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## AC WLAN

Operating Manual



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## Safety Informations



Only authorized professional electricians are allowed to work on the 230 V power supply!



Potential risk of death due to electric shock!

### Disconnect the power supply before performing any installation tasks!

Follow the currently valid standards and directives in order to fulfill the general safety regulations for telecommunications equipment and to prevent interference. In combined systems, make sure there is shock protection for the high voltage section. According to DIN VDE 0620, protection against shock must also be guaranteed after you have removed the shared cover (this is not always the case in older systems).

When setting up combined systems, make sure to maintain the minimum distance of 10 mm between data and telecommunication lines and high-voltage power cables.

Working on existing data networks may require the consent of the corresponding network/data protection officer, and it may also be necessary to create a data backup prior to the work.

Please note the permissible operating temperature as well. Never place the AC WLAN directly next to devices that generate a lot of heat (e.g. dimmers).

### Proper Use

This device has three operating modes. It can be used as an access point for devices communicating wirelessly or as a repeater to extend the range of the WLAN network. Furthermore, it can be connected to devices that do not have their own WLAN adapter.

Do not use the device for any other purpose. Only operate the device indoors.

## General Information

The AC WLAN offers an excellent alternative for fulfilling the requirements of modern network infrastructures according to DIN 18015-2 and RAL-RG 678 without having to go without the flexible use of modern, mobile technologies such as tablet PC's or laptops, for example, or having to restrict the wireless data rate.

In addition, the AC WLAN operates like a normal wall outlet box with an RJ45 outlet for a conventional data end device (data rate 100 Mbit/s). Power is supplied via the 230 V connection on the back of the device. The AC WLAN is connected to the internal data network using a classic copper data cable, but also using a polymer optical fiber (POF) cable.

The WLAN range can be adapted to the conditions of the room and can be restricted to the room. This creates powerful room wireless cells that ensure the maximum bandwidth is available in the room while simultaneously ensuring low power consumption and low emissions.

Due to its low power requirement and resulting low emissions, separation problems between individual access points, overlapping between WLAN areas, and lowered data rates are avoided for the most part. The AC WLAN can be controlled directly via UDP.

It is the first WLAN access point in the world to fit in a commercially available installation box, and it also fits in with all of the designs offered by renowned switch manufacturers.

### System Requirements

- Connection to a LAN via a copper network cable or, as an alternative, a POF cable
- Internet browser

## Function Types

The AC WLAN operates as an interface for wireless communication devices in the network. All devices in the network can communicate with each other. If the AC WLAN is connected to a network router without a WLAN

interface, then WLAN devices can also obtain access to the network router through the AC WLAN.

When using more than one AC WLAN, the base station and the client must have the same SSID,

the IP address must be in the same range (e.g. 192.168.0.xxx), and they must use the same encryption method.

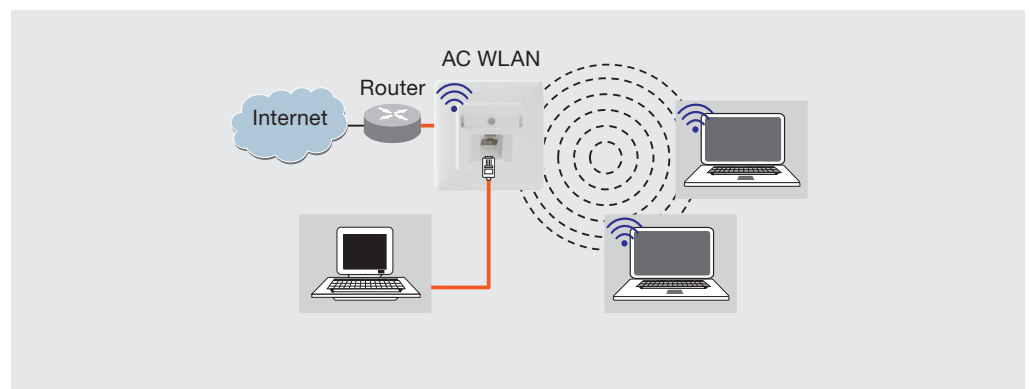
The MAC address of the base station must be entered in the client in the BSSID field.

The Access Point mode (WDS/ Repeater) must be set on the base station, and the Client mode (WDS) must be set on the client.

### Access Point

Connection of the end devices in the building to the Internet via WLAN and RJ45 outlet

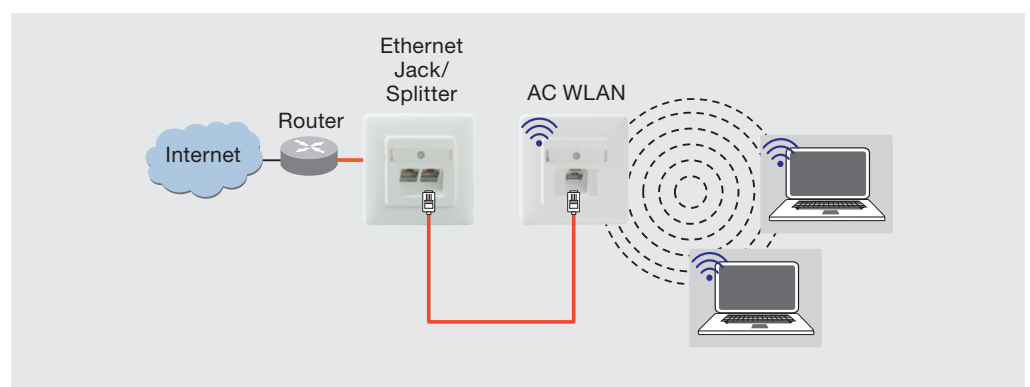
- Hard-wired network connection via a POF or Cu connection
- Interface to the LAN/Internet
- Mode: Access Point



### Access Point

Connection of the end devices to the Internet via WLAN using the existing installation with a patch cable

- Mode: Access Point

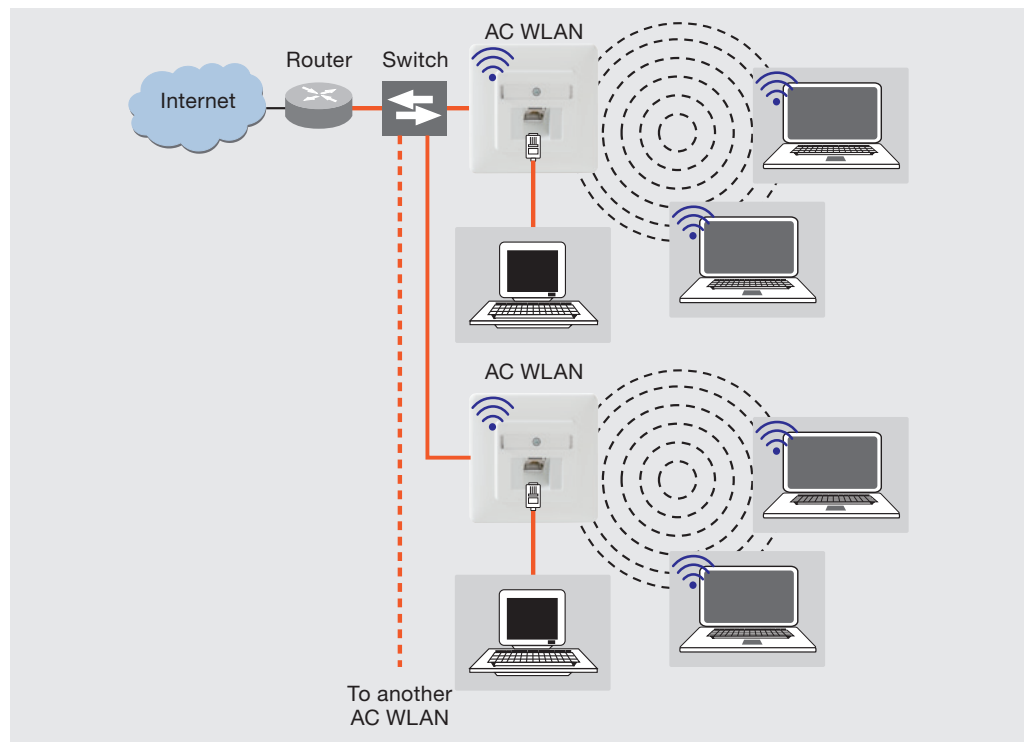


## General Information

### Access Points on the Switch

Operation of several AC WLANs over one switch

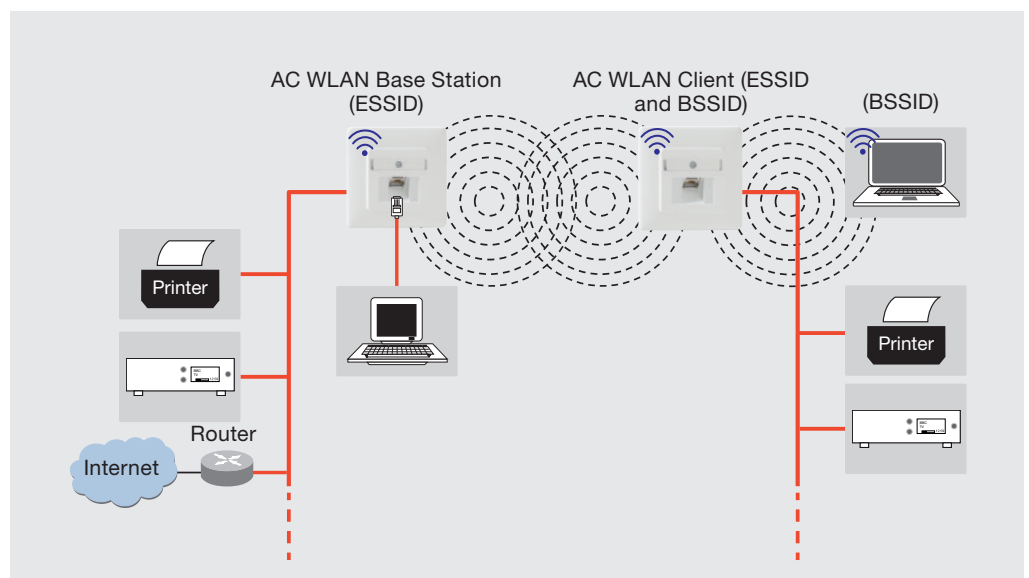
- Hard-wired network connection via POF or Cu connection
- Interface to the LAN/Internet
- Mode: Access Point



### Bridge/Repeater

Connection of two network segments via WLAN

- Increase the range of WLAN-enabled devices
- Interface to the LAN/Internet
- Mode  
Base Station: Access Point (WDS/Repeater)  
Client: Client (WDS)

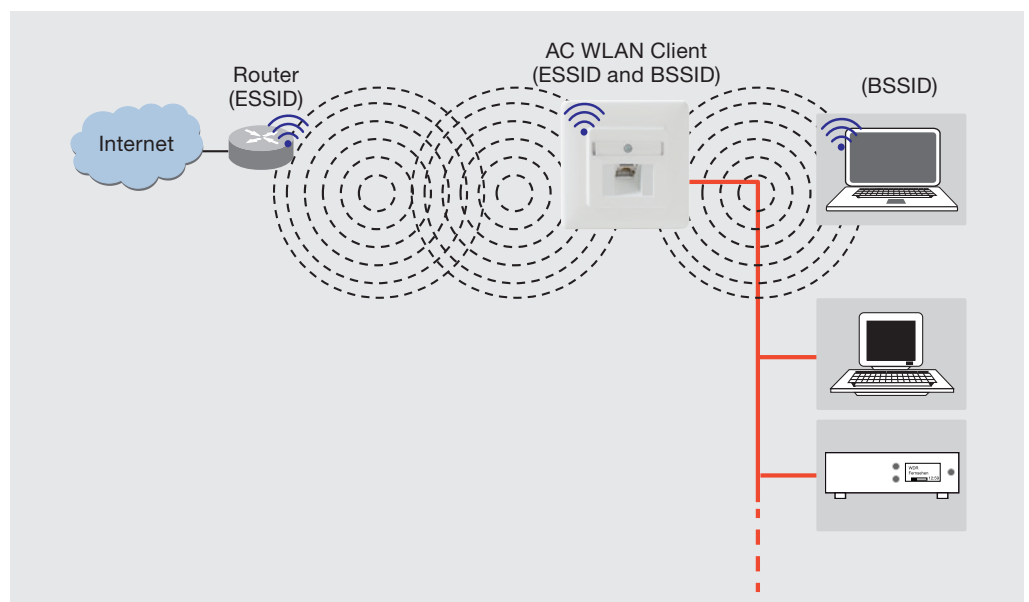


### Repeater

Connection of the end devices to a WLAN router

- Increase the range of WLAN-enabled devices
- Interface to the LAN/Internet
- Mode  
Client: Client (WDS)

In this operating mode, compatibility with all manufacturers on the market cannot be guaranteed. Note the corresponding specifications of the manufacturer.



## General Information

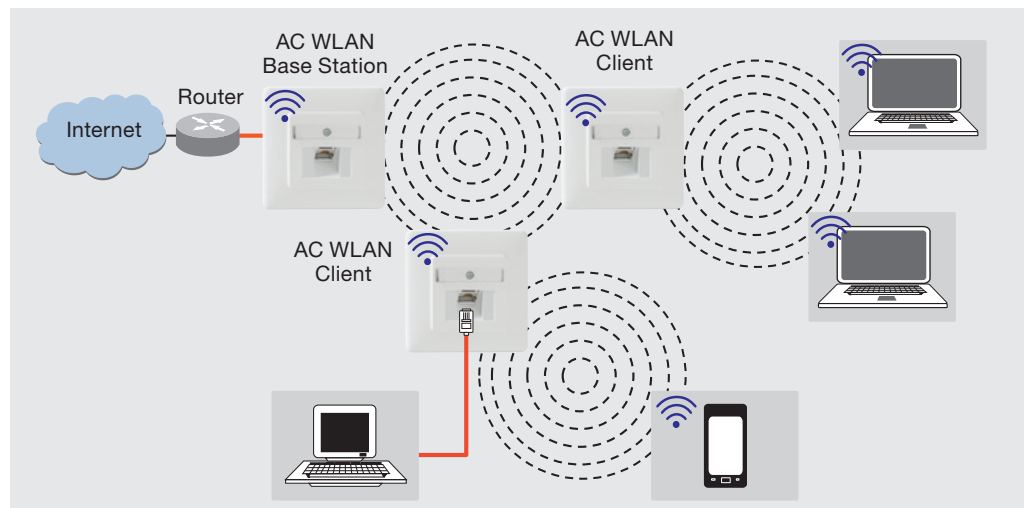
### Central Access Point (Roaming)

Increase the range WLAN-enabled devices

- Interface to the LAN/Internet

The following applies to all WLAN devices:

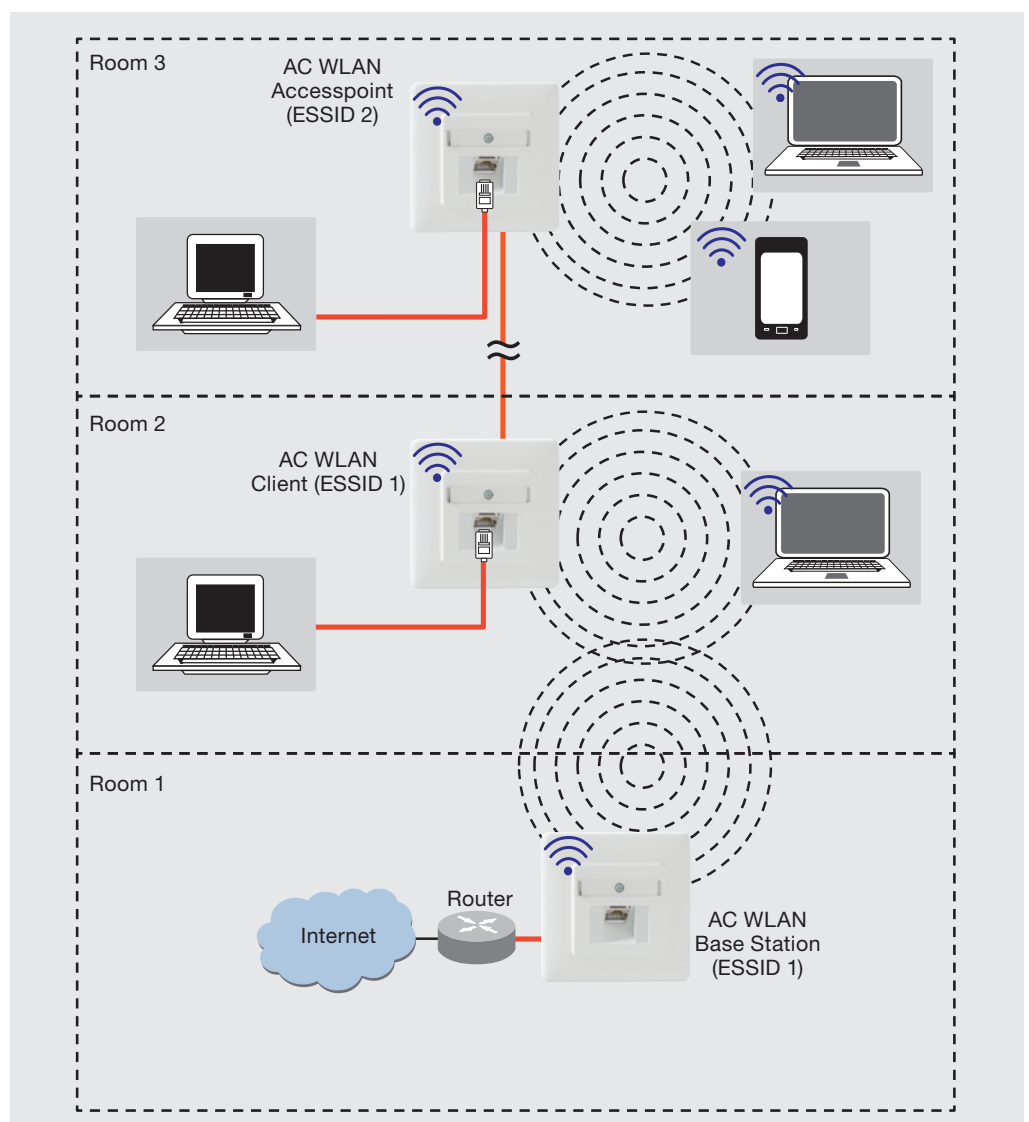
- Same SSID
- Same encryption method
- Same IP range
- Mode
  - Base Station: Access Point (WDS/Repeater)
  - Client: Client (WDS)



### Access Points in Separate Rooms

Use of the Internet in several rooms via WLAN

- Interface to the LAN/Internet
- Same SSID for client and base station (Rooms 1 and 2)
- Different SSID for Room 3
- Same encryption method in all rooms
- Same range of IP addresses for the client and base station (Rooms 1 and 2)
- Mode
  - Access Point: Access Point (WDS/Repeater)
  - Base Station: Access Point (WDS/Repeater)
  - Client: Client (WDS)



## Installation

### Connecting the supply voltage



**Caution: Risk of death!**  
**Disconnect the power supply before making the connections!**

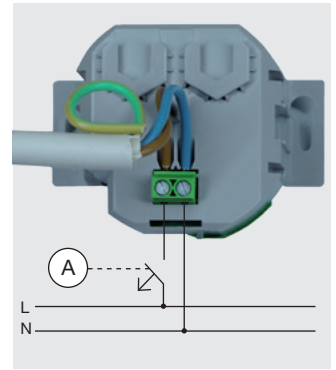
When working in and on electrical systems, follow the five safety rules according to DIN VDE 0105:

- 1 Disconnect the power.
- 2 Secure against restarting
- 3 Verify that there is no voltage on all poles.
- 4 Ground and short-circuit
- 5 Cover neighboring parts that are still live.

Connect the power supply according to the figure on the right. To prevent malfunctions/changes in the 230 V system from affecting the network, always separate the power supply to active components and to the data end devices (PC, etc.) from the power supplies to other consumers (e.g. microwave ovens, vacuum cleaners, radios, etc.).

Use separate circuits by inserting a line disconnector or line protection switch (Figure, A), and possibly by inserting suitable surge protection (Class C). Clearly mark

the circuit as well as the associated sockets, e.g. with the label „IT“.



### Connecting the network cable

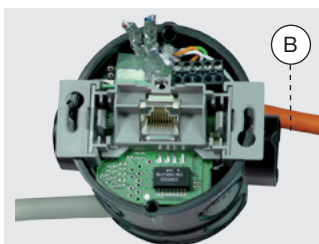
- 1 It is best to pull the cable into the wall box from the top (Figure, B). Use **device junction boxes** only!
- 2 Cut the cable so that there are about 90 mm extending past the bottom of the junction box.



- 3 Remove about 80 mm of insulation from the cable.
- 4 Place the AC WLAN in the flush-mount box.
- 5 Pull off the 5-pin screw terminal block and connected the wires according to the color codes.

Color Code				
Terminal	↓	6	3	2 1
Connection	S			

- Leave the wire pair shielding on and the wires twisted for as long as possible!
  - Twist the cable shield (S) together and use a 1 mm wire end sleeve, if necessary.
  - Make sure the wires are connected in the same manner on the patch panel and on the jack!
- 6 Place the terminal block on the screw terminal.



- 7 Check the installation based on the LED's (see „Meaning of the LED's“ on page 6) and mount the cover.

### Initial Configuration

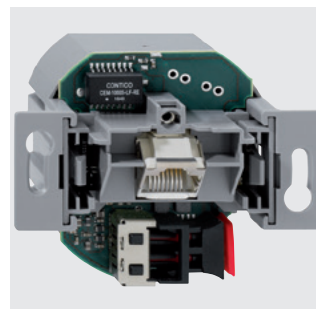
It is recommended to set up the initial configuration over the LAN interface of the device, for example using the socket on the front. Connect the LAN interface of your PC to AC WLAN to configure it.

The factory settings require address of the PC to be within the address range 192.168.0.xxx ( $x \geq 0 \leq 255, x \neq 5$ !). Subnet mask: 255.255.255.0

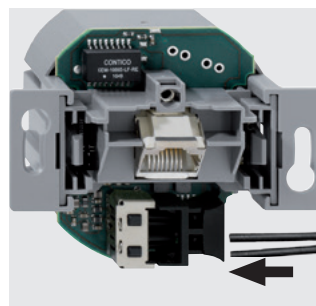
- 1 Start your web browser (e.g. the Internet Explorer) and enter <http://192.168.0.5> in the address line. The AC WLAN then sends a message asking you to enter the password. In the factory settings, the password is „admin“.
  - 2 Configure the AC WLAN as desired.
  - 3 If it is only possible to specify the initial configuration over the WLAN, then you must first search for the AC WLAN in the wireless interface of the device to be used (tablet PC or a similar device). The AC WLAN appears in the network using the SSID „Rutenbeck“. The factory setting for the WLAN password is „wireless123“.
- When changing the SSID, use standard letters and numbers only.**
- The WLAN IP address of the device used for programming must be within the address range 192.168.0.xxx ( $x \geq 0 \leq 255, x \neq 5$ !). Subnet mask: 255.255.255.0
- 4 Configure the AC WLAN as desired.

### Cutting and connecting the POF cable

- 1 After installing the POF cable (you will find information on this topic at [www.rutenbeck.de](http://www.rutenbeck.de) in the download section), proceed as follows:
- 2 Pull the cable into the switch or channel installation box and shorten the fiber-optic conductor to about 190 mm. Use **device junction boxes** only!
- 3 Carefully split the cable in the middle for about 30 mm and make sure that there are no bumps on the sheath that could prevent you from inserting the cable.
- 4 Insert it in the POF cutting tool and cut it by pressing on the blades.
- 5 Make sure that both conductors are the same length.
- 8 Insert the POF cable (the arrow in the figure) and make sure that you push it in up to the stop in order to ensure a good connection.
- 9 Close the POF terminal by pushing the black connector into the device opening to fasten the cable in place.
- 10 Now connect the AC WLAN to the LAN interface of your PC using a patch cable and configure it as desired.
- 11 Check the installation based on the LED's (see „Meaning of the LED's“ on page 6).
- 12 Mount the cover.



- 6 Open the POF terminal by pulling lightly on the black connector and remove the red protection cap (C).



- 7 Insert the AC WLAN in the flush-mount box.

## Licensing Information

Parts of the firmware of this device are subject to the GNU general public license.

This product includes third-party software licensed under the terms of the GNU General Public License. You can modify or redistribute this free software under the terms of the GNU General Public License.

Availability of source code  
We have made available the full source code of the GPL licensed software, including any scripts to control the compilation and installation of the object code in the

driver section of this product on our website. On request you can get the software by mail.

## General Information

You can configure the AC WLAN and thus adapt it to your requirements over the web interface.

Alternatively, you can access it via a patch cable, a permanent connection, or the WLAN; although in the latter case you will need to enter the access data (see "Factory Settings" on page 7).

The network from which the AC WLAN will be configured must be in the address range 192.168.0.xxx because otherwise access is impossible.

The AC WLAN is delivered with default factory settings (see "Factory Settings" on page 7) and is ready for operation. You should always change the password (see below) and the key in the interface configuration

of the WLAN network (see "Network – WLAN Settings – Interface Configuration – General Settings" on page 7).

In addition, you should make some changes to your network and enter the gateway and the DNS server of your router for Internet access (see "Network – IP Settings" on page 7).

If you do not want to make any further changes, then please continue reading in the "Network – Diagnosis" section on page 7.

## Login

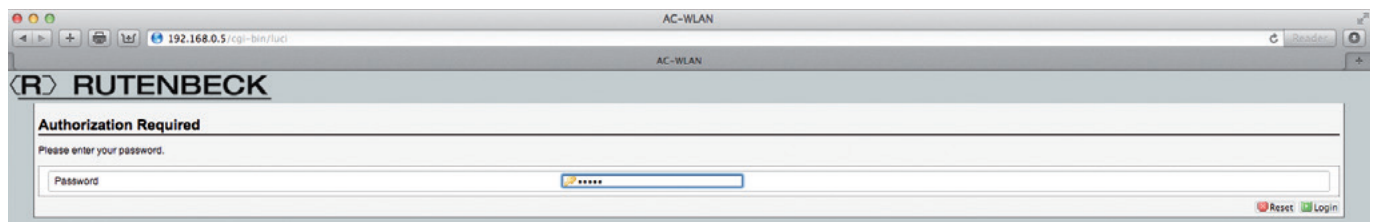
After installation, the AC WLAN can be accessed using the address **http://192.168.0.5**.



If the blocking of pop-ups is enabled in the browser, then you must explicitly

permit access in the corresponding dialog.

Enter the password (factory setting: "admin") and log in.



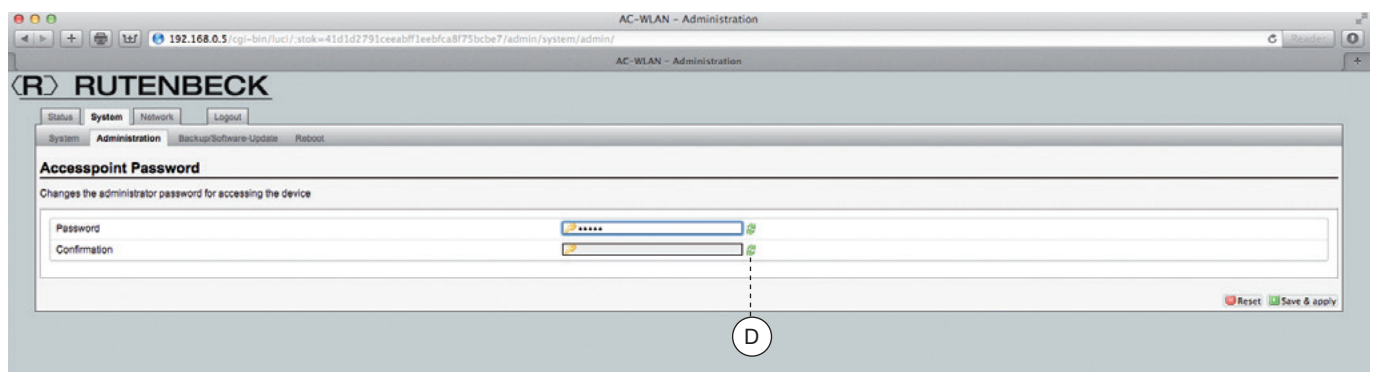
## Password Setting

You open the password setting of the AC WLAN via the "System/ Administration" menu.

Increase your access protection by setting an individual password.

Clicking on the green arrow (D) makes the password visible.

Confirm the password and save it by clicking on "Save and Apply".



## Configuration – System – General

### System Settings

The system settings apply to all operating modes and can be changed in the „System“ menu.

### System – General Settings

Enter an individual, unique name in "Hostname" (factory setting: "AC-WLAN") so you will be able to recognize the AC WLAN in your network. The name must start with

a letter and may not contain any space characters. Invalid input is marked in red. Clicking on "Save and Apply" saves the changes you have made

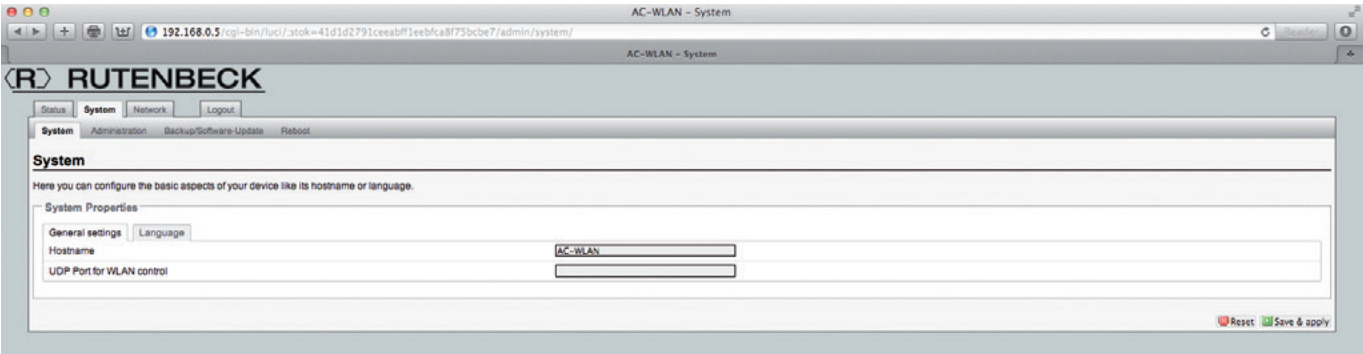


You must perform a restart after changing the host name. To do this, click on "Restart" and then on

"Execute Restart" in the window that appears. A restart takes about one minute.



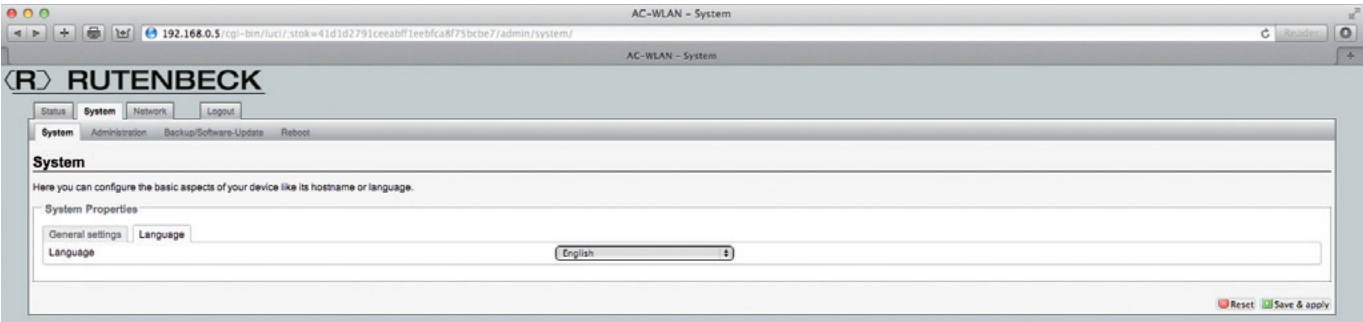
Configuration – System/Status



System Language

The user interface can be set to the German or English language.

Clicking on “Save and Apply” saves the settings specified.

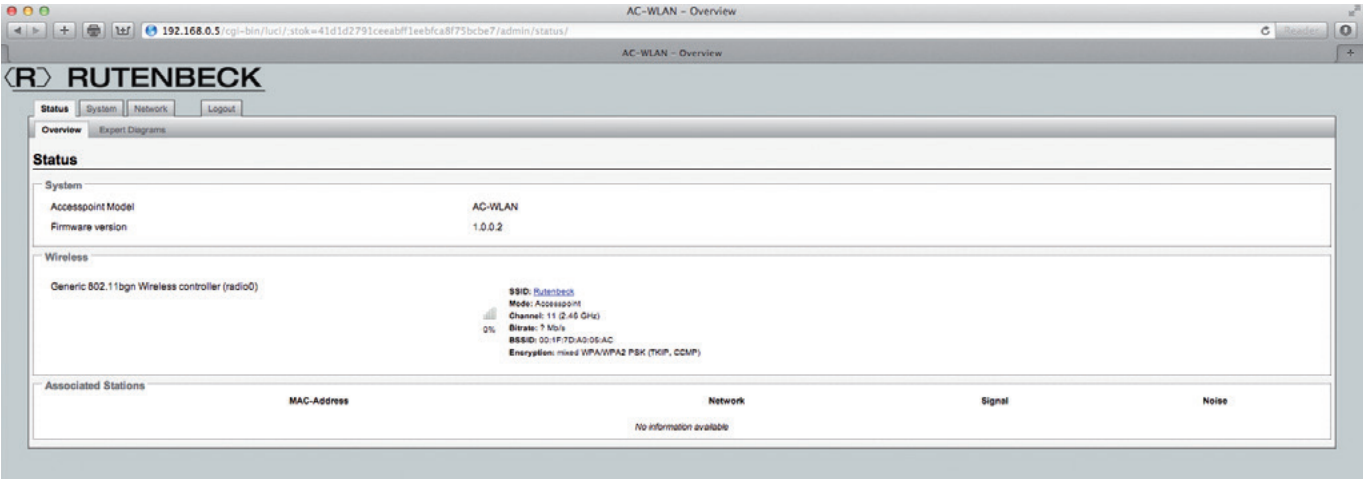


Configuration – Status

Status Information

The “Status” displays the current values of the system as well as which devices are connected to the AC WLAN. Information on the channel and the stations registered in the network, for example, is available here for configuration purposes. If there are several base stations registered in a network, then the AC WLAN automatically selects the station with the strongest signal. The reception quality should not be below 20 % in order to guarantee secure data transmissions.

You can also see the firmware version here in addition to the model of the access point.



Configuration – Network

You specify the operating mode and other aspects of the configuration on the “Network” tab under “IP Settings” and “WLAN”. You can choose between three different operating modes:

- Access Point (factory setting),
- Access Point (WDS/Repeater) and
- Client (WDS) (see the “Function Types” on page 3).



Configuration – Network

Network – IP Settings

This menu displays status information for the LAN settings of your AC WLAN. The runtime, MAC address, send and receive data

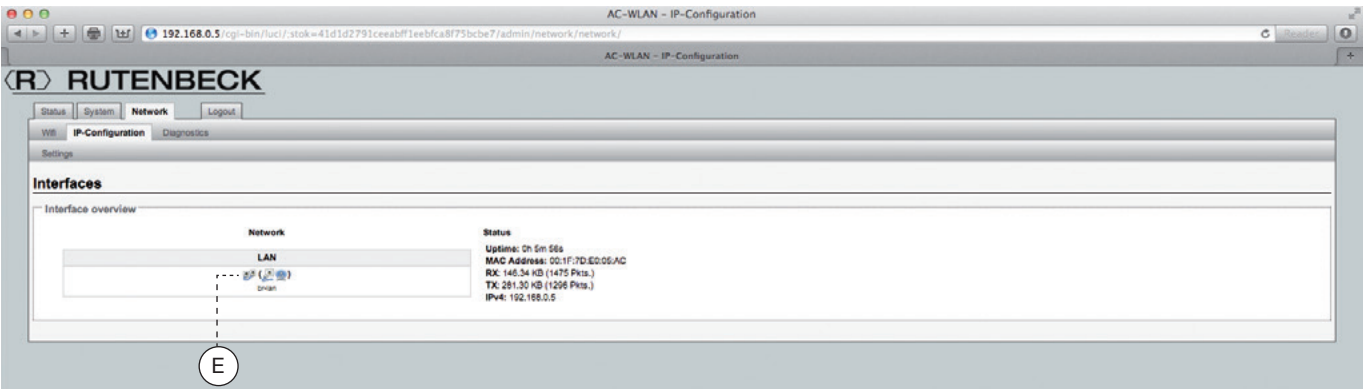
rates, and the IP address are displayed here. The symbols in the field on the left (E) have the following meanings:



Interface: Copper/POF  
Interface: Front connection



Interface: Wireless



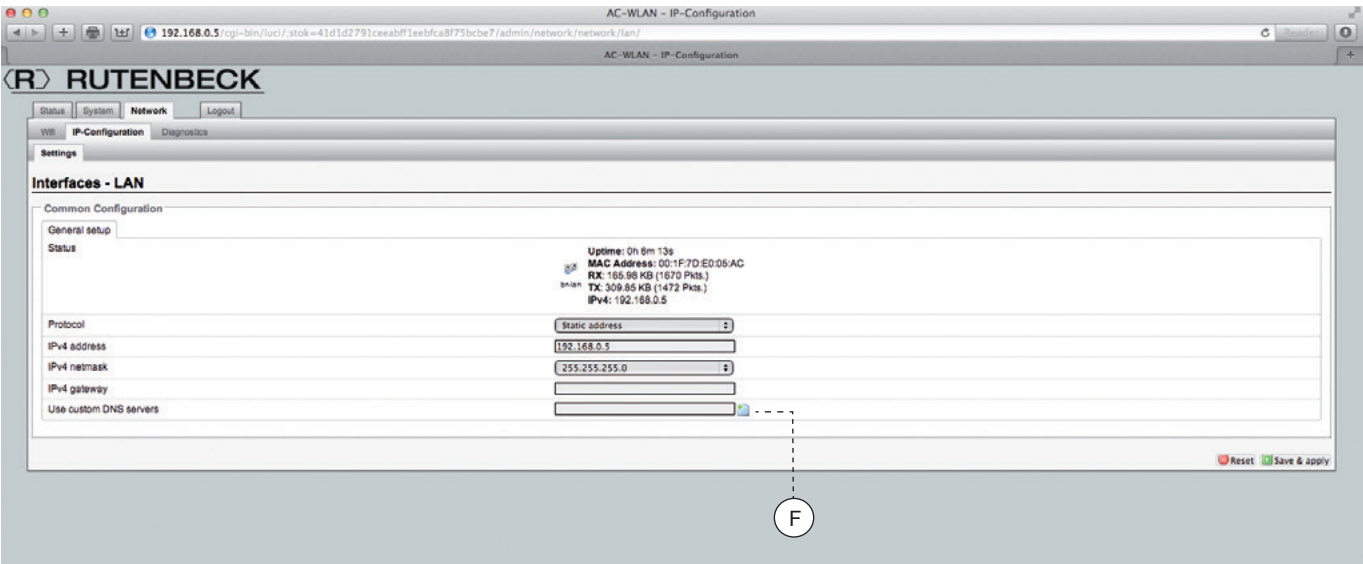
Network – IP Settings – Settings

In addition to status information (see "Network – IP Settings" on page 9), you also select the pro-

tolocol (static address or DHCP client), change the IP address and network mask of your AC WLAN,

and enter the gateway address and DNS server of your router. Clicking on the symbol (F) allows

you to enter additional DNS servers.



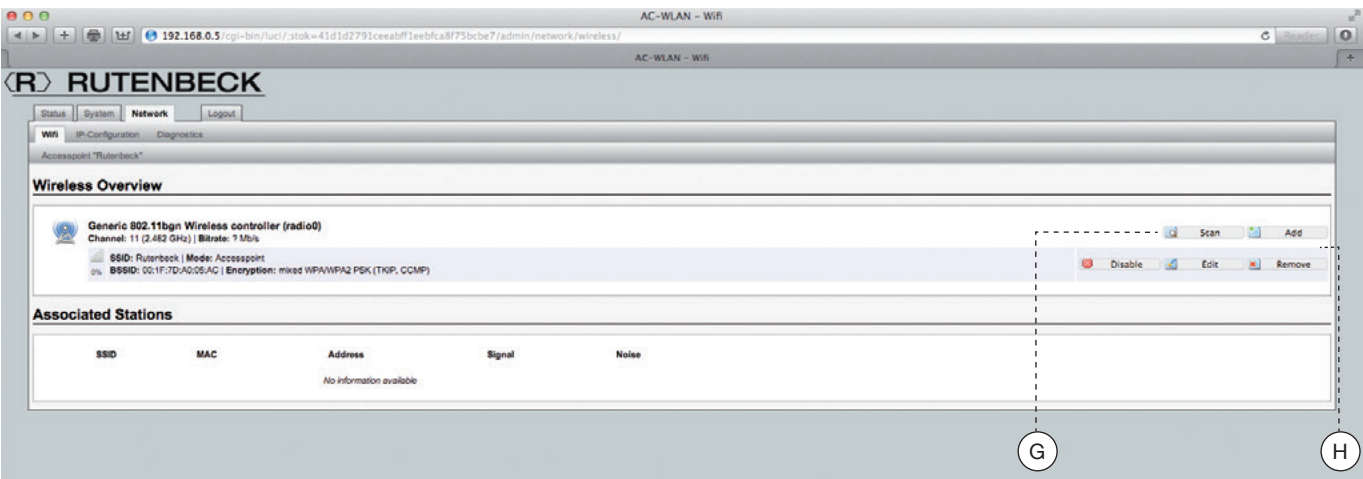
Network – WLAN

In the WLAN status section, you will find an overview of the WLAN settings of your AC WLAN. The wireless standard, channel, bit rate, SSID, mode, BSSID, encryp-

tion, signal strength in percent, stations registered with their SSIDs, MAC address, IP address, and the signal and noise levels are displayed here.

The "Scan" button (G) displays an overview of the neighboring networks. The other four fields (H) are for use in the repeater mode. In the repeater mode, the device

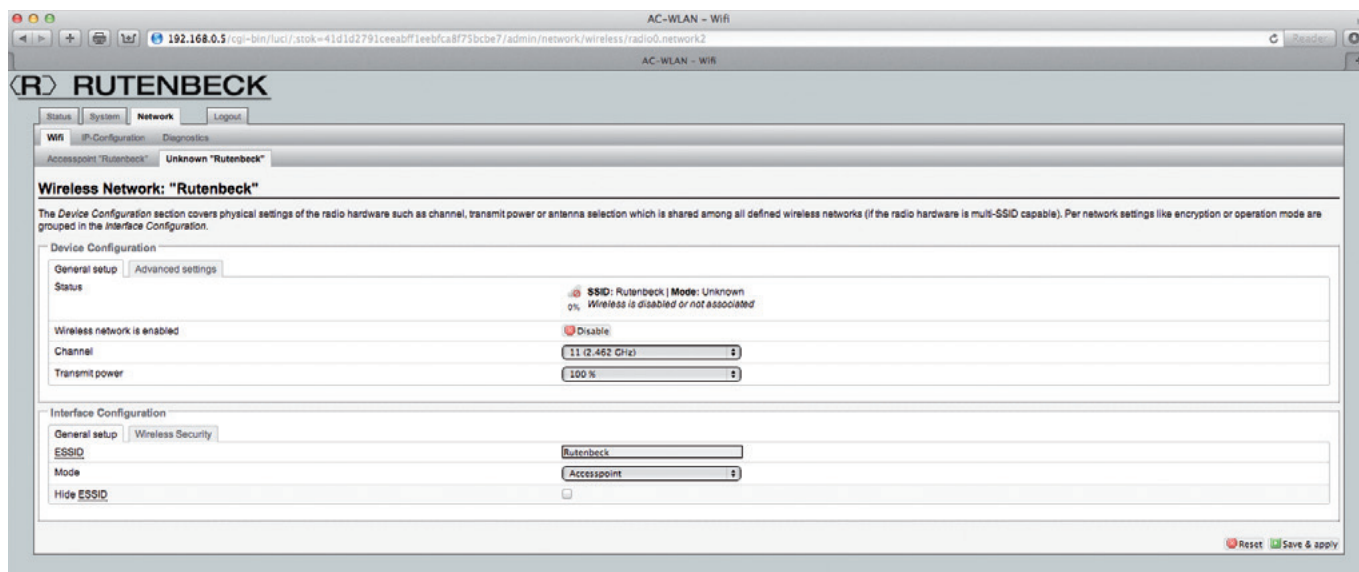
forwards the data from one WLAN to another WLAN. These networks can be specified and managed as follows:



## Configuration – Network

After executing the “Add” command, you can set the following parameters on the new tab that appears:

- **Channel:** There are 12 different frequencies (auto – 2.467 GHz) available for selection.
- **Transmission power:** The transmission power can be adapted to the local conditions.
- **Mode:** Select “Access Point”, “Access Point (WDS/Repeater)”, or “Client (WDS)”.



### Network – WLAN Settings

The WLAN settings are divided into a device configuration and

an interface configuration.

### Network – WLAN settings – Device Configuration – General Settings

In addition the display of the status, you can also specify the following settings here:

- **Enable/Disable WLAN**  
You can switch the WLAN off when not needed it in order to stop emissions and save energy. The other two interfaces are still available. You can also

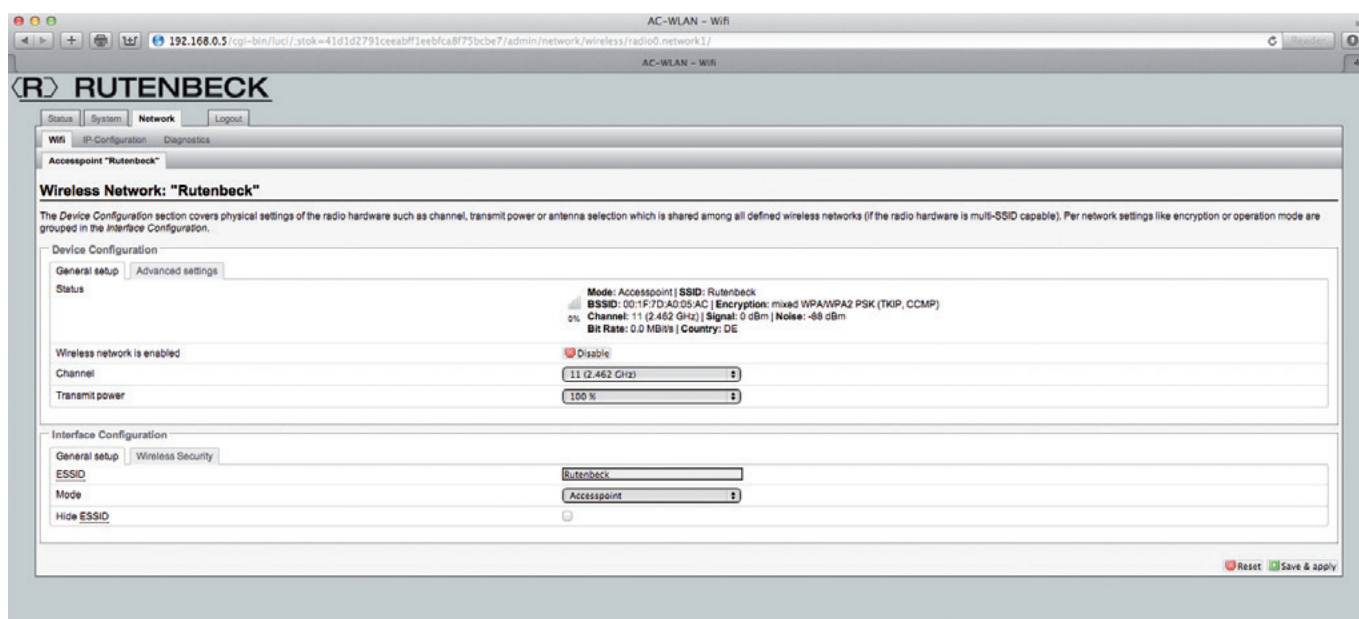
implement the switch using UDP (see “Controlling the AC WLAN via UDP” on page 10).

- **Channel**  
The frequency ranges of adjacent channels overlap. For this reason, select the channel so that the frequencies of other wireless devices in your vicinity

do not overlap (microwave devices transmit at frequencies near channels 9 and 10). In Germany, 13 channels are allowed, but only 11 channels are allowed in the USA, for example. To ensure you can select from a full range of devices, we recommend that

you use channels 1 through 11 only.

- **Transmission Power**  
You can change the range of the AC WLAN by changing the transmission power. You should keep its coverage area as small as possible.



### Network – WLAN settings – Interface Configuration – General Settings

The settings possible in the interface configuration are network-specific settings:

- **ESSID**  
The name of the network to which the AC WLAN should connect.

- **Mode**  
Three modes are available for selection: The Access Point, Client (WDS), and Access Point (WDS/Repeater) operating modes (see “Function Types” on page 3).

- **Hide ESSID**  
Prevents unauthorized devices from seeing your network.

The settings you have entered are saved with “Save and Apply”.

## Configuration – Network

### Network – WLAN Settings – Device Configuration – Advanced Settings

Additional settings can be specified in the device configuration as well as in the interface configuration:

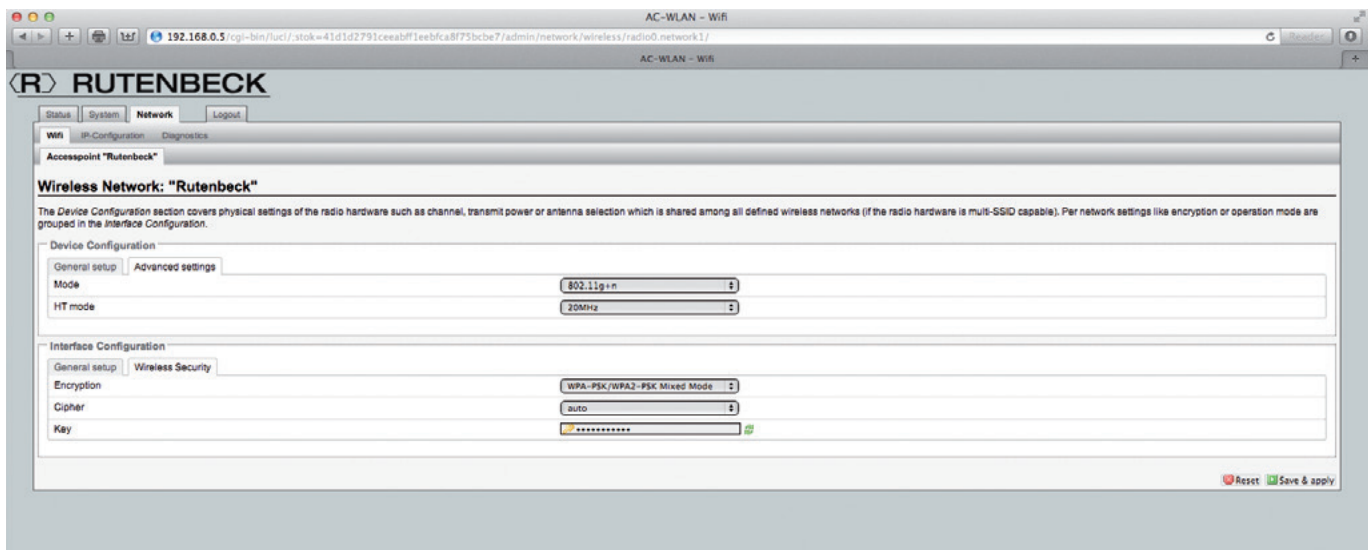
- **Mode**

The factory settings allow devices according to the IEEE 802.11 b/g/n standards to log in. If you want to restrict access, then

you can specify special wireless standards.

- **HT Mode** (only for the 802.11g+n mode)

You can select HT 20/40 when using the 802.11n standard. Check which bandwidth provides you with the best results.



### Interface Configuration – WLAN Encryption

WLAN encryption protects the network against attacks from unauthorized users.

- **Encryption**

The method specified in the factory settings is considered the most secure, but this method is not supported by

some older devices (avoid using WEPI).

- **Cipher**

The encryption method, set to "auto" in the factory settings

- **Key**

When you assign a key, you only allow authorized users to

have access to your network.

**You must change the default key!**

When selecting the key, apply the same criteria as when selecting a password. When using WLAN encryption methods like WPA and WPA2, for

example, the password should be at least 20 characters long for security reasons.

All settings specified can now be confirmed and saved using "Save & Apply".

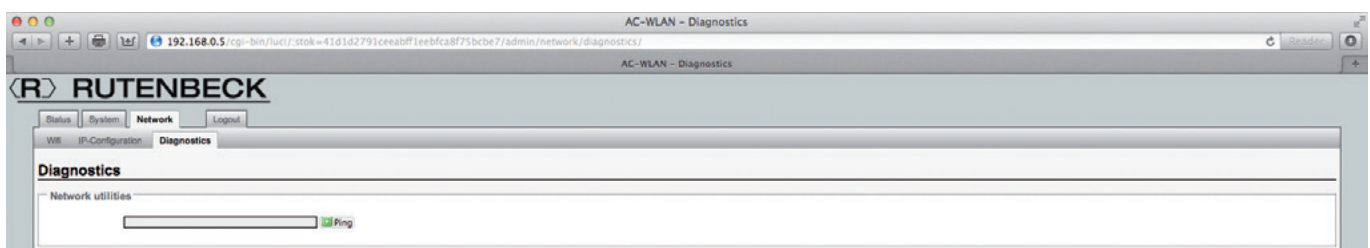
### Network – Diagnoses

You can test the network and Internet connections with this tool. Enter an Internet address (can be

an internal or external address) and click on "Ping".

Information stating if the data was sent and if the destination

address sent a reply back is then displayed.



## Configuration – System – Backups/Updates

### Backup/Software Update

For backup purposes, you can save your custom settings to a PC or you can reset to the factory settings. You can also install new firmware here.

#### Backup/Restore

Select a file folder on your PC for the backup by saving your current settings. Click on "Save". Click on "Load" to reset to the factory settings. If you want to install several AC WLANs with the exact same configuration, then you can save the settings of one device as a backup and then load the configuration into the other devices.

#### Install New Firmware

You can download the most recent firmware available from our home page. Proceed as follows to do this:

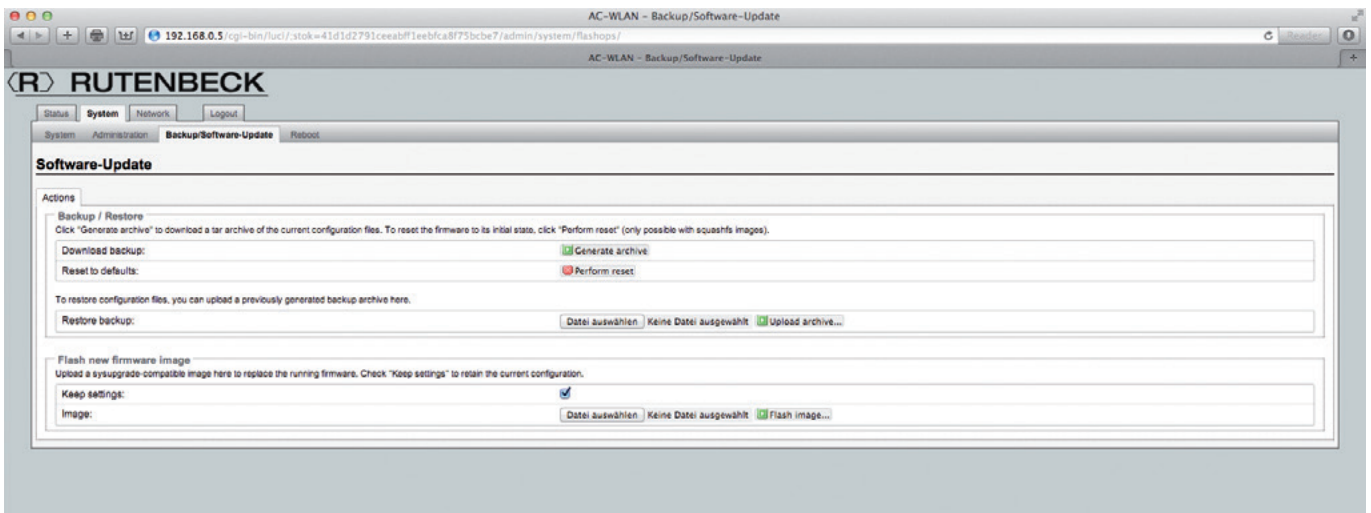
- 1 Save the file to your PC.
- 2 If you want to keep the current settings, then confirm this.
- 3 Select the saved file.
- 4 Click on "Install".

#### Registration

Register your MAC address (see the ratings plate) at <http://www.rutenbeck.de/service/Produktregistrierung>

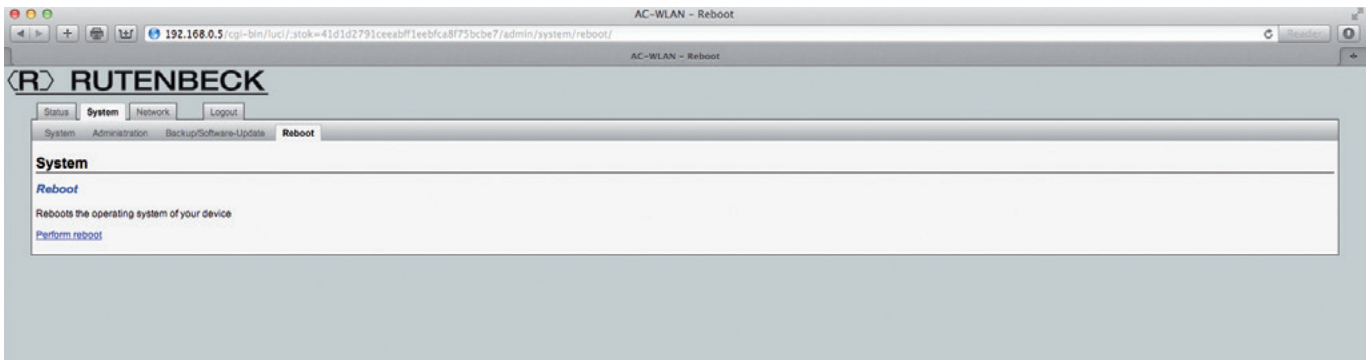
You will then be informed of new updates promptly and will also receive a 1 year extension to your warranty (based on the date of purchase).

## System – Backup/Software Update



## Restart

When you restart, you reset the system or save any changes made to the settings.



## Log Off

You exit the user interface of the AC WLAN with "Log Off". You must save any settings you have made before logging off. You will need to log in again with your password to make further changes.

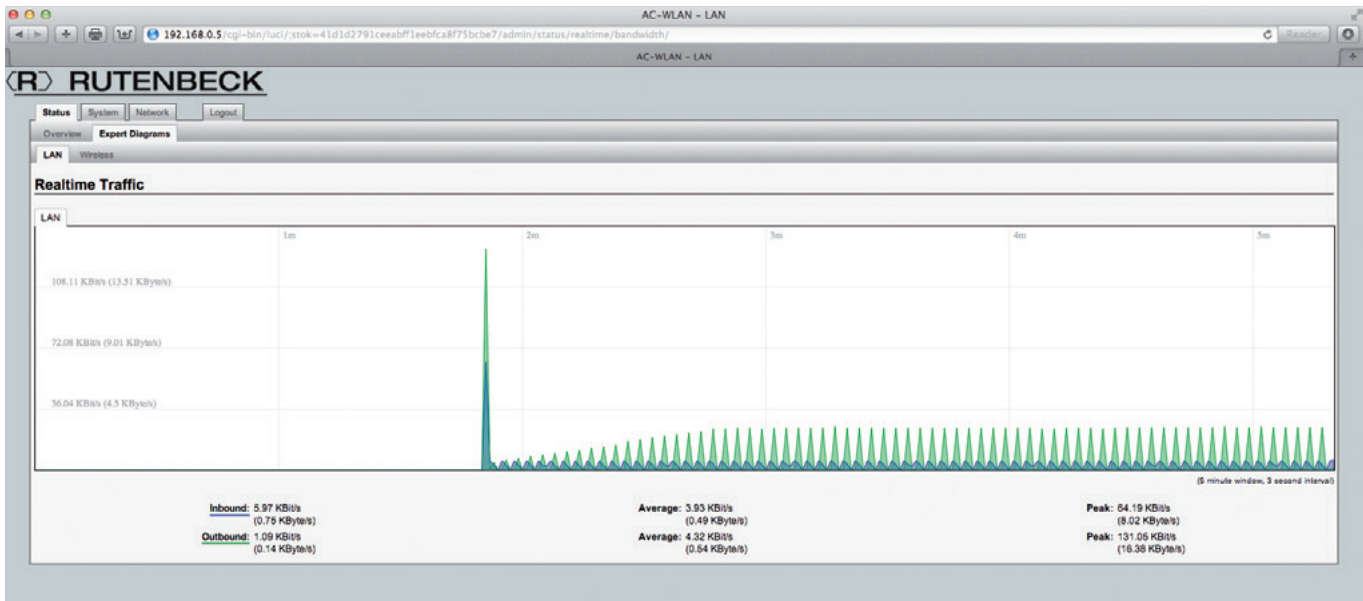
Expert Diagrams

This menu provides detailed information on the current data transmissions in the LAN and WLAN areas that you can use as a tool for analysis.

LAN

With this diagram you can check if there is a connection to a LAN and, if so, the incoming and out-

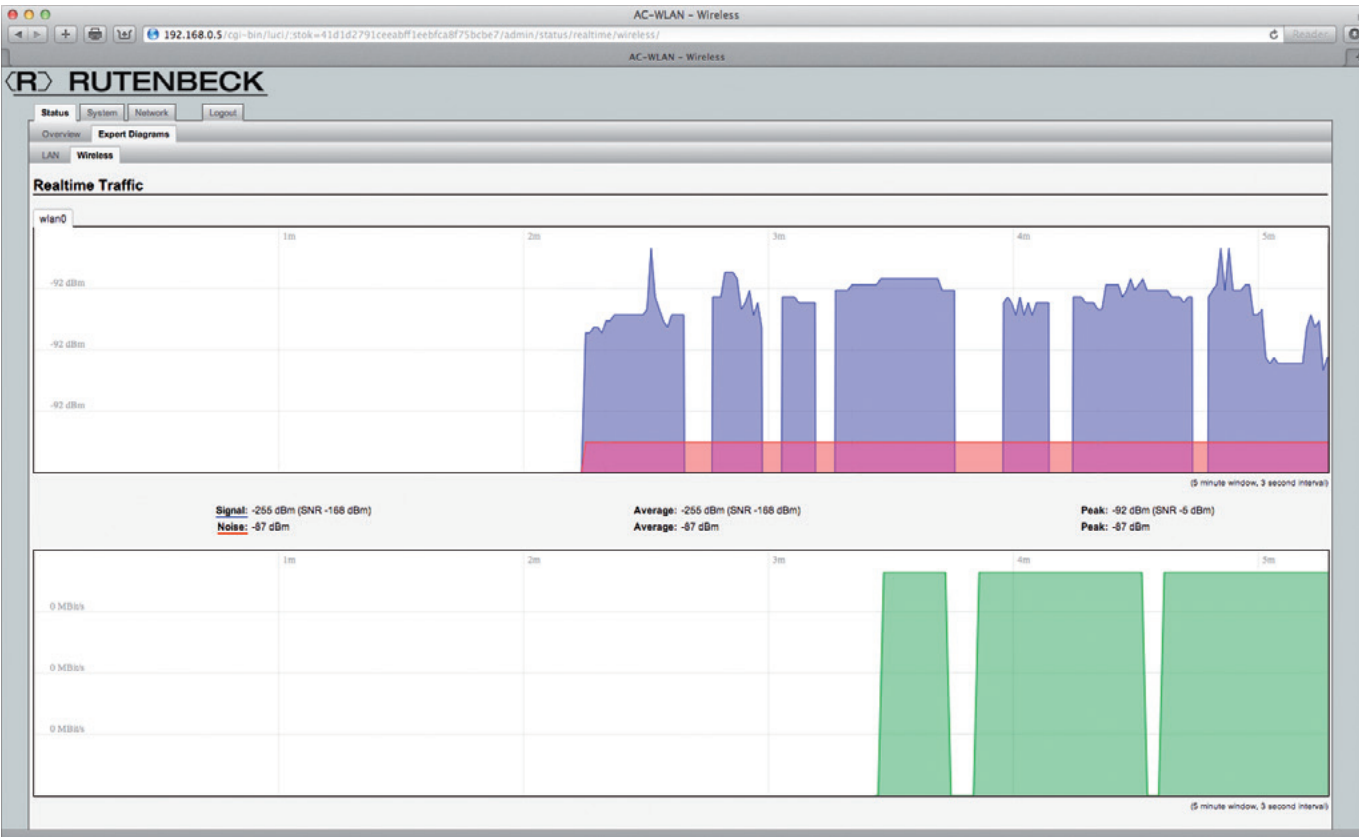
going data rates transmitted over a period of 5 minutes. The data is recorded permanently.



WLAN

The WLAN diagrams provide information on the quality of transmis-

sion in terms of the signal, noise, and data rate.





Controlling the AC WLAN via UDP

The WLAN interface of the device can be switched on and off via UDP commands. You enable the UDP functionality by entering the desired port in the "System" menu. No port is specified in the factory settings. After that, confirm the data you have entered by clicking on the "Save and Apply" button.

**Notes:** You must execute a restart of the AC WLAN in order for the UDP port entered to take effect. To restart the system, click on "Restart" and then on "Perform Restart" in the window that then appears. The restart will take about one minute. The UDP functionality is then available after restarting.  
You can also switch it off via WLAN (smart phone), but you cannot switch it back on again over the WLAN.

UDP Commands

Commands	Meaning
WLAN ON	Switch on the WLAN interface
WLAN OFF	Switch off the WLAN interface
WLAN ?	Query the status

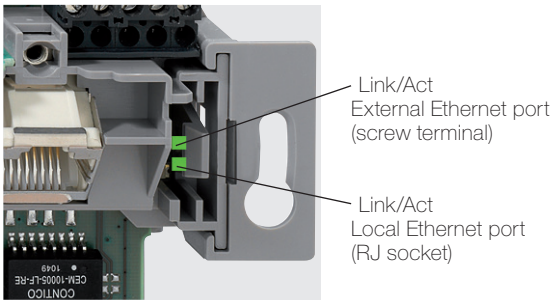
Note that the commands are case-sensitive and make sure to enter the proper number of space characters.

The AC WLAN confirms the UDP command sent by returning the current status.

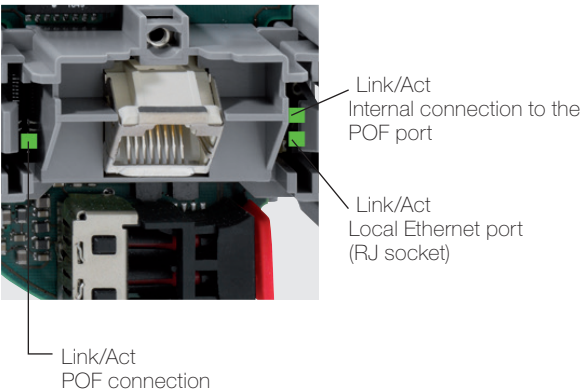
Meaning of the LED's

The status of the LED's can also be used to perform detailed error analyses and when starting for the first time. The LED's can be seen when the cover of the upper module of the AC WLAN is removed. They indicate the activity on the corresponding ports – i. e. on the screw terminal, RJ socket, and POF connection.

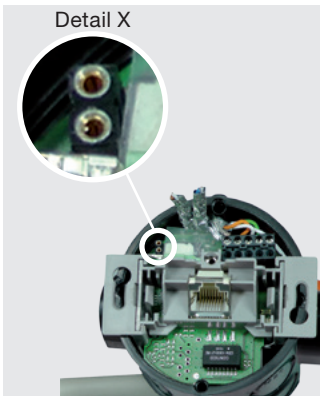
AC WLAN UAE Up



AC WLAN UAE/POF 1xUp



Reset Functions




Reset

- During operation, place a jumper (for example a paper clip) for at least 5 seconds and at most 30 seconds as shown (Figure, Detail X).
- The system restarts with the factory settings.

Resetting to the factory settings / loading the in case of a malfunction

If you do not have access to your AC WLAN any more, then proceed as follows to reset it to the factory settings:

 The network card of the PC must have an address in the same IP range!

- Switch off the power of the AC WLAN.
- Insert a jumper as shown (Figure, Detail X).
- Switch the power on again.
- Wait for 5 seconds.
- Go to "Windows – Start – Run..." and enter "cmd" there.
- Confirm with "OK".

- Enter "tftp -i 192.168.1.1 put acw-rkxxx.bin" (see below for the meaning).

Meaning of the data entered:

**C:\** Switch to the root directory

**tftp** Start the TFTP client (included with the operating system)

**-i** Transfer a binary file

**192.168.1.1** Address of the TFTP server in the AC WLAN

**put** Send data

**acw-rk-xxx.bin** Filename (xxx is a version number like 1002, for example), must be located in the root directory.

- The system returns a status message regarding the success of the data transmission.

## Factory Settings

	Factory Setting	Your Setting
<b>System/Administration:</b>		
Password	admin	
<b>System/System:</b>		
Hostname	AC-WLAN	
Language	German	
UDP-Port	none	
<b>Network/LAN/Settings:</b>		
Protocol	Static address	
IPv4 Address	192.168.0.5	
IPv4 Netmask	255.255.255.0	
IPv4 Gateway	none	
DNS Server	none	
<b>Network/WLAN/Settings:</b>		
The WLAN network is enabled	Yes	
Channel	auto	
Transmission Power	100 %	
ESSID	Rutenbeck	
Mode	Access Point	
Hide ESSID	No	
<b>Network/WLAN/Advanced Settings:</b>		
Mode	auto	
HT Mode	20 MHz	
<b>Network/WLAN/WLAN Encryption:</b>		
Encryption	WPA-PSK/WPA2-PSK Mixed Mode	
Cipher	auto	
Key	wireless123	
<b>Network/Diagnoses:</b>		
Ping	none	



## Troubleshooting

LED's do not light up	
Cause	Measure
No power is being supplied to the AC WLAN.	Connect the power supply voltage.
No connection to the WLAN base station	
Cause	Measure
The AC WLAN is located outside of the range the base station.	Reduce the distance between the devices.
The WLAN function of your AC WLAN is disabled.	Enable the WLAN function.
Another WLAN wireless network is causing malfunctions.	Switch to a different channel or set the channel to "auto".
The encryption is set to "WEP" or "unencrypted" on your AC WLAN.	Set the encryption method to WPA/WPA2 in the user interface.
The ESSID is set to "hidden".	To establish a connection using WEP, the ESSID must be "visible". Set the ESSID to "visible". After a connection has been established, you can set the ESSID back to "hidden".
Different encryption methods are set on the PC and on the AC WLAN.	Set the same encryption method on the PC as on the AC WLAN.
No connection between WLAN and PC	
Cause	Measure
The WLAN adapter of the PC's is not ready for operation.	Check if the WLAN adapter is turned on; on some devices, you will need to press a switch to turn it on.
The PC is located outside of the range of the AC WLAN.	Reduce the distance between the PC and the AC WLAN.
Different encryption methods are set on the PC and on the AC WLAN.	Set the same encryption method on the PC as on the AC WLAN.
Impossible to access devices in the network	
Cause	Measure
A firewall is running on the devices.	Allow access to the network on the firewall.
Wrong address range/wrong network mask	Check if the addresses are set correctly.
The AC WLAN cannot be found at the IP address	
Cause	Measure
You have enabled the DHCP client.	Try to find the device using the WLAN function.
The plain text display of the password and key does not work	
Cause	Measure
You use Internet Explorer 9.	Disable all settings in the Compatibility View under Tools / Settings.
The diagrams are not shown	
Cause	Measure
You use Internet Explorer 7 or 8.	You use Internet Explorer 7 or 8. Install an SVG plugin (e.g. from Adobe, found at <a href="http://www.chip.de/downloads/Adobe-SVG-Viewer_15272819.html">http://www.chip.de/downloads/Adobe-SVG-Viewer_15272819.html</a> ).
You use Internet Explorer 9.	Disable all Compatibility View settings under Tools/Settings.

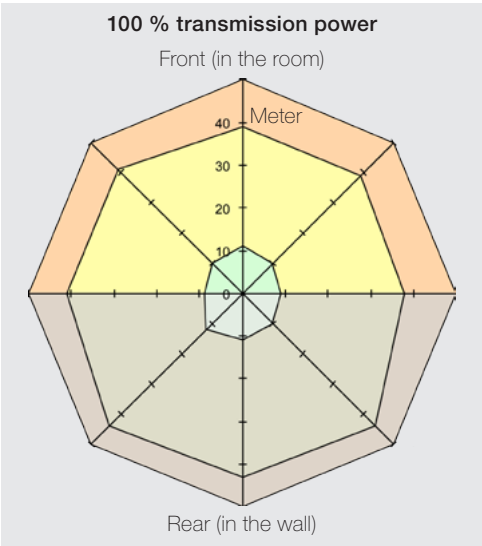
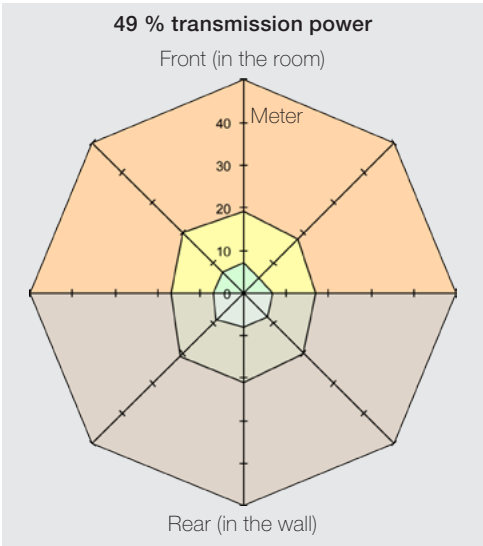
## Technical Data

	AC WLAN UAE Up	AC WLAN POF/UAE 1xUp 2.2 mm
General Information		
Item Number:	22610403	22610405
Function Types:	Access Point, Access Point (WDS/Repeater), Client (WDS)	
Mechanical Properties		
Dimensions (L x W x H):	80 x 80 x 50 mm	
Weight:	112 g	115 g
Color (cover):	Pure white (similar to RAL 9010)	
Protection Class:	IP20 according to DIN EN 60529	
Operating Temperature Range:	-5 °C bis 45 °C	
Connections:	RJ 45 (10/100 Mbit/s) Screw contacts The data rate is 10/100 Mbit/s for all connections	RJ 45 (10/100 Mbit/s) 2.2 mm Duplex POF
Electrical Properties		
Power supply:	100-250 V~/50-60 Hz	
Power Consumption:	≤ 1.8 W	≤ 2.5 W
WLAN Properties		
Frequency Range:	2.4 GHz	
Wireless Data Rates:	max. 150 Mbit/s	
Wireless Standard:	IEEE 802.11 b/g/n	
Security and Encryption:	WEP, WPA, WPA2	
Optical Properties		
Transmission Length:	-	100 m
Transmission Rate:	-	100 Mbit/s
Wavelength:	-	660 nm
Copper Properties		
Transmission Length:	90 m	
Transmission Rate:	100Mbit/s	

### Transmission power ranges

The range for a given transmission power depends on the building infrastructure, among other things. Install the AC WLAN at a location appropriate for the conditions in the room.

The diagram shows an **example** of the reception quality for **concrete walls** depending on the transmission power and the distance to the AC WLAN.



## Glossary

Meaning	Abbreviation	Function
Access Point	<b>AP</b>	Base station, interface for wireless communication, end devices log in via WLAN to the Access Point that is connected by a cable to the network, similar to bridges or switches, based on Layer 2
Adapter		Connects a wired communication device to an AP via WLAN.
Advanced Encryption Standard	<b>AES</b>	Readily available encryption algorithm with 128-, 192-, or 256-bit key lengths and 128-bit block sizes
Basic Service Set	<b>BSS</b>	Created by synchronizing the relevant parameters on several devices
Basic Service Set Identifier	<b>BSSID</b>	The BSSID is either the MAC address of the AP or generated randomly and is a unique identifier for each BSS.
Cipher		Operating mode in which the text can be encrypted that is longer than the block size are (e.g. AES)
Client		Connects a wired communication device per WLAN with a AP, also as Repeater and WLAN adapter refers to
DNS Server		A computer (server) that performs name resolution
Domain Name System	<b>DNS</b>	Performs name resolution, i.e. it converts a host name to the corresponding IP address.
Extended Service Set	<b>ESS</b>	A set of several WLAN wireless cells connected to form one large cell
Extended Service Set Identifier	<b>ESSID</b>	The connection of several APs to a network requires the use of the same SSID, which in this case is referred to as the ESSID.
High Throughput	<b>HT mode</b>	In the HT-40 mode, higher bandwidths, and therefore higher data rates, are possible. The range is reduced, and speed advantages are only realistic to a certain extent (IEEE 802.11 n devices are required and an optimal connection is assumed)
Independent Basic Service Set	<b>IBSS</b>	An IBSS is a closed network without any connection to other networks.
IPv4 address		Fourth version of the Internet Protocol, 32-bit address with four blocks (each expressed as decimal numbers) and 8 bits per block, a range of values from 0 - 255 and separated by a dot (xxx.xxx.xxx.xxx)
IPv4 gateway		Connects networks using different protocols, specifies the path to the Internet.
IPv4 netmask		Separates the network and address portion of the IP address, computers are in the same network when the address portions are the same (the bits in the netmask that are equal to "1").
Channel		The frequency range available in the 2.4 GHz range is separated into 14 channels to improve utilization. The first 13 channels are available in Europe.
Copper cable	<b>Cu</b>	Network cable
Local Area Network	<b>LAN</b>	A local network with a max. distance limit of 500 meters, used primarily in homes and small companies.
Mode		See pages 3-5
Polymer Optical Fiber	<b>POF</b>	An optical fiber made of plastic polymer.
Port		A part of a network address used to associate data packets with clients and servers. In UDP, the port number of the service that will receive the data is also sent.
Protocol		Negotiated by the software to transmit the data.
Repeater		A signal amplifier used to increase the range.
Key	Hostname	Name of the AP
	Password	Access protection
	Roaming	The ability to take the WLAN connection from one AP to the next.
Transmission power		Power output of the AP, usually specified in dBm.
Service Set Identifier	<b>SSID</b>	User-defined name of a WLAN, can be up to 32 characters long, set on the AP and on all connected clients.
Temporal Key Integrity Protocol	<b>TKIP</b>	A security protocol for WLANs or other wireless networks based on the IEEE 802.11 standard.
User Datagram Protocol	<b>UDP</b>	A simple, connectionless network protocol used to transmit data. Ports are used to enable the data to be associated with the right applications.
Encryption		Used for security reasons in data transmissions.
Wi-Fi Protected Access	<b>WPA</b>	A WLAN encryption algorithm
	<b>WPA2</b>	Successor to WPA and based on AES according to the WLAN standards IEEE 802.11 a,b,g,n
Wired Equivalent Privacy	<b>WEP</b>	A WLAN encryption algorithm

## Glossary

Meaning	Abbreviation	Function
Wireless Distribution System	<b>WDS</b>	A method used to address data frames and assemble a wireless network using several APs. WDS can be implemented on the AP with one WLAN interface (single radio WDS, connection to the AP and client) as well as with several WLAN interfaces (dual radio WDS, one interface to the AP and another to the client), with two different modes: the bridging mode (2 WLAN bridges are connected) and the repeating mode (several APs are connected via WDS).
Wireless Local Area Network	<b>WLAN</b>	Like a LAN, but wireless

## Manufacturer's data

### Warranty

We guarantee the perfect function of the AC WLAN for 2 years after date of purchase (receipt) assuming that it was professionally installed and operated.

### Maintenance

In case of a malfunction consult the expert who installed the AC WLAN or send it with the receipt and a short description of the malfunction to the following address:

**Rutenbeck Service-Center  
Gewerbegebiet  
Im Meilesfeld 5  
99819 Marksuhl**

Phone  
+49 - (0)3 69 25 - 9 00 91  
Fax  
+49 - (0)3 69 25 - 9 00 92

### Manufacturer's declaration

We, Wilhelm Rutenbeck GmbH & Co. KG declare, that the AC WLAN was manufactured under a full quality assurance system and that the mentioned equipment is in compliance with the essential requirements and provisions of the directives 2004/108/EG and 2006/95/EG.

The complete declaration of conformity can be found under [www.rutenbeck.de](http://www.rutenbeck.de) in the download-sector.

### Disposal

Please do your part to protect the environment by properly recycling this equipment at the end of its useful life. You should never dispose of this device in general unsorted garbage. Improper disposal of the electronic waste can introduce dangerous substances into the environment and affect public health.



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