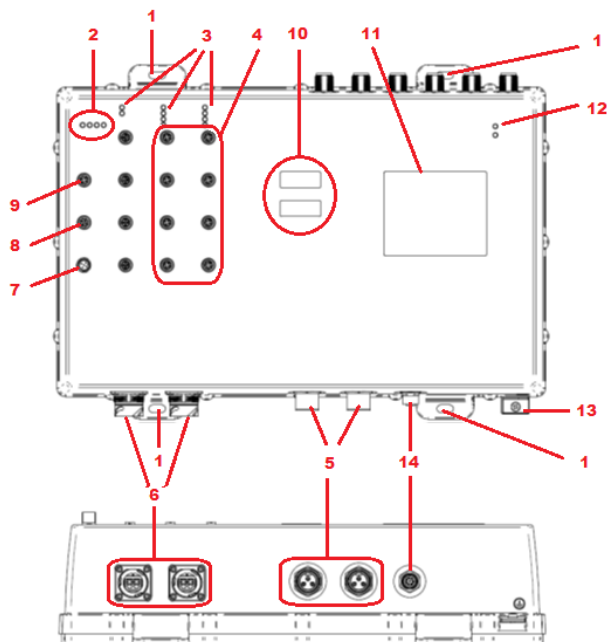
The devices work without a fan.

## 1.2 Device name and product code

The device name corresponds to the product code.

<b>Product Number</b>	<b>Product Code</b>	<b>Description</b>
942244001	BATOne EEC	1 WLAN + ECC + 1 PSU one Radio, conformal coating, one power supply and extended temperature SW: HiOS software layer 2 advanced, HiLCOS software
942244002	BATOne EEC DP	1 WLAN + ECC + 2 PSU one Radio, conformal coating, two power supplies and extended temperature SW: HiOS software layer 2 advanced, HiLCOS software
942244003	BATOne	1 WLAN + No-ECC + 1 PSU one Radio, no conformal coating, one power supply and standard temperature SW: HiOS software layer 2 advanced, HiLCOS software
942244004	BATOne DP	1 WLAN + No-ECC + 2 PSU one Radio, no conformal coating, two power supplies and standard temperature SW: HiOS software layer 2 advanced, HiLCOS software
942244005	BATOne EEC DR	2 WLAN + ECC + 1 PSU two Radios, conformal coating, one power supply and extended temperature SW: HiOS software layer 2 advanced, HiLCOS software
942244006	BATOne EEC DRP	2 WLAN + ECC + 2 PSU two Radios, conformal coating, two power supplies and extended temperature SW: HiOS software layer 2 advanced, HiLCOS software
942244007	BATOne DR	2 WLAN + No-ECC + 1 PSU two Radios, no conformal coating, one power supply and standard temperature SW: HiOS software layer 2 advanced, HiLCOS software
942244008	BATOne DRP	2 WLAN + No-ECC + 2 PSU two Radios, no conformal coating, two power supplies and standard temperature SW: HiOS software layer 2 advanced, HiLCOS software

## 1.3 Device view



Device view using an example: BATOne DRP

Above: front of device

Below: bottom of device

1	Hole for mounting
2	LED display elements for device status
3	LED display elements for port status:
4	Up to 8 x: <ul style="list-style-type: none"> <li>▶ 10/100 Mbit/s twisted pair port</li> <li>Local ports ▶ 4-pin, "D"-coded M12 socket</li> </ul>
5	Power Connector 3-pin, 7/8"
6	Uplink F/O ports 1 and 2 <ul style="list-style-type: none"> <li>Data rate</li> <li>▶ 1000 Mbit/s F/O port</li> </ul>
7	signal contact ▶ 5-pin M12 connector
8	5-pin, "A"-coded M12 socket for USB interface
9	4-pin, "A"-coded M12 socket for Switch V.24 interface
10	WLAN MAC Labels
11	Device Label
12	WLAN LED
13	Ground connection
14	8-pin, "A"-coded M12 socket for Wireless V.24 interface



## 1.4 Power supply

Two 3-pin 7/8" plugs are available for the power supply to the device.

For more detail see

[Supply voltage on page 30.](#)

## 1.5 Ethernet ports

You have the option of choosing various media to connect to the terminal devices and other network components:

- ▶ Singlemode optical fiber
- ▶ Twisted pair cable

You find information on pin assignments for making patch cables here:

[Pin assignments on page 18.](#)

### 1.5.1 10/100 Mbit/s twisted pair port

This port is a 4-pin, "D"-coded M12 socket.

The 10/100 Mbit/s twisted pair port allows you to connect network components according to the IEEE 802.3 10BASE-T/100BASE-TX standard.

This port supports:

- ▶ Autonegotiation
- ▶ Autopolarity
- ▶ Autocrossing (if autonegotiation is activated)
- ▶ 100 Mbit/s half-duplex mode, 100 Mbit/s full duplex mode
- ▶ 10 Mbit/s half-duplex mode, 10 Mbit/s full duplex mode

Delivery state: Autonegotiation activated

The socket housing is electrically connected with the device housing.

### 1.5.2 1000 Mbit/s F/O port




*Figure 1: IP67 plug as per IEC 61076-3-106.*

The 1000 Mbit/s F/O port offers you the ability to connect network components according to the IEEE 802.3 1000BASE-LX standard.

This port supports:

- ▶ Full duplex mode

### 1.5.3 Pin assignments

M12 4-pin ("D"-coded)	Pin	Data
	1	TX+
	2	RX+
	3	TX-
	4	RX-

## 1.6 Connections for antennas

The devices have 3 N sockets on each WLAN module.

The "Antenna Guide" document provides an overview of the antennas that can be used as well as the suitable antenna accessories.

This document is available for download as a PDF file on the Hirschmann product pages ([www.hirschmann.com](http://www.hirschmann.com)).

## 1.7 Display elements

After the supply voltage is set up, the software starts and initializes itself. Afterwards, the device performs a self-test. During this process, various LEDs light up.

### 1.7.1 Device state

These LEDs provide information about conditions which affect the operation of the whole device.



LED	Display	Color	Activity	Meaning
Power	Supply voltage	—	None	Supply voltage is too low
		Yellow	Lights up	Device variants with redundant power -supply: Supply voltage 1 <b>or</b> 2 is on
			flashes 4 times a period	Software update is running. Maintain the power -supply.
		Green	Lights up	Device variants with redundant power -supply: Supply voltages 1 <b>and</b> 2 are on
				Device variants with single power supply: Supply voltage is on
ACA	-ACA21-M12/ACA2 2-M12 storage medium (USB interface)	—	None	ACA storage medium not connected
		Green	Lights up	ACA storage medium connected
			Flashes 3 times a period	Device writes to/reads from the storage medium
		Yellow	Lights up	ACA storage medium inoperative
RM	Ring Manager	—	None	No redundancy configured
		Green	Lights up	Redundancy exists
			Flashes 1 time a period	Device is reporting an incorrect configuration of the RM function
		Yellow	Lights up	No redundancy exists
Status	Device Status	—	None	Device is starting and/or is not ready for operation
		Green	Lights up	Device is ready for operation. Characteristics can be configured
		Red	Lights up	Device is ready for operation. Device has detected at least one error in the monitoring results
			Flashes 1 time a period	The boot parameters used when the device has been started differ from the boot parameters saved. Start the device again.
			flashes 4 times a period	Device has detected a multiple IP address

## 1.7.2 Port status

These LEDs provide port-related information.

### ■ Link state

These LEDs are identified with the number of the related port.

LED	Display	Color	Activity	Meaning
L/D	Link status	—	None	Device detects an invalid or missing link
		Green	Lights up	Device detects a valid link
			Flashes 1 time a period	Port is switched to stand-by
			Flashes 3 times a period	Port is switched off
		Yellow	Lights up	Device detects a data rate that is <b>not</b> supported
			Flashing	Device is transmitting and/or receiving data
Flashes 1 time a period	Device detects at least one unauthorized MAC address (Port Security Violation)			

WLAN 1, WLAN 2 (green/red LEDs)		WLAN mode	Meaning
Off		All	No WLAN network defined or WLAN module deactivated. WLAN module does not send any beacons.
Green	Glowing	Access Point, P2P	At least one WLAN network defined and WLAN module activated. WLAN module sends beacons.
Green	Flashing inversely	Access Point, P2P	Number of flashes = Number of connected WLAN stations and P2P radio lines, then there is a break.
Green	Flashing	Access Point, P2P	DFS scanning or another scan procedure.
Green	Flashing	Client, P2P	Signal strength: The faster the LED blinks, the better the signal and thus the connection quality.
Red	Flashing	All	Hardware error detected in the WLAN module.

## 1.8 Management interfaces

### 1.8.1 USB interface

This interface offers you the ability to connect the storage medium AutoConfiguration Adapter ACA22-M12. This storage medium is used for saving/loading the configuration and diagnostic functions, and for loading the software.

This interface is a 5-pin, “A”-coded M12 socket with shielding.  
 Only connect the ACA22-M12 storage medium. You can obtain this as accessory: [See Accessories on page 48](#).


	Pin	Function
	1	U <sub>in</sub> 5 V
	2	N.C. Not used
	3	D- Data -
	4	GND Ground (0 V)
	5	D+ Data +

Table 6: Pin assignment of the USB interface, 5-pin, “A”- coded M12 socket

### 1.8.2 V.24 interface (external management)

BATOne have 2 V.24 ports. Both are “A”- coded M12 socket.  
 V.24 connection, a serial interface is provided for the local connection of an external management station (VT100 terminal or PC with corresponding terminal emulation). This enables you to set up a connection to the Command Line Interface (CLI) and to the system monitor.  
 Switch V.24:

VT 100 terminal settings	
Speed	9600 Baud
Data	8 bit
Stopbit	1 bit
Handshake	off
Parity	none

The socket housing is electrically connected to the housing of the device.


Figure	Pin	Function
	1	TX. Transmit Data
	2	RX Receive Data
	3	N.C. Not used
	4	GND Ground

Table 7: Pin assignment of the V.24 interface (M12 socket)

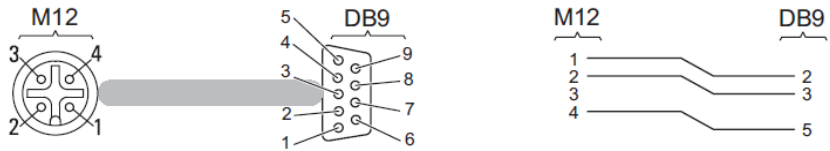


Figure 2: Terminal cable for connecting an external Management Station

The Terminal cable is available as an accessory.

You will find a description of the V.24 interface in the “User Manual Basic Configuration” document.

### Wireless V.24

- ▶ Connecting the BATOne device allows you to automate the configuration of a point-to-point WLAN line by connecting two devices directly via the wireless V.24 interface.

You will find more information here:

- User Manual Configuration Guide  
This document is available for download as a PDF file on the Hirschmann product pages ([www.hirschmann.com](http://www.hirschmann.com)).

The socket housing is electrically connected to the device casing. The V.24 interface is electrically insulated from the supply voltage.

- Only use a shielded cable.

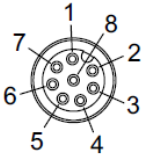
Pins of the M12 socket on the device	Pin	Function	Description of functions
	1	GND	Ground
	2	DTR	Data terminal ready
	3	TxD	Transmit data
	4	RxD	Receive data
	5	DCD	Data carrier detect
	6	DSR	Dataset ready
	7	RTS	Request to send
	8	CTS	Clear to send

Table 8: Pin assignment of the V.24 interface, 8-pin, “A”- coded M12 socket

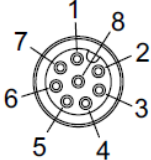
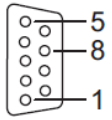
Pins of the M12 socket on the device	Pin assignment for the connection with a cable	Pins of the DB9 plug on the external device
	<pre> 1 ----- 5 2 ----- 4 3 ----- 3 4 ----- 2 5 ----- 1 6 ----- 6 7 ----- 7 8 ----- 8 </pre>	

Table 9: Pin assignment for the connection with a cable:  
8-pin, "A"- coded M12 plug to DB9 connector

You can order a terminal cable M12, 8-pin, to DB9 as an accessory.  
[See Accessories on page 48.](#)

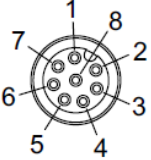
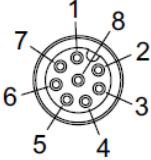
Pins of the M12 socket on the device	Pin assignment for the connection with a cable	Pins of the M12 socket on the device
	<pre> 1 ----- 1 2 ----- 2 3 ----- 3 4 ----- 4 5 ----- 5 6 ----- 6 7 ----- 7 8 ----- 8 </pre>	

Table 10: Pin assignment for the connection with a cable:  
8-pin, "A"- coded M12 plug to 8-pin, "A"-coded M12 plug (point-to-point WLAN line)

**Note:** With the point-to-point WLAN line, the following pins are short-circuited at both ends:

- ▶ 2 (DTR) + 6 (DSR)
- ▶ 7 (RTS) + 8 (DSR)

## 1.9 Signal contact

The signal contact is a potential-free relay contact.

The device allows you to perform remote diagnosis via the signal contact. In the process, the device signals events such as a line interruption. When an event occurs, the device opens the relay contact and interrupts the closed circuit. The management setting specifies which events switch a contact. You can also use the management to switch the signal contact manually and thus control external devices.

For more detail see

[Signal contact on page 30.](#)



## 2 Installation

The devices have been developed for practical application in a harsh industrial environment.

On delivery, the device is ready for operation.

Perform the following steps to install and configure the device:

- ▶ Checking the package contents
- ▶ Installing and grounding the device
- ▶ Installing the antennas
- ▶ Connecting the ferrite
- ▶ Connecting the power supply and signal lines
- ▶ Operating the device
- ▶ Connecting data cables
- ▶ Filling out the inscription label

### 2.1 Checking the package contents

Proceed as follows:

- Check whether the package includes all items named in the section [Scope of delivery on page 48](#).
- Check the individual parts for transport damage.

## 2.2 Installing and grounding the device

### 2.2.1 Installing the device



## WARNING

### **ELECTRIC SHOCK**

Install this device solely in a switch cabinet or in an operating site with restricted access, to which maintenance staff have exclusive access.

**Failure to follow this instruction can result in death, serious injury, or equipment damage.**

To protect the exposed uninstalled contacts of the components from dirt, connect the individual system components in a dry and clean working area.

- Prepare the drill holes at the installation point.
- Mount the device on a level surface with four M6 screws.
- To preserve the suitability of your device for IP65/67, proceed as follows:
- Remove the provided transport protection caps and the transport protection screws from the device.
- Seal unused sockets and plugs with your desired type of protection screws which you can order separately.

### 2.2.2 Grounding the device

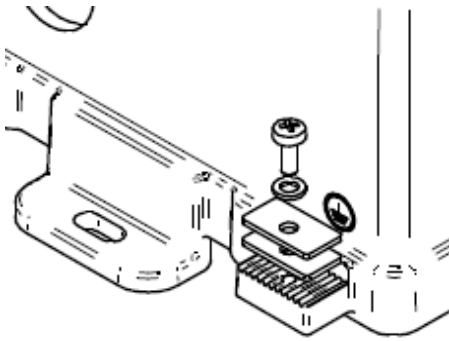
Grounding the device is by means of a separate ground connection on the device.

The overall shield of a connected shielded twisted-pair cable is connected to the metal housing as a conductor.

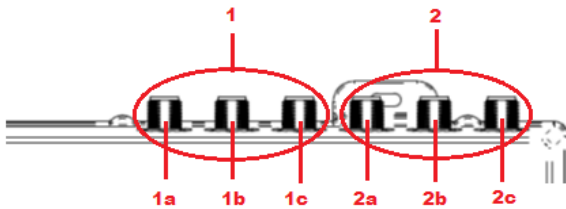
The device variants have a connection for protective grounding.

**Note:** Use toothed washers to ensure good electrical conductivity at the connection.

- Ground the device via the provided M4 screw.



## 2.3 Installing the antennas



1	alternatively, depending on device variant	For device variants with 2 WLAN modules: 3 x N socket for WLAN module 1
		For device variants with 1 WLAN module: Not present
	1a	Antenna connection 1
	1b	Antenna connection 2
	1c	Antenna connection 3
2	alternatively, depending on device variant	For device variants with 2 WLAN modules: 3 x N socket for WLAN module 2
		For device variants with 1 WLAN module: 3 x N socket for WLAN module 1
	2a	Antenna connection 1
	2b	Antenna connection 2
	2c	Antenna connection 3

Table 11: Antenna connections

If you connect to 2 BATOne devices antennas to 2 WLAN modules, ensure that there is a distance of at least 2 m between the BATOne devices.

If you would like to connect several antennas to a WLAN module, align the antennas so that the points of the antennas point away from each other in a star shape.

- Install at least one antenna on the WLAN module that you would like to use.
- Insert the terminating resistors available as accessories into the sockets not being used in order to avoid radio signals from one WLAN module being received by the other WLAN module.

## 2.4 Connecting the ferrite

To adhere to EMC conformity, you connect the ferrite supplied to the voltage input via the power supply cable.

**Note:** To open the ferrite use the key supplied.

- Insert the power supply cable through the ferrite 1 time.
- Position the ferrite as close as possible to the voltage input (max. distance 19.7 inches (50 cm)).
- Lock the ferrite.

## 2.5 Connecting the power supply and signal lines



### WARNING

#### **ELECTRIC SHOCK**

Before connecting the electrical wires, **always** verify that the requirements listed are complied with.

[See Requirements for connecting electrical wires on page 7.](#)

**Failure to follow this instruction can result in death, serious injury, or equipment damage.**

The supply voltage is electrically isolated from the casing.

You have the option of supplying the supply voltage redundantly, without load distribution.



### WARNING

#### **ELECTRIC SHOCK**

Using external Supply voltage category III requires external filter to ensure category II.

[See Requirements for connecting the supply voltage on page 8.](#)

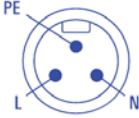
**Failure to follow this instruction can result in death, serious injury, or equipment damage.**

### 2.5.1 Supply voltage (100 V AC ... 240 V AC, 50 Hz / 60 Hz)

Two 3-pin 7/8" plugs are available for the power supply to the device.

You find the prescribed tightening torque in [Technical data section on page 39](#).

The supply voltage is connected to the device casing through protective elements exclusively.

Type and specification of the supply voltage	Connections	
Rated voltage range AC 100 V ... 240 V, 50 Hz / 60 Hz		L Outer conductor
Voltage range AC incl. maximum tolerances 88 V ... 265 V, 47 Hz ... 63 Hz		PE Protective conductor
		N Neutral conductor

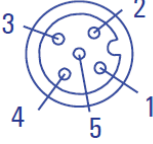
Connect the electrical wires to the socket according to the pin assignment.

### 2.5.2 Signal contact

A 5-pin M12 plug is available as a signal contact.

You find the prescribed tightening torque in [Technical data section on page 39](#).

Depending on the device variant, the signal contact lines are laid in the power supply plug or in a special plug.

Connection assignments	
	1 —
	2 Signal contact
	3 —
	4 —
	5 Signal contact

## 2.6 Operating the device



### WARNING

#### **ELECTRIC SHOCK**

Before connecting the electrical wires, **always** verify that the requirements listed are complied with.

[See Requirements for connecting electrical wires on page 7.](#)

**Failure to follow this instruction can result in death, serious injury, or equipment damage.**

By connecting the supply voltage via a connector, you start the operation of the device.

Proceed as follows:

- Connect the power supply cable.
- Enable the supply voltage.

## 2.7 Connecting data cables

Note the following general recommendations for data cable connections in environments with high electrical interference levels:

- ▶ Keep the length of the data cables as short as possible.
  - ▶ Use optical data cables for the data transmission between the buildings.
  - ▶ When using copper cables, provide a sufficient separation between the power supply cables and the data cables. Ideally, install the cables in separate cable channels.
  - ▶ Verify that power supply cables and data cables do not run parallel over longer distances, and that ideally they are installed in separate cable channels. If reducing the inductive coupling is necessary, verify that the power supply cables and data cables cross at a 90° angle.
  - ▶ Use SF/UTP cables as per ISO/IEC 11801:2002.
- 
- Connect the data cables according to your requirements.

For more detail see

[Ethernet ports on page 19.](#)

## 2.8 Filling out the inscription label

The information field for the IP address helps you identify your device.



### 3 Making basic settings

The IP parameters must be entered when the device is installed for the first time. The device provides the following options for configuring IP addresses:

- ▶ Entry via V.24 connection
- ▶ Entry via the HiDiscovery protocol in the applications -HiDiscovery
- ▶ Configuration via BOOTP
- ▶ Configuration via DHCP (Option 82)
- ▶ AutoConfiguration Adapter

#### ■ Default settings

- ▶ IP address: The device looks for the IP address using DHCP
- ▶ Management password:
  - user, password: public (read only)
  - admin, password: private (read/write)
- ▶ Switch V.24 data rate: 9600 Baud
- ▶ Wireless V.24 data rate: 115200 Baud
- ▶ Ethernet ports: link status is not evaluated (signal contact)
- ▶ Optical ports: Full duplex
- ▶ TP ports: Autonegotiation
- ▶ RSTP (Rapid Spanning Tree) activated

## 4 Monitoring the ambient air temperature

Operate the device below the specified maximum ambient air temperature exclusively.

[See Technical data on page 39.](#)

The ambient air temperature is the temperature of the air at a distance of 2 in (5 cm) from the device. It depends on the installation conditions of the device, e.g. the distance from other devices or other objects, and the output of neighboring devices.

The temperature displayed in the CLI and the GUI is the internal temperature of the device. It is higher than the ambient air temperature. The maximum internal temperature of the device named in the technical data is a guideline that indicates to you that the maximum ambient air temperature has possibly been exceeded.

If the ambient temperature exceeds the normal operating range of the equipment, additional protective measures are recommended.

## 5 Configuring the transmit power

**Note:** The operator of a WLAN radio installation must adhere to the applicable transmission threshold values.

Use the graphical user interface or the LANconfig software. You can download the LANconfig software as an ISO image from the Hirschmann product pages ([www.hirschmann.com](http://www.hirschmann.com)).

In the graphical user interface, proceed as follows:

- In the menu tree, open the **Configuration > Wireless LAN > General** dialog.
- In the “General” tab, specify in the “General” frame the country in which you install the device, and click the “Send” button.
- In the menu tree, open the **Configuration > Wireless LAN > General > Physical WLAN settings - Radio** dialog.
- In the “General” tab, click in the “Interface” column the physical WLAN interface to which you connect the antenna.

- Subtract the cable and installed overvoltage protector attenuation from the antenna gain. Enter the calculated value in the “Antenna gain” field.

**Physical WLAN settings**  
**- Radio**

Interface	WLAN interface 1	
Frequency band	2.4 GHz (802.11g/b/n) ▾	
Sub-bands	1 ▾	
Channel number	Channel 11 (2.462 GHz) ▾	
2.4 GHz mode	802.11g/b/n (mixed) ▾	
5 GHz mode	802.11a/n (mixed) ▾	
Max. channel bandwidth	Auto ▾	
Antenna grouping	Auto ▾	
Antenna gain	3	dBi (possible values: -128 - 127)
TX power reduction	0	dB (possible values: 0 - 255)
Access point density	Low ▾	
Maximum distance	0	km (possible values: 0 - 65535)
Channel list		
Background scan	0	(possible values: 0 - 2147483647)
Background scan unit	seconds ▾	
Time of DFS rescan		
Number of channels to scan	2	(possible values: 0 - 1410065407)
Rescan free channels	No ▾	
Adaptive Noise Immunity	On ▾	

- To save the value, click the “Send” button.

## 6 Maintenance and service

- ▶ When designing this device, Hirschmann largely avoided using high-wear parts. The parts subject to wear and tear are dimensioned to last longer than the lifetime of the product when it is operated normally. Operate this device according to the specifications.
- ▶ Relays are subject to natural wear. This wear depends on the frequency of the switching operations. Check the resistance of the closed relay contacts and the switching function depending on the frequency of the switching -operations.
- ▶ Hirschmann is continually working on improving and developing their software. Check regularly whether there is an updated version of the software that provides you with additional benefits. You find information and software downloads on the Hirschmann product pages on the Internet ([www.hirschmann.com](http://www.hirschmann.com)).

**Note:** You find information on settling complaints on the Internet at [www.beldensolutions.com/en/Service/Reparaturen/index.phtml](http://www.beldensolutions.com/en/Service/Reparaturen/index.phtml).

## 7 Disassembly



### WARNING

#### **ELECTRIC SHOCK**

Disconnect the grounding only after disconnecting all other cables.

**Failure to follow this instruction can result in death, serious injury, or equipment damage.**

- Disconnect the data cables.
- Disable the supply voltage.
- Disconnect the power supply cables and signal lines.
- Remove the antennas.
- Disconnect the grounding.

## 8 Technical data

### 8.1 General technical data

Dimensions W x H x D	BATOne	<a href="#">See Dimension drawings on page 41.</a>	
Weight		approx. 7.5 kg	
Mounting	Flat surface mounting		
	Screw type	M6	
Power supply Supply voltage	Rated voltage range AC	100 V ... 240 V, 50 Hz / 60 Hz	
	Voltage range AC incl. maximum tolerances	88 V ... 265 V, 47 Hz ... 63 Hz	
	Connection type	3-pin, 7/8" connector	
		Tightening torque 22 lb-in (2.5 Nm)	
	Power loss buffer	> 10 ms at 93.5 V AC	
	Overload current protection at input	Non-replaceable fuse	
	Back-up fuse	Nominal rating:	1 A ... 20 A
		Characteristic:	slow blow
Peak inrush current	< 3.5 A		
Signal contact	Switching current	max. 1 A	
	Switching voltage	max. 60 V DC max. 30 V AC	
	Connection type	5-pin M12 connector	
	Tightening torque	5.3 lb-in (0.6 Nm)	
Climatic conditions during operation	Minimum clearance around the device	Top and bottom sides of device: 1.97 in (5 cm)	
		Left and right sides of device: 1.97 in (5 cm)	
		Derating <sup>a</sup> : 5 K at the following clearance: Top and bottom sides of device: 0 in Left and right device side: 0 in	
	Ambient air temperature <sup>b</sup>	Devices with operating temperature characteristic (standard): -40 °F ... +140 °F (-40 °C ... +60 °C)	

		Devices with operating temperature characteristic value EEC (extended): -40 °F ... +158 °F (-40 °C ... +70 °C)
Maximum inner temperature of device (guideline)		Devices with operating temperature characteristic (standard): 90 °C
		Devices with operating temperature characteristic value EEC (extended): 95 °C
Humidity		5 % ... 100 % (also in condensing atmospheres) <sup>c</sup>
Air pressure		minimum 700 hPa (+9842 ft; +3000 m) maximum 1060 hPa (-1312 ft; -400 m)
Climatic conditions during storage	Ambient air temperature <sup>b</sup>	-40 °F ... +185 °F (-40 °C ... +85 °C)
	Humidity	5 % ... 100 % (also in condensing atmospheres) <sup>d</sup>
	Air pressure	minimum 700 hPa (+9842 ft; +3000 m) maximum 1060 hPa (-1312 ft; -400 m)
Pollution degree		2
Protection classes	Laser protection	Class 1 in compliance with IEC 60825-1
	Degree of protection	IP65/67 <sup>e</sup>

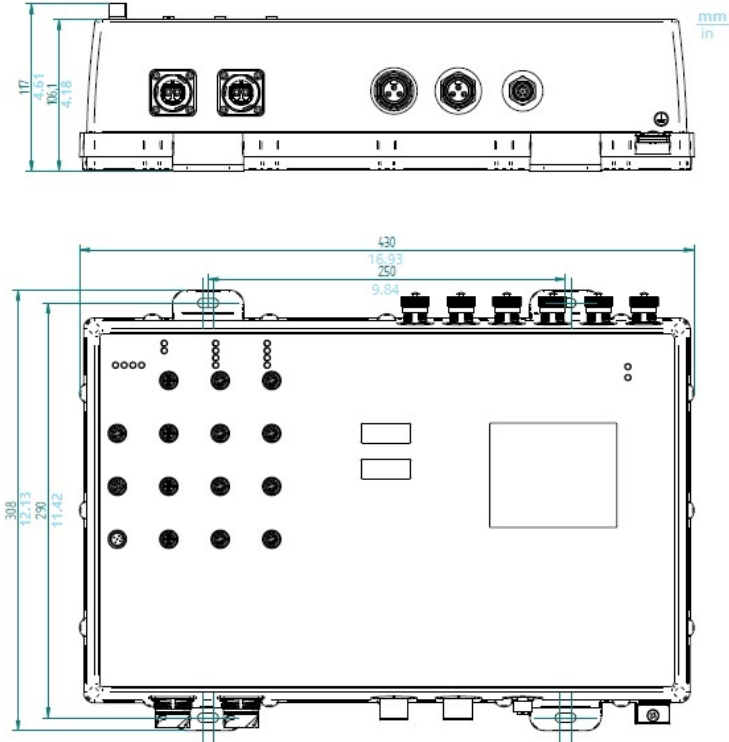
- a. Reduction of the maximum permitted ambient air temperature under specific conditions
- b. Temperature of the ambient air at a distance of 2 in (5 cm) from the device
- c. Remove the provided transport protection caps and the transport protection screws from the device. Seal unused sockets and plugs with your desired type of protection screws which you can order separately.
- d. Remove the provided transport protection caps and the transport protection screws from the device. Seal unused sockets and plugs with your desired type of protection screws which you can order separately.
- e. To preserve the suitability of your device for IP65/67, proceed as follows: Remove all provided transport protection caps and transport protection screws. Seal unused sockets and plugs with your desired type of protection screws which you can order separately.

## 8.2 Power consumption/power output

Conditions	Maximum power consumption	Power output
Equipped with 1 WLAN module	TBD	TBD Btu (IT)/h
Equipped with 2 WLAN modules	23 W	78.5 Btu (IT)/h



### 8.3 Dimension drawings



## 8.4 Radio technology

Antenna connection	For each WLAN module: 3 x N socket
Range	Depending on the antenna used, frequency range and data rate
Encryption	<ul style="list-style-type: none"><li>▶ IEEE 802.11i/WPA2 with passphrase or IEEE 802.1x and hardware-accelerated AES</li><li>▶ Closed Network</li><li>▶ WEP 64<sup>a</sup></li><li>▶ WEP 128<sup>b</sup></li><li>▶ WEP 152<sup>c</sup></li><li>▶ User authentication</li><li>▶ 802.1x/EAP</li><li>▶ LEPS</li><li>▶ WPA1/TKIP<sup>d</sup></li><li>▶ For more information, see the HiLCOS data sheet.</li></ul>
Frequency range	▶ Support of 2.4 GHz and 5 GHz: 2412 MHz to 2472 MHz and 5180 MHz to 5825 MHz
Modulation technology	<ul style="list-style-type: none"><li>▶ OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM</li><li>▶ DSSS/CCK</li></ul>
Radio topology	WLAN Access-Point, Bridge-, Router-, Point-to-Point-, Client-, Client-Bridge-Mode

- a. With encryptions of the type TKIP and WEP, the device falls back on IEEE 802.11b/g or IEEE 802.11a.
- b. With encryptions of the type TKIP and WEP, the device falls back on IEEE 802.11b/g or IEEE 802.11a.
- c. With encryptions of the type TKIP and WEP, the device falls back on IEEE 802.11b/g or IEEE 802.11a.
- d. With encryptions of the type TKIP and WEP, the device falls back on IEEE 802.11b/g or IEEE 802.11a.

## 8.5 Roaming

- ▶ IEEE 802.11F (Inter-Access Point Protocol)
- ▶ IEEE 802.11r (Fast Roaming)
- ▶ PMK caching
- ▶ Pre authentication
- ▶ OKC (Opportunistic key caching)

## 8.6 Receiving sensitivity, transmit power, and data rate of the WLAN module version EWLAN1

The values shown in the following tables are the maximum values of the WLAN module version EWLAN1. The values are in no case to be perceived as a guaranteed property of the overall product. For some country profiles, the module reduces data rate and transmit power automatically. The reason for this are national standards.

### 8.6.1 IEEE 802.11b

<b>IEEE 802.11b</b>		
<b>Frequency range 2.412 GHz to 2.472 GHz</b>		
<b>Data rate</b>	<b>Typical transmit power</b>	<b>Typical receiving sensitivity</b>
1 Mbit/s	19 dBm	-94 dBm
11 Mbit/s	19 dBm	-94 dBm

### 8.6.2 IEEE 802.11g

<b>IEEE 802.11g</b>		
<b>Frequency range 2.412 GHz to 2.472 GHz</b>		
<b>Data rate</b>	<b>Typical transmit power</b>	<b>Typical receiving sensitivity</b>
6 Mbit/s	22 dBm	-94 dBm
9 Mbit/s	22 dBm	-94 dBm
12 Mbit/s	22 dBm	-90 dBm
18 Mbit/s	22 dBm	-89 dBm
24 Mbit/s	22 dBm	-85 dBm
36 Mbit/s	21 dBm	-82 dBm
48 Mbit/s	20 dBm	-78 dBm
54 Mbit/s	19 dBm	-77 dBm

**IEEE 802.11a****Bandwidth 5.180 GHz to 5.825 GHz****Data rate Typical transmit power Typical receiving sensitivity**

6 Mbit/s	16 dBm	-93 dBm
9 Mbit/s	16 dBm	-93 dBm
12 Mbit/s	16 dBm	-93 dBm
18 Mbit/s	16 dBm	-91 dBm
24 Mbit/s	16 dBm	-88 dBm
36 Mbit/s	15 dBm	-84 dBm
48 Mbit/s	13 dBm	-80 dBm
54 Mbit/s	12 dBm	-79 dBm

**IEEE 802.11n****Frequency range 2.412 GHz to 2.472 GHz****Coding Typical transmit power Typical receiving sensitivity**

MCS 0	18 dBm	-87 dBm
MCS 1	18 dBm	-90 dBm
MCS 2	18 dBm	-86 dBm
MCS 3	18 dBm	-82 dBm
MCS 4	18 dBm	-79 dBm
MCS 5	16 dBm	-75 dBm
MCS 6	16 dBm	-73 dBm
MCS 7	15 dBm	-72 dBm
MCS 8	22 dBm	-87 dBm
MCS 9	21 dBm	-90 dBm
MCS 10	22 dBm	-86 dBm
MCS 11	21 dBm	-82 dBm
MCS 12	16 dBm	-79 dBm
MCS 13	16 dBm	-75 dBm
MCS 14	15 dBm	-73 dBm
MCS 15	15 dBm	-72 dBm
MCS 16	23 dBm	-87 dBm
MCS 17	23 dBm	-90 dBm
MCS 18	23 dBm	-86 dBm

MCS 19	23 dBm	-82 dBm
MCS 20	16 dBm	-79 dBm
MCS 21	17 dBm	-75 dBm
MCS 22	17 dBm	-73 dBm
MCS 23	16 dBm	-72 dBm

## IEEE 802.11n

Frequency range 5.180 GHz to 5.825 GHz

**Coding**    **Typical transmit power**    **Typical receiving sensitivity**

MCS 0	17 dBm	-92 dBm
MCS 1	17 dBm	-91 dBm
MCS 2	17 dBm	-89 dBm
MCS 3	17 dBm	-84 dBm
MCS 4	17 dBm	-81 dBm
MCS 5	15 dBm	-77 dBm
MCS 6	14 dBm	-75 dBm
MCS 7	14 dBm	-73 dBm
MCS 8	20 dBm	-92 dBm
MCS 9	20 dBm	-91 dBm
MCS 10	19 dBm	-89 dBm
MCS 11	20 dBm	-84 dBm
MCS 12	18 dBm	-81 dBm
MCS 13	15 dBm	-77 dBm
MCS 14	15 dBm	-75 dBm
MCS 15	14 dBm	-73 dBm
MCS 16	21 dBm	-92 dBm
MCS 17	21 dBm	-91 dBm
MCS 18	21 dBm	-89 dBm
MCS 19	21 dBm	-84 dBm
MCS 20	16 dBm	-81 dBm
MCS 21	15 dBm	-77 dBm
MCS 22	14 dBm	-75 dBm
MCS 23	14 dBm	-73 dBm

## 8.7 EMC and immunity

**Note:** You will find detailed information on the certificates and declarations applying to your device in a separate overview.

EMC interference emission		Standard applications	Railway applications (trackside)
<b>Radiated emission</b>			
EN 55032		Class A	Class A
EN 61000-6-4		Fulfilled	Fulfilled
<b>Conducted emission</b>			
EN 55032	AC supply connection	Class A	Class A
EN 61000-6-4	AC supply connection	Fulfilled	Fulfilled
EN 55032	Telecommunication connections	Class B	Class B
EN 61000-6-4	Telecommunication connections	Fulfilled	Fulfilled

EMC interference immunity		Standard applications	Railway applications (trackside)
<b>Electrostatic discharge</b>			
EN 61000-4-2	Contact discharge	± 4 kV	± 6 kV
EN 61000-4-2	Air discharge	± 8 kV	± 8 kV
<b>Electromagnetic field</b>			
EN 61000-4-3	80 MHz ... 6000 MHz	10 V/m	20 V/m
<b>Fast transients (burst)</b>			
EN 61000-4-4	AC supply connection	± 2 kV	± 2 kV
EN 61000-4-4	Data line	± 1 kV	± 2 kV
<b>Voltage surges - AC supply connection</b>			
EN 61000-4-5	line/ground	± 2 kV	± 2 kV
EN 61000-4-5	line/line	± 1 kV	± 1 kV
<b>Voltage surges - data line</b>			
EN 61000-4-5	line/ground	± 1 kV	± 2 kV
<b>Conducted disturbances</b>			
EN 61000-4-6	150 kHz ... 80 MHz	10 V	10 V
<b>Power frequency magnetic fields</b>			
EN 61000-4-8		—	300 A/m

Stability		Standard applications	Railway applications (in vehicles)
IEC 60068-2-6, test Fc	Vibration	5 Hz ... 8.4 Hz with 0.14 in (3.5 mm) amplitude	Operating 5 Hz ... 150 Hz, Broadband noise vertical: 1.0 m/s <sup>2</sup> (rms) horizontal: 0.7 m/s <sup>2</sup> (rms)
		8.4 Hz ... 150 Hz with 1 g	Not operating: 5 Hz ... 150 Hz, Broadband noise vertical: 7.9 m/s <sup>2</sup> (rms) horizontal: 5.5 m/s <sup>2</sup> (rms)
IEC 60068-2-27, test Ea	Shock	15 g, 11 ms	vertical: 30 m/s <sup>2</sup> , 30 ms horizontal: 50 m/s <sup>2</sup> , 30 ms

## 8.8 Network range

The line lengths specified for the transceivers apply for the respective fiber data (fiber attenuation and BLP/dispersion).

Product code M-SFP-...	Wave length	Fiber	System attenuation	Example for F/O line length <sup>a</sup>	Fiber attenuation	BLP <sup>b</sup> /dispersion
-LX/LC...	S M	1310 nm 9/125 μm	0-9.5 dB	0-17.5 km	0.4 dB/km	3.5 ps/(nm×km)

Table 12: Fiber port 1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver)

- Including 3 dB system reserve when compliance with the fiber data is observed
- Using the bandwidth length product is inappropriate for expansion calculations.

SM = Singlemode

### Network range: 10/100/1000 Mbit/s twisted pair port

Length of a twisted pair segment                      max. 328 ft (100 m) (for Cat5e cable)

Table 13: Twisted Pair

## 9 Scope of delivery, order numbers and accessories

### ■ Scope of delivery

Number	Article
1 x	General safety instructions
1 x	Device
1 x or 2 x (depending on the device variant)	7/8" connector, 3-pin
2 x premounted	50 $\Omega$ terminating resistor for sealing unused antenna connections (exclusively for device variants with 1 wireless module)
4 x premounted	50 $\Omega$ terminating resistor for sealing unused antenna connections (exclusively for device variants with 2 wireless modules)
1 x or 2 x premounted	Protection cap (7/8", plastic) for supply voltage connection
1 x per WLAN module premounted	Protection cap (plastic) for N socket
1 x premounted	Protection screw (M12, plastic) for signal contact
10 x Premeounted	Protection cap (plastic) for M12 socket

Table 14: List of the scope of delivery

The order numbers correspond to the product codes of the devices. [See "Device name and product code" on page 15.](#)



## ■ Accessories

Name	Order number
Terminal cable: M12 4pin to sub-D9-pin	943 902-001
Terminal cable: M12 plug, 8-pin on DB9 socket	942 087-001
AutoConfiguration Adapter ACA22-M12 (EEC)	942 125-001
M12 connector - ELWIK A 5012 PG7 -,5-pin, (M12 socket, "A"-coded)	933 175-100
M12 connector - shielded -,5-pin, (M12 socket, "A"-coded)	942 219-001
M12 connector, 4-pin, "D"-coded	934 445-001
7/8" connector, 3-pin	942 086-003
Protection screw for M12 socket, metal, IP65/67 (25 pieces)	942 057-001
Protection screw for M12 socket, plastic, IP65/67 (25 pieces)	942 057-002
Protection screw for M12 plug, metal, IP65/67 (10 pieces)	942 115-001
Connection cable with M12 connector, "D"-coded	934 497-00x
Transition M12 "D"-coded to RJ45	934 498-001
50 Ω terminating resistors for sealing unused antenna connections, N (10 pieces)	942 118-001
Antenna cable BAT-CLB-2 N m-f	943 903-514
BAT-ANT-N-3AGN-IP67 (10 pcs.)	942 110-001
BAT Protector	943 903-373
SFP mounting tool for IP67 socket	942 079-001
Plug casing for IP67 plug acc. to IEC 61076-3-106	Available at BTR NETCOM GmbH

Table 15: List of the accessories

## 10 Underlying technical standards

Name	
EN 55032	Electromagnetic compatibility of multimedia equipment – Emission Requirements
EN 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
EN 61000-6-4	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments
EN 60950-1	Information technology equipment – Safety – Part 1: General requirements
EN 61131-2	Programmable controllers – Part 2: Equipment requirements and tests
EN 50121-4	Railway applications – EMC – Emission and immunity of the signaling and telecommunications apparatus (Rail Trackside)
EN 300 328	Electromagnetic compatibility and radio spectrum matters (ERM) - bandwidth transfer systems - data transmission equipment operating in 2.4 GHz ISM band and using spread spectrum modulation technology
EN 301 489-1	Electromagnetic compatibility for radio equipment and services
EN 301 489-17	Electromagnetic compatibility (EMC) for radio equipment and services - specific conditions for 2.4 GHz broadband transmission systems and 5 GHz high-performance RLAN equipment
EN 302 502	Broadband radio access networks (BRAN) – permanently installed broadband data transmission systems with 5.8 GHz band
EN 301 893	Broadband radio access networks (BRAN) – 5 GHz high performance Remote Local Area Network (RLAN)
IEEE 802.1D	MAC Bridges (switching function)
IEEE 802.1Q	Virtual LANs (VLANs, MRP, Spanning Tree)
IEEE 802.1w	Rapid Reconfiguration
IEEE 802.11a/b/g/h/n	WLAN
IEEE 802.3	Ethernet
IEEE 802.3af	Power over Ethernet

*Table 16: List of the technical standards*

The device has an approval based on a specific standard only if the approval indicator appears on the device casing.

The device generally fulfills the technical standards named in their current versions.

## A Further support

### Technical questions

For technical questions, please contact any Hirschmann dealer in your area or Hirschmann directly.

You find the addresses of our partners on the Internet at [www.hirschmann.com](http://www.hirschmann.com).

A list of local telephone numbers and email addresses for technical support directly from Hirschmann is available at

<https://hirschmann-support.belden.com>

This site also includes a free of charge knowledge base and a software download section.

### Hirschmann Competence Center

The Hirschmann Competence Center is ahead of its competitors on three counts with its complete range of innovative services:

- ▶ Consulting incorporates comprehensive technical advice, from system evaluation through network planning to project planning.
- ▶ Training offers you an introduction to the basics, product briefing and user training with certification.

You find the training courses on technology and products currently available at <http://www.hicomcenter.com>

- ▶ Support ranges from the first installation through the standby service to maintenance concepts.

With the Hirschmann Competence Center, you decided against making any compromises. Our client-customized package leaves you free to choose the service components you want to use.

Internet:

<http://www.hicomcenter.com>

