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FL WLAN 1100/1101

User manual

UM EN FL WLAN 1000

User manual

FL WLAN 1100/1101

2017-05-03

Designation: UM EN FL WLAN 1000

Revision: 01

Order No.:   —

This user manual is valid for:

Designation	Order No.
FL WLAN 1100	2702534
FL WLAN 1101	2702538

Please observe the following notes

User group of this manual

The use of products described in this manual is oriented exclusively to:

– Qualified electricians or persons instructed by them, who are familiar with applicable standards and other regulations regarding electrical engineering and, in particular, the relevant safety concepts.

– Qualified application programmers and software engineers, who are familiar with the safety concepts of automation technology and applicable standards.

Explanation of symbols used and signal words

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

There are three different categories of personal injury that are indicated with a signal word.

DANGER   This indicates a hazardous situation which, if not avoided, will result in death or serious injury.

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

CAUTION   This indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

This symbol together with the signal word **NOTE** and the accompanying text alert the reader to a situation which may cause damage or malfunction to the device, hardware/software, or surrounding property.

This symbol and the accompanying text provide the reader with additional information or refer to detailed sources of information.

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Table of Contens

1 Technical description

ℹ️ Unless otherwise expressly stated, all information provided in this user manual always applies to both the FL WLAN 1100 and the FL WLAN 1101.

1.1 General description

Robust, compact WLAN module with integrated antennas:

– Turnkey solution with integrated antenna and wireless module in a single device
– Space savings in the control cabinet, optimized for mounting directly on machines, mobile units or control cabinets
– Fast and reliable wireless communication, thanks to powerful MIMO antennas
– Quick and easy connection, thanks to single-hole mounting
– Extremely robust housing, shock-proof according to IK08
– Operation as a WLAN access point, client or repeater
– Supports WLAN 802.11 standards a, b, g, and n
– Operation in the 2.4 GHz and 5 GHz band

Figure 1-1   FL WLAN 1100

1.2 FL WLAN 110x country registrations

1.2.1 FL WLAN 1100

The FL WLAN 1100 is a WLAN device with access point and client functionality. The device uses the WLAN standard in the license-free 2.4 GHz and 5 GHz bands which are free of charge. It is approved for use in Europe.

$\mathbf{i}$	An up-to-date list of additional country registrations can be found in the e-shop at phoenixcontact.net/product/2702534.

$\mathbf{i}$	Make sure you observe the regulations of the relevant regulatory body for device operation in all countries.

Approvals for other countries are available on request.

1.2.2 FL WLAN 1101

$\mathbf{i}$	The FL WLAN 1101 device, Order No. 2702538, can be used in the USA and Canada. It does not have CE approval and may not be operated in Europe. It is only available for export.

Furthermore, the following approvals have been performed and passed for the FL WLAN 1101 device:

– FCC/CFR 47, Part 15 (USA)
– RSS 210 (Canada)

1.2.2.1 FCC information

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

NOTICE:

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

NOTICE:

This device complies with Part 15 of the FCC Rules and with Industry Canada licence-exempt RSS standard(s).

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.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

    1   l'appareil ne doit pas produire de brouillage, et

    2   l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

NOTICE:

Changes or modifications made to this equipment not expressly approved by Phoenix Contact GmbH & Co. KG may void the FCC authorization to operate this equipment.

Radiofrequency radiation exposure Information:

This equipment complies with FCC and IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

Ce transmetteur ne doit pas etre place au meme endroit ou utilise simultanement avec un autre transmetteur ou antenne.

1.3   Firmware

Table 1-1

Firmware version	Functions
FW 1.0x	Initial version

ℹ️ Additional information on the latest firmware changes for the respective product can be found in the e-shop at phoenixcontact.com or at phoenixcontact.net/product/2702534.

2 Mounting/antenna configuration
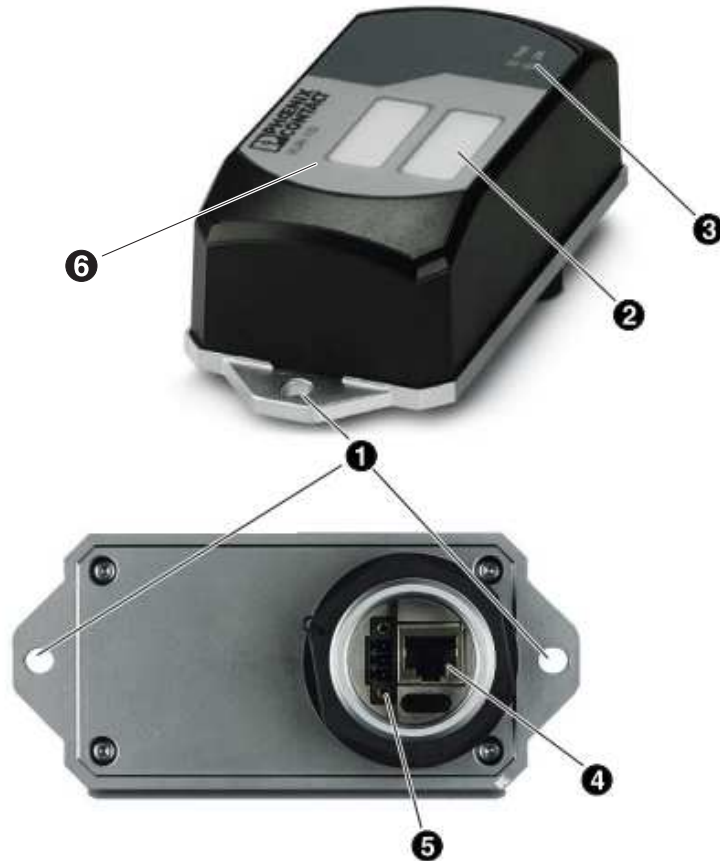
2.1 Connections and operating elements

Figure 2-1   Connections and operating elements of the device

1. Mounting holes
2. Marking fields
3. Status and diagnostic LEDs
4. Ethernet connection in RJ45 format with 100 Mbps
5. Connections for supply voltage and one digital input via COMBICON
6. Two integrated WLAN antennas

2.1.1 Housing dimensions

The outside dimensions of the FL WLAN 1100 and FL WLAN 1101 devices are 62.8 mm x 36.5 mm x 113.2 mm (width x height x depth).
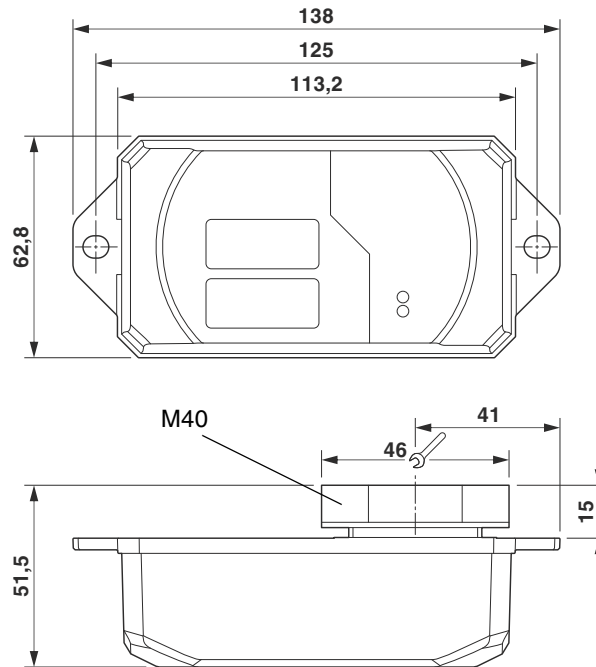

Figure 2-2   Housing dimensions and distances
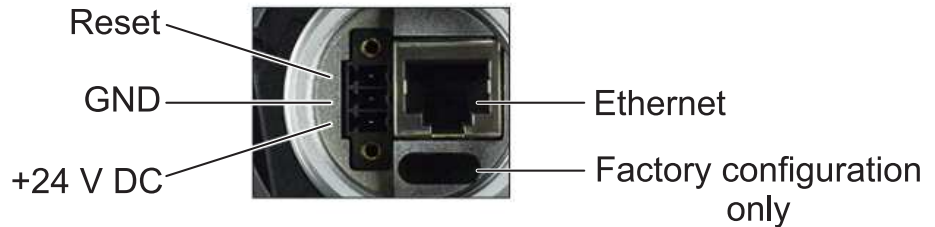
2.1.2 Electrical connection

Figure 2-3   Connection of the supply voltage, Ethernet, and the reset input

The supplied connector is an FMC 1,5/ 3-STF-3,5 (Order No. 1966101).

A cable with a cross section of 0.75 mm^2 and a trapezoidal or square crimped ferrule that is 10 mm long is recommended.

Always use the appropriate conductor cross section and ferrules to ensure that the cable is fixed securely.

Table 2-1   Connection data for the connector

Conductor cross section solid/stranded min.	0.2 mm^2
Conductor cross section solid/stranded max.	1.5 mm^2
Conductor cross section stranded with ferrule without plastic sleeve min.	0.25 mm^2
Conductor cross section stranded with ferrule without plastic sleeve max.	1.5 mm^2
Conductor cross section stranded with ferrule with plastic sleeve min.	0.25 mm^2
Conductor cross section stranded with ferrule with plastic sleeve max.	0.75 mm^2
Conductor cross section AWG min.	24
Conductor cross section AWG max.	16
Conductor cross section AWG min. according to UL/CUL	24
Conductor cross section AWG max. according to UL/CUL	16

2.1.2.1   Assignment of the RJ45 Ethernet connectors

Table 2-2   Pin assignment of RJ45 connectors

Pin number	10Base-T/10 Mbps	100Base-T/100 Mbps
1	TD+ (transmit)	TD+ (transmit)
2	TD- (transmit)	TD- (transmit)
3	RD+ (receive)	RD+ (receive)
4	-	-
5	-	-
6	RD- (receive)	RD- (receive)
7	-	-
8	-	-

2.1.2.2   Grounding of the device ⏚

Grounding protects people and machines against hazardous voltages. To avoid these dangers, as far as possible, correct grounding, taking the local conditions into account, is vital.

Functional grounding of the device:
The device must be connected to ground (functional earth ground) via the metal part of the housing. If this is not possible, ensure a low-resistance ground connection (functional earth ground) for the shielding of the Ethernet cable.

FL WLAN 1100 and FL WLAN 1101: it is recommended that the base plate of the device is grounded by connecting the mounting screws to a grounded metal surface (functional earth ground/FE).

If this is not possible, e.g., because the device is installed on a plastic surface, you must make sure that the Ethernet cable is properly shielded. This is particularly important if the housing is not grounded by other means, e.g., via the base plate.

2.1.3 Mounting the device on a level surface

The devices in the FL WLAN 110x series are designed for external mounting on control cabinets, machines, automatic guided vehicle (AGV) systems or similar equipment.

To mount the device on a level surface, a bore hole is required for the mounting flange (40 mm in diameter). The nut must be tightened (8 - 10 Nm maximum) to ensure a tight seal. The device can be additionally secured to the surface with two screws (M6). When using this additional screw connection, make sure that the entire system is sealed tight.

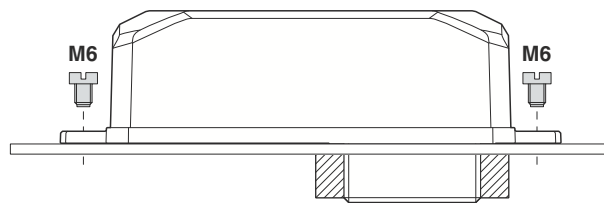The device can be installed in any mounting position.

Figure 2-4   Mounting on a level surface
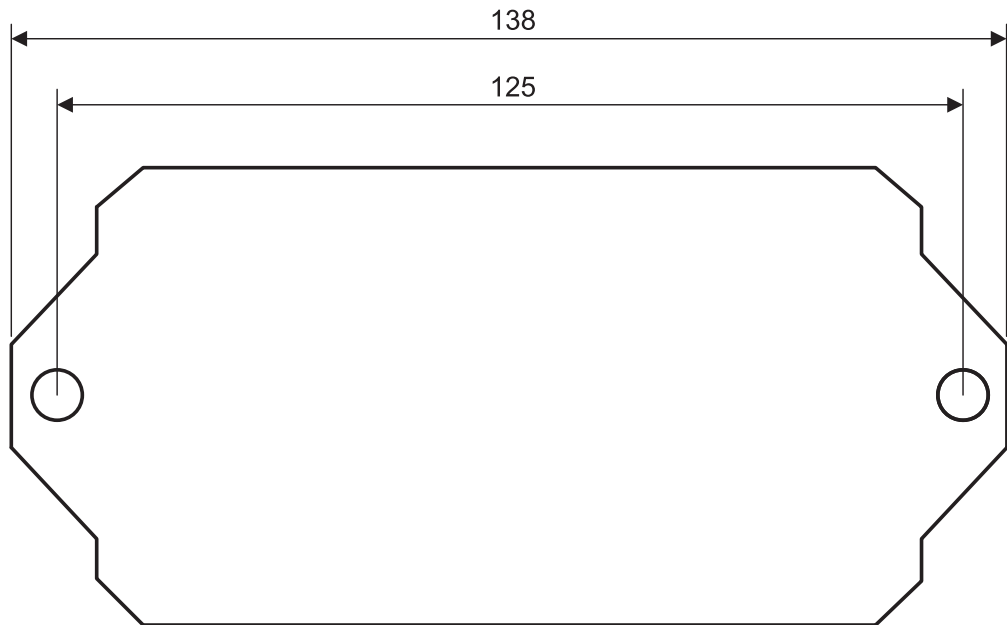
2.1.3.1   Drill hole template

Figure 2-5   Drill hole template (original size)

2.1.4 Mounting the device with cable feed-through and seal

When mounting the device outside the control cabinet (e.g., on a mounting bracket), a cable feed-through with seal can be used to seal the connection dome for the supply line. The metal cable feed-through (FL M32 ADAPTER, Order No. 2702544) screws into the M32 internal thread of the FL WLAN 1100 connection dome. The FL WLAN 1100 is therefore sealed to IP54 even outdoors.
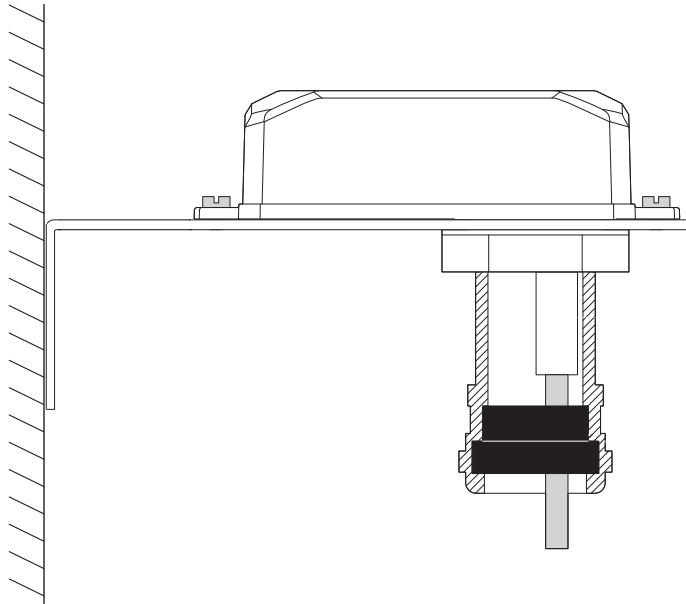

Figure 2-6   Mounting on a mounting bracket. If the device is not mounted directly on a control cabinet, use the FL M32 ADAPTER (Order No. 2702544) to create the seal.

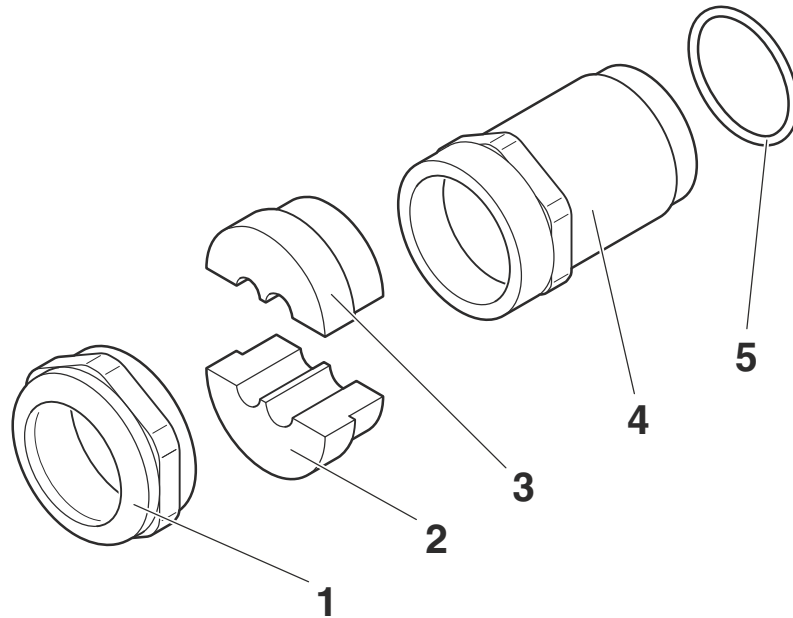### 2.1.4.1 Handling the FL M32 ADAPTER

Figure 2-7   Handling the FL M32 ADAPTER

2.1.4.2 Tightness of seal, retention, and strain relief (in accordance with EN 50262)

Tightening torque (double nipple): 15 Nm for M32

Tightening torque (pressure screw): 20 Nm for Pg29

Tightness of seal for 7 mm hole pattern and 8.5 mm for cable:

IP65 protection is achieved in accordance with DIN EN 60529(2014.09) if the difference between the cable diameter and hole is less than 10%.

If both are the same, IP68 can be achieved up to 10 bar with defined "retention" in accordance with EN 50262 Class A. The tightness of seal and strain relief depend on the cable used.

2.1.4.3 Mounting taking the internal antennas into consideration

The FL WLAN 1100 has two internal antennas which transmit through the plastic housing. This must be taken into consideration when mounting the device: in order to ensure that the WLAN signal can be transmitted via the built-in antennas, the device must not be installed inside control cabinets or other metal housings.

> The devices in the FL WLAN 110x series have internal antennas for WLAN communication. The device should therefore be mounted on the outside of metal objects so as to ensure that the WLAN signal can be transmitted.

In order to optimize the device's performance with respect to transmission, the same rules that apply when mounting antennas should be observed. An important criterion here is the lateral distance from conductive surfaces. These surfaces can influence the radio propagation (directional characteristics of the antenna) due to reflections and interference.
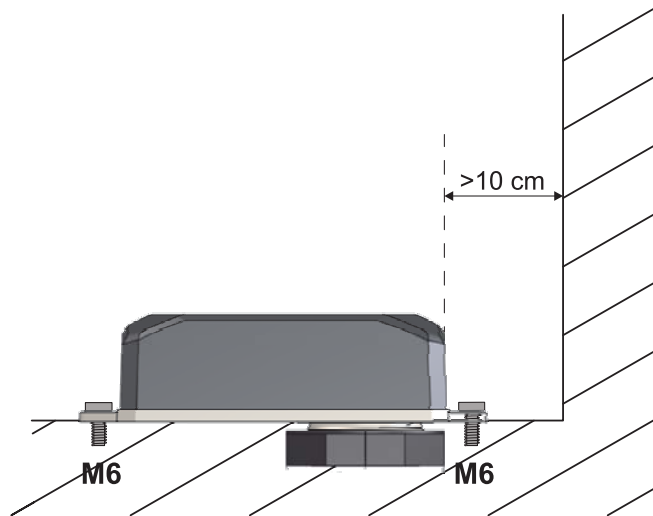

Figure 2-8   Mounting distance from lateral conductive surfaces

Due to its internal antennas, the device should not be located too close to conductive objects, if possible. Keep a distance of more than 100 mm, if possible. Smaller distances are possible, but they may adversely affect transmission.

3 Startup and configuration

3.1 Delivery state/factory settings

By default upon delivery or after the system is reset to the factory settings, the following functions and properties are available:

– The user name is: "admin"
– The password is: "private"
– All IP parameters are deleted. The device has no valid IP address
– BootP is activated

Installation notes

The product may only be installed, started up, and maintained by qualified specialist personnel who have been authorized to do so by the system operator. An electrician is someone who because of their education, experience, and instruction and their knowledge of relevant standards is able to assess all planned activities and recognize any possible dangers. Specialist personnel must read and understand this document and follow the instructions. You must comply with the applicable national regulations regarding the operation, function tests, repair, and maintenance of electronic devices.

> **NOTE: Statement regarding RF emission**
> This device should be operated with a minimum distance of 20 cm between the emitter/antenna and your body.

3.1.1 Meaning of diagnostic and status indicators

The device indicates the following information via the LEDs. Additional diagnostic options can be accessed via the CLI or web-based management.

Table 3-1   Meaning of diagnostic and status indicators

Des.	Color	Function	
		Access point	Client
US	Green (on)	Supply voltage is present	
WLAN	off	WLAN interface deactivated	
	Blue (on)	WLAN interface activated	WLAN interface connected*
	Violet (on)	Automatic channel selection (only with DFS)	Scanning for access point
	Green (on)	WLAN interface in Idle mode if radar check (DFS) is active at 5 GHz.	WLAN interface in Idle mode

*WLAN connection established (blue):

Whether data transmission occurs depends on whether the passwords and certificates are valid. A WLAN connection can therefore exist even if data cannot be transmitted. If WLAN authentication fails, this is indicated in the log file.

3.1.2 General sequence for startup

During startup, supply the device with operating voltage (nominal value: 24 V DC). The assignment of the connector is shown in Unknown source of cross-reference.

In order to start up the device, the device must first be assigned an IP address. This is done via BootP. The IP address is allocated by a corresponding server in the network or a PC tool (see "Assigning the IP address using IPAssign.exe" on page 21 or "Assigning the IP address using IPAssign.exe" on page 21). The device can then be configured via the web interface (WBM) or the Command Line Interface (CLI).

In any case, the device must be connected via its Ethernet interface and an appropriate cable (RJ45 connector) to the device used for configuration.

By default upon delivery (factory settings), the WLAN interface is deactivated for security reasons. Configuration via the WLAN interface is therefore not possible in this state.

The device can be configured by setting all parameters via the web interface (see "Startup via the web interface" on page 24) or the Command Line Interface (CLI). In order to do this, the device must first be assigned an IP address. The factory default setting is BootP.

3.1.3 Assigning the IP address via BootP (with IPAssign)

This section explains IP address assignment using the "IP Assignment Tool" Windows software (IPAssign.exe). This software can be downloaded free of charge at phoenixcontact.net/product/2702534. The tool can also be found under "Help & Documentation" on the web page for the device, where it can be started directly.

Notes on BootP

During initial startup, the device sends BootP requests without interruption until it receives a valid IP address. As soon as it receives a valid IP address, the device stops sending BootP requests.

After receiving a BootP reply, the device no longer sends BootP requests. Following a restart, a device that was previously configured sends three BootP requests; if these requests are not answered, the device starts with the IP address that was last assigned via BootP. After the factory settings are restored, the device sends BootP requests until they are answered.

Requirements

The device is connected to a computer with a Microsoft Windows operating system.

3.1.4 Assigning the IP address using IPAssign.exe

Step 1: downloading and executing the program

You can either load the tool from the Internet or from the device itself.

From the Internet:

• On the Internet, select the link phoenixcontact.net/products.
• Enter IPASSIGN in the search field, for example.

The BootP IP addressing tool can be found under "Configuration file".
• Double-click on the "IPAssign.exe" file.
• In the window that opens, click on the "Run" button.

Step 2: "IP Assignment Wizard"

i	For the device to send BootP requests, you must switch the device back to BootP on the "Quick setup/IP Address assignment" web page.

The program opens and the start screen of the addressing tool appears.

The program is mostly in English for international purposes. However, the program buttons change according to the country-specific settings.

The start screen displays the IP address of the PC. This helps when addressing the device in the following steps.
• Click on the "Next" button.

Step 3: "IP Address Request Listener"

All devices sending a BootP request are listed in the window which opens. These devices are waiting for a new IP address.
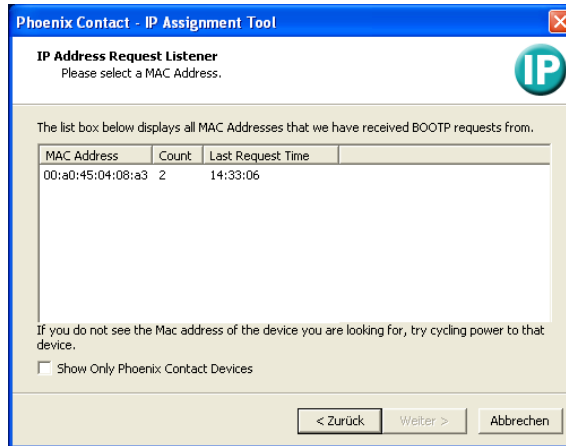
Figure 3-1   "IP Address Request Listener" window

In this example, the device has MAC ID 00.A0.45.04.08.A3.
• Select the device to which you want to assign an IP address.
• Click on the "Next" button.

Step 4: "Set IP Address"

The following information is displayed in the window which opens:
– IP address of the PC
– MAC address of the selected device
– IP parameters of the selected device
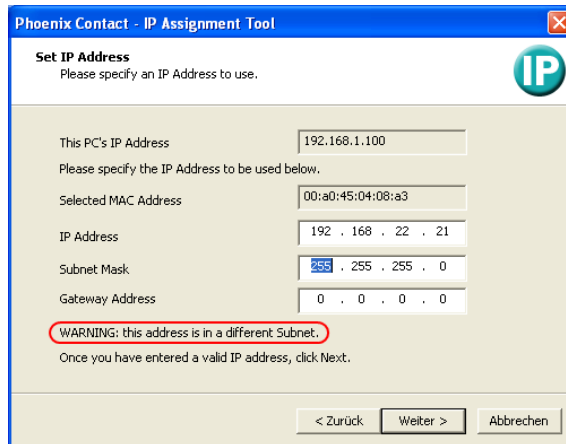   (IP address, subnet mask, and gateway address)
– Any incorrect settings

Figure 3-2   "Set IP Address" window with incorrect settings

• Adjust the IP parameters according to your requirements.

If inconsistencies are no longer detected, a message appears indicating that a valid IP address has been set.

• Click on the "Next" button and perform a voltage reset.

Step 5: "Assign IP Address"

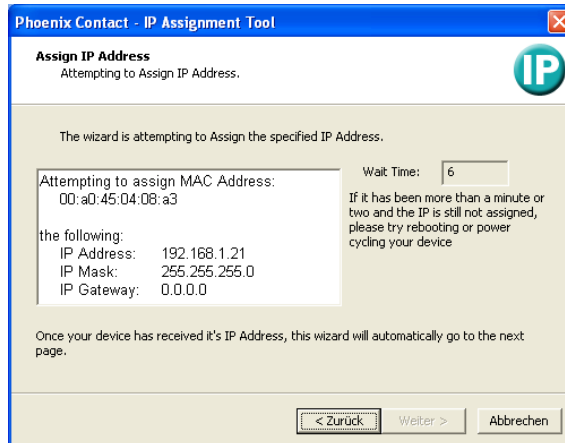The program attempts to transmit the set IP parameters to the device.

Figure 3-3   "Assign IP Address" window

Following successful transmission, the next window opens.

Step 6: completing IP address assignment

The window that opens informs you that IP address assignment has been successfully completed. It gives an overview of the IP parameters that have been transmitted to the device with the MAC address shown.

To assign IP parameters for additional devices:
• Click on the "Back" button.

To exit IP address assignment:
• Click on the "Finish" button.

3.1.5   Reset to the factory settings

The device has a digital input. This digital input on the device is used exclusively to reset the device to the factory settings.
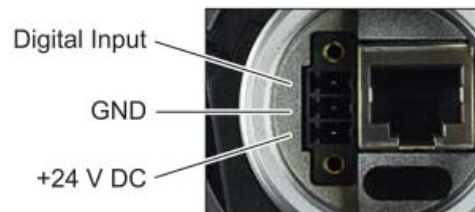

Figure 3-4   Connection of the supply voltage and the digital input on the bottom of the device

3.1.5.1   Detailed instructions for resetting the device to the factory settings:

Connect the device to the supply voltage.

As soon as the device has started up and is ready for operation, you have 1 minute to reset the device to the factory settings. To do this, the digital input must be supplied with voltage equivalent to the operating voltage. The operating voltage must be applied at the digital input for at least 5 seconds. The device is then reset to the factory settings and restarted.

3.2 Startup via the web interface

> **i** WBM of the device is optimized for Mozilla Firefox.

3.2.1 General information in the web interface

3.2.1.1 Web interface icons

There are a few icons at the top of the web page (marked in red in the graphic below), which provide an overview of important device functions.

Figure 3-5   Web page with overview icons

Meaning of the individual icons:

Table 3-2   Meaning of the icons

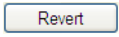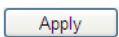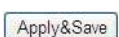| Icon	Meaning
	The WLAN interface is deactivated.
	The device is in "Client" mode and there is no WLAN connection to an access point at present.
	The device is in "Client" mode and connected to an access point. The bars indicate the signal strength of the access point for reception. One bar: poor link quality Two bars: good link quality Three bars: optimum link quality Four bars: excellent link quality
Connected clients: 1	The device is in "Access Point" mode and connected to a number of clients. The number of connected clients is displayed. If "0" is displayed, there is no connection to a client.

Table 3-2   Meaning of the icons [...]

Icon	Meaning
	Connection status: connected Indicates whether the PC with the browser has an active connection to the device.
	Connection status: disconnected During a configuration change or in the event that a configuration change has been made via WLAN and the connection has been disabled.
	An administrator is logged into the device. The icon also acts as the logout button.
	An administrator is not logged in at present. The icon also acts as the login button.
	The active configuration differs from the saved configuration for the device. To save the active configuration, simply click on the icon.

Web interface buttons

Meaning of the individual buttons:

Table 3-3   Meaning of the buttons

Icon	Meaning
Revert	This button deletes the entries made since the last saved entry.
Apply	This button applies the current settings, but does not save them.
Apply&Save	This button applies and saves the current settings.

3.2.2   Quick Setup

The "Quick Setup" feature on the web page allows you to quickly configure the minimum requirements of a WLAN network. You are guided through the individual menus by a wizard. The procedure is described below.

Establishing a connection to the device

• Connect the device to the supply voltage and connect it to the PC via an Ethernet cable.
• In order to address the device, an IP address is assigned to it via BootP. To do this, an appropriate tool is needed on the PC (for details, see "Assigning the IP address via BootP (with IPAssign)" on page 21).
• Using a browser, go to the assigned IP address.
• In web-based management, select "Quick Setup".