



**HIRSCHMANN**

A **BELDEN** BRAND

# User Manual

Installation

**BAT-Controller WLC**

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# Safety instructions

This documentation contains instructions which must be observed to ensure your own personal safety and to avoid damage to devices and machinery.

## ■ **Correct usage**

Only use the device for those purposes specified in the catalog and in the technical description. Only operate the device with external devices and components that are recommended and permitted by the manufacturer. The proper and safe operation of this product depends on proper handling during transport, proper storage, assembly and installation, and conscientious operation and maintenance procedures.

## ■ **Supply voltage**

The supply voltage is electrically isolated from the housing.

- Use undamaged parts.
- Internal fuses are triggered only in the case of a detected error in the device. In case of damage or malfunction of the device, turn off the supply voltage and return the device to the plant for inspection.
- Only switch on the device when the housing is closed.
- Only use connection cables that are permitted for the specified temperature range.



### **Warning!**

Only connect a supply voltage that corresponds to the type plate of your device.

## ■ **Safe grounding**

Make sure you ground the devices assembled in the switch cabinet safely. In particular, check the supply voltage connections if they are not connected directly to the supply cable (e.g. when using power strips).

## ■ **Shielded ground**

The shielded ground wire of the twisted pairs cables is connected to the front panel as a conductor.

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

## ■ Housing

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

The device is grounded via the voltage supply socket.

- Verify that the electrical installation meets locally or nationally applicable safety regulations.
- Reduced air flow: Install the device in the switch cabinet in such a way that ensures sufficient air flow for operating the device safely.
- Keep the ventilation slits free to ensure good air circulation.



### **Warning!**

Never insert sharp objects (small screwdrivers, wires, etc.) into the inside of the product. There is the risk of an electric shock.

- Close all empty slots with a covering panel.
- Modules, fans and power supply units of a switched-on device may only be installed or removed by an electrician.
- The chassis should be installed in the horizontal position.
- After the device is switched off, the fan blades continue rotating for a number of seconds. Do not reach into a rotating fan!
- The internal workings of the basic device are not for users! Do not reach inside a switched-on device because of the danger caused by high energy densities.



### **Warning!**

When installing the device, make sure the ventilation slots remain unobstructed, as otherwise the device can overheat and be damaged.

## ■ Environment

The device may only be operated at the specified maximum ambient temperature and relative air humidity (non-condensing).

- Select the assembly location such that climatic limit values specified in the technical data are maintained.
- Only to be used in an environment with the contamination level specified in the technical data.
- Increased ambient temperature: When you are operating the device in a closed switch cabinet or together with other devices in a switch cabinet, the ambient temperature in the switch cabinet can be higher than the ambient temperature in the room. Only install the device in an ambient temperature in line with the maximum ambient temperature specified by the manufacturer:  $t_{max}$ .
- Mechanical stress: Install the device in a switch cabinet in such a way that rules out hazardous conditions due to severe mechanical stress.

## ■ **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.

## ■ **General safety instructions**

This device is operated by electricity. You must follow precisely the prescribed safety requirements for the voltage connections in this document.

Non-observance of these safety instructions can cause material damage and/or injuries.

- ▶ Only appropriately qualified personnel should work on this device or in its vicinity. The personnel must be thoroughly familiar with all the warnings and maintenance procedures outlined in this operating manual.
- ▶ The proper and safe operation of this device depends on proper handling during transportation, proper storage and assembly, and conscientious operation and maintenance procedures.
- ▶ Never start operation with damaged components.
- ▶ Only use the devices in accordance with this manual. In particular, observe all warnings and safety-related information.
- ▶ Any work that may be required on the electrical installation may only be carried out by personnel trained for this purpose.

## ■ **National and international safety regulations**

- Make sure that the electrical installation meets local or nationally applicable safety regulations.

## ■ **CE marking**

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

2014/30/EU (EMC)

Directive of the European Parliament and the council for standardizing the regulations of member states with regard to electromagnetic compatibility.

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.

2014/35/EU

Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits.

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

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The product can be used in the industrial sector.

- ▶ Interference immunity: EN 55024
- ▶ Emitted interference: EN 55032
- ▶ Reliability: EN 60950-1

**Warning!** This is a class A device. This device can cause interference in living areas, and in this case the operator may be required to take appropriate measures.

## ■ **FCC note:**

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; (2) this device must accept any interference received, including interference that may cause undesired operation.

Appropriate testing has established that this device fulfills the requirements of a class A digital device in line with part 15 of the FCC regulations.

These requirements are designed to provide sufficient protection against interference when the device is being used in a business environment.

The device creates and uses high frequencies and can also radiate these frequencies. If it is not installed and used in accordance with this operating manual, it can cause radio transmission interference. The use of this device in a residential area can also cause interference, and in this case the user is obliged to cover the costs of removing the interference.

#### ■ **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.

# Legend

The symbols used in this manual have the following meanings:

▶	Listing
□	Work step
■	Subheading

# 1 Installation

This chapter assists you to quickly install hardware and software. First, check the package contents and system requirements.

## 1.1 Package content

Before beginning with the installation, please check that nothing is missing from your package. Along with the device itself, the box contains the following accessories:

- ▶ IEC cable
- ▶ CAT5 LAN connector cable (green connectors)
- ▶ RS232 connector cable for the configuration interface
- ▶ 19" mounting brackets
- ▶ Product CD
- ▶ Printed Installation Guide
- ▶ Return form

If anything is missing, please take up immediate contact to your dealer or to the address on the delivery note supplied with your device.

## 1.2 System requirements

### 1.2.1 Configuring the devices

Computers that connect to a BAT-Controller WLC meet the following minimum requirements:

- ▶ Operating system with TCP/IP support, such as Windows®, Linux, BSD Unix, Apple Mac OS, OS/2.
- ▶ Access to the LAN via the TCP/IP protocol.

**Note:** For LANtools, you need a Windows operating system. For accessing WEBconfig, you need a web browser.

## 1.3 Status displays and interfaces

### ■ Meanings of the LEDs

**Note:** In addition to the LEDs, the LANmonitor shows far more information about the status of the devices.

In the following sections, we use different terms to describe the behavior of the LEDs:

- ▶ Blinking means, that the LED is switched on or off at regular intervals in the respective indicated color.
- ▶ Flashing means, that the LED lights up very briefly in the respective color and stays then clearly longer (10x longer) switched off.
- ▶ Inverse flashing means the opposite. Here the LED lights permanently in the respective color and is only briefly interrupted.
- ▶ Flickering means, that the LED is switched on at irregular intervals.

### 1.3.1 Status displays

The BAT-Controller WLCs offers the following status displays:

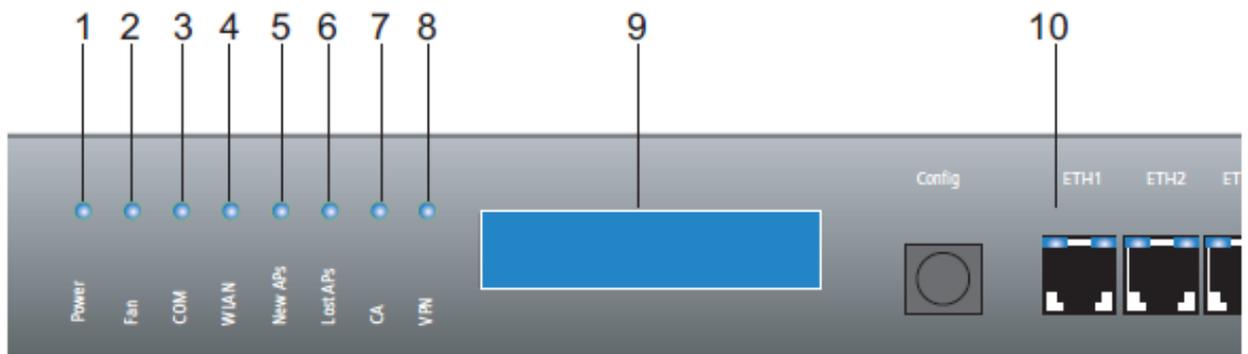


Figure 1: Status displays in WLAN Controller

1 Power

2 Fan

3 COM

4 WLAN

5 New APs

6 Lost APs

7 CA

8 VPN

9 LCD display

10 LEDs for the LAN interfaces ETH 1 to ETH 4 for data rate (orange, left) and connection status (green, right)

## ■ Power

This LED provides information on the operating state of the device.

Off		Device switched off
Green	Blinking	Self-test after power-up
Green	On (permanently)	Device operational
Red/green	Blinking alternately	No configuration password set in the device
Red	Blinking	Time limit for online connections reached

## ■ Fan

The Fan LED displays the status of the fan:

Green	On (permanently)	CPU temperature OK
Orange	On (permanently)	CPU temperature > 55°
Red	Blinking	Hardware defect of the fan or CPU temperature > 60°, additional acoustic signal

To avoid damage to the hardware, an acoustic signal complements this LED. If the fan blocks or the CPU temperature exceeds 60°, the device emits a pulsed acoustic signal.

## ■ COM

Connection status of the serial configuration interface:

Off		No login session
Green	On (permanently)	Serial configuration session logged on
Orange	Flickering	Data transmission during the configuration session

## ■ WLAN

Provides information on the operational state of the device and the connected Access Points. The WLAN display shows the following:

Red	On (permanently)	The BAT-Controller WLC is out of order, one of the following elements is missing: - Root certificate - Device certificate - Current time
Red	Blinking	The device is operational but a connection to an active access point is missing.
Green	On (permanently)	At least one active access point connected and authenticated.

**Note:** The display shows the reason for non-operability.

### ■ **New APs**

Provides information on new access points.

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Orange	Blinking	At least the BAT-Controller WLC found one new access point for authentication.
--------	----------	--

---

### ■ **Lost APs**

Provides information on lost access points.

---

Red	Blinking	The BAT-Controller WLC misses at least one expected BAT-Access Point.
-----	----------	---

---

### ■ **CA**

Internal CA status

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Off		CA off
Green	On (permanently)	CA on and ready
Red	On (permanently)	CA on, an error has occurred
Orange	On (permanently)	CA on and ready; request pending

---

### ■ **VPN**

Status of a VPN connection

---

Off		No VPN tunnel established
Green	Blinking	connection establishment
Green	Flashing	1 Connection
Green	Inverse flashing	Other connections
Green	On (permanently)	VPN tunnels are established

---

### ■ **LCD display**

The LC display has 2 lines of 16 characters each to show the following information in rotation:

- ▶ Device name
- ▶ Firmware version
- ▶ Device temperature
- ▶ Date and time
- ▶ CPU load
- ▶ Memory load
- ▶ Number of VPN tunnels

- ▶ Number of authenticated Access Points
- ▶ Number of expected Access Points (actively configured)
- ▶ Number of new found Access Points (without authentication)
- ▶ Number of missing, expected Access Points

If the WLAN LED constantly illuminates in red, the display also shows the following information:

- ▶ SNTP status
- ▶ SCEP status

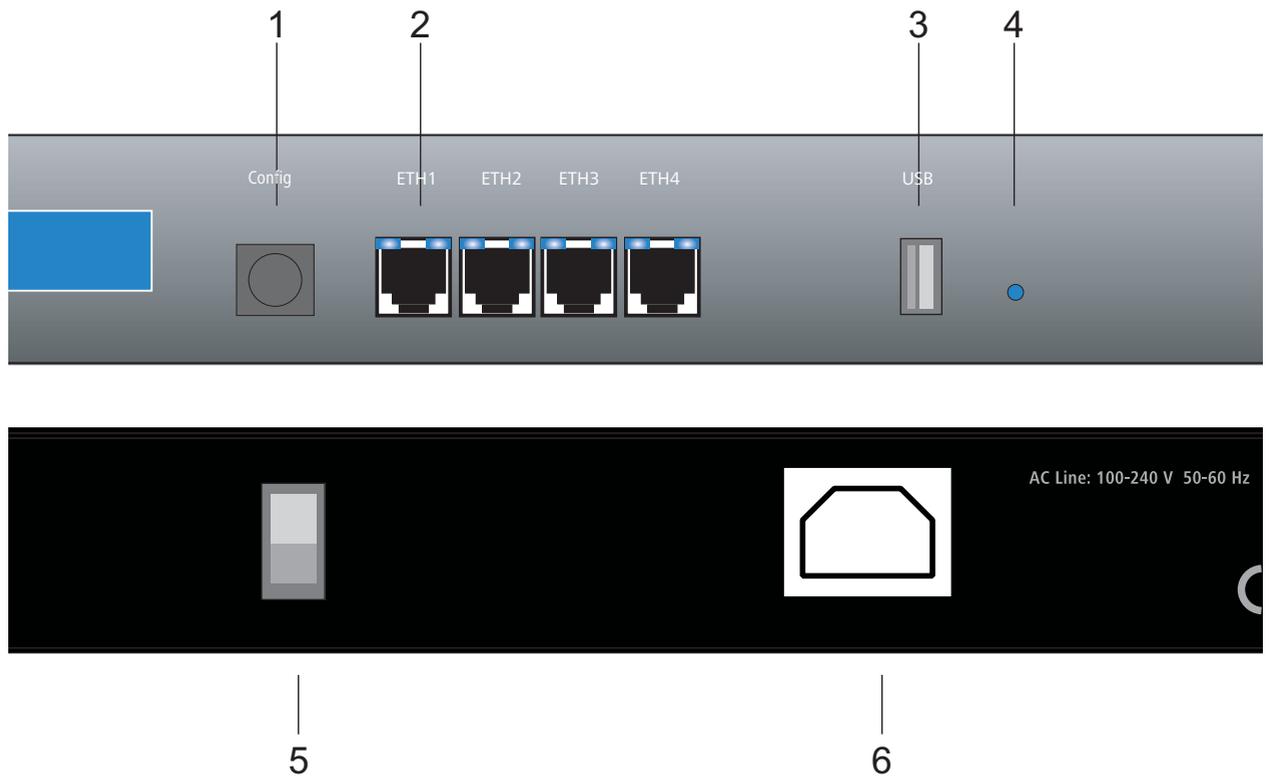
## ■ LEDs of the LAN interfaces ETH 1 to ETH 4

LAN connector status in the integrated switch:

Right: green	Off	No networking device attached
Right: green	On	Connection to network device operational (permanently)
Right: green	Flickering	Data traffic
Left: orange	Off	1000 Mbps
Left: orange	On	10/100 Mbps

## 1.3.2 Device connectors

The BAT-Controller WLCs offers the following interfaces:



*Figure 2: Device connectors in WLAN Controller*  
1 serial configuration port  
2 RJ 45 ports (ETH 1 to ETH 4) to connect to a LAN  
3 USB 2.0 interface  
4 Reset  
5 Power switch  
6 Power connection

### ■ **COM**

Connector for the serial configuration cable.

### ■ **ETH 1 to 4**

Ethernet sockets (10/100/1000Base-Tx) for connection to the LAN. The device supports 10 Mbps, 100 Mbps and Gigabit connections. The available transfer rate is detected automatically (autosensing). Each Ethernet socket has 2 LEDs (green and yellow):

### ■ **USB**

USB connector (USB host)

### ■ **Reset**

Reset button (see 'Reset button functions')

## ■ **Power switch**

Switch for detaching the device from the power supply.

**Note:** For an entire detachment from the power supply please unplug the power connection.

## ■ **Power connection**

Connector for the IEC cable for power supply unit.

## ■ **Reset button functions**

The reset button offers 2 functions, which are called by pressing the button for different lengths of time. 'Boot' restarts the device and 'reset' sets the device to the factory settings.

Pressing the button shortly restarts the device. Pressing the button 5 to 10 seconds sets the configuration to the factory settings. The LEDs on the device light up continuously. Once you release the switch the device reboots with the restored factory settings.

Some devices suit only for an installation in free accessible areas. The configuration is deleted by mistake, if a co-worker presses the reset button too long. Define the behavior of the reset button with a setting in WEBconfig (LCOS-Menübaum / Setup / Config):

- ▶ Ignore: The button shows no response to pressure.
- ▶ Boot only: Pressing the button restarts the device, no matter how long you press it.
- ▶ Reset-or-boot (standard setting): A short pressure on the button restarts the device. Pressing the button 5 to 10 seconds or longer reboots the device and resets the configuration to its factory settings. The LEDs on the device light up continuously.

Once you release the switch the device reboots with the restored factory settings.

**Note:** A reset causes the device to start with the default factory settings, any previous settings are lost. Any access points managed by this WLAN Controller lose their configuration, depending on the settings of the standalone operation. The standalone operation is described in the user manual.

**Note:** With the settings 'Ignore' or 'Boot only', you lock the device for being reset to the factory settings. If you lose the password for a device with this setting, there is no way to access the device. In this case use the serial communications interface to upload a new firmware version to the device. This action resets the device to its factory settings, which results in the deletion of the former configuration. Further information and help on the firmware upload via the serial communications interface is available in the Reference Manual.

**Note:** After resetting, the device starts completely without any configuration and any settings are lost. If possible, restore the current device configuration before resetting.

## 1.4 Hardware installation

Installing the BAT-Controller WLC involves the following steps:

- Mounting – mount the device in a 19”-cabinet.
- LAN – Firstly connect your BAT-Controller WLC to the LAN. Plug one end of the supplied network cable (green connectors) into an Ethernet port on the device (figure 2, position 2) and the other end into an available network connector socket in your local network. The Ethernet ports use autosensing to recognize the data rate (10/100/1000 Mbps) and the type (MBI/MBI-X) of attached network devices. You can connect devices of different speeds and types in parallel.
- Configuration interface – optionally, connect the device directly to the serial interface (RS-232, V.24) of a PC. Use the included serial configuration cable for this connection. Connect the configuration interface (figure 2, position 1) to an available serial interface on the PC.
- Supply power and switch on – supply power to the device by using the power connection (figure 2, position 6). Afterwards, switch it on by using the switch located on the rear panel (figure 2, position 5).

## 1.5 Software installation

Place the product CD into your drive.

Start the files for the installation from the directory \Firmware and Tools\LANtools:

- ▶ HAC-LANconfig-<version>.exe LANconfig is the Windows configuration program for Hirschmann wireless devices. Use WEBconfig alternatively or in addition via a web browser.
- ▶ HAC-LANmonitor-<version>.exe Monitor your wireless devices with LANmonitor a Windows computer.
- ▶ WLANmonitor enables the observation and surveillance of wireless LAN networks. Furthermore, the WLANmonitor shows the WLAN controller, access points, and the clients connected to the access points. With the functions Rogue AP Detection and Rogue Client Detection, the WLANmonitor shows foreign access points and clients.

**Note:** The installation file for the LANmonitor installs the WLANmonitor automatically on your PC.

## 2 Configuration

### 2.1 Searching for and configuring the device

Configuring the BAT-Controller WLC involves the following steps:

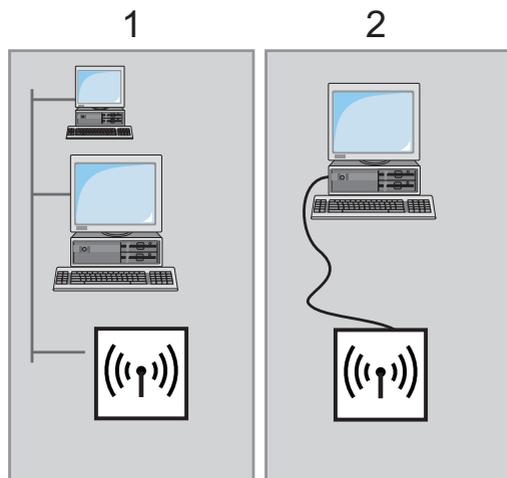


Figure 3: Searching for and configuring the device  
1 Via the local network (LAN)  
2 Via the serial configuration interface

#### 2.1.1 Configuration with LANconfig

Start LANconfig.

**Note:** If LANconfig searches for the device without avail, check the network connection and update the IP address of the configuration computer. You can do that, for example, via the command line with `ipconfig/renew`, by reactivating the network connection, or by restarting the computer. Then start the search in LANconfig again.

**Note:** Potentially, an activated "Internet connection firewall" or any other active personal firewall bars the LANconfig from detecting devices in the LAN. Deactivate the firewall while you carry out the configuration if LANconfig searches for the unconfigured devices without avail.

The Basic Settings Wizard also starts by itself. It sets the following parameters depending on the input of the user:

- ▶ TCP/IP and DHCP settings
- ▶ Restricting access to the configuration
- ▶ DSL settings

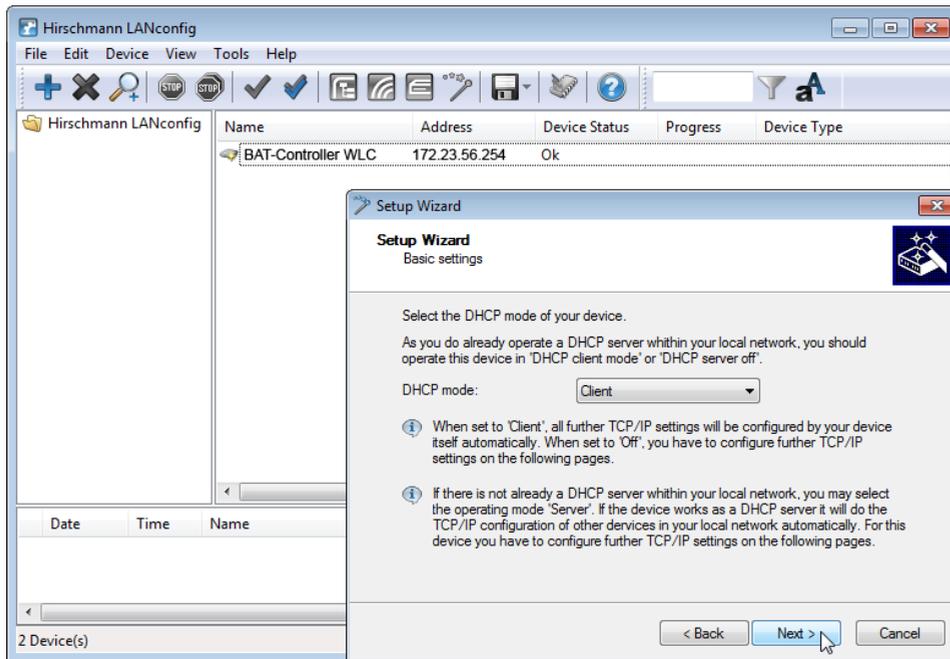


Figure 4: Basic settings wizard

**Note:** The credentials in the ex-factory state are "admin" as user name and "private" as password. Change the predefined credentials at 1. login if possible.

**Note:** At start up, the BAT-Controller WLC needs a time information (date and time) for the widely automatic configuration of the Access Points. The device uses the time for the validation of the required certificates. To set the time in the device, start LANconfig and click the entry for the WLAN-Controller with the right-hand mouse key. Then select 'Set date/time' from the context menu.

As soon as the WLAN-Controller has valid time information, the generation of the certificates (root and device certificate) starts. Once the necessary certificates have been generated, the BAT-Controller WLC indicates that the device is operational and the WLAN LED blinks red.

**Note:** To configure access points automatically with the BAT-Controller WLC you need a DHCP server in your LAN.

## 2.1.2 Configuration with WEBconfig

As an alternative, start the web browser to carry out the configuration. The behavior and accessibility of the devices depend on different circumstances:

- ▶ Are there active DHCP server and DNS serve available in your LAN?
- ▶ Share these two server processes the assignment of IP addresses to symbolic names?

## ■ DHCP – client or server?

Following power-on, unconfigured devices first check whether a DHCP server is already active in the LAN. According to the situation, the device enables its own DHCP server or enables the DHCP client mode. In the second operating mode, the device retrieves an IP address for itself from a DHCP server in the LAN.

## ■ Network without a DHCP server

In a network without a DHCP server, unconfigured devices enable their own DHCP server service when switched on. Afterwards, they assign IP addresses, netmask, and DNS server to other computers in the LAN, if these are set for automatic retrieval of IP addresses – auto DHCP. In this constellation, you reach the device from each computer with active auto-DHCP function. Enter 'Hirschmann' or the IP address '172.23.56.254' in your web browser.

**Note:** With the factory settings and an activated DHCP server, the device forwards the incoming DNS requests to the internal web server. By this function, you easily set up an unconfigured device by entering any name into a web browser.

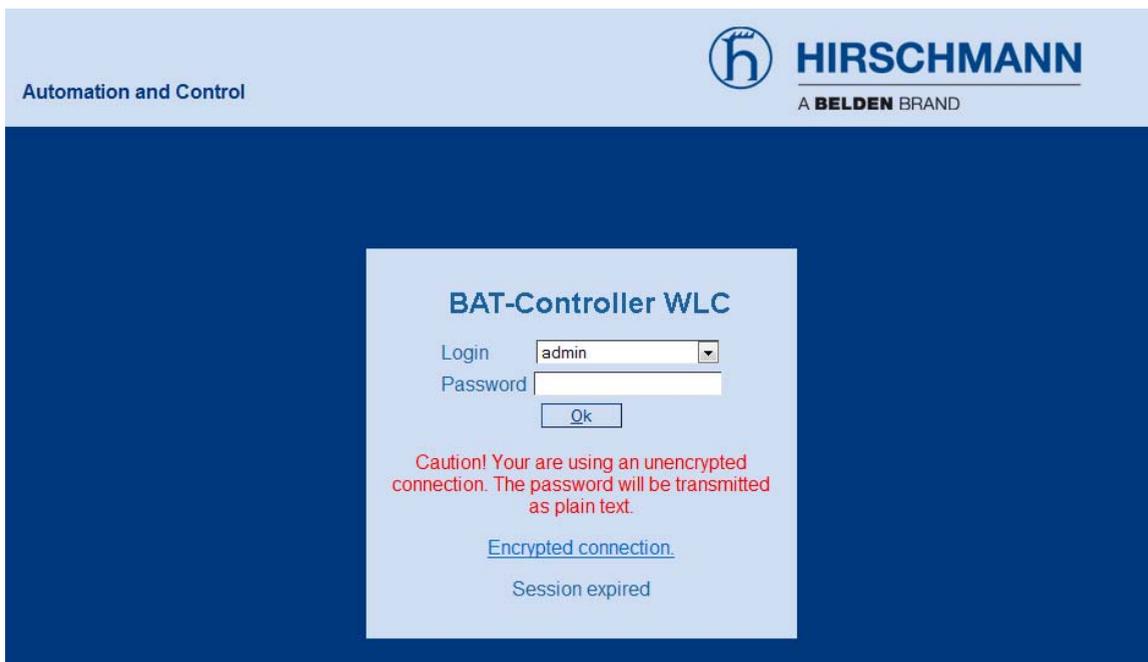


Figure 5: Login screen for configuration with WEBconfig

**Note:** The credentials in the ex-factory state are "admin" as user name and "private" as password. Change the predefined credentials at 1. login.

If you work with static IP addresses in your LAN, you can reach the BAT-Controller WLC by the last IP address in the subnet:

- ▶ In an a-class net (IP netmask 255.0.0.0), you reach the device by the IP address x.255.255.254.
- ▶ In a b-class net (IP netmask 255.255.0.0), you reach the device by the IP address x.x.255.254.
- ▶ In a c-class net (IP netmask 255.255.255.0), you reach the device by the IP address x.x.x.254.

## ■ Network with DHCP server

If a DHCP server is active in the LAN, an unconfigured BAT-Controller WLC disables its own DHCP server. Afterwards, it switches to DHCP client mode and retrieves an IP address from the DHCP server in the LAN. This IP address is initially unknown and accessing the device hangs on the name resolution:

If the LAN also has a DNS server for name resolution and this server communicates the IP address/name assignment to the DHCP server, you reach the device under name "Hirschmann-<MAC address>", e.g. "Hirschmann-00a057xxxxx".

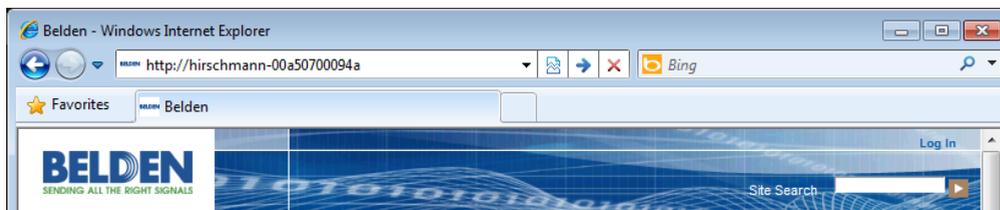


Figure 6: Access via WEBconfig in a network with DHCP server

**Note:** You find the MAC address on a sticker on the base of the device.

If there is no DNS server in the LAN, or if it has no connection to the DHCP server, the device is only reachable by different ways:

- ▶ Detect the IP address of the Hirschmann-device with appropriate tools. Use this IP address to connect to the device.
- ▶ Use LANconfig.
- ▶ Use a computer with a terminal program via the serial communication interface.

**Note:** At startup, the BAT-Controller WLC needs a time information (date and time) for the widely automatic configuration of the access points. The device uses the time for the validation of the required certificates. To set the time in the device click 'Set Date and Time' in the 'Extras' section in WEBconfig.

As soon as the WLAN-Controller gets valid time information, it starts the construction of the certificates. Once the device generated the necessary certificates, the BAT-Controller WLC indicates that it is operational and the WLAN LED blinks red.

### **2.1.3 Configuration via the serial interface**

If there is no possibility to establish LAN access to the device, you connect the computers via the serial configuration interface. Now, configure the device with LANconfig or a terminal program.

**Note:** Enter the parameters separate via a command line interface when you use a terminal program. The most convenient option here is to use LANconfig.

## **2.2 The Setup Wizards**

**Note:** When starting the installation for any device, run the Setup Wizard for the Basic Settings and then run the Check security settings Setup Wizard.

**Note:** If you alter the WLAN encryption settings (for example, WPA) in the device when carrying out the configuration via the WLAN interface with the aid of the Setup Wizards, also alter the WLAN encryption settings for the WLAN card of the configuration computer.

### **2.2.1 Setup wizards under LANconfig**

When using LANconfig, continue with the configuration by starting the Setup Wizards (e.g. for basic settings or WLAN). Choose your device from the selection window and select the button Setup Wizard or use the menu bar to access Tools E Setup Wizard

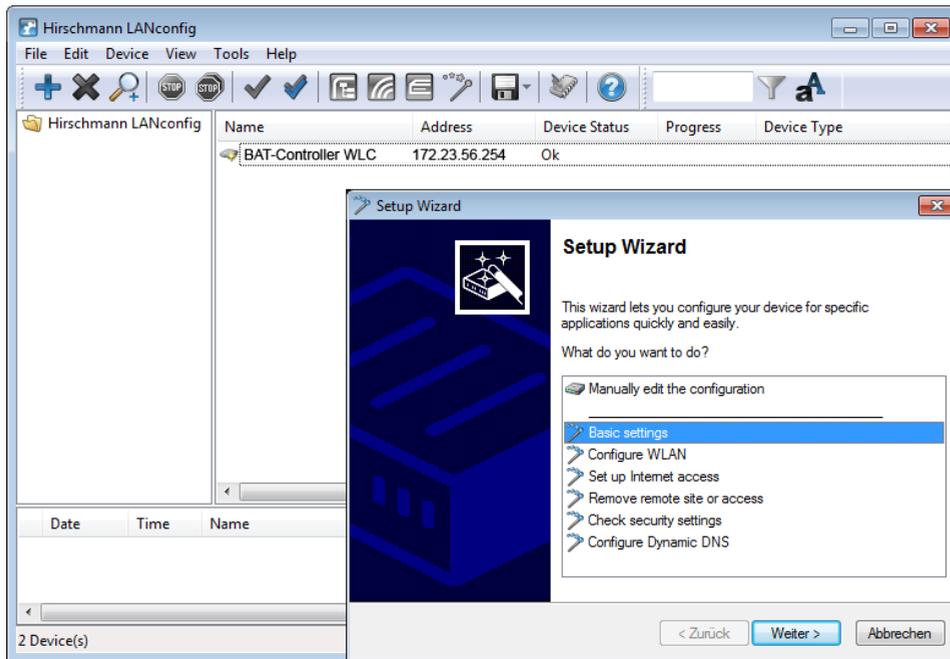


Figure 7: Setup wizards under LANconfig

## 2.2.2 Setup wizards under WEBconfig

When using WEBconfig, also continue with the configuration by starting the Setup Wizards (for example, for Internet connections, coupling LANs, or RAS). To do this, click the corresponding entry in the Web configuration.



Figure 8: Setup wizards under WEBconfig

## **2.3 TCP/IP settings for access points**

The access points need an IP address to connect to the WLAN-Controller. The access point has a static, internal IP address or you allocate an IP address to the device via the DHCP server.

## **2.4 TCP/IP settings for PC workstations**

It is fundamental to assign the correct addresses to the devices in the LAN. Also, these computers have to know the IP addresses of 2 central stations in the LAN:

- ▶ Standard gateway – receives the packets which are addressed to computers outside of the local network
- ▶ DNS server – translates network and computer names into their actual IP addresses.

The WLAN Controller fulfills the functions of a standard gateway and also of a DNS server. It also operates as a DHCP server, which automatically assigns IP addresses to the computers in the LAN.

# A Appendix

## A.1 Performance and characteristics

Connectors	Ethernet LAN	4 x 10/100/1000 Base-TX, Autonegotiation, MBI/MBI-X
	WAN	Define the ethernet ports as WAN connectors optionally.
	USB	USB 2.0 Host Port (high speed: 480 Mbps) for connecting a USB printer and for future extensions
	Configuration	Serial V.24/RS-232 outband interface with Mini-DIN8 connector
	Power supply	Internal power supply unit (110-230 V)
Housing	Robust metal housing, 19" 1 HU, (435 x 45 x 207 mm) with mounting brackets, network connectors on the front	
Environment/ Temperature	5 °C to +40 °C at 80% max. humidity (without condensing)	

## A.2 Connector wiring

### A.2.1 Ethernet interface 10/100/1000 Base-TX

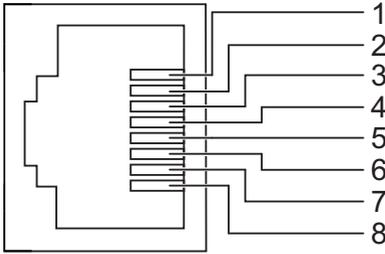
Connector	Pin	Fast Ethernet	Gigabit Ethernet
	1	T+	BI_DA+*
	2	T-	BI_DA-
	3	R+	BI_DB+
	4		BI_DC+
	5		BI_DC-
	6	R-	BI_DB-
	7		BI_DD+
	8		BI_DD-

Table 1: 8-pin RJ45 sockets (ISO 8877, EN 60603-7)

## A.2.2 Configuration interface (outband)

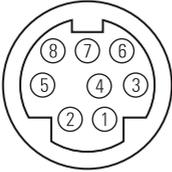
Connector	Pin	Line
	1	CTS
	2	RTS
	3	RxD
	4	RI
	5	TxD
	6	DSR
	7	DCD
	8	DTR
	U	GND

Table 2: 8-pin Mini DIN socket

## A.3 Order number

Name	Order number
BAT-Controller WLC25	942 034-001
BAT-Controller WLC50	942 034-002
BAT-Controller WLC100	942 034-003
BAT-Controller WLC200	942 034-004
BAT-Controller WLC500	942 034-005
BAT-Controller WLC1000	942 034-006

## **B 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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