User Manual

Installation
Industrial Wireless LAN Client
BAT-C

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Contents

Safety Instructions

■ Important Information

Notice: Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

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

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

Note: Contains important information on the product, on how to manage the product, or on the respective section of the documentation to which your special attention is being drawn.

■ Certified usage

The device may only be employed for the purposes described in the catalog and technical description, and only in conjunction with external devices and components recommended or approved by the manufacturer. The product can only be operated correctly and safely if it is transported, stored, installed and assembled properly and correctly. Furthermore, it must be operated and serviced carefully.

■ Supply voltage

The devices are designed for operation with either extra-low voltage (SELV) or Limited Low Power Sources (LPS)

Extra-low voltage (SELV)

SELV circuits with voltage restrictions in accordance with IEC/EN 60950-1 may be connected to the supply voltage connectors. Use a slow-blow fuse with a nominal rating of 4 A on the voltage input. Use undamaged parts.

Low Power Sources (LPS)

Low Power Sources (LPS) with voltage restrictions in accordance with IEC/EN 60950-1 may be connected to the supply voltage connectors. Use undamaged parts.

⚠ WARNING

ELECTRIC SHOCK

Connect only a supply voltage that corresponds to the type plate of your device.

Never insert sharp objects (small screwdrivers, wires, etc.) into the supply voltage connection terminals, and do not touch the terminals.

Start connecting the supply voltage only if all the above mentioned requirements are fulfilled.

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

■ Housing

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

☐ Verify that the electrical installation meets local or nationally applicable safety regulations.

⚠ WARNING

ELECTRIC SHOCK

Never insert any pointed objects (small screwdrivers, wires, etc,.) into the product!

Never insert sharp objects (small screwdrivers, wires, etc.) into the supply voltage connection terminals or the signal contact, and do not touch the terminals!

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

⚠ CAUTION

HOT SURFACE – RISK OF BURNING

When the product is touchable after installation, protective gloves have to be worn during maintenance operation at an ambient temperature higher than 60 °C.

■ Mounting outdoors

Note: Set up the antenna close to the device. Use the shortest antenna cable possible to minimize attenuation.

Note: Connectors are subject to corrosion in outdoor WLAN installations which can result in higher attenuation. Seal the outdoor connectors with water and weather resistant tape.

■ **Lightning protection**

☐ Note the safety instructions for lightning protection (see the datasheet for lightning protection or the WLAN Outdoor Guide).
☐ If possible, avoid installing in locations with a high risk of lightning. This applies in particular to installing antennas.

The antenna should not be the highest point in the area. If this is the case, use a separate lightning conductor to divert lightning strikes.

⚠ WARNING

ELECTROSTATIC DISCHARGES

Lightening protection is an indispensible part of your outdoor antenna installation. It protects your sensitive electronic devices from transient or electrostatic discharges to the antenna.

Antennas placed outdoors must be within the catchment area of a lightening conductor. Verify that there is lightening protection equipotential bonding for all conductive systems leading from outdoors. When implementing your lightening protection concept, verify your plan meets the requirements of standards VDE 0182 and IEC 62305. Hirschmann recommends using the Hirschmann BAT Protector for lightening protection (see on page 26 "Accessories").

Installing this lightening protection element between an antenna and a BAT-C does not alone provide sufficient protection against a lightening strike. The BAT Protector lightening protection element only works as part of a comprehensive lightening protection concept. If you have any questions relating to this, contact a qualified dealer.

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

■ **Qualification requirements for personnel**

Qualified personnel as understood in this manual, are persons who are familiar with the setup, assembly, startup, and operation of this product and are appropriately qualified for their job. This includes, for example, those persons who have been:

□ trained or directed or authorized to switch on and off, to ground and to label power circuits and devices or systems in accordance with current safety engineering standards;
□ trained or directed in the care and use of appropriate safety equipment in accordance with the current standards of safety engineering;
□ trained in providing first aid.

■ National and international safety regulations

Verify that the electrical installation meets local or nationally applicable safety regulations.
When installing external antennas, adhere to the regulations of the country in which you are operating the WLAN device.

This device has been designed to operate with the antennas listed below, having a maximum gain of 6 dBi:

► Stub antenna (within the scope of delivery)
► BAT-ANT-N-6G-IP65
► BAT-ANT-N-5A-IP65
► BAT-ANT-N-6ABG-IP65

Antennas not included in this list are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

■ CE marking

The devices comply with the regulations contained in the following European directive:

1999/5/EC

Directive of the European Parliament and the council for radio installations and telecommunication systems and for the mutual recognition of their conformity.
This directive also contains the goals of directive 2004/108/EC of the European Parliament and the council for standardizing the regulations of member states relating to electromagnetic compatibility, and directive 2006/95/EC of the European Parliament and the council for standardizing the regulations of member states relating to electrical equipment to be used within specific voltage ranges, but without applying the lower voltage threshold.

2011/65/EU (RoHS)

Directive of the European Parlament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

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

Hirschmann Automation and Control GmbH
Stuttgarter Str. 45-51
72654 Neckartenzlingen
Germany
Tel.: +49 1805 141538

This product can be used in living areas, place of business, small business and in industrial areas.

■ **FCC statement**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) 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:

► Reorient or relocate the receiving antenna
► Increase the separation between the equipment and receiver
► Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
► Consult the dealer or an experienced radio/TV technician for help.

Note: §15.407 statement; in case of absence of information to transmit or operational failure the product will automatically discontinue transmission.

⚠ CAUTION

Any changes or modifications NOT explicitly APPROVED by Hirschmann Automation and Control GmbH could cause the module to cease to comply with FCC rules part 15, and thus void the user's authority to operate the equipment.

■ **IC Compliance**

Operation is subject to the following two conditions:

1. this device may not cause harmful interference,
2. this device must accept any interference received, including interference that may cause undesired operation.

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website http://www.hc-sc.gc.ca/rpb.

■ **Information on using devices in motor vehicles (E-marking)**

Operate only suitably labeled products in motor vehicles.

■ **Ad-hoc frequencies**

⚠ CAUTION

Within the 5180 to 5240 MHz band (5 GHz radio channels 34 to 48) the product are restricted to indoor operations.

When operating under the definition of a client in 47 CFR §15.202 the device is preconfigured to use the most restrictive regulatory domain. For this reason the available operating frequency range is limited to channel 1 - 11 (2412 - 2462 MHz) for IEEE802.11b/g. For IEEE802.11a

the available operating frequency range is limited to channels 36 - 48 (5180 - 5240 MHz).

■ **RF-exposure statement**

This modular transmitter must have a separation distance of at least 20 cm between the antenna and the body of the user or nearby persons. Any notification to the end user of installation or removal instructions about the integrated radio module is not allowed.

■ **Maintenance**

□ When designing this device, Hirschmann was largely able to forego using parts that are subject to wear and tear. The parts subject to wear are designed to last longer than the lifetime of the product when it is operated properly. Operate this device according to the specifications (see "Technical data").

□ 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 to improve and develop their software. You should regularly check whether there is a new version of the software that provides you with additional benefits. You will find software information and downloads on the product pages of the Hirschmann website.

Note: You will find information about the complaints and returns procedures in the Internet under
http://www.beldensolutions.com/en/Service/Repairs/index.phtml

■ **Recycling note**

□ After usage, this product 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 other information that you need to install the device.

The following manuals are available as PDF files on the CD-ROM supplied:

► User Manual Configuration and Administration
► Reference Manual
► User Manual Installation

■ Related Documents

BAT-C User Manual Configuration and Administration.
This is a quick setup guide to be able to setup the BAT-C for the simplest out-of-the-box applications.

BAT-C CLI-Reference.
This is a detailed specification/reference for the supported AT commands.

■ Legend

The symbols used in this manual have the following meanings:

►	Listing
□	Work step
■	Subheading

1   Installation
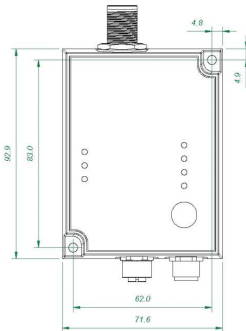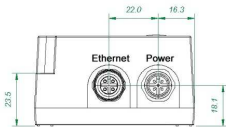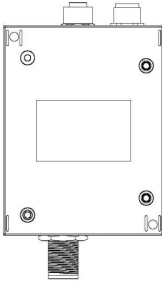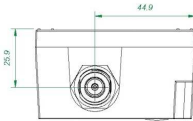
[+/- 0.5 mm]

Power connector pinning
A-coded male M12

1. Vin (9-30V)
2. Digital Input Ground
3. Vin Ground
4. Digital Input (9-30V) or digital output
5. Supply for digital output (9-30V)

Ethernet connector pinning
D-coded female M12

1. Transmit +
2. Receive +
3. Transmit -
4. Receive -

Weight 325 g

1.1 Ethernet interface

The Ethernet interface supports 10/100 Mbps with both MDI/MDI-X auto crossover and polarity correction.

1.2 Status indicators

Description	Color	Status	Meaning
P	Green	On	Supply voltage is present and application is running.
P	Green	Off	Supply voltage is not present, or no application is running.
WLAN	Blue/Purple/Red	Blue	An established WLAN connection detected.
WLAN	Blue/Purple/Red	Flashing Blue	This display indicates WLAN data activity.
WLAN	Blue/Purple/Red	Purple	This display indicates an attempt to establish a connection to another WLAN device.
WLAN	Blue/Purple/Red	Red	Indicates a detected Error.

Description	Color	Status	Meaning
WLAN	Blue/Purple/Red	Off	No WLAN activity.
ETH	Yellow	On	Ethernet link is present.
ETH	Yellow	Flashing	Ethernet data activity.
ETH	Yellow	Off	No Ethernet connection.

2 Configuration

2.1 Using the WEB configuration

By default, the BAT-C is a DHCP Client and Relay, which has an IP address: 172.23.56.99, subnet mask: 255.255.255.0 and default gateway: 172.23.56.99. To access the BAT-C by the Web based configuration interface the computer is set up in the same network, i.e. IP address: 172.23.56.1 and subnet mask: 255.255.255.0.

Open a web browser and enter http://172.23.56.99 in the address bar. Here you find the common configuration parameters needed to setup a connection. If the device is in factory default, you will need to login using the password *private* before configuring the unit. In case the BAT-C received an IP address from DHCP Server, then you can access the device exclusively via this IP address.

Below is an example of the WEB interface.

BAT-C

172.23.56.99

HIRSCHMANN

System Overview

General

Firmware	2.3.5 [15:17:21, Jun 14 2012]

[Logout]

WLAN Status

Connected to	
Network Name (SSID)	HIRSCHMANN
Operating Mode	Infrastructure
Data Rate	
Signal (RSSI)	
WLAN Channel	
WLAN MAC Address	00:12:F3:13:00:69

[Auto Update]

WLAN Status	Connecting...

[Update Status]

LAN Network

IP Address	172.23.56.99
Subnet Mask	255.255.255.0
Default Gateway	172.23.56.99
Primary DNS server	0.0.0.0
Secondary DNS server	0.0.0.0
IP Assignment	DHCP Client and Relay
Ethernet MAC Address	00:12:F3:13:00:69
LAN Status	Link up

[Hide Advanced]

Network

IP Configuration

IP Address	172.23.56.99
Subnet Mask	255.255.255.0
Default Gateway	172.23.56.99
Primary DNS server	0.0.0.0
Secondary DNS server	0.0.0.0
IP Assignment	DHCP Client & Rela ▼ [Set IP Configuration]

WLAN

WLAN Network

Press Scan to find Networks ▼

[Scan for Networks]

Network Name (SSID)	HIRSCHMANN [Set SSID]

General

Operating Mode	Infrastructure ▼

2.2 Two BAT-Cs Connected in Client mode

Operation	Infrastructure (Managed) mode
Encryption	WEP/ WPA/ WPA2 (IEEE 802.11i)

Overview:
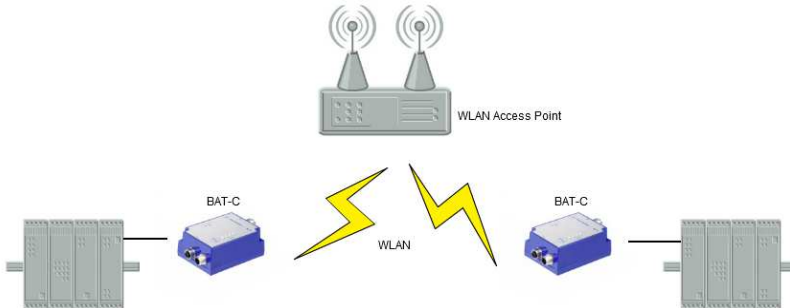
This example is using two BAT-Cs connected in Client mode. This example supports one Ethernet device connected to each of the BAT-Cs. Connect the BAT-C to a WLAN Access Point that allows you to access the Managed (Infrastructure) mode resulting in a higher performance.

2.2.1 How to setup this example?

Both BAT-Cs are operating in Client mode in this example.

1. Connect a PC to the BAT-C. For more information on how to connect to a BAT-C, see section, "Using the WEB configuration".
2. Define the WLAN connection parameters. The following parameters are required:

Parameter	Required Value	Comment
Operational Mode	Managed	
WLAN Channel		Select the one used by the Access Point.
WLAN Data Rate		This is the maximum used data rate.
Encryption		Choose the one required by the Access Point.
Authentication		Choose the one required by the Access Point.
User Name and Key		Choose the one required by the Access Point.
SSID		Choose the SSID of the Access Point.
WLAN Address		Enter the MAC address of the device to which the BAT-C is to connect or use SMART to assign the MAC address (see next bullet).

Note: Use the SMART mode 11 as an alternate for entering the MAC address manually. In order for this mode to function, the device first transmits Ethernet data on the Ethernet link.

For other configuration options, such as SMART mode, please see the "BAT-C User Manual Configuration and Administration" available at http://www.hirschmann.com.

3   Flash Loader and Firmware upgrade

Update the firmware in the BAT-C Ethernet Port Adapter (BAT-C) using the Hirschmann BAT-C Flash Loader tool. Use BOOTP or TFTP for the firmware upgrade procedure. If possible, use an AT command to trigger the device to transfer the firmware to the Ethernet Port Adapter.

To upgrade the firmware, follow these steps:

1. The BAT-C Flash Loader is a C# project, and it requires .NET 2.0 to be able to run.
2. Transfer, unzip and install BAT-C Flash Loader.
3. Run the program (Start->Programs->Hirschmann-> BAT-C Flash Loader-> BAT-C Flash Loader).
4. Connect the BAT-C to the computer via a HUB or Switch. Please see the Limitations section when connecting the BAT-C directly to a PC.

5. Start by selecting a valid cbz-file, this contains a boot loader, firmware and application. The filename of the cbz-file contains the version number of the firmware.

Note: It is also possible to select a single bin-file.

6. Select a static "Host IP Address", typically 172.23.56.1.
7. The BAT-C IP Address should be the Address that the BAT-C is using, typically 172.23.56.99.
8. Press Flash and the firmware upgrade will begin.

3.1   Advanced Mode

1. When a cbz-file is selected, it is possible to use the "Advanced Mode".
2. When selecting the "Advanced mode", it is possible to choose what files in the cbz-file to transfer. Select the "loader.bin" file if you are having difficulties transferring the files.
3. It is also possible to specify a TCP Port number (default: 8080) and AT Password (by default it is not used).

3.2   Flash Modes

1. Default Mode sends an AT command to start the file transfer, if this is unsuccessful, or times out, you will need to hold the 'Smart button' and then Power Cycle the BAT-C for the file transfer to start.
2. The device receives no AT commands in the Recover Mode. Hold the 'Smart button' down and then Power Cycle the BAT-C to start the file transfer.

3.3   Limitations

► When pressing the Mode button during power up, the boot loader is active for about 3 seconds. If connected directly to a PC or to a Switch with auto MDI/MDI-X, it is possible that the Ethernet link connection remains unestablished within the allotted 3 seconds, resulting in an unsuccessful flash procedure.

► Plug the Ethernet Cable into the PC before starting the BAT-C Flash Loader. Start the BAT-C Flash Loader then select the correct "Host IP address:" in the tool.

4 Technical data

■ General technical data

Dimensions	D × W × H	93 × 72 × 40 mm

Weight	without stub antenna	325 g
	with stub antenna	400 g

Operating voltage		9.6 V … 30 V DC
Nominal voltage		12 V … 24 V DC

Climatic conditions during operation	Surrounding air temperature	-40℃ to +70℃

Climatic conditions during storage	Surrounding air temperature	-40℃ to +85℃

Pollution degree		2

Protection classes	Degree of protection	IP67

■ EMC and immunity

EMC interference immunity		
EN 61000-4-2	Electrostatic discharge Contact discharge: test level 3 Air discharge: test level 3	6 kV 8 kV
EN 61000-4-3	Electromagnetic field, test level 3 - 80 – 2000 MHz - 2000 MHz – 2700 MHz	10 V/m 3 V/m

EMC interference immunity		
EN 61000-4-4	Fast transients (burst), test level 3	
	- Power line	2 kV
	- Data line	1 kV
EN 61000-4-5	Voltage surges	
	- Power line, line/line: test level 2	0,5 kV
	- Power line, line/earth: test level 3	1 kV
	- Data line: test level 3	1 kV
EN 61000-4-6	Conducted interference voltages, test level 3	
	150 kHz – 80 MHz	10 V

EMC emitted interference	
EN 55022	Class B
FCC 47 CFR Part 15	Class B

■ Radio standards

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 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 301 489-17	Electromagnetic compatibility (EMC) for radio equipment and services - specific conditions for 2.4 GHz wideband transmission systems and 5 GHz high-performance RLAN equipment

■ Network range

TP port	
Length of twisted pair segment	Max. 100 m
Twisted pair cable type	Shielded

Table 1: TP port 10BASE-T/ 100BASE-TX

■ Power consumption/ power output

Input voltage	Input current	Maximal power consumption	Power output
12 V	200 mA	2,4 W	8,2 Btu (IT)/h
24 V	100 mA	2,4 W	8,2 Btu (IT)/h

■ Scope of delivery

► BAT-C device
► Stub antenna, 3 dBi
► CD ROM
► Adapter M12 connector A-coded Female 5-poles for 24V interface
► Adapter M12 connector D-coded Male 4-poles for Ethernet interface

■ Accessories

Name	Order number
BAT-ANT-N-6G-IP65	943 981-002
BAT-ANT-N-5A-IP65	943 981-003
BAT-ANT-N-6ABG-IP65	943 981-004
Stub antenna (within the scope of delivery)	742 240-001
BAT Protector f-m	943 903-373

Table 2: Optional equipment

■ Underlying norms and standards

Name	
IEC/EN 60950-1	Information technology equipment
FCC 47 CFR Part 15	Code of Federal Regulations
IEEE 802.11 a/b/g/h/i/n	WLAN
IEEE 802.3	Ethernet

Table 3: List of norms and standards

Rule No. 10 of the Economic Commission for Europe (ECE): Devices with a certification are labelled with the E type-approval mark.

The device has a certification based on a specific standard only if the certification indicator appears on the housing.

However, with the exception of Germanischer Lloyd, ship certifications are only included in the product information under www.hirschmann.com.

A Further Support

■ Technical Questions

For technical questions, please contact any Hirschmann dealer in your area or Hirschmann directly.
You will find the addresses of our partners on the Internet at
http://www.hirschmann.com

Contact our support at
https://hirschmann-support.belden.eu.com

You can contact us in the EMEA region at

► Tel.: +49 (0)1805 14-1538
► E-mail: hac.support@belden.com

in the America region at

► Tel.: +1 (717) 217-2270
► E-mail: inet-support@belden.com

in the Asia-Pacific region at

► Tel.: +65 68549860
► E-mail: inet-ap@belden.com

■ Hirschmann Competence Center

The Hirschmann Competence Center is ahead of its competitors:
► 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.
► The current training courses to technology and products can be found at http://www.hicomcenter.com
► Support ranges from the first installation through the standby service to maintenance concepts.

With the Hirschmann Competence Center, you have 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