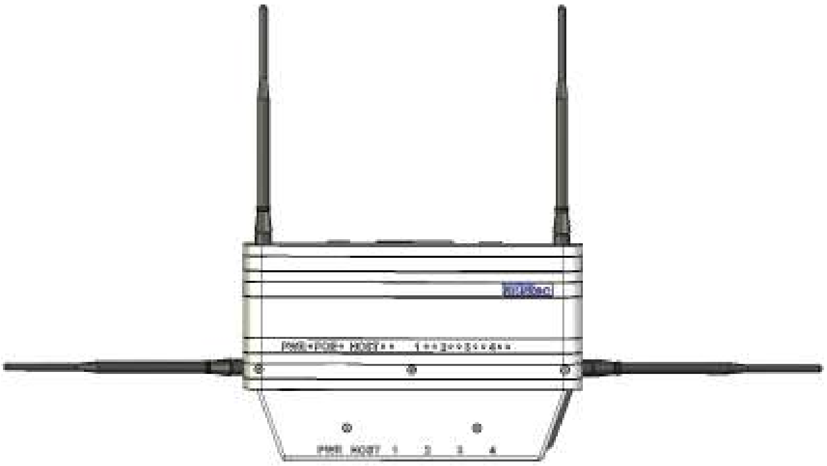
# User Manual

Version 3.0.3



# Access Point/Client

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HIGH RISK APPLICATION HAZARD NOTICE

Unless otherwise stated in the product documentation, the device is not provided with error-tolerance capabilities and  cannot therefore be deemed as being engineered, manufactured or setup to be compliant for implementation or for resale as an online surveillance device in environments requiring safe, error-free performance, e.g. for implementation in nuclear power plants, aircraft navigation, communication systems, or air traffic control, life saving and military facilities whereby possible device failures might result in death, personal injuries, or serious physical and/or environmental damages (i.e. all applications involving high-risk hazard factors).

This is therefore to state that neither ads-tec nor any ads-tec sub-supplier do not hereby undertake any warranty of fitness and/or liability whatsoever, be it by express or by tacit consent, in as far as the suitability of the Firewall to high-risk application hazards is concerned.

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# About us

ads-tec GmbH
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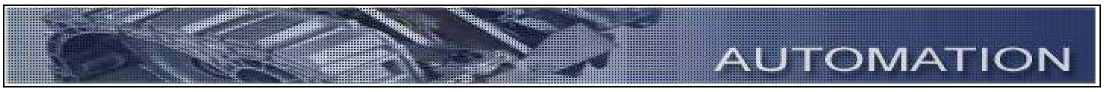
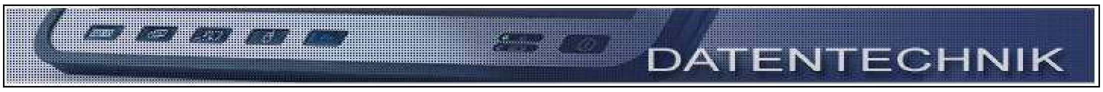
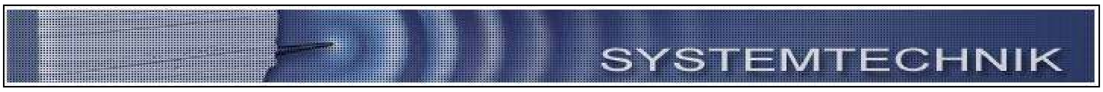
ads-tec GmbH provides large enterprises and globally active corporations with cutting edge technology, up-to-date know-how and comprehensive services in the area of automation technology, data processing technology and systems engineering.



ads-tec GmbH implements full automation solutions from planning to commissioning and is specialized in handling and material handling technologies.



The data systems division develops and produces PC based solutions and offers a broad range of industrial PCs, thin clients and embedded systems.



ads-tec is specialized in modifying and optimizing embedded operating systems and develops software tools to complement its hardware platforms.

# 1 Notes

## 1.1 Relevant Unit Documentation

The following documents are essential to unit setup and operation:

**<u>User Manual (this document)</u>**

Contains information on mounting, placing into operation and operation of the unit, further to technical data on unit hardware.

**<u>Service CD:</u>**

Contains the User Manual, the Assembly Guide, the Quick Install Guide and Tools.

Contains the User Manual, the Assembly Guide, the Quick Install Guide and Tool.

## 1.2 Description of the warning symbols used in this guide

***Warning:***

*The "Warning" symbol precedes warnings on uses or operations that might either lead to personal injury and/or hazards, or to any hardware and software damages.*

***Note:***

*This Symbol indicates special notes, terms and/or conditions that strictly need to be observed to ensure optimised and/or zero-defect operations. It also precedes tips and suggestions for efficient unit implementation and software optimisation.*

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Any violation and infringement thereto will be held liable for compensation of all damages.

## 1.6 STANDARDS

This unit is compliant with the provisions and safety objectives of the following EU Directives:

- This unit is compliant with the CE mark testing specification limits as defined in the European test standards EN 55022 and EN 50082-2
- This unit is compliant to the DIN EN 60950 (VDE0805, IEC950) testing specification limits on "Safety of Information Technology Equipment"
- This unit is compliant to the DIN EN 60068-2-6 (sinusoidal vibration) testing specification limits
- This unit is compliant to the DIN EN 60068-2-27 (shock and bump) testing specification limits

➔

***Note:***

*A corresponding declaration of conformity is available for competent authorities, care of the Manufacturer. Said declaration can be viewed at all times upon request.*

*For full compliance to the legal requirements in force on electromagnetic compatibility, all components and cables used for unit connection must also be compliant with said regulations. It is therefore necessary to employ BUS and LAN cables featuring screened plug connectors, to be strictly installed as per the instructions contained in the User Manual.*

# 2 Operating and Safety Instructions

The unit operates under electrical tension and implements supersensitive component parts. Intervention by the User is required only for power supply line connection operations. Should any further alterations be required, it is necessary to consult either with the Manufacturer directly or with authorised service personnel accordingly. During said connection operations, the unit must be completely powered down. Specific requirements need to be met concerning the prevention of electrostatic discharge on component construction parts during contact. If the unit is opened up by a non authorised individual, the User may be subject to potential hazards and, warranty conditions are terminated.

General Instructions:

- This User's Guide must be read and understood by all Uses and must be available for consultation at all times
- Mounting, operation start-up and unit operation must only be conducted by appropriately qualified and trained personnel
- All individuals and operators using the unit must strictly observe all safety and use instructions as provided within the User's Guide
- All regulations and prescriptions on accident prevention and safety in force at the unit installation site must be strictly observed at all times
- This User's Guide provides all the most important directions as required for safe and security oriented operation
- Safe and optimised unit operations are subject to appropriate storage, proper transport and handling, accurate unit setup, start-up and operation

***Note:***

*Only original ads-tec firmware / software is allowed for any of the adjustments and features described in this User's Guide. Deployment of any firmware / software that has not been released by ads-tec will terminate all warranty conditions.*

## 2.1 Safety Instructions

***Warning:***

*In order to prevent possible unit damages, all cable lines (power supply, interface cables) must be hooked up strictly with the unit in power-OFF conditions.*

***Warning:***

*All unit mounting operations must be strictly conducted under safe, secure and zero-potential conditions.*

***Note:***

*When handling parts and components susceptible to electrical discharge, please accurately observe all the relevant safety provisions.*

*(DIN EN 61340-5-1 / DIN EN 61340-5-2)*

## 2.2 Unit Operation Site

This unit is engineered for industrial application. It is necessary to ensure that specified environmental conditions are maintained at all times. Unit implementation in non-specified surroundings, i.e. onboard ships, in explosive atmospheres or at extreme heights, is prohibited.

***Warning:***

*For the prevention of water condensate accumulation, the unit should be turned ON only when it reaches ambient temperature. This particularly applies when the unit is subject to extreme temperature fluctuations and/or variations.*

*Avoid overheating during unit operations; the unit must not be exposed to direct sunlight or any other direct light or heat sources.*

***Warning:***

*If the unit is operated in outdoor locations, a lightning conductor needs to be present within capture range. Ensure that all incoming conductive systems are equipped with equipotential bonding.*

## 2.3 Damages due to improper Use

Should the service system have evident signs of damages incurred e.g. due to wrong operation or storage conditions or due to improper unit use, the unit must be decommissioned or scrapped. Ensure that it is protected against accidental start-up.

## 2.4 Warranty / Repairs

During the unit warranty period, any repairs thereto must strictly be conducted solely by the manufacturer or by service personnel that has been duly authorised by the manufacturer.

## 2.5 General Directions for the 5GHz Version (802.11 a / 802.11 h) ETSI

- The unit is certified for use of the 5 GHz band in accordance with ETSI EN 301 893 V1.3.1. Users need to observe the following:
- Access Point as well as Access Client units make use of DFS and TPC as standard on all 5 GHz channels, in indoor as well as in outdoor configuration. This means that the devices may always be operated at a maximum transmission power of 23 dBm or 30 dBm, respectively.

***Note:***

*Access Points must not switch off DFS in outdoor locations. Access Clients may switch off DFS, though. This setting is turned off by default.*

- 802.11a channels cannot be set to static values.

***Note:***

*The lower 4 channels (non-DFS) can be set to static values if DFS is turned off. Turning off DFS will however also make the features 60s Scan, 24h Scan and Radar Detection unavailable.*

- When activating the Access Point, the unit will perform an initial Radar Detection Scan during which it will wait 60 seconds for a radar impulse on a randomly chosen channel. Subsequently, it will start operating on this channel.
- The 60s Scan will be repeated every 24 hours and cause a temporary connection loss.
- If an Access Client detects a radar impulse during operation, the Access Point will be notified of this via 802.11h. Triggered by this or its own detection of the impulse, the Access Point will subsequently perform a channel switch to 802.11h. The connection loss in this case is usually less than 80ms.
- The maximum permissible transmission power is different for each channel. Hence users are required to correctly set the antenna amplification in case the standard antenna is replaced!

## 2.6 Antenna List for use in USA and Canada / FCC

- This antenna types can be used with the Access Points and Access Client in USA and Canada. The antennas can be ordered at ads-tec GmbH. For the correct operation you have to use an absorbability cabel for the different antenna types.

| Ads-tec part number | Ads-tec part description | Antenna type | Frequency band | Gain | absorbability |
|---|---|---|---|---|---|
| DZ-PCKO-11032-0 | RAP Antenne 2,4 GHz SMA-R 5dBi | Swivel | 2,4 ~ 2,4835 GHz | 5 dBi | none |
| DZ-PCKO-11033-0 | RAP Antenne 5 GHz SMA-R 7dBi | Swivel | 5,1 ~ 5,835 GHz | 7 dBi | none |
| DZ-PCKO-11034-0 | RAP Antenne 2,4 GHz N-fem. 9 dBi | Omni | 2,4 ~ 2,4835 GHz | 9 dBi | none |
| DZ-PCKO-11034-1 | RAP Antenne 2,4 GHz N-fem. 12 dBi | Omni | 2,4 ~ 2,4835 GHz | 12 dBi | none |
| DZ-PCKO-11035-0 | RAP Antenne 2,4 GHz N-fem. 12 dBi | Panel | 2,4 ~ 2,4835 GHz | 12 dBi | none |
| DZ-PCKO-11035-1 | RAP Antenne 2,4 GHz N-fem. 18 dBi | Panel | 2,4 ~ 2,4835 GHz | 18 dBi | minimum 20m<br>(it is a Ecoflex10*[1] cable to use) |
| DZ-PCKO-11036-0 | RAP Antenne 5 GHz N-fem. 12 dBi | Omni | 5,1 ~ 5,835 GHz | 12 dBi | minimum 14m<br>(it is a Ecoflex10*[1] cable to use) |
| DZ-PCKO-11037-0 | RAP Antenne 5 GHz N-fem. 12 dBi | Panel | 5,1 ~ 5,835 GHz | 12 dBi | minimum 20m<br>(it is a Ecoflex10*[1] cable to use) |
| DZ-PCKO-11037-1 | RAP Antenne 5 GHz N-fem. 20 dBi | Panel | 5,1 ~ 5,835 GHz | 20 dBi | minimum 37m<br>(it is a Ecoflex10*[1] cable to use) |

*[1] It has at 2,4GHz 22.5dB/100m absorbability and at 5GHz 35.9dB/100m absorbability. Additional every plug has 0.5dB absorbability.

***Warning:***

*Behalf of the correct operation you have use an absorbability element for the different antenna types.*

***Note:***

*Also light wave conductor cable can be used. It is necessary to use terminating impedance for the correct use.*

## 2.7 Channel List for use in USA and Canada / FCC

- The following List showes the pool of available frequency and channles for the use in USA and Canada. The customer can define between Indoor and Outdoor use. This option can be selected by a checkbox in the web interface.

| Frequency | Channel | Indoor use | Outdoor use |
|---|---|---|---|
| 2,4 GHz (2.400~2.483GHz) | 1 – 11 | X | X |
| 5 GHz (5.18~5.24GHz) | 36,40,42,44,48 | X | |
| 5 GHz (5.725~5.825GHz) | 149 ,153,157,161,165 | X | |
| 5 GHz (5.725~5.825GHz) | 149 ,153,157,161,165 | | X |

## 2.8 WLAN Instructions

***Warning:***

*These warnings need to be observed during operation:*

- *The unit does not provide a „secure" transmission medium*
- *The units cannot be used to establish a real-time system*
- *The units' system behaviour is non-deterministic*
- *MIN/MAX roaming period is not guaranteed*

*Setting the applicable regulatory authority as well as the respective antenna amplification is solely the responsibility of the operator.*

# 3 Introduction

Reliable, stable and secure wireless LAN connections: employing state-of-the-art technology, the industrial Rugged Access Point (RAP) provides *the* network interface for a variety of applications, such as commissioning, mobile computing and data communication. The RAP supports all applicable standards, including 802.11a/b/g, at a transmission frequency of 2.4 and 5 GHz. Industrial applications necessitate sturdy technology. Whether installed in a cold store or in great heat – thanks to its extended temperature range, the RAP continues to function. Furthermore, the RAP is MIL-certified, which means it passed one of the most demanding shock and vibration tests – this guarantees utmost ruggedness.

***Note:***

*In Case of Updates, it is possible that external Hyperlinks, which are used in this Documentation, will not work properly or may be available under a different Hyperlink.The Company ads-tec (also "ads-tec") does not take over any kind of warranty or adhesion for the functionality of Hyperlinks. Furthermore, ads tec does not take over any kind of warranty or adhesion regarding the installation, use and the accuracy of all open SOURCE software.*

***Note:***

*For the efficient online configuration of your ads tec devices, it is possible to download the current version of the free Tool „**IDA light** "on the company`s homepage **http://www.ads-tec.de**. The Tool offers you for example the possibility of defining individual parameters or whole groups of parameters at a master device and to transfer your settings to a limited selection and/or to all ads tec devices of same design and version, without having to make these configurations time-consuming at each individual device. You also have the possibility of assigning sequential IP addresses for your ads tec devices.*
*With IDA light you can provide comfortably own groups of parameters according to your specific requirements and modify them at any time.*

***Note:***

*This documentation always refers to both Access Point and Access Client, unless explicitly stated otherwise.*

## 3.1 VARIANTS

The device is available in 12 different variants.

| Access Point | RAP1110 | RAP1111 | RAP1210 | RAP1211 | RAP1120 | RAP1121 | RAP1220 | RAP1221 |
|---|---|---|---|---|---|---|---|---|
| 1 WLAN Module | X | X | X | X |  |  |  |  |
| 2 WLAN Modules |  |  |  |  | X | X | X | X |
| 1xCU Ethernet Port (RJ45) | X | X |  |  | X | X |  |  |
| 5xCU Ethernet Port (integrated switch) (RJ45) |  |  |  |  |  |  |  |  |
| 1xOptical Ethernet Port |  |  | X | X |  |  | X | X |
| PoE (IEEE 802.3af) 48V DC | X | X |  |  | X | X |  |  |
| 24 V DC | X |  | X |  | X |  | X |  |
| AC integrated 110-230 V AC |  | X |  | X |  | X |  | X |
| Client Mode available | X | X | X | X | X | X | X | X |
| **Access Client** | **RAC1110** | **RAC1111** | **RAC1510** | **RAC1511** | **RAC1120** | **RAC1121** | **RAC1220** | **RAC1221** |
| 1 WLAN Module | X | X | X | X |  |  |  |  |
| 2 WLAN Modules |  |  |  |  | X | X | X | X |
| 1xCU Ethernet Port | X | X |  |  | X | X |  |  |
| 5xCU Ethernet Port (integrated switch) |  |  | X | X |  |  |  |  |
| 1xOptical Ethernet Port |  |  |  |  |  |  | X | X |
| PoE (IEEE 802.3af) 48V DC | X | X | X | X | X | X |  |  |
| 24 V DC | X |  | X |  | X |  | X |  |
| AC integrated 110-230 V AC |  | X |  | X |  | X |  | X |

**RJ45 (Registered Jack 45 = standardised jack)** is an Ethernet standard frequently used in telecommunication applications. Transmission method is equivalent to 10/100Mbits half & full DUPLEX 100 BASE-TX.

**Optical fibres** are flexible optic media for controlled conduction of light. Contrarily to the Ethernet standard, the fibre optic connection technology is insensitive to voltage interference.

The plugs required for implementation are equivalent to the MTRJ Standard Multimode with a 100Base-FX 100 Mbit/s Ethernet transmission via fibre optics.

## 3.2 Scope of Supply

Package contents need to be checked for integrity and completeness:

- 1 device
- 1 x two-pole COMBICON plugs (in case of 24V DC devices)
  Manufacturer: Phoenix Contact
  Item description/item short text: FMC 1,5 / 2-STF-3,5

- 1 x three-pole COMBICON plugs (in case of 230V AC devices)
  Manufacturer: Phoenix Contact
  Item description/item short text: MC 1,5 / 3-STF-3.81

- Four or eight antennas (depending on variant)
- Grommets / blanking plugs
- Installation kit with mounting plate and fasteners (fixed to device)
- Quick Install Guide / Quick Mount Guide
- GNU General Public License
- Service CD

## 3.3 Environmental Conditions

The unit can be put into operation and used under the following conditions. Failure to observe any one of the specified data will immediately terminate all warranty conditions. ads-tec cannot be held liable for any damages arising due to improper device or unit use and handling.

- Permissible ambient temperature
  during operation    from -20°C to 55°C
  during storage    from -20°C to 60°C

- Humidity
  during operation    10 to 85%, without condensate
  during storage    10 to 85%, without condensate

- Vibration
  during operation    1 G, 10 to 500 Hz
  (DIN EN 60068-2-6)

  Vibration certificate:    MIL-STD-810F 514.5 C-2
  5 to 500 Hz (01-01-2000)
- Shock
  during operation    5 g, with a 30 ms half-cycle
  (DIN EN 60068-2-29)

# 4 Mounting

## 4.1 Mounting Conditions

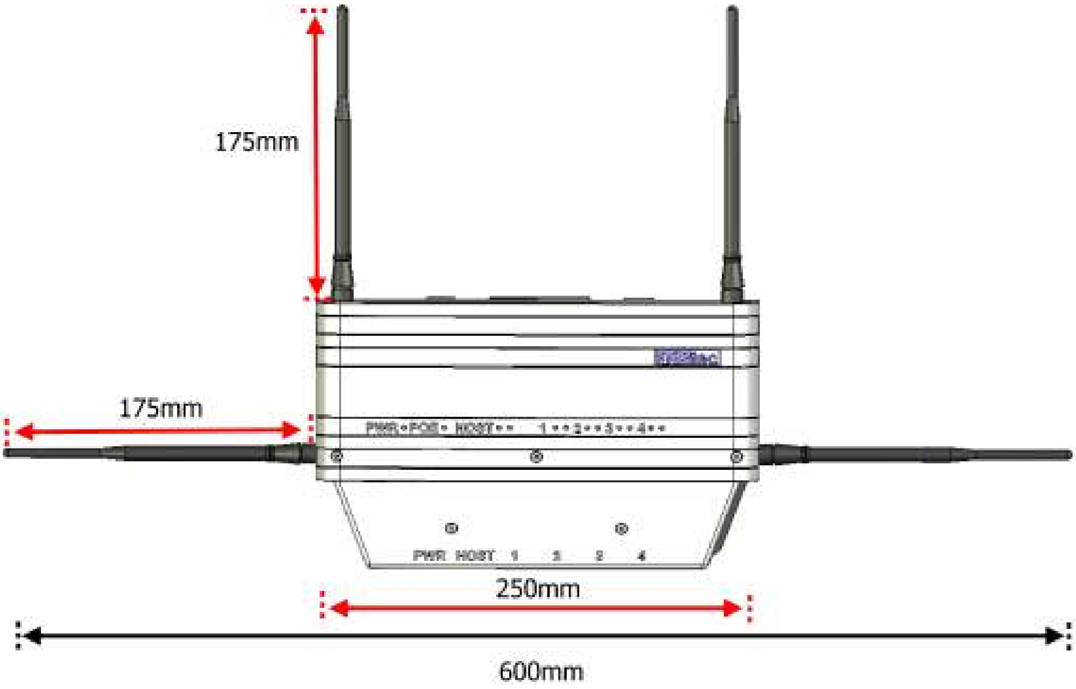
The device is designed for industrial operations and may be employed wherever the environment conditions specified above are met. In order to ensure optimal mounting and operation, the unit should be placed at suitable location at which WLAN connectivity is not impaired. WLAN connectivity is adversely influenced by iron beams and thick concrete walls.

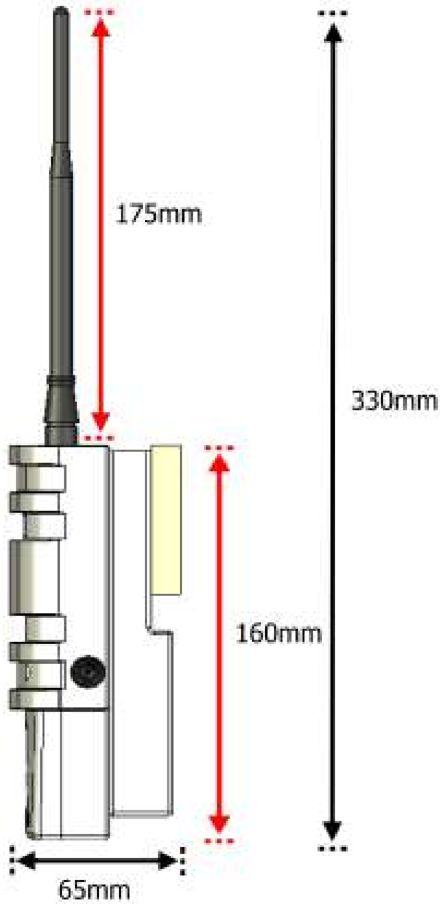
## 4.2 Exterior Device Dimensions

Height: 160 mm (w/o antenna)

Width: 250 mm (w/o antenna)

Depth: 65 mm (w/o antenna)



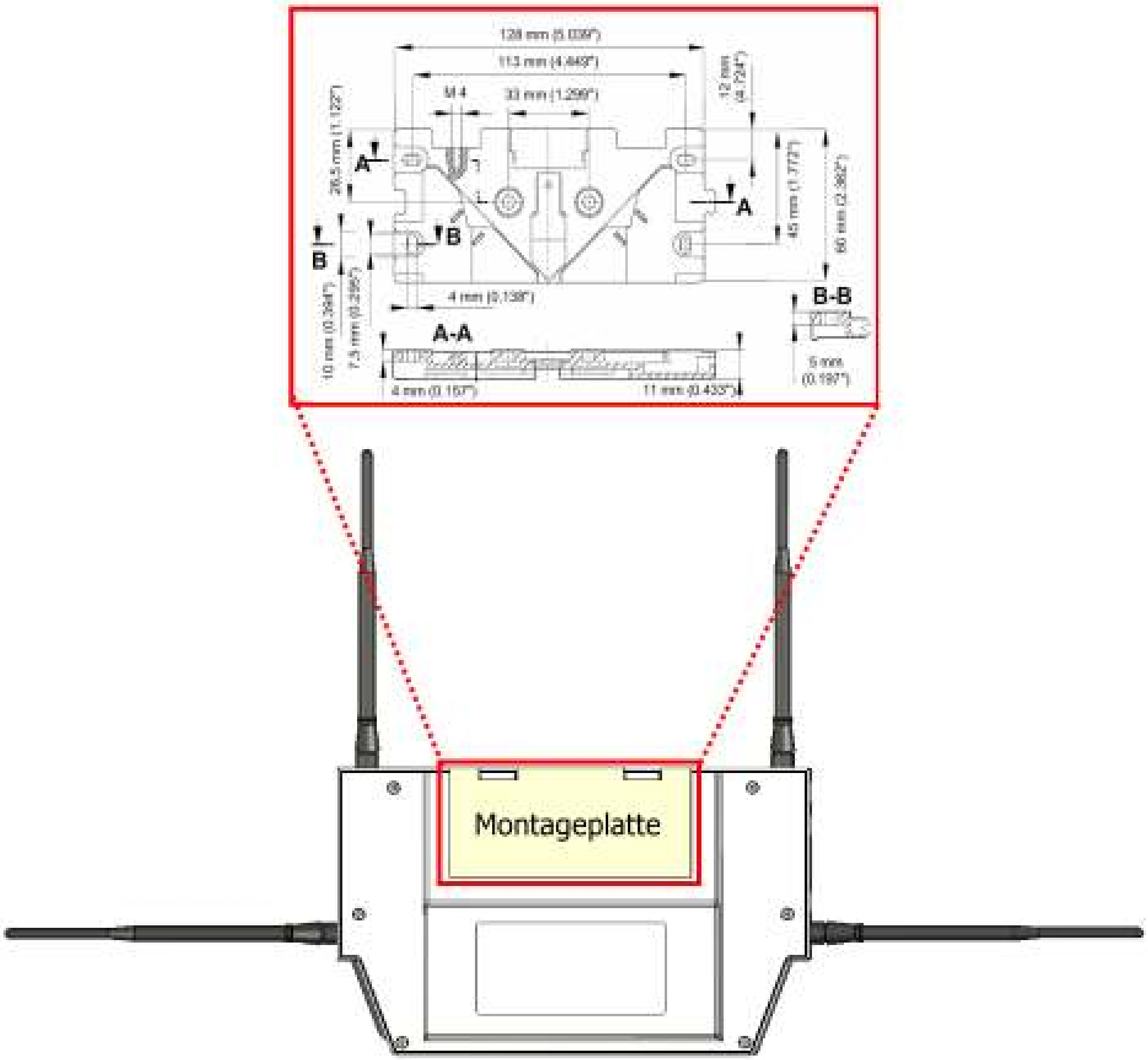

175mm
330mm
160mm
65mm

## 4.3 MOUNTING DIAGRAM

***Note:***

*The mounting diagram shown herein is not 1:1 scale.*

*Please refer to the Quick Install Guide for a 1:1 scale diagram.*

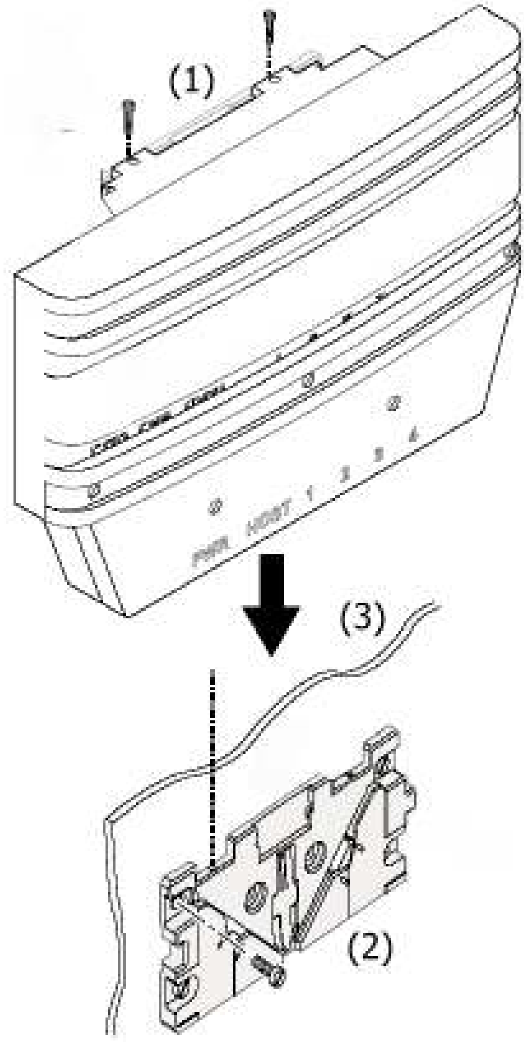


## 4.4 DEVICE MOUNTING

The mounting plate is pre-mounted to the device when delivered to the customer.

1) To install the device in the desired location, loosen the Allen screws (M4x12). **(1)**

2) Fix the mounting plate (w/o device) in the desired location. Ensure that the plate is held by at least two opposing screws. **(2)**



3) Place the device onto the mounted fixture and make sure that device and fixture are flush with each other. **(3)**

4) Secure the device inside the fixture using the previously removed Allen screws. **(1)**

➔

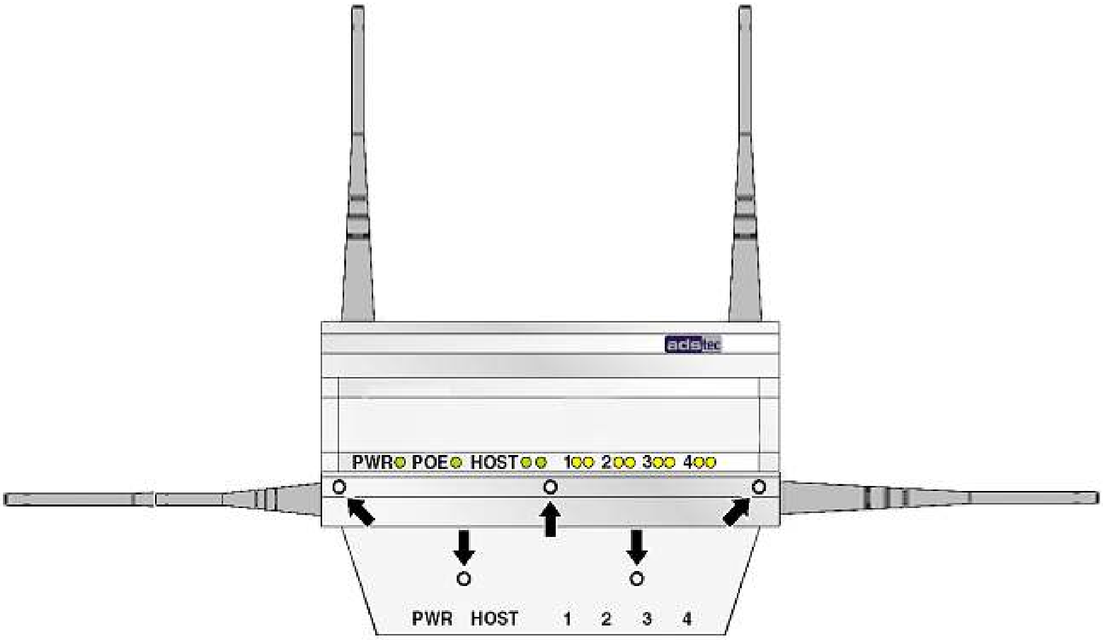
***Note:***

*Please ensure that the device is not mounted behind or next to another object as this may impair the unit's transmission performance and connectivity.*

## 4.5 CONNECTING SUPPLY LINES

The supply connection, as well as device interfaces, is located inside the unit. The maintenance duct cover needs to be removed before supply lines and interface cables can be connected.

Please remove the five screws (M3x8) indicated below.



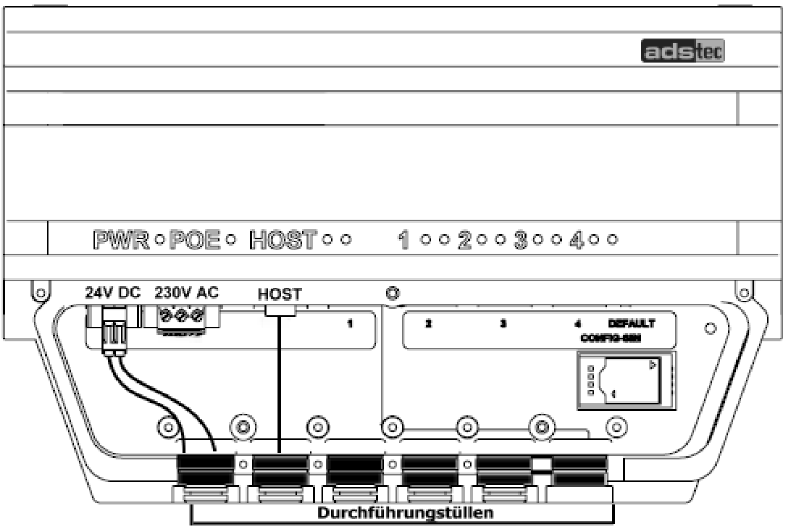
**Warning:**

*To avoid damage to the unit's electronics, switch off the device before establishing or removing any plug connections.*

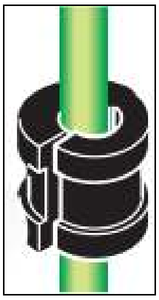
*Observe permissible device voltage.*

Once the maintenance duct cover has been removed, the supply lines can be connected to the device.

The diagram shows an exemplary device configuration with 24V DC power supply and host line.



To ensure IP65 protection all supply lines need to be fitted with suitable grommets.



**Note:**

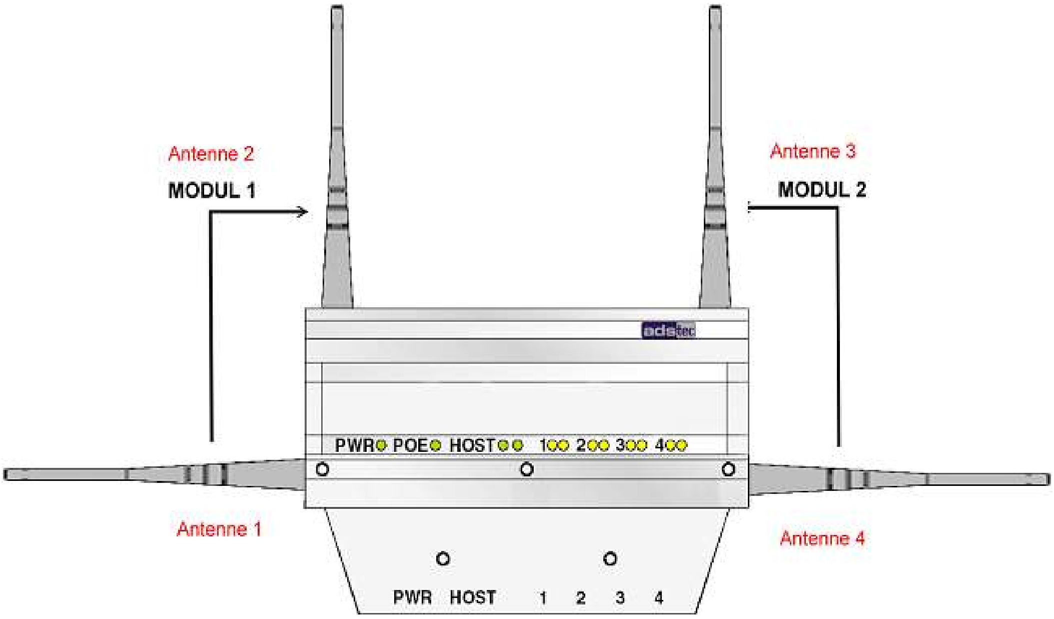
*Grommet sizes need to be chosen in accordance with the respective cable diameters.*

Once the grommets have been placed around the cables, they need to be placed into the intended slots.

Finally, put the maintenance duct cover back onto the device and screw it down with the five screws removed previously.

## 4.6 ANTENNA ASSEMBLY

For each WLAN module, 2 antennas should be installed.



Depending on the device variant, the unit accommodates up to two radio modules for two separate WLANs. The full antenna assembly for each module consists of one vertical and one horizontal antenna. The four or eight antennas supplied work at a frequency of 2.5GHz or 5Ghz (two or four each, respectively).

Screw the antennas onto the antenna connectors.

# 5 System Features

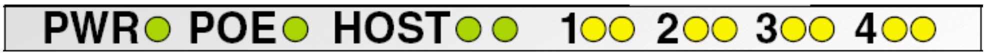
## 5.1 LED Status Indicators

The device is fitted with LEDs that indicate the status of the respective interfaces. This facilitates an on-site status diagnosis of the Access Point/Client. The following overview explains the different states of the LED indicators:

**Legend**

| LED status | Shown in table as |
|---|---|
| off | □ |
| green | 🟩 |
| green, flashing | ◧ |
| ret | 🟥 |
| orange | 🟧 |
| orange, flashing | ◧ |

**Power Supply / Power over Ethernet / HOST / Switch**



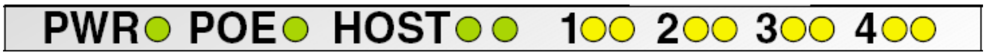
| **Power** | **Status** | **Description** |
|---|---|---|
| PWR | □ | No power supply. |
| PWR | 🟩 | Device connected to power supply and ready for use. |
| | | |
| **Power over Ethernet** | | |
| POE | □ | Device not connected to power supply via PoE. |
| POE | 🟩 | Device connected to power supply via PoE and ready for use. |
| | | |
| **HOST** | | |
| Left LED LINK | □ | Interface not connected to remote station. |
| Left LED LINK | 🟩 | Interface connected to remote station and ready for use. |
| Right LED ACT | □ | No data transfer between device and remote station. |
| Right LED ACT | ◧ | Indicates data transfer between device and remote station. |
| **Switch 1 / 2 / 3 / 4** | | |

| | | |
|---|---|---|
| LEFT LED LINK | □ | Interface not connected to remote station. |
| LEFT LED LINK | 🟩 | Interface connected to remote station and ready for use. |
| RIGHT LED ACT | □ | No data transfer between device and remote station. |
| Right LED ACT | ◧ | Indicates data transfer between device and remote station. |

### 5.1.1 LED Status Indicators during Operation

**Behaviour of Status Indicators during Boot Sequence**

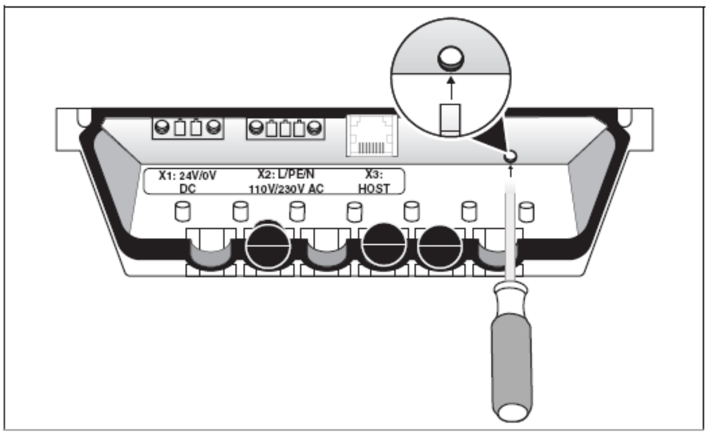
The boot sequence is initiated as soon as the Access Point / Client is connected to a power supply. The **HOST** indicator LEDs can be used to monitor the boot sequence. Please refer to the following overview to verify the device boots correctly. The overview assumes that no cable is connected to **HOST** / PoE.



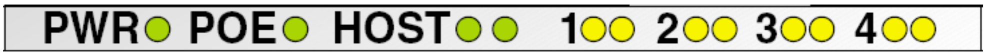
| **PWR** | **Status** | **Description** |
|---|---|---|
| L+ | 🟩 | Device is connected to power supply via POWER and ready for use. |
| | | |
| **POE** | | |
| L+ | 🟩 | Device is connected to power supply via BACKUP and ready for use. |
| | | |
| **HOST** | | |
| LINK / ACT | ◧ ◧ | LEDs flash briefly once |
| | ◧ | LED flashes slowly, then quickly (20x) |
| | □ | LED extinguished |

## BEHAVIOUR OR STATUS INDICATORS DURING RESET TO DEFAULT SETTINGS

The reset button located under the interface cover may be used to reset the Access Point / Client to factory default settings at any time and without regard to the current device configuration.



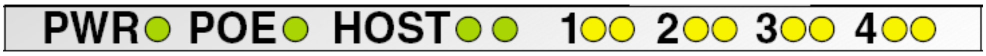
To reset device to default settings, press reset button and switch on the device. Keep reset button pressed for approx. 20 seconds. Button may be released as soon as left HOST indicator LED turns green. The following overview assumes that no cable is connected to **HOST** / PoE. Please refer to the overview to monitor the reset to factory defaults.



| **PWR** | **STATUS** | **DESCRIPTION** |
|---|---|---|
| L+ | 🟩 | Device is connected to power supply via POWER and ready for use. |
| | | |
| **POE** | | |
| L+ | 🟩 | Device is connected to power supply via BACKUP and ready for use. |
| | | |
| **HOST** | | |
| LINK / ACT | ◧ ◧ | LEDS FLASH CONTINUOUSLY |
| LINK / ACT | □ □ | LEDS EXTINGUISHED |
| | | |

## BEHAVIOUR OF STATUS INDICATORS DURING FIRMWARE UPDATE

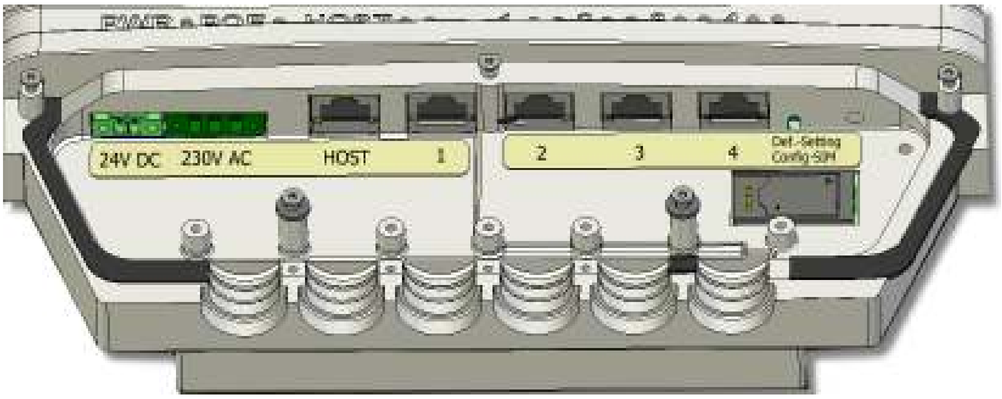
The web interface can be used to perform firmware updates. Once initiated, the actual update may take several minutes to complete. Please refer to the following overview to monitor the firmware update sequence.



| PWR | STATUS | DESCRIPTION |
|---|---|---|
| L+ | 🟩 | Device is connected to power supply via POWER and ready for use. |
| | | |
| POE | | |
| L+ | 🟩 | Device is connected to power supply via BACKUP and ready for use. |
| | | |
| HOST | | |
| LINK / ACT | ◧ ◧ | LEDS FLASH QUICKLY |
| LINK / ACT | □ ◧ | LINK EXTINGUISHED / ACT FLASHES |
| LINK / ACT | 🟩 □ | LINK LIT UP / ACT EXTINGUISHED |
| LINK / ACT | 🟩 ◧ | LINK LIT UP / ACT FLASHES SLOWLY |
| LINK / ACT | 🟩 ◧ | LINK LIT UP / ACT FLASHES QUICKLY |
| LINK / ACT | 🟩 □ | LINK LIT UP / ACT EXTINGUISHED |
| THE WEB INTERFACE MAY SUBSEQUENTLY BE STARTED BY SELECTING "TRY TO RECONNECT" | | |

## Interface Overview

The following figure shows the available device interfaces. The exact interfaces may differ depending on the device variant.



The device is equipped with the following interfaces:

1. Power 24V DC power supply (two-pole COMBICON plug)
2. Power 230V AC power supply (three-pole COMBICON plug)
3. HOST RJ45 (PoE) or Optical connector
4. SWITCH 4x RJ45 connector (optional feature for Access Client)
5. Default reset button
6. SIM card reader

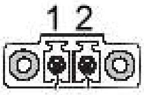
***Note:***

*Input voltages may be connected redundantly (i.e. Power 24V DC, Power 230V AC and PoE via HOST).*

### 5.1.2 Power Supply 24V DC

A bushing terminal with threaded connector is used to establish the power supply connection (diagram shows bushing inside device).

| PIN NUMBER | SIGNAL NAME |
|---|---|
| 1 | 24V DC |
| 2 | 0V DC |



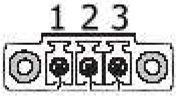
PIN 1: = L+ 24V DC power supply

PIN 2: = GND Ground

### 5.1.3 Power Supply 110/230 VAC

A bushing terminal with threaded connector is used to establish the power supply connection (diagram shows bushing inside device).

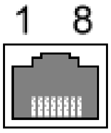
| PIN NUMBER | SIGNAL NAME |
|---|---|
| 1 | 110/230 V AC |
| 2 | PE |
| 3 | 0 V DC |



### 5.1.4 Power Supply PoE / HOST (IEEE 802.AF)

Wire pairs 4/5 (positive pole) and 7/8 (negative pole) are used for power over Ethernet functionality.

| PIN NUMBER | SIGNAL NAME |
|---|---|
| 1 | TX + |
| 2 | TX - |
| 3 | RX + |
| 4 | PoE/G |
| 5 | PoE/G |
| 6 | RX - |
| 7 | PoE/-48V |
| 8 | PoE/-48V |



***Note:***

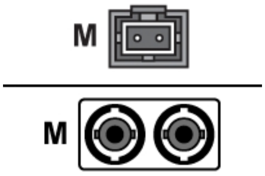
*Transmission of 48V DC power supply is designed for a maximum feeding distance of 100 meters (approx. 330 ft.) in accordance with Ethernet specification requirements. The connected devices may draw 350 mA of power; maximum supply power is 15.4 Watts.*

*For PoE power supply to be possible, all network hubs and switches need to be PoE-compatible.*

### 5.1.5 Fibre Optic Ethernet

The optical connection requires an MTRJ fibre optic connector.

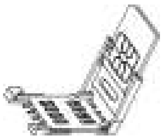
Multimode cable, MTRJ connector to Duplex connector 62.5/125µm.

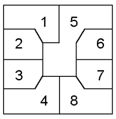


### 5.1.6 SIM Card Reader, ISO 7816-compatible

The SIM card reader is used for saving configuration data.

| PIN NUMBER | SIGNAL NAME |
|---|---|
| 1 | VCC 5 Volt |
| 2 | RESET |
| 3 | CLOCK |
| 4 | n/c |
| 5 | GND |
| 6 | n/c |
| 7 | I/O |
| 8 | n/c |





**Note:**

*Interface and supply connectors are located on the bottom of the device. Secure plugs against slipping out.*

# 6 Initial Device Operations

## 6.1 First-time Configuration

***Warning:***

*First-time configuration of the device can only be performed via RJ45/optical interface marked HOST.*

*AN RJ45 PATCH CABLE IS REQUIRED FOR FIRST-TIME CONFIGURATION.*

Connection of 24V DC / PoE voltage supply

The device may be powered by a **24V DC (two-pole plug)** voltage supply source or via a **PoE connection**. The required COMBICON plugs are supplied with the device.

Connect the device to the appropriate voltage supply source.

Connection of RJ45 / optical network cable

For first-time device operations, a connection between the device and a PC via an RJ45/optical network cable is strictly required.

Connect the device to a PC:

Device HOST connector <-> PC LAN adapter

## 6.2 Manual Network Adapter Configuration via RJ45/optical Cable

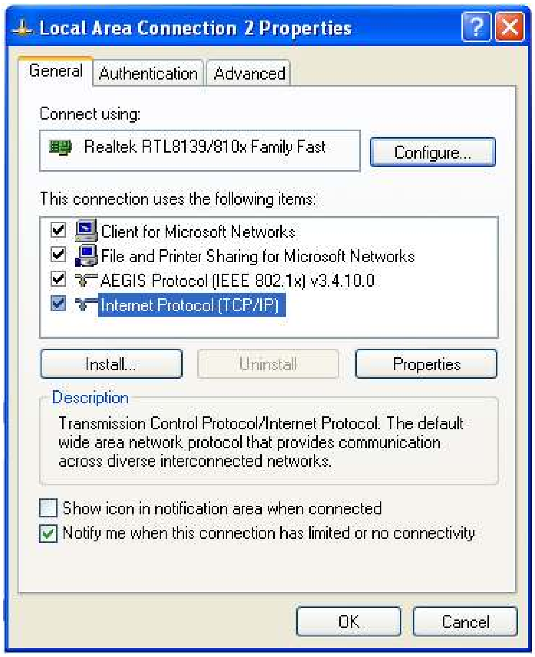
***Note:***

*The following directions and screenshots refers to settings in Windows XP®. The paths and properties described herein may differ for other operating systems.*

Open the Properties tab for the network adapter in use. The path is as follows:

**Start> Control Panel > Network Connections > Local Area Connection > Properties.**

Select **Internet Protocol (TCP/IP)** in the dialogue window that comes up and then click **Properties**.



Local Area Connection 2 Properties

General | Authentication | Advanced

Connect using:

Realtek RTL8139/810x Family Fast — Configure...

This connection uses the following items:

☑ Client for Microsoft Networks
☑ File and Printer Sharing for Microsoft Networks
☑ AEGIS Protocol (IEEE 802.1x) v3.4.10.0
☑ Internet Protocol (TCP/IP)

Install... | Uninstall | Properties

Description

Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

□ Show icon in notification area when connected
☑ Notify me when this connection has limited or no connectivity

OK | Cancel

Click to select: **Use the following IP address**

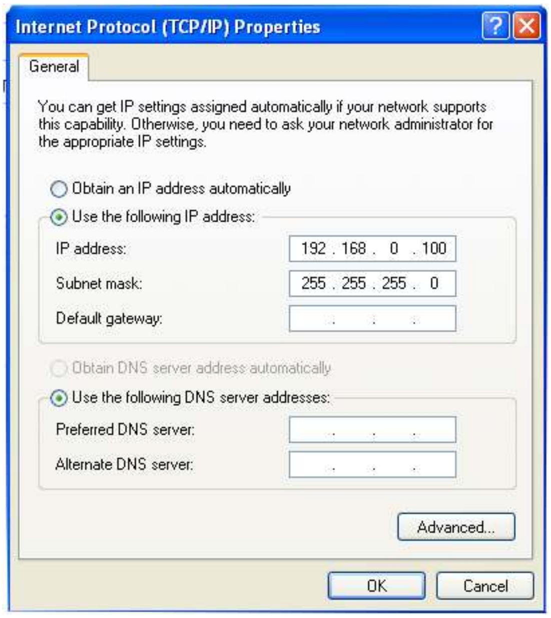
Access to the device is only possible when the following parameters are set as the static IP address or if the computer is located in the same subnet space:

**IP ADDRESS: 192.168.0.100**

> ***Note:***
>
> *The last set of digits must be a number between 1 and 253. In the example, "**100**" was chosen.*

Once the IP address has been entered, the subnet mask address must be set as well. Clicking directly into the field **Subnet mask** will automatically set the correct subnet mask.

**SUBNET MASK: 255.255.255.0**



Internet Protocol (TCP/IP) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically
● Use the following IP address:

IP address: 192 . 168 . 0 . 100
Subnet mask: 255 . 255 . 255 . 0
Default gateway: . . .

○ Obtain DNS server address automatically
● Use the following DNS server addresses:

Preferred DNS server: . . .
Alternate DNS server: . . .

Advanced...

OK | Cancel

You may now close the dialogue windows by clicking "**OK**".

## 6.3 WLAN Network Adapter Configuration

Follow the directions as given above to configure the WLAN network adapter. However, the IP address parameter needs to be set to a different value. Enter the following IP address in the Internet Protocol properties dialogue:

**IP Address: 192.168.0.200**

➔

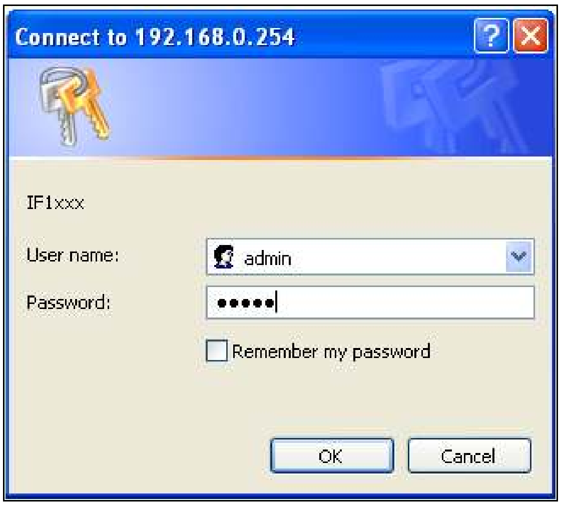
> ***Note:***
>
> *The last set of digits must be a number between 1 and 253. In the example, "**200**" was chosen.*

### Calling up the Device Web Interface

To access and open the device web interface, start up your web browser. In the browser's address bar, enter the following IP address then confirm with "**Enter**".

**Login**

Once the IP address has been entered and confirmed, the login prompt appears. Enter the default values in the login panel.



Connect to 192.168.0.254

IF1xxx

User name: admin

Password: •••••

☐ Remember my password

Factory default settings are as follows:

**User name : admin**

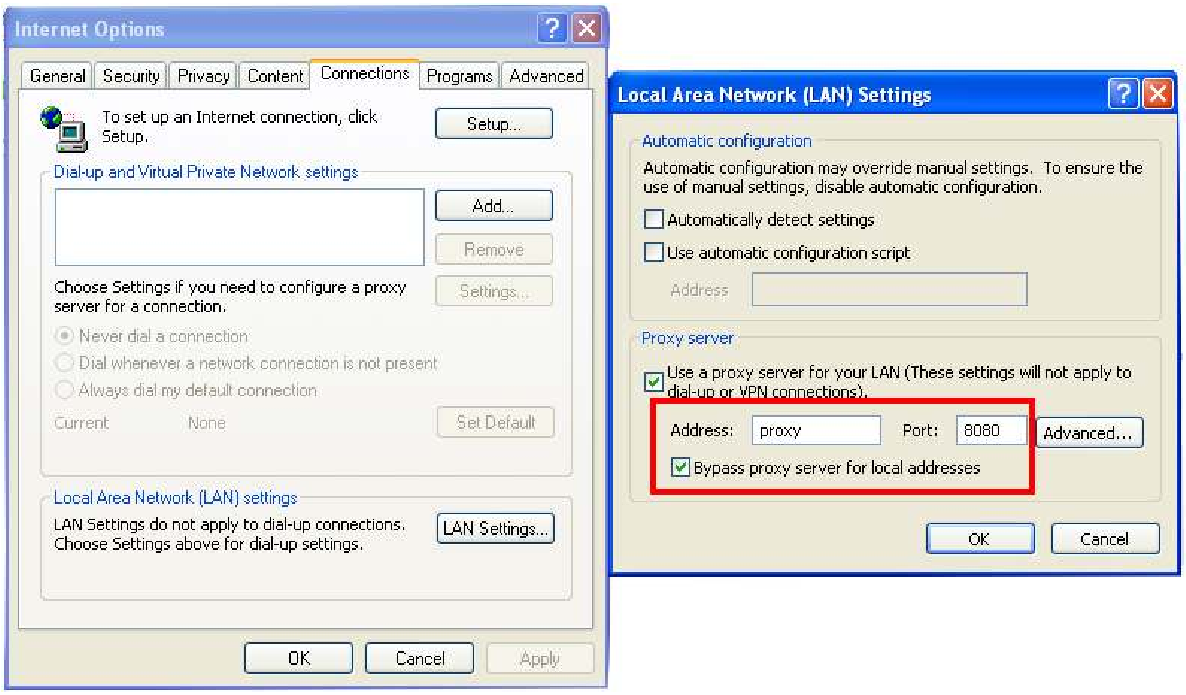
**Password : admin**

Confirm your input by clicking **OK**. The device web interface will subsequently appear.

➔ ***Note:***

*If the login prompt does not appear ensure that the device has been connected via a RJ45/optical cable. Otherwise, connect the device to a PC (Device HOST connector <> PC LAN adapter).*

*If there still is no connection to the firewall login prompt check your proxy and local firewall settings. It is often the case that local subnet addresses (e.g. 192.168.x.x) are diverted to a proxy server. In this case it is possible to select the "Bypass proxy server for local addresses" check box and enter the address spaces in question.*



Internet Options

General | Security | Privacy | Content | Connections | Programs | Advanced

To set up an Internet connection, click Setup.

Dial-up and Virtual Private Network settings

Choose Settings if you need to configure a proxy server for a connection.

● Never dial a connection

○ Dial whenever a network connection is not present

○ Always dial my default connection

Current None

Local Area Network (LAN) settings

LAN Settings do not apply to dial-up connections. Choose Settings above for dial-up settings.

Local Area Network (LAN) Settings

Automatic configuration

Automatic configuration may override manual settings. To ensure the use of manual settings, disable automatic configuration.

□ Automatically detect settings

□ Use automatic configuration script

Address

Proxy server

☑ Use a proxy server for your LAN (These settings will not apply to dial-up or VPN connections).

Address: proxy Port: 8080

☑ Bypass proxy server for local addresses

## 6.4 First-time Configuration via Web Interface

### Activating WLAN Module(s)

Go to the following web interface page to activate the WLAN module(s):

**Basic Settings>Interfaces>WLAN 1/2**

Depending on the actual device variant, the unit is equipped with one or two WLAN modules. Activate the desired WLAN module by checking the **Activate Interface** check box in the web interface.

### WLAN Module Configuration:

Operating Mode:

The device operating mode needs to be set. Available options are **Access Point** and **Client**.

Network Name (SSID)

The SSID is the visible name of the WLAN. The default setting is **ads**.

You may choose to set the SSID to any alphanumeric value.

WLAN Mode:

Select your preferred WLAN mode:

***Warning:***

*Only use a WLAN mode that is supported by all of your WLAN devices.*

Regulatory Authority:

Select your current location.

***Note:***

*The FCC version of the device does not offer the "Regulatory Authority" option.*

***Warning:***

*Setting the applicable regulatory authority as well as the respective antenna amplification is solely the responsibility of the operator.*

Channel:

Default setting: **Auto**

The device automatically determines the best channel setting.

Saving Configuration Settings:

All changes need to be saved to be activated. To save the modified settings, select the menu item:

**Configuration> Save**.

Click **Save** in the subsequent dialogue window. The current configuration will now be transmitted and saved.

## 6.5 Wireless Network Configuration

Once again open up the properties panel located at:

**Start> Control Panel > Network Connections**

Right-click on your current wireless connection and then select **Properties**. Now click on the tab **Wireless Networks**. In the **Preferred Networks** section on that tab, click the button **Add**. Enter the following parameters:

**Network Name SSID**: (self-chosen non-default network name), or the default value **ads**

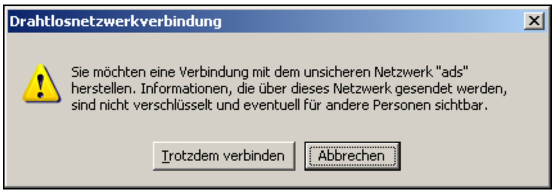
**Network Authentication**: Open

**Data Encryption**: Disabled

You may now close the dialogue windows by clicking "**OK**".

## 6.6 Establishing a Wireless Network Connection

In order to establish a wireless connection to the device, click on the WLAN icon you're your taskbar. A window listing all available networks will appear. Select the wireless network with the appropriate SSID (self-chosen or default name **ads**) and click on **Connect**. The following warning dialogue will pop up:



Drahtlosnetzwerkverbindung

Sie möchten eine Verbindung mit dem unsicheren Netzwerk "ads" herstellen. Informationen, die über dieses Netzwerk gesendet werden, sind nicht verschlüsselt und eventuell für andere Personen sichtbar.

In order to connect to the WLAN you need to select **"Connect Anyway"**. The computer will now establish a wireless connection to the device.

> ***Note:***
>
> *In case you are unable to establish a connection to the device, we recommend resetting the device to factory default settings.*

> ***Note:***
>
> *The current configuration does not use date encryption to secure wireless communication channels. We recommend using data encryption. Please refer to the chapter Configuration>Security>WLAN 1/2 for details on how to activate and configure encryption.*

# 7 Access Point Setup Wizard

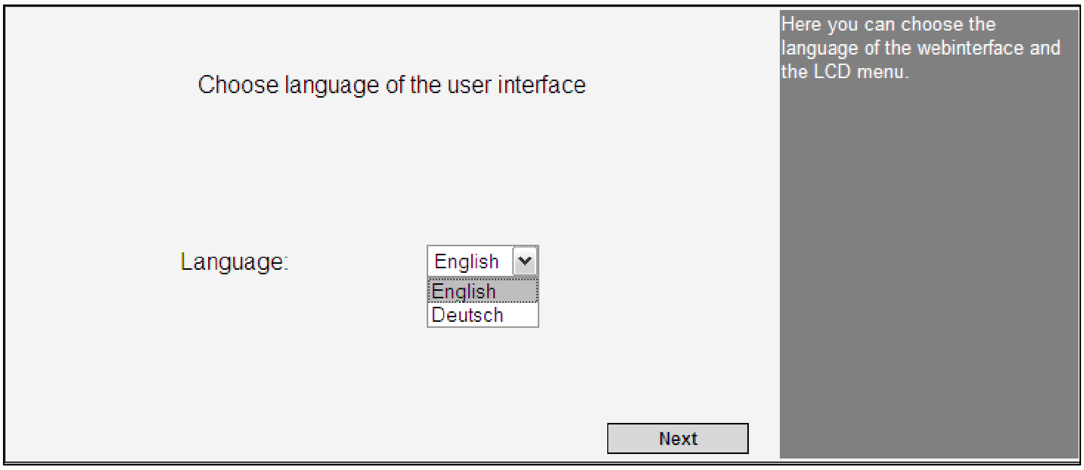
## 7.1 First-time Configuration using the Setup Wizard

To perform a basic configuration, select the following under **Quick Links**:

**START SETUP WIZARD**

### 7.1.1 Language Selection

Via the dialogue window it is possible to set the user interface language.



Choose language of the user interface

Language: English

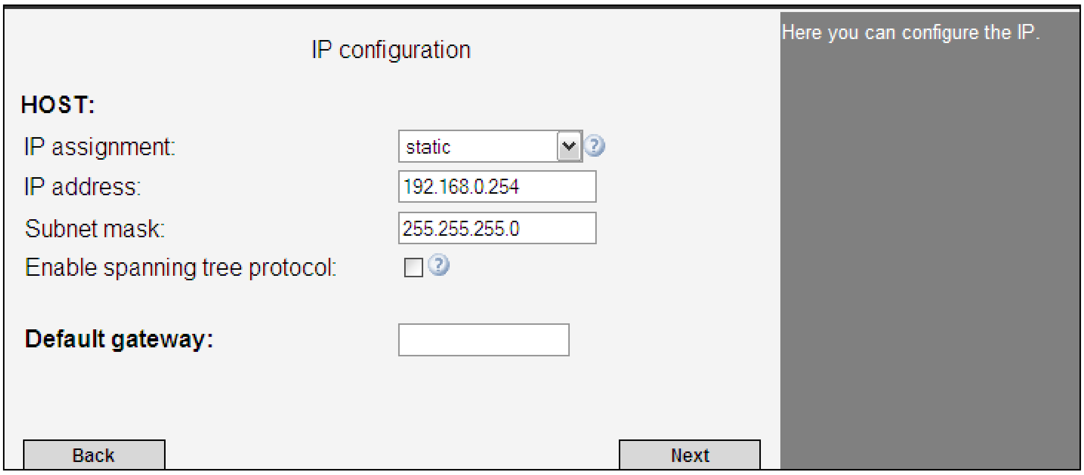
Here you can choose the language of the webinterface and the LCD menu.

The selected language is used for the overall web interface.

Confirm your choice by clicking: **Next**

### 7.1.2 IP Configuration

The IP configuration settings define the behaviour of the HOST interface. The IP address may be assigned statically or automatically.



IP configuration

**HOST:**

IP assignment: static

IP address: 192.168.0.254

Subnet mask: 255.255.255.0

Enable spanning tree protocol: □

**Default gateway:**

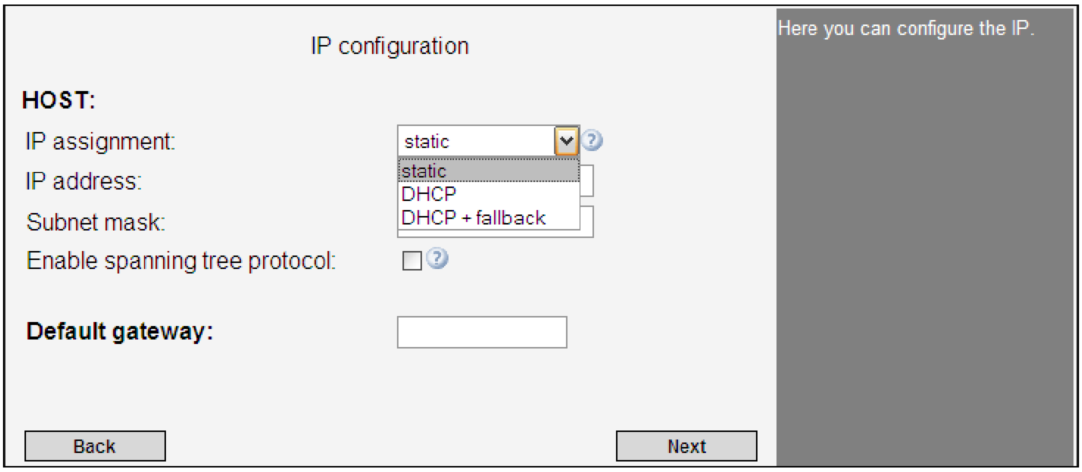
Here you can configure the IP.

Static:

If this option is selected, it is possible to set a static IP address. Static IP allocation requires entering the IP address and subnet mask.

Default values are:

| | |
|---|---|
| IP address: | **192.168.0.254** |
| Subnet mask: | **255.255.255.0** |



IP configuration

**HOST:**

IP assignment: static

IP address:

Subnet mask:

Enable spanning tree protocol: □

**Default gateway:**

DHCP:

The DHCP function requests an IP address from a DHCP server and subsequently allocates IP addresses automatically.

DHCP fallback:

This option allows for automatic IP address allocation. Should there be an error with the automatic allocation, the IP allocation automatically switches to the static setting.

Activate Spanning Tree Protocol:

The Spanning Tree Protocol (STP) is used to avoid redundant network loops, especially in switched environments.

If this option is activated, it is possible to establish redundant network connections.

Standard Gateway:

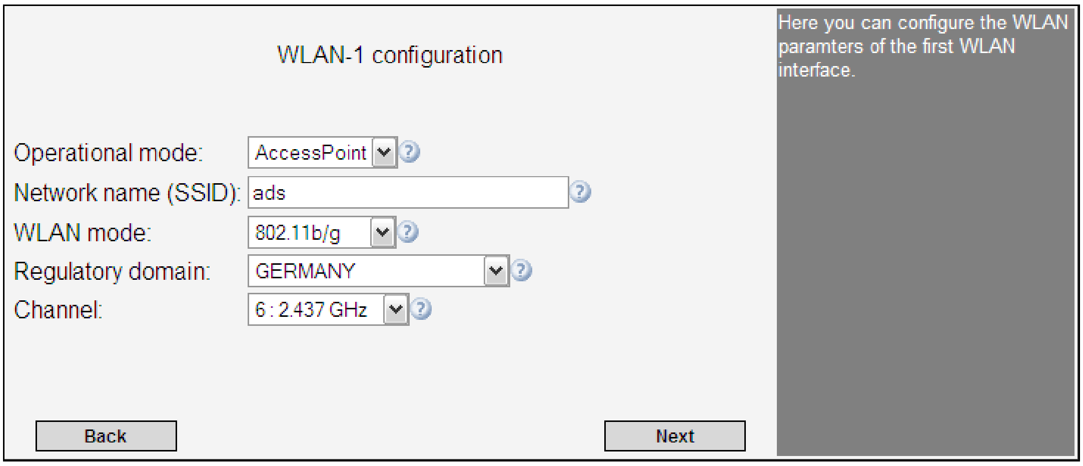
The IP address entered as standard gateway address is used to establish a connection to an address located outside of the device's own IP subnet (i.e. outside 192.168.0.254 in the example given previously). However, the standard gateway itself needs to be inside the device's IP subnet address space. In case IP allocation was set to DHCP, the standard gateway address may be dynamically overwritten, providing the DHCP server supports this. The standard gateway may, for instance, be required in order to reach an NTP time server or to relay the IP address to WLAN clients in case the device serves as a DHCP server itself.

Now click **Next**

### 7.1.3 WLAN-1 Configuration

The next dialogue is used to configure all relevant basic settings for WLAN operation.

Access Point Mode



WLAN-1 configuration

Operational mode: AccessPoint

Network name (SSID): ads

WLAN mode: 802.11b/g

Regulatory domain: GERMANY

Channel: 6 : 2.437 GHz

Here you can configure the WLAN paramters of the first WLAN interface.

**OPERATING MODE:**

Use this option to switch between the two operating modes **Access Point** and **Access Client**.

> ***Note:***
>
> *The RAC (Access Client) does not offer an operating mode option. It is permanently set to Access Client mode.*

Access Point:

In Access Point mode, the device serves as a network gateway for other wireless devices (clients).

Access Client:

In Access Client mode, the device tries to establish a connection to an Access Point in order to establish a connection with the network.

**NETWORK NAME (SSID):**

Use this option to assign a name to your wireless network. We recommend not using any names that allow conclusions with regard to your company, department or the type of data transmitted. Any clients that want to establish a connection with this Access Point need to know this network name.

Default setting is: **ads**

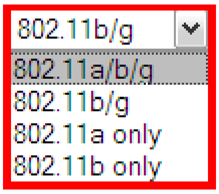
> ***Note:***
>
> *The SSID may consist of a maximum of 32 characters. Valid characters are: a-z, A-Z, 0-9, valid special characters: . _ - ? $ @ ! { } [ ] ( ) + # ; , < > | : * ~ % $ & / =*

### WLAN Mode:

Use this option to select the wireless standard to employ. All clients that are meant to communicate with this Access Point need to be compatible with the selected wireless standard.

The following WLAN modes can be chosen:

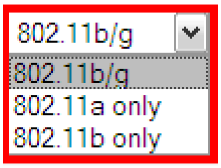
### Access Client:



802.11b/g

802.11a/b/g
802.11b/g
802.11a only
802.11b only

### Access Point:



802.11b/g

802.11b/g
802.11a only
802.11b only

### Regulatory Authority

Under this option, select the country in which the device is operated. This country setting ensures that applicable national regulations are observed in each country.

> ***Note:***
>
> *The FCC version of the device does not offer the "Regulatory Authority" option.*

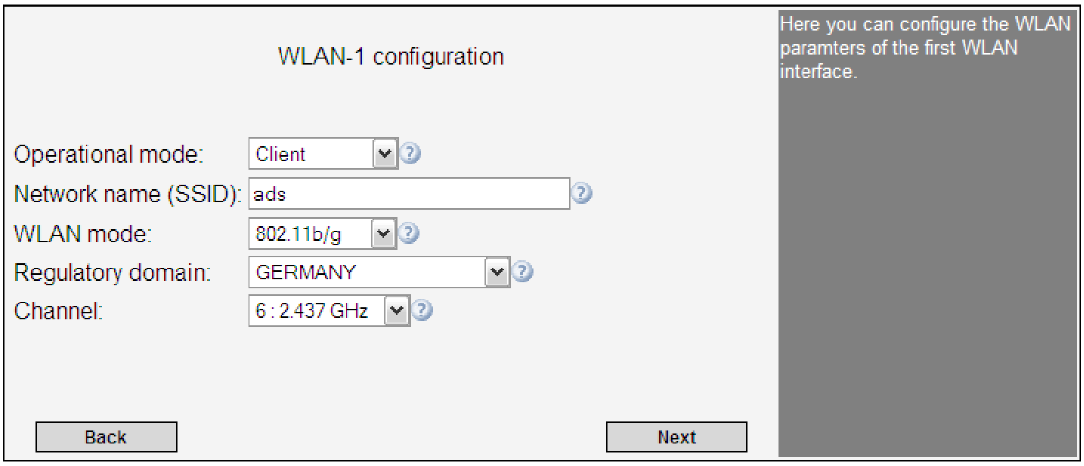
> ***Warning:***
>
> *A wrong country setting may lead to illegal radio frequency settings which are punishable by law.*
>
> *The operator is solely responsible for ensuring the correct country setting.*

### Channel:

Depending on operator settings, the device can choose a transmission channel automatically or use a manually selected channel. We recommend using automatic channel selection (option **Auto**). In the event of channel interferences, the device can only switch to an interference-free channel if automatic channel selection is activated.

> ***Note:***
>
> *5GHz channels cannot be selected statically; instead, they are chosen randomly from the available free channels. (This constraint is required for device approval by law.)*
>
> *In case other WLANs are operated in parallel, manual radio field planning is essential in order to avoid limitations to wireless communications. In this case, the transmission channel should be chosen manually.*
>
> *Please note that DFS needs to be switched off in order for channels to be selected manually.*

Access Client Mode



WLAN-1 configuration

Operational mode: Client

Network name (SSID): ads

WLAN mode: 802.11b/g

Regulatory domain: GERMANY

Channel: 6 : 2.437 GHz

Here you can configure the WLAN paramters of the first WLAN interface.

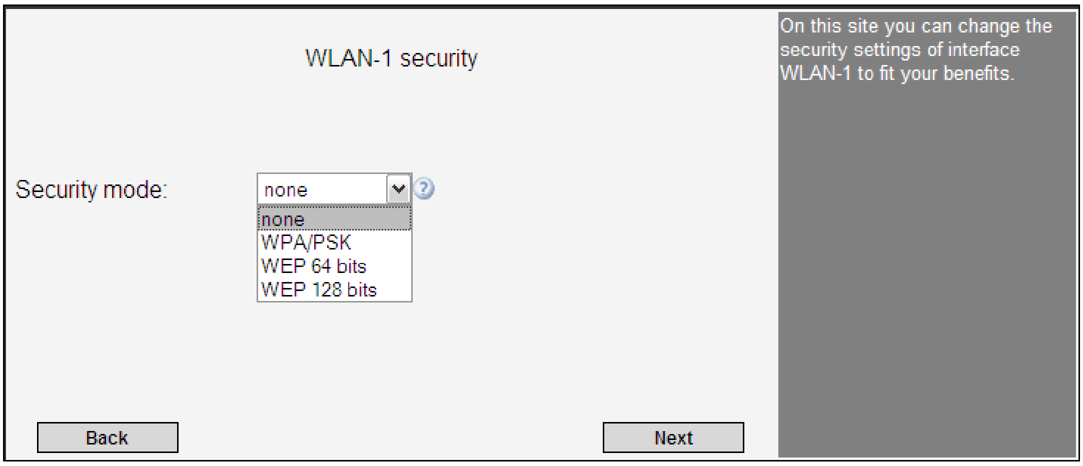
Client Mode differs with regards to the following additional configuration settings:

Outdoor:
This option must be activated if the unit is operated outdoors. Activating this function will turn off all channels that may legally not be used outdoors.

Disable DFS:
Activating this option will turn off DFS on the 5GHz band. All channels that can be used without DFS may then be selected manually. This option must not be activated if the unit is operated outdoors.

### 7.1.4 WLAN-1 Security

Use the WLAN security option to configure the applicable security standards for your WLAN. The following modes can be selected:



WLAN-1 security

Security mode: none

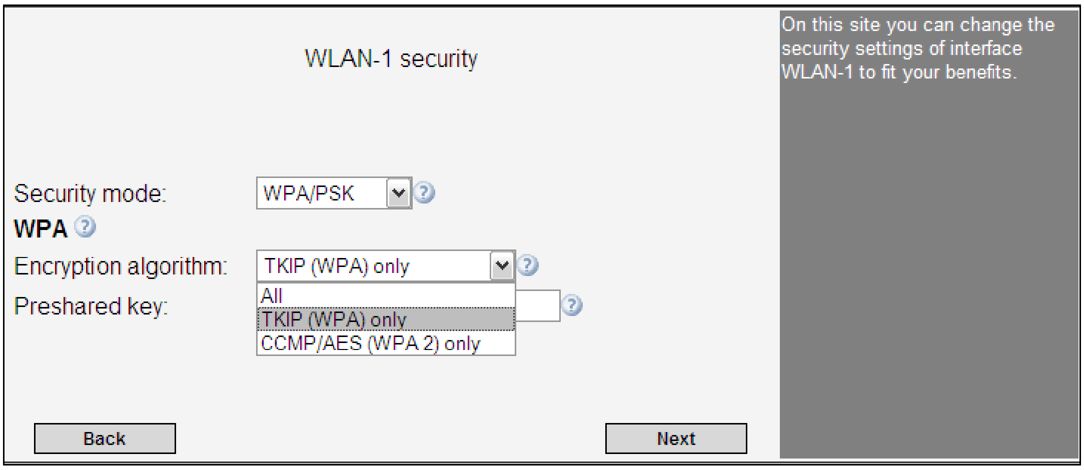
On this site you can change the security settings of interface WLAN-1 to fit your benefits.

## WPA/PSK

WPA/PSK mode secures communications by requiring a keyword and employing a particular data encryption method. The keyword (Pre-Shared Key) may contain a minimum of 8 and a maximum of 63 characters. Rather than actual words, we recommend using alphanumeric combinations of letters and numbers in order to ensure optimal security.

***Note:***

*Pre-Shared Key specifications: 8-63 characters; valid are all characters between ASCII code 32 and 116*


WLAN-1 security

On this site you can change the security settings of interface WLAN-1 to fit your benefits.

Security mode: WPA/PSK

WPA

Encryption algorithm: TKIP (WPA) only

Preshared key:

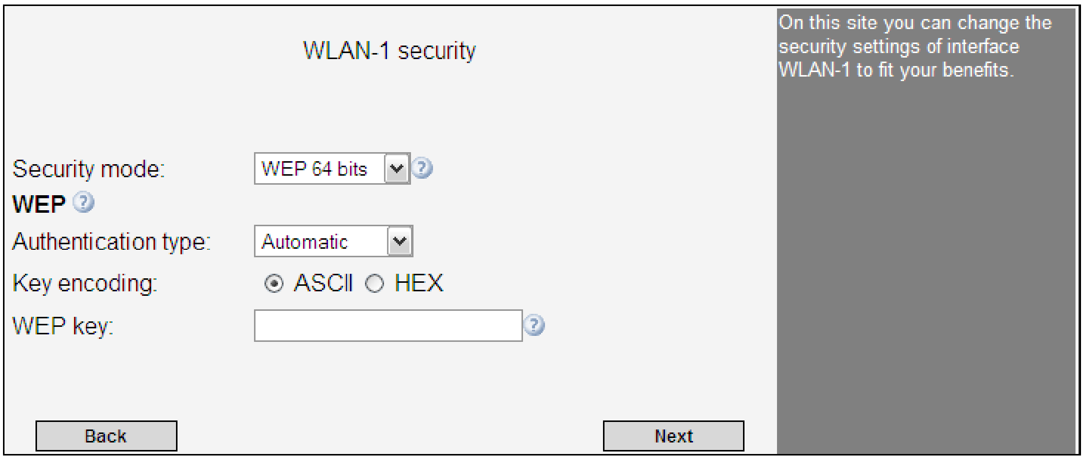
Data Encryption:

You may choose to either use all data encryption methods or select a particular method. Please note that WPA 2 encryption requires that all network access points and clients support the WPA 2 standard.

## WEP 64 Bits / WEP 128 Bits

Like WPA, the WEP 64 Bits / 128 Bits mode requires a keyword for securing wireless communications. The chief difference is that in WPA mode, this key changes dynamically during a connection, whereas it remains static in WEP mode.

> ***Note:***
>
> *We recommend using the WPA encryption standard because WEP-based data encryption has to be regarded as insufficient by today's standards.*



WLAN-1 security

Security mode: WEP 64 bits

**WEP**

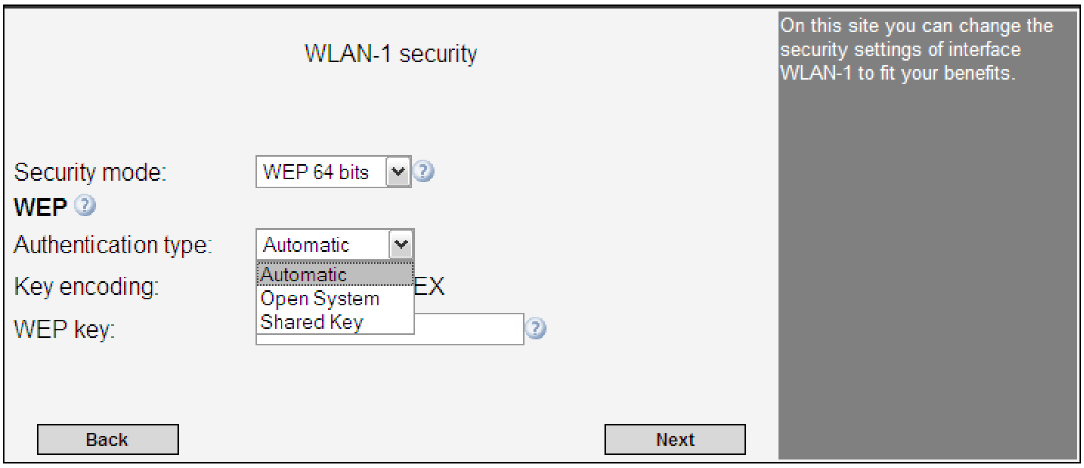
Authentication type: Automatic

Key encoding: ● ASCII ○ HEX

WEP key:

On this site you can change the security settings of interface WLAN-1 to fit your benefits.

Authentication Mode:



WLAN-1 security

Security mode: WEP 64 bits

**WEP**

Authentication type: Automatic

Key encoding:

WEP key:

On this site you can change the security settings of interface WLAN-1 to fit your benefits.

Automatic:

In **Automatic** mode, the authentication mode is selected automatically.

Open System:

**Open System** authentication is the default authentication setting.

Shared Key:

Shared Key authentication employs an enhanced handshake mechanism during login, which does, however, not provide any additional security.

Key Encoding:

You may select ASCII or HEX key encoding. ASCII is a 7-bit encoding scheme, HEX is a 16-bit scheme.

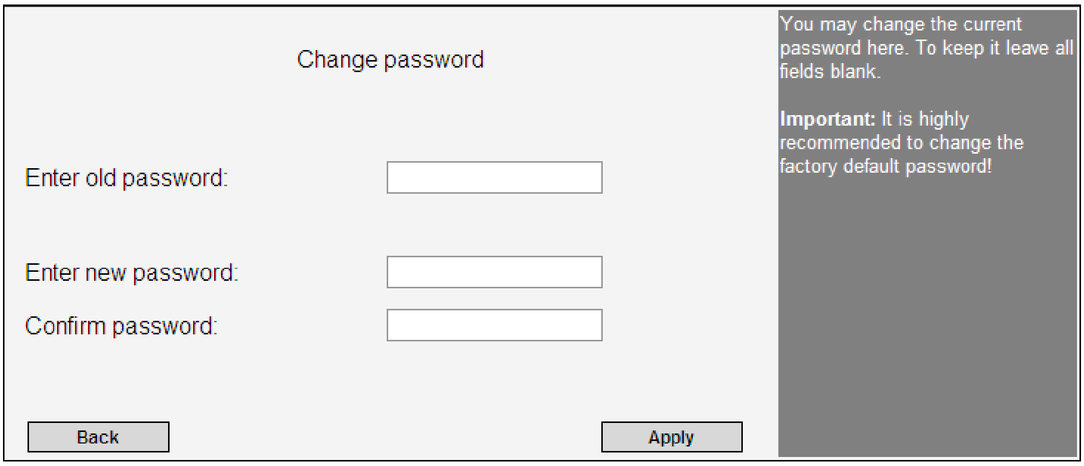
WEP Key:

WEP key length is limited to 5 characters in ASCII encoding mode. Using HEX encoding, keys with a length of up to 10 characters may be chosen. Rather than actual words, we recommend using alphanumeric combinations of letters and numbers in order to ensure optimal security.

Confirm by clicking **Next**

### 7.1.5 Changing the Password

Use this dialogue to change the device password.



Change password

Enter old password:

Enter new password:

Confirm password:

You may change the current password here. To keep it leave all fields blank.

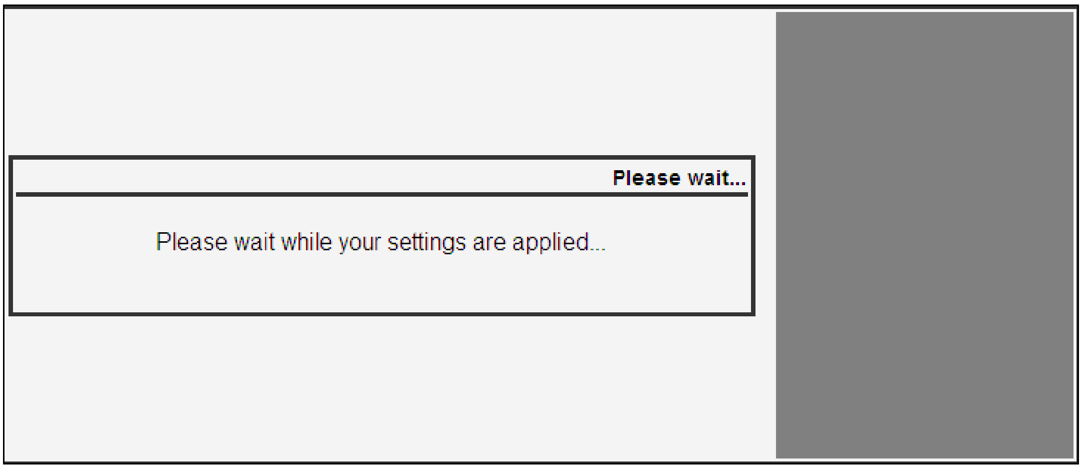
**Important:** It is highly recommended to change the factory default password!

In order to change the password, enter the current password in the field **Old Password**.

Choose a new password and confirm it by entering it in the next two fields (**New Password** and **Password Confirmation**). Leave all fields empty in case you have not set a password.

Subsequently click on the **Apply** button.

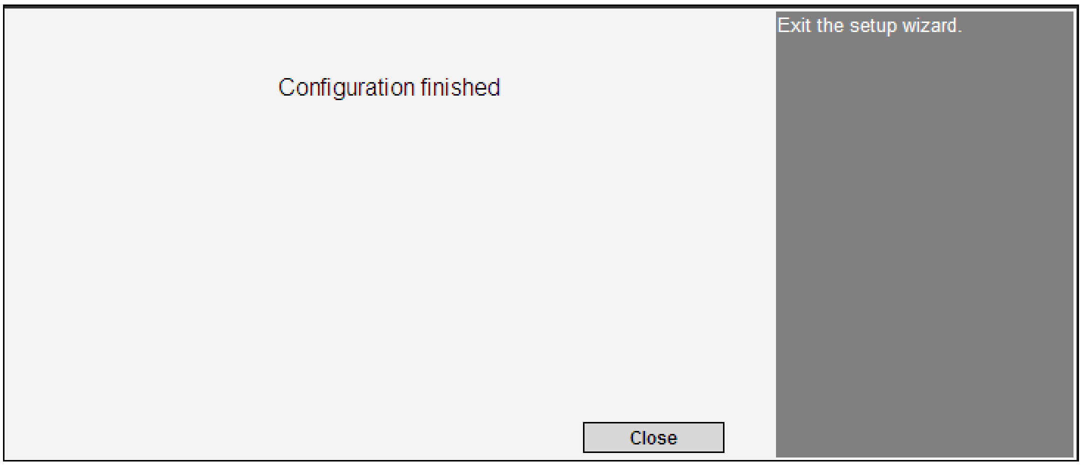
Your settings are being saved…



Please wait...

Please wait while your settings are applied...

**The Setup Wizard is now complete.**



Configuration finished

Exit the setup wizard.

## 7.2 Configuration using the Filter Wizard

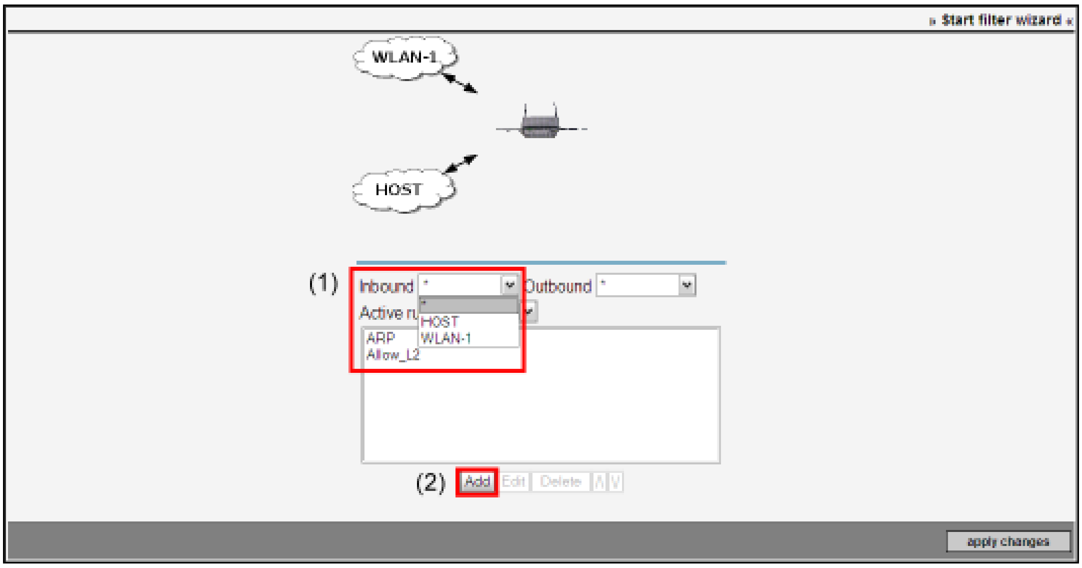
Filters may be configured using the Filter Wizard.

The Filter Wizard is accessible via the **Configuration > Security > Filter Wizards** path.

The initial Filter Wizard page allows adding new rule sets as well as editing existing sets.

### Adding a Rule set:

In order to add a rule set, you first need to select a **Layer (1)**.



Layer 2:

This layer corresponds to MAC filtering. Selecting this option enables filtering MAC address-based filtering.

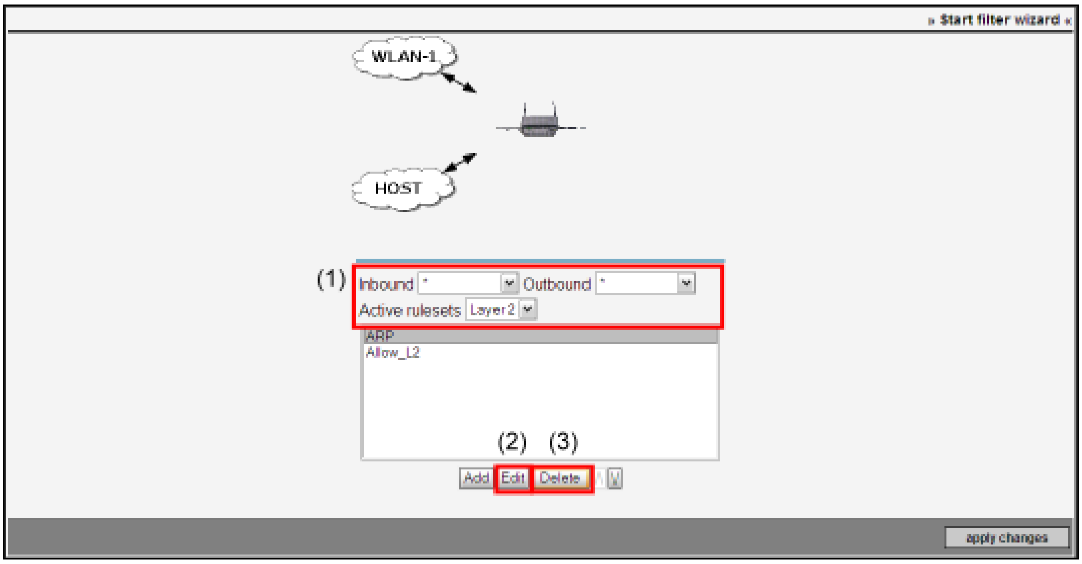
Layer 3:

This layer allows IP address-based filtering.

Click **Add (2)** to create/add a new or pre-configured rule set for the selected layer.

### Changing and Searching existing Rule Sets

If rules have already been generated or uploaded, they appear in the rule summary. When searching for a rule, the filter criteria for the rule set being sought can be restricted to **Inbound**, **Outbound** and **Activated rule sets** (**1**) via the respective drop-down fields.



Inbound *
Outbound *
Active rulesets Layer2

ARP
Allow_L2

The **Edit** (**2**) button allows for subsequent modifications of the selected rule set. By way of the **Delete** (**3**) option, it is possible to remove the selected rule set.

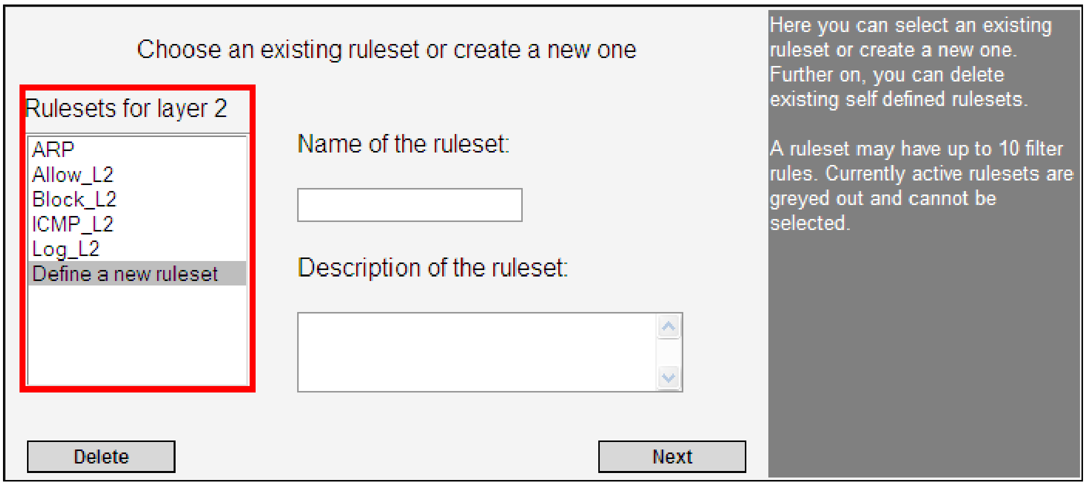
***Note:***

*The arrows in the diagram shown above the filter configuration adapt to the selected configuration of the incoming and outgoing data flows, so the settings will also be visually comprehensible.*

### 7.2.1 Loading pre-configured Rule sets

Select a pre-configured rule set.

The pre-configured rule sets are displayed on the left of the dialogue window.



Choose an existing ruleset or create a new one

Rulesets for layer 2

- ARP
- Allow_L2
- Block_L2
- ICMP_L2
- Log_L2
- Define a new ruleset

Name of the ruleset:

Description of the ruleset:

Here you can select an existing ruleset or create a new one. Further on, you can delete existing self defined rulesets.

A ruleset may have up to 10 filter rules. Currently active rulesets are greyed out and cannot be selected.

By way of example, the following standard rule sets are pre-configured for layers 2 and 3.

**LAYER 2 RULE SETS**

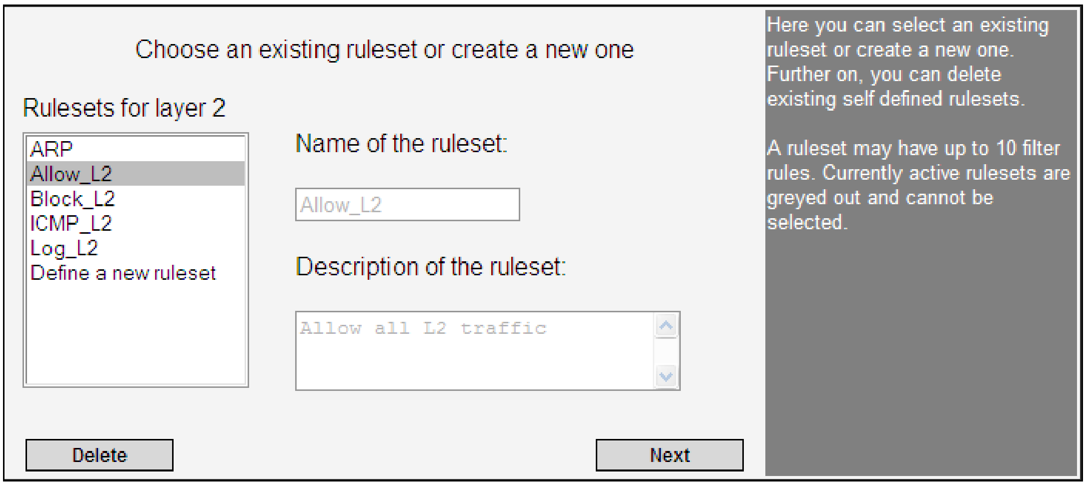
| Name | Brief Description |
|---|---|
| **ARP** | Address Resolution Protocol allows assignment of network addresses to hardware addresses |
| **Allow_L2** | Allows all data traffic on layer 2 |
| **Block_L2** | Discards all data packets (i.e. blocks all data traffic) on layer 2 |
| **ICMP_L2** | Allows all ICMP-based data traffic on layer 2 |
| **Log_L2** | Maintains an event log and discards all data packets on layer 2 |

Select the rule set you want to load and confirm by clicking **Next**,

**RULE SETS FOR LAYER 3**

| Name | Brief Description |
|---|---|
| **ALLOW_L3** | Allows all data traffic on layer 3 |
| **BLOCK_L3** | Discards all data packets (i.e. blocks all data traffic) on layer 3 |
| **ICMP_L3** | Allows all ICMP-based data traffic on layer 3 |
| **Log_L3** | Maintains an event log and discards all data packets on layer 3 |

Confirm the next message prompt by clicking **Close**.



Choose an existing ruleset or create a new one

Rulesets for layer 2

- ARP
- Allow_L2
- Block_L2
- ICMP_L2
- Log_L2
- Define a new ruleset

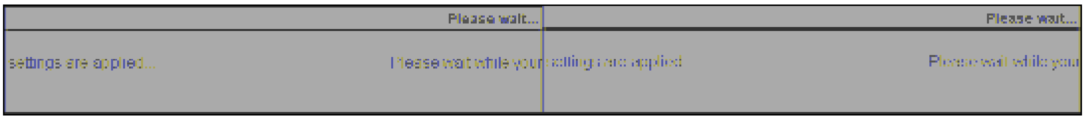
Name of the ruleset: Allow_L2

Description of the ruleset: Allow all L2 traffic

Here you can select an existing ruleset or create a new one. Further on, you can delete existing self defined rulesets.

A ruleset may have up to 10 filter rules. Currently active rulesets are greyed out and cannot be selected.

Once a rule set has been successfully loaded and activated, it will be shown in the filter overview page.



Please wait...

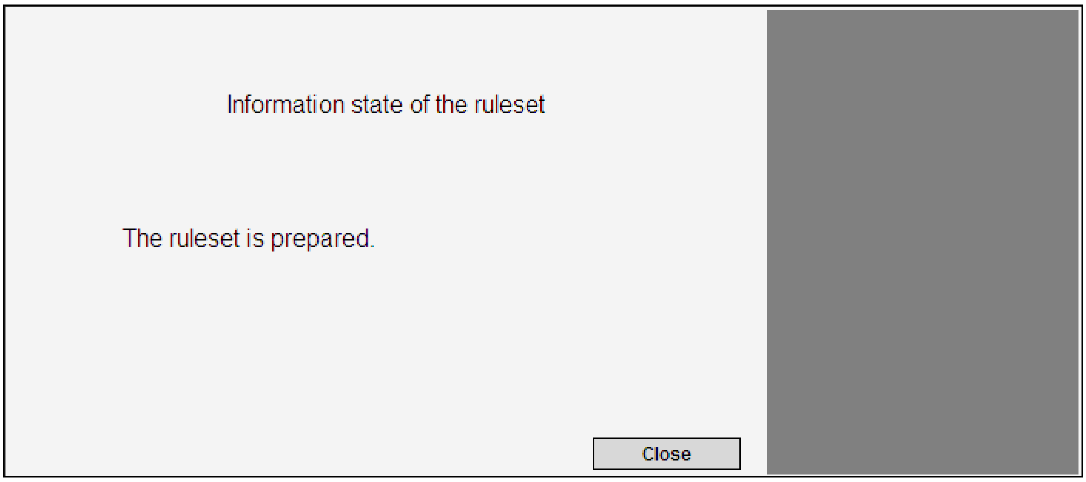
settings are applied...

Please wait while your

Please wait...

settings are applied...

Please wait while your



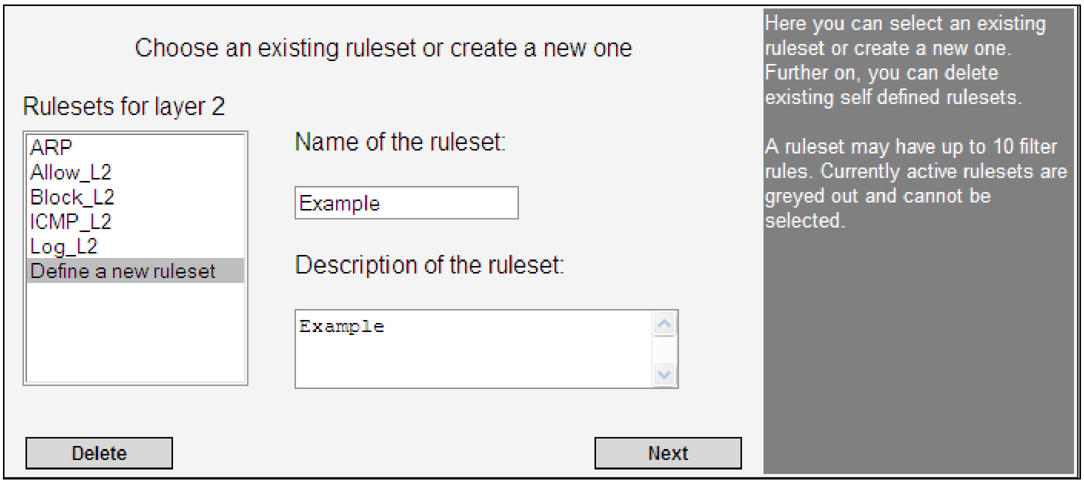
Information state of the ruleset

The ruleset is prepared.

## 7.2.2 Definition of a new Rule set on Layer 2

> ***Note:***
>
> *For configuring rules on layer 3, please refer to the section **"Definition of a new Rule set on Layer 3"**.*

Select the menu item **Definition of a new rule set**



Choose an existing ruleset or create a new one

Rulesets for layer 2

- ARP
- Allow_L2
- Block_L2
- ICMP_L2
- Log_L2
- Define a new ruleset

Name of the ruleset: Example

Description of the ruleset: Example

Here you can select an existing ruleset or create a new one. Further on, you can delete existing self defined rulesets.

A ruleset may have up to 10 filter rules. Currently active rulesets are greyed out and cannot be selected.

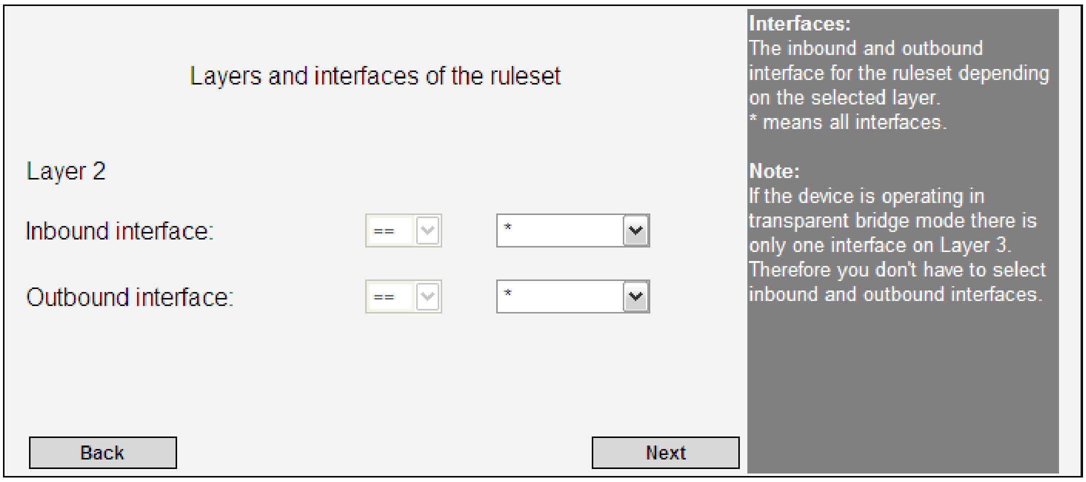
Enter a name and a description for the new rule set.

> ***Note:***
>
> *The rule set name is restricted to 10 characters. It is not possible to use umlauts.*

Confirm your input by clicking **Next**.

## RULE SET LAYERS AND INTERFACES

The following dialogue allows configuration of the type of filtering.



Layers and interfaces of the ruleset

Layer 2

Inbound interface: == *

Outbound interface: == *

**Interfaces:**
The inbound and outbound interface for the ruleset depending on the selected layer.
* means all interfaces.

**Note:**
If the device is operating in transparent bridge mode there is only one interface on Layer 3. Therefore you don't have to select inbound and outbound interfaces.

| SYMBOL | DESCRIPTION |
|---|---|
| == | Filter will be applied to the selected interface. |
| != | Filter will be applied to all interfaces **except for** the selected interface. |

**EXAMPLE:**

| INTERFACE | SELECTION | RESULT |
|---|---|---|
| Incoming interface: **HOST** | == | filters all inbound data packets on **HOST** |
| Outgoing interface: **WLAN-1** | != | filters all outgoing data packets on all ports, **except for WLAN-1** |

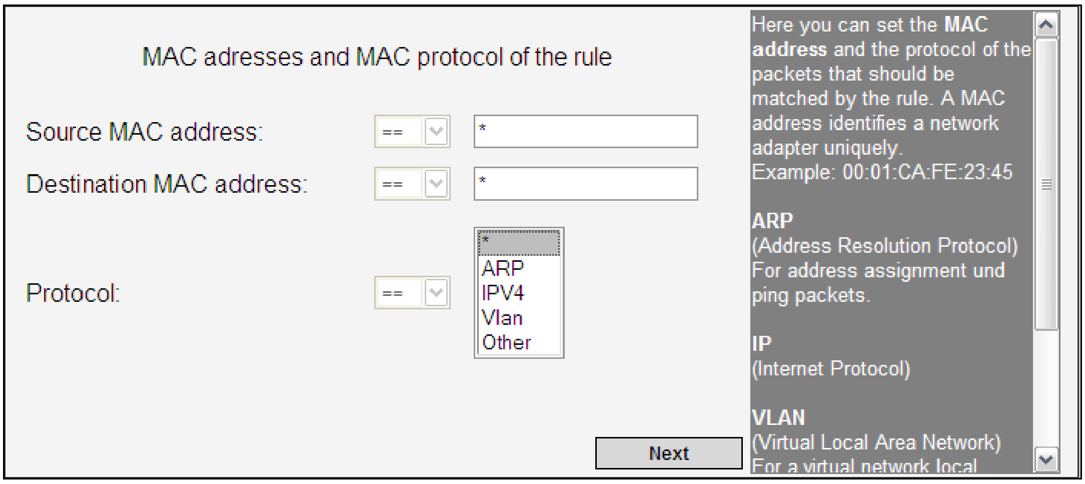
Confirm your input by clicking **Next**

## RULE-RELATED MAC ADDRESSES AND MAC PROTOCOLS

Via the following dialogue window it is possible to define the MAC addresses of the respective sources and targets.

The **Source MAC Address** defines the source from which data is received.

The **Target MAC Address** defines the target to which data is sent.



MAC adresses and MAC protocol of the rule

Source MAC address: == *

Destination MAC address: == *

Protocol: ==

Here you can set the **MAC address** and the protocol of the packets that should be matched by the rule. A MAC address identifies a network adapter uniquely.
Example: 00:01:CA:FE:23:45

**ARP**
(Address Resolution Protocol)
For address assignment und ping packets.

**IP**
(Internet Protocol)

**VLAN**
(Virtual Local Area Network)
For a virtual network local

In case you are using a permanent, static connection between two devices, you may enter their respective MAC addresses here. Otherwise leave the asterisk symbol unchanged.

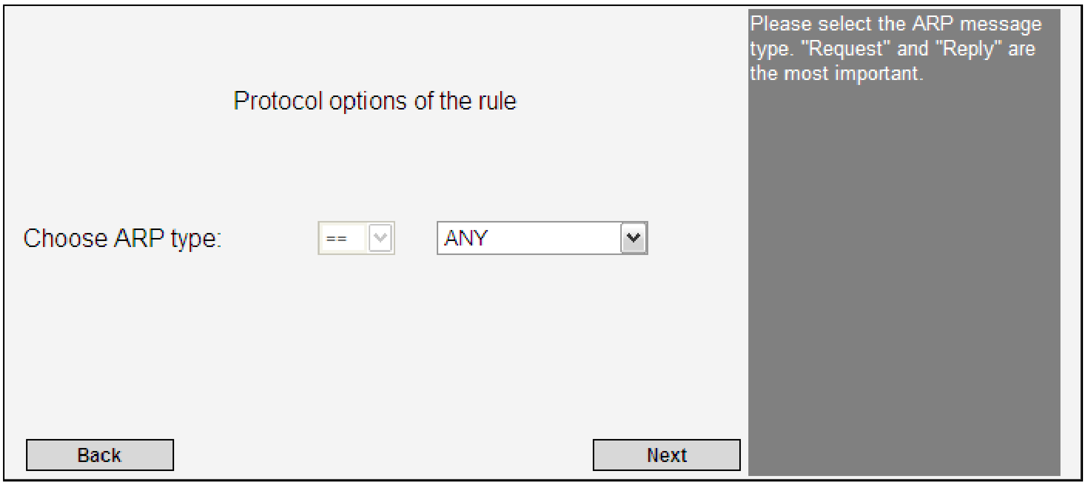
| PROTOCOL | DESCRIPTION |
|---|---|
| **ARP** | The Address Resolution Protocol (ARP) is a network protocol that allows resolving network addresses to hardware addresses. ARP is not an IP-only or Ethernet-only protocol, but due to the prevalence of IPv4 and Ethernet, it is used almost exclusively for resolving IP addresses to Ethernet MAC addresses. |
| **IPv4** | IPv4 (Internet Protocol Version 4, formerly simply IP), is the fourth iteration of the Internet Protocol (IP). It is the first version of the protocol to be widely deployed and is one of the essential underlying internet technologies. |
| **Vlan** | A Virtual Local Area Network (VLAN) is a virtual local network inside a physical network. The protocol commonly used in configuring virtual LANs is IEEE 802.1Q. |
| **Other** | Allows selection of a different protocol. |

***Note:***

*If you do not wish to select a particular protocol, choose the default menu item (i.e. the asterisk item). Once a specific protocol has been selected you may adjust protocol-specific configuration settings.*

The following configuration options are available once a specific protocol has been selected. In case you have not selected a particular protocol, simply confirm this screen by clicking **Next** and follow the steps described in the **Rule Name and Behaviour** section.

**ARP:**

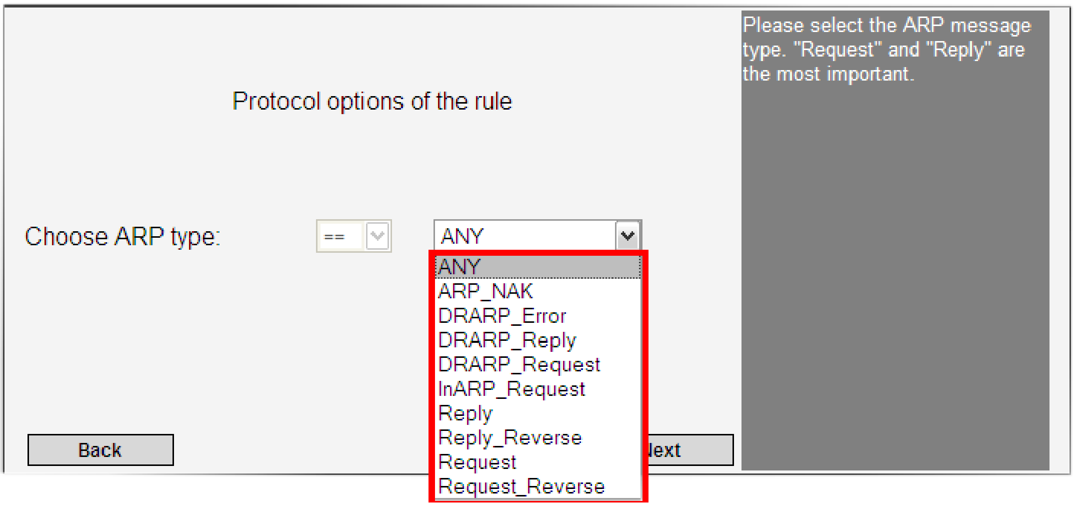


Protocol options of the rule

Choose ARP type: == ANY

Please select the ARP message type. "Request" and "Reply" are the most important.

ARP offers the following options:



Protocol options of the rule

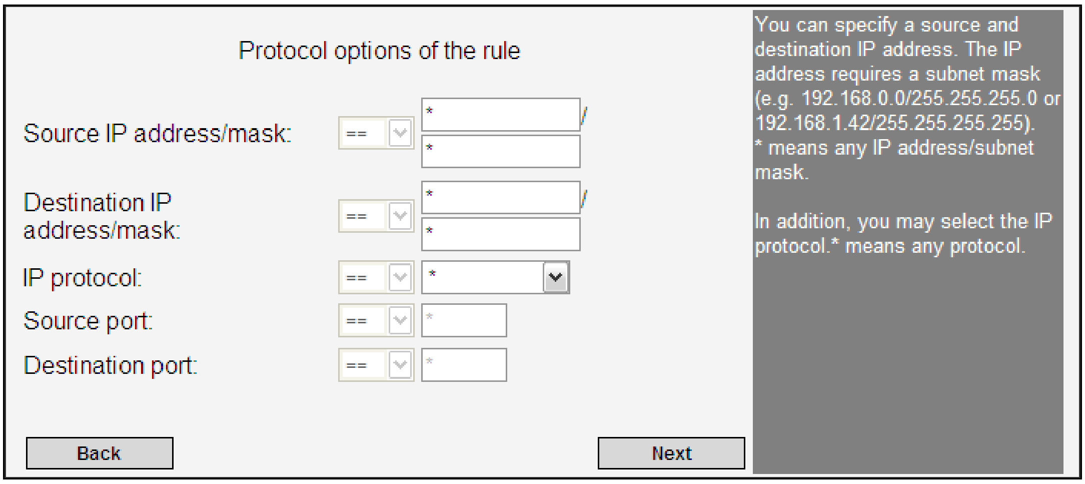
Choose ARP type: == ANY

- ANY
- ARP_NAK
- DRARP_Error
- DRARP_Reply
- DRARP_Request
- InARP_Request
- Reply
- Reply_Reverse
- Request
- Request_Reverse

Please select the ARP message type. "Request" and "Reply" are the most important.

## IPv4:

IPv4 requires setting a source and a target IP address. Furthermore, the respective subnet mask for the source and target IP address is required.



Protocol options of the rule

Source IP address/mask: == * / *

Destination IP address/mask: == * / *

IP protocol: == *

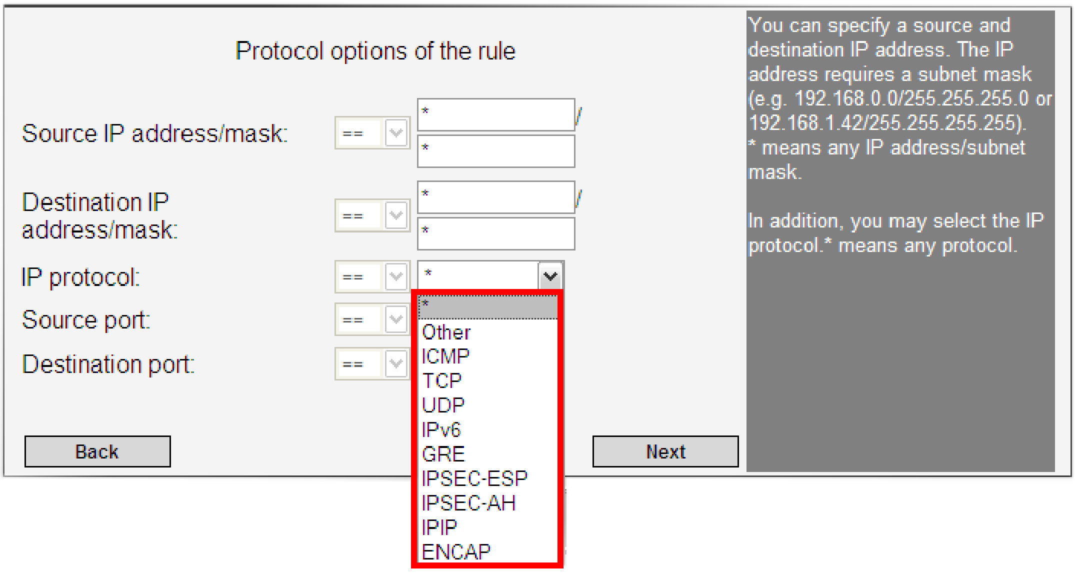
Source port: == *

Destination port: == *

You can specify a source and destination IP address. The IP address requires a subnet mask (e.g. 192.168.0.0/255.255.255.0 or 192.168.1.42/255.255.255.255). * means any IP address/subnet mask.

In addition, you may select the IP protocol.* means any protocol.

The Internet Protocol offers the following options:



Protocol options of the rule

Source IP address/mask: == * / *

Destination IP address/mask: == * / *

IP protocol: == *

Source port: ==

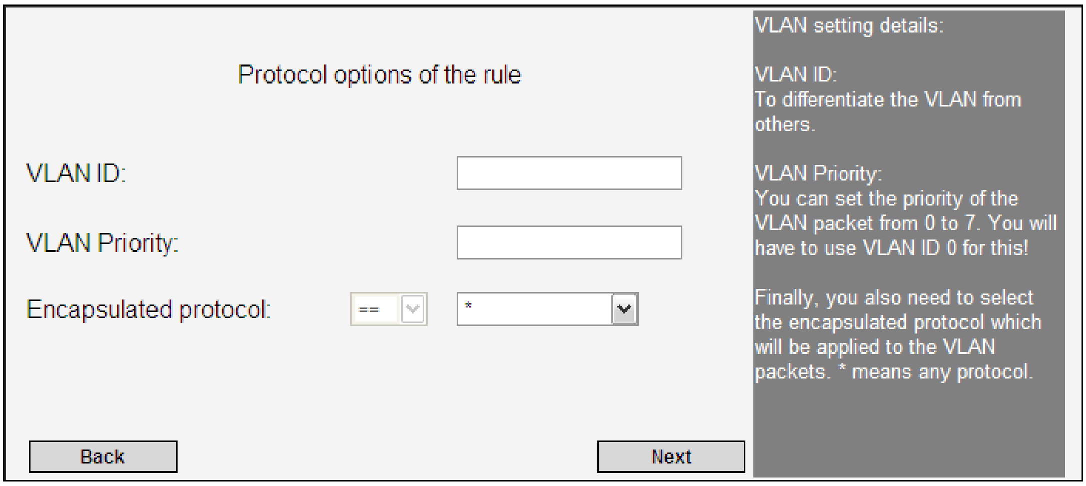
Destination port: ==

You can specify a source and destination IP address. The IP address requires a subnet mask (e.g. 192.168.0.0/255.255.255.0 or 192.168.1.42/255.255.255.255). * means any IP address/subnet mask.

In addition, you may select the IP protocol.* means any protocol.

**VLAN:**

The VLAN protocol requires setting a VLAN ID, a VLAN priority and a Wrapped Protocol to be used.



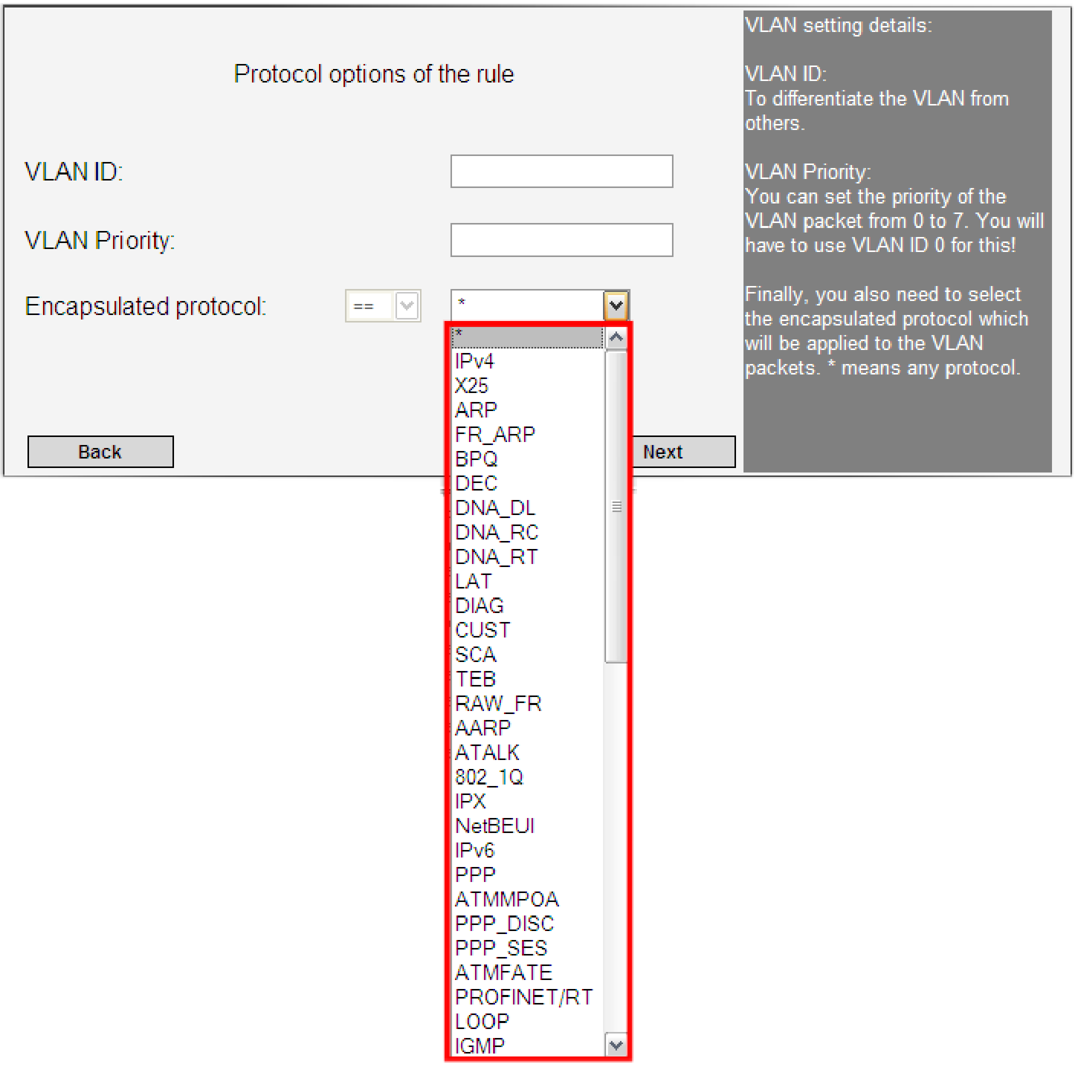
VLAN setting details:

VLAN ID:
To differentiate the VLAN from others.

VLAN Priority:
You can set the priority of the VLAN packet from 0 to 7. You will have to use VLAN ID 0 for this!

Finally, you also need to select the encapsulated protocol which will be applied to the VLAN packets. * means any protocol.

The following options are available for the Wrapped Protocol:



VLAN setting details:

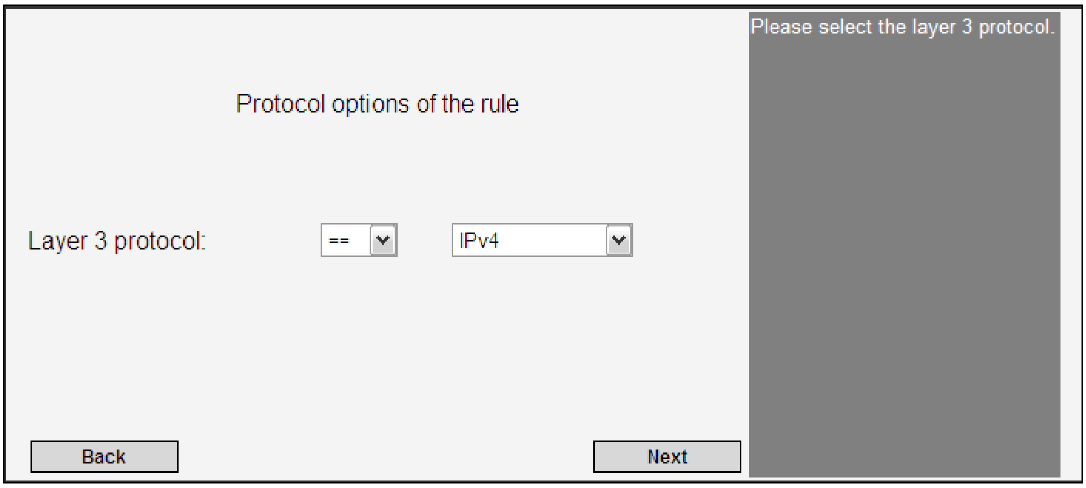
VLAN ID:
To differentiate the VLAN from others.

VLAN Priority:
You can set the priority of the VLAN packet from 0 to 7. You will have to use VLAN ID 0 for this!

Finally, you also need to select the encapsulated protocol which will be applied to the VLAN packets. * means any protocol.

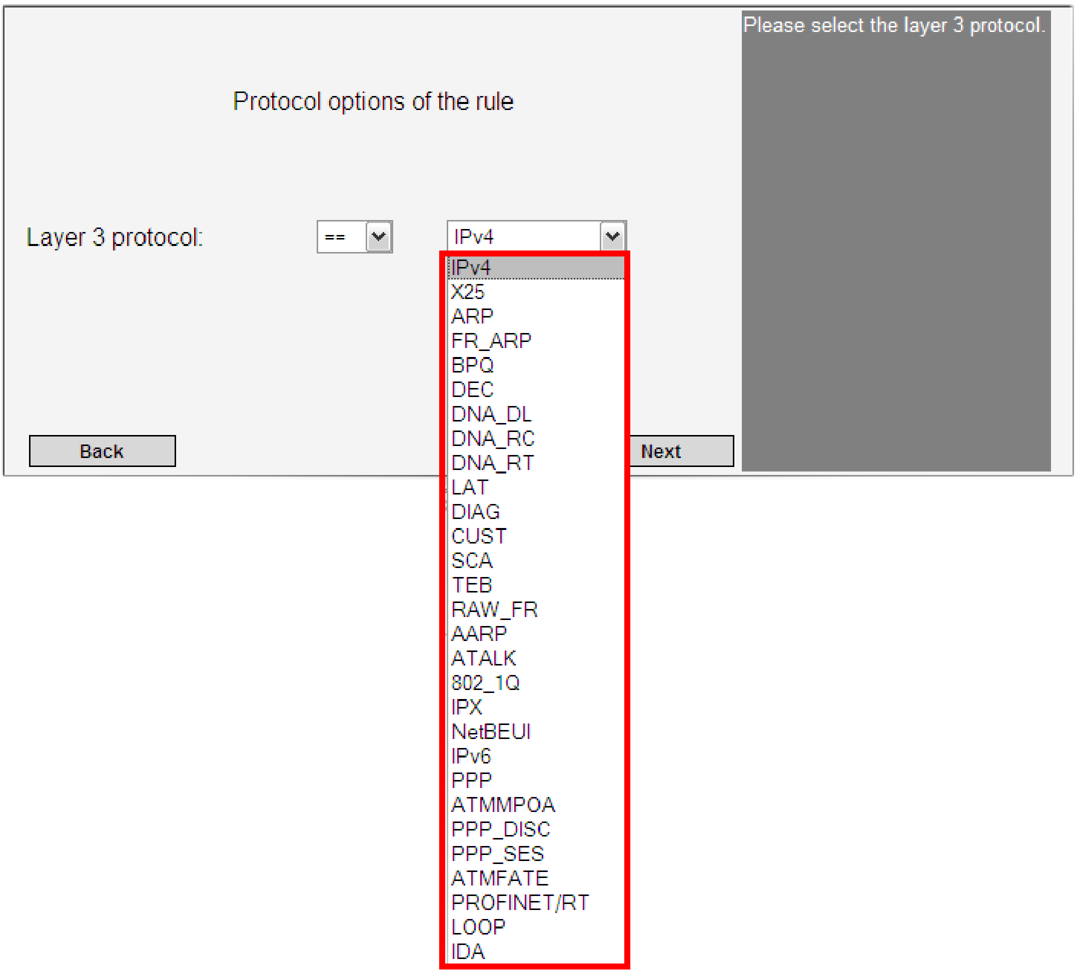
### OTHER:

Use **Other** to select the Layer 3 protocol.



Please select the layer 3 protocol.
Protocol options of the rule
Layer 3 protocol:
==
IPv4
Back
Next

**Other** offers the following options:

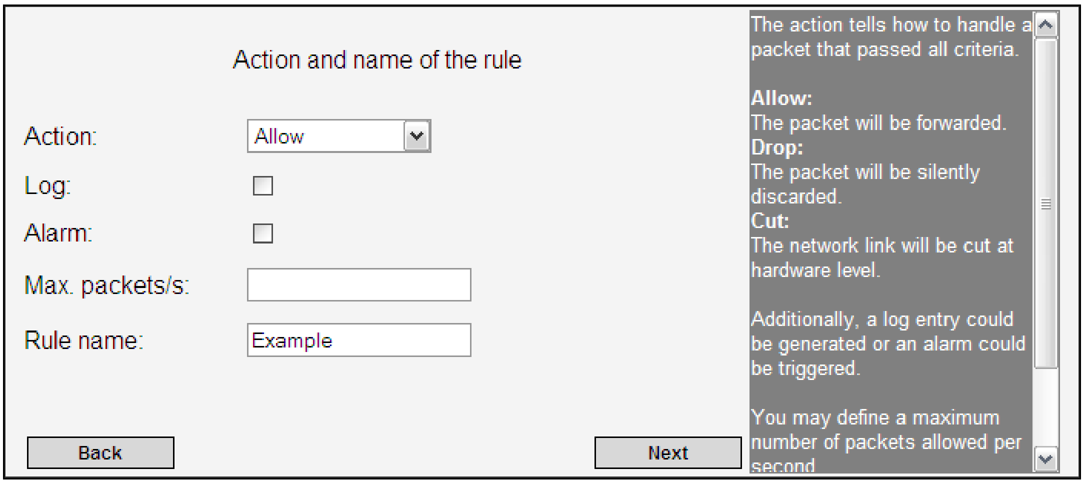


Please select the layer 3 protocol.
Protocol options of the rule
Layer 3 protocol:
==
IPv4
Back
Next

- IPv4
- X25
- ARP
- FR_ARP
- BPQ
- DEC
- DNA_DL
- DNA_RC
- DNA_RT
- LAT
- DIAG
- CUST
- SCA
- TEB
- RAW_FR
- AARP
- ATALK
- 802_1Q
- IPX
- NetBEUI
- IPv6
- PPP
- ATMMPOA
- PPP_DISC
- PPP_SES
- ATMFATE
- PROFINET/RT
- LOOP
- IDA

## RULE NAME AND BEHAVIOUR:

The next dialogue will allow you to define the rule behaviour in more detail. Use the menu item **Rule Action** to determine how the device should handle packets.



Action and name of the rule

Action: Allow

Log: □

Alarm: □

Max. packets/s:

Rule name: Example

The action tells how to handle a packet that passed all criteria.

**Allow:**
The packet will be forwarded.
**Drop:**
The packet will be silently discarded.
**Cut:**
The network link will be cut at hardware level.

Additionally, a log entry could be generated or an alarm could be triggered.

You may define a maximum number of packets allowed per second

**Rule Action**:
Available options are Allow and Block.

**Log**:
This function will log any violations of this rule in the event log.

**Max. Packets/sec**:

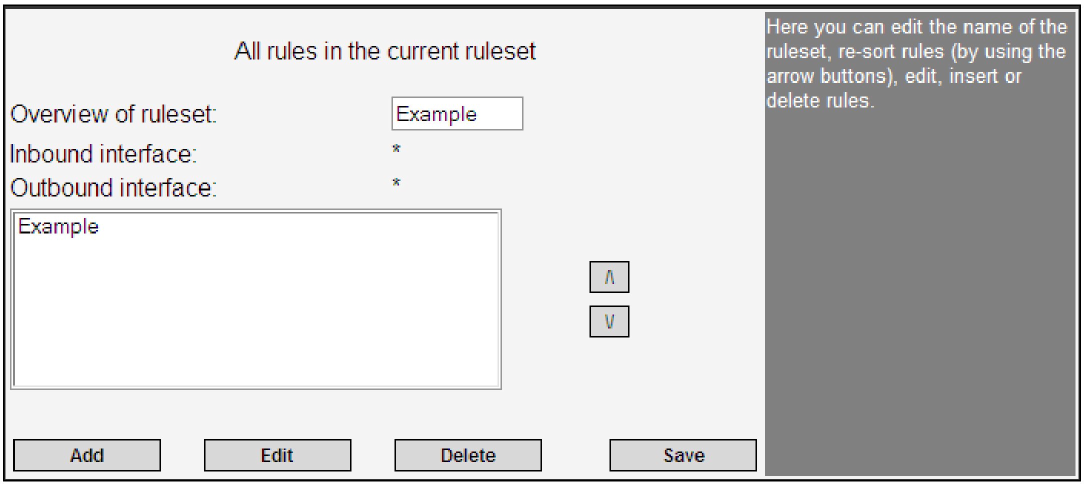
Use this option to specify a maximum packet rate per second; this rate will then serve as a upper limit against Denial-of-Service attacks.

**Rule Name**:
Choose a name for this rule; the name should be unique, i.e. differ from the name of any other rule set.

Confirm by clicking **Next**.

### OVERVIEW OF ALL RULES IN A RULE SET:

The next dialogue window will provide an overview of all existing rule sets.



All rules in the current ruleset

Overview of ruleset: Example

Inbound interface: *

Outbound interface: *

Example

Here you can edit the name of the ruleset, re-sort rules (by using the arrow buttons), edit, insert or delete rules.

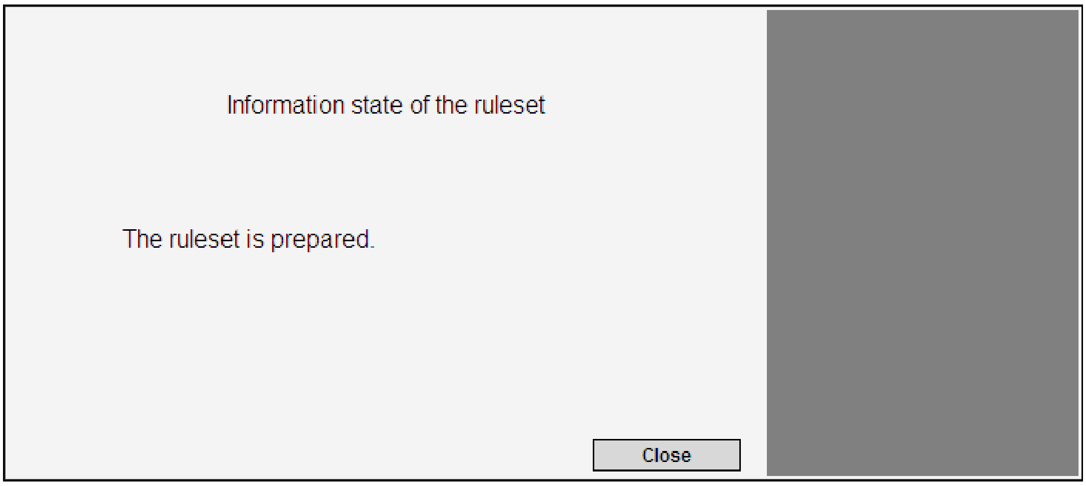
Use the **Add** button for starting the rule configuration process anew to define another rule. The **Edit** button allows subsequent modifications to previously defined rules.

Choose **Delete** to delete the selected rule.

Use the arrow buttons to modify the position of a rule within the current rule set.

Confirm by clicking **Next**.

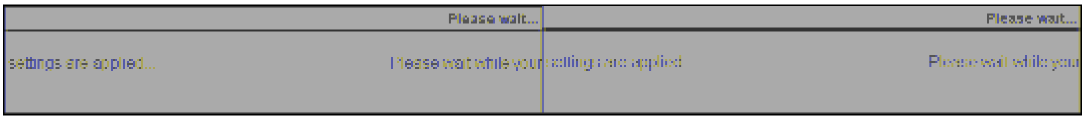
Confirm the next message prompt by clicking **Close**.



Information state of the ruleset

The ruleset is prepared.

Once the rule set was successfully activated, it will be displayed in the filter overview window.

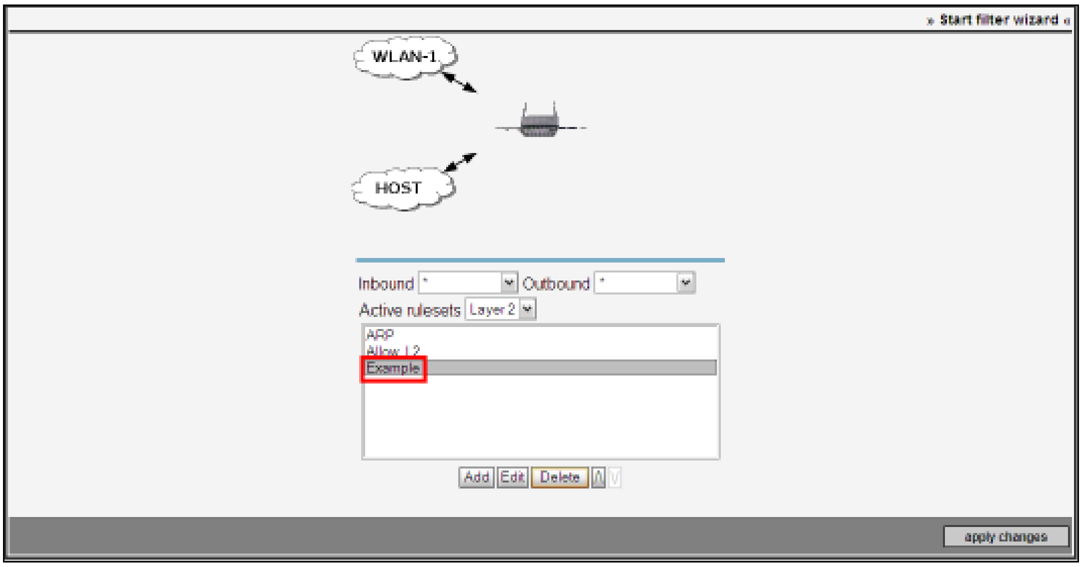


Please wait...

settings are applied... Please wait while your settings are applied

Please wait...

Please wait while your



Inbound *
Outbound *
Active rulesets Layer 2

ARP
Allow L2
Example

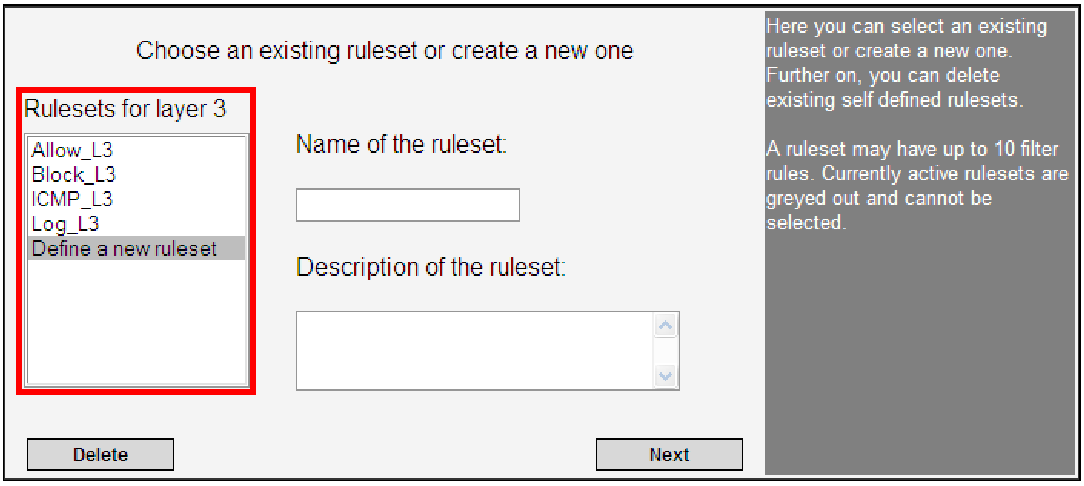
### 7.2.3 Definition of a new Rule set on Layer 3

The configuration of rule sets for filter layer 3 will be described on the following pages.

***Warning:***

*Before configuring a rule set on layer 3, ensure the option check box **"Activate IP Router Functionality"**, located at the path **Basic Settings→ User Interface**. is checked. Confirm any modifications to this setting by selecting **"Activate"**.*

To begin the configuration, choose the option **Layer 3** in the Filter Wizard main menu.



Choose an existing ruleset or create a new one

Rulesets for layer 3

- Allow_L3
- Block_L3
- ICMP_L3
- Log_L3
- Define a new ruleset

Name of the ruleset:

Description of the ruleset:

Here you can select an existing ruleset or create a new one. Further on, you can delete existing self defined rulesets.

A ruleset may have up to 10 filter rules. Currently active rulesets are greyed out and cannot be selected.

Click the **Add** button and subsequently select **Definition of a new Rule Set**.

Then assign a name and a description to the new rule set.

***Note:***

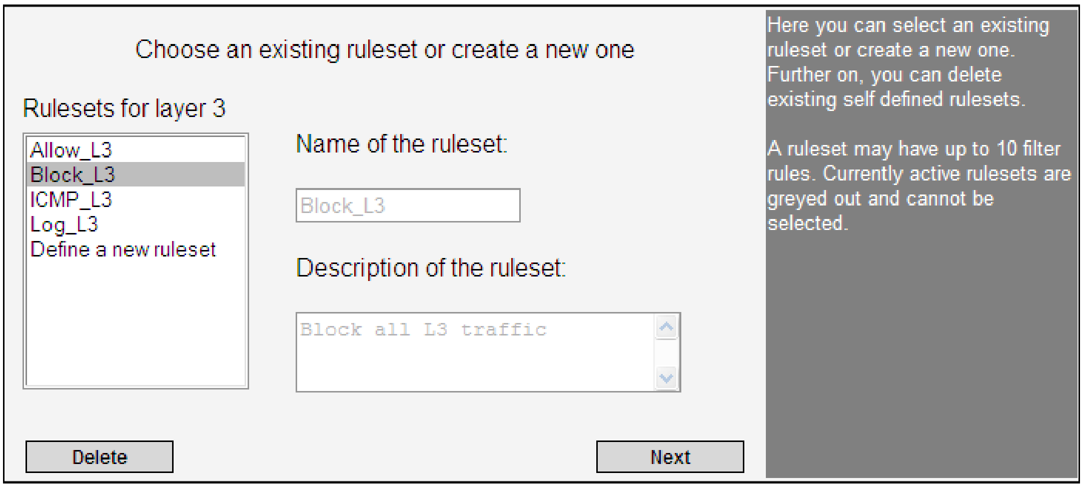
*Use a different name for each rule set if possible. Do not use umlauts as they will lead to error messages.*

Confirm by clicking **Next**.

### RULE SET LAYER AND INTERFACES

On layer 3, you may choose to use the following filter criteria: **LAN/VPN/Service**

Select the port to filter and configure the filtering mode.



Choose an existing ruleset or create a new one

Rulesets for layer 3

- Allow_L3
- Block_L3
- ICMP_L3
- Log_L3
- Define a new ruleset

Name of the ruleset: Block_L3

Description of the ruleset: Block all L3 traffic

Here you can select an existing ruleset or create a new one. Further on, you can delete existing self defined rulesets.

A ruleset may have up to 10 filter rules. Currently active rulesets are greyed out and cannot be selected.

**EXAMPLE:**

| SYMBOL | INTERFACE | ACTION |
|---|---|---|
| == | Incoming interface: **HOST** | filters all inbound data packets on **HOST** |
| != | Outgoing interface: **WLAN-2** | filters all outgoing data packets on all ports, **except for WLAN-2** |

***Note:***

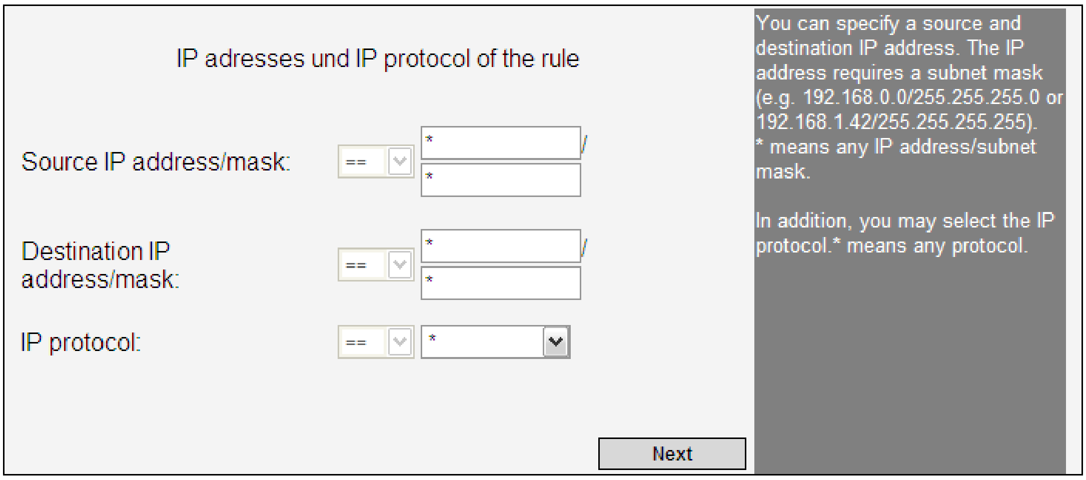
*If you do not wish to filter particular ports, choose the default menu item (i.e. the asterisk item).*

Confirm your input by clicking **Next**.

## RULE-RELATED INTERNET PROTOCOLS AND IP ADDRESSES

The **Source IP Address** defines the source from which data is received.

The **Target IP Address** defines the target to which data is sent.



IP adresses und IP protocol of the rule

Source IP address/mask: == * / *

Destination IP address/mask: == * / *

IP protocol: == *

You can specify a source and destination IP address. The IP address requires a subnet mask (e.g. 192.168.0.0/255.255.255.0 or 192.168.1.42/255.255.255.255).
* means any IP address/subnet mask.

In addition, you may select the IP protocol.* means any protocol.

In case you are using a permanent, static connection between two devices, you may enter their respective IP addresses here. You also need to enter a valid subnet mask for each IP address.

**Example:** IP Address: **192.168.0.0** / Subnet mask: **255.255.255.0**

***Note:***

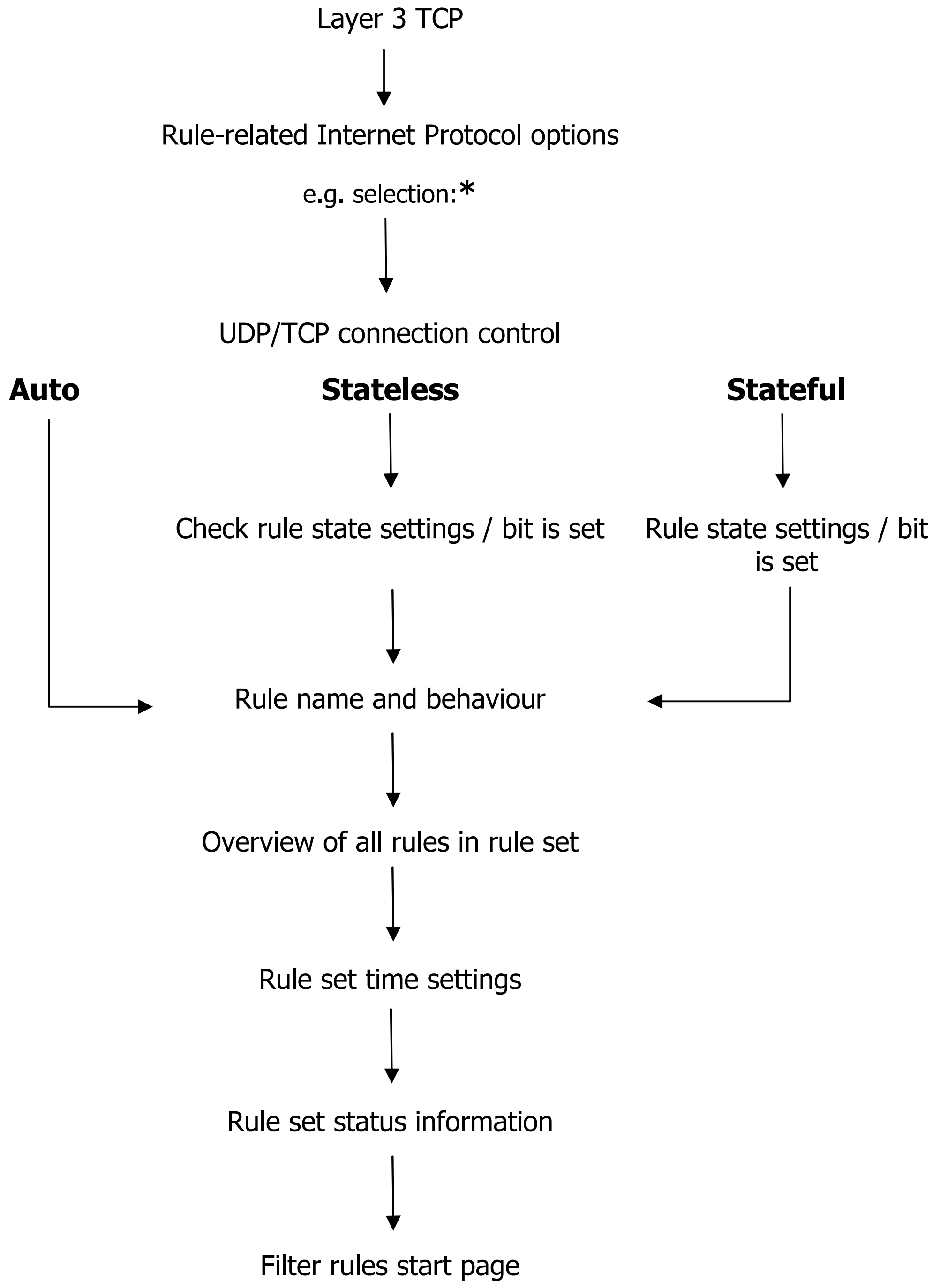
*Once a specific protocol has been selected you may adjust protocol-specific configuration settings.*

Internet Protocols:

| PROTOCOL | DESCRIPTION |
|---|---|
| **TCP** | The Transmission Control Protocol (TCP) is a protocol defining the way in which streams of bytes are exchanged between computers. All current operating systems support TCP and employ it for exchanging data with other computers. |
| **UDP** | The User Datagram Protocol (UDP) is a minimal message-oriented network protocol that belongs to the transport layer of the Internet Protocol Suite. UDP is used to allow application-to-application communication via the internet. |
| **ICMP** | Like TCP and UDP, the Internet Control Message Protocol (ICMP) uses the Internet Protocol (IP) and is hence also part of the Internet Protocol Suite. It is chiefly used by networked computers' operating systems to send error and information messages. |

The following overview shows the configuration options available for each protocol.

## MENU OVERVIEW LAYER 3 SELECTION TCP



Layer 3 TCP

Rule-related Internet Protocol options

e.g. selection:*

UDP/TCP connection control

**Auto**

**Stateless**

**Stateful**

Check rule state settings / bit is set

Rule state settings / bit is set

Rule name and behaviour

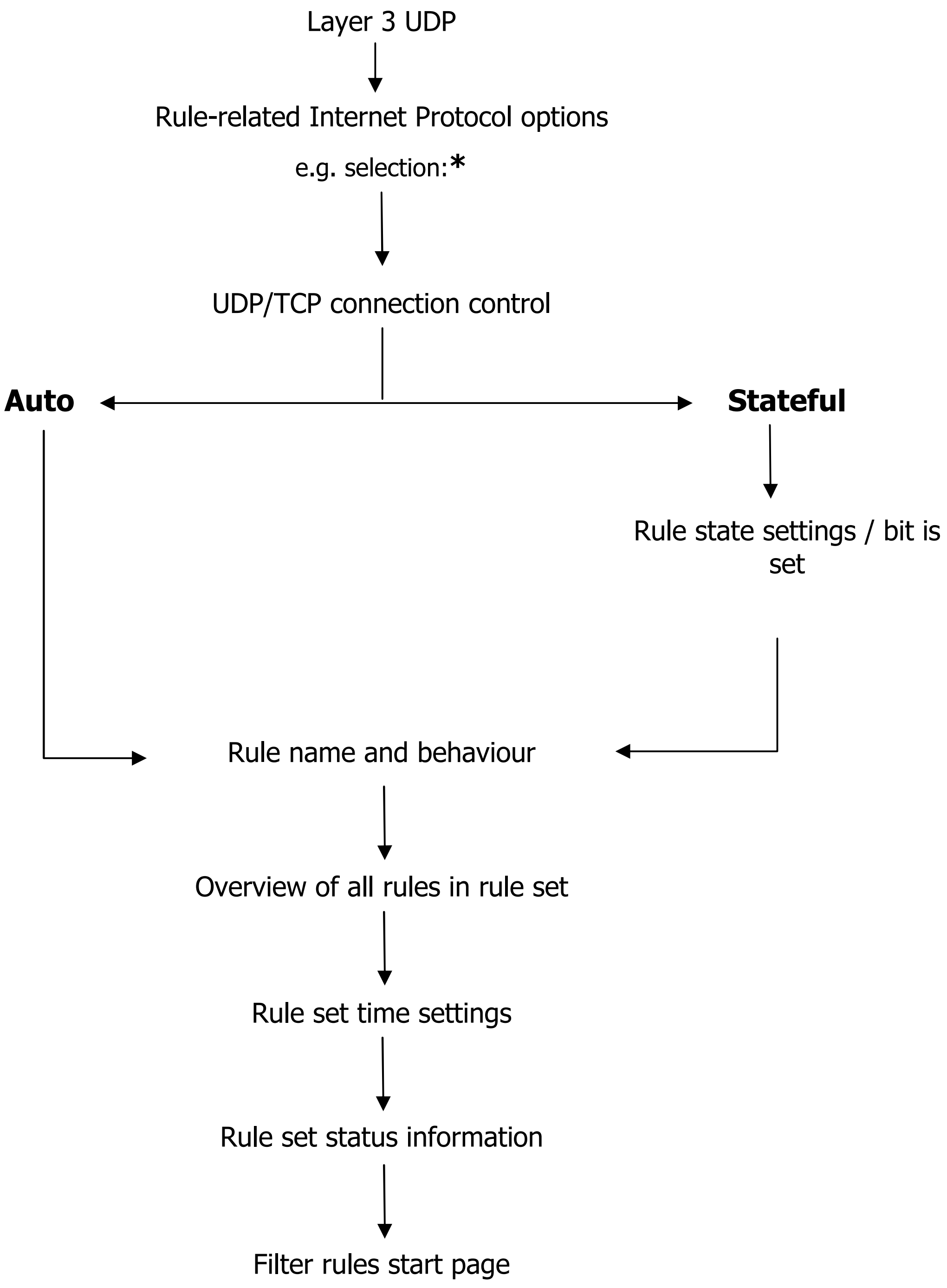
Overview of all rules in rule set

Rule set time settings

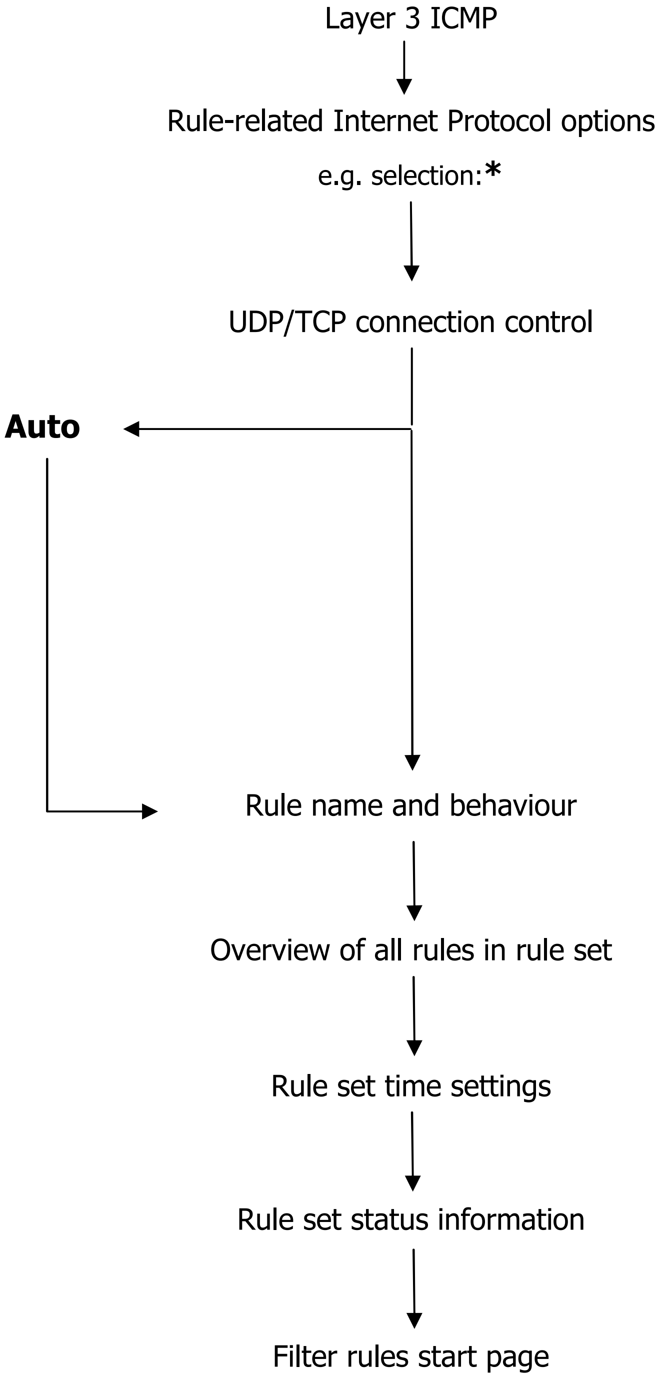
Rule set status information

Filter rules start page

### Menu Overview Layer 3 Selection UDP

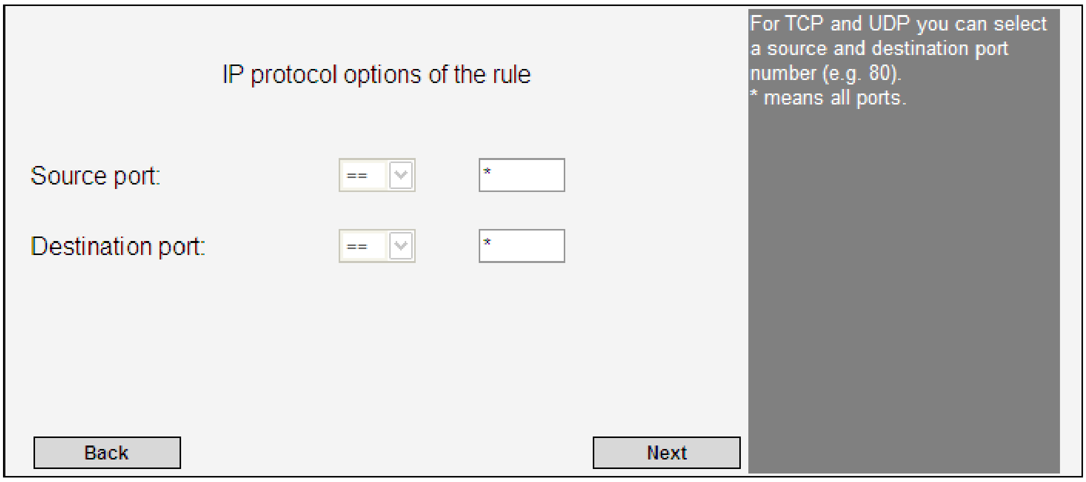

Layer 3 UDP
Rule-related Internet Protocol options
e.g. selection:*
UDP/TCP connection control
Auto
Stateful
Rule state settings / bit is set
Rule name and behaviour
Overview of all rules in rule set
Rule set time settings
Rule set status information
Filter rules start page

## Menu Overview Layer 3 Selection ICMP


Layer 3 ICMP
Rule-related Internet Protocol options
e.g. selection:*
UDP/TCP connection control
Auto
Rule name and behaviour
Overview of all rules in rule set
Rule set time settings
Rule set status information
Filter rules start page

### EXEMPLARY CONFIGURATION – SELECTION TCP:

If TCP has been selected, the wizard will guide you through the following menus:



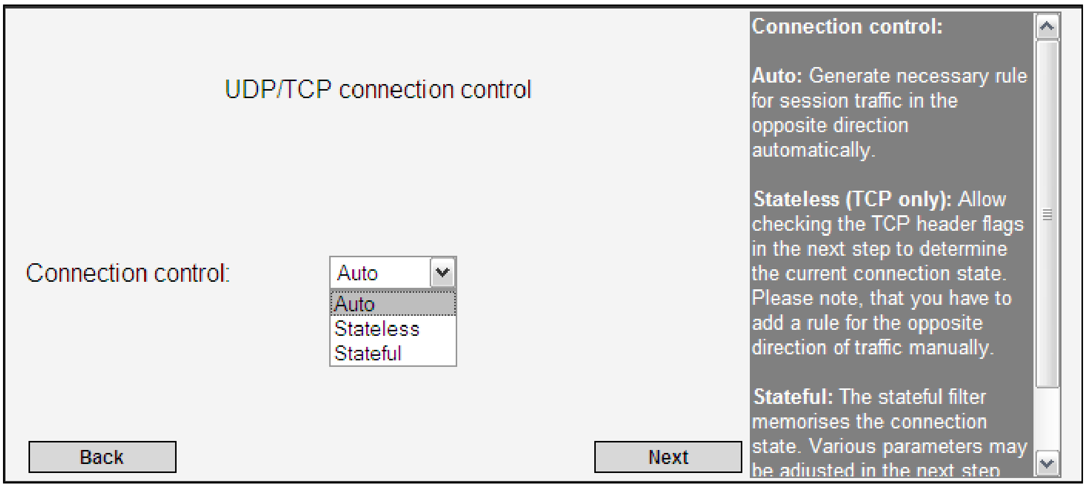
IP protocol options of the rule

Source port: == *

Destination port: == *

For TCP and UDP you can select a source and destination port number (e.g. 80).
* means all ports.

You may define source/target ports for TCP and UDP connections. In case you do not wish to define such ports, select **Next**.



UDP/TCP connection control

Connection control: Auto

**Connection control:**

**Auto:** Generate necessary rule for session traffic in the opposite direction automatically.

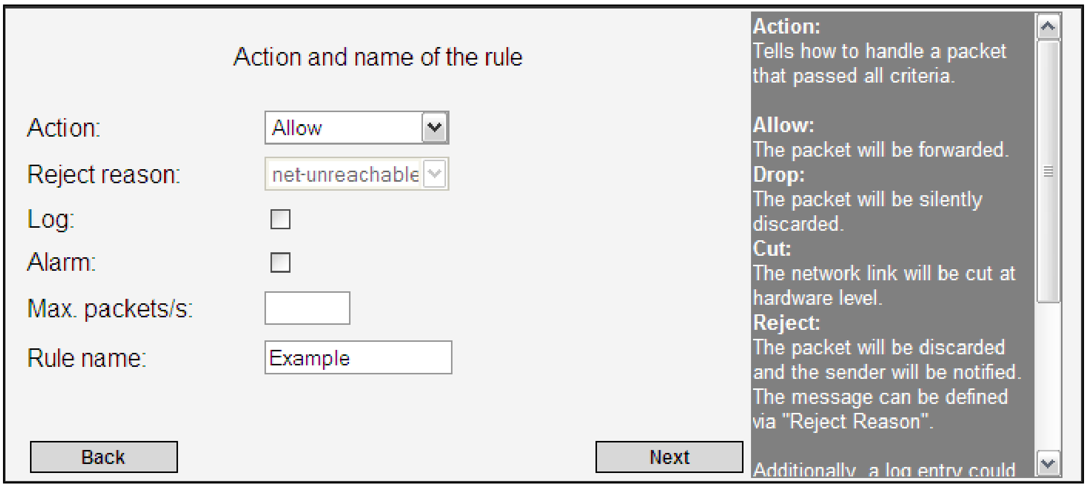
**Stateless (TCP only):** Allow checking the TCP header flags in the next step to determine the current connection state. Please note, that you have to add a rule for the opposite direction of traffic manually.

**Stateful:** The stateful filter memorises the connection state. Various parameters may be adjusted in the next step

A connection control may be configured for the TC protocol. Available options are Auto, Stateless and Stateful.

### AUTO

If **Auto** is selected, clicking **Next** will take you to the **Rule Name and Behaviour** menu.



Action and name of the rule

| | |
|---|---|
| Action: | Allow |
| Reject reason: | net-unreachable |
| Log: | □ |
| Alarm: | □ |
| Max. packets/s: | |
| Rule name: | Example |

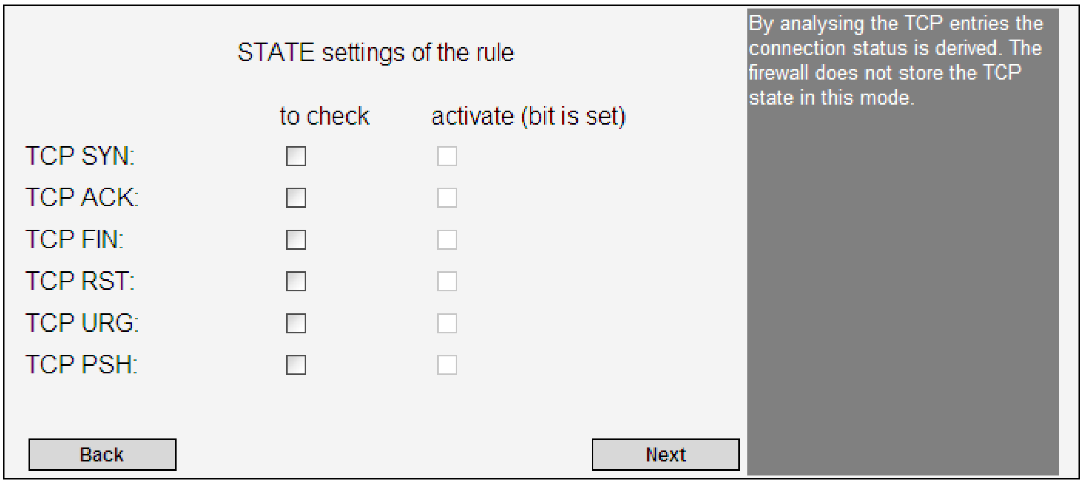
**Action:**
Tells how to handle a packet that passed all criteria.

**Allow:**
The packet will be forwarded.
**Drop:**
The packet will be silently discarded.
**Cut:**
The network link will be cut at hardware level.
**Reject:**
The packet will be discarded and the sender will be notified. The message can be defined via "Reject Reason".

Additionally, a log entry could

## STATELESS:

With this option activated, the TCP headers containing information on the connection status will be analysed.



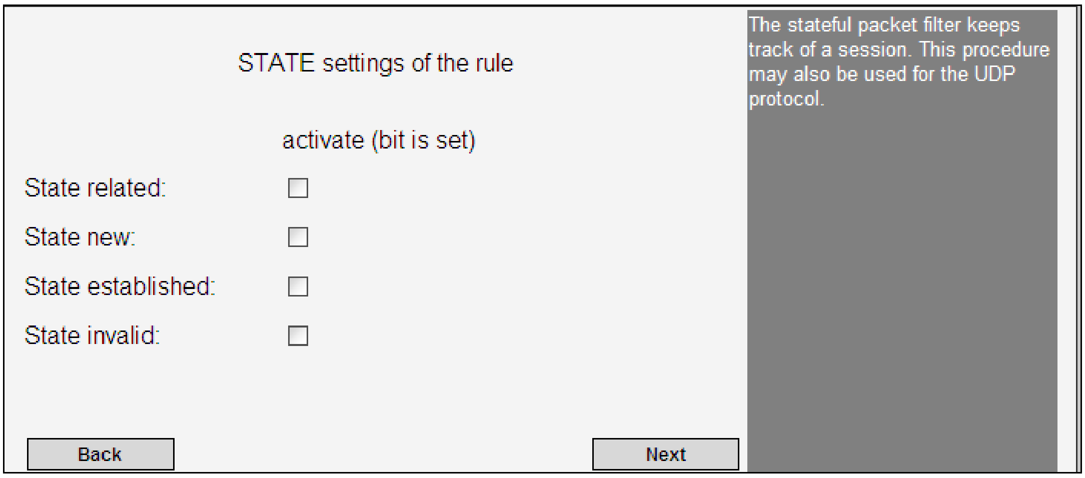
STATE settings of the rule

| | to check | activate (bit is set) |
|---|---|---|
| TCP SYN: | □ | □ |
| TCP ACK: | □ | □ |
| TCP FIN: | □ | □ |
| TCP RST: | □ | □ |
| TCP URG: | □ | □ |
| TCP PSH: | □ | □ |

By analysing the TCP entries the connection status is derived. The firewall does not store the TCP state in this mode.

## STATEFUL:

The stateful packet filter monitors all session-related connection information.



STATE settings of the rule

| | activate (bit is set) |
|---|---|
| State related: | □ |
| State new: | □ |
| State established: | □ |
| State invalid: | □ |

The stateful packet filter keeps track of a session. This procedure may also be used for the UDP protocol.

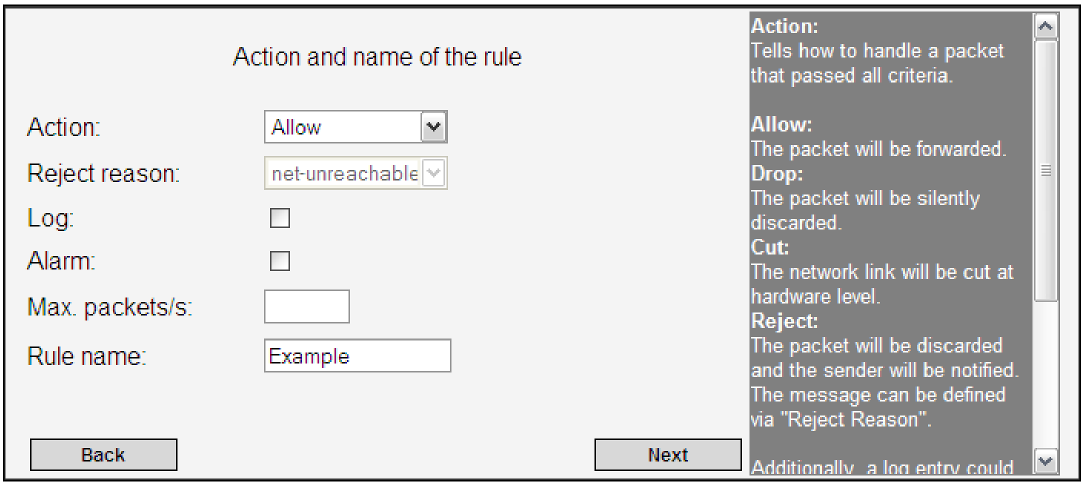
State Related: Data packet is assigned to existing data connection, e.g. for establishing an FTP feedback channel.

State New: Data packet establishes a new data connection, e.g. TCP with SYN flag.

State Established: Data packet belongs directly to specific data connection, e.g. TCP data without SYN flag.

State Invalid: Data packets for which the firewall could not determine a valid connection state.

## Rule Name and Behaviour



Action and name of the rule

Action: Allow

Reject reason: net-unreachable

Log: □

Alarm: □

Max. packets/s:

Rule name: Example

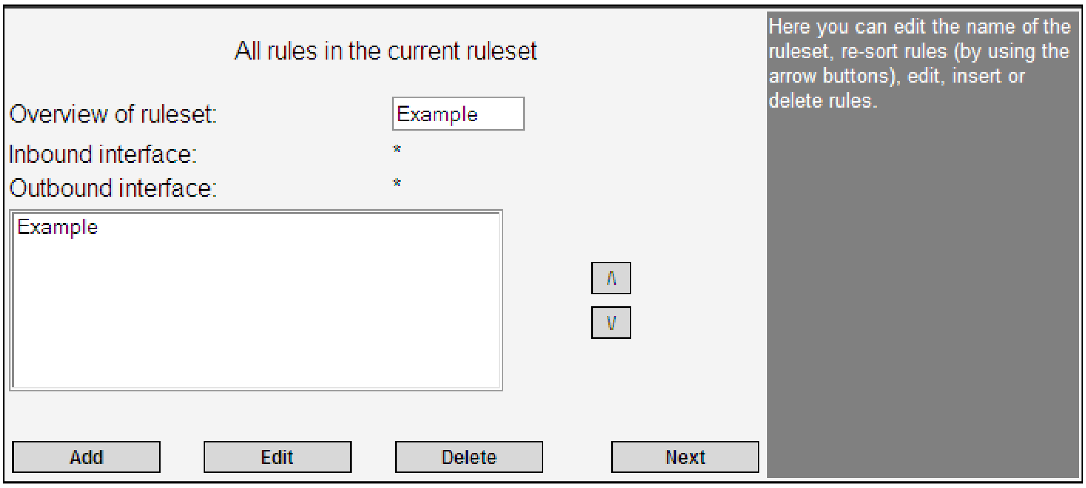
**Action:**
Tells how to handle a packet that passed all criteria.

**Allow:**
The packet will be forwarded.
**Drop:**
The packet will be silently discarded.
**Cut:**
The network link will be cut at hardware level.
**Reject:**
The packet will be discarded and the sender will be notified. The message can be defined via "Reject Reason".

Additionally, a log entry could

Confirm your input by clicking **Next**.

## Overview of all Rules in Rule Set



All rules in the current ruleset

Overview of ruleset: Example

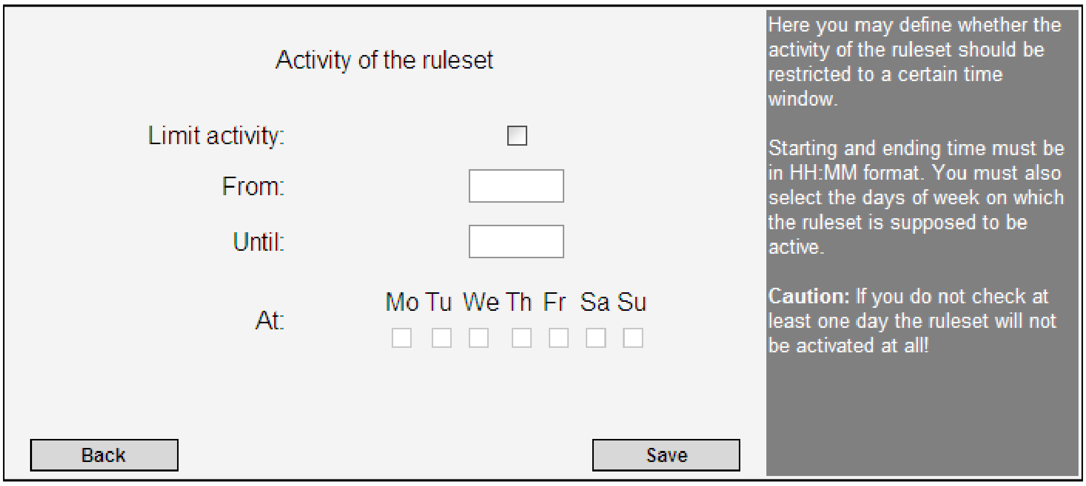
Inbound interface: *

Outbound interface: *

Example

Here you can edit the name of the ruleset, re-sort rules (by using the arrow buttons), edit, insert or delete rules.

## RULE SET TIME SETTINGS



Activity of the ruleset

Limit activity: □

From:

Until:

At: Mo □ Tu □ We □ Th □ Fr □ Sa □ Su □

Here you may define whether the activity of the ruleset should be restricted to a certain time window.

Starting and ending time must be in HH:MM format. You must also select the days of week on which the ruleset is supposed to be active.

**Caution:** If you do not check at least one day the ruleset will not be activated at all!

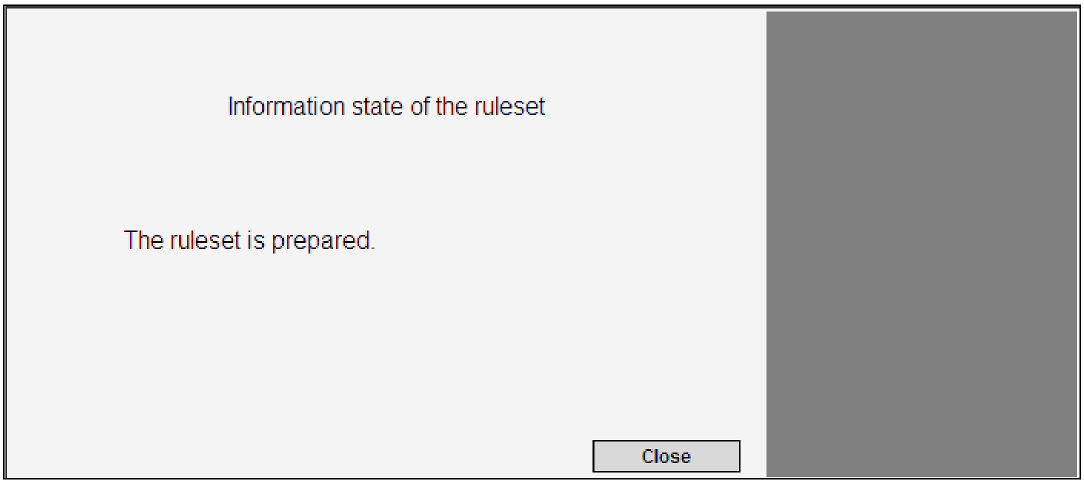
Activate the check box by clicking the empty box if you would like to use this function. Enter a start and an end time in the format: HH:MM. The start time needs to be lower than the end time.

Furthermore, you will need to specify the days of the week on which to activate the function.

> ***Note:***
>
> *At least one day of the week needs to be specified, otherwise the rule is invalid and will not be applied.*

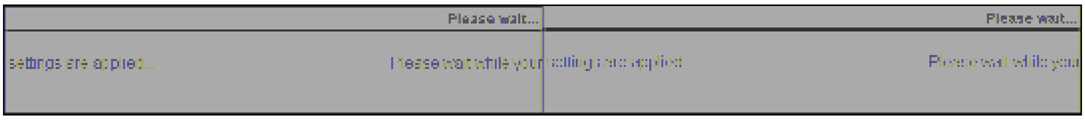
Complete the configuration by clicking **Save**.

Confirm the next message prompt by clicking **Close**.



Information state of the ruleset

The ruleset is prepared.

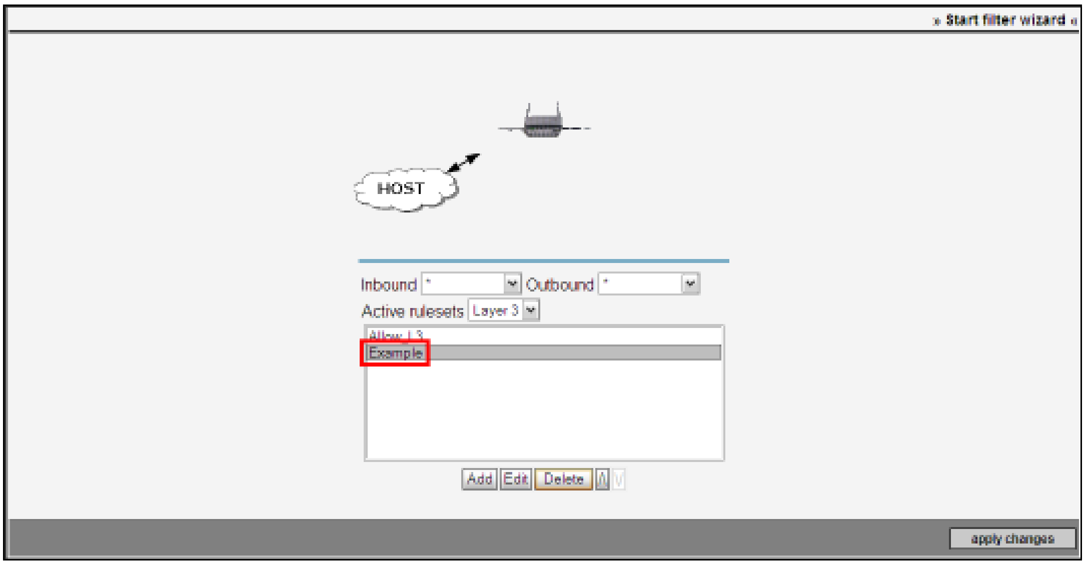


Please wait...

settings are applied... Please wait while your

Please wait...

settings are applied Please wait while you



Inbound * Outbound *

Active rulesets Layer 3

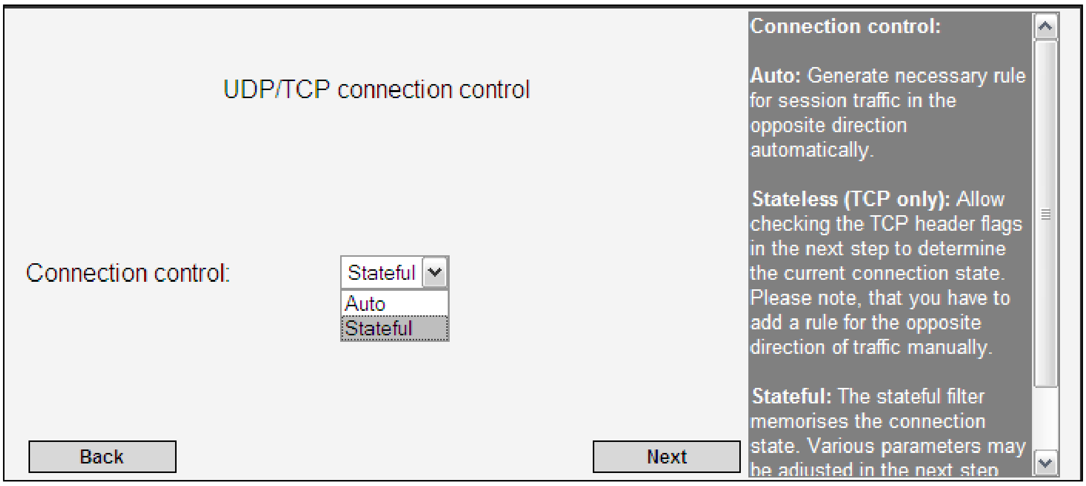
Allow L3
Example

## RULE-RELATED INTERNET PROTOCOL OPTIONS

Stateful filtering stores the state of a connection.

**Auto:** function disabled

**Stateful:** function enabled; offers further configuration options



UDP/TCP connection control

Connection control: Stateful

**Connection control:**

**Auto:** Generate necessary rule for session traffic in the opposite direction automatically.

**Stateless (TCP only):** Allow checking the TCP header flags in the next step to determine the current connection state. Please note, that you have to add a rule for the opposite direction of traffic manually.

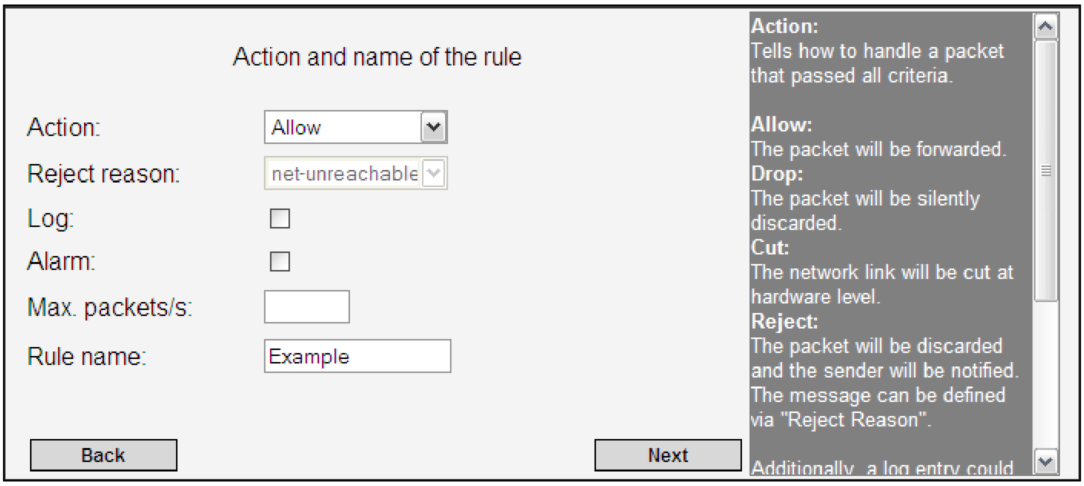
**Stateful:** The stateful filter memorises the connection state. Various parameters may be adjusted in the next step

Confirm by clicking **Next**

## RULE NAME AND BEHAVIOUR

The next dialogue will allow you to define the **Rule Behaviour** in more detail.

Use the menu item **Rule Action** to determine how the device should handle packets.



Action and name of the rule

Action: Allow

Reject reason: net-unreachable

Log: □

Alarm: □

Max. packets/s:

Rule name: Example

**Action:**
Tells how to handle a packet that passed all criteria.

**Allow:**
The packet will be forwarded.
**Drop:**
The packet will be silently discarded.
**Cut:**
The network link will be cut at hardware level.
**Reject:**
The packet will be discarded and the sender will be notified. The message can be defined via "Reject Reason".

Additionally, a log entry could

**Rule Action**:
Available options are Allow and Block.

**Reason for Rejection:**

This allows you to define a reason for packet rejection. In case a rule is violated, the sender will be notified, giving this reason as an explanation.

**Log:**
The Log function enables logging of events.

**Max. Packets/sec**:

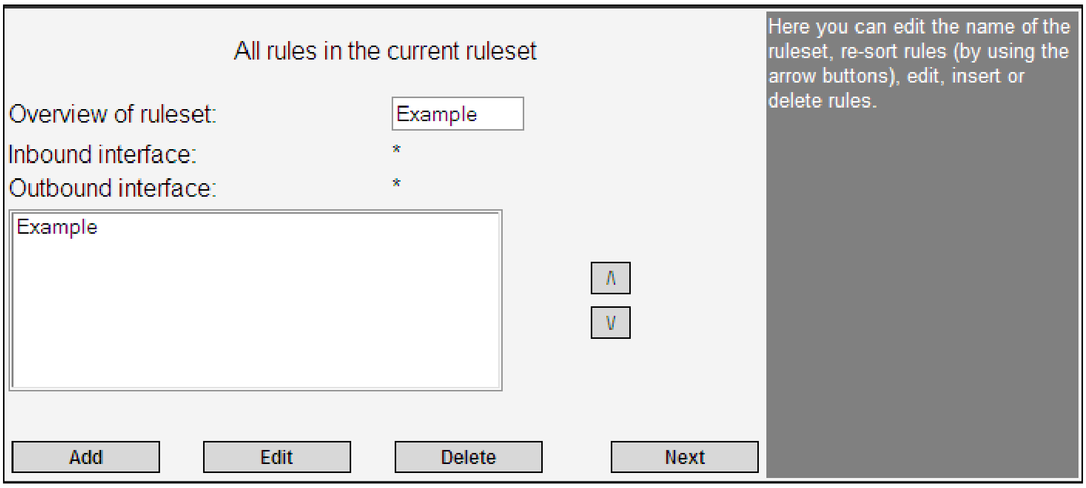
Use this option to specify a maximum packet rate per second at which packets may pass the device.

**Rule Name**:
Choose a name for this rule; the name should be unique, i.e. differ from the name of any other rule set.

Confirm by clicking **Next**.

## OVERVIEW OF ALL RULES IN RULE SET

The next dialogue window provides an overview of all existing rule sets.



All rules in the current ruleset

Overview of ruleset: Example

Inbound interface: *

Outbound interface: *

Example

Here you can edit the name of the ruleset, re-sort rules (by using the arrow buttons), edit, insert or delete rules.

Use the **Add** button for starting the rule configuration process anew to define another rule. The **Edit** button allows subsequent modifications to previously defined rules.

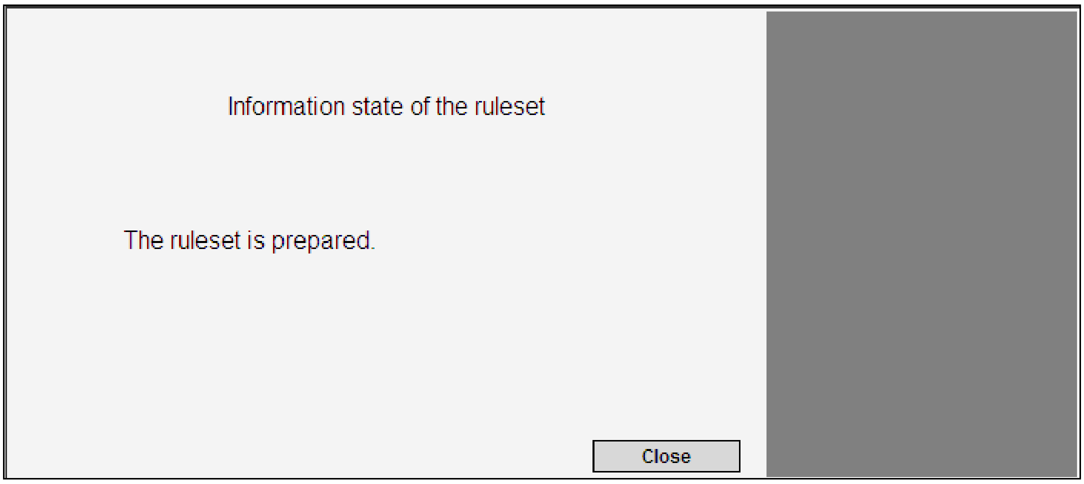
Choose **Delete** to delete the selected rule.

Use the arrow buttons to modify the position of a rule within the current rule set.

Confirm by clicking **Next**.

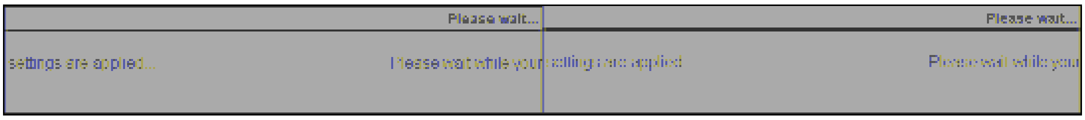
Complete the configuration by clicking **Save.**

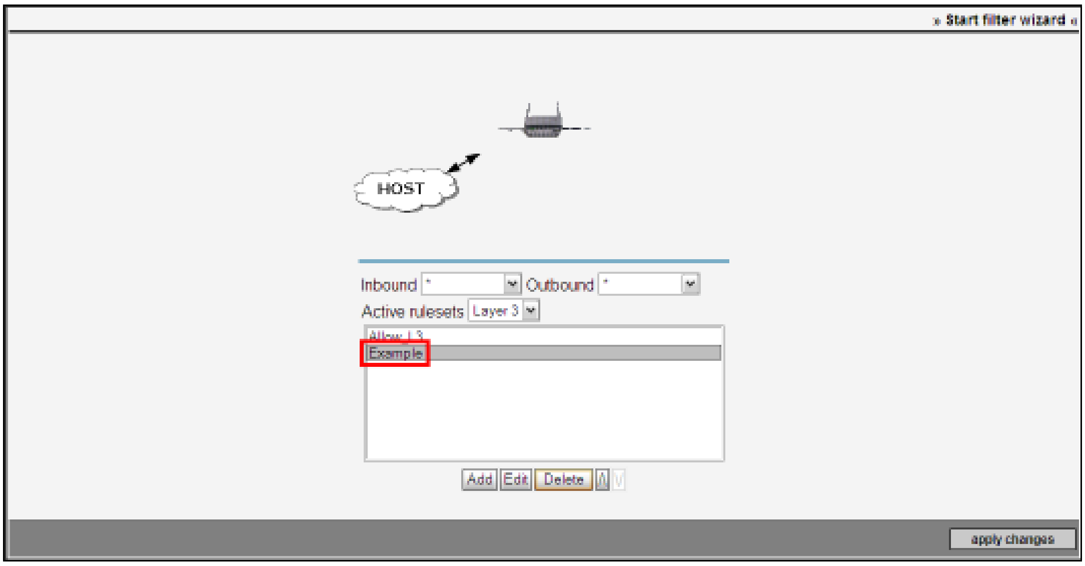
Confirm the next message prompt by clicking **Close.**



Information state of the ruleset

The ruleset is prepared.





Inbound * Outbound *

Active rulesets Layer 3

Allow L3

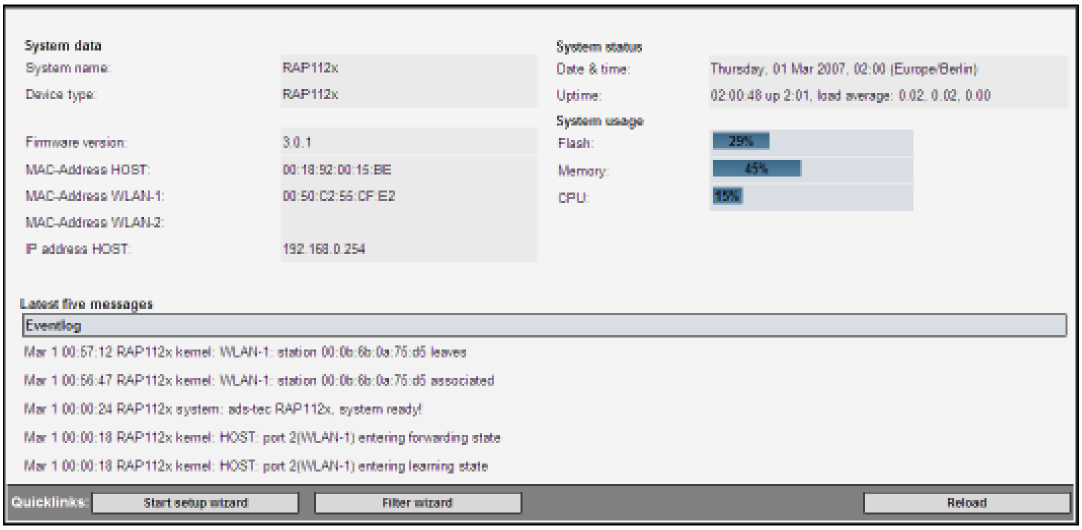
Example

Once a rule set has been successfully loaded and activated, it will be shown in the filter overview page.

**This completes the first-time configuration using the configuration wizards.**

# 8 Access Point/Client Web Interface

The start page of the web interface displays all important Access Point parameters at a glance. Individual settings are directly accessible via hyperlinks on the start page.



System data

| | |
|---|---|
| System name: | RAP112x |
| Device type: | RAP112x |
| Firmware version: | 3.0.1 |
| MAC-Address HOST: | 00:18:92:00:15:BE |
| MAC-Address WLAN-1: | 00:50:C2:55:CF:E2 |
| MAC-Address WLAN-2: | |
| IP address HOST: | 192.168.0.254 |

System status

| | |
|---|---|
| Date & time: | Thursday, 01 Mar 2007, 02:00 (Europe/Berlin) |
| Uptime: | 02:00:48 up 2:01, load average: 0.02, 0.02, 0.00 |

System usage

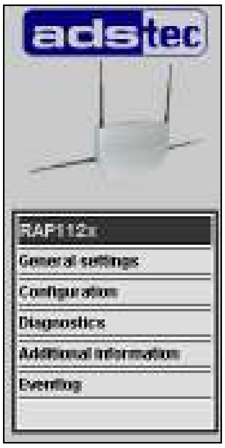
| | |
|---|---|
| Flash: | 29% |
| Memory: | 45% |
| CPU: | 15% |

Latest five messages

Eventlog

```
Mar 1 00:57:12 RAP112x kernel: WLAN-1: station 00:0b:6b:0a:75:d5 leaves
Mar 1 00:56:47 RAP112x kernel: WLAN-1: station 00:0b:6b:0a:75:d5 associated
Mar 1 00:00:24 RAP112x system: ads-tec RAP112x, system ready!
Mar 1 00:00:18 RAP112x kernel: HOST: port 2(WLAN-1) entering forwarding state
Mar 1 00:00:18 RAP112x kernel: HOST: port 2(WLAN-1) entering learning state
```

The Access Point web interface is subdivided into five main categories.



**BASIC SETTINGS**

For adjusting basic Access Point settings

**CONFIGURATION**

Configures specific Access Point functions and features

**DIAGNOSIS**

Indicates the current interface status

**ADDITIONAL INFORMATION**

Contains general device information

**EVENT LOG**

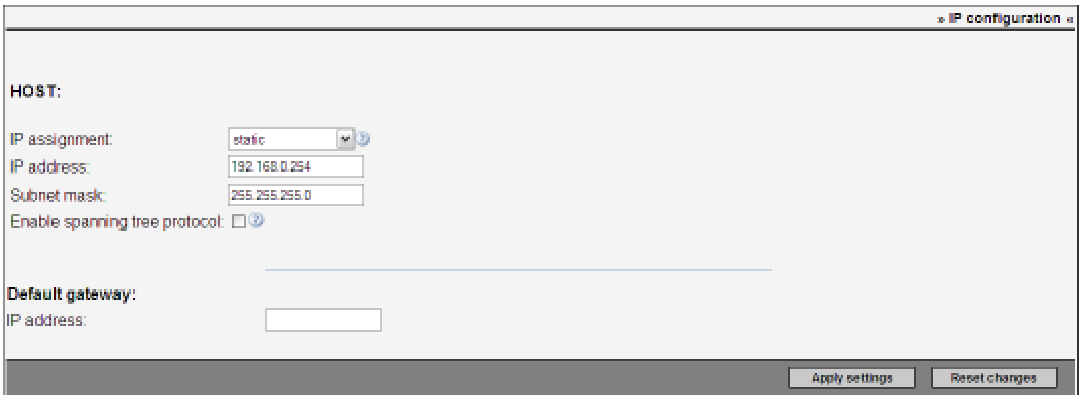
Event log display and configuration

> ***Note:***
>
> *In case you did not use the configuration wizards, you may refer to the following documentation to configure settings manually.*

## 8.1 BASIC SETTINGS MAIN MENU

### 8.1.1 IP Configuration

Access Point IP configuration



» IP configuration «

HOST:

IP assignment: static

IP address: 192.168.0.254

Subnet mask: 255.255.255.0

Enable spanning tree protocol: □

Default gateway:

IP address:

**_Note:_**

*Clicking the question mark ? to the right of the drop-down menus will open up general information about and brief descriptions of the available options.*

Static:

If this option is selected you may enter a static IP address. Static IP address assignment requires entering an IP address and its corresponding subnet mask.

Default values are:

IP address: **192.168.0.254**

Subnet mask: **255.255.255.0**

DHCP:

The DHCP function requests an IP address from a DHCP server and automatically assigns that address.

DHCP fallback:

This option is a combination of static and automatic IP address assignment. In case an error occurs during automatic address assignment (via DHCP server), the system automatically uses the specified static IP address.

Activate Spanning Tree Protocol:

The Spanning Tree Protocol (STP) is used to avoid redundant network loops, especially in switched environments.

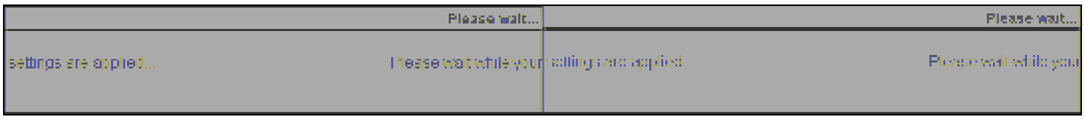
If this option is enabled, it is possible to establish redundant network connections.

Standard Gateway:

Use this field to specify the IP address of the standard gateway to be used.

The IP address entered as standard gateway address is used to establish a connection to an address located outside of the device’s own IP subnet (i.e. outside 192.168.0.254 in the example given previously). However, the standard gateway itself needs to be inside the device’s IP subnet address space. In case IP allocation was set to DHCP, the standard gateway address may be dynamically overwritten, providing the DHCP server supports this. The standard gateway may, for instance, be required in order to reach an NTP time server or to relay the IP address to WLAN clients in case the device serves as a DHCP server itself.

Now click **Activate**



Please wait...

settings are applied... Please wait while your

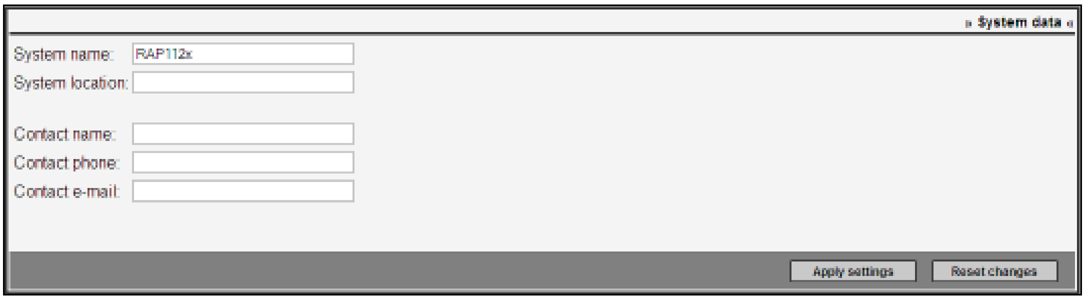
Please wait...

settings are applied Please wait while your

Your changes are now saved and activated.

## 8.1.2 System Data

Use the System Data dialogue to enter important system-related information such as device location and contact data. These data serve as unique identifiers of the device at its location; this includes contact data, which is accessible on this page in case of device maintenance, revision or similar.



» System data «

System name: RAP112x

System location:

Contact name:

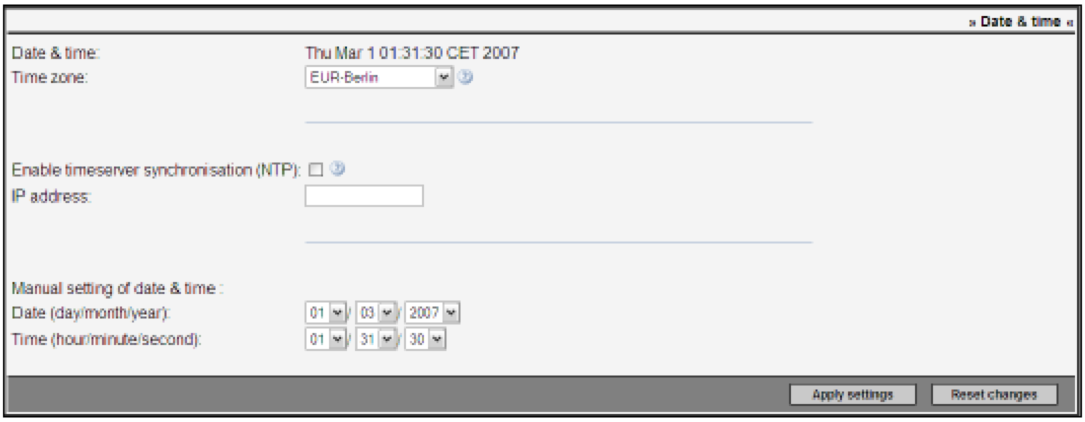
Contact phone:

Contact e-mail:

Click **Activate** to accept the settings

## 8.1.3 Date & Time

This menu item allows setting the system date and time.



» Date & time «

Date & time: Thu Mar 1 01:31:30 CET 2007

Time zone: EUR-Berlin

Enable timeserver synchronisation (NTP): □

IP address:

Manual setting of date & time :

Date (day/month/year): 01 / 03 / 2007

Time (hour/minute/second): 01 / 31 / 30

Date and time can be automatically set via an NTP server or, alternatively, manually.

Time Zone:

Use the drop-down menu to set the correct time zone. GMT (Greenwich Mean Time) is equivalent to Western European Time and may be adapted depending on local time differences.

Time Synchronisation via NTP Server:

This function allows synchronisation of date and time via an NTP server.

To use this service, activate the check box next to this option and enter the IP address of the NTP server you wish to use.

Manual Date & Time Configuration:

Alternatively, you may choose to set date and time manually.

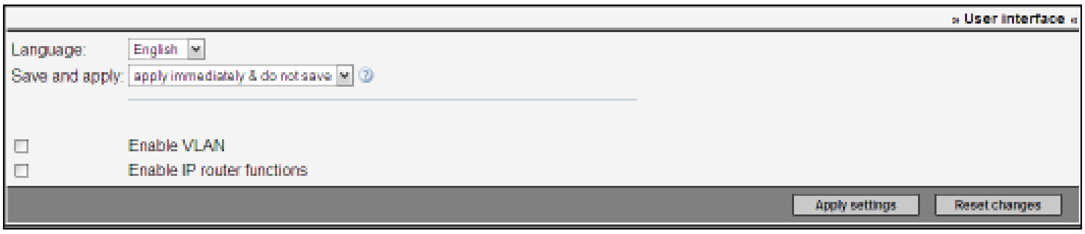
Click **Activate** to confirm your settings.

> ***Note:***
>
> *Correct date and time settings are essential for verifying certificates, reviewing event logs and applying time-based rules defined in the Filter Wizard.*

> ***Note:***
>
> *A device reboot should be performed in order for changes to take effect.*

### 8.1.4 User Interface

Use the **"User Interface"** menu to set the web interface display language to English or German.



» User interface «

Language: English

Save and apply: apply immediately & do not save

☐ Enable VLAN

☐ Enable IP router functions

The drop-down menu allows selecting either **"apply immediately, do not save"** or **"do not apply, save only"** as **Saving and Applying** options.

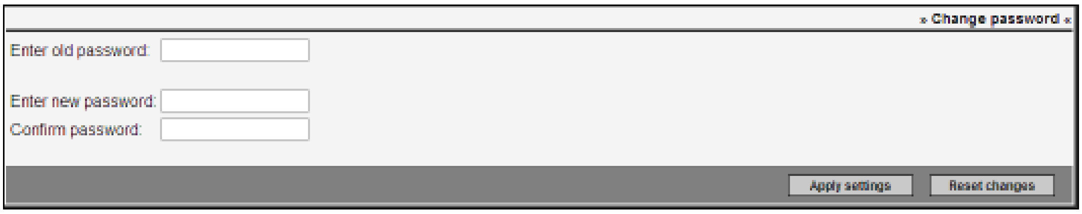
Choosing "**apply immediately, do not save"** will add an **"Apply"** button to all pages in the Access Point configuration menu. That button can be used to implement any changes immediately. In order to keep such changes so they remain available after a device reboot, the user will need to click a disk icon which will subsequently flash up.

The **"do not apply, save only"** option adds a **"Save"** button to all pages in the Access Point configuration menu. Any modified settings will not be implemented, but will be saved immediately. The device needs to be rebooted for changes to take effect. This option omits the **"Please wait"** dialogue shown after a page has been confirmed. Instead of a disk icon, a reboot icon will appear. Clicking it will take the user to the start page from which a reboot may be initiated. The **"Please wait"** screen will still be displayed in some special cases, such as for example ping tests and firmware updates.

Confirm your settings by clicking **Activate**.

## 8.1.5 Change password

Users will need to enter the password specified here before being able to access the web interface. The dialogue window allows changing the password.



Enter old password:

Enter new password:

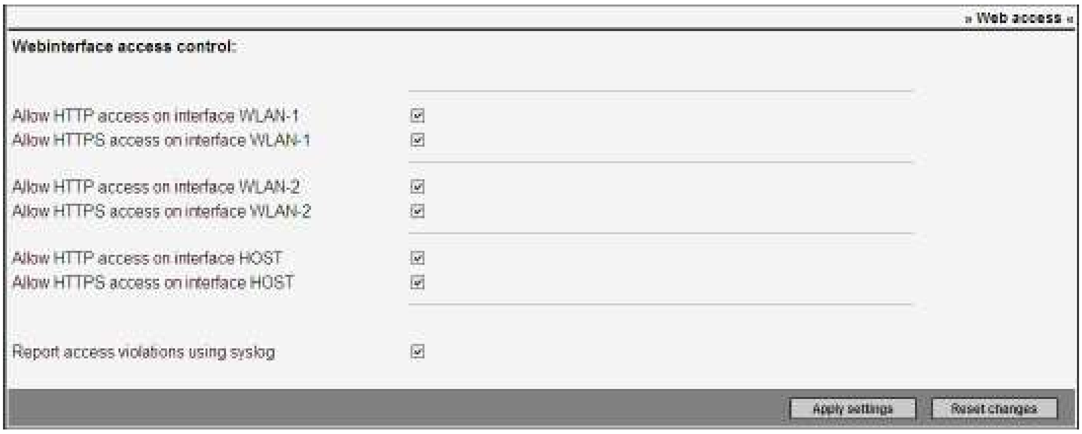
Confirm password:

In order to change the password, enter the current password in the field **Old Password**. Choose a new password and confirm it by entering it in the **Password Confirmation** field.

Confirm your settings by clicking **Apply**.

## 8.1.6 Web Access

The Web Interface Access Control menu allows configuring access to a particular interface via http/https. Furthermore, you may enable a logging of access violations in the Syslog.



**Webinterface access control:**

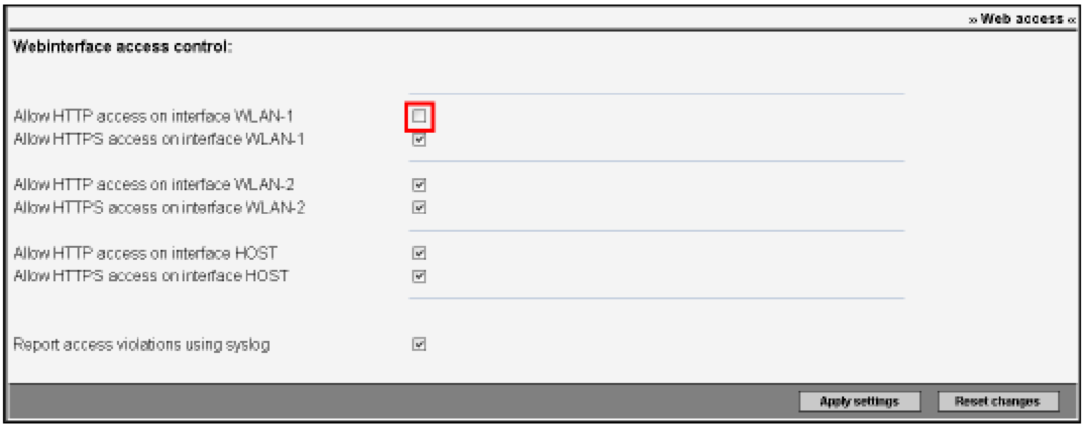
Allow HTTP access on interface WLAN-1 ☑
Allow HTTPS access on interface WLAN-1 ☑

Allow HTTP access on interface WLAN-2 ☑
Allow HTTPS access on interface WLAN-2 ☑

Allow HTTP access on interface HOST ☑
Allow HTTPS access on interface HOST ☑

Report access violations using syslog ☑

In order to deny access to a particular interface, the checkmark next to the respective option needs to be removed.



**Webinterface access control:**

Allow HTTP access on interface WLAN-1 □
Allow HTTPS access on interface WLAN-1 ☑

Allow HTTP access on interface WLAN-2 ☑
Allow HTTPS access on interface WLAN-2 ☑

Allow HTTP access on interface HOST ☑
Allow HTTPS access on interface HOST ☑

Report access violations using syslog ☑

> ***Note:***
>
> *In case you are using an Access Point with 2 integrated WLAN adapters, the same configuration options will appear for WLAN-2.*

Confirm your changes by clicking **Activate**.

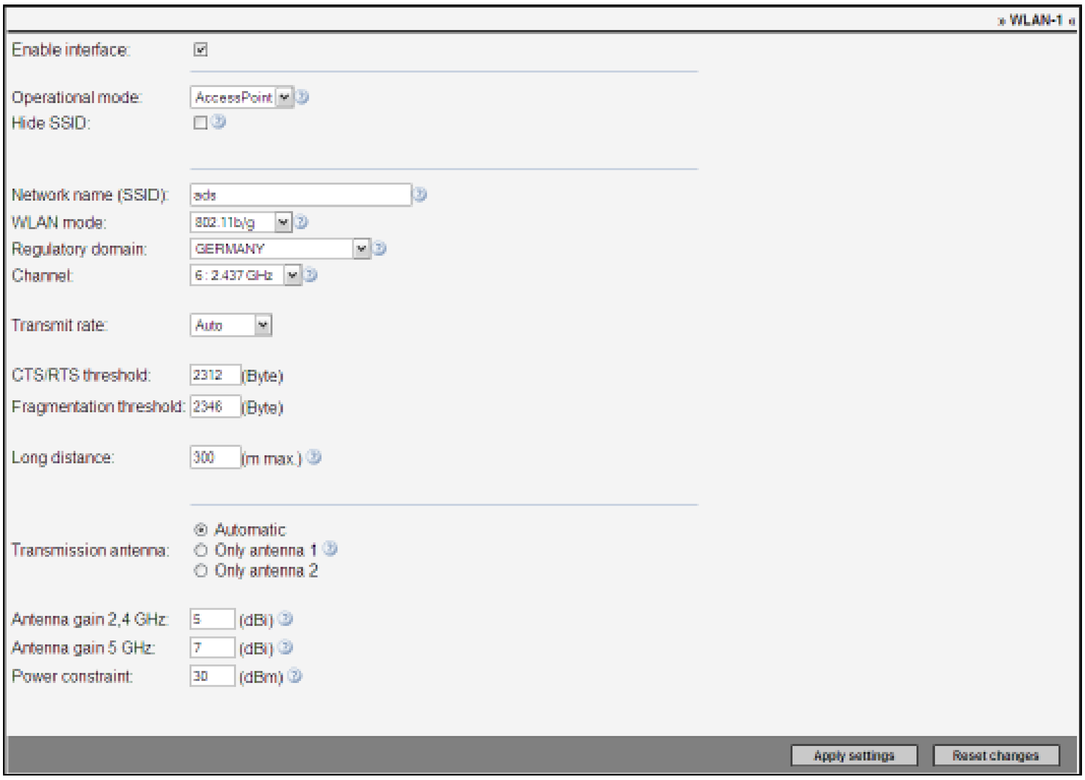
## 8.1.7 Interfaces

Use the **Interfaces** menu to configure the Access Point interfaces. Each interface offers individual configuration options that can be set to influence the interface behaviour. Furthermore, unused interfaces can be deactivated.

> ***Note:***
>
> *Some device variants offer a second WLAN interface.*

### WLAN-1 (Access Point) 2.4GHz-802.11b/g:

Configure the LAN-in interface by setting the duplex mode.



Enable interface: ☑

Operational mode: AccessPoint

Hide SSID: □

Network name (SSID): ads

WLAN mode: 802.11b/g

Regulatory domain: GERMANY

Channel: 6 : 2.437 GHz

Transmit rate: Auto

CTS/RTS threshold: 2312 (Byte)

Fragmentation threshold: 2346 (Byte)

Long distance: 300 (m max.)

Transmission antenna: ● Automatic ○ Only antenna 1 ○ Only antenna 2

Antenna gain 2,4 GHz: 5 (dBi)

Antenna gain 5 GHz: 7 (dBi)

Power constraint: 30 (dBm)

The **Activate Interface** check box needs to be enabled before any changes to the interface configuration are possible.

Operating Mode: Switch / Available options: Access Point / Client (This option is not available for the RAC111x and RAC151x)

Hide SSID: Activating this option will hide the SSID (network name)

Network Name (SSID): The network identifier. Default value: **ads**. Maximum SSID length is 32 characters.

> ***Note:***
>
> *Valid characters are: a-z, A-Z, 0-9, Valid special characters: . _ - ? $ @ ! { } [ ] ( ) + # ; , < > | : * ~ % $ & / =*

WLAN Mode: Allows selection of particular WLAN transmission standard

Regulatory Authority: Select the country in which the device is used. (This option is not available if you are using the FCC version of the device.)

Channel: Allows specifying a particular transmission channel or selecting automatic channel selection.

Transmission Rate: Automatic or manual selection of the Mbit rate.

CTS/RTS Threshold: The Access Point will be notified of any packets exceeding the value specified here. The Access Point will keep the channel open for the packet in question.

Fragmentation Threshold: In case a packet exceeds the value specified here, that packet will be fragmented for transmission, i.e. it will be divided into multiple smaller packet units.

> ***Note:***
>
> *The Fragmentation Threshold option cannot be used if WPA encryption is activated.*

Long Range: In case the physical distance that needs to be bridged between two devices is relatively large, this option allows increasing the timeout value by specifying the distance (in metres). With an increased timeout value, the Access Point will wait longer for a reply from a remote station.

Transmission Antenna:

This option allows specifying whether the device should choose the transmission antenna automatically. Alternatively, the antenna may be specified manually.

Antenna Amplification: Enable the Antenna Amplification option to increase the output power. The maximum output power may however be limited by national guidelines and regulations.

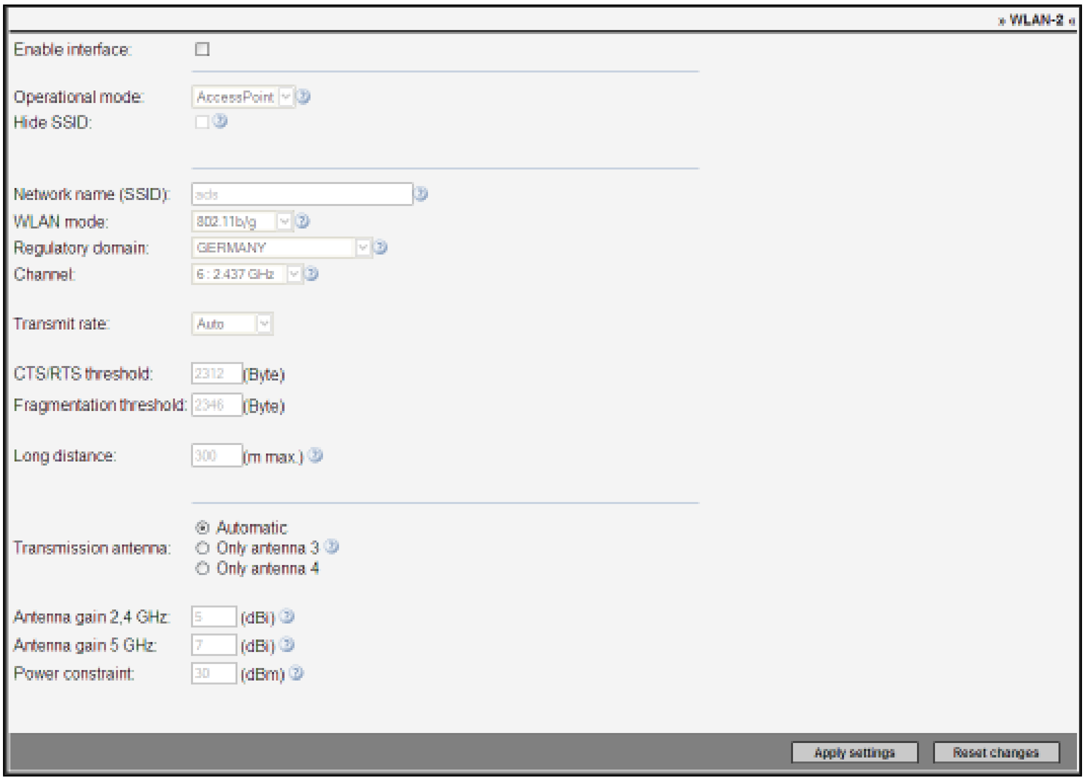
Example: A 10dbi antenna is used in combination with a 3db cable. The Antenna Amplification to be entered in this case is 7dbi.

Power Restriction:

This option allows limiting the Access Point transmission power to the value specified. This value will be conveyed to all clients that can access the Access Point.

## WLAN-1 (Access Client) 2.4 GHz – 802.11b/g:

The configuration menu for the Access Client only differs from the one described above by the missing **"Hide SSID"** option, which is replaced by the **"Static BSSID"** option:



Enable interface: □

Operational mode: AccessPoint

Hide SSID: □

Network name (SSID): ads

WLAN mode: 802.11b/g

Regulatory domain: GERMANY

Channel: 6 : 2.437 GHz

Transmit rate: Auto

CTS/RTS threshold: 2312 (Byte)

Fragmentation threshold: 2346 (Byte)

Long distance: 300 (m max.)

Transmission antenna: ● Automatic ○ Only antenna 3 ○ Only antenna 4

Antenna gain 2,4 GHz: 5 (dBi)

Antenna gain 5 GHz: 7 (dBi)

Power constraint: 30 (dBm)

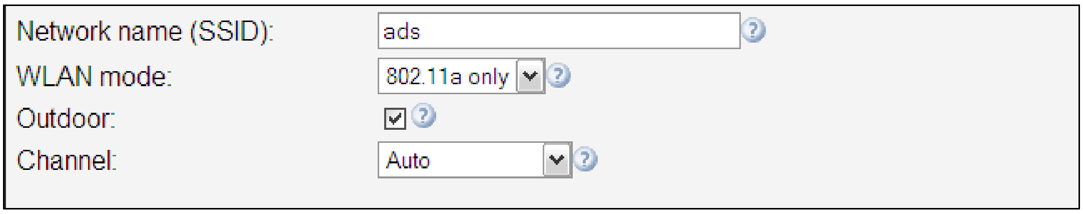
Use static Access Point BSSID:

With this option enabled, you may enter the MAC address of an access point. This option is useful for access points with identical SSID as it allows accessing a particular device.

Confirm by clicking **Activate**.

## WLAN-1 (Access Point & Access Client) 5 GHz – 802.11a (ETSI):

In case WLAN Mode is set to 802.11a, or 802.11a/b/g for the Client, some available options differ:



Network name (SSID): ads

WLAN mode: 802.11a only

Outdoor: ☑

Channel: Auto

Outdoor:

This option must be activated if the device is operated outdoors. Some of the 5GHz band channels may not be used outdoors. Activating this function will turn off all such channels. This option is not required for the Access Client.

Disable DFS:

Providing the Access Point is ***not*** operated outdoors, DFS may be disabled. Channels 36, 40, 44 and 48 may then also be configured manually. Furthermore, activating this option will reduce the maximum transmission power. In Client mode, DFS may also be disabled outdoors.

***Note:***

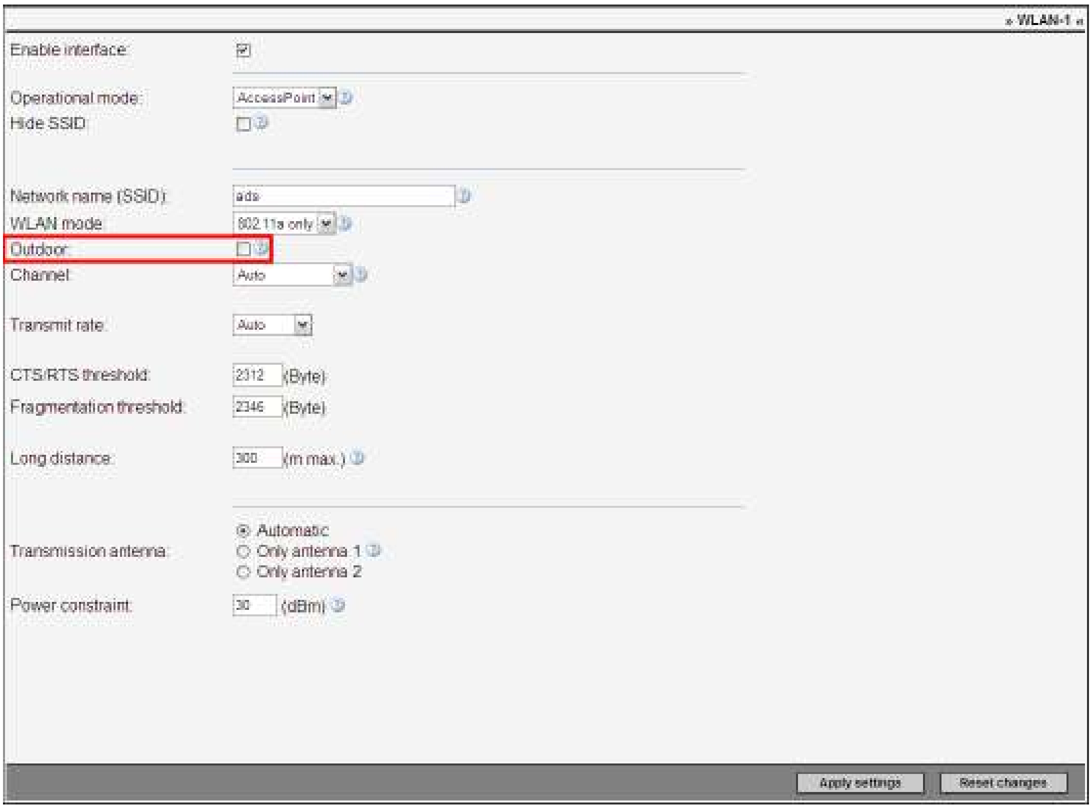
*In Client mode, DFS is disabled per default. The radar scan during data transmissions may create strong interferences with the client, which subsequently need to be analysed as radar impulses. This frequently causes a high CPU load as well as faulty radar detections. This means that in Client mode, DFS should only be enabled if the higher Client transmission power of 23dB is exceeded and 30dBm are required to establish a stable connection. In Client mode, the presence of another 5GHz device in the vicinity may also cause significant interferences if DFS is enabled.*

## WLAN-1 (Access Point & Access Client) 2.4 GHz – 802.11a (FCC):

The FCC version of the device offers the following additional interface configuration options:

Outdoor:
This option must be activated if the device is operated outdoors. It will turn off all channels that may legally not be used outdoors.

> ***Note:***
>
> *DFS and TPC are disabled in this case. Compared to the A version, the 802.11b/g (FCC) version merely offers the Directional Antenna setting as an additional option.*

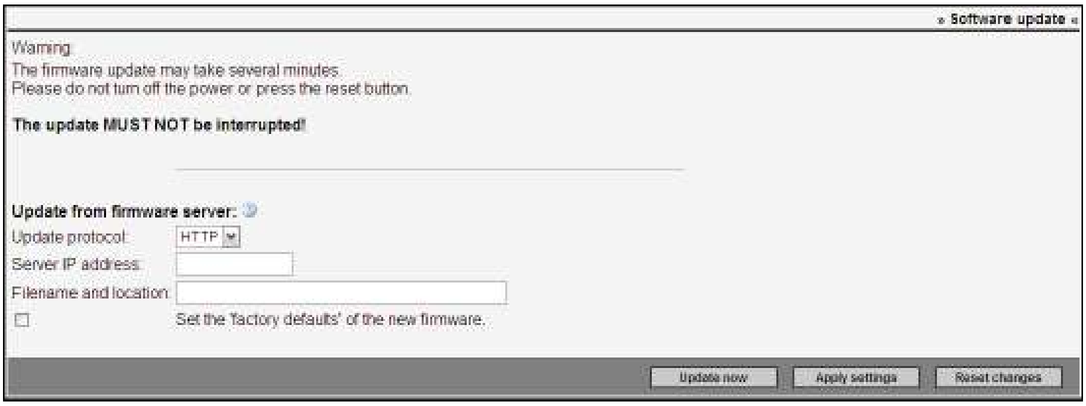


» WLAN-1 «

| | |
|---|---|
| Enable interface: | ☑ |
| Operational mode: | AccessPoint |
| Hide SSID: | □ |
| Network name (SSID): | ads |
| WLAN mode: | 802.11a only |
| Outdoor: | □ |
| Channel: | Auto |
| Transmit rate: | Auto |
| CTS/RTS threshold: | 2312 (Byte) |
| Fragmentation threshold: | 2346 (Byte) |
| Long distance: | 300 (m max.) |
| Transmission antenna: | ● Automatic<br>○ Only antenna 1<br>○ Only antenna 2 |
| Power constraint: | 30 (dBm) |

## SOFTWARE UPDATE:

The menu item Software Update allows updating the device firmware. You may choose one of three options to update the firmware:



» Software update «

Warning:
The firmware update may take several minutes.
Please do not turn off the power or press the reset button.

**The update MUST NOT be interrupted!**

**Update from firmware server:**

Update protocol: HTTP

Server IP address:

Filename and location:

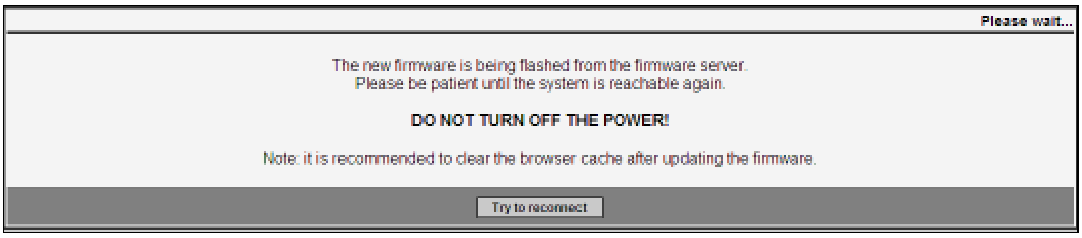
□ Set the 'factory defaults' of the new firmware.

You may update the firmware via an FTP, a TFTP or an HTTP server.

## PROCEDURE:

1) Save the new firmware file in a folder of your choice on your workstation PC.
2) Start the desired server service or use a freeware program such as tfpd32 (available on the ads-tec service CD) in order to perform a firmware update. Please mind local firewall settings to ensure communication with the device is not blocked.
3) Under **Browse**, enter the path of the folder in which the new firmware is located. Confirm by clicking **OK**.
4) Before initiating the update process, it is recommended to enable the option to adopt the factory settings of the new firmware.
5) Enter the IP address in the field Server IP Address.
6) The file name, including its path with all required subfolders, is specified under File Name and Location.
7) Before initiating the update process, you may opt to adopt the factory settings of the new firmware.
8) Start the update process.

During the firmware update, the following dialogue window will be displayed:



Please wait...

The new firmware is being flashed from the firmware server.
Please be patient until the system is reachable again.

**DO NOT TURN OFF THE POWER!**

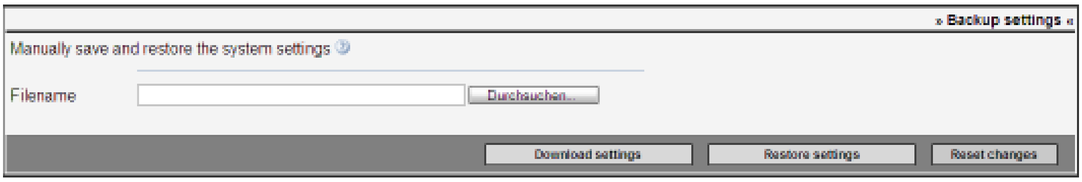
Note: it is recommended to clear the browser cache after updating the firmware.

Once the Link LED turns green and the ACT LED is extinguished, you may click the button **Try to reconnect**. The Access Point will then try to access the web interface. If the update was successful the Software Update screen will appear.

**Note:**

*Abortion of the update process, e.g. due to a power failure, may damage the device and/or its firmware. In this case, the device needs to be sent in to the manufacturer for repair.*

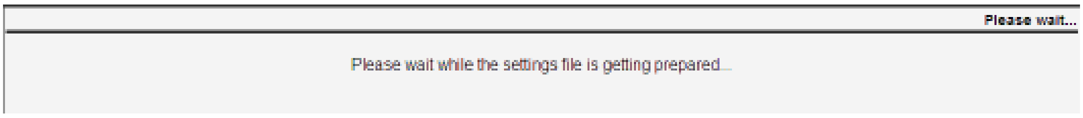
## Backup Settings



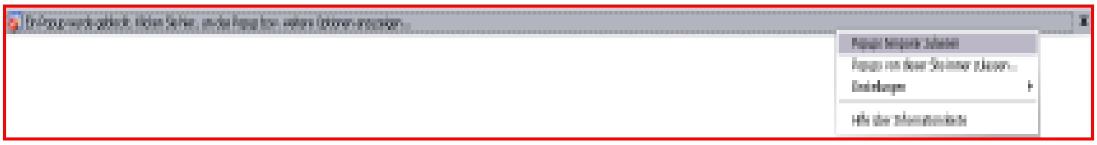
The Backup Settings menu allows saving and restoring the device configuration.

## Saving the Device Configuration:

To save the configuration to a file, click **Save Settings**

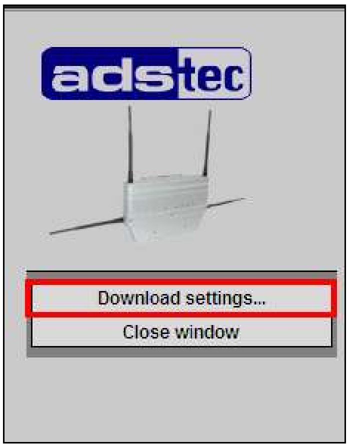


Please wait while the settings file is getting prepared...

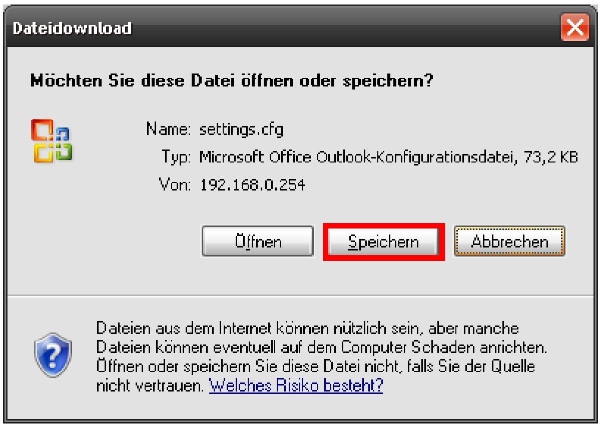

Ein Popup wurde geblockt. Klicken Sie hier, um das Popup bzw. weitere Optionen anzuzeigen.
Popups temporär zulassen
Popups von dieser Site immer zulassen...
Einstellungen
Hilfe über Informationsleiste

**Note:**

*In case a popup blocker is enabled, it should be set to temporarily accept the following page. In Internet Explorer, select the option **"Temporarily allow popups"** in the dialogue appearing below the URL bar. When using a different browser, select an equivalent option.*



Select Save Settings


Dateidownload

Möchten Sie diese Datei öffnen oder speichern?

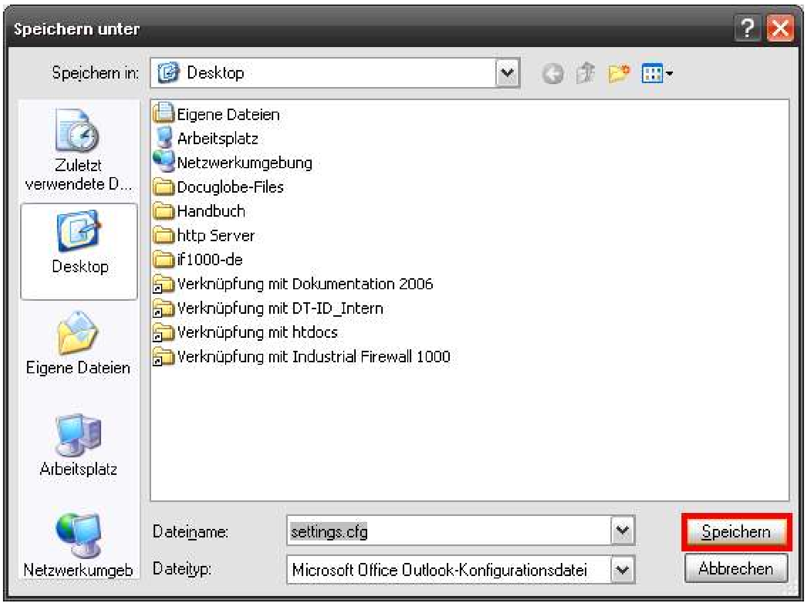
Name: settings.cfg
Typ: Microsoft Office Outlook-Konfigurationsdatei, 73,2 KB
Von: 192.168.0.254

Dateien aus dem Internet können nützlich sein, aber manche Dateien können eventuell auf dem Computer Schaden anrichten. Öffnen oder speichern Sie diese Datei nicht, falls Sie der Quelle nicht vertrauen. Welches Risiko besteht?

The following popup window appears

You will be prompted to save the file **settings.cfg** .

Select **Save**, then choose a file location and click **Save** again.


Speichern unter

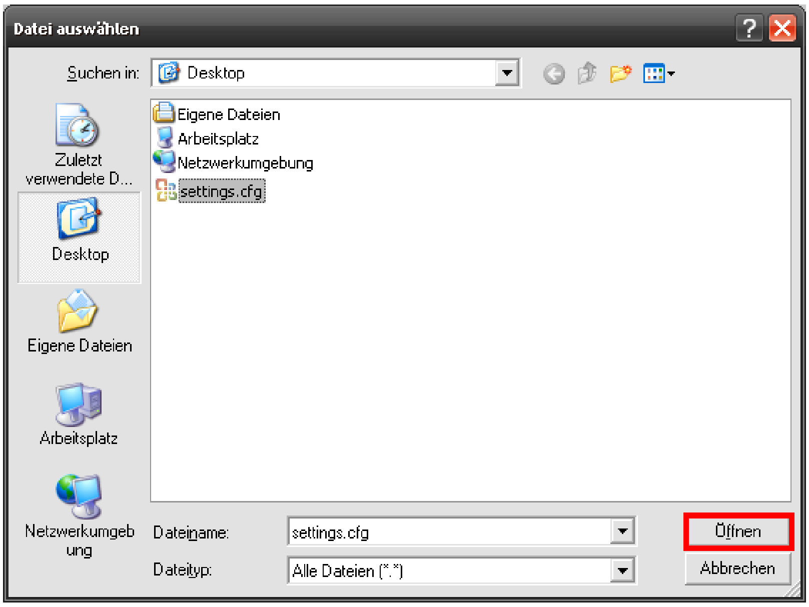
Speichern in: Desktop

Eigene Dateien
Arbeitsplatz
Netzwerkumgebung
Docuglobe-Files
Handbuch
http Server
if1000-de
Verknüpfung mit Dokumentation 2006
Verknüpfung mit DT-ID_Intern
Verknüpfung mit htdocs
Verknüpfung mit Industrial Firewall 1000

Dateiname: settings.cfg
Dateityp: Microsoft Office Outlook-Konfigurationsdatei

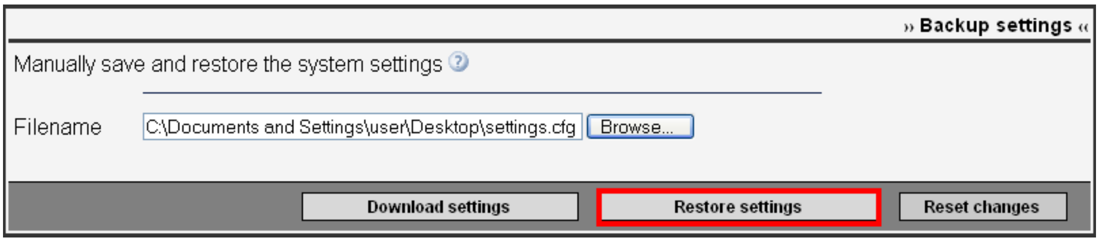
## RESTORING A DEVICE CONFIGURATION:

To restore your saved settings, click **Browse** and select the file **settings.cfg** (unless you saved your settings under a different file name).



Confirm by clicking **Open**.

Then click the button **Restore Settings**.



Manually save and restore the system settings

Filename: C:\Documents and Settings\user\Desktop\settings.cfg

Reboot the device to load and apply the restored settings.

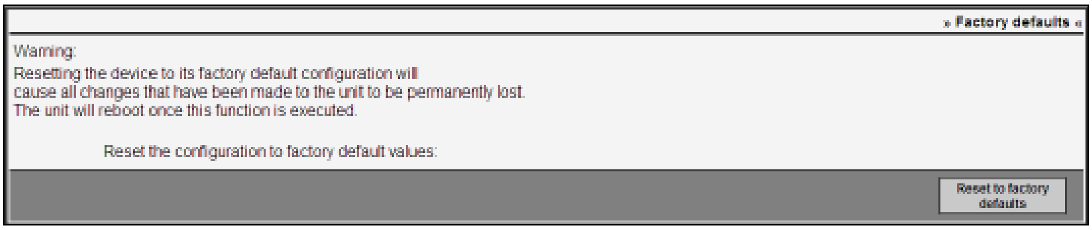
***Note:***

*Version 1.x and 2.x configuration files (file extension .dat) are no longer supported in version 3.x.*

## FACTORY SETTINGS

This menu item allows resetting the device to its factory settings.

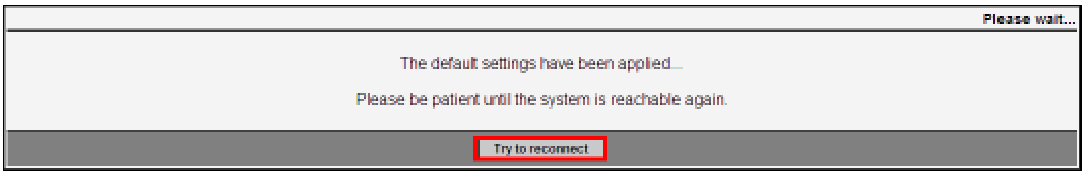
Clicking the button **Restore Factory Settings** will load the device’s default settings.



Warning:
Resetting the device to its factory default configuration will
cause all changes that have been made to the unit to be permanently lost.
The unit will reboot once this function is executed.

Reset the configuration to factory default values:

The following dialogue window will be displayed while factory settings are being restored.



The default settings have been applied...

Please be patient until the system is reachable again.

Subsequently click the button **Try to reconnect**.

***Note:***

*The button will only work if the IP address to be restored is identical to the pre-configured IP address.*

The Access Point will now try to access the web interface. If the update was successful the web interface will appear.

***Warning:***

*This option will reset all configuration settings. All user-defined filter rules will be discarded. If you are unable to access the web interface after resetting the device to factory settings you may need to adapt the IP address of your PC.*

The following default settings will be restored:

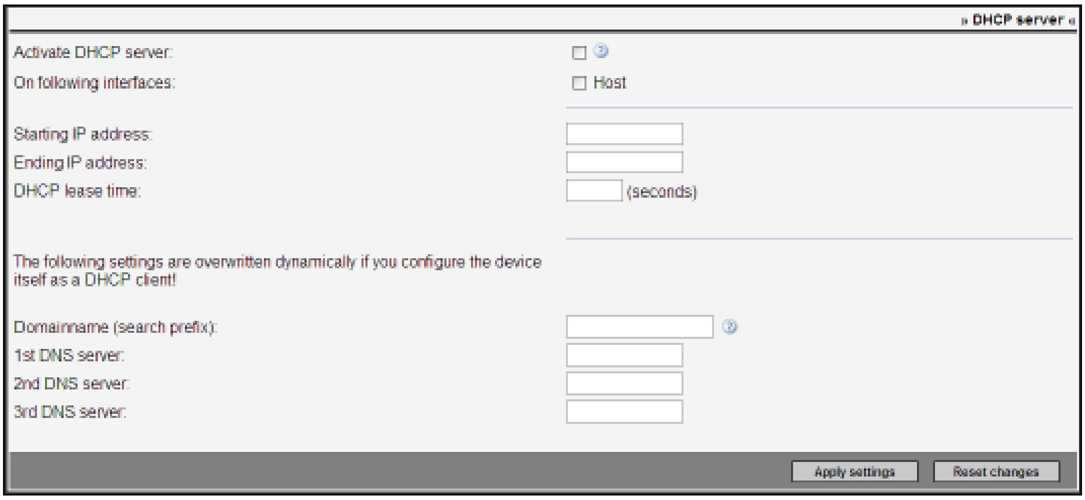
| | |
|---|---|
| IP address: | 192.168.0.254 |
| User name: | **admin** |
| Password: | **admin** |

## 8.2 CONFIGURATION

### 8.2.1 Network

**DHCP SERVER**

The integrated DHCP server can be used to automatically assign IP addresses. It is however disabled by default and may be enabled by checkmarking the **Activate DHCP Server** option.



» DHCP server «

Activate DHCP server: □

On following interfaces: □ Host

Starting IP address:

Ending IP address:

DHCP lease time: (seconds)

The following settings are overwritten dynamically if you configure the device itself as a DHCP client!

Domainname (search prefix):

1st DNS server:

2nd DNS server:

3rd DNS server:

**Note:**

*The IP address of the interface itself needs to be within the IP address range!*

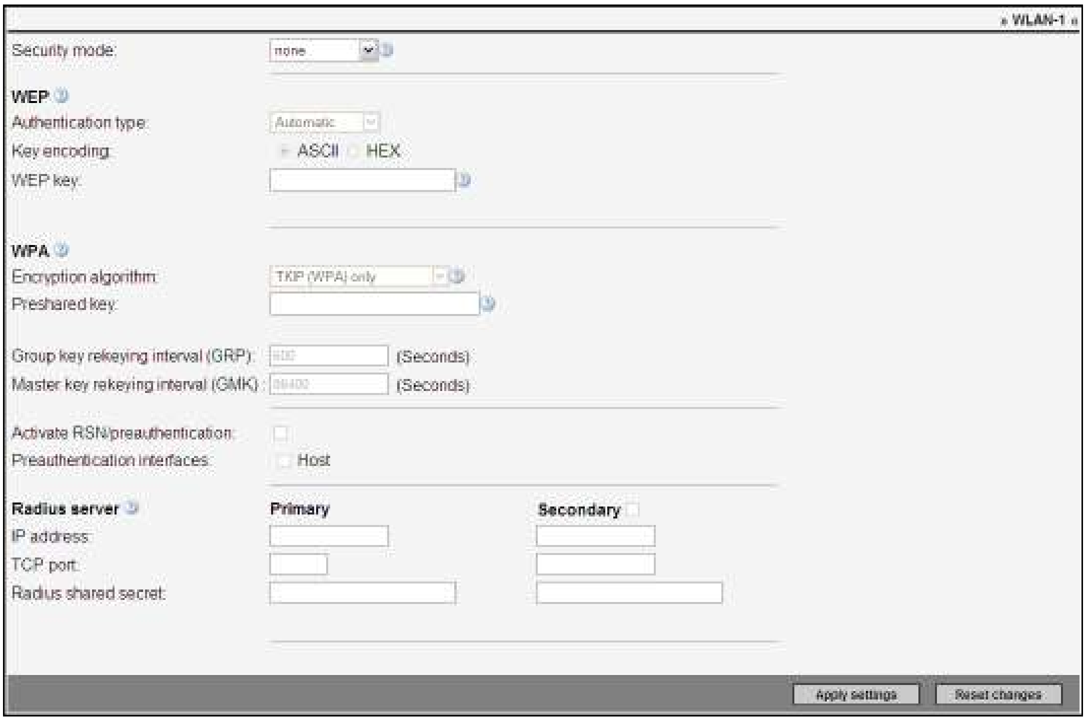
The interfaces to be covered by the DHCP server can be specified in more detail by means of the options available in the **for the following interfaces** section. This allows setting the pool range individually for each interface.

In addition to IP addresses, the DHCP server can, in server operation, also forward a domain lookup prefix as well as up to three DNS server addresses. This information is passed on to DHCP clients. The device employs its own internal DNS service for temporary query storage. If the Access Point itself operates as a DHCP client, rather than having a static IP address, the DHCP server used in that case will overwrite these data.

## 8.2.2 Security

### WLAN 1 / 2

The WLAN security menu allows configuring the security standard for the wireless network. The following modes are available:



Security mode: none

**WEP**

Authentication type: Automatic

Key encoding: ● ASCII ○ HEX

WEP key:

**WPA**

Encryption algorithm: TKIP (WPA) only

Preshared key:

Group key rekeying interval (GRP): 600 (Seconds)

Master key rekeying interval (GMK) : 86400 (Seconds)

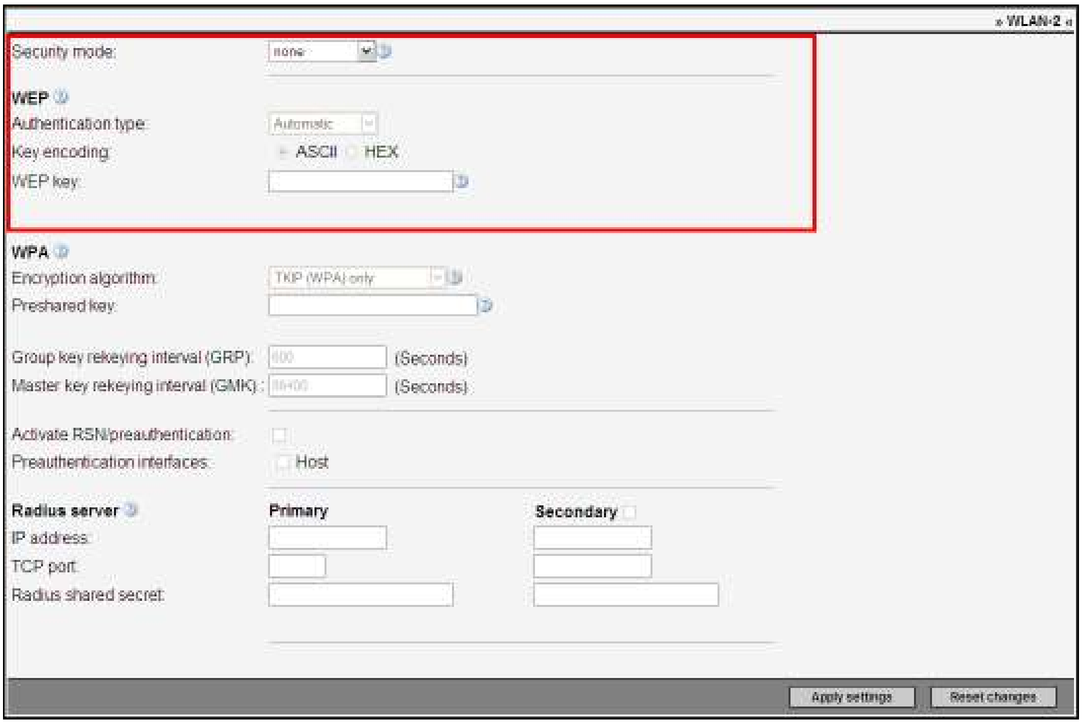
Activate RSN/preauthentication: □

Preauthentication interfaces: □ Host

| **Radius server** | **Primary** | **Secondary** □ |
|---|---|---|
| IP address: | | |
| TCP port: | | |
| Radius shared secret: | | |

### WEP 64 Bits / WEP 128 Bits

Like WPA, the WEP 64 Bits / 128 Bits mode requires a keyword for securing wireless communications. The chief difference is that in WPA mode, this key changes dynamically during a connection, whereas it remains static in WEP mode.



Security mode: none

**WEP**

Authentication type: Automatic

Key encoding: ● ASCII ○ HEX

WEP key:

**WPA**

Encryption algorithm: TKIP (WPA) only

Preshared key:

Group key rekeying interval (GRP): 600 (Seconds)

Master key rekeying interval (GMK) : 86400 (Seconds)

Activate RSN/preauthentication: □

Preauthentication interfaces: □ Host

| **Radius server** | **Primary** | **Secondary** □ |
|---|---|---|
| IP address: | | |
| TCP port: | | |
| Radius shared secret: | | |

## AUTHENTICATION MODE:

Automatic:

In **Automatic** mode, the authentication mode is selected automatically.

Open System:

**Open System** authentication is the default authentication setting.

Shared Key:

Shared Key authentication employs an enhanced handshake mechanism during login, which does, however, not provide any additional security.

Key Encoding:

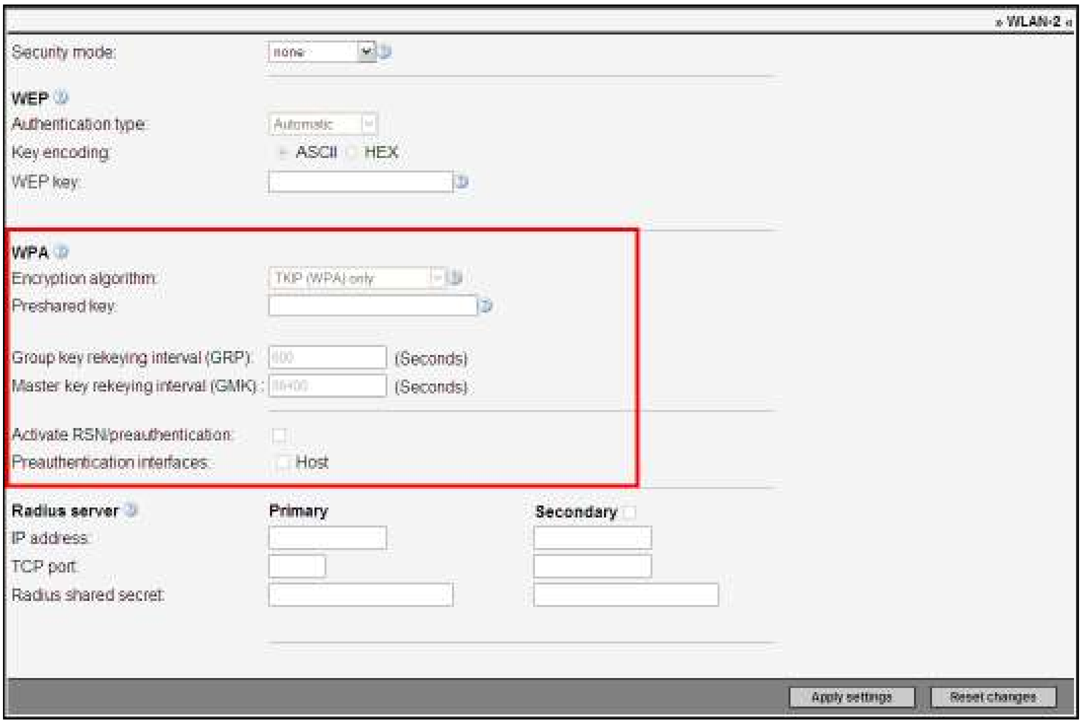
You may select ASCII or HEX key encoding. ASCII is a 7-bit encoding scheme, HEX is a 16-bit scheme.

WEP Key:

WEP key length is limited to 5 characters in ASCII encoding mode. Using HEX encoding, keys with a length of up to 10 characters may be chosen. Rather than actual words, we recommend using alphanumeric combinations of letters and numbers in order to ensure optimal security.

## WPA/PSK

WPA/PSK mode secures communications by requiring a keyword and employing a particular data encryption method. The keyword (Pre-Shared Key) may contain a minimum of 8 and a maximum of 63 characters. Rather than actual words, we recommend using alphanumeric combinations of letters and numbers in order to ensure optimal security.



» WLAN-2 «

Security mode: none

**WEP**

Authentication type: Automatic

Key encoding: ● ASCII ○ HEX

WEP key:

**WPA**

Encryption algorithm: TKIP (WPA) only

Preshared key:

Group key rekeying interval (GRP): 600 (Seconds)

Master key rekeying interval (GMK): 86400 (Seconds)

Activate RSN/preauthentication: □

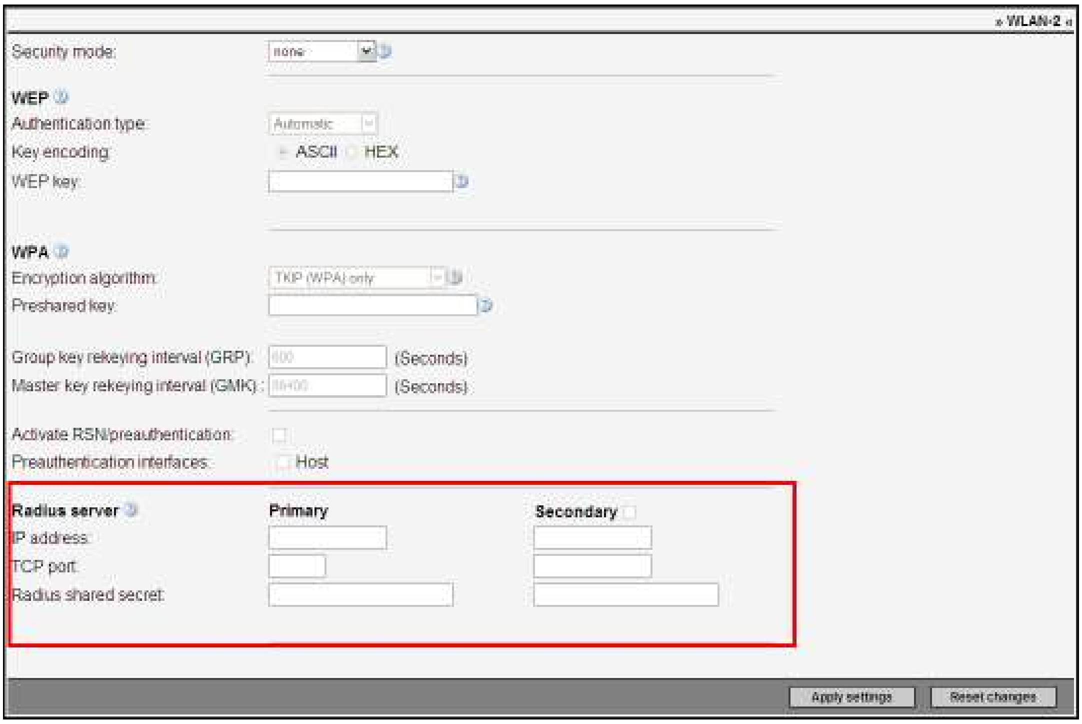
Preauthentication interfaces: □ Host

| **Radius server** | **Primary** | **Secondary** □ |
|---|---|---|
| IP address: | | |
| TCP port: | | |
| Radius shared secret: | | |

Data Encryption:

You may choose to either use all data encryption methods or select a particular method. Please note that WPA 2 encryption requires that all network access points and clients support the WPA 2 standard.

## WPA RADIUS



» WLAN-2 «

Security mode: none

**WEP**

Authentication type: Automatic

Key encoding: ● ASCII ○ HEX

WEP key:

**WPA**

Encryption algorithm: TKIP (WPA) only

Preshared key:

Group key rekeying interval (GRP): 600 (Seconds)

Master key rekeying interval (GMK): 86400 (Seconds)

Activate RSN/preauthentication: □

Preauthentication interfaces: □ Host

**Radius server** **Primary** **Secondary** □

IP address:

TCP port:

Radius shared secret:

The Access Point is able to use an existing external RADIUS server for user authentication. This requires entering the IP address of the RADIUS server in the IP Address field.

You also need to specify the TCP port used by the RADIUS server in the field TCP Port. Most RADIUS servers use the standard TCP port 1812.

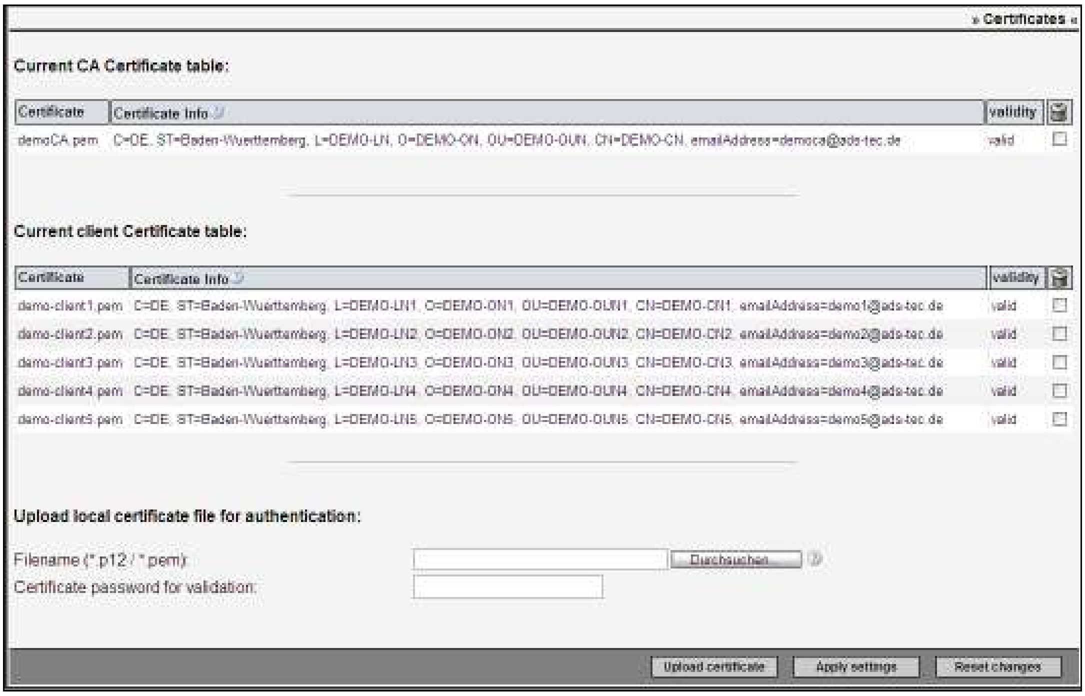
The RADIUS keyword is required by the RADIUS server to identify and authenticate the Access Point.

In case two RADIUS servers are used, an alternative configuration may be entered in the Secondary section. These settings will only take effect if the first RADIUS server is unreachable. The Access Point will then try to establish a connection to the secondary RADIUS server.

Confirm by clicking **Activate**

## CERTIFICATES

The Access Point uses certificates to authenticate L2TP/IPSec, OpenVPN and HTTPS web server connections. The Access Point Certificate Management web interface shown below lists a number of demo certificates only generated for test purposes.



Current CA Certificate table:

| Certificate | Certificate Info | validity | |
|---|---|---|---|
| demoCA.pem | C=DE, ST=Baden-Wuerttemberg, L=DEMO-LN, O=DEMO-ON, OU=DEMO-OUN, CN=DEMO-CN, emailAddress=democa@ads-tec.de | valid | □ |

Current client Certificate table:

| Certificate | Certificate Info | validity | |
|---|---|---|---|
| demo-client1.pem | C=DE, ST=Baden-Wuerttemberg, L=DEMO-LN1, O=DEMO-ON1, OU=DEMO-OUN1, CN=DEMO-CN1, emailAddress=demo1@ads-tec.de | valid | □ |
| demo-client2.pem | C=DE, ST=Baden-Wuerttemberg, L=DEMO-LN2, O=DEMO-ON2, OU=DEMO-OUN2, CN=DEMO-CN2, emailAddress=demo2@ads-tec.de | valid | □ |
| demo-client3.pem | C=DE, ST=Baden-Wuerttemberg, L=DEMO-LN3, O=DEMO-ON3, OU=DEMO-OUN3, CN=DEMO-CN3, emailAddress=demo3@ads-tec.de | valid | □ |
| demo-client4.pem | C=DE, ST=Baden-Wuerttemberg, L=DEMO-LN4, O=DEMO-ON4, OU=DEMO-OUN4, CN=DEMO-CN4, emailAddress=demo4@ads-tec.de | valid | □ |
| demo-client5.pem | C=DE, ST=Baden-Wuerttemberg, L=DEMO-LN5, O=DEMO-ON5, OU=DEMO-OUN5, CN=DEMO-CN5, emailAddress=demo5@ads-tec.de | valid | □ |

Upload local certificate file for authentication:

Filename (*.p12 / *.pem):

Certificate password for validation:

When a certificate is uploaded, its validity is automatically checked. An invalid certificate, e.g. one for which the date and time range do not match the Access Point's system time, will be indicated by the word *invalid* in the validity column. A question mark symbol will appear for the invalid certificate. Click that symbol to obtain further information on the corresponding system error message.

***Note:***

*A *.pem certificate file must contain a private key as well as a public certificate part. The private key needs to be available in RSA format.*

*Certificates are also classified as invalid if no corresponding CA file can be found on the system.*

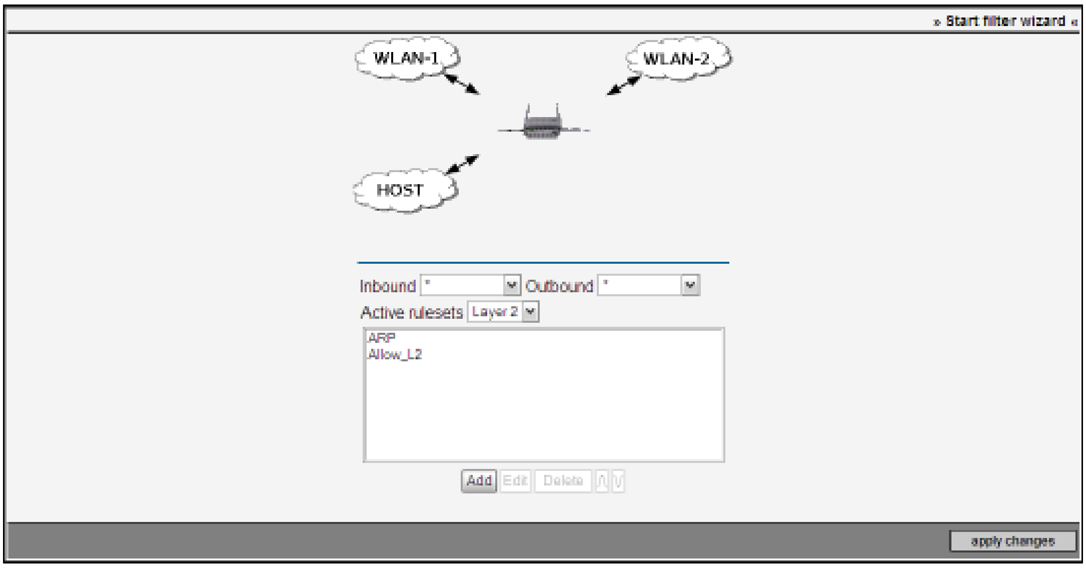
Select **Activate** to apply your settings.

## FILTER WIZARD

**Note:**

*The Filter Wizard may also be started via the web interface start page.*

The Filter Wizards supports you in creating rules by automatically prompting you for essential configuration parameters in a step-by-step process.



Inbound * Outbound *

Active rulesets Layer 2

ARP
Allow_L2

The clouds shown in the upper part of the screen are used to illustrate the paths of communication between the selected incoming/outgoing interfaces.

Once a layer has been defined, only those rules pertaining to that layer will be displayed. All active rules will be shown in the overview window.

**Note:**

*Rules are processed in the sequence in which they are displayed in the list. If one rule is triggered for a particular data packet, that packet will not be processed further.*

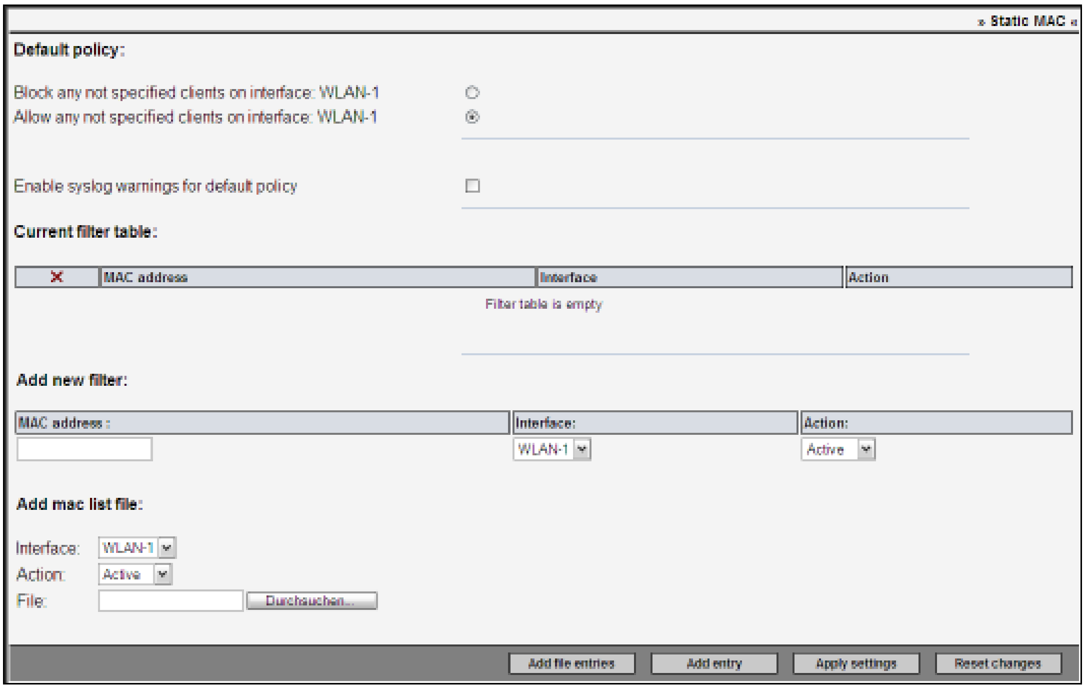
**Note:**

*Once a rule has been defined, you need to select **Apply Changes** in the web interface to test their functionality.*

## Static MAC Address

The static MAC filter can be used as an access control option for any interface set to Access Point mode. MAC address filtering entails checking a client's physical (MAC) address against an access list; only clients with a MAC address contained in that list will be granted access. If access is blocked for a particular client, that client will be denied access during the 802.11 authentication process. As MAC addresses can be faked relatively easily, this option does not offer a high level of security. When using WPA data encryption, MAC filtering is not required as WPA itself offers sufficient security. However, MAC address filtering may be useful as an additional means of protection if less secure WEP encryption is employed. The MAC filter table cannot be applied to interfaces not set to Access Point mode. In that case, the message "No WLAN interfaces in AP mode. Filter inactive." will appear.

This option is not available for the RAC111x and RAC151x.



» Static MAC «

**Default policy:**

Block any not specified clients on interface: WLAN-1 ○
Allow any not specified clients on interface: WLAN-1 ●

Enable syslog warnings for default policy □

**Current filter table:**

| ✕ | MAC address | Interface | Action |
|---|---|---|---|

Filter table is empty

**Add new filter:**

| MAC address: | Interface: | Action: |
|---|---|---|
|  | WLAN-1 | Active |

**Add mac list file:**

Interface: WLAN-1
Action: Active
File:

Standard Behaviour:

The Standard Behaviour defines how the device handles MAC addresses contained in the filter table. A client may either be explicitly blocked (blacklist) or explicitly allowed (whitelist). The latter is the setting employed in most cases.

Syslog:

Enabling this option will add a message to the system event log every time a client is denied access because it is explicitly or implicitly blocked.

New Filter:

In order to create a new filter, enter a client's MAC address (format example: 00:50:C2:45:A1:BB) and the interface(s) on which to apply the new filter (WLAN-1, WLAN-2, *). Select **"active"** or **"inactive"** in the "Action" column to temporarily disable an entry or in order to not activate it immediately. Subsequently click **"Add"** to save the new MAC address filter entry.

MAC list file:

If you wish to configure multiple MAC addresses at once, it may be helpful to use a text file with a list of MAC addresses, rather than entering each address individually. A MAC list file must contain one MAC address per line, for example:
00:50:C2:48:A1:00
00:50:C2:48:A1:02
00:50:C2:48:A1:01

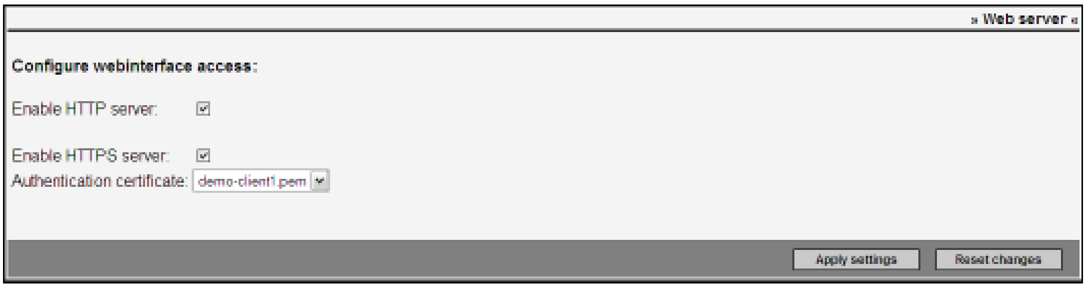
Additionally, you need to select the corresponding interface and specify whether all MAC addresses loaded this way are to be set to **"active"** or **"inactive"**. The list of MAC addresses is then added to the existing filter entries. The system's MAC address filter list is limited to a maximum of 500 entries.

***Note:***

*An extensive list takes longer to process – each entry requires approximately 1 second. This time will also be required during the device boot sequence when all configuration settings are loaded.*

## WEB SERVER

Use the Web Server Access Control menu to configure access to the Access Point web interface via the HTTP and HTTPS protocols.



Configure webinterface access:

Enable HTTP server: ☑

Enable HTTPS server: ☑

Authentication certificate: demo-client1.pem

The Access Point's integrated web server will subsequently be accessible through the enabled protocol interfaces.

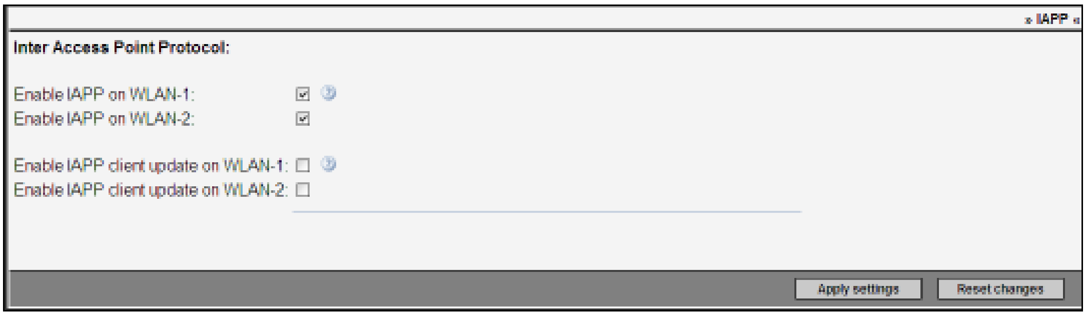
***Note:***

*For optimal security, an individual certificate should be assigned to each Access Point.*

## 8.2.3 Adv. WLAN

### IAPP

The IAPP is employed to exchange control and additional information between Access Points. For instance, an AP sends an IAPP notification to all other APs in the same network whenever a new client logs into the network. All other APs may then remove that client from their table of logged-in clients. Regardless of this setting, an LLC Xid packet, originally also defined as part of the IAPP, will be transmitted in any case whenever a client logs into the network.



» IAPP «

Inter Access Point Protocol:

Enable IAPP on WLAN-1: ☑

Enable IAPP on WLAN-2: ☑

Enable IAPP client update on WLAN-1: □

Enable IAPP client update on WLAN-2: □

Activate IAPP

This option enables IAPP broadcasts and reception of IAPP messages on Access Points.

Activate IAPP Client Update

This option enables a special ads-tec extension of the IAP protocol. This extension will, at a 1 second interval, send the 802.11 beacon information via the Ethernet as an IAPP broadcast. ads-tec clients are able to receive these messages and can thus obtain information about all APs in the network, independent of whether these APs are already visible to the client through a wireless connection. This information is particularly useful for automatic channel resolution in the 5 GHz band when using fast roaming.

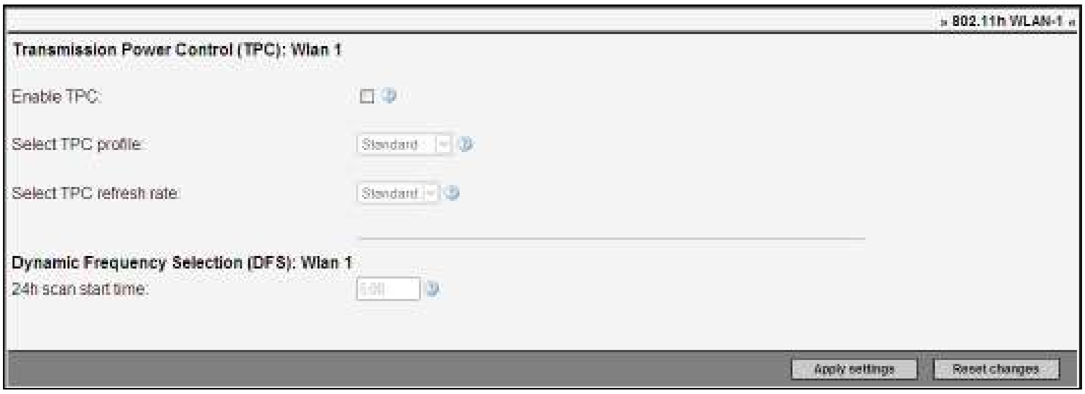
Hence, this option is only useful when fast roaming is employed.

***Note:***

*The IAPP (Inter-Access Point Protocol) was defined in the IEEE 802.11f recommendation. It was only defined as a trial use recommendation and withdrawn in 2006. Consequently, IAPP is not a standardised protocol.*

## 802.11H WLAN-1

802.11h is an extension of the IEEE 802.11 WLAN standard, introduced to avoid, particularly in Europe, interference with satellite and radar systems employing the 5 GHz band. The standard consists of two chief components: DFS (Dynamic Frequency Selection) and TPC (Transmission Power Control). DFS settings for this device can be configured on the standard WLAN configuration page.



» 802.11h WLAN-1 «

**Transmission Power Control (TPC): Wlan 1**

Enable TPC: □

Select TPC profile: Standard

Select TPC refresh rate: Standard

**Dynamic Frequency Selection (DFS): Wlan 1**

24h scan start time: 5:00

TPC:

The objective of Transmission Power Control is to reduce the device's average transmission power as much as possible. TPC is always active when a 5 GHz channel is used – it cannot be turned off in such cases. By default, TPC is not active in the 2.4 GHz band, but it may be enabled if desired.

Power Profiles:

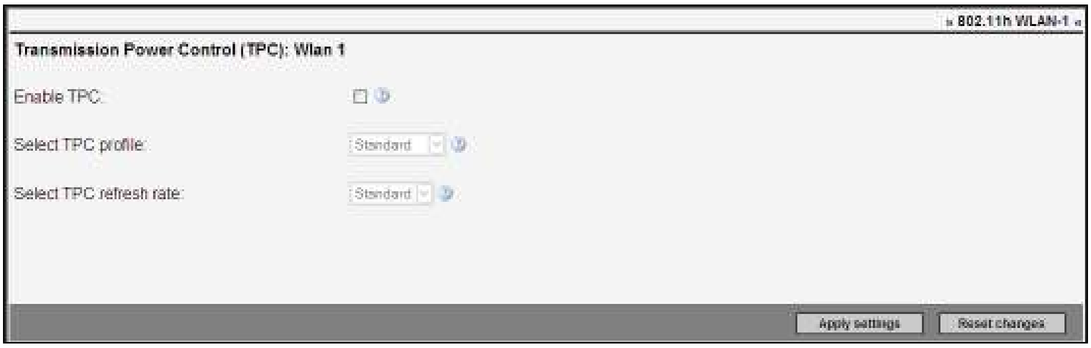
- Standard: Optimises transmission power for a data rate of 48 MBit/s.
- Max. Power: Optimises transmission power for a data rate of 54 MBit/s.
- Min. Power: Optimises transmission power for a data rate of 11/12 MBit/s.

TPC Update Rate:

Clients moving quickly should use the higher update rate in order to prevent connection losses. The lower rate may be used for static connections.

DFS Scan Time:

DFS requires the WLAN to be deactivated once every 24 hours in order to scan all available channels for radar signals (this process takes at least one minute). To avoid occurrence of this obligatory connection loss at critical times, you may specify a particular time at which to perform the DFS radar scan.



» 802.11h WLAN-1 «

**Transmission Power Control (TPC): Wlan 1**

Enable TPC: □

Select TPC profile: Standard

Select TPC refresh rate: Standard

( FCC-Version )

***Note:***
*The FCC version of the device does not offer the DFS option.*

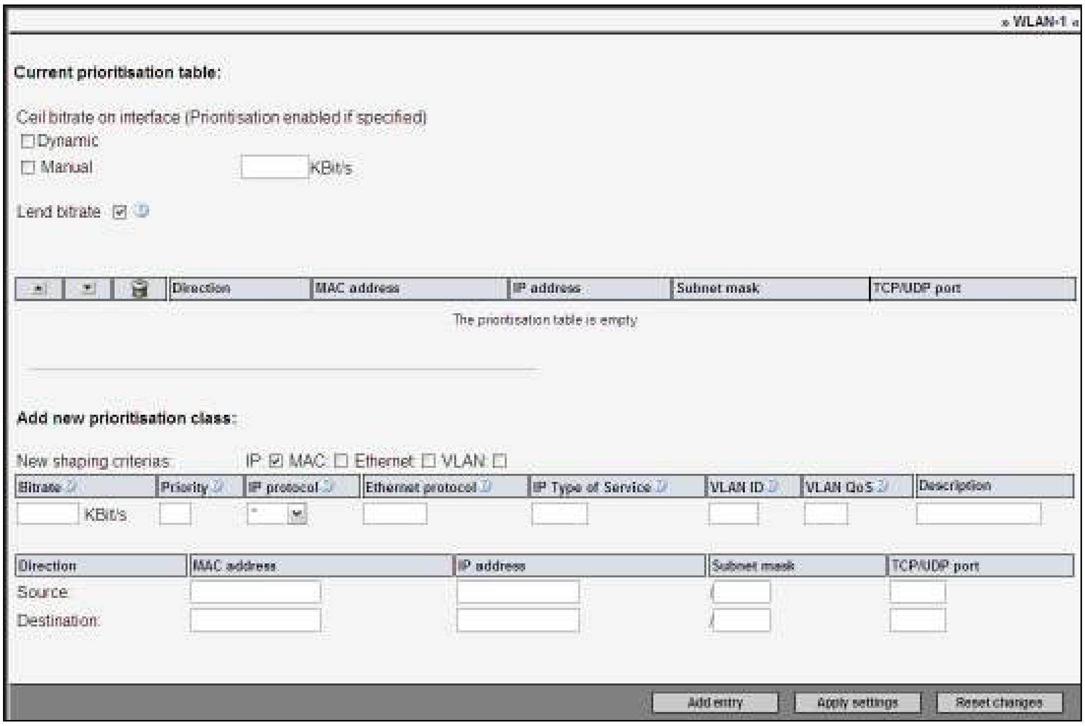
***Warning:***
*In order to ensure the system time and date settings are correct, you need to specify an NTP server!*

## 8.2.4 Advanced

### PRIORITISATION

### WLAN-1

The integrated prioritisation feature allows a more nuanced handling of data streams between interfaces. Particular data packets can be preferred by assigned a higher priority to them; furthermore, the bandwidth of specific protocols can be restricted.



» WLAN-1 «

**Current prioritisation table:**

Ceil bitrate on interface (Prioritisation enabled if specified)

□ Dynamic

□ Manual KBit/s

Lend bitrate ☑

| ▲ | ▼ | 🗑 | Direction | MAC address | IP address | Subnet mask | TCP/UDP port |
|---|---|---|---|---|---|---|---|

The prioritisation table is empty

**Add new prioritisation class:**

New shaping criterias: IP: ☑ MAC: □ Ethernet: □ VLAN: □

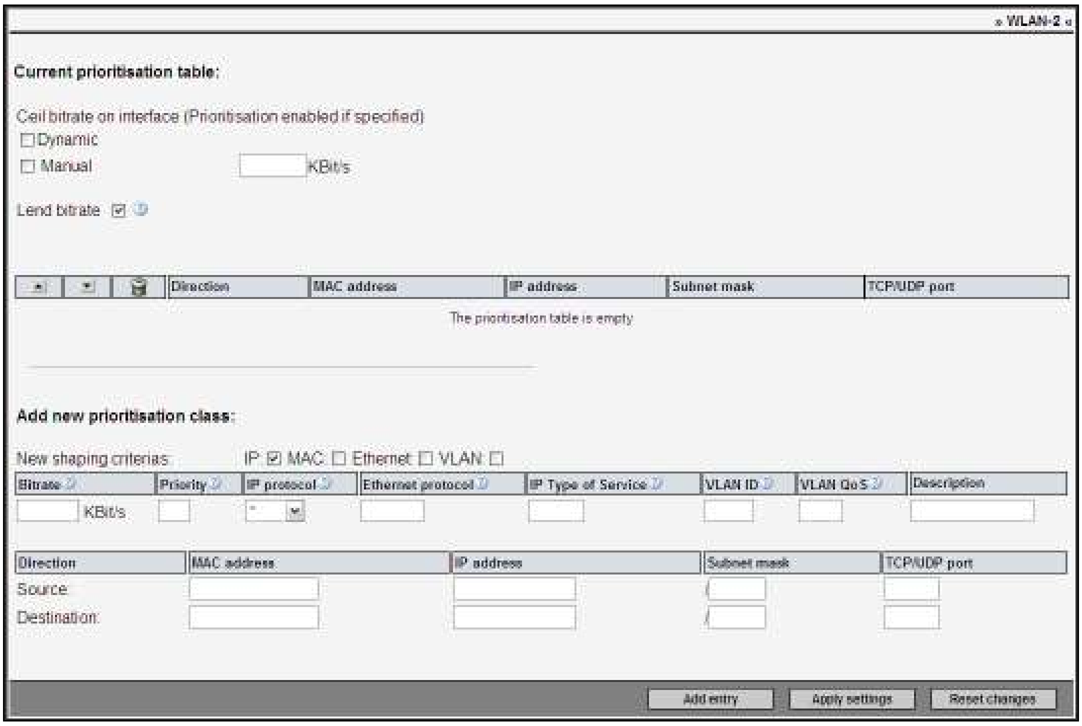
| Bitrate | Priority | IP protocol | Ethernet protocol | IP Type of Service | VLAN ID | VLAN QoS | Description |
|---|---|---|---|---|---|---|---|
| KBit/s | | * | | | | | |

| Direction | MAC address | IP address | Subnet mask | TCP/UDP port |
|---|---|---|---|---|
| Source: | | | / | |
| Destination: | | | / | |

The prioritisation feature is enabled by entering a maximum bit rate and at least one priority class. For instance, if the Ethernet infrastructure as a maximum bandwidth of 50Mbit/sec the maximum bit rate of 50000kbit/s should be entered.

Not all priority class criteria can be combined with each other. For example, IP cannot be selected in conjunction with VLAN due to the underlying protocol architectures and principles.

## HOST



» WLAN-2 «

**Current prioritisation table:**

Ceil bitrate on interface (Prioritisation enabled if specified)

□ Dynamic

□ Manual KBit/s

Lend bitrate ☑

| | | | Direction | MAC address | IP address | Subnet mask | TCP/UDP port |
|---|---|---|---|---|---|---|---|

The prioritisation table is empty

**Add new prioritisation class:**

New shaping criterias: IP: ☑ MAC: □ Ethernet: □ VLAN: □

| Bitrate | Priority | IP protocol | Ethernet protocol | IP Type of Service | VLAN ID | VLAN QoS | Description |
|---|---|---|---|---|---|---|---|
| KBit/s | | * | | | | | |

| Direction | MAC address | IP address | Subnet mask | TCP/UDP port |
|---|---|---|---|---|
| Source: | | | / | |
| Destination: | | | / | |

**Note:**

*In order to prioritise a particular data stream, you need to create at least two classes. The first is assigned the lowest priority value in the **Priority** field and thus specifies the preferred data traffic. The second class represents the remaining stream of data and should get a reduced bit rate value. This ensures sufficient bandwidth is available to the prioritised data traffic of the first priority class.*

**Note:**

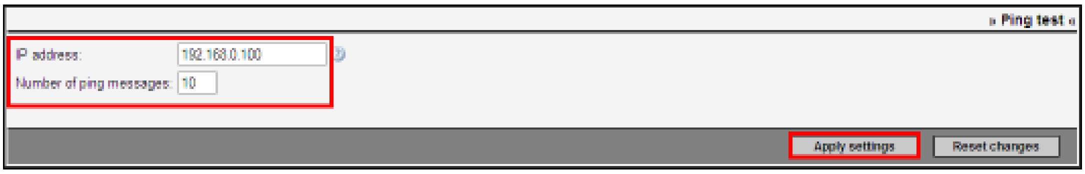
*In the **Priority** input field, a low numeric value stands for a short Ethernet packet latency, while a high value represents a longer latency period.*

## PING TEST

The Ping test can be used to test whether a particular remote station is reachable across the network. The test will send the an Echo-Request packet to the target address and analyses the data received as reply.

Specify the remote station to be checked by entering its IP address in the corresponding field. Additionally, the number of packets to send needs to be specified. It is limited to a maximum of 10 packets.

Clicking **Activate** will start the Ping Test.

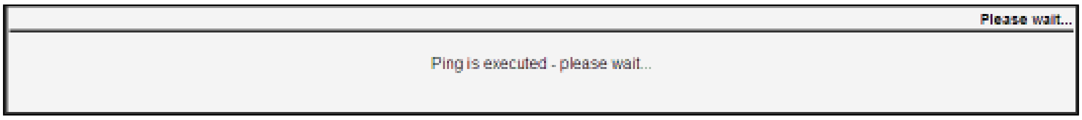


» Ping test «

IP address: 192.168.0.100

Number of ping messages: 10

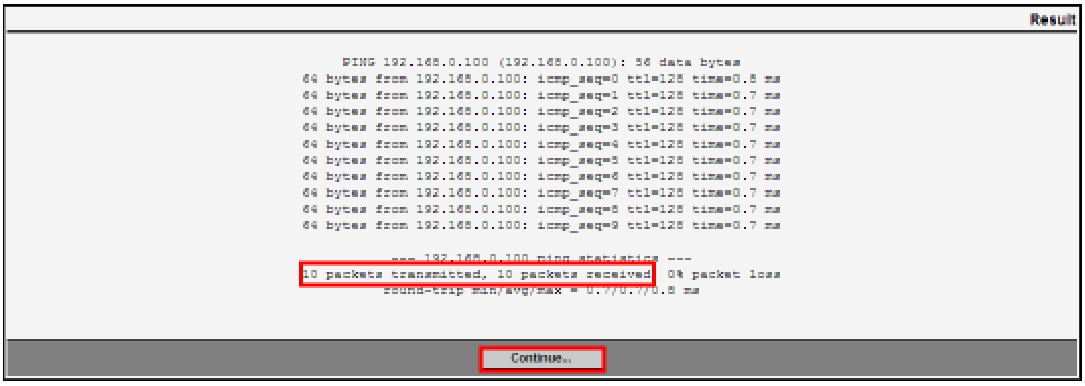
After a short time, an overview showing the course and the result of the Ping Test will appear. The overview shows the status of all packets that were sent and received.



Please wait...

Ping is executed - please wait...

Click **Next** to end the Ping Test.



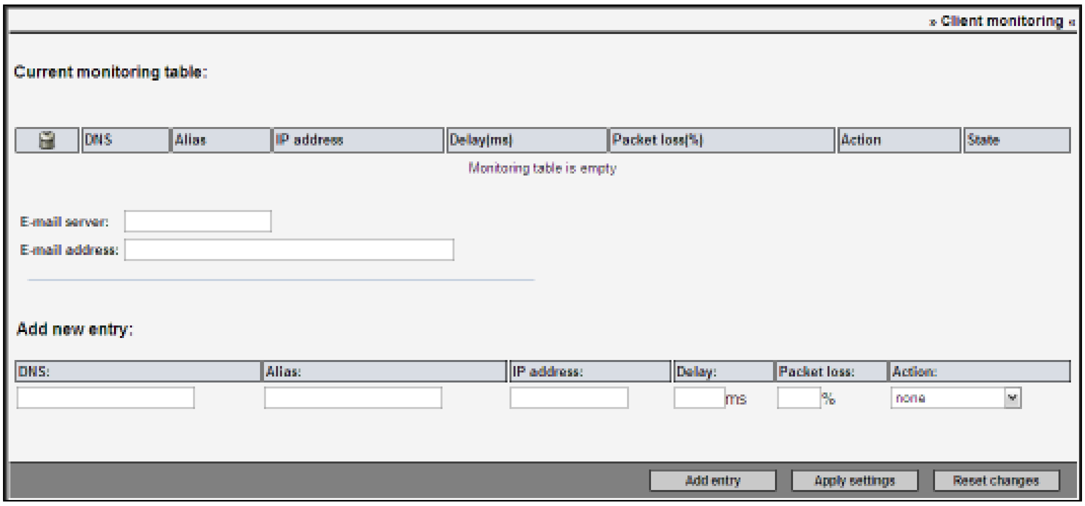
Result

```
      PING 192.168.0.100 (192.168.0.100): 56 data bytes
64 bytes from 192.168.0.100: icmp_seq=0 ttl=128 time=0.8 ms
64 bytes from 192.168.0.100: icmp_seq=1 ttl=128 time=0.7 ms
64 bytes from 192.168.0.100: icmp_seq=2 ttl=128 time=0.7 ms
64 bytes from 192.168.0.100: icmp_seq=3 ttl=128 time=0.7 ms
64 bytes from 192.168.0.100: icmp_seq=4 ttl=128 time=0.7 ms
64 bytes from 192.168.0.100: icmp_seq=5 ttl=128 time=0.7 ms
64 bytes from 192.168.0.100: icmp_seq=6 ttl=128 time=0.7 ms
64 bytes from 192.168.0.100: icmp_seq=7 ttl=128 time=0.7 ms
64 bytes from 192.168.0.100: icmp_seq=8 ttl=128 time=0.7 ms
64 bytes from 192.168.0.100: icmp_seq=9 ttl=128 time=0.7 ms

          --- 192.168.0.100 ping statistics ---
10 packets transmitted, 10 packets received, 0% packet loss
          round-trip min/avg/max = 0.7/0.7/0.8 ms
```

## CLIENT MONITORING

The integrated Client Monitoring feature allows monitoring network participants and their reachability. All clients to be monitored need to be added to the monitoring table; their reachability will be checked by means of periodic ICMP messages.



Current monitoring table:

|  | DNS | Alias | IP address | Delay(ms) | Packet loss(%) | Action | State |
|---|---|---|---|---|---|---|---|

Monitoring table is empty

E-mail server:

E-mail address:

Add new entry:

| DNS: | Alias: | IP address: | Delay: | Packet loss: | Action: |
|---|---|---|---|---|---|
|  |  |  | ms | % | none |

An action can be triggered by any monitored client in the event of a loss of connection to that client. This action may for instance consist of an email being sent to a supervisor or similar.

### Action:

up/down WLAN-1/2

With this option selected the WLAN adapter will be shut down in case the Ethernet participant can no longer be reached via ICMP. When monitoring the AP's gateway via ICMP messages, the AP is only able to detect that its uplink is lost. The WLAN interface the shuts down and thus kicks out all connected clients. Otherwise, a client may log in to the network via the AP in question although that AP does not have sufficient connectivity. In that case, the client should use a different AP to connect to the network.

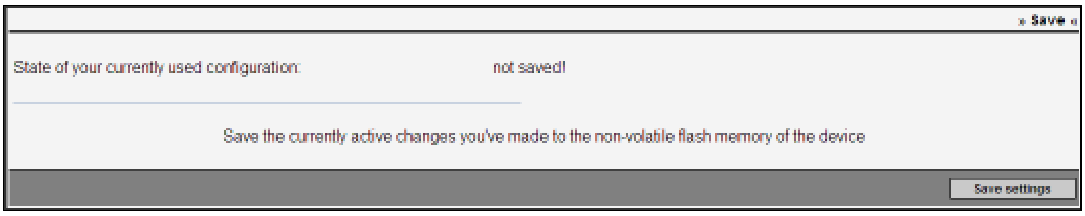
➔ ***Note:***

*The current time of all ICMP replies may be checked by calling up a tooltip on a symbolic LED in the status field.*

➔ ***Note:***

*An email notification is sent out each time a status changes, providing valid entries are specified in the Email Server and Email Address fields.*

## SAVE

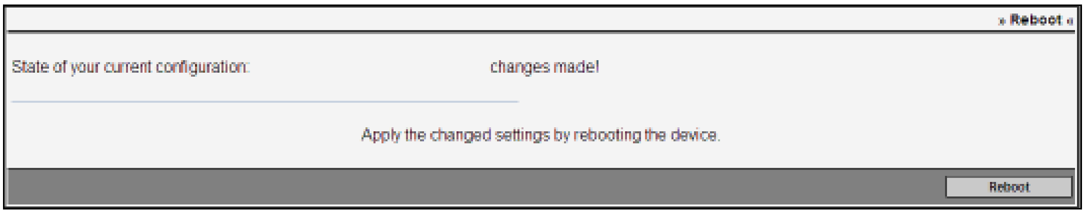


State of your currently used configuration: not saved!

Save the currently active changes you've made to the non-volatile flash memory of the device

Any configuration changes can be saved to the Flash memory by clicking the **Save** button.

### REBOOT



State of your current configuration: changes made!

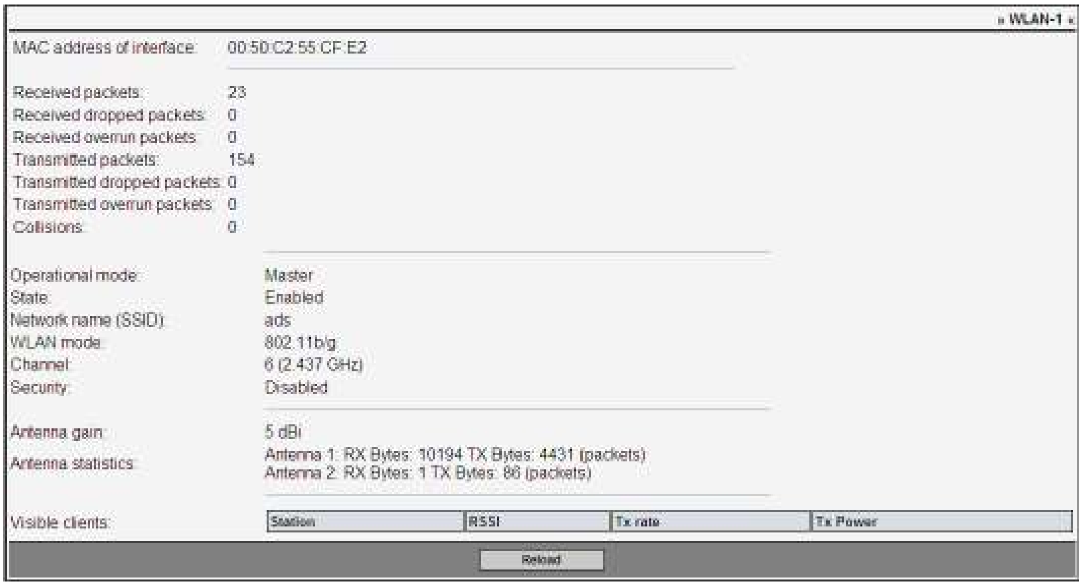
Apply the changed settings by rebooting the device.

Clicking **Reboot** will reboot the Access Point.

## 8.3 DIAGNOSIS

### WLAN-1

View: Access Point Mode



MAC address of interface: 00:50:C2:55:CF:E2

Received packets: 23
Received dropped packets: 0
Received overrun packets: 0
Transmitted packets: 154
Transmitted dropped packets: 0
Transmitted overrun packets: 0
Collisions: 0

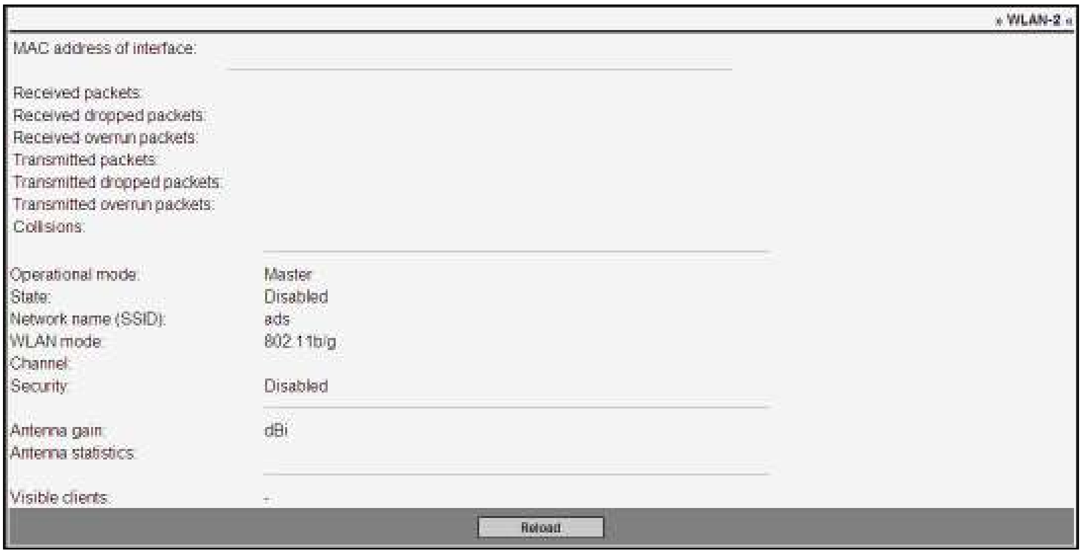
Operational mode: Master
State: Enabled
Network name (SSID): ads
WLAN mode: 802.11b/g
Channel: 6 (2.437 GHz)
Security: Disabled

Antenna gain: 5 dBi
Antenna statistics: Antenna 1: RX Bytes: 10194 TX Bytes: 4431 (packets)
Antenna 2: RX Bytes: 1 TX Bytes: 86 (packets)

Visible clients:

| Station | RSSI | Tx rate | Tx Power |
|---|---|---|---|

View: Access Client Mode



MAC address of interface:

Received packets:
Received dropped packets:
Received overrun packets:
Transmitted packets:
Transmitted dropped packets:
Transmitted overrun packets:
Collisions:

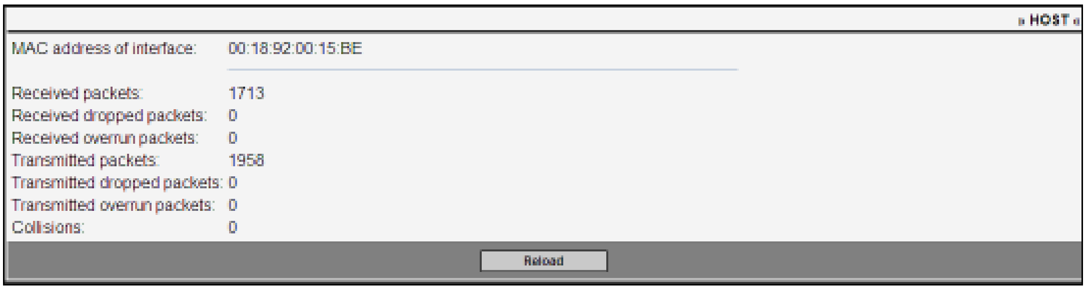
Operational mode: Master
State: Disabled
Network name (SSID): ads
WLAN mode: 802.11b/g
Channel:
Security: Disabled

Antenna gain: dBi
Antenna statistics:

Visible clients: -

The WLAN-1 interface status display indicates data traffic and relevant traffic information. Click **Reload** to update the information on this page.

## HOST



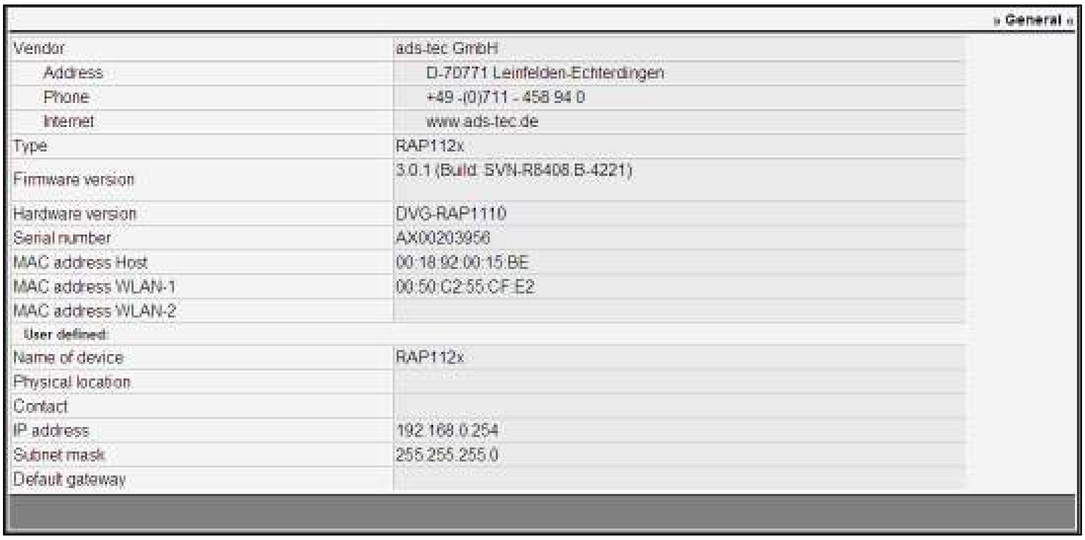
| | |
|---|---|
| MAC address of interface: | 00:18:92:00:15:BE |
| Received packets: | 1713 |
| Received dropped packets: | 0 |
| Received overrun packets: | 0 |
| Transmitted packets: | 1958 |
| Transmitted dropped packets: | 0 |
| Transmitted overrun packets: | 0 |
| Collisions: | 0 |

Based on the indicated data, the behaviour of sent and received packets can be monitored. Click **reload** to update the information on this page.

## 8.4 ADDITIONAL INFORMATION

### 8.4.1 General

The menu item **General** displays basic information about the device.



» General «

| | |
|---|---|
| Vendor | ads-tec GmbH |
| Address | D-70771 Leinfelden-Echterdingen |
| Phone | +49 -(0)711 - 458 94 0 |
| Internet | www.ads-tec.de |
| Type | RAP112x |
| Firmware version | 3.0.1 (Build: SVN-R8408.B-4221) |
| Hardware version | DVG-RAP1110 |
| Serial number | AX00203956 |
| MAC address Host | 00:18:92:00:15:BE |
| MAC address WLAN-1 | 00:50:C2:55:CF:E2 |
| MAC address WLAN-2 | |
| **User defined:** | |
| Name of device | RAP112x |
| Physical location | |
| Contact | |
| IP address | 192.168.0.254 |
| Subnet mask | 255.255.255.0 |
| Default gateway | |

**1)MANUFACTURER:**

This field shows all relevant contact data for the device manufacturer ads-tec GmbH.

**2)DEVICE INFORMATION:**

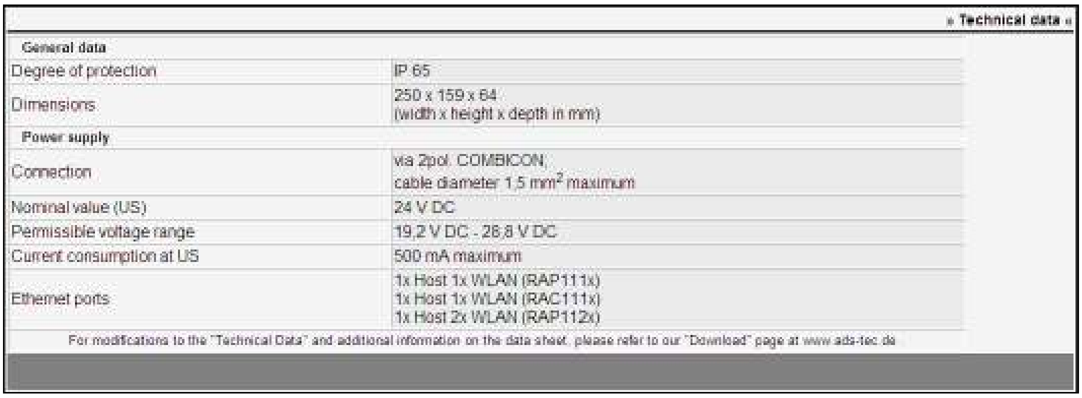
This section lists all relevant device data, such as type, firmware and hardware version, etc.

**3)USER-DEFINED:**

All user-defined device data is shown in this section.

### 8.4.2 Technical Data

The Technical Data screen lists general operating data, including details on the permissible power supply.

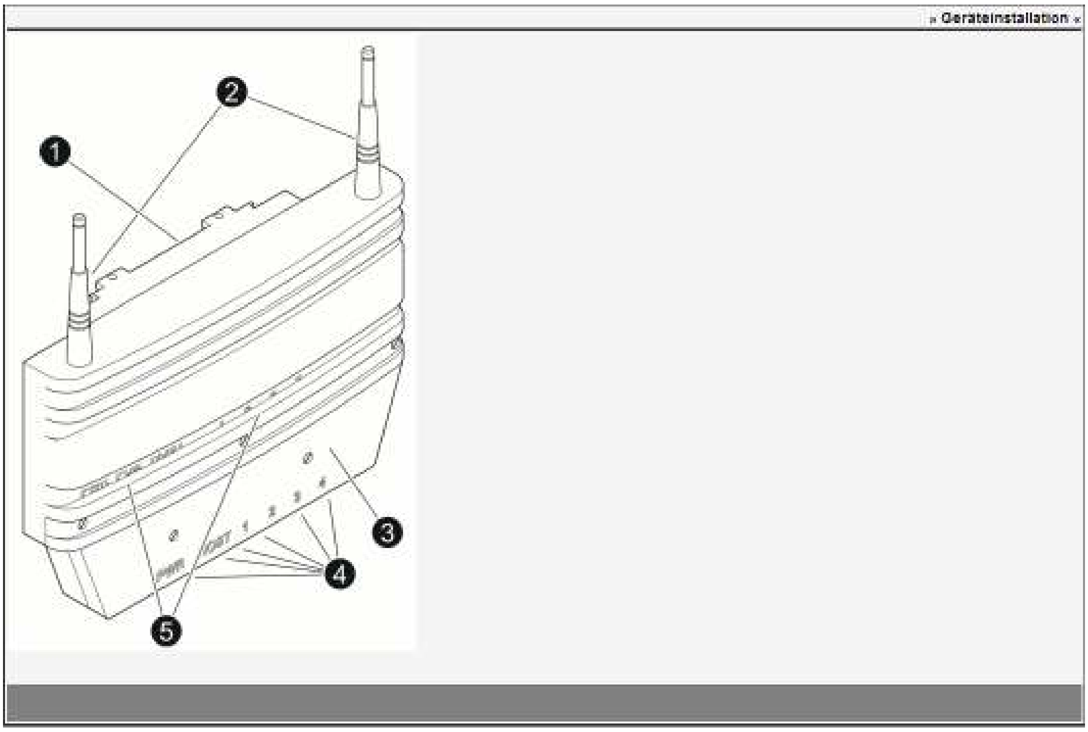


» Technical data «

| | |
|---|---|
| **General data** | |
| Degree of protection | IP 65 |
| Dimensions | 250 x 159 x 64<br>(width x height x depth in mm) |
| **Power supply** | |
| Connection | via 2pol. COMBICON;<br>cable diameter 1,5 mm$^2$ maximum |
| Nominal value (US) | 24 V DC |
| Permissible voltage range | 19,2 V DC - 28,8 V DC |
| Current consumption at US | 500 mA maximum |
| Ethernet ports | 1x Host 1x WLAN (RAP111x)<br>1x Host 1x WLAN (RAC111x)<br>1x Host 2x WLAN (RAP112x) |

For modifications to the "Technical Data" and additional information on the data sheet, please refer to our "Download" page at www.ads-tec.de

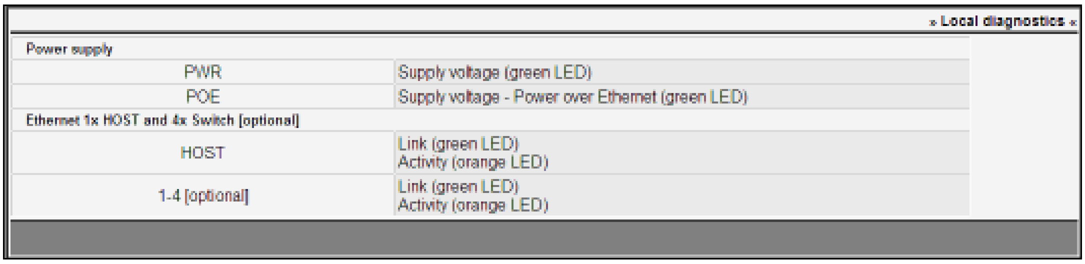
### 8.4.3 Device Mounting



1) Mounting plate (for mounting the Access Point to the installation site)
2) Antenna
3) Maintenance Duct Cover
4) Interfaces
5) Status indicators

### 8.4.4 Local Diagnosis

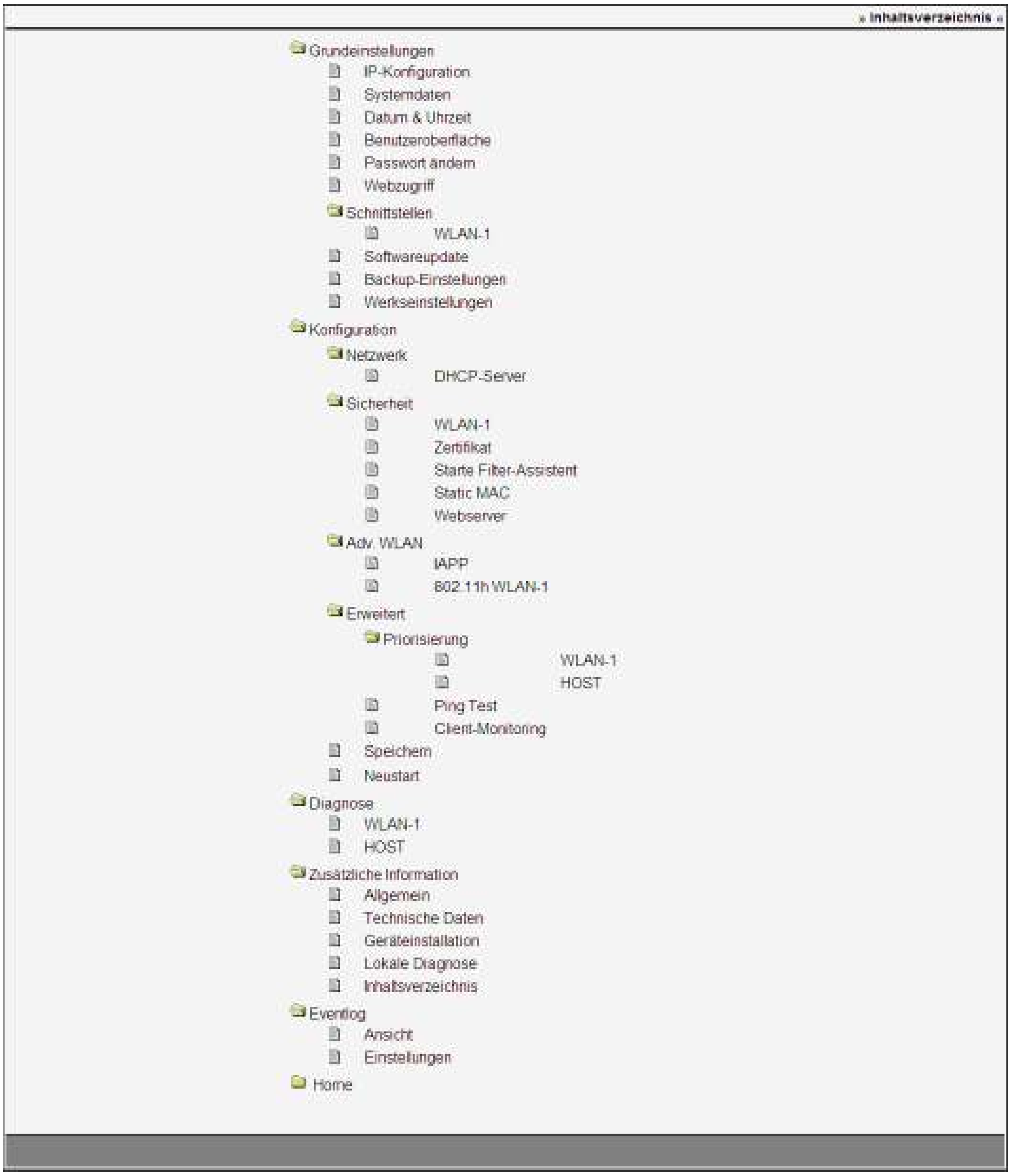
The Local Diagnosis screen lists the LED indicator behaviour for different system states.


» Local diagnostics «

| | |
|---|---|
| Power supply | |
| PWR | Supply voltage (green LED) |
| POE | Supply voltage - Power over Ethernet (green LED) |
| Ethernet 1x HOST and 4x Switch [optional] | |
| HOST | Link (green LED)<br>Activity (orange LED) |
| 1-4 [optional] | Link (green LED)<br>Activity (orange LED) |

### 8.4.5 Site Map

For direct and easy access to configuration settings, the Site Map shows a tree structure of the web interface including all of its sub-menus.



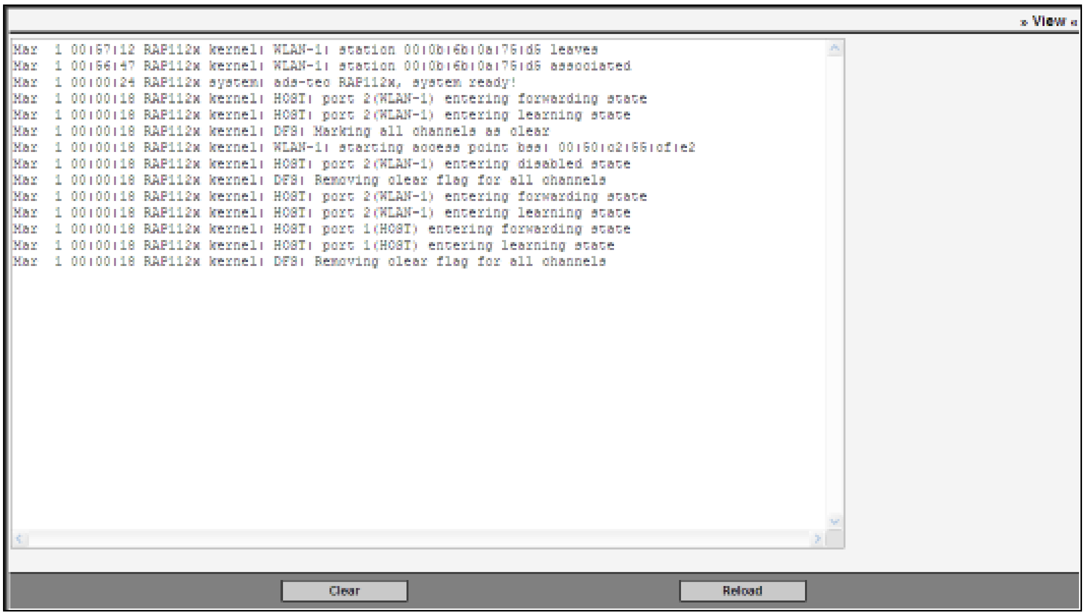
» Inhaltsverzeichnis «

- Grundeinstellungen
  - IP-Konfiguration
  - Systemdaten
  - Datum & Uhrzeit
  - Benutzeroberflache
  - Passwort andern
  - Webzugriff
  - Schnittstellen
    - WLAN-1
  - Softwareupdate
  - Backup-Einstellungen
  - Werkseinstellungen
- Konfiguration
  - Netzwerk
    - DHCP-Server
  - Sicherheit
    - WLAN-1
    - Zertifikat
    - Starte Filter-Assistent
    - Static MAC
    - Webserver
  - Adv. WLAN
    - IAPP
    - 802.11h WLAN-1
  - Erweitert
    - Priorisierung
      - WLAN-1
      - HOST
    - Ping Test
    - Client-Monitoring
  - Speichern
  - Neustart
- Diagnose
  - WLAN-1
  - HOST
- Zusätzliche Information
  - Allgemein
  - Technische Daten
  - Geräteinstallation
  - Lokale Diagnose
  - Inhaltsverzeichnis
- Eventlog
  - Ansicht
  - Einstellungen
- Home

## 8.5 EVENT LOG

### VIEW

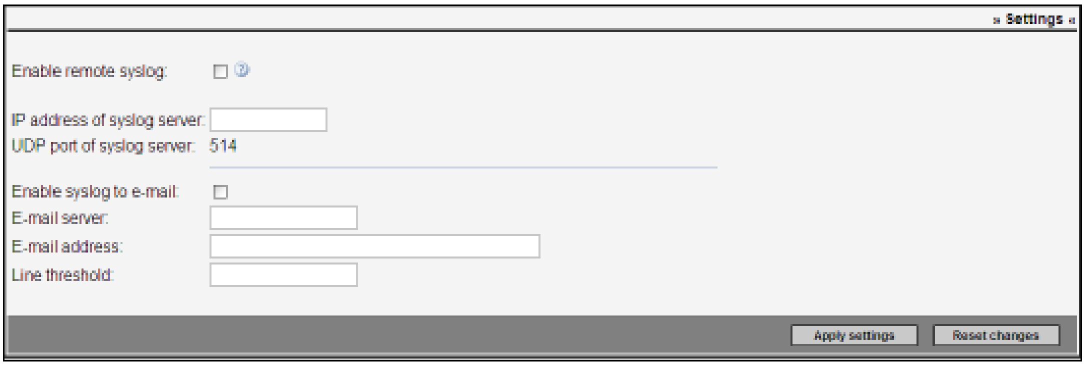
The Event log is the device’s most important diagnosis tool. The log contains essential information on the system status. Any system error messages will be logged and displayed here. The event log display is comparable to a transcript of system activities. Any configuration changes and error messages can be viewed here.



```
Mar  1 00:57:12 RAP112x kernel: WLAN-1: station 00:0b:6b:0a:75:d5 leaves
Mar  1 00:56:47 RAP112x kernel: WLAN-1: station 00:0b:6b:0a:75:d5 associated
Mar  1 00:00:24 RAP112x system: ads-tec RAP112x, system ready!
Mar  1 00:00:18 RAP112x kernel: HOST: port 2(WLAN-1) entering forwarding state
Mar  1 00:00:18 RAP112x kernel: HOST: port 2(WLAN-1) entering learning state
Mar  1 00:00:18 RAP112x kernel: DFS: Marking all channels as clear
Mar  1 00:00:18 RAP112x kernel: WLAN-1: starting access point bss: 00:60:c2:55:cf:e2
Mar  1 00:00:18 RAP112x kernel: HOST: port 2(WLAN-1) entering disabled state
Mar  1 00:00:18 RAP112x kernel: DFS: Removing clear flag for all channels
Mar  1 00:00:18 RAP112x kernel: HOST: port 2(WLAN-1) entering forwarding state
Mar  1 00:00:18 RAP112x kernel: HOST: port 2(WLAN-1) entering learning state
Mar  1 00:00:18 RAP112x kernel: HOST: port 1(HOST) entering forwarding state
Mar  1 00:00:18 RAP112x kernel: HOST: port 1(HOST) entering learning state
Mar  1 00:00:18 RAP112x kernel: DFS: Removing clear flag for all channels
```

## SETTINGS

The Event log transcript can also be sent to a central computer for ease and convenience of access. To enable this feature, specify the remote computer in the input fields.



Enable remote syslog: □

IP address of syslog server:

UDP port of syslog server: 514

Enable syslog to e-mail: □

E-mail server:

E-mail address:

Line threshold:

Additionally, you may opt to send out the system log via email. To enable this feature, checkmark the corresponding check box and specify an email server and a recipient email address.

***Note:***

*In order to avoid an unnecessarily high volume of emails, we recommend specifying a suitable threshold value in the "Number of Lines" input field. This value defines how many lines of event log entries need to have accumulated before an email is sent out.*

## START PAGE SETUP & FILTER WIZARD

Can be used to navigate back to the start page, from where the Wizards are accessible.

# 9 Regulatory Approvals

## 9.1 European Approvals

***Note:***

*Some national regulations may in effect restrict the functionality of the device.*

| Country | Tags | 2.4–2.4835 GHz IEEE 802.11b/g | Restrictions |
|---|---|---|---|
| Belgium | CE ⓘ | X | Use of 5150-5350 MHz range only allowed indoors<br>TPC and DFS mandatory for 5GHz band |
| Germany | CE ⓘ | X | |
| Finland | CE ⓘ | X | |
| Greece | CE ⓘ | X | |
| Ireland | CE ⓘ | X | Indoor use only for 5150-5350 MHz band |
| Latvia | CE ⓘ | X | |
| Luxembourg | CE ⓘ | X | Indoor use only for 5150-5350 MHz band. Only mobile applications allowed in the 5 GHz band.<br>RLAN/WLAN used for public service requires an *autorisation générale* from the ILR (Institut Luxembourgeois de Regulation) |
| Netherlands | CE ⓘ | X | |
| Poland | CE ⓘ | X | |
| Sweden | CE ⓘ | X | |
| Slovenia | CE ⓘ | X | |
| Czech Republic | | X | |
| Cyprus | CE ⓘ | X | |
| Denmark | CE ⓘ | X | |
| Estonia | CE ⓘ | X | |
| France | CE ⓘ | X | |
| United Kingdom | CE ⓘ | X | |
| Italy | CE ⓘ | X | |
| Lithuania | CE ⓘ | X | |
| Malta | CE ⓘ | X | This equipment may be placed on the local market, subject to |

| | | | |
|---|---|---|---|
| | | | the condition that a copy of the Declaration of Conformity is submitted to the Authority by the person intending to market the equipment. |
| Austria | CE ⓘ | X | |
| Portugal | CE ⓘ | X | Information: for this type of applications an integral or dedicated antenna is required.<br>In the frequency ranges of 5250-5350MHz and 5470-5725MHz DFS and TPC are mandatory.<br>If the equipment does not implement DFS, use will be limited to the frequency range 5150-5250MHz, with a limited maximum output power (EIRP) of 0.25mW/25kHz |
| Slovakia | CE ⓘ | X | Operation of the wireless LAN equipment is allowed in the frequency band 2400-2483.5MHz, subject to the conditions laid down in the General Authorisation No. VPR-01/2001 (20 dBM EIRP) issued by the Telecommunications Office of the Slovak Republic. In the frequency band 5150-5350MHz, operation of WLAN equipment is allowed subject to the conditions laid down in the General Authorisation No.: VPR-03/2004 (indoors only 5150-5350MHz with DFS: 200mW EIRP with TPC, 120mW EIRP without TPC; 5150-5250MHz without DFS: 120mW EIRP with TPC, 60mW EIRO without TPC). In the frequency band 5470-5725MHz, operation of WLAN equipment is allowed, subject to the conditions laid down in the General Authorisation No.: VPR-07/2004 (1W EIRP, DFS & TCP are required) |
| Spain | CE ⓘ | X | |
| Hungary | CE ⓘ | X | |
| Switzerland | CE ⓘ | X | |
| Norway | CE ⓘ | X | |
| Iceland | CE ⓘ | X | |

## 9.2 FCC-Approval

This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry Canada.

Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

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

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

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

⚠ ***Warning:***

*Changes or modifications made to this equipment not expressly approved by ads-tec GmbH may void the FCC authorization operate this equipment.*

➔ ***Special Note:***

*This equipment complies with FCC radiation exposure limits set forth for an uncontrolled*

*environment. This equipment should be installed and operated with minimum distance of 20cmbetween the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.*

## 9.3 DIRECTIVES

RAP 1120, RAP 1121, RAP 1220,

RAP 1220, RAP 1221,

RAC 1110, RAC 1111, RAC 1510, RAC1511

as manufactured by ads-tec GmbH conform to the regulations of the following EU directives:

**99/5/EC**

Directive of the European Parliament and of the Council on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

Conformity to the basic requirements of this directive is demonstrated by conformity to the following norms:

**EN 60950**

Safety of information technology equipment

**EN 301489-1**

Electromagnetic Compatibility (EMC) standard for radio equipment and services

**EN 301489-17**

Specific requirements for broadband data transmission systems and for equipment in local high-performance radio networks (HIPERLAN)

**EN 300328**

Electromagnetic compatibility and Radio spectrum Matters (ERM), Wideband Transmission systems

**EN 301893**

Broadband Radio Access Networks (BRAN) - 5 GHz high performance RLAN

**EN 50371**

Generic Standard to Demonstrate the Compliance of Low Power Electronic and Electrical Apparatus with the Basic Restrictions Related to Human Exposure to Electromagnetic Fields (10 MHz - 300 GHz)

**1999/519/EC**

European Council recommendation on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)

Any devices connected to the system need to fulfil all applicable safety regulations. In accordance with the above EU directives, a copy of the EU declaration of conformity is kept at the following address at the disposal of the competent authority:

ads-tec GmbH Raiffeisenstraße 14

70771 Leinfelden-Echterdingen / Oberaichen

This declaration confirms conformity with the aforementioned directives and guidelines. It does not constitute a warranty of performance.

# 10 Technical Details

## 10.1 Variants

The device is available in different variants.

| Access Point | RAP1110 | RAP1111 | RAP1210 | RAP1211 | RAP1120 | RAP1121 | RAP1220 | RAP1221 |
|---|---|---|---|---|---|---|---|---|
| 1 WLAN Module | X | X | X | X | | | | |
| 2 WLAN Modules | | | | | X | X | X | X |
| 1xCU Ethernet Port (RJ45) | X | X | | | X | X | | |
| 5xCU Ethernet Port (integrated switch) (RJ45) | | | | | | | | |
| 1xOptical Ethernet Port | | | X | X | | | X | X |
| PoE (IEEE 802.3af) 48V DC | X | X | | | X | X | | |
| 24 V DC | X | | X | | X | | X | |
| AC integrated 110-230 V AC | | X | | X | | X | | X |
| Client Mode available | X | X | X | X | X | X | X | X |
| **Access Client** | **RAC1110** | **RAC1111** | **RAC1510** | **RAC1511** | **RAC1120** | **RAC1121** | **RAC1220** | **RAC1221** |
| 1 WLAN Module | X | X | X | X | | | | |
| 2 WLAN Modules | | | | | X | X | X | X |
| 1xCU Ethernet Port | X | X | | | X | X | | |
| 5xCU Ethernet Port (integrated switch) | | | X | X | | | | |
| 1xOptical Ethernet Port | | | | | | | X | X |
| PoE (IEEE 802.3af) 48V DC | X | X | X | X | X | X | | |
| 24 V DC | X | | X | | X | | X | |
| AC integrated 110-230 V AC | | X | | X | | X | | X |

## 10.2 Ethernet Data Transmission

| | |
|---|---|
| HOST Ethernet plug | RJ45 or optical fibre (MTRJ) |
| Transmission rate Ethernet | 10/100 Mbit/s |
| Optional Switch | 4x RJ45 with 10/100 Mbit/s |

## 10.3 Radio Properties

| | |
|---|---|
| Frequency range | 2.412 to 2.483 GHz<br>5.15 to 5.34 GHz<br>5.47 to 5.725 GHz |
| Radio channels | 13 for 802.11b/g<br>19 for 802.11a |
| Transmission bandwidth | 802.11b (11 Mbit/s)<br>802.11g (54 Mbit/s)<br>802.11a (54 Mbit/s)<br>802.11h (54 Mbit/s) |
| Max. transmission power | 20 dBM EIRP, 17dBm with R-SMA connector |
| Modulation | 802.11b: DSSS<br>802.11g: OFDM<br>802.11a/h: OFDM |
| Impedance | 50 Ohm |
| Polarity | Vertical / Horizontal |
| Antennas | 2x R-SMA connectors per radio module |

## 10.4 Power Supply

| | |
|---|---|
| Voltage | 24 V DC<br>110/230 V AC<br>PoE 48VDC over RJ45 |
| Power input | max. 500mA |

## 10.5 Configuration

| | |
|---|---|
| Software | Web-based Interface (German/English) via HTTP or HTTPS, password-protected |

## 10.6 General Data

| | |
|---|---|
| Exterior dim. w/o antenna | 250 mm x 160 mm x 65 mm (W x H x D) |
| Exterior dim. w/ 2 antennas | 425 mm x 335 mm x 65 mm (W x H x D) |
| Exterior dim. w/ 4 antennas | 600 mm x 335 mm x 65 mm (W x H x D) |
| Weight | approx. 1 kg |
| Protection Class | IP65 |

# 11 Service and Support

ads-tec and appointed partner companies offer you comprehensive maintenance and support services, ensuring quick and competent support should you have any questions or concerns with regard to ads-tec products and equipment.

ads-tec products may also be provided and installed by partner companies. Such devices may have customised configurations. Should any questions arise with regard to such specific settings and software installations, please contact the system supplier in question as ads-tec will not be able to reply to such questions.

ads-tec does not provide support services for any device or unit that was not bought directly from ads-tec. In any such case, maintenance and support is provided solely by the partner company that supplied the device or unit.

## 11.1 ads-tec Support

The ads-tec support team is available for inquiries by direct customers between 8:30am and 5:00pm, Monday to Friday. The support team can be reached via phone, fax or email.

Tel: +49 (0) 711 / 45894-500

Fax: +49 (0) 711 / 45894-990

Email: info@ads-tec.com

## 11.2 Company Address

ads-tec
Automation Daten- und Systemtechnik GmbH
Raiffeisenstraße 14
70771 Leinfelden-Echterdingen
Germany

Tel: +49 (0) 711 / 45894-0

Fax: +49 (0) 711 / 45894-990

Email: info@ads-tec.de

Web: www.ads-tec.de