REX300

Application Examples

Edition 1 / 28.01.2010

HW 1 and FW 2.02 and higher

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Note:

We have checked the content of this manual for conformity with the hardware and software described. Nevertheless, because deviations cannot be ruled out, we cannot accept any liability for complete conformity. The information in this manual is regularly updated. When using purchased products, please heed the latest version of the manual, which can be viewed in the Internet at www.helmholz.de, from where it can also be downloaded.

Our customers are important to us. We are always glad to receive suggestions for improvement and ideas.

Revision history of this document:

Edition	Date	Revision
1	28.01.2010	First edition

Contents

1 Overview

1.1 Application and function description

The REX 300 is intended to be used as an Ethernet router for the remote maintenance of S7-300 and S7-400 systems. It has an integrated MPI/DP interface. This MPI/DP interface supports MPI and PROFIBUS with up to 12 Mbps. The REX 300 enables remote servicing of the S7 systems via the Internet. Depending on the available connection to the Internet, the REX 300 is obtainable with various integrated modems or integrated interfaces. It can establish the Internet connection via an analog, ISDN, or GPRS/EDGE modem. Moreover, an external DSL modem can be connected to the REX 300 devices with a WAN interface to provide an Internet connection. The WAN interface can also be used for existing Internet connections. Existing Internet connections are Internet connections provided by a server or a gateway.

This document is intended as a supplement to the "*REX 300*" Quickstart Guide.

It is intended to help the user set up the desired connection step by step.

Please pay attention to the information in the figures

1.2 Information in the figures

In the printed figures, important settings and notes for the user are highlighted red.

2 Overview of the Web interface

The following text provides an overview of the Web interface integrated in the REX 300.

2.1 Menu structure

The web user interface of the REX 300, is divided into a main menu on the left and a submenu at the top of your browser window. The following Figure 2-1 shows the menu structure.

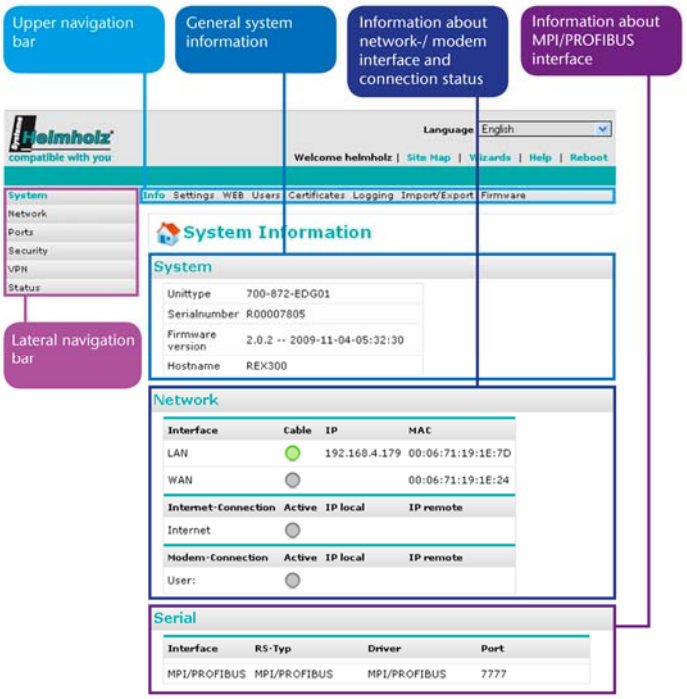
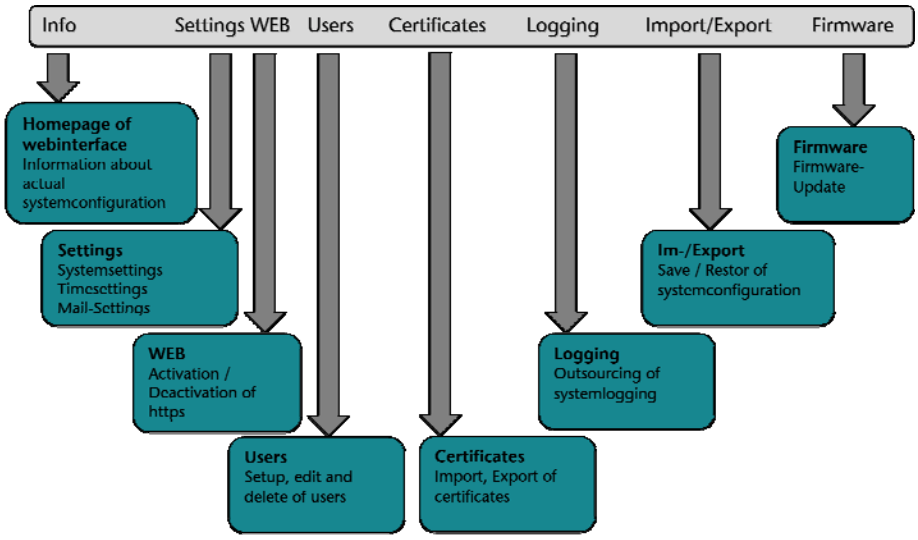


Fig. 2-1: Menu structure

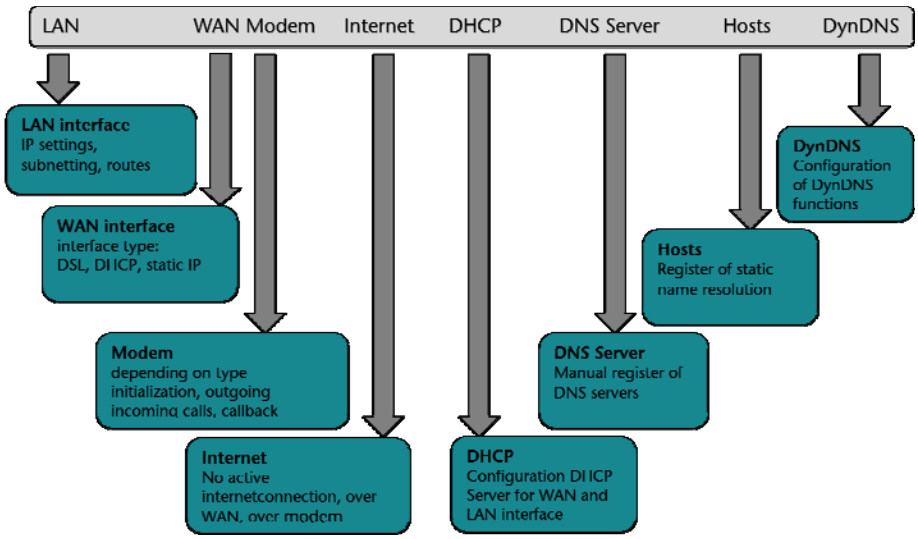
2.2 Menu overview

The following figures show the menus available to you in the REX 300. The submenus of the main menus System, Network, Interfaces, Security Settings, and VPN are explained. The main menu Status with its various submenus is for error diagnostics and is self-explanatory.

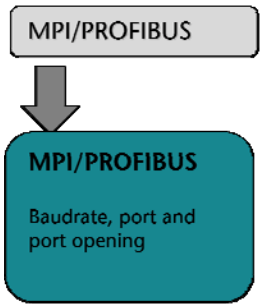
System menu:



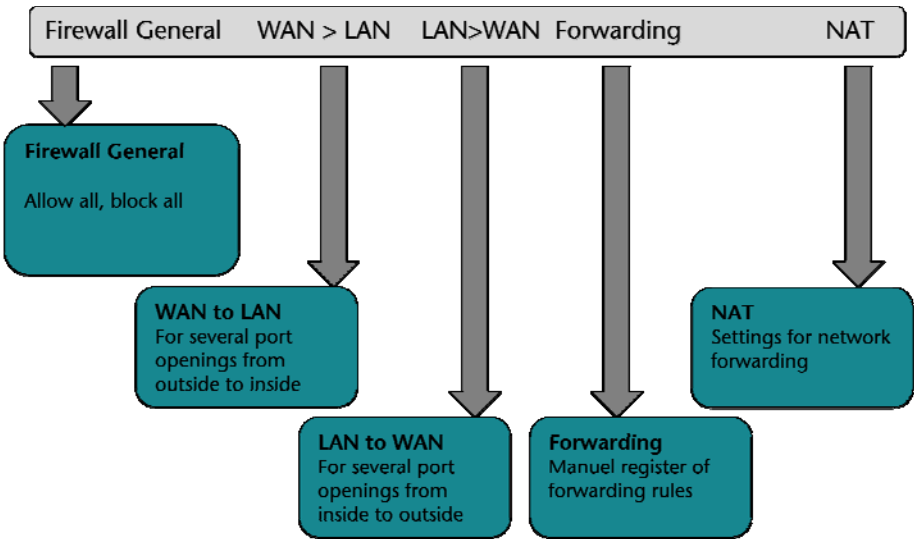
Network menu:



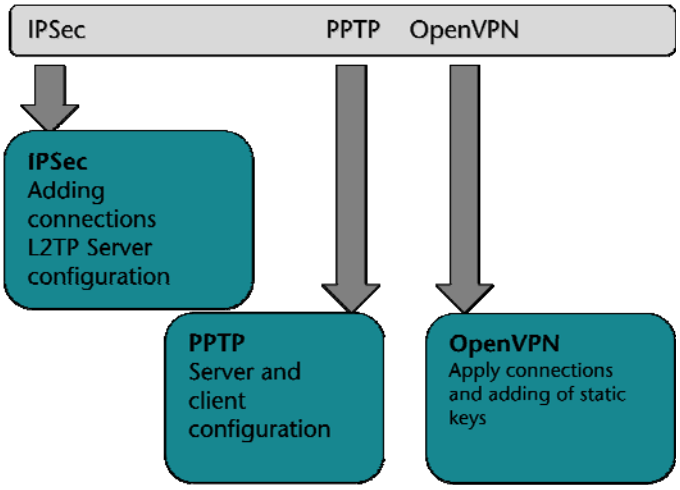
Interfaces menu:



Security settings menu:



VPN menu:



3 Active Internet connection scenarios

The steps explained in this manual are all performed manually. Configuration of the LAN, Internet, and VPN connection is also possible using the wizard integrated into the web interface.

The following steps must be performed in the sequence described:

3.1 Internet connection via analog/ISDN/EDGE modem

This section explains the connection with the Internet via the various modems.

The prerequisite of the Internet connections show is an analog or ISDN phone line (Fig. 3-1-1), or a SIM card with enabled data service for GPRS connections (Fig. 3-1-2).

3.1.1 Internet connection via an analog modem

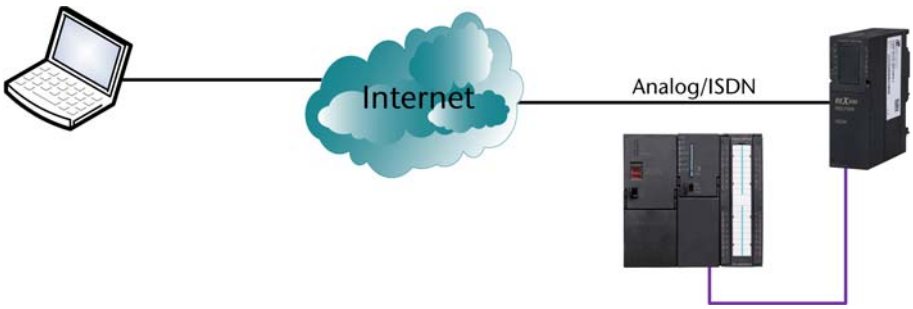


Fig. 3-1-1: Internet via analog or ISDN line

Step-by-step instructions:

1. It is first necessary to connect the device to an analog phone line. The analog phone line is connected via the RJ socket under the front hatch.

Fig. 3-1-2: Modem socket on the REX 300

2. Now it is necessary to communicate to the device via the web interface to inform it how the Internet connection will be established.
3. To establish the Internet connection via an analog phone line, it is necessary to enter an Internet-by-call provider in

the device. This is entered under menu item Network > Modem.

4. Under this menu item, it is important to enter the phone number of the Internet-by-call provider, the user names, and the password. This data is usually found on the web site of the provider.

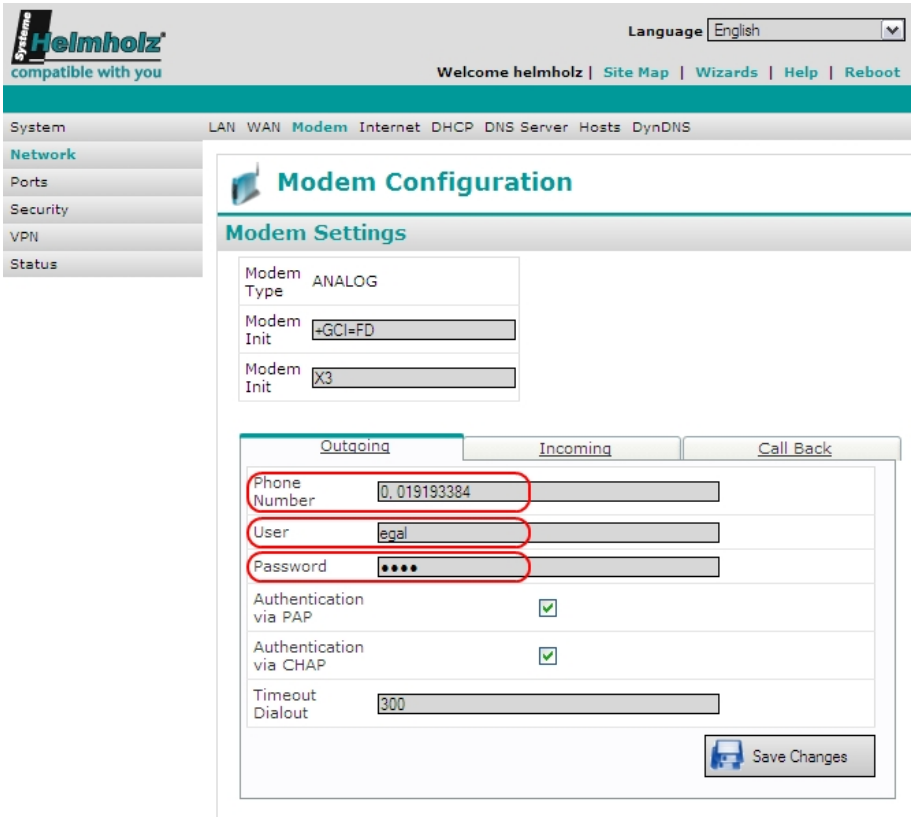


Fig. 3-1-3: Settings on the Modem tab

5. Now, because the modem is configured, settings still have to be entered under menu item Network > Internet. Here, it is possible to set that the Internet connection will be be established via the modem. It is also possible to define when the Internet connection will be established. In this example, it is possible to activate call-back by the device to establish the Internet connection. This is done with the dial-out key or by a call on the device. If call-back is activated, the device hangs up after four ring tones and then dials the stored Internet-by-call number. (Fig. 3-1-4)

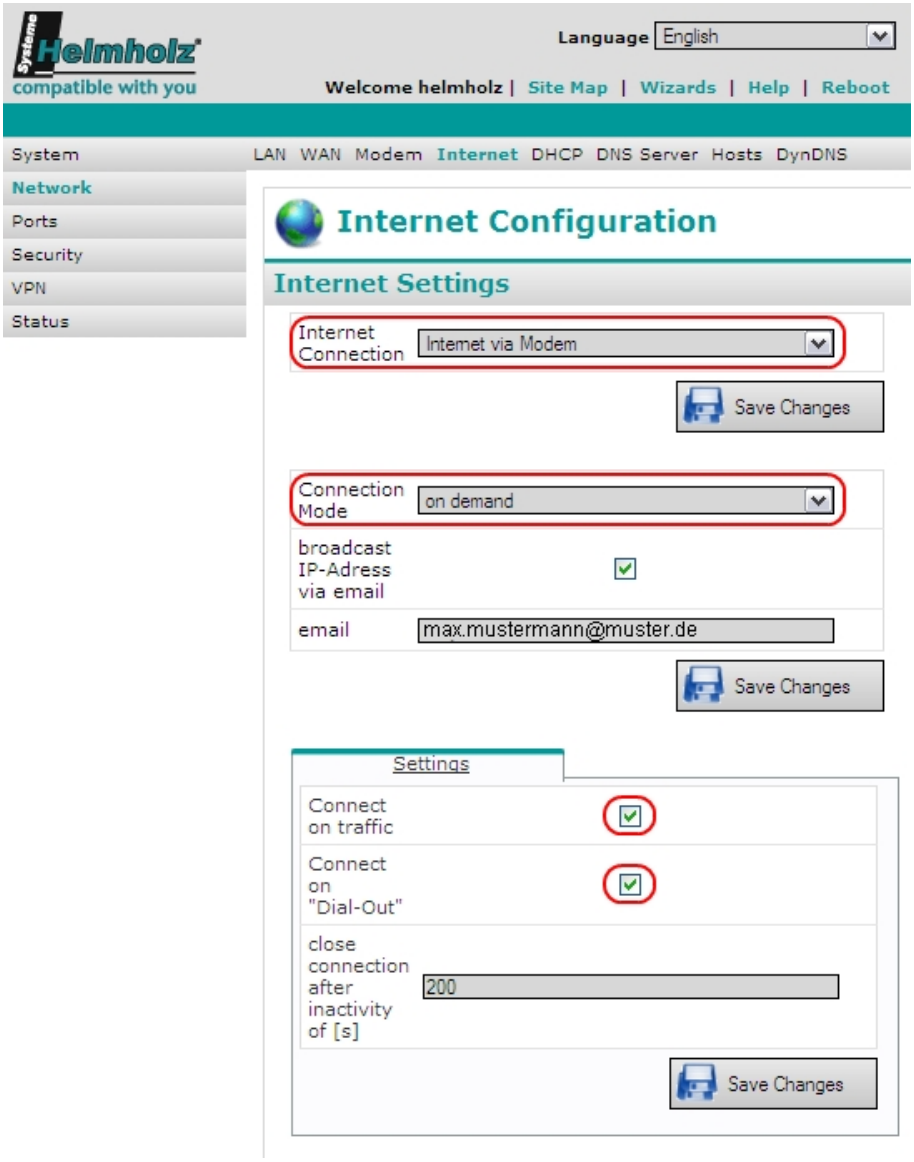


Fig. 3-1-4: Settings on the Internet tab

6. How the device is accessed from the Internet is explained in a general explanation in Section 5.

3.1.2 Internet connection via EDGE Modem

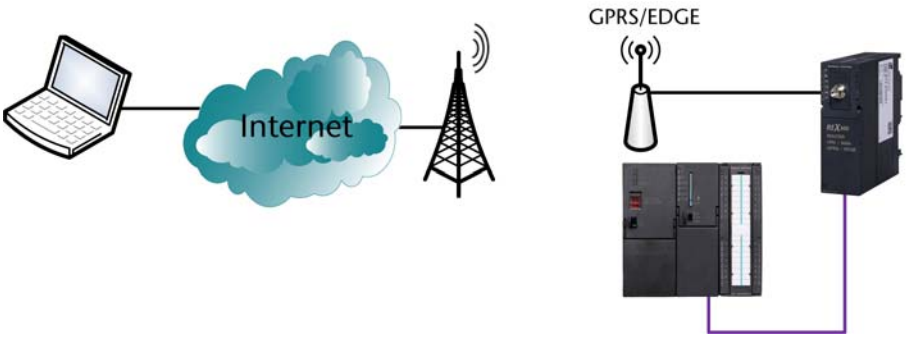


Fig. 3-1-2: Internet with SIM card via GSM (GPRS/EDGE)

Step-by-step instructions:

1. First of all, it is necessary to fit the device with a SIM card on which a data service is enabled.
   The providers supported by the integrated wizard are T-Mobile, Vodafone, Eplus, and O2. The relevant parameters can, of course, be set manually. This is done with the setting "*Other provider.*" This example explains how the settings are made for a german T-Mobile card (manually).

Provider dial-in data:

Provider (German)	T-Mobile	Vodafone	EPlus	O2
Phone number	*99***1#	*99***1#	*99***1#	*99***1#
User	any	blank	eplus	blank
Password	any	blank	gprs	blank
Data also apply to:	Congstar klarmobil callmobile REWE simply Tangens	Milleni.com PAYBACK smobil	BASE Blau MEDION-Mobile simyo uboot vybemobile	Fonic

2. If the device is equipped with a SIM card and the web interface has been opened, it is necessary to enter the following settings with menu items Network > Modem. (Fig. 3-1-3)

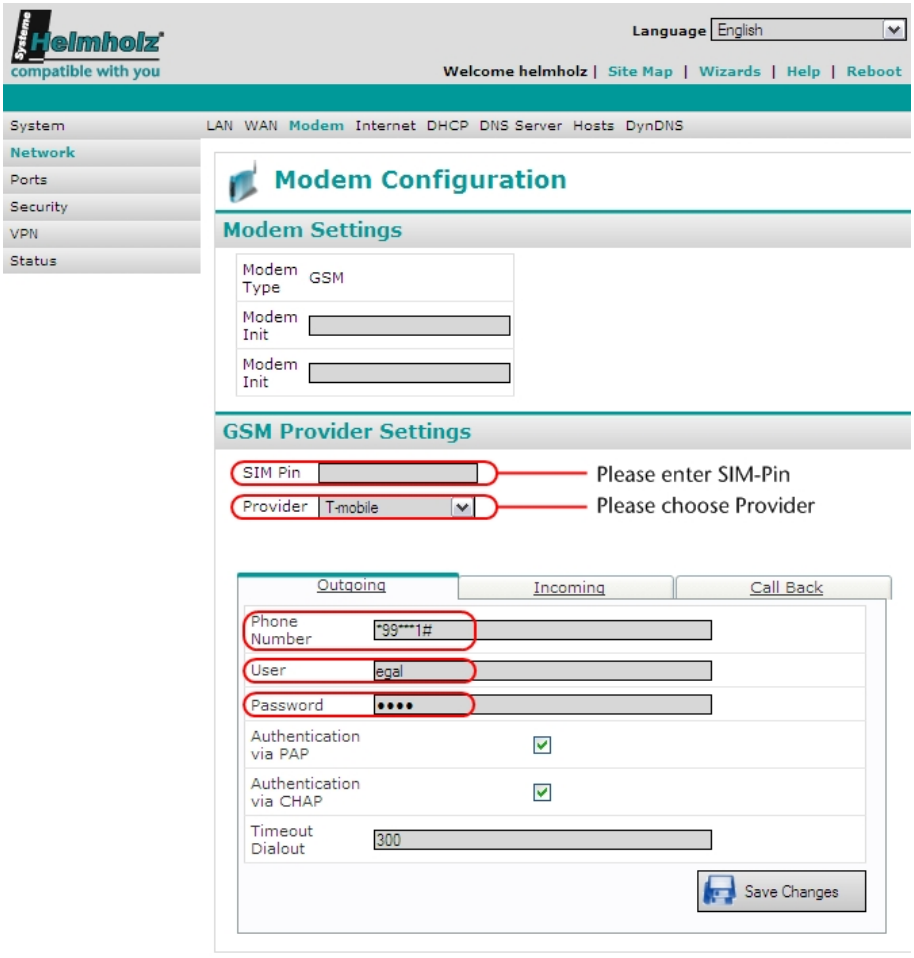


Fig. 3-1-3: Settings on the Modem tab

If the provider you want is not in the list of providers, set the phone number, user, and password manually!

3. Under menu item System > Internet, you can now define whether the Internet connection will remain permanently or only be established when required. The setting *"As required"* permits establishment an Internet connection on a dialed call, for example. That is, if you call the mobile number of the SIM card, 4 ring tones are allowed to elapse; the REX 300 then hangs up and dials into the Internet within 40 seconds.
The Internet connection via modem must remain activated here. (Fig. 3-1-4)

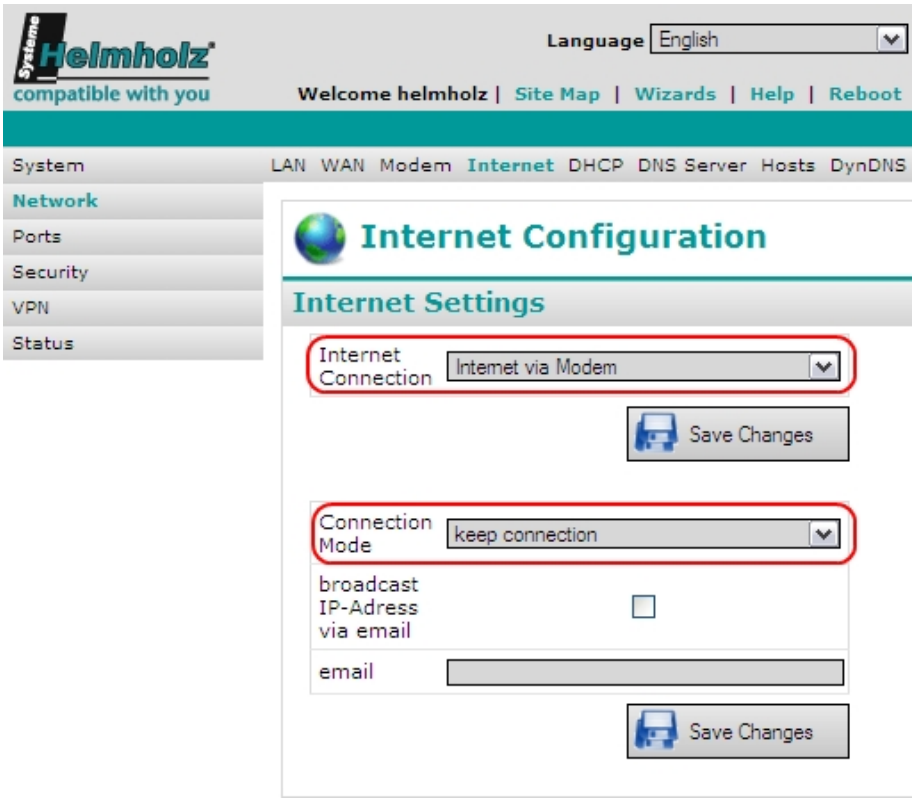


Fig. 3-1-4: Settings on the Internet tab

4. How the device is reached from the Internet is explained in a general explanation in Section 5.

4 Passive Internet connection scenarios

The following steps must be performed in the sequence described:

For the REX 300, a passive Internet connection is a connection through a device that provides an Internet connection. The REX 300 uses this Internet connection and therefore does not establish the connection itself.

A passive Internet can only be used by REX 300s having a WAN interface.

4.1 REX 300 behind an Internet gateway

This particular case means for the user that relevant settings must be made in the Internet gateway for a VPN connection to be established, for example. This refers to port redirections to internal IP addresses. It is shown below how the settings must be made in the REX 300 and not in the corresponding Internet gateway. Only the responsible administrator can usually make the settings of the Internet gateway.

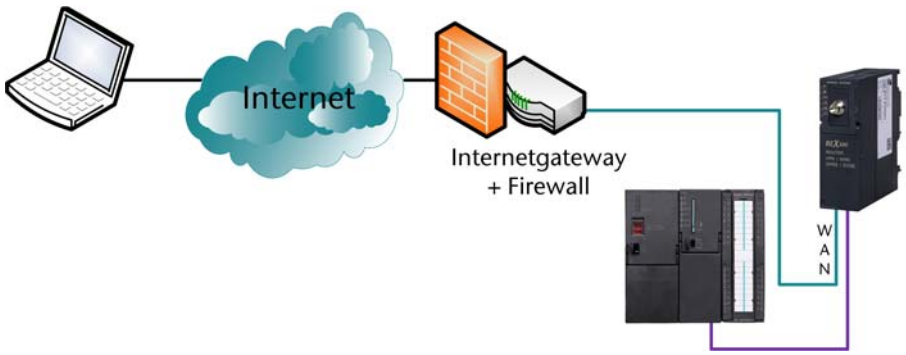


Fig. 4-1-1: REX behind an Internet gateway

Step-by-step instructions:

1. It is necessary for the WAN interface to be able to establish a connection with the Internet gateway. This connection can, of course, be routed through multiple switches or hubs.

2. Under menu item Network > WAN, the settings for the WAN interface must be made. Here, the IP address, subnet mask, and gateway IP address can be set. Moreover, the WAN interface can be configured in such a way that the REX 300 automatically receives the parameters from a DHCP server. (Fig. 4-1-2)

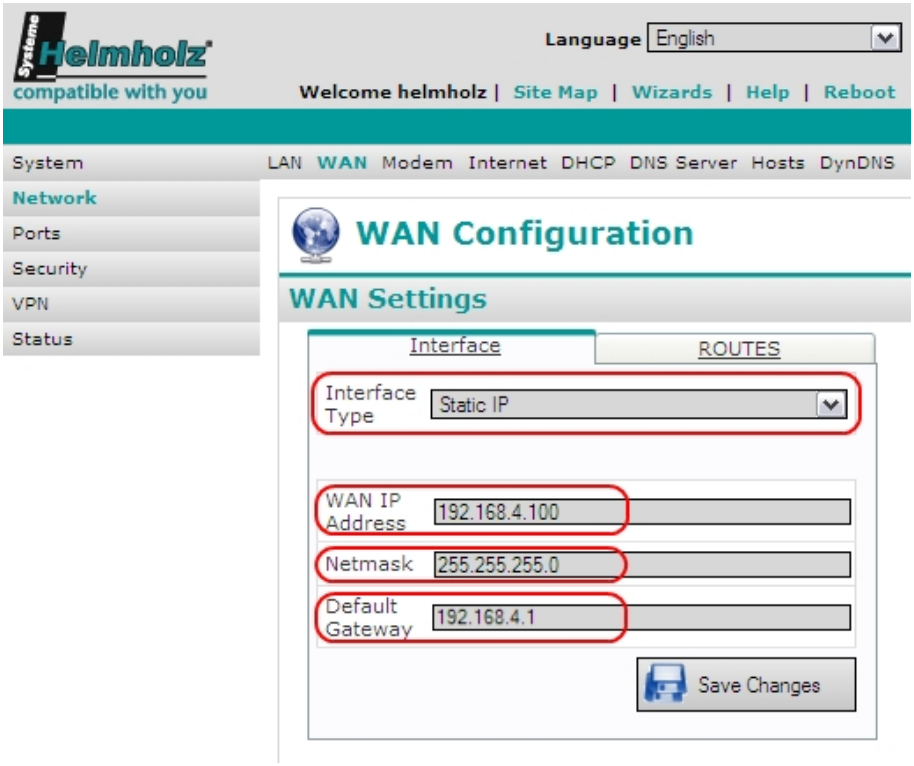


Fig. 4-1-2: Settings on the WAN tab

3. In this example, the Internet gateway has the IP address 192.168.4.1 and the REX 300 has 192.168.4.100.

4. Configuration of the Internet connection is performed under menu item Network > Internet and must look as shown in the figure. Because the REX 300 uses the Internet connection of another device, the Internet connection type is "*No Internet connection*" in this case. (Fig. 4-1-3)

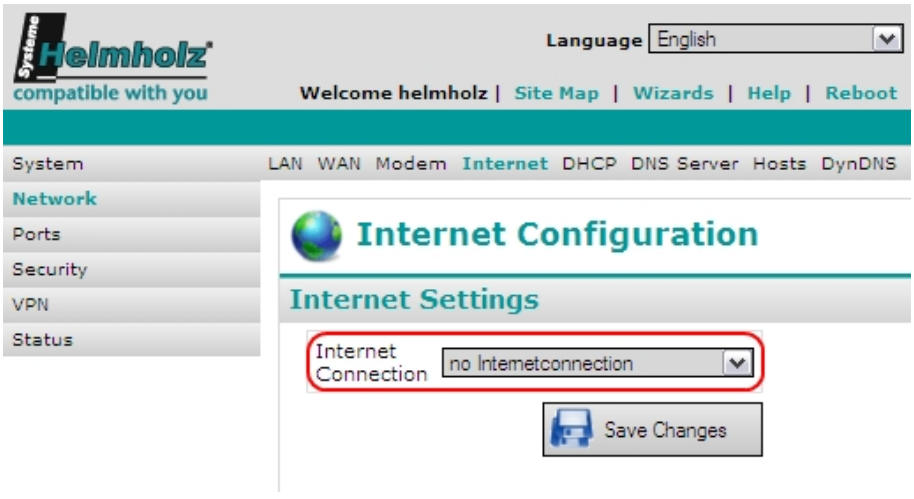


Fig. 4-1-3: Settings on the Internet tab

5. Now, the necessary settings have been made in the REX 300. Depending on the system implementation, the Internet gateway or the firewall now has to be configured to establish a VPN connection. Section 7 explains what port enables have to be set up for this purpose.

4.2 REX 300 with a public IP address

This connection scenario is similar to the previous scenario. The difference is that the device uses a public IP address and is not protected by an additional firewall. It is still protected by the internal REX 300 firewall.

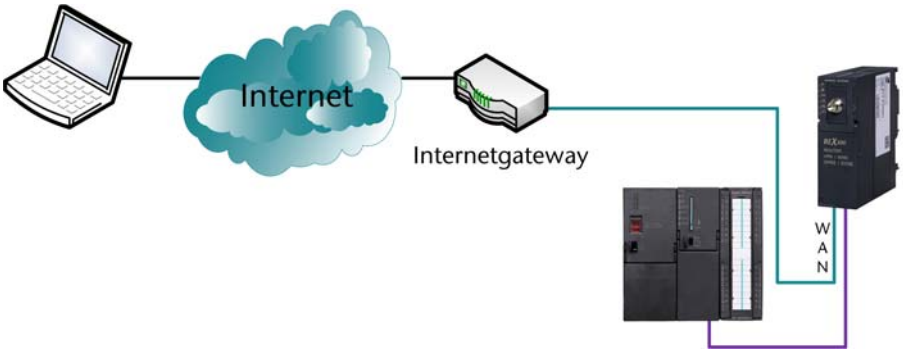


Fig. 4-2-1: REX 300 with a public IP address

Step-by-step instructions:

1. The WAN interface must be able to establish a connection with the Internet gateway. This connection can, of course, be routed through multiple switches or hubs.
2. Under menu item Network > WAN, the settings for the WAN interface must be made. Here, the IP address, subnet mask, and gateway IP address can be set. Moreover, the WAN interface can be configured in such a way that the REX 300 automatically receives the parameters from a DHCP server. (Fig. 4-2-2)

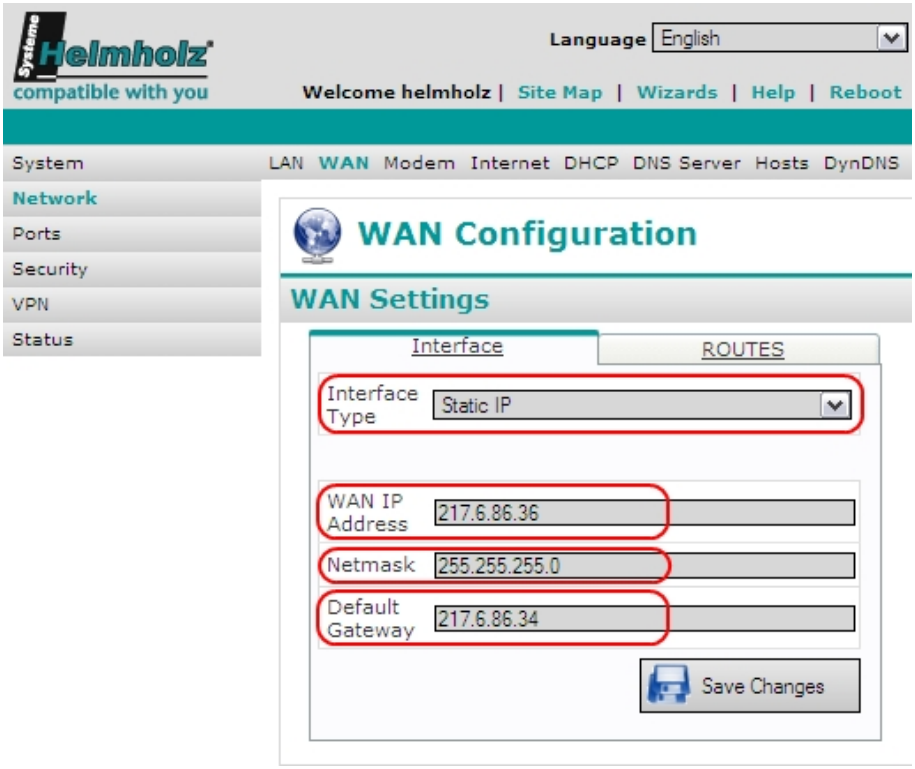


Fig. 4-2-2: Settings on the WAN tab

3. The REX 300 can be accessed directly via a public IP address via the relevant gateway (here: 217.6.86.34) in the Internet and is not in an internal network.

4. Configuration of the Internet connection is performed under menu item Network > Internet and must look as shown in the figure. Because the REX 300 uses the Internet connection of another device, the Internet connection type is "*No Internet connection.*" (Fig. 4-2-3)

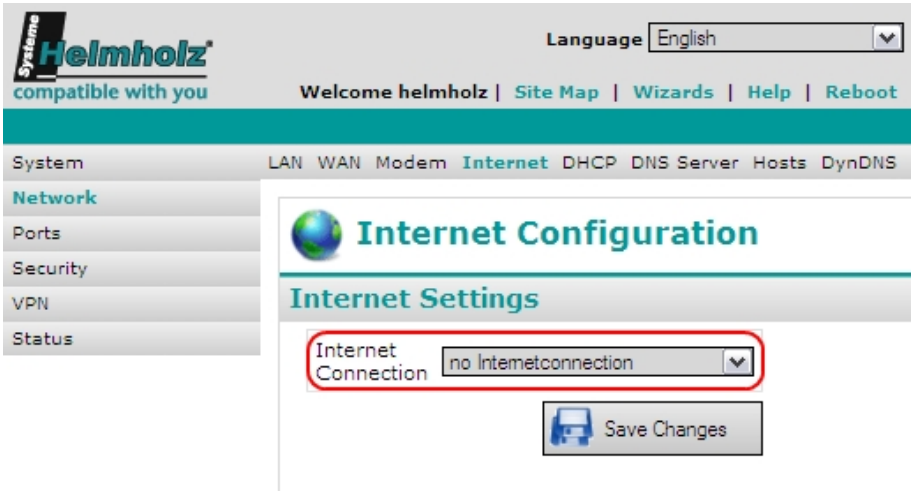


Fig. 4-2-3: Settings on the Internet tab

6. Now, the necessary settings have been made in the REX 300. Depending on the system implementation, the Internet gateway now has to be configured to establish a VPN connection. Section 7 explains what port enables have to be set up.

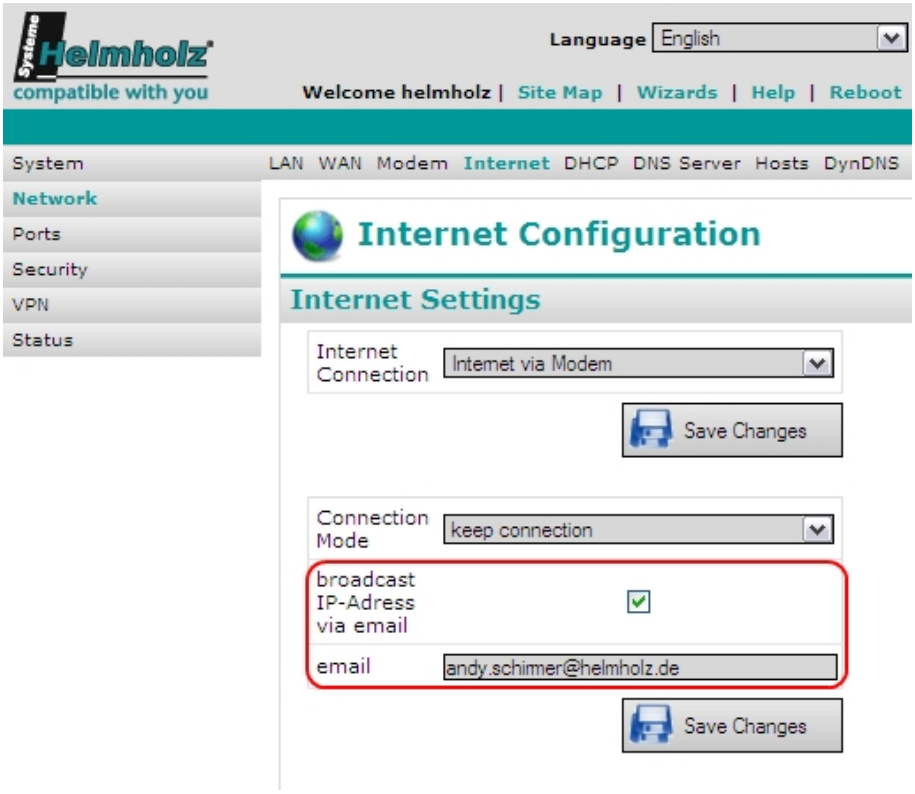
5 Access to the REX 300 via the Internet

For the following functions it is necessary for the REX 300 to have already established the Internet connection.

5.1 IP address via e-mail

Systeme Helmholz GmbH offers the service of sending e-mails via a server that is provided free of charge. This free service allows you to find out the IP address that the REX 300 has obtained from the Internet Service Provider. The REX 300 sends an e-mail containing the IP address to the e-mail address you specified via the server of Systeme Helmholz GmbH.

The necessary settings are preconfigured on delivery. That is, you do not have to set anything except the e-mail address to which the e-mail is to be sent. You can set your e-mail address under menu item Network > Internet for an Internet connection via modem or WAN.



You can also deactivate this automatic e-mail function and use your own server. You will find this function in the menu System > Settings > *"Activate automatic e-mail settings."* (Fig. 5-1-1)

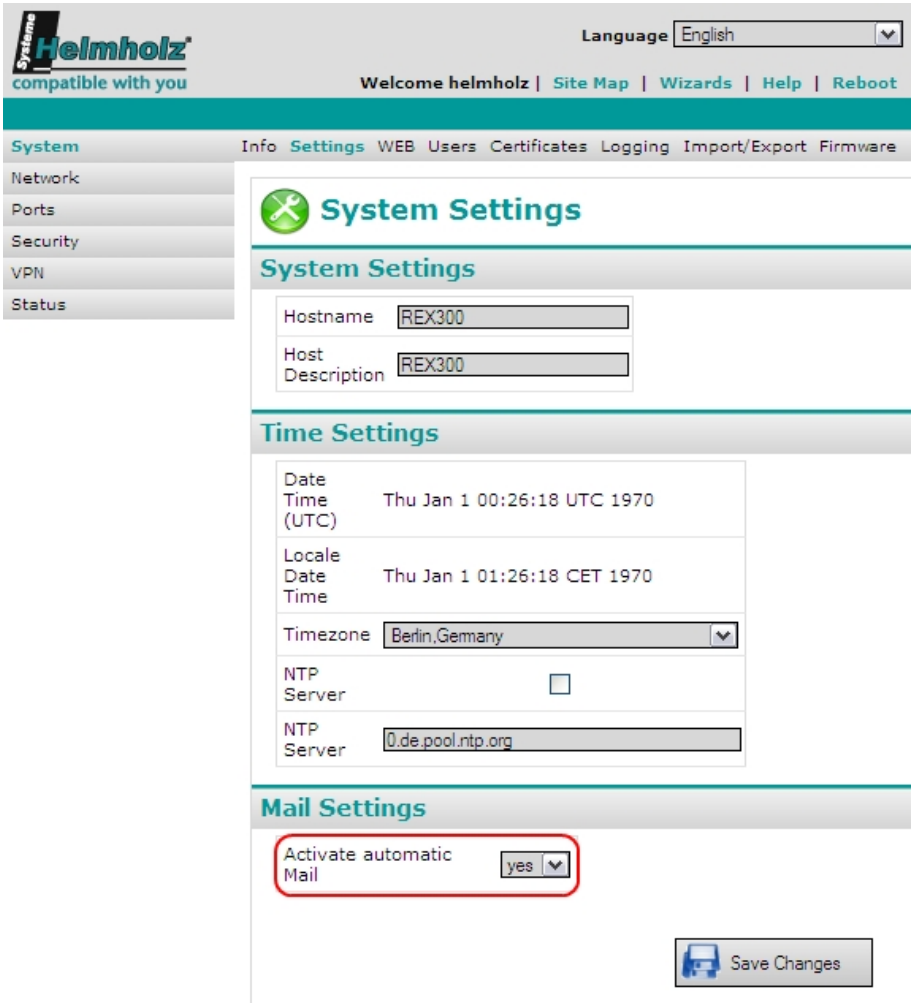


Fig. 5-1-1: IP address via e-mail

A manual setting would look like this. (Fig. 5-1-2)

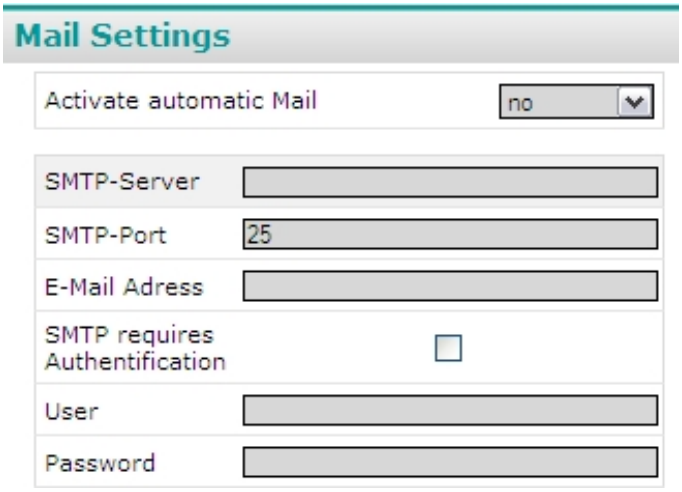


Fig. 5-1-2: Manual e-mail server settings

The IP address or name of your e-mail server and the e-mail address of the REX 300 now have to be entered under SMTP server. If authentication is necessary, a user and password have to be entered in addition.

5.2 DNS name resolution

To reach the REX 300 even more simply from the Internet, Systeme Helmholz GmbH allows you to perform DNS name resolution using a free service.

That means that the IP address that is assigned to the REX 300 for an active Internet connection is converted to a permanent name. The REX 300 can then be reached by this name in the Internet. The necessary settings are preset in the REX 300. However, manual settings can also be made to be able to use, for example, other service providers for this function. You will find the settings under Network > DynDNS
(Fig. 5-2-1)

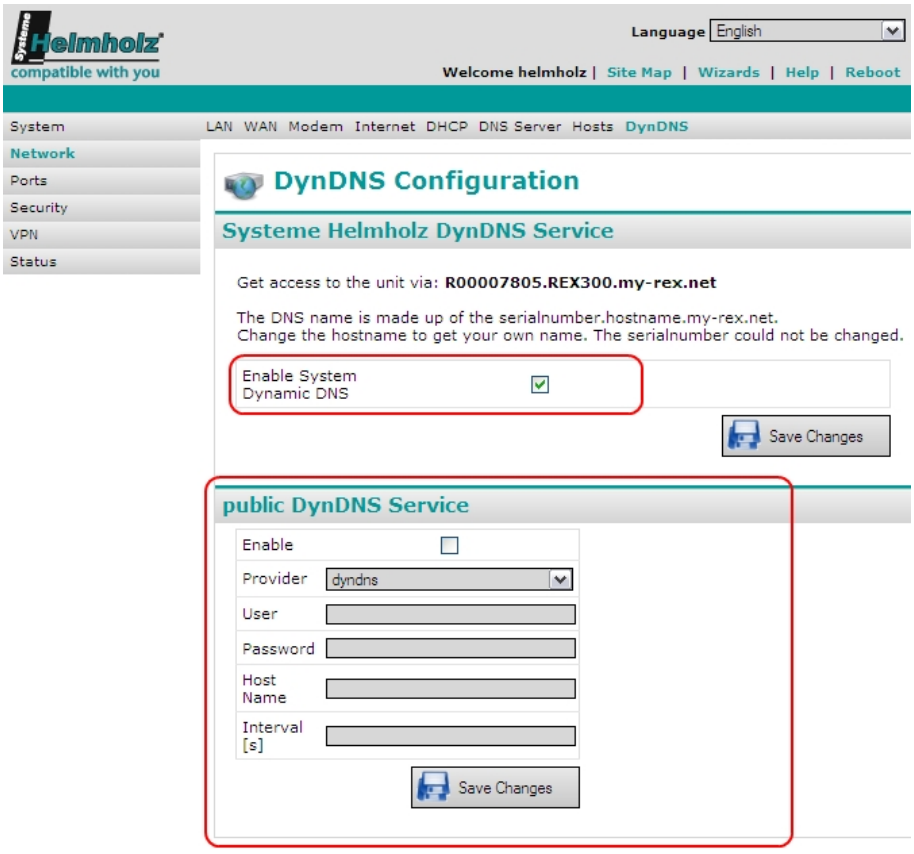


Fig. 5-2-1: DNS service

In this example, the REX 300 would be accessible via the name R00007821.REX300.my-rex.net. In the lower part of the display, manual settings are possible if a public provider is to be used.

6 Point-to-point connections

Point-to-point connections do not usually require security functions to prevent unwanted access. The firewall is therefore deactivated in this example. Point-to-point connections limit the connections option by the modem technology used. That means that analog modems can only communicate with analog modems. This rule also applies in the case of ISDN, which means that the ISDN modems can only communicate with ISDN modems.

The following steps must be performed in the sequence described:

6.1 Analog direct connection

Via this type of connection, it is possible to access the MPI and PROFIBUS or LAN interface of the REX 300 independently of a connection with the Internet. In the following example, a PC with a modem connection is used as the client.

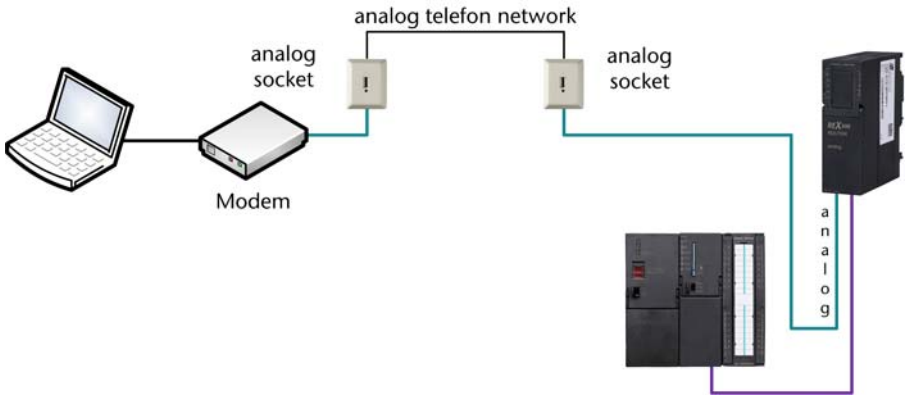


Fig. 6-1-1: Analog point-to-point connection

Step-by-step instructions:

1. The integrated modem must be configured to permit PPP dialing under the menu item Network > Modem. (Fig. 6-1-2)

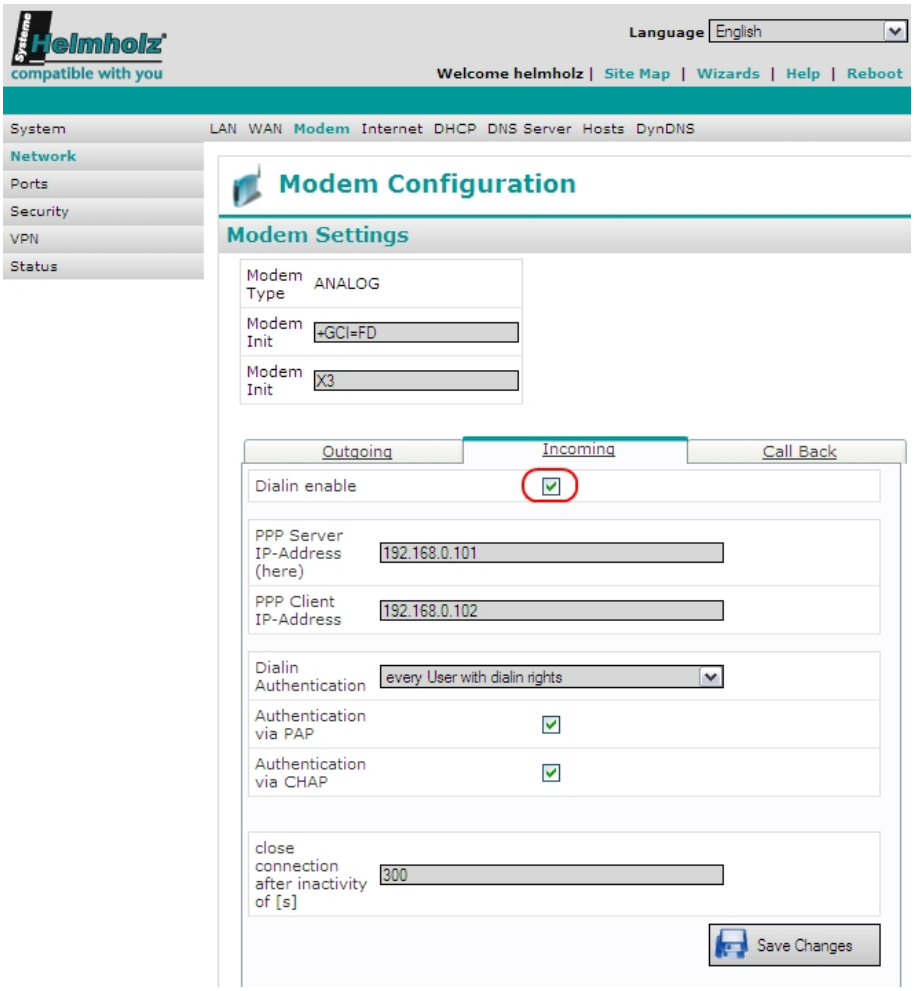


Fig. 6-1-2: Settings on the Modem tab

2. On this page, it is also possible to set whether dial-in is to be permitted to just a certain user or to all users from the user list with dial-in rights.

3. The server-side (REX 300) connection is now parameterized. To be able to access the REX 300, it is necessary to set up a data telecommunication connection in your operating system. You will find a general explanation in Section 6.3.

6.2 GSM direct connection

Via this type of connection, it is possible to access the MPI and PROFIBUS or LAN interface of the REX 300 independently of a connection with the Internet. In the following example, a PC with a modem connection is used as the client. For the PPP connection with a GSM modem, the CSD client must be enabled on your SIM card. This special modem service must be activated with the relevant network provider. The CSD service limits the transmission rate for direct connections via the GSM network to 9.6 Kbps.

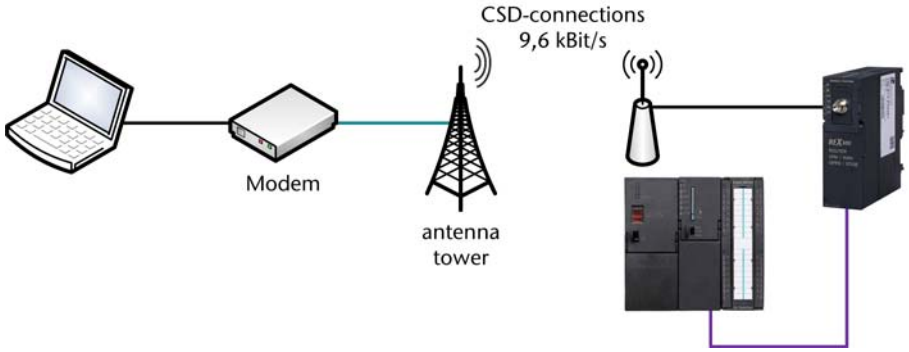


Fig. 6-2-1: GSM point-to-point connection

Step-by-step instructions:

1. The integrated modem must be configured to permit PPP dial-in under menu item Network > Modem. (Fig. 6-2-2)

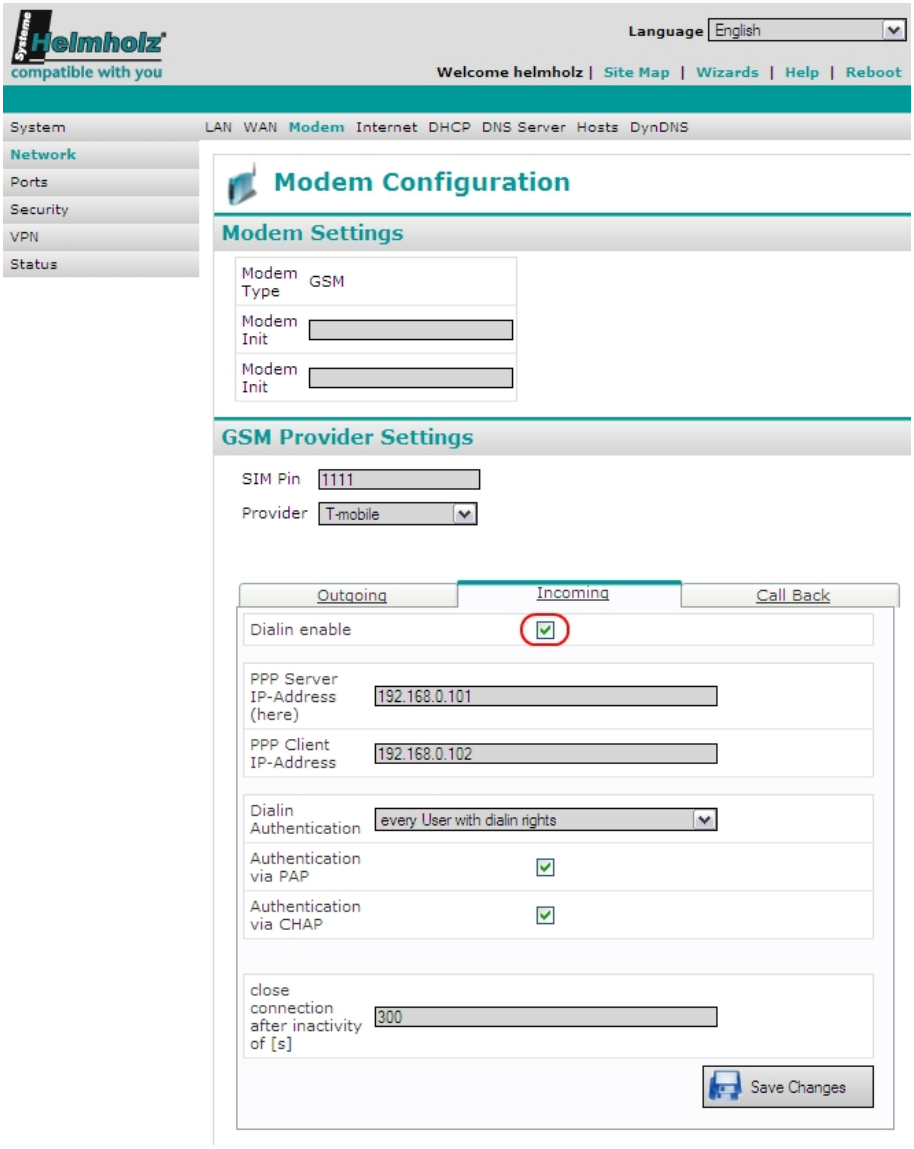


Fig. 6-2-2: Settings on the Modem tab

2. On this page, it is also possible to set whether dial-in will be permitted to just a particular user or to all users with dial-in rights in the user list (see System > User).

3. Now the server-side (REX 300) connection is parameterized and a dial-up connection can be set up in your operating system. You will find a general explanation in Section 6.3.

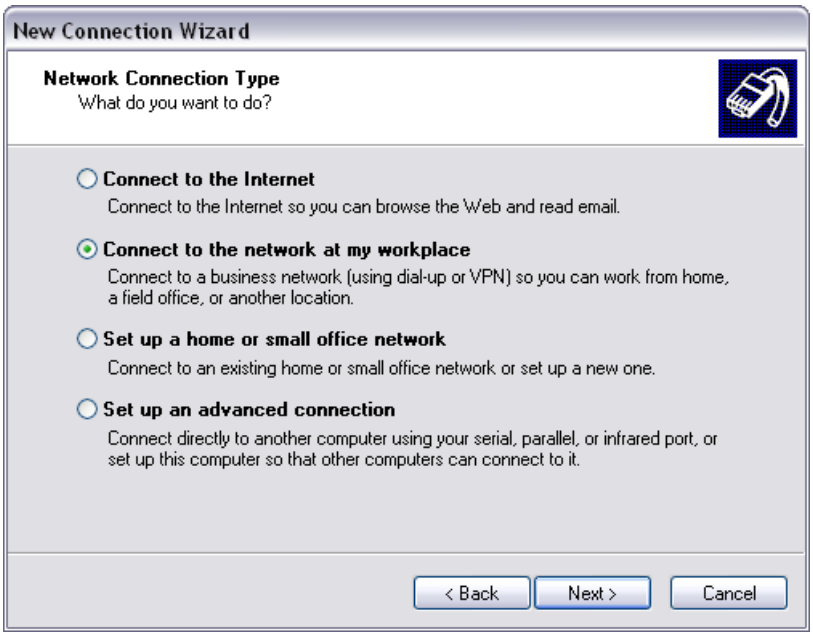
6.3 Setting up a dial-up connection

This Section tells you how to set up a dial-up connection for your direct connection with the REX 300 under Window XP.

Step-by-step instructions:

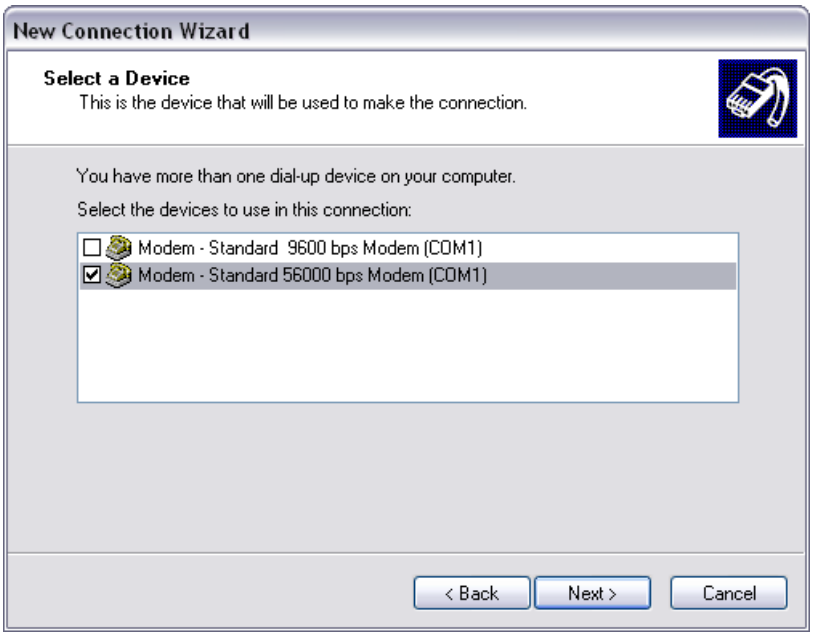
1. You must first start the "*New Connection Wizard*" under Start > Settings > Control Panel > Network Connection with the item "*Create a new connection.*"
2. Now click "*Next*" in the open window

3. In the next step, select "*Connect to the network at my workplace*" and then click "*Next.*"

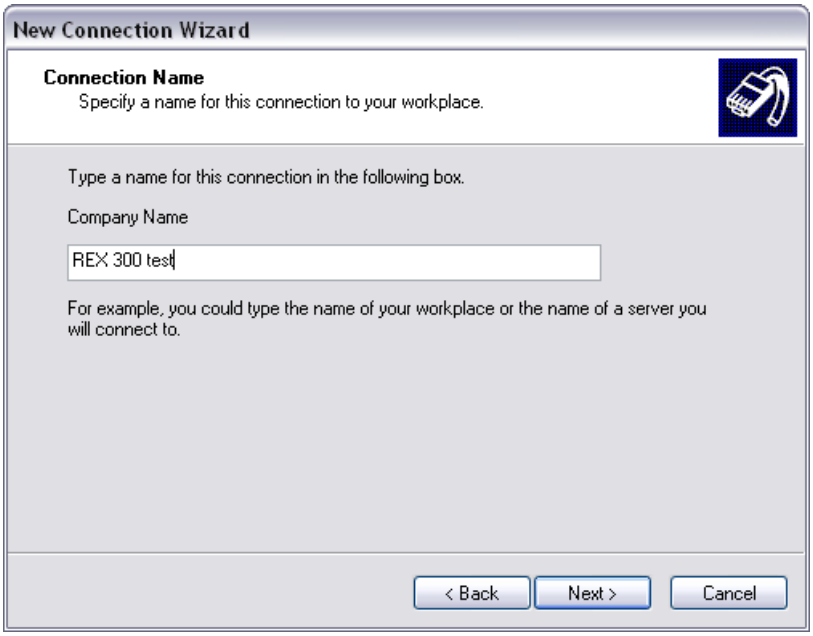


4. In the following window, select the item "*Dial-up connection*" and confirm the dialog box with "*Next.*"

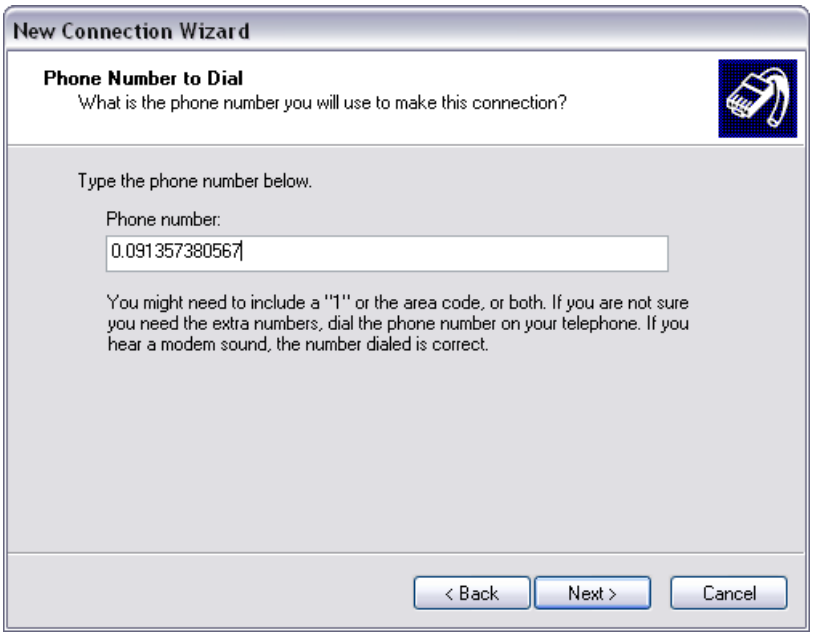
5. In the following dialog box, you must select the modem with which the connection is to be opened and confirm the dialog box with *"Next."*



6. Now enter a name for your new connection, for example, *"REX 300 Test."*



7. Enter the phone number at which the REX 300 can be reached and confirm the dialog box with *"Next."*



8. Click *"Finish."* The connection has now been set up.

9. Now you can either open the connection by double-clicking on an icon on the desktop, if one was placed there, or you can open the connection by clicking the menu item Start > Settings > Control Panel > Network Connections.

10. In the connection dialog box, you have to enter the user name and the password that you defined for the relevant user in the web interface. The factory setting is, for example
    User name: helmholz
    Password: router

11. Finally, click the "*Dial*" button to make the connection.

7 Troubleshooting

If a problem is not described here and this Getting Started does not provide any information on how to remedy it, the support service of Systeme Helmholz GmbH will gladly help you to solve the problem.

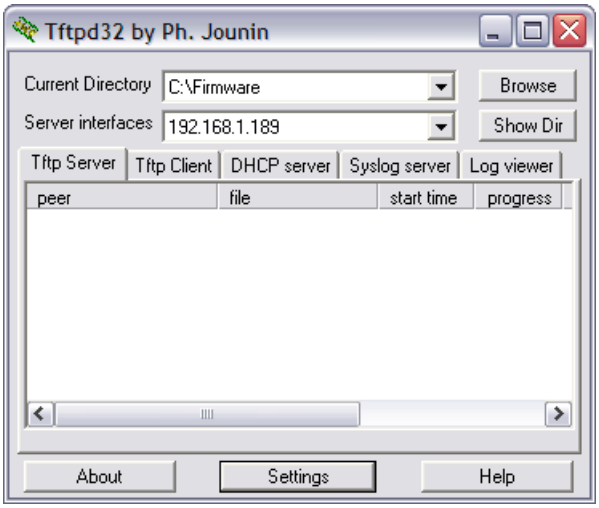
Q: How is a firmware update of the REX 300 performed?

A: The following steps must be performed:

1) Download the latest firmware file from www.helmholz.de

> Download > REX 300 > image.bin

2) Start or install the software TFTP32 from www.helmholz.de under Download > REX 300 > TFTP32.zip



3) Place the image.bin file in a folder of your choice. (in this case: C:\Firmware) You must specify this folder in the program TFTP32 under TFTP Server in *"Current Directory."*

4) Open the web interface of the REX 300 in your browser.

5) Open the menu item System > Firmware and choose the upgrade method "*Upgrade via netzwerk*" and, under TFTP server, specify the IP address of your computer on which the TFTP software is started. (Fig. 7-1)

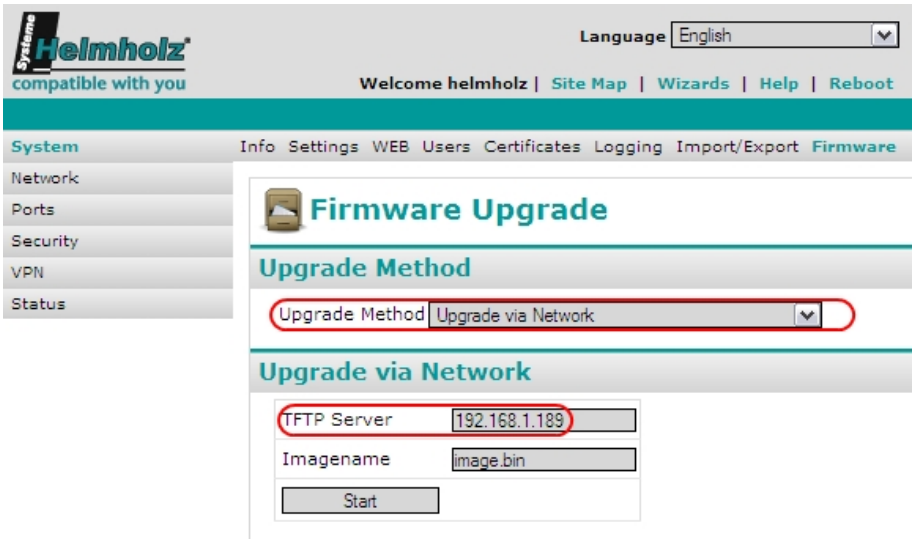


Fig. 7-1: Firmware update method selection

6) With a mouse click on the "*Start*" button, the message "*Do NOT switch off the device!*" is displayed. (Fig. 7-2)

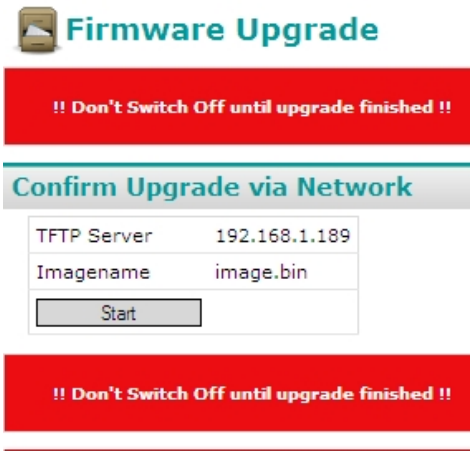


Fig. 7-2: Firmware update warning

7) With a further mouse click on the "*Start*" button, the firmware update is performed. If the upload of the image.bin file is complete. The device starts the update mechanism and then requests that the device is restarted. You can either do that via the web interface or by disconnecting the power supply.

8) After the device has been restarted, the latest firmware version will be on the device.

Q: Which ports have to be enabled or redirected for a passive Internet connection for OpenVPN in the factory setting?

A: In the relevant firewall, the UDP port 1194 must be enabled or redirected.

Q: Which ports have to be enabled or redirected for a passive Internet connection for IPSec?

A: In the relevant firewall, the UDP port 500 must be enabled or redirected.

Q: Which ports have to be enabled or redirected for a passive Internet connection for PPTP?

A: In the relevant firewall, the TCP port 1723 must be enabled or redirected.

Q: Is it possible to establish a VPN test connection with a REX 300 in your company?

A: Yes. You will find the necessary files (OpenVPN configuration script and Static Key) on www.helmholz.de under Download > REX 300 > OpenVPN Testverbindung.zip. You will also find a picture of the configuration there.

8 List of Sources