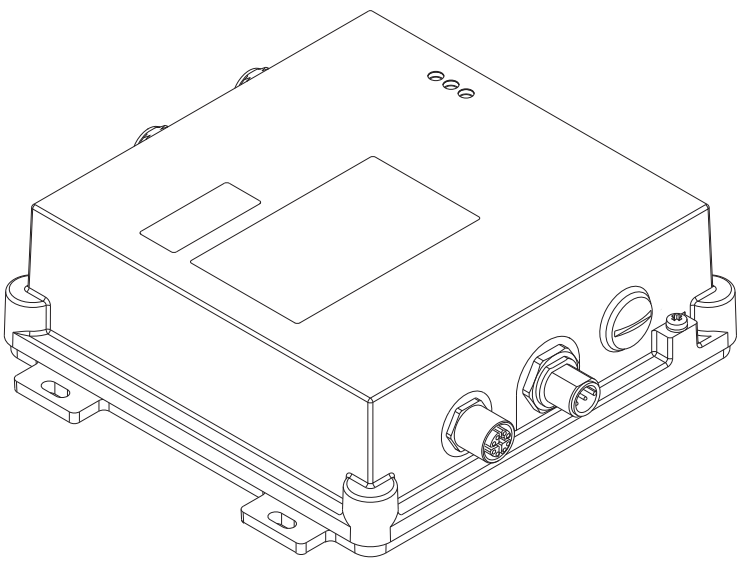
HIRSCHMANN
A BELDEN BRAND

User Manual

Installation
Industrial Access-Point / Client / Access-Bridge
BAT867-F



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Important information

Note: Read these instructions carefully, and familiarize yourself with the device before trying to install, operate, or maintain it. The following notes may appear throughout this documentation or on the device. These notes warn of potential hazards or call attention to information that clarifies or simplifies a procedure.

Symbol explanation

This is a general warning symbol. This symbol alerts you to potential personal injury hazards. Observe all safety notes that follow this symbol to avoid possible injury or death.

If this symbol is displayed in addition to a safety instruction of the type “Danger” or “Warning”, it means that there is a danger of electric shock and failure to observe the instructions will inevitably result in injury.

This symbol indicates the danger of hot surfaces on the device. In connection with safety instructions, non-observance of the instructions will inevitably result in injuries.

DANGER

DANGER draws attention to an immediately dangerous situation, which will **inevitably** result in a serious or fatal accident if not observed.

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **could** result in death or serious injury.

CAUTION

CAUTION indicates a possible danger which, if not avoided, **may** result in minor injuries.

NOTICE

NOTE provides information about procedures that do not involve the risk of injury.

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 this instruction 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 device, turn off the supply voltage and return the device to Hirschmann for inspection.

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 53.
- ☐ Connect to the product only components suitable for the requirements of the specific application case.

Installation site requirements

Applies to Indoor device variants (APAC device variants featuring Mounting with characteristic value A):

☐ Use the device only indoors.

Indoor operator access area:

- The location is accessible without tools.
- The person responsible for the area has provided access for the operator intentionally.
- The operator knows of the access possibilities, regardless of whether they need a tool.

Applies to Outdoor device variants (APAC device variants featuring Mounting with characteristic value B, Europe device variants, Americas device variants):

☐ Observe the mounting instructions in chapter “Installing the antennas”:
See “Outdoor device variants” on page 34.

☐ Observe the mounting instructions in chapter “Connecting the power supply”:
See “Outdoor device variants” on page 39.

Restricted access location:

- The location is outside the operator access area.
- The location is accessible to the service personnel even when the device is switched on.

Strain relief

Note: If the strain relief is insufficient, there is a potential risk of torsion, contact problems and creeping interruptions.

☐ Relieve the connection points of cables and lines from mechanical stress.

☐ Design strain reliefs in such a way that they help prevent any mechanical damage to cables, wires or conductors caused by external influences or their own weight.

☐ To help prevent damage to device connections, connectors and cables, follow the instructions for proper installation in accordance with DIN VDE 0100-520:2013-06, sections 522.6, 522.7 and 522.13.

Device casing

Only technicians authorized by the manufacturer are permitted to open the casing.

- ☐ Never insert pointed objects (narrow screwdrivers, wires, etc.) into the device or into the connection terminals for electric conductors. Do not touch the connection terminals.
- ☐ Mount the device in the vertical position.

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.

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 50 cm (19.7 in) between the antenna and your body.

Grounding the device

- ▶ **Applies to Indoor device variants (APAC device variants featuring Mounting with characteristic value A):**
  For the functional grounding, there is a separate earth screw on top of the device. The functional ground is electrically connected to the circuit ground and the metal housing of the device.
- ▶ **Applies to Outdoor device variants (APAC device variants featuring Mounting with characteristic value B, Europe device variants, Americas device variants):**
  For the protective grounding, there is a separate earth screw on top of the device. The protective ground is electrically connected to the circuit ground and the metal housing of the device.

Shielding ground

The overall shield of a connected shielded twisted pair cable is connected to the grounding connector on the front panel as a conductor.

☐ Beware of possible short circuits when connecting a cable section with conductive shielding braiding.

Requirements for connecting electrical wires

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

The following requirements apply without restrictions:
▶ The electrical wires are voltage-free.
▶ The cables used are permitted for the temperature range of the application case.
▶ The voltage connected complies with the requirements for a safety extra-low voltage (SELV) as per IEC 60950-1 or ES1 as per IEC/EN 62368-1.
▶ Relevant for North America: Exclusively use 60/75 °C (140/167 °F) or 75 °C (167 °F) copper (Cu) wire.

Table 1: Requirements for connecting electrical wires

Requirements for connecting the supply voltage

The following requirements apply without restrictions:		
All of the following requirements are complied with: ▶ The supply voltage corresponds to the voltage specified on the type plate of the device. ▶ The power supply conforms to overvoltage category I or II. ▶ The power supply has an easily accessible disconnecting device (for example 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. ▶ The power supply cable is suitable for the voltage, the current and the physical load. Hirschmann recommends a conductor cross section of 0.5 mm² to 0.75 mm² (AWG20 up to AWG18). ▶ Applies to Outdoor device variants (APAC device variants featuring Mounting with characteristic value B, Europe device variants, Americas device variants): The cross-section of the ground conductor is ≥1.5 mm².		
The following requirements apply alternatively:		
Only for device variants featuring supply voltage with characteristic value W (24 V DC):	Alternative 1	The power supply complies with the requirements for a limited power source (LPS) according to IEC 60950-1 or PS2 according to IEC/EN 62368-1.
	Alternative 2	Relevant for North America: The power supply complies with the requirements according to NEC Class 2.
	Alternative 3	**All** of the following requirements are complied with: ▶ The power supply complies with the requirements for a safety extra-low voltage (SELV) according to IEC 60950-1 or ES1 according to IEC/EN 62368-1. ▶ A back-up fuse suitable for DC voltage is located in the plus conductor of the power supply. The minus conductor is on ground potential. Otherwise, a back-up fuse is also located in the minus conductor. Regarding the properties of this back-up fuse: See “Technical data” on page 53.

Table 2: Requirements for connecting the supply voltage

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

Lightning protection and surge protection

- **Applies to Outdoor device variants (APAC device variants featuring Mounting with characteristic value B, Europe device variants, Americas device variants):**
  The installation of the device must be carried out by a lightning protection professional in accordance with valid standards (such as IEC 62305 / DIN EN 62305 (VDE 0185-305)), and in accordance with the lightning protection procedures recognized and proven for the application and the environment.

☐ Refer to the information in the “WLAN Outdoor Guide” on “Lightning protection and surge protection”.
The manual is available for download on the Internet: https://www.doc.hirschmann.com

☐ Ensure that the lightning protection professional installs lightning protection devices (for example lightning conductors) to protect antennas installed outdoors.

☐ Ensure that the lightning protection professional takes appropriate lightning protection measures that mitigate the effects of lightning strikes.

CE marking

The labeled devices comply with the regulations contained in the following European directive(s):

- **2011/65/EU and 2015/863/EU (RoHS)**
  Directive of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

- **2014/53/EU (RED)**
  Directive of the European Parliament and of the council on the harmonization of the laws of the Member States relating to the making available on the market of radio equipment.

CE This product may be operated in all EU (European Union) countries under the condition that it has been configured correctly.

In accordance with the above-named EU directive(s), the EU conformity declaration will be available to the relevant authorities at the following address:

Hirschmann Automation and Control GmbH
Stuttgarter Str. 45-51
72654 Neckartenzlingen
Germany

You find the EU conformity declaration as PDF file for downloading on the Internet at: https://www.doc.hirschmann.com/certificates.html

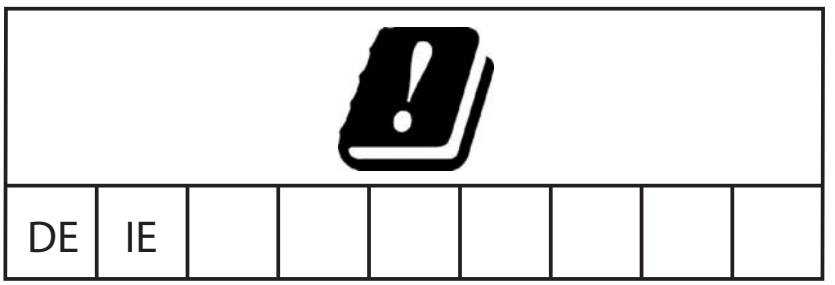
The product can be used in residential areas (residential, commercial and light-industrial environments) and in industrial areas.

Notes for countries with the following country codes:

AT	BE	BG	CH	CY	CZ	DE	DK	EE
EL	ES	FI	FR	HR	HU	IE	IT	LI
LT	LU	LV	MT	NL	NO	PL	PT	RO
RS	SE	SI	SK	TR				

- The RED compliance requires compliant operation of the device in the 5 GHz band channels. Compliant operation of the device is achieved by an unchangeable determination of the country setting. To obtain RED compliance, perform the work steps described in chapter “Obtaining compliance for operation in the European Union and in the United Kingdom (UK)” on page 45.

Notes for Germany (DE) and Ireland (IE):



Operation in the 5.8 GHz band at a radiated power (EIRP) >25 mW is subject to meeting the following conditions:

- Germany (DE)
  Frequency range: 5725 MHz to 5875 MHz
  Condition: The usage of this band is restricted to commercial public telecommunication services. Registration at the Federal Network Agency is required.
  Name and website of the competent authority:
  Bundesnetzagentur
  www.bundesnetzagentur.de

- Ireland (IE)
  Frequency range: 5725 MHz to 5875 MHz
  Condition: Registration of operational base stations
  Name and website of the competent authority:
  Commission for Communications Regulation
  www.comreg.ie

UKCA marking

The labeled devices comply with the following UK regulations:

- **S.I. 2012 No. 3032**
  Restriction of the Use of Certain Hazardous Substances in Electrical and Electronical Equipment Regulations
- **S.I. 2017 No. 1206**
  Radio Equipment Regulations

UK
CA

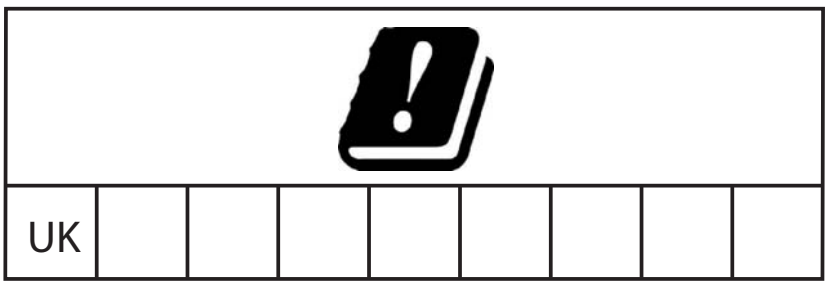
The UKCA conformity declaration will be available to the relevant authorities at the following address:

Belden UK Ltd.
1 The Technology Centre, Station Road
Framlingham, IP13 9EZ, United Kingdom

You find the UKCA conformity declaration as PDF file for downloading on the Internet at: https://www.doc.hirschmann.com/certificates.html

The product can be used in residential areas (residential, commercial and light-industrial environments) and in industrial areas.

Notes for the United Kingdom (UK):



- The Radio Equipment Regulations compliance requires compliant operation of the device in the 5 GHz band channels. Compliant operation of the device is achieved by an unchangeable determination of the country setting. To obtain the Radio Equipment Regulations compliance, perform the work steps described in chapter “Obtaining compliance for operation in the European Union and in the United Kingdom (UK)” on page 45.

- Operation in the 5.8 GHz band at a radiated power (EIRP) >25 mW is subject to meeting the following conditions:

  Frequency range: 5725 MHz to 5850 MHz
  Condition: Light-licensing regime
  Name and website of the competent authority:
  Ofcom
  www.ofcom.org.uk

FCC note

Supplier's Declaration of Conformity
47 CFR § 2.1077 Compliance Information

BAT867-F

U.S. Contact Information
Belden – St. Louis
1 N. Brentwood Blvd. 15th Floor
St. Louis, Missouri 63105, United States
Phone: 314.854.8000

This device complies with part 15 of the FCC rules.
Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ☐ Reposition the receiver antenna or change the angle of the receiver antenna.
- ☐ Increase the separation between the device and the receiver.
- ☐ Connect the device to a different power supply from that to which the receiver is connected.
- ☐ Consult a specialist retailer or an electronic systems engineer for help.

Changes or modifications not expressly approved by the holder of the certificate could void the user’s authority to operate this equipment.

Note for the use in the USA and in Canada
The following section applies to BAT867-F variants with the characteristic value US (USA/Canada) for country approvals which are labeled as follows:
Contains Transmitter Module
FCC ID: TK4WLE600VX
IC: 7849A-WLE600VX

This equipment complies with FCC and IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. Install and operate this equipment with a minimum distance of 50 cm (19.7 in) (related to a 9 dBi antenna) between the radiation source and your body.

The antenna used for this transmitter must not be co-located with any other transmitters within a host device, except in accordance with FCC multi-transmitter product procedures.

This transmitter is restricted to indoor use only within the 5.15 to 5.25 GHz band to reduce potential for harmful interference to co-channel mobile satellite systems.

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that permitted for successful communication.

Antenna(s) for operation with this device:	Permitted band of operation				
	2.4 GHz band	5 GHz band			
		5180 ... 5240 MHz	5260 ... 5320 MHz	5500 ... 5720 MHz	5745 ... 5825 MHz
BAT-ANT-N-3AGN-IP67	Yes	Yes	Yes	Yes	Yes

The FCC approval is valid only in conjunction with the listed antennas. If other antennas are used, the approval expires. The responsibility lies with the operator of the system. The required antenna impedance is 50 Ω.

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.

Documentation mentioned in the “User Manual Installation” that is not supplied with your device as a printout can be found as PDF files for downloading on the Internet at: https://www.doc.hirschmann.com

Key

The symbols used in this manual have the following meanings:

▶	Listing
☐	Work step
■	Subheading

1 Description

1.1 General description

The devices allow you to set up WLANs (Wireless Local Area Networks) in a local network. In contrast to a conventional network connection through copper cables and fiber optic cables, some of the communication is performed by means of a radio link.

The devices allow you to install a new LAN or expand an existing LAN. Thanks to its high level of flexibility, the BAT867-F device is suitable for a wide range of applications. Anywhere that high bandwidths, stable operation and network security is required, WLAN with these devices provides the ideal solution.

The devices are dual-band industrial high-performance wireless LAN access points or clients complying with IEEE 802.11a/b/g/n/ac. They provide a high radio output with a bandwidth of up to 867 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. 2 antennas for sending and receiving help ensure stable network coverage with few shadow areas.

The device is designed for the special requirements of industrial automation. The device meets the relevant industry standards, provides very high operational reliability, even under extreme conditions, and also long-term reliability and flexibility.
The device works without a fan.
The device complies with the degrees of protection IP65/67.

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

- Web browser
- SSH
- Telnet
- HiDiscovery (software for putting the device into operation)
- Management software (for example Industrial HiVision, LANconfig/ LANmonitor)
  The Network Management Software Industrial HiVision provides you with options for smooth configuration and monitoring. You find further information on the Internet at the Hirschmann product pages:
  http://www.hirschmann.com/en/QR/INET-Industrial-HiVision

The device provides you with a large range of functions, which the manuals for the operating software inform you about. You can download these manuals as PDF files from the Internet at: https://www.doc.hirschmann.com The Hirschmann network components help you ensure continuous communication across all levels of the company.

1.2 Device name and product code

The device name corresponds to the product code. The product code is made up of characteristics with defined positions. The characteristic values stand for specific product properties.

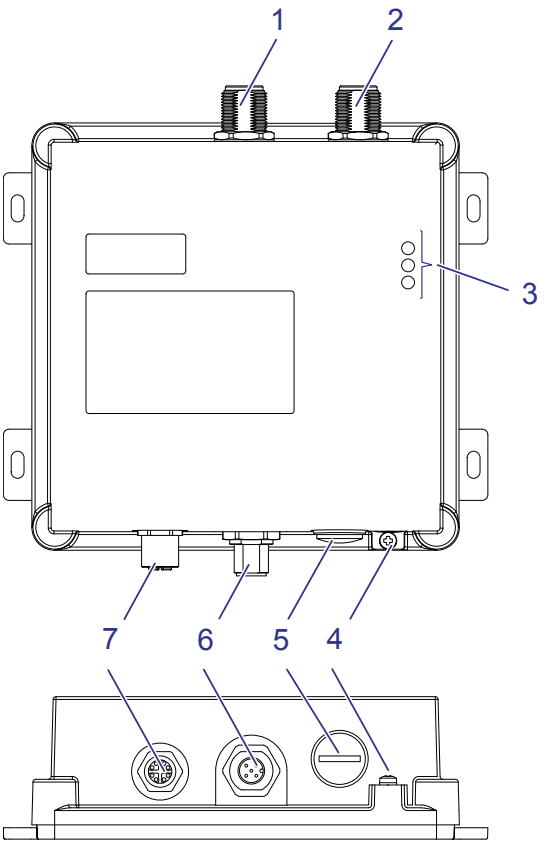
Item	Characteristic	Characteristic value	Description
1 ... 8	Product	BAT867-F	IP65/67 housing
9 ... 10	Country approvals	XX	You can determine the current country approvals using the configurator (https://catalog.belden.com)
	Example: Singapore	Example: SG	
11	Slot 1	W	WLAN module
12	Slot 2	9	Not assembled
13	Slot 3	9	Not assembled
14	Access point or client	A	Access point, client or P2P
15	Supply voltage 1	W	Rated voltage 24 V DC with PoE support
		P	Power supply exclusively via PoE
16	Supply voltage 2	9	Not assembled
17	Approvals 1	9	No additional approvals
		J	Railway applications (trackside) as per EN 50121-4
18	Approvals 2	9	No additional approvals
19	Mounting	A	Indoor
		B	Outdoor + Indoor
20 ... 21	Ethernet port 1	T6	8-pin, “X”-coded M12 socket for 10/100/1000 Mbit/s PoE port
22 ... 23	Ethernet port 2	99	Not assembled
24	Temperature range	L	-10 °C ... +60 °C (+14 °F ... +140 °F)
		T	Extended -40 °C ... +70 °C (-40 °F ... +158 °F)
		E	Extended with Conformal Coating -40 °C ... +70 °C (-40 °F ... +158 °F)
25	Software option 1	9	Not present
26	Software option 2	9	Not present

Table 3: Device name and product code

Item	Characteristic	Characteristic value	Description
27	Software option 3	9	Not present
28	Configuration	Z	Accessory package
		9	Not present
29	Device model	H	Hirschmann standard

Table 3: Device name and product code

1.3 Device view



1	Antenna connection 2	
2	Antenna connection 1	
3	LED display elements	
4	Applies to Indoor device variants (APAC device variants featuring Mounting with characteristic value A):	Connection for functional ground
	Applies to Outdoor device variants (APAC device variants featuring Mounting with characteristic value B, Europe device variants, Americas device variants):	Connection for protective ground
5	Reset button behind a screwable IP65/67 protection cap	
6	Applies to device variants featuring supply voltage with characteristic value W (24 V DC): 5-pin, “A”-coded M12 socket	
7	8-pin, “X”-coded M12 socket for 10/100/1000 Mbit/s PoE port	

1.4 Power supply

1.4.1 Supply voltage with the characteristic value W (24 V DC)

- **Power supply via an 8-pin, “X”-coded M12 socket for PoE port**
  Your device is a PD (Powered Device). PSE (Power Sourcing Equipment) connected via a twisted pair cable on the PoE PD port serves as the PoE power supply voltage. The PoE power supply means that no separate power supply is required for your device.

- **Power supply via a 5-pin, “A”-coded M12 plug**
  For the power supply of the device, a 5-pin, “A”-coded M12 plug is available.

1.4.2 Supply voltage with the characteristic value P (Power supply exclusively via PoE)

- **Power supply via an 8-pin, “X”-coded M12 socket for PoE port**
  Your device is a PD (Powered Device). PSE (Power Sourcing Equipment) connected via a twisted pair cable on the PoE PD port serves as the PoE power supply voltage. The PoE power supply means that no separate power supply is required for your device.

1.5 Ethernet port

1.5.1 10/100/1000 Mbit/s PoE port

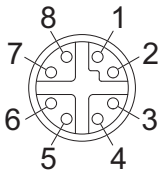
This port is an 8-pin, “X”-coded M12 socket.
The 10/100/1000 Mbit/s PoE port allows you to connect network components as a PoE power source according to standards IEEE 802.3 10BASE-T/ 100BASE-TX/1000BASE-T and IEEE 802.3af.
This port supports:

- Autocrossing (if autonegotiation is activated)
- Autonegotiation
- Autopolarity
- 10 Mbit/s half-duplex mode, 10 Mbit/s full duplex mode
- 100 Mbit/s half-duplex mode, 100 Mbit/s full duplex mode
- 1000 Mbit/s full duplex
- Power over Ethernet

The socket housing is electrically connected with the device housing.
Delivery state: Autonegotiation activated

The PoE power is supplied via the wire pairs transmitting the signal (phantom voltage).
The pin assignment corresponds to MDI-X.

1.5.2 Pin assignments

M12 8-pin (“X”-coded)	Pin	10/100 Mbit/s (applies to Twisted Pair port)	1000 Mbit/s	PoE (applies to PoE port)
	1	RX+	BI_DB+	Negative V_{PSE}
	2	RX−	BI_DB−	Negative V_{PSE}
	3	TX+	BI_DA+	Positive V_{PSE}
	4	TX−	BI_DA−	Positive V_{PSE}
	5	—	BI_DC+	Negative V_{PSE}
	6	—	BI_DC−	Negative V_{PSE}
	7	—	BI_DD−	Positive V_{PSE}
	8	—	BI_DD+	Positive V_{PSE}

1.6 Antenna connections

The device has connections for external antennas. These connections are N sockets.
The "Antenna Guide" document provides an overview of the antennas that can be used as well as the suitable antenna accessories.
The manual is available for download on the Internet: https://www.doc.hirschmann.com

1.7 Display elements

After the supply voltage is set up, the Software starts and initializes the device. 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.

- P
- LS/DA
- WLAN

P Color	Activity	Meaning
green	lights up	LED lights up after the configuration
red	flashing	Device has detected at least one hardware error.
green/red	short flashing	No password or the default password is set

LS/DA Color	Activity	Meaning
—	off	No network device connected
green	lights up	Ethernet connection active
yellow	flashing	Data traffic

WLAN Color	Activity	Meaning
—	off	▶ No WLAN network specified ▶ WLAN module deactivated ▶ WLAN module does not send any beacons
green	lights up	▶ At least one WLAN network defined ▶ WLAN module activated
green	inverse flashing	Number of flashes corresponds to number of connected WLAN stations and P2P radio lines.

WLAN Color	Activity	Meaning
green	flashing	▶ DFS scanning or another scan procedure ▶ Display of signal strength in client or P2P
red	flashing	Device has detected at least one hardware error.

1.8 Reset button

The device has a reset button. The reset button is located behind a screwable IP65/67 protection cap.
The tightening torque is 0.5 Nm to 1.0 Nm (4.42 lb-in to 8.85 lb-in).

Prerequisite: Keep the working area dry and clean when you are carrying out a reset.
After pressing the reset button, replace the protection cap. Degrees of protection IP65/67 are only achieved when the protection cap is closed.

You will find more information in the “User Manual Configuration Guide”, in the chapter “Using the Boot Configurations”.
The manual is available for download on the Internet: https://www.doc.hirschmann.com

2 Installation

The devices have been developed for practical application in a harsh industrial environment.
On delivery, the device is ready for operation.

The device fulfills the protection class IP65/67 under the following conditions, exclusively:

- All the connectors and cables connected also fulfill protection class IP65/67.
- All the unused connections and ports are sealed with the appropriate protection screws.
- The protection screws that are available as accessories comply with degrees of protection IP65/67.
  See “Order numbers accessories” on page 63.

Perform the following steps to install and configure the device:

- Checking the package contents
- Installing and grounding the device
- Installing the antennas
- Connecting the power supply
- Operating the device
- Connecting data cables
- Making basic settings
- Configuring the transmit power

2.1 Checking the package contents

☐ Check whether the package includes all items named in the section “Scope of delivery, order numbers and accessories” on page 62.
☐ Check the individual parts for transport damage.

2.2 Installing and grounding the device

⚠ WARNING

ELECTRIC SHOCK

Install this device only 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 preserve the suitability of your device for IP65/67, perform the following work steps:

☐ Remove the premounted transport protection caps.
☐ Seal unused sockets and plugs with your desired type of protection screws which you can order separately.
☐ To protect the exposed uninstalled contacts of the components from dirt, connect the individual system components in a dry and clean working area.

2.2.1 Installing the device onto or on a flat surface

Verify that the device maintains the minimum clearance to meet the climatic conditions during operation:

▶ Top and bottom sides of device: 5 cm (2 in)
▶ Left and right device side: 2 cm (0.79 in)

Perform the following work steps:

☐ Prepare the assembly at the installation site.
See “Dimension drawings” on page 54.
☐ Mount the device with 4 M4 screws on a level surface > 170 mm (6.7 in) × 150 mm (5.9 in).

2.2.2 Grounding the device

⚠ WARNING

ELECTRIC SHOCK

Ground the device before connecting any other cables.

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

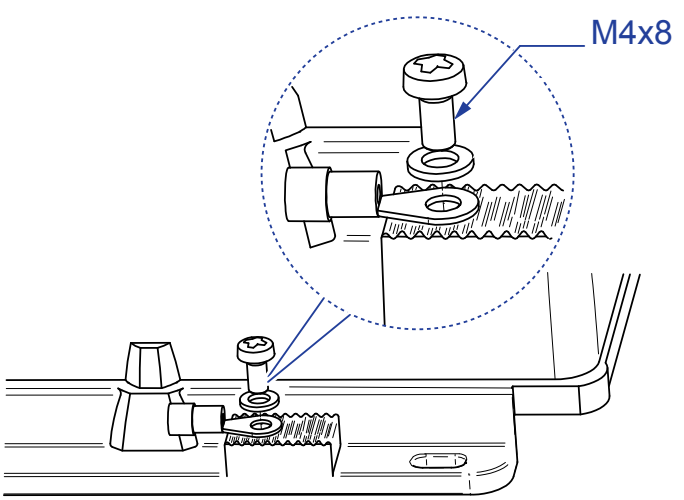
The device is grounded via the separate ground screw.

The Indoor device variants (APAC device variants featuring Mounting with characteristic value A) have a connection for functional ground.

The Outdoor device variants (APAC device variants featuring Mounting with characteristic value B, Europe device variants, Americas device variants) have a connection for protective ground.

☐ Terminate the ground conductor between the fastening plates.
☐ Make sure the fastening plates cover the stripped part of the ground conductor completely.
☐ Ground the device via the provided M4 screw.

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



☐ Tighten the grounding screw with a tightening torque of 3 Nm ± 0.5 Nm (26.55 lb-in ± 4.43 lb-in).

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

2.3 Installing the antennas

2.3.1 Indoor device variants

▶ **Applies to Indoor device variants (APAC device variants featuring Mounting with characteristic value A):**

☐ Install the antennas only indoors.

The device has connections for external antennas. These connections are N sockets.
On delivery, the antenna connections are sealed with transport protection caps.

Perform the following work steps:

☐ Remove the premounted transport protection caps from the antenna connections.

☐ Install at least one antenna on the radio module that you would like to use.

☐ Seal an unused socket with a terminating resistor to avoid interferences from radio signals. The terminating resistor is included in the scope of delivery of some device variants and is available as an accessory.
See “Scope of delivery, order numbers and accessories” on page 62.

You will find information on setting the transmit power in chapter “Configuring the transmit power” on page 48.

2.3.2 Outdoor device variants

▶ **Applies to Outdoor device variants (APAC device variants featuring Mounting with characteristic value B, Europe device variants, Americas device variants):**

⚠ WARNING

ELECTRIC SHOCK

Mount the antennas outdoors only with the surge protection device BAT-ANT-Protector m-f.
See “Order numbers accessories” on page 63.

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

The device has connections for external antennas. These connections are N sockets.
On delivery, the antenna connections are sealed with transport protection caps.

Perform the following work steps:
☐ Remove the premounted transport protection caps from the antenna connections.
☐ Mount the BAT-ANT-Protector m-f as described in the following:

Mounting Note surge protection device BAT-ANT-Protector m-f

⚠ WARNING

ELECTRIC SHOCK OR FALLING

Avoid mounting the antenna near power lines.
When installing an antenna from a ladder or elevating equipment, take precautions to avoid falling and ensure the equipment is securely positioned on solid ground.

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

Safety instructions

☐ Only qualified personnel are permitted to install the device in accordance with the relevant national installation and safety rules. Its usage is only permitted under the conditions stated and shown in this instruction.
☐ The BAT-ANT-Protector m-f and the equipment connected to it can be destroyed by EM surges exceeding the given specification, for example due to a direct lightning strike.

- ☐ The operational voltage of the system/equipment to be protected must not exceed the maximum permissible operating voltage (rated voltage) of the BAT-ANT-Protector m-f.
- ☐ Disconnect or switch off inline equipment when installing or removing the BAT-ANT-Protector m-f.
- ☐ Do not open the BAT-ANT-Protector m-f. Opening the BAT-ANT-Protector m-f will void the warranty and may result in the accidental destruction of electronic components.

General instructions

If exposed to extreme environmental conditions, especially icy conditions or a polluted atmosphere, the connectors should be covered with a self-vulcanizing tape or a cold shrink tube.

If the BAT-ANT-Protector m-f is mated with connectors made of copper-alloy base material and trimetal or nickel plating the connector area must be taped to improve long-term durability.

Disclaimer

All pertinent country, state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components. This equipment must only be installed and serviced by qualified personnel.

Device description

The BAT-ANT-Protector m-f is recommended for protecting the interior electronics of BAT867-F devices with outdoor antennas.
Despite outer surge protection measures, partial discharges can still cause surges that can damage BAT867-F devices. The BAT-ANT-Protector m-f should be mounted as close as possible to the BAT867-F device.

BAT-ANT-Protector m-f connectors

The BAT-ANT-Protector m-f provides two connectors, one for connecting to the Access Point and one for connecting to the antenna (see figure 1).

Figure 1: BAT-ANT-Protector m-f connectors
1 - N socket for connection to the antenna (unprotected end)
2 - N plug for connection to the Access Point (protected end marked in red)

Connecting to the Access Point

To connect the BAT-ANT-Protector m-f to the Access Point proceed as follows:

- ☐ Connect one end of the adapter cable supplied with the antenna to the N plug of the BAT-ANT-Protector m-f.
- ☐ Connect the other end of the adapter cable to the antenna output of the Access Point.

Note: Depending on the type, you can connect the BAT-ANT-Protector m-f directly to the antenna output of the Access Point. In this case you do not need an adapter cable.

Connecting to the antenna

To connect the BAT-ANT-Protector m-f to the antenna proceed as follows:

- ☐ Connect one end of the antenna cable to the N socket of the BAT-ANT-Protector m-f.
- ☐ Connect the other end of the antenna cable to the antenna input.
- ☐ Seal an unused socket with a terminating resistor to avoid interferences from radio signals. The terminating resistor is included in the scope of delivery for device variants with the Configuration characteristic value Z and available as accessory.

Note: Depending on the connector type, you may require an adapter or an adapter cable.

Grounding the BAT-ANT-Protector m-f

Ground the BAT-ANT-Protector m-f appropriately according to all national, state and local regulations to ensure that any surges can be conducted away from the device to the building‘s earthing system.

- ☐ Fix a cable lug with a nut as shown in figure 2.

Note: Use a sufficiently sized grounding cable (min. 16 mm^2 or 0.02 in^2 / AWG 6) as short a distance as possible (max. 0.5 m or 19.69 in).

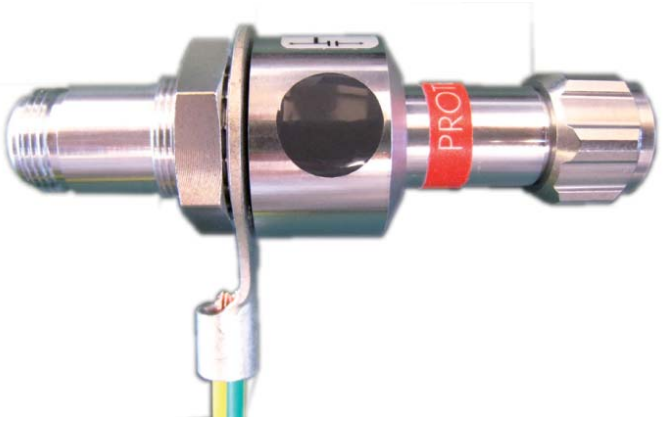


Figure 2: Grounding the BAT-ANT-Protector m-f

You will find information on setting the transmit power in chapter “Configuring the transmit power” on page 48.

2.4 Connecting the power supply

2.4.1 Indoor device variants

▶ **Applies to Indoor device variants (APAC device variants featuring Mounting with characteristic value A):**

⚠ 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 11.
See “Requirements for connecting the supply voltage” on page 12.

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

The supply voltage is electrically isolated from the casing.

Supply voltage with the characteristic value W (24 V DC)

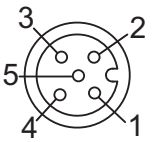
Type and specification of the supply voltage	Pin assignment on the device	
Rated voltage DC: 24 V DC		1 +24 V DC
Voltage range DC incl. maximum tolerances: 18 V DC ... 32 V DC		2 0 V DC
		3 0 V DC
		4 N.C.
		5 N.C.

Table 4: Type and specification of the supply voltage

☐ Connect the wires for the supply voltage according to the pin assignment with a suitable socket.

Supply voltage with the characteristic value P (Power supply exclusively via PoE)

☐ Only connect the device to a PoE network indoors.

See “Supply voltage with the characteristic value P (Power supply exclusively via PoE)” on page 27.

See “10/100/1000 Mbit/s PoE port” on page 27.

2.4.2 Outdoor device variants

▶ **Applies to Outdoor device variants (APAC device variants featuring Mounting with characteristic value B, Europe device variants, Americas device variants):**

⚠ 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 11.
See “Requirements for connecting the supply voltage” on page 12.
To exclude an outdoor power supply cable routing, mount the external power supply together with the BAT867-F in a separate protective casing.

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

⚠ WARNING

ELECTRIC SHOCK

Only use shielded and grounded PoE lines. If you source the device via PoE, seal the 5-pin, “A”-coded M12 socket for the 24 V DC power supply with a metal protection screw.
See “Order numbers accessories” on page 63.

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

The supply voltage is electrically isolated from the casing.

Supply voltage with the characteristic value W (24 V DC)

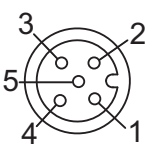
Type and specification of the supply voltage	Pin assignment on the device	
Rated voltage DC: 24 V DC		1 +24 V DC
Voltage range DC incl. maximum tolerances: 18 V DC ... 32 V DC		2 0 V DC
		3 0 V DC
		4 N.C.
		5 N.C.

Table 5: Type and specification of the supply voltage

☐ Connect the wires for the supply voltage according to the pin assignment with a suitable socket.

Supply voltage with the characteristic value P (Power supply exclusively via PoE)

See “Supply voltage with the characteristic value P (Power supply exclusively via PoE)” on page 27.

See “10/100/1000 Mbit/s PoE port” on page 27.

2.5 Operating the device

You start up the device by connecting the power supply via the 8-pin, “X”-coded M12 socket for PoE port or via a 5-pin, “A”-coded M12 socket.
You find the prescribed tightening torque of the locking screw in chapter:
“General technical data” on page 53

2.6 Connecting data cables

2.6.1 Indoor device variants

▶ **Applies to Indoor device variants (APAC device variants featuring Mounting with characteristic value A):**
☐ Only run data links indoors (IEEE 802.3 area A).

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. To reduce inductive coupling, verify that the power supply cables and data cables cross at a 90° angle.
☐ Use shielded data cables for gigabit transmission via copper cables, for example SF/UTP cables according to ISO/IEC 11801. Exclusively use shielded data cables to meet EMC requirements according to EN 50121-4 and marine applications.
☐ Connect the data cables according to your requirements.
See “Ethernet port” on page 27.

2.6.2 Outdoor device variants

Applies to Outdoor device variants (APAC device variants featuring Mounting with characteristic value B, Europe device variants, Americas device variants):

⚠ WARNING

ELECTRIC SHOCK

Only use shielded and grounded PoE lines. If you source the device via PoE, seal the 5-pin, “A”-coded M12 socket for the 24 V DC power supply with a metal protection screw.
See “Order numbers accessories” on page 63.

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

The supply voltage is electrically isolated from the casing.
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. To reduce inductive coupling, verify that the power supply cables and data cables cross at a 90° angle.
- ☐ Use shielded data cables for gigabit transmission via copper cables, for example SF/UTP cables according to ISO/IEC 11801. Exclusively use shielded data cables to meet EMC requirements according to EN 50121-4 and marine applications.
- ☐ Connect the data cables according to your requirements.
  See “Ethernet port” on page 27.

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 the HiDiscovery protocol in the applications HiDiscovery or Industrial HiVision
- Configuration via BOOTP

You will find more information in the “User Manual Configuration Guide”. The manual is available for download on the Internet: https://www.doc.hirschmann.com

4 First login (Password change)

Applies to devices with the following software release and later:
HiLCOS 10.12-RU2

To help prevent undesired access to the device, it is imperative that you change the default password during initial setup.

Perform the following steps:

- ☐ Open the graphical user interface WEBconfig, the Command Line Interface or LANconfig the first time you log on to the device.
- ☐ Log on to the device with the default password “private”.
  The device prompts you to type in a new password.
  Note: When you log on with LANconfig, the device prompts you to type in a new password before your first configuration change.
- ☐ Type in your new password.
  Choose a password that contains at least 8 characters which includes upper-case characters, lower-case characters, numerical digits and special characters.
- ☐ Confirm your new password.

For further information see:
https://hirschmann-support.belden.com/en/kb/required-password-change-new-procedure-for-first-time-login

5 Obtaining compliance for operation in the European Union and in the United Kingdom (UK)

For operation in the European Union, the device must comply with the Radio Equipment Directive (RED) 2014/53/EU. For operation in the United Kingdom (UK), the device must comply with the Radio Equipment Regulations. The RED compliance and the Radio Equipment Regulations compliance require compliant operation of the device in the 5 GHz band channels. Compliant operation of the device is achieved by an unchangeable determination of the country setting.

Make the country setting unchangeable using the Command Line Interface (CLI), the graphical user interface WEBconfig or the LANconfig software. You can download the LANconfig software from the Hirschmann product pages (www.hirschmann.com).

Perform the following work steps:

Command Line Interface (CLI)

☐ To access the possible country settings, execute the following command:

```
set Setup/WLAN/Country ?
```

Note: The country setting “Europe” is valid for all European countries and the United Kingdom (UK). Specific country settings such as “France” or “Germany” include additional country specific channels in comparison to the “Europe” country setting.
The device ignores specific country settings and uses the country setting “Europe” until the RED compliance or the Radio Equipment Regulations compliance has been obtained.

☐ Select the desired country setting with the following command:

```
set Setup/WLAN/Country [Country]
```

Example:

```
set Setup/WLAN/Country France
```

☐ Execute the following command:

```
> REDcompliance
```

Note: To check the country setting and correct it, type `no`. Then check the country setting with the following command: `ls Setup/WLAN/Country`.

☐ To obtain RED compliance or Radio Equipment Regulations compliance, type `yes`. This makes the country setting unchangeable. Subsequently, the device restarts.

Graphical user interface

☐ Open the **Configuration > Wireless LAN > General** dialog and select the desired country setting.

Note: The country setting “Europe” is valid for all European countries and the United Kingdom (UK). Specific country settings such as “France” or “Germany” include additional country specific channels in comparison to the “Europe” country setting.
The device ignores specific country settings and uses the country setting “Europe” until the RED compliance or the Radio Equipment Regulations compliance has been obtained.

☐ To confirm your choice, click the “Send” button.

☐ Open the **Extras > RED compliance** dialog.

Note: To check the country setting and correct it, open the **Configuration > Wireless LAN > General** dialog.

☐ To obtain RED compliance or Radio Equipment Regulations compliance, click the “Confirm RED compliance” button. This makes the country setting unchangeable. Subsequently, the device restarts.

LANconfig

☐ In the LANconfig device overview, highlight the row containing the desired device.

☐ In the menu bar, select **Device > Configure**.

☐ Open the **Configuration > Wireless LAN > General** dialog and select the desired country setting.

Note: The country setting “Europe” is valid for all European countries and the United Kingdom (UK). Specific country settings such as “France” or “Germany” include additional country specific channels in comparison to the “Europe” country setting.
The device ignores specific country settings and uses the country setting “Europe” until the RED compliance or the Radio Equipment Regulations compliance has been obtained.

☐ To confirm your choice, click the “OK” button.

☐ In the LANconfig device overview, highlight the row containing the desired device.

☐ In the menu bar, select **Device > RED compliance**.

Note: To check the country setting and correct it, click the “No” button. Then open the **Configuration > Wireless LAN > General** dialog.

☐ To obtain RED compliance or Radio Equipment Regulations compliance, click the “Yes” button. This makes the country setting unchangeable. Subsequently, the device restarts.

6 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 WEBconfig or the LANconfig software. You can download the LANconfig software from the Hirschmann product pages (www.hirschmann.com).

In WEBconfig, perform the following work steps:

☐ Open the **Configuration > Wireless LAN > General** dialog.

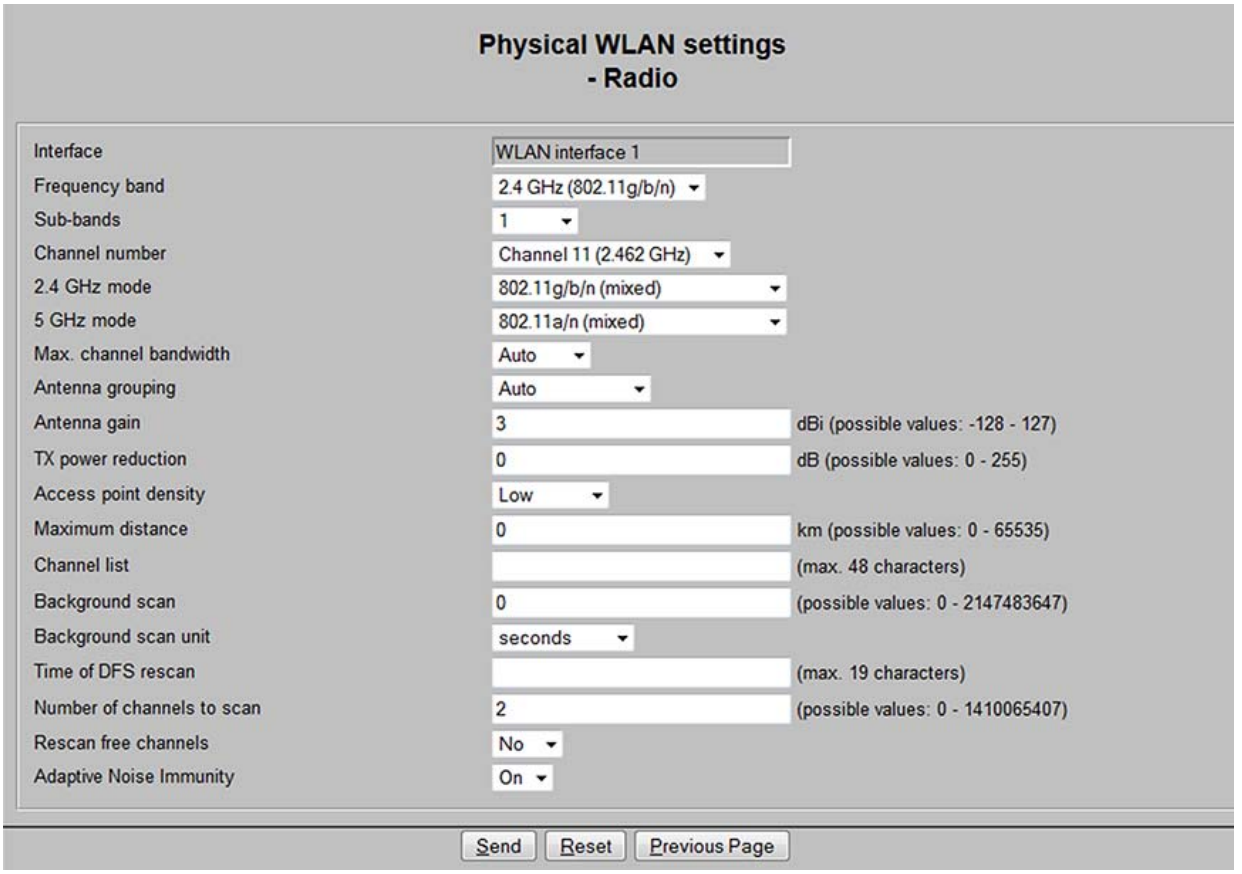
☐ In the “General” tab, specify in the “General” frame the country in which you install the device, and click the “Send” button.

Note: For devices that are operated in the European Union or in the United Kingdom (UK), perform the work steps described in chapter “Obtaining compliance for operation in the European Union and in the United Kingdom (UK)” on page 45.

☐ 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 from the antenna gain the attenuation by cables and by surge protection devices. Enter the calculated value in the “Antenna gain” field.



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

7 Monitoring the ambient air temperature

Operate the device below the specified maximum ambient air temperature exclusively.
See “General technical data” on page 53.

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

The temperature displayed in the CLI (Command Line Interface) and the GUI (Graphical User Interface) 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.

8 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.
- 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 (http://www.hirschmann.com).

Note: You find information on settling complaints on the Internet at http://www.beldensolutions.com/en/Service/Repairs/index.phtml.

9 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 cable.
☐ Remove the antennas.
☐ Disconnect the grounding.

10 Technical data

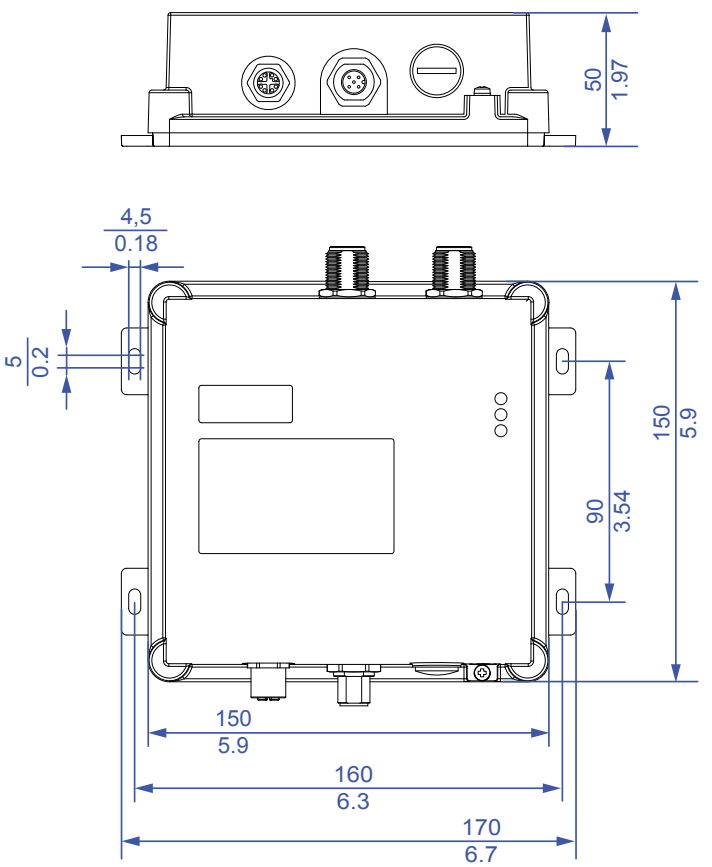
10.1 General technical data

Dimensions W × H × D	BAT867-F	See “Dimension drawings” on page 54.
Weight	Applies to Indoor device variants (APAC device variants featuring Mounting with characteristic value A):	900 g (31.75 oz)
	Applies to Outdoor device variants (APAC device variants featuring Mounting with characteristic value B, Europe device variants, Americas device variants):	934 g (32.88 oz)
Supply voltage	Rated voltage	24 V DC
	Voltage range incl. maximum tolerances	18 V DC ... 32 V DC
	Connection type	8-pin, “X”-coded M12 socket for PoE port or a 5-pin, “A”-coded M12 plug
		Tightening torque of the locking screw: 0.6 Nm (5.3 lb-in)
	Power loss buffer	10 ms at 19.2 V DC
	Overload current protection on the device	Non-replaceable fuse
	Back-up fuse	Nominal rating: 3.5 A
		Characteristic: slow blow
	Peak inrush current (slow voltage increase)	<3.5 A
	Current integral I^2t	0.373 A^2s
Climatic conditions during operation	Minimum clearance around the device	Top and bottom sides of device: 5 cm (2 in) Left and right device side: 2 cm (0.79 in)
	Ambient air temperature[a]	Devices with operating temperature characteristic value L (standard): -10 °C ... +60 °C (+14 °F ... +140 °F)
		Devices with operating temperature characteristic value E and T (extended): -40 °C ... +70 °C (-40 °F ... +158 °F)
	Maximum inner temperature of device (guideline)	+90 °C (+194 °F)
	Humidity	10 % ... 95 % (non-condensing)
	Air pressure	min. 700 hPa (+3000 m ASL; +9842 ft ASL) max. 1060 hPa (-400 m ASL; -1312 ft ASL)

Climatic conditions during storage	Ambient air temperature[a]	-40 °C ... +70 °C (-40 °F ... +158 °F)
	Humidity	10 % ... 95 % (non-condensing)
	Air pressure	min. 700 hPa (+3000 m ASL; +9842 ft ASL) max. 1060 hPa (-400 m ASL; -1312 ft ASL)
Pollution degree		2
Protection classes	Degree of protection	IP65/67[b]

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

10.2 Dimension drawings



10.3 Radio technology

Antenna connection	2 × N socket for WLAN module
Range	Depending on the antenna used, frequency range and data rate
Encryption	▶ IEEE 802.11i/WPA2 with passphrase or IEEE 802.1x and hardware-accelerated AES ▶ Closed Network ▶ WEP 64 ▶ WEP 128 ▶ WEP 152 ▶ User authentication ▶ 802.1x/EAP ▶ LEPS ▶ WPA1/TKIP ▶ For more information, see the HiLCOS data sheet.
Frequency range	▶ Support of 2.4 GHz and 5 GHz: 2412 MHz to 2472 MHz and 5180 MHz to 5825 MHz
Modulation technology	▶ OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM ▶ DSSS/CCK, DSSS/DBPSK, DSSS/DQPSK
Radio topology	WLAN Access-Point, Bridge-, Router-, Point-to-Point-, Client-, Client-Bridge-Mode

10.4 Roaming

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

10.5 Receiving sensitivity, transmit power and data rate

The values of the WLAN module shown in the following tables are subject to a tolerance of ±2 dB. If you use only 1 antenna, the transmit power is reduced by 3 dB. 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.

10.5.1 IEEE 802.11b

IEEE 802.11b Frequency range 2.412 GHz to 2.472 GHz Bandwidth 20 MHz		
Data rate	**Transmit power**	**Receiving sensitivity**
1 Mbit/s	23 dBm	-95 dBm
2 Mbit/s	23 dBm	-94 dBm
5.5 Mbit/s	23 dBm	-92 dBm
11 Mbit/s	23 dBm	-90 dBm

Table 6: IEEE 802.11b, frequency range 2.412 GHz to 2.472 GHz, bandwidth 20 MHz

10.5.2 IEEE 802.11g

IEEE 802.11g Frequency range 2.412 GHz to 2.472 GHz Bandwidth 20 MHz		
Data rate	**Transmit power**	**Receiving sensitivity**
6 Mbit/s	24 dBm	-94 dBm
9 Mbit/s	24 dBm	-93 dBm
12 Mbit/s	24 dBm	-92 dBm
18 Mbit/s	24 dBm	-90 dBm
24 Mbit/s	24 dBm	-88 dBm
36 Mbit/s	23 dBm	-85 dBm
48 Mbit/s	22 dBm	-81 dBm
54 Mbit/s	21 dBm	-80 dBm

Table 7: IEEE 802.11g, frequency range 2.412 GHz to 2.472 GHz, bandwidth 20 MHz

10.5.3 IEEE 802.11a

IEEE 802.11a Frequency range 5.180 GHz to 5.825 GHz Bandwidth 20 MHz		
Data rate	**Transmit power**	**Receiving sensitivity**
6 Mbit/s	23 dBm	-94 dBm
9 Mbit/s	23 dBm	-94 dBm
12 Mbit/s	23 dBm	-92 dBm
18 Mbit/s	23 dBm	-90 dBm
24 Mbit/s	23 dBm	-86 dBm
36 Mbit/s	21 dBm	-84 dBm
48 Mbit/s	19 dBm	-81 dBm
54 Mbit/s	18 dBm	-80 dBm

Table 8: IEEE 802.11a, frequency range 5.180 GHz to 5.825 GHz, bandwidth 20 MHz

10.5.4 IEEE 802.11n

IEEE 802.11n Frequency range 2.412 GHz to 2.472 GHz Bandwidth 20 MHz		
Coding	**Transmit power**	**Receiving sensitivity**
MCS 0 / 8	24 dBm	-93 dBm
MCS 1 / 9	24 dBm	-91 dBm
MCS 2 / 10	24 dBm	-89 dBm
MCS 3 / 11	23 dBm	-84 dBm
MCS 4 / 12	23 dBm	-83 dBm
MCS 5 / 13	23 dBm	-78 dBm
MCS 6 / 14	21 dBm	-78 dBm
MCS 7 / 15	19 dBm	-76 dBm

Table 9: IEEE 802.11n, frequency range 2.412 GHz to 2.472 GHz, bandwidth 20 MHz

IEEE 802.11n Frequency range 2.412 GHz to 2.472 GHz Bandwidth 40 MHz		
Coding	**Transmit power**	**Receiving sensitivity**
MCS 0 / 8	23 dBm	-92 dBm
MCS 1 / 9	23 dBm	-88 dBm

Table 10: IEEE 802.11n, frequency range 2.412 GHz to 2.472 GHz, bandwidth 40 MHz

IEEE 802.11n Frequency range 2.412 GHz to 2.472 GHz Bandwidth 40 MHz		
Coding	**Transmit power**	**Receiving sensitivity**
MCS 2 / 10	23 dBm	-85 dBm
MCS 3 / 11	22 dBm	-82 dBm
MCS 4 / 12	22 dBm	-79 dBm
MCS 5 / 13	22 dBm	-75 dBm
MCS 6 / 14	21 dBm	-75 dBm
MCS 7 / 15	19 dBm	-73 dBm

Table 10: IEEE 802.11n, frequency range 2.412 GHz to 2.472 GHz, bandwidth 40 MHz

IEEE 802.11n Frequency range 5.180 GHz to 5.825 GHz Bandwidth 20 MHz		
Coding	**Transmit power**	**Receiving sensitivity**
MCS 0 / 8	22 dBm	-93 dBm
MCS 1 / 9	22 dBm	-90 dBm
MCS 2 / 10	22 dBm	-87 dBm
MCS 3 / 11	21 dBm	-83 dBm
MCS 4 / 12	21 dBm	-80 dBm
MCS 5 / 13	20 dBm	-77 dBm
MCS 6 / 14	19 dBm	-74 dBm
MCS 7 / 15	17 dBm	-73 dBm

Table 11: IEEE 802.11n, frequency range 5.180 GHz to 5.825 GHz, bandwidth 20 MHz

IEEE 802.11n Frequency range 5.180 GHz to 5.825 GHz Bandwidth 40 MHz		
Coding	**Transmit power**	**Receiving sensitivity**
MCS 0 / 8	21 dBm	-90 dBm
MCS 1 / 9	21 dBm	-88 dBm
MCS 2 / 10	21 dBm	-85 dBm
MCS 3 / 11	20 dBm	-82 dBm
MCS 4 / 12	20 dBm	-79 dBm

Table 12: IEEE 802.11n, frequency range 5.180 GHz to 5.825 GHz, bandwidth 40 MHz

IEEE 802.11n Frequency range 5.180 GHz to 5.825 GHz Bandwidth 40 MHz		
Coding	**Transmit power**	**Receiving sensitivity**
MCS 5 / 13	19 dBm	-75 dBm
MCS 6 / 14	18 dBm	-73 dBm
MCS 7 / 15	17 dBm	-73 dBm

Table 12: IEEE 802.11n, frequency range 5.180 GHz to 5.825 GHz, bandwidth 40 MHz

10.5.5 IEEE 802.11ac

IEEE 802.11ac Frequency range 5.180 GHz to 5.825 GHz Bandwidth 20 MHz		
Coding	**Transmit power**	**Receiving sensitivity**
MCS 0	22 dBm	-93 dBm
MCS 1	22 dBm	-90 dBm
MCS 2	22 dBm	-87 dBm
MCS 3	21 dBm	-83 dBm
MCS 4	21 dBm	-80 dBm
MCS 5	20 dBm	-77 dBm
MCS 6	19 dBm	-74 dBm
MCS 7	17 dBm	-73 dBm
MCS 8	16 dBm	-71 dBm

Table 13: IEEE 802.11ac, frequency range 5.180 GHz to 5.825 GHz, bandwidth 20 MHz

IEEE 802.11ac Frequency range 5.180 GHz to 5.825 GHz Bandwidth 40 MHz		
Coding	**Transmit power**	**Receiving sensitivity**
MCS 0	21 dBm	-90 dBm
MCS 1	21 dBm	-88 dBm
MCS 2	21 dBm	-85 dBm
MCS 3	20 dBm	-82 dBm
MCS 4	20 dBm	-79 dBm

Table 14: IEEE 802.11ac, frequency range 5.180 GHz to 5.825 GHz, bandwidth 40 MHz

IEEE 802.11ac Frequency range 5.180 GHz to 5.825 GHz Bandwidth 40 MHz		
Coding	**Transmit power**	**Receiving sensitivity**
MCS 5	19 dBm	-75 dBm
MCS 6	18 dBm	-73 dBm
MCS 7	17 dBm	-73 dBm
MCS 8	16 dBm	-69 dBm
MCS 9	16 dBm	-66 dBm

Table 14: IEEE 802.11ac, frequency range 5.180 GHz to 5.825 GHz, bandwidth 40 MHz

IEEE 802.11ac Frequency range 5.180 GHz to 5.825 GHz Bandwidth 80 MHz		
Coding	**Transmit power**	**Receiving sensitivity**
MCS 0	21 dBm	-88 dBm
MCS 1	21 dBm	-86 dBm
MCS 2	21 dBm	-84 dBm
MCS 3	20 dBm	-81 dBm
MCS 4	20 dBm	-77 dBm
MCS 5	19 dBm	-74 dBm
MCS 6	18 dBm	-73 dBm
MCS 7	17 dBm	-70 dBm
MCS 8	16 dBm	-67 dBm
MCS 9	16 dBm	-65 dBm

Table 15: IEEE 802.11ac, frequency range 5.180 GHz to 5.825 GHz, bandwidth 80 MHz

10.6 EMC and immunity

EMC interference immunity		
EN 61000-4-2	Electrostatic discharge	
	Contact discharge	±6 kV
	Air discharge	±8 kV

EMC interference immunity		
EN 61000-4-3	Electromagnetic field	
	80 MHz ... 1000 MHz	20 V/m
	1400 MHz ... 2700 MHz	10 V/m
EN 61000-4-4	Fast transients (burst)	
	DC power line	±2 kV
	Data line	±4 kV
EN 61000-4-5	Voltage surges	
	DC power line	±1 kV line/ground; ±0.5 kV line/line
	Data line, shielded	±2 kV line/ground
EN 61000-4-6	Conducted disturbances	
	150 kHz ... 80 MHz	10 V

EMC interference emission	
EN 55032	Class A

Immunity		
IEC 60068-2-6, test Fc	Vibration	5 Hz ... 8.4 Hz with 3.5 mm (0.14 in) amplitude
		8.4 Hz ... 150 Hz with 1 g
IEC 60068-2-27, test Ea	Shock	15 g at 11 ms

10.7 Network range

10/100/1000 Mbit/s twisted pair port	
Length of a twisted pair segment	max. 100 m (328 ft) (for Cat5e cable)

Table 16: Network range: 10/100/1000 Mbit/s twisted pair port

10.8 Power consumption/power output

Power consumption	Power output
9 W	31.0 Btu (IT)/h

Table 17: Power consumption/power output

11 Scope of delivery, order numbers and accessories

Scope of delivery APAC device variants

Amount	Article
1 ×	Device
1 ×	Safety and general information sheet
1 ×	Applies to Outdoor device variants (APAC device variants featuring Mounting with characteristic value B, Europe device variants, Americas device variants): Information sheet Outdoor safety instructions
1 ×	Sheet with the conformity declarations for the European Union and the United Kingdom (UK)
1 × premounted	Transport protection cap (M12, plastic) for supply voltage connection
2 × premounted	Transport protection cap (plastic) for N socket

Table 18: Scope of delivery for APAC device variants featuring Configuration with characteristic value 9

Amount	Article
1 ×	Device
1 ×	Safety and general information sheet
1 ×	Applies to Outdoor device variants (APAC device variants featuring Mounting with characteristic value B, Europe device variants, Americas device variants): Information sheet Outdoor safety instructions
1 ×	Sheet with the conformity declarations for the European Union and the United Kingdom (UK)
1 × premounted	Transport protection cap (M12, plastic) for supply voltage connection
2 × premounted	Transport protection cap (plastic) for N socket
2 × included	BAT-ANT-N-3AGN-IP67
1 × premounted	50 Ω terminating resistor for closing unused antenna connections for N socket
1 × included	“X”-coded M12 plug for Ethernet port
1 × included	M12 power supply plug ELKA 5012 PG7

Table 19: Scope of delivery for APAC device variants featuring Configuration with characteristic value Z

Scope of delivery Europe device variants and Americas device variants

Amount	Article
1 ×	Device
1 ×	Safety and general information sheet
1 ×	Information sheet Outdoor safety instructions
1 ×	Sheet with the conformity declarations for the European Union and the United Kingdom (UK)
1 × premounted	Transport protection cap (M12, plastic) for supply voltage connection
2 × premounted	Transport protection cap (plastic) for N socket
2 × included	BAT-ANT-N-3AGN-IP67
1 × premounted	50 Ω terminating resistor for closing unused antenna connections for N socket
1 × included	“X”-coded M12 plug for Ethernet port
1 × included	M12 power supply plug ELKA 5012 PG7

Order numbers Europe device variants

Designation	Order number
BAT867-F Europe for Transportation	942 276-200
BAT867-F Europe	942 276-201

Order numbers Americas device variants

Designation	Order number
BAT867-F North America for Transportation	942 276-300
BAT867-F North America	942 276-301

Order numbers accessories

Note that products recommended as accessories may have different characteristics to those of the device, which may limit the application range of the overall system. For example, if you add an accessory with IP20 to a device with IP65, the degree of protection of the overall system is reduced to IP20.

For reliable receive power and transmission power, you require antennas that pertain to your application case.
The "Antenna Guide" document provides an overview of the antennas that can be used as well as the suitable antenna accessories.
The manual is available for download on the Internet: https://www.doc.hirschmann.com

Designation		Order number
BAT-ANT-Protector m-f	Mandatory for antennas in outdoor areas.	943 903-373
BAT-ANT-N-3AGN-IP67 for N socket (10 pieces)		942 110-001
50 Ω terminating resistors for closing unused antenna connections for N socket (10 pieces)		942 118-001

Designation	Order number
Applies to device variants featuring supply voltage with characteristic value W (24 V DC): M12 power supply plug ELKA 5012 PG7	933 170-100
Protection screw for M12 plug, metal, IP65/67 (10 pieces)	942 115-001
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

12 Underlying technical standards

Name	
EN 50121-4	Railway applications – EMC – Emission and immunity of the signaling and telecommunications apparatus (Rail Trackside)
EN 55032	Electromagnetic compatibility of multimedia equipment – Emission Requirements
EN 60529	Degrees of protection provided by housing – IP-Code
EN 60950-22	Information technology equipment – Safety – Part 22: Equipment to be installed outdoors 4.1 Ambient air temperature 8.3 Resistance to corrosion 8.5 Gaskets 9.1 Protection from moisture 9.3 Protection from excessive dust 10 Impact test
EN 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
EN 61131-2	Programmable controllers – Part 2: Equipment requirements and tests
IEC/EN 62368-1	Equipment for audio/video, information and communication technology - Part 1: safety requirements
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 301 893	Broadband radio access networks (BRAN) – 5 GHz high performance Remote Local Area Network (RLAN)
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
FCC 47 CFR Part 15	Code of Federal Regulations
IEEE 802.1D	MAC Bridges (switching function)
IEEE 802.1Q	Virtual LANs (VLANs, MRP, Spanning Tree)
IEEE 802.11a/b/g/n/ac	WLAN
IEEE 802.3af	Power over Ethernet (PoE)

The device has an approval based on a specific standard exclusively 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 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.

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- 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 https://www.belden.com/solutions/customer-innovation-center.
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