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NETLink PRO PoE

Ethernet Gateway for MPI/PPI/PROFIBUS

700-881-MPI21

Manual

Edition 1 / 16.06.2011 / HW 1-1 and FW 2.37 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.

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Revision history of this document:

Edition	Date	Revision
1	16.06.2011	First edition

Contents

1 Safety Information

For your own safety and for the safety of others, always heed the safety information given here. The safety information indicates possible hazards and provides information about how you can avoid hazardous situations.

The following symbols are used in this manual.

Caution, indicates hazards and sources of error

Gives information

Hazard, general or specific

*Danger of **electric shock***

1.1 General

The NETLink® PRO PoE is only used as part of a complete system.

The operator of a machine system is responsible for observing all safety and accident prevention regulations applicable to the application in question.

During configuration, safety and accident prevention rules specific to the application must be observed.

Emergency OFF facilities according to EN 60204 / IEC 204 must remain active in all modes of the machine system. The system must not enter an undefined restart.

Faults occurring in the machine system that can cause damage to property or injury to persons must be prevented by additional external equipment. Such equipment must also ensure entry into a safe state in the event of a fault. Such equipment includes electromechanical safety buttons, mechanical interlocks, etc. (see EN 954-1, risk assessment).

Never execute or initiate safety-related functions using an operator terminal.

1.2 Restriction of access

Only authorized persons must have access to the modules!

The modules are open equipment and must only be installed in electrical equipment rooms, cabinets, or housings. Access to the electrical equipment rooms, barriers, or housings must only be possible using a tool or key and only permitted to personnel having received instruction or authorization.

1.3 Information for the user

During configuration, safety and accident prevention rules specific to the application must be observed.

This manual is addressed to anyone wishing to configure, use, or install the NETLink® PRO PoE.

The manual tells the user how to operate the NETLink® PRO PoE and explains the signaling functions. It provides the installing technician with all the necessary data.

The NETLink® PRO PoE is exclusively for use with a S7-200 and S7-300/S7-400 programmable controller from Siemens.

The NETLink® PRO PoE is for use within a complete system only. For that reason, the configuring engineer, user, and installing technician must observe the standards, safety and accident prevention rules applicable in the particular application. The operator of the automation system is responsible for observing these rules.

1.4 Use as intended

The NETLink® PRO PoE must only be used as a communication and signaling system as described in the manual.

1.5 Avoiding use not as intended!

Make sure in the software that uncontrolled restarts cannot occur.

Safety-related functions must not be controlled via the NETLink® PRO PoE alone. Make sure in the software that uncontrolled restarts cannot occur.

2 Installation and mounting

Before you start installation work, all system components must be disconnected from their power source.

Installation and mounting must be carried out in accordance with VDE 0100 / IEC 364. As this is an IP20 module, it must be installed in a cabinet.

A maximum ambient temperature of 60 ºC must be ensured for reliable operation.

2.1 Mounting orientation

The NETLink® PRO PoE can be installed in any orientation.

2.2 Minimum spacing

By maintaining minimum spacings

- then NETLink® PRO PoE can be inserted and removed without having to remove other system components.
- there is sufficient space to connect existing interfaces and other contacts using standard commercial type accessories.
- there is room for any necessary cable routing.

For the NETLink® PRO , a minimum clearance of 60 mm must be left above and below and 10 mm at the sides.

2.3 Installing the module

A wall/DIN rail bracket is available as an accessory for mounting on flat surfaces or on DIN rails.

The accessories available are listed in Section 3.5, together with the corresponding order numbers.

3 Overview of the System

3.1 Application and functional description

The NETLink® PRO PoE is a gateway between a TCP network and an MPI, PPI, or Profibus network.

Two protocols are available on the TCP side for the exchange of user data with the automation system:

- one is a proprietary protocol that is used to connect to the proprietary NETLink-S7-NET driver, and
- the other is the S7-TCP/IP protocol often used by visualization system manufacturers which is known as *'RFC1006'* or *'ISO on top of TCP'*.

Up to 16 TCP connections (10 Mbps or 100 Mbps) and up to 32 MPI/Profibus connections (9.6 Kbps to 12 Mbps) can be used simultaneously.

The connecting cable used to link the NETLink® PRO PoE with the programmable controller is 1.2 meters long and active. Because it is active, no spur lines are required which could interfere with the bus. The TCP/IP end of the NETLink® PRO PoE is electrically isolated from the MPI/PPI/PROFIBUS.

On both the TCP and the fieldbus sides, the baud rate used can be determined automatically (auto negotiation or auto baud).

By using the NETLink-S7-NET driver, the NETLink PRO® PoE can be used as the following at the programming unit/PC end:

- Programming adapter,
- Teleservice unit, or
- Operator control and monitoring unit.

The RFC1006 interface also allows third-party software that supports this protocol to be used to communicate with S7-200/S7-300 and S7-400 systems.

The NETLink® PRO PoE can draw the necessary power from either the bus interface of the programmable controller or via an external power supply. In addition the IEEE 802.3af Power over Ethernet function is also supported as an enhancement.

In general, the NETLink® PRO PoE can be connected to the PC via a switch, hub or directly via CAT5 cable.

The NETLink has the IP address 192.168.4.49 on delivery from the factory.

3.2 Connections

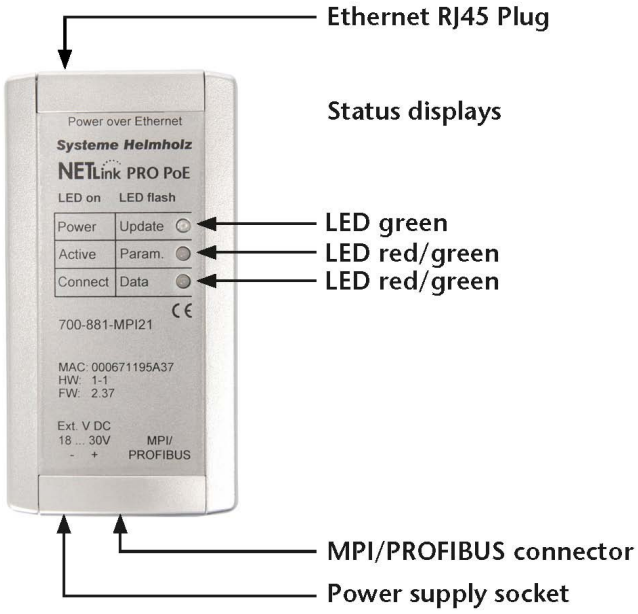
The NETLink® PRO PoE has the following connections:

- RJ45 female connector for connecting the supplied standard CAT5-TCP cross-over cable. The automatic interface detection “Auto - (MDI)X” means that switches and computer direct connections can be used with this cable type. A separate converter is not required.

- Power supply female connector for 24 V DC power supply. This power supply option can be used if the programmable controller used does not supply any or only insufficient power on the bus connector and there is also no Power over Ethernet switch/router that can deliver the 48 volt supply to the RJ45 connector. Further information about Power over Ethernet is provided in Section 10.2.4.
- Bus connector with programming unit female connector, switchable terminating resistor, and 1.2 m connecting cable. This is an 'active cable.' This means there is no spur line, thus avoiding interference on the bus at high baud rates. The programming unit female connector of the bus connector allows further bus nodes to be plugged in. The terminating resistor must be inserted (ON) if the NETLink® PRO PoE is plugged in at the start or end of a bus segment. If this is not the case, the switch must be in the OFF position.

3.3 LED indicators

The NETLink® PRO PoE has five LEDs, including two two-color LEDs, to indicate its operating status.



The two LEDs located on the RJ45 female connector indicate by their status, the current state of the TCP network:

LINK LED (green)		ACTIVE LED (yellow)	
Status	**Description**	**Status**	**Description**
OFF	Not connected	**OFF**	No activity on the network
ON	Connected	**ON**	Activity on the network
BLINK		**BLINK**	Activity on the network

The three LEDs (two two-color LEDs) on the top of the NETLink® PRO PoE indicate the operating status of the device itself:

LED status for operating status	Power LED (green)	Active LED (green)	Active LED (red)	Connect LED (green)	Connect LED (red)
Search TCP configuration	BLINK				
Ready for operation	ON				
Try to log on to the MPI/PPI/PROFIBUS	ON	BLINK			
Actively logged on to the MPI/PPI/PROFIBUS	ON	ON			
Active connection to an automation system	ON	ON		ON	
Data exchange with an automation system	ON	ON		BLINK	
Transferring firmware update	BLINK		BLINK		BLINK
Storing firmware update	ON		ON		ON
Bus side exception error	ON				BLINK
Programming unit/PC side exception error	ON		BLINK		

3.4 Included in Delivery

All NETLink have the IP address 192.168.4.49 on delivery from the factory.

The following are delivered with the NETLink® PRO PoE:

- NETLink® PRO PoE ready for operation
- CAT5 TCP cable (cross-over) with a length of 3 meters
- CD with NETLink-S7-NET driver, additional info
- Quick Start Guide (German/English)

3.5 Accessories

3.5.1 Manuals

Manual, German	900-881-MPI21/de
Manual, English	900-881-MPI21/en

3.5.2 Software

S7/S5-OPC-Server with USB Dongle	800-880-OPC20

3.5.3 Other accessories

DIN rail bracket 700-751-HSH01

The DIN rail bracket is for mounting the NETLink® PRO PoE on DIN rails.

The DIN rail bracket and NETLink® PRO PoE can be separated without the use of tools.

The DIN rail bracket can also be used as a wall bracket for mounting on flat surfaces.

Mains power adapter 700-751-SNT01

Input: AC 100-240 V / 47-63 Hz / 400 mA

Output: DC 24 V / 625 mA

4 Installation of the Driver Software

With installation of the NETLink-S7-NET driver for the NETLink® PRO PoE, it is easy to access controllers with an MPI-, PPI- or PROFIBUS interface from the PG/PC via TCP/IP.

4.1 Introduction

The NETLink-S7-NET driver is inserted in the PG/PC interface of an existing Simatic application and can then be used from most Simatic engineering tools (STEP7, ProTool, WinCC, etc.).

As a result, access is possible to any controllers of the Simatic S7-200, S7-300, or S7-400 series via the NETLink® PRO PoE.

4.2 System requirements

A PC with a 32-bit Windows operating system is required to operate the NETLink-S7-NET driver at the PG/PC end. The XP operating systems (SP3 and higher) and Windows 7 operating systems can be used.

A further requirement is the existence of Simatic engineering tools, such as STEP7, Version 5.1 and higher or STEP7-Micro/Win Version 4.0 and higher, which ensures that the PG/PC interface is installed on the computer.

Installation under Windows 98/ME/NT is possible but is not supported by the technical support team of Systeme Helmholz GmbH. Please pay attention to the requirements of the Simatic package used.

A functioning network link using TCP/IP must have been set up on the PG/PCs that are used. The network configuration of the PC must be known. Commercially available network cards and, for the connection, cross-over or 1:1 (straight) cables may be used.

The integrated auto-negotiation function automatically negotiates the TCP/IP transmission speed between the stations. In this way, the best performance is achieved in a local 100 Mbps network. Status operation will be slowed down if older 10 Mbps network cards and hubs are used.

4.3 Running the installation setup

After you have inserted the installation CD, user guidance starts automatically, allowing the user to start the setup routine of the NETLink-S7-NET driver.

If the user guidance does not start automatically, the setup file can be launched manually in directory '*CD drive:\Driver*.'

If necessary, you can download the latest NETLink-S7-NET driver from our homepage (http://www.helmholz.de).

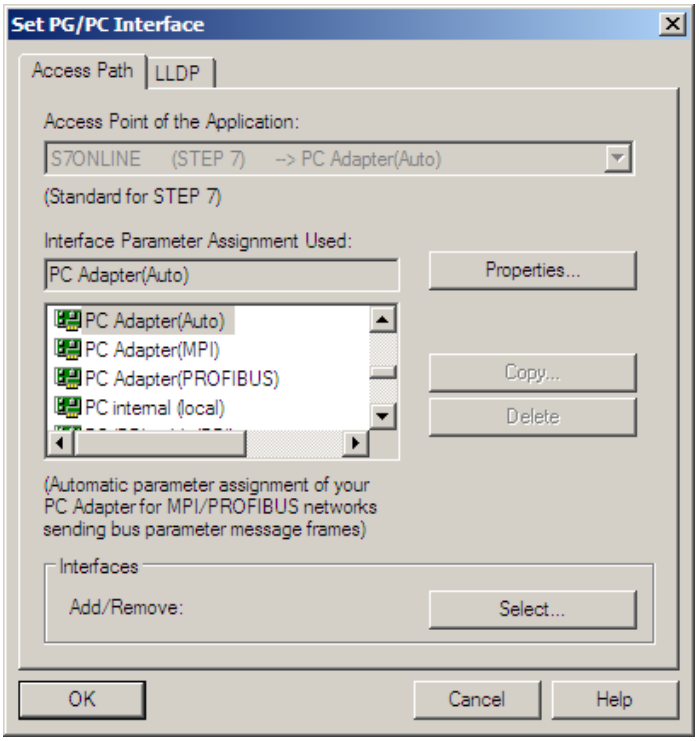
Administration rights are required for installation.

Please note that for installation you have to log on as an administrator under the 32-bit Windows operating systems Windows 2000® and Windows XP® because the setup program has to make entries in the Windows registry.

4.3.1 Adding the interface to the PG/PC interface

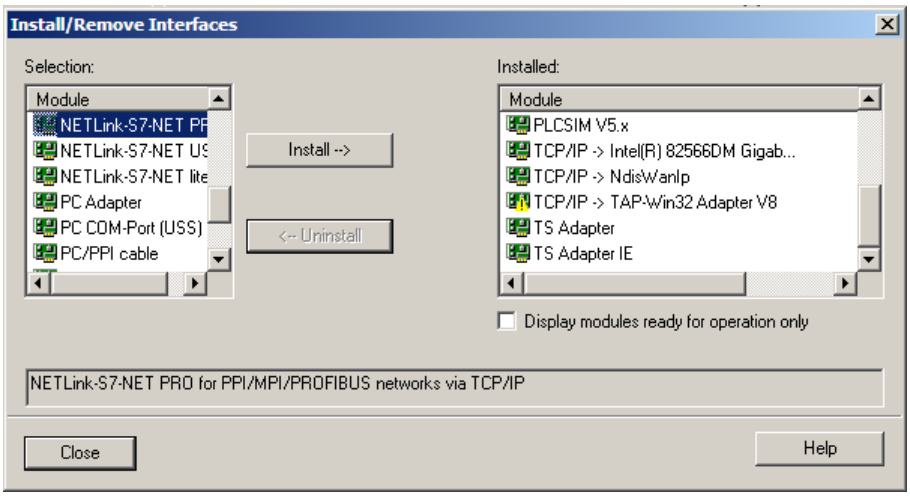
After initial installation, the new interface parameter set '*NETLink-S7-NET PRO*' has to be set up. Administrator rights are necessary for this.

After you have started '*Set PG/PC Interface*' in the Control Panel, click the '*Select...*' button there.



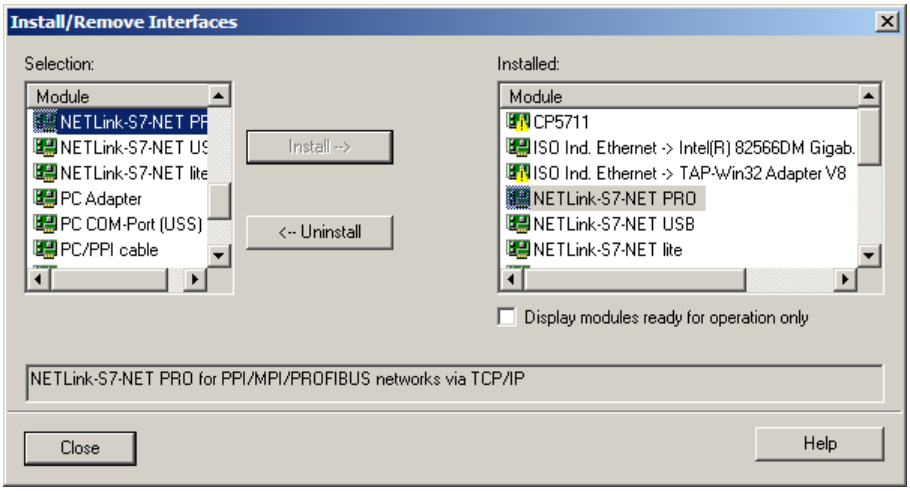
This step is absent in a Windows 7 operating system. In this case you can skip this part.

This opens the '*Install/uninstall interface*' dialog box.



After you have selected the entry '*NETLink-S7-NET PRO family*' from the left-hand list, click the '*Install-->*' button.

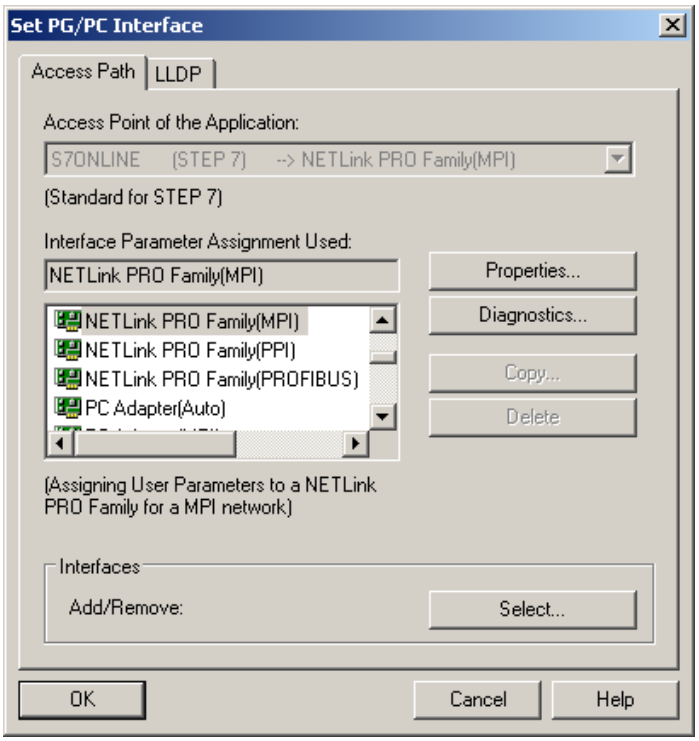
The *'NETLink-S7-NET PRO'* has now been included in the selection list so that it is available for selection in future.



The access path in the *'Set PG/PC Interface'* dialog box is set when this window is closed.

4.3.2 Selecting the required interface parameterization

The selection list for the interface parameter sets now contains an additional three items for the NETLink® PRO Family.



All relevant settings of a NETLink-S7-NET driver can be made via the *'Properties'* access field. With the button *'Diagnostics...,'* it is possible to show the nodes connected to the bus and the parameters the bus is working with. These fields are explained in Section 5.

5 Configuration via the NETLink-S7-NET Driver

Once a NETLink® PRO Family has been selected in the '*Set PG/PC Interface*' window, it is possible to specify this access path more precisely with the '*Properties…'* button.

With the functionality behind the button '*Diagnostics...,'* which is visible when a NETLink® PRO Family is selected, it is possible to read the bus configuration and scan connected nodes.

The properties of the access NETLink® PRO Family are divided into three subareas:

- Bus settings
  Here it is possible to state the bus configuration (e.g. station address) with which the NETLink® PRO PoE will enter the bus system (Section 5.1).
- Local connection (TCP configuration)
  Here, you set the IP address via which the required connection with the programmable controller will be established (Section 5.2).
  The NETLink® PRO PoE hardware can also be parameterized in this window.
- Options
  Here it is possible to change the language of the NETLink-S7-NET driver and to read out the version information of the driver (Section 5.3).

Two functionalities are implemented for diagnostics at the connected bus:

- Bus members
  a list of all active and passive nodes connected to the bus will be displayed. By request the order numbers (MLFBs) will be displayed also if this functionality is available by the nodes (Section 5.4.1).
- Bus parameters
  If possible, a list of all available bus parameters will be displayed (Section 5.4.2).

5.1 Bus settings

The NETLink® PRO PoE can be operated on three different bus systems: MPI, PPI, and PROFIBUS.

From the NETLink® PRO PoE user's viewpoint, the three bus systems only differentiates by the transmission rates that can be selected and the additional options which are explained here.

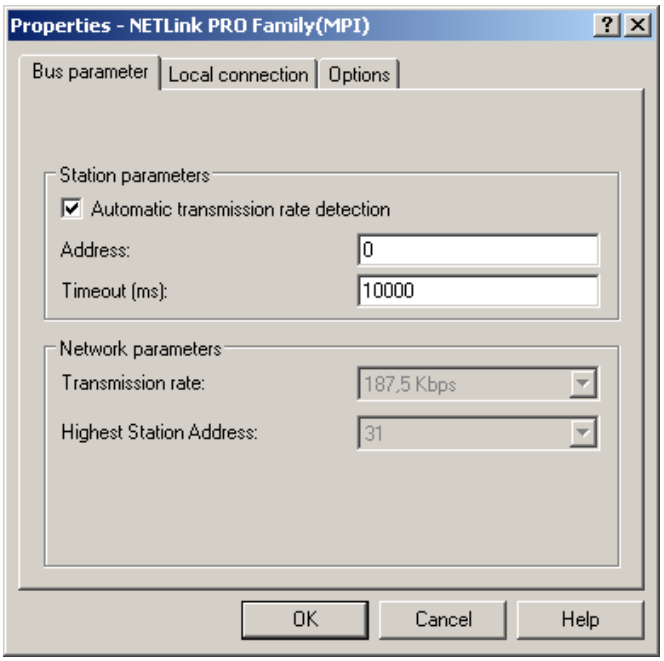
The bus configuration is passed to the NETLink® PRO PoE during the runtime of the NETLink-S7-NET driver and is not stored in the device.

It is possible to use the NETLink® PRO PoE without specifying bus-related information. The NETLink® PRO PoE then automatically ascertains the baud rate and the bus parameters, and can be oper-

ated on different programmable controllers with different transmission rates without switching over the NETLink-S7-NET driver.

5.1.1 MPI

The MPI configuration contains station and network-related settings.



The most important setting concerning bus configuration is assignment of the station address. This refers to the address the NETLink® PRO PoE will have on the bus when it goes online.

The station address can have any value from *'0'* and *'126'* if the selected address is lower than or equal to the highest station address (HSA).

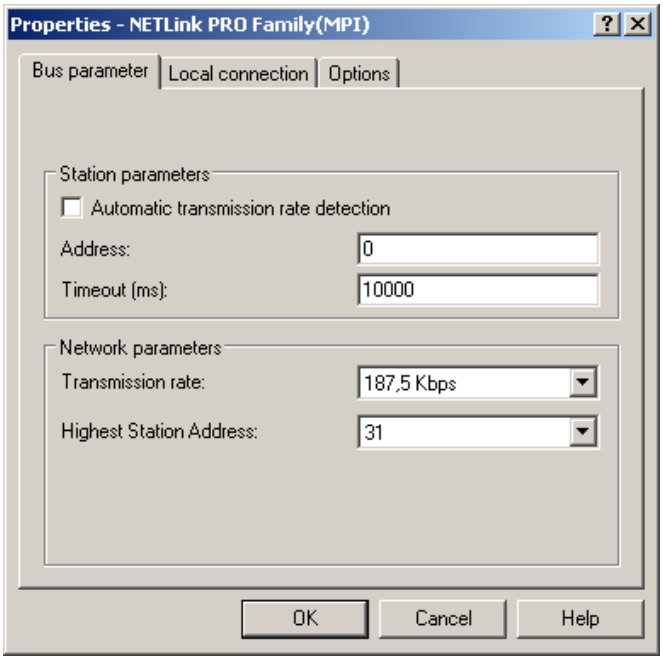
Example: HSA = 31

Any value between *'0'* and *'31'* can be specified for the station address if this address does not yet exist on the bus.

The local timeout of the NETLink-S7-NET driver can be parameterized in the station-related settings. If the driver does not receive a response to a request within the set timeout, a communication error is signaled to the Simatic application.

The network settings can be adapted manually if the checkmark next to *"Automatic Baud Rate Detection"* is removed. This is usually only necessary if the NETLink® PRO PoE fails to sign onto the bus system automatically (can happen with passive bus nodes).

Some older Siemens CPUs do not support the auto baud function on the MPI. PPI systems do not usually support this function either. In such cases, the network-related parameters should be adapted manually.



The transmission speed and the HSA of the PLC being addressed must be known and identical to all connected bus nodes.

It is also possible that the auto baud function may not function reliably at transmission rates slower than or equal to 19.2 Kbps or with increased use of communication via global data exchange, because the relevant frame is transmitted more irregularly by the CPUs. In such cases it may be advantageous to assign the bus parameters manually.

5.1.2 PROFIBUS configuration

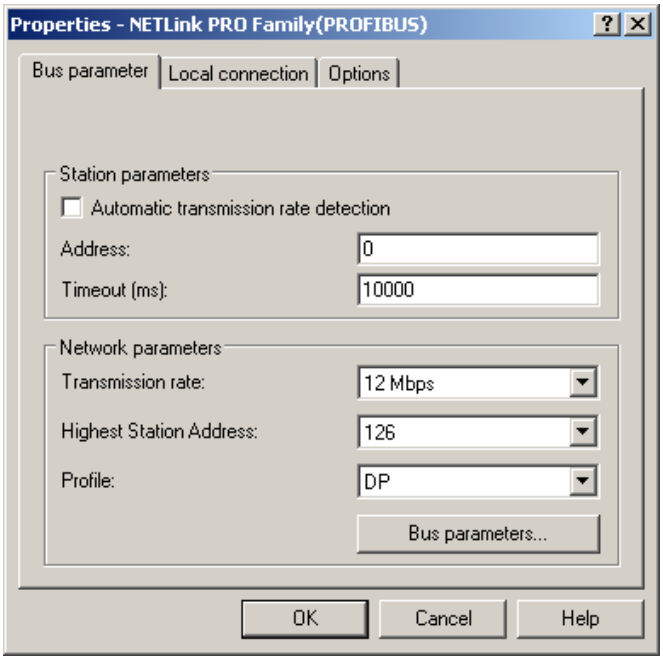
Basically, the same applies to PROFIBUS configuration as to MPI configuration. However, the network-related parameters are more extensive.

In addition to the parameters transmission rate and highest station address mentioned in Section 5.1.1, PROFIBUS also has parameter field for selecting the bus profile and bus parameters.

If the NETLink® PRO PoE is the only active station on the PROFIBUS, it operates in so-called single-master mode, i.e. it generates the token cycle with the set bus parameters.

If the bus speed on the PROFIBUS is set to a value less than 187.5 Kbps, please remember that it may take up to half a minute for the bus parameters to be recognized.

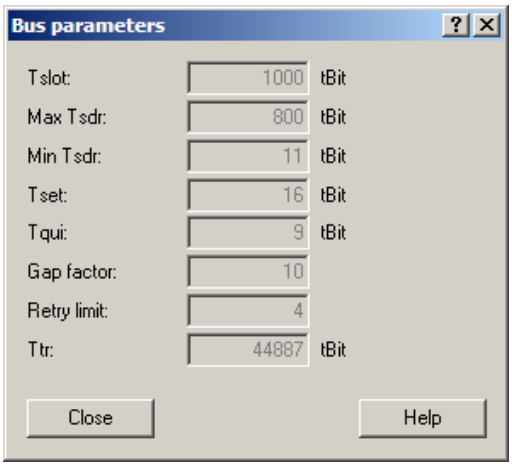
In this case, the timeout value should be increased correspondingly.



Profile:

- Under PROFIBUS, there are usually the profiles *DP*, *Standard* und *User defined*.
- The profile must be selected that is already used in the programmable controller.

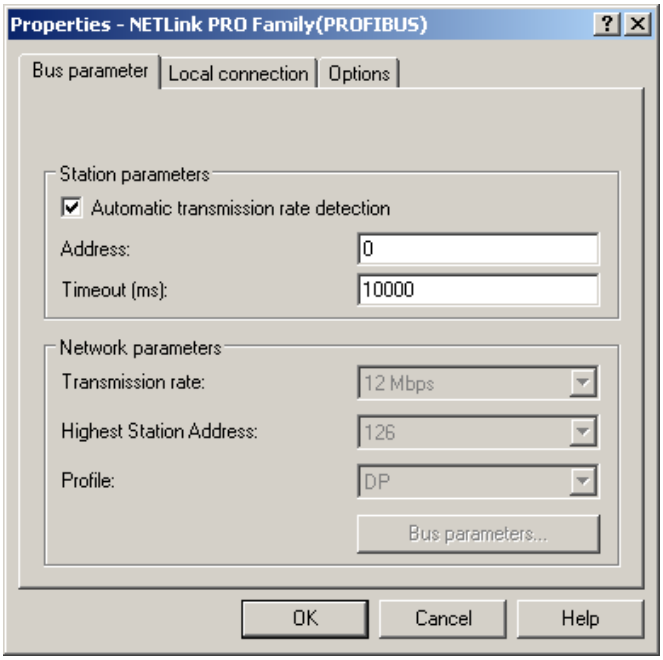
Bus parameters:



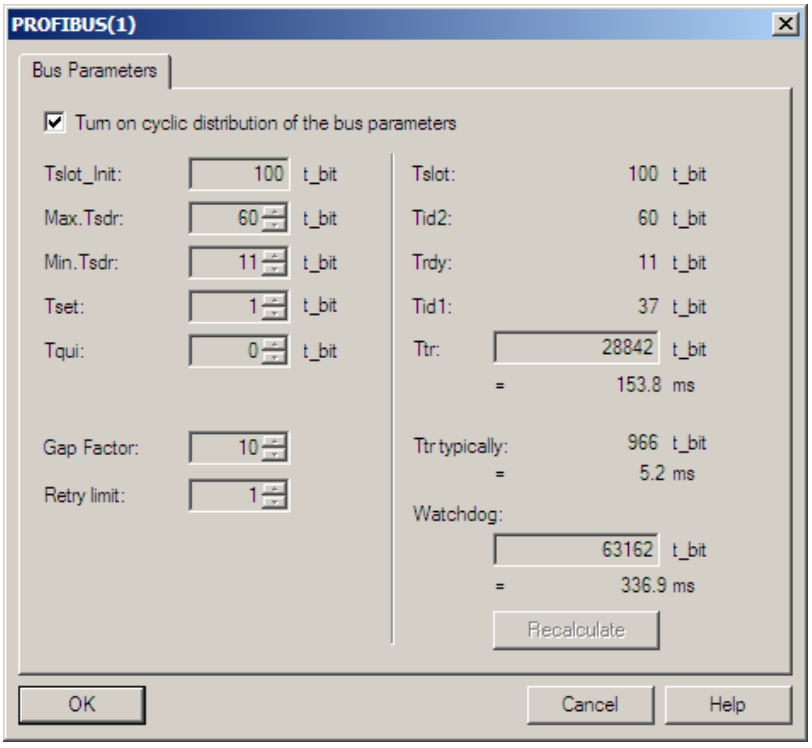
- Unlike the MPI bus profile, the bus parameters for PROFIBUS are not constant and change with the type and number of PROFIBUS stations used.
- Always set the PROFIBUS parameters that are set in the currently used programmable controller (see current STEP7 project).

In order to simplify these procedures, it makes sense to use of the auto baud function under PROFIBUS.

The bus parameters are then calculated automatically.



Under PROFIBUS, please note that the auto baud function works best if the *'Cyclic distribution of the bus parameters'* function is activated in the programmable controller used.



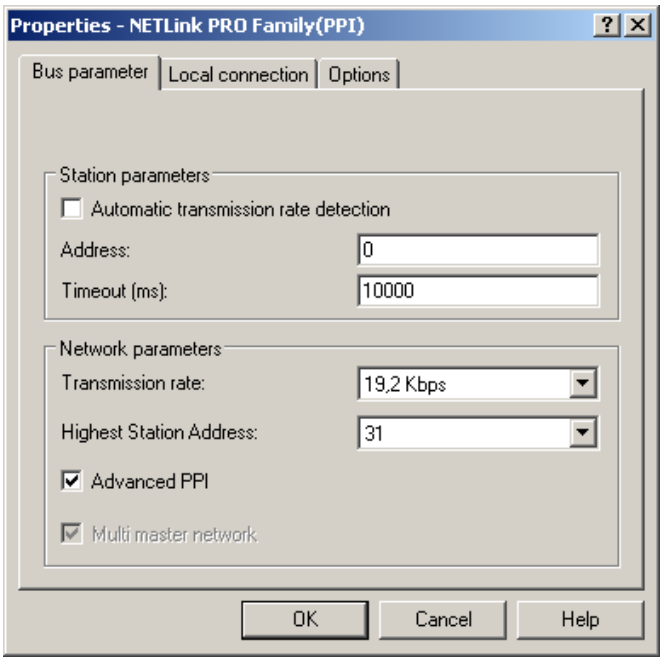
The screenshot above of a hardware configuration of a randomly chosen PROFIBUS CPU shows where to find the switch for cyclic distribution of the bus parameters.

5.1.3 PPI configuration

Basically, the same applies to PPI configuration as to MPI configuration. However, the network-related parameters are more extensive.

!

Normally the baud rate cannot be detected automatically at PPI systems.



In addition to the parameters transmission rate and highest station address mentioned in Section 5.1.1, PROFIBUS also has a parameter field for selecting the bus profile and bus parameters:

According to current knowledge, all S7-200 CPUs of the product line 22x should be able to communicate with '*Advanced PPI.*' It is recommended to use '*Advanced PPI*' if possible.

5.2 Local connection (TCP parameterization)

There are three basic ways of parameterizing NETLink® PRO PoE at the TCP end:

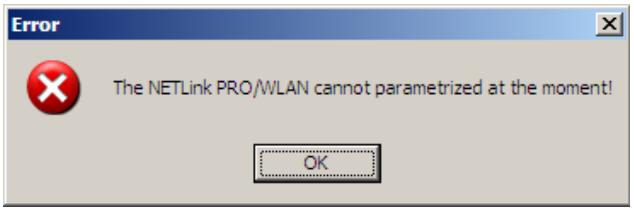
- Parameterization via 'Set *PG/PC interface*
  Existing stations can be reparameterized using the '*Change*' button
- Parameterization via the '*NETLink PRO Family configuration*' tool (see Section 6).
- Parameterization via the web interface of the NETLink® PRO PoE (see Section 7.3).

If the NETLink® PRO PoE is configured via the NETLink-S7-NET driver, the following points must be considered:

If the NETLink® PRO PoE is active on the bus when reparameterization is required (e.g. a variable table or block is being viewed), reparameterization is not performed.

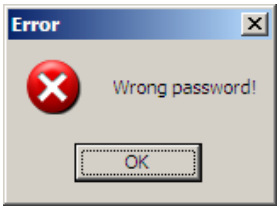
The ensuing reset would interrupt the NETLink® PRO PoE link

The password query must be answered correctly and confirmed with OK.



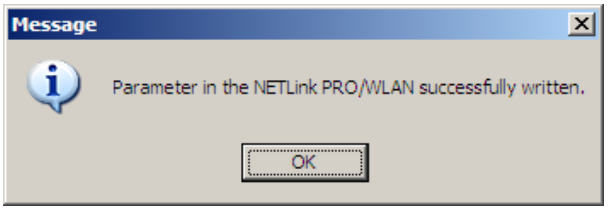
- The NETLink® PRO PoE can be protected against unauthorized reparameterization via a password (default password: “admin”). If an attempt is made to save a parameter set with an incorrect password, the following messages is displayed:

The default password is ‘admin.’



- If the password is correct during parameterization, the new parameter set will be saved and the following message displayed:

Rebooting can take up to 15 seconds.

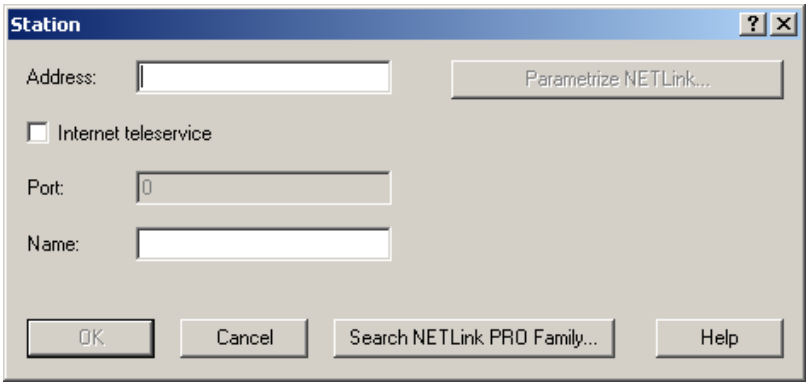


- NETLink® PRO PoE is now restarted. This can take up to 15 seconds.

5.2.1 Creating a station

The ‘*New*’ button takes you to an input dialog box in which you can store the known IP address of an existing NETLink® PRO PoE and any name for easier assignment.

All NETLink have the IP address 192.168.4.49 on delivery from the factory.



To able to access a NETLink® PRO PoE with the NETLink-S7-NET driver, a station must be set up first. This station is virtually and is not stored in the NETLink® PRO PoE hardware – it permits easier differentiation if several NETLink® PRO PoE and/or other devices from the NETLink® family are used.

If NAT/PAT is used, a port can be defined if ‘Internet teleservice’ is selected.

Is the desired NETLink® PRO PoE behind a router (e.g. internet teleservice), the network administrator is able to configure the

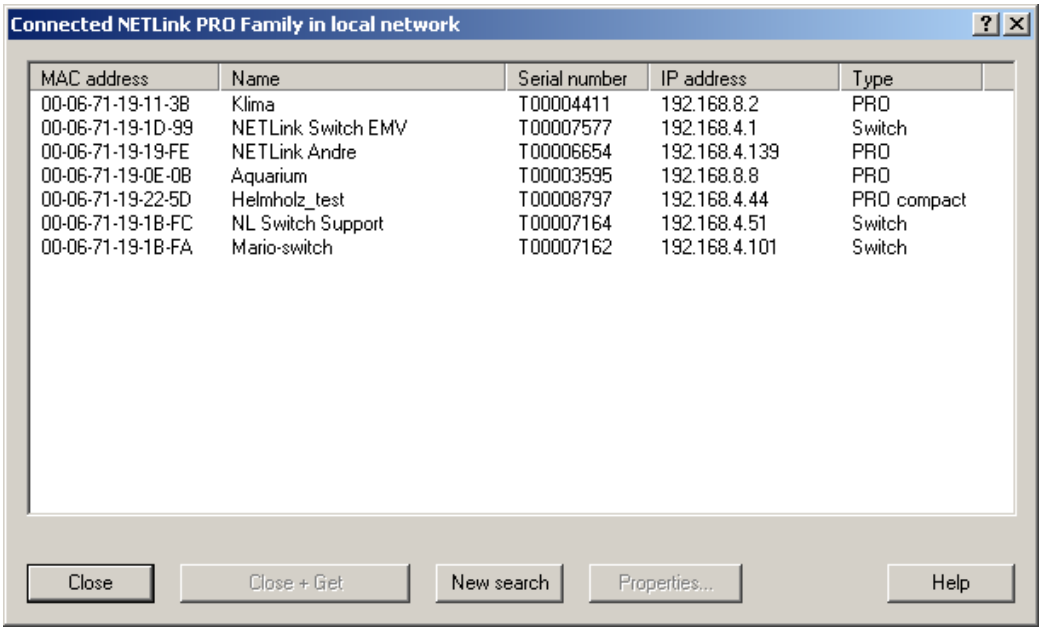
router via NAT/PAT. So all frames going to a specific port of the router going to a specific NETLink® PRO PoE behind the router.

Using this functionality makes it possible to communicate to more as one NETLink® PRO PoE behind a router, if each station gets a specific port configuration.

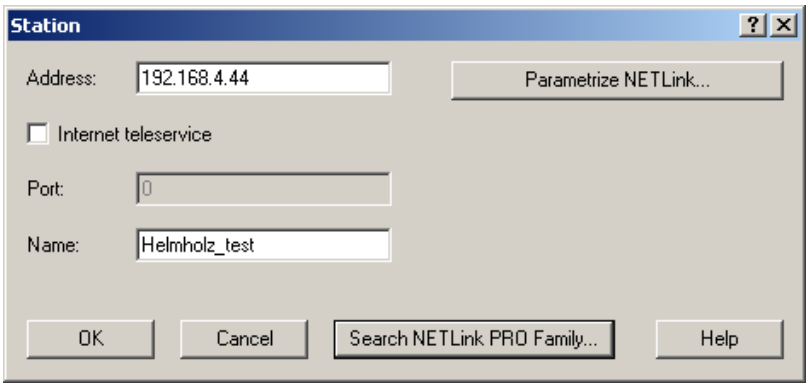
Is the NETLink® PRO PoE connected to the local network, the 'Internet teleservice' option must be deselected.

'*OK*' stores this station, which can now be used.

It is easier to search for an existing NETLink® PRO PoE in the local area network. Just click the '*Search NETLink PRO Family…*' button.



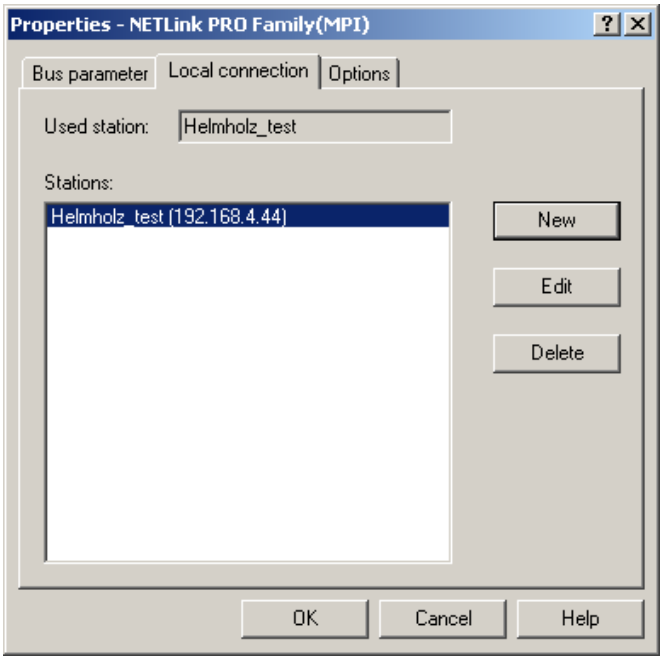
If you now select the required NETLink® PRO PoE and click the '*Close + Get*' button, the following dialog box will appear again:



This station can also be saved with '*OK*' and is then available.

If you do not want the name that is stored in the NETLink® PRO PoE to be the same as the station name, you can overwrite the station

name (e.g. replacing the name '*Helmholz_test*' with the name '*Workshop*' in the example below).

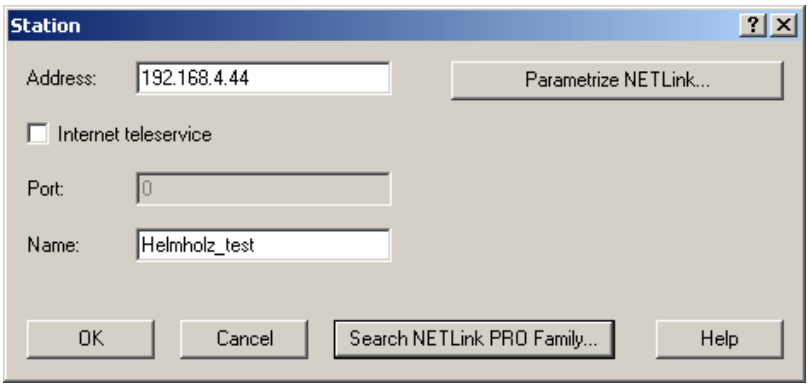


This completes parameterization of the driver.

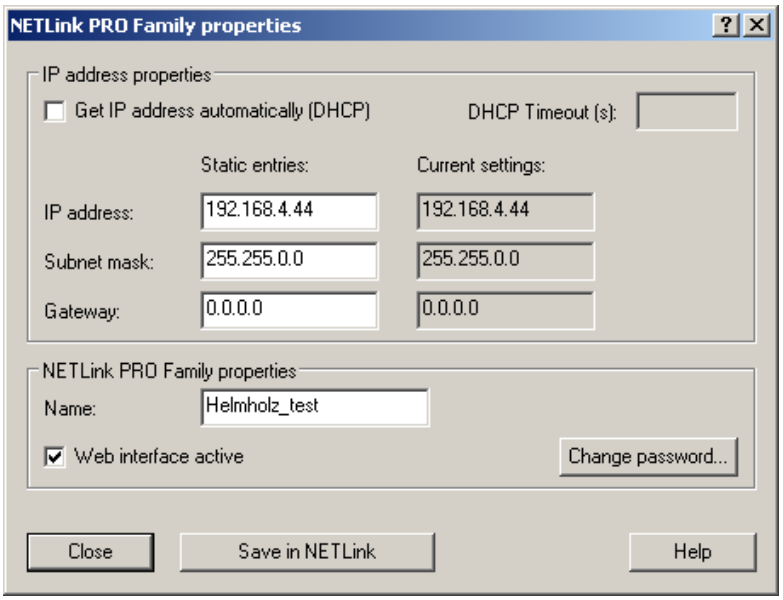
It may now be necessary to adapt the NETLink® PRO PoE to the situation in the existing TCP/IP network.

5.2.2 Setting TCP parameters

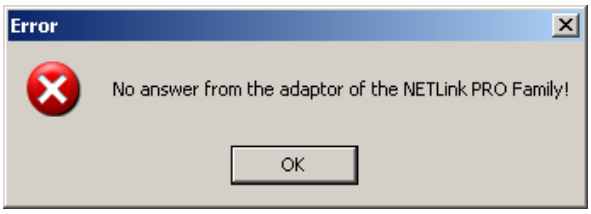
To change the TCP parameters, select the station in question and open the following dialog box with the '*Edit*' button.



The *'Parameterize NETLink ...'* button takes you to a new input form that already contains the current parameters of the NETLink® PRO PoE:



If no NETLink® PRO PoE can be accessed via the stated IP address, the following message will appear:



This message can have two causes:

- There is no NETLink® PRO PoE with the stated IP address (e.g. the device has not yet been switched on or is still starting up).
- The IP configuration of the computer used does not match the IP configuration of the stated NETLink® PRO PoE (e.g. different subnet mask settings).

From the parameterization form shown, it can be seen that not only static IP address allocation but also IP parameter assignment via DHCP is possible.

Both these options are now explained in more detail.

5.2.3 Operation without the DHCP

If NETLink® PRO PoE is used in a network without a DHCP server (or you want the NETLink® PRO PoE to work with the same IP address on the network despite the presence of a DHCP server) the required IP parameters are stored in the input forms for *'Static parameters.'*

In this case, the checkmark is not set in the field *'Get IP address automatically (DHCP).'*

Clicking the *'Save in NETLink PRO Family'* button saves the parameters in the NETLink® PRO PoE.

5.2.4 DHCP

To have the NETLink® PRO PoE receive its IP parameters automatically via DHCP, set a checkmark in the field '*Get IP address automatically (DHCP).*'

This then enables the '*DHCP Timeout (s)*' input field. Enter the maximum waiting time here. If the NETLink® PRO PoE does not receive any parameters from the DHCP server within this time, it will use the stored static parameters to ensure that the device is accessible in the network and can be configured if necessary.

Times shorter than 30 seconds are replaced by the default value (30 seconds) because most DHCP servers require 12 to 20 seconds to assign valid parameter sets.

Clicking the '*Save in NETLink®*' button saves the parameters in the NETLink® PRO PoE.

DHCP has the drawback that a NETLink® PRO PoE parameterized by this method could theoretically be assigned a different IP address from the DHCP every time it is switched on.

The system administrator responsible for the DHCOP server can counter this informing the DHCP server of the MAC address of the NETLink® PRO PoE. However, this is additional work for the system administrator.

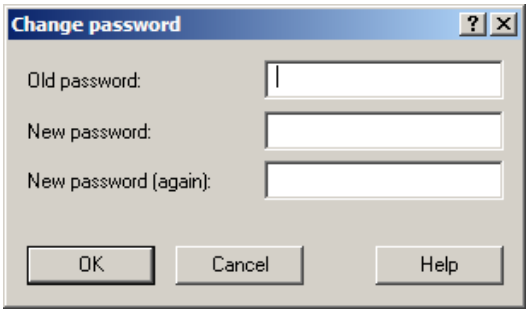
5.2.5 Additional features

The '*NETLink PRO Family properties*' input form contains a '*NetLink PRO Family properties*' group box with further options that are explained here:

- Name:
  Here a name can be given to the NETLink® PRO PoE that identifies it better when it is shown in the search window. The name is stored in the device.
  The name may designate the location (e.g. conveyor HG1), the user (e.g. Mr. Example), or anything else.
- Web interface active:
  If there is a checkmark in this checkbox, the parameterization of the NETLink® PRO PoE can be viewed and changed, if necessary, in any standard Browser (e.g. IE, Firefox, Opera …) as long as the password (if one has been set) is known.
  Section 7 provides more detailed information about what you can do with the web interface.

- Changing the password:
  Here you can change the actual password.
  It is only possible to change the configuration of the NETLink® PRO PoE with the password. This applies to parameterization both via the driver and via the web interface.

The default password is 'admin.'

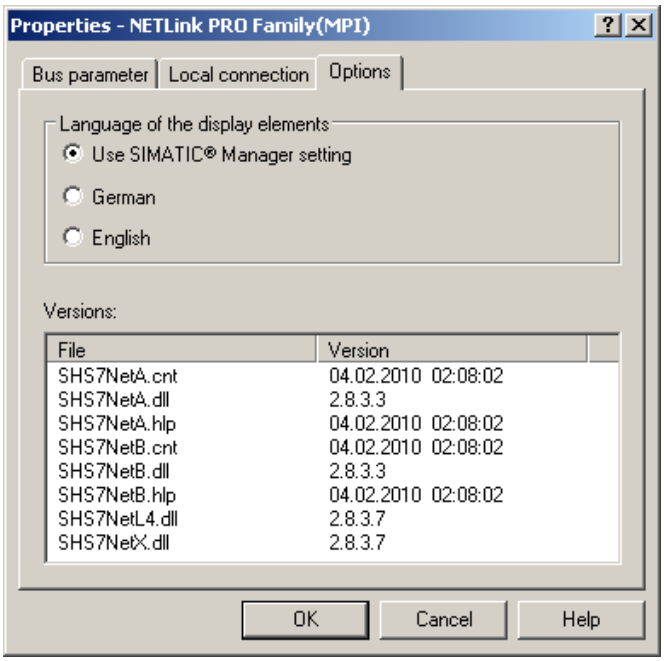


Clicking the '*Save in NETLink®*' button saves the parameters in the NETLink® PRO PoE in this case, too.

5.3 Options of the driver

Under the options of the NETLink-S7-NET driver, it is possible to set the language of the output and help texts of the driver.

It is also possible to read out the version numbers of the driver files used.



5.3.1 Language setting of the display elements

The languages German and English are currently available.

After switching over the language, the setting window must be opened again to apply the changes.

5.3.2 Version information

The names and version number of all driver files are listed here.

If support is needed, this data is used to obtain information about the components used quickly and effectively.

5.4 Diagnostics

For rudimentary diagnostics of the connected bus two sub functions are available:

- Display bus nodes
- Display bus parameters

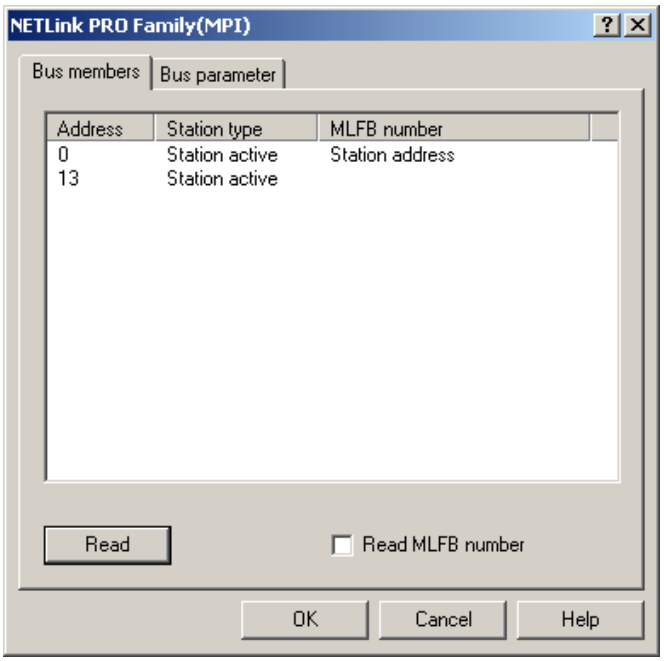
Before the diagnostics functionality is used, a valid station must be created and a plausible bus configuration set.

5.4.1 Bus members

A list of all available nodes at the bus will be generated by clicking the button *'Read.'*

With activating the option *'Read MLFB number'* the order numbers of all devices supporting this function will be displayed too.

The possibility to detect all connected nodes depends on the parameterization of the PG/PC Interface. It is recommended to enable auto baud functionality at MPI and PROFIBUS.

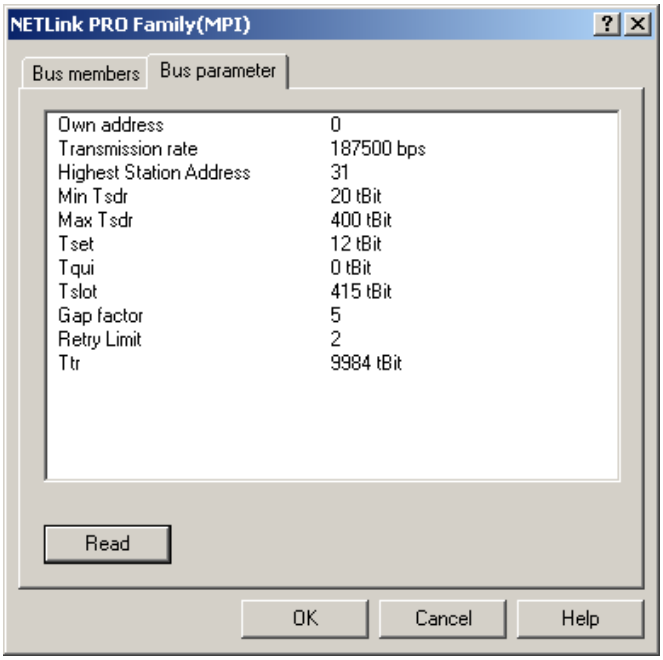


5.4.2 Bus parameters

If it is possible a list of all bus parameters will be displayed by clicking the button *'Read.'*

The possibility to detect the bus parameters depends on the parameterization of the PG/PC Interface.

It is recommended to enable auto baud functionality at MPI and PROFIBUS.



5.5 Teleservice

If you want to use the NETLink® PRO PoE for teleservice, you should consult the network administrators of both the locations involved.

There are various ways of implementing teleservice via a WAN. Here are some suggestions:

- Assignment of a separate, unique IP address with direct access to the network (WAN).

Advantage: Quick to implement
No intervention by the administrator required
Disadvantage: Few globally available addresses exist,
A separate network with direct WAN access is required, Security

- Use behind a router by means of NAT/PAT

Advantage: Can be integrated into existing infrastructures.
Administrator can ensure that it is not visible/usable from outside.
Disadvantage: Network administrators must parameterize routers and firewalls between the communicating nodes.

- Use of a dial-up router (e.g. NETLink® Router)

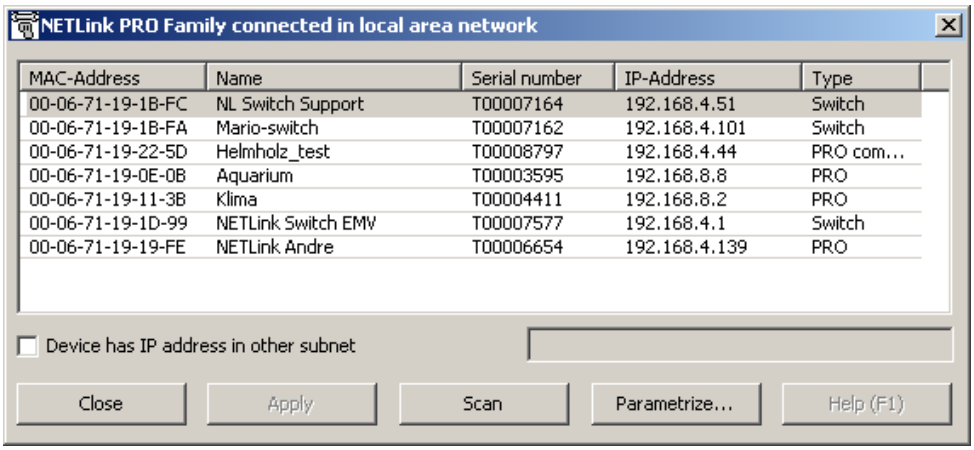
Advantage: relatively simple to implement if a phone connection is available.
Disadvantage: Loss of performance, additional costs due to phone charges, IP address can only be queried remotely via DynDNS services.

6 The Tool: '*NETLink® PRO Family Configuration*'

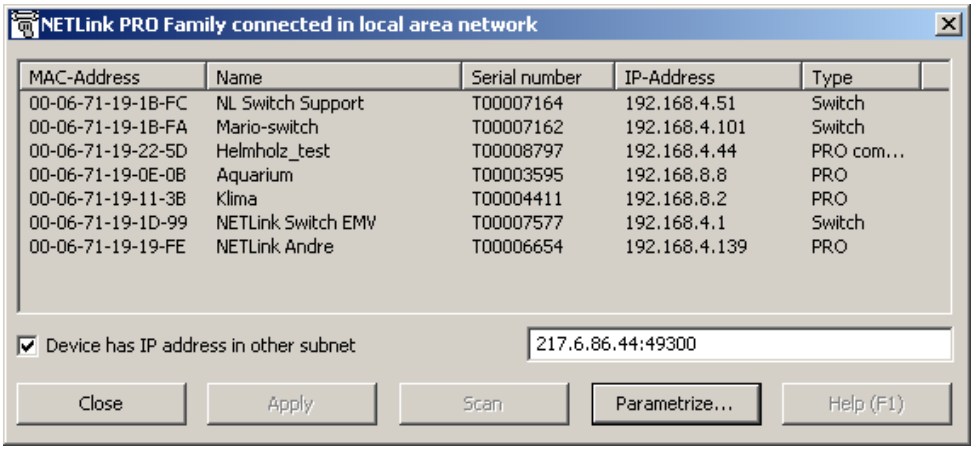
If no Simatic engineering tool is available on the parameterization computer that has installed the PG/PC interface, it is possible to configure the NETLink® PRO PoE via the integrated web interface (see Section 7.3) or via the separate configuration tool.

The tool is accessible under '*Start/Programs/Systeme Helmholz/NETLink-S7-NET/NETLink PRO Family Configuration*' after the NETLink-S7-NET driver has been installed.
After this program has been called, the network will be searched for connected NETLink® MAC addresses:

The set IP address of the connected NETLink® devices is not relevant for search function. The search function uses the device-specific MAC addresses. All other data in the list is for information only.



The scan can be repeated at any time by pressing the *"Scan"* button again. Having chosen any NETLink® adapter out of the provided list, it is possible to configure the device after clicking '*Parametrize...*' as described in Section 5.



An extended function enables direct parameterization across network boundaries. To do this, activate the radio button and enter the known IP address of the NETLink® (the example includes the optional address of the port – separated by a colon) in the empty field. The corresponding configuration menu then opens when *"Parameterize..."* is clicked.

7 Possibilities of the Web Interface

All NETLink have the IP address 192.168.4.49 on delivery from the factory.

If it has not been deactivated by the user, the web interface of the NETLink® PRO PoE can be opened with any standard browser (e.g. Internet Explorer, Firefox, Opera, etc.)

The web interface is intended to support the user intuitively with information and configuration tasks.

7.1 Home page

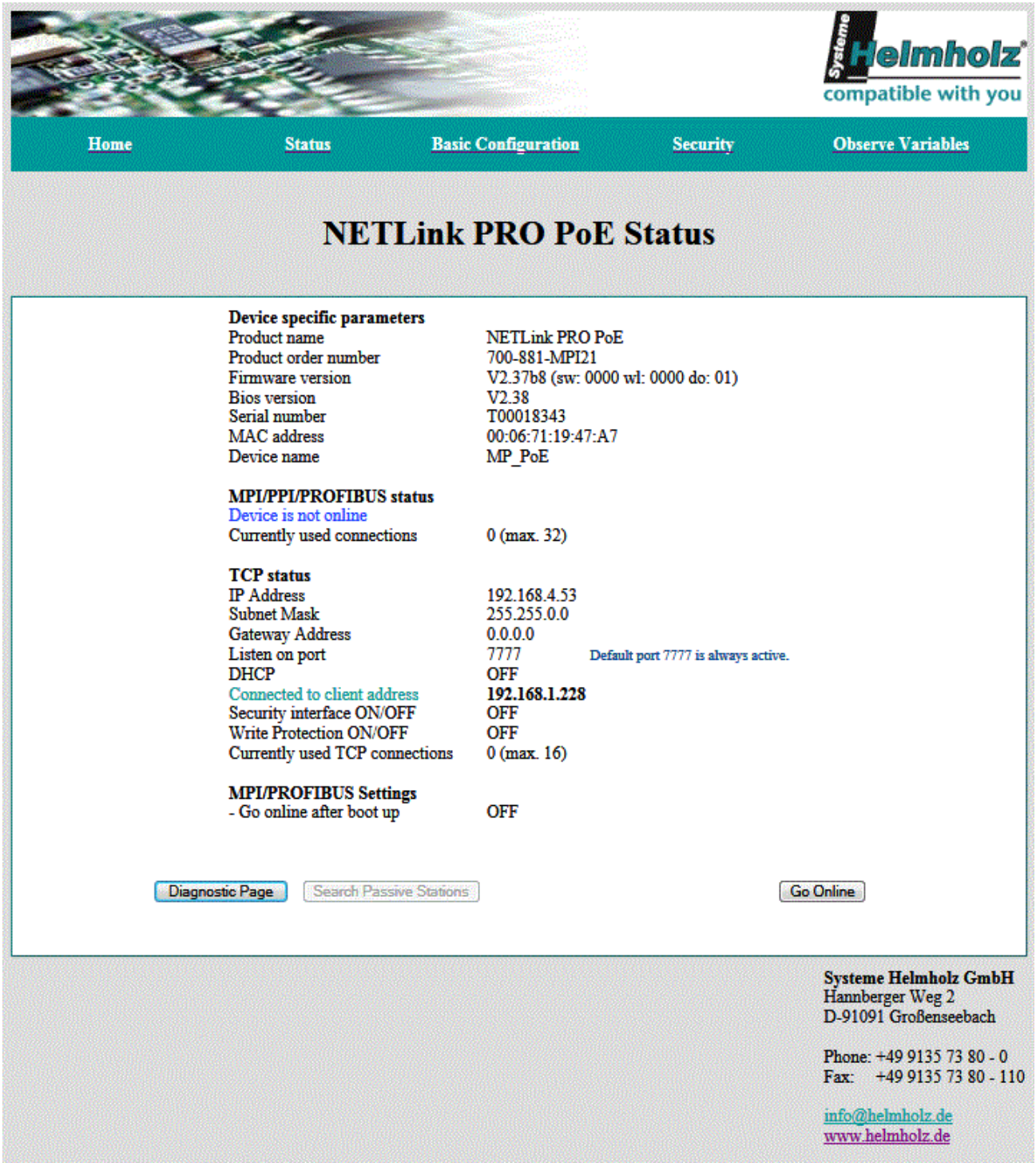
The home page, which is located at '*http://<ip-address>*,' is a basic address and navigation starting point for the user.

From this page you can go to the status page, to the Basic Configuration page, to the security page and, if the computer is connected to the Internet, to the web site of Systeme Helmholz GmbH.

The page also shows the contact data, such as postal address, phone and fax number, e-mail and web address.

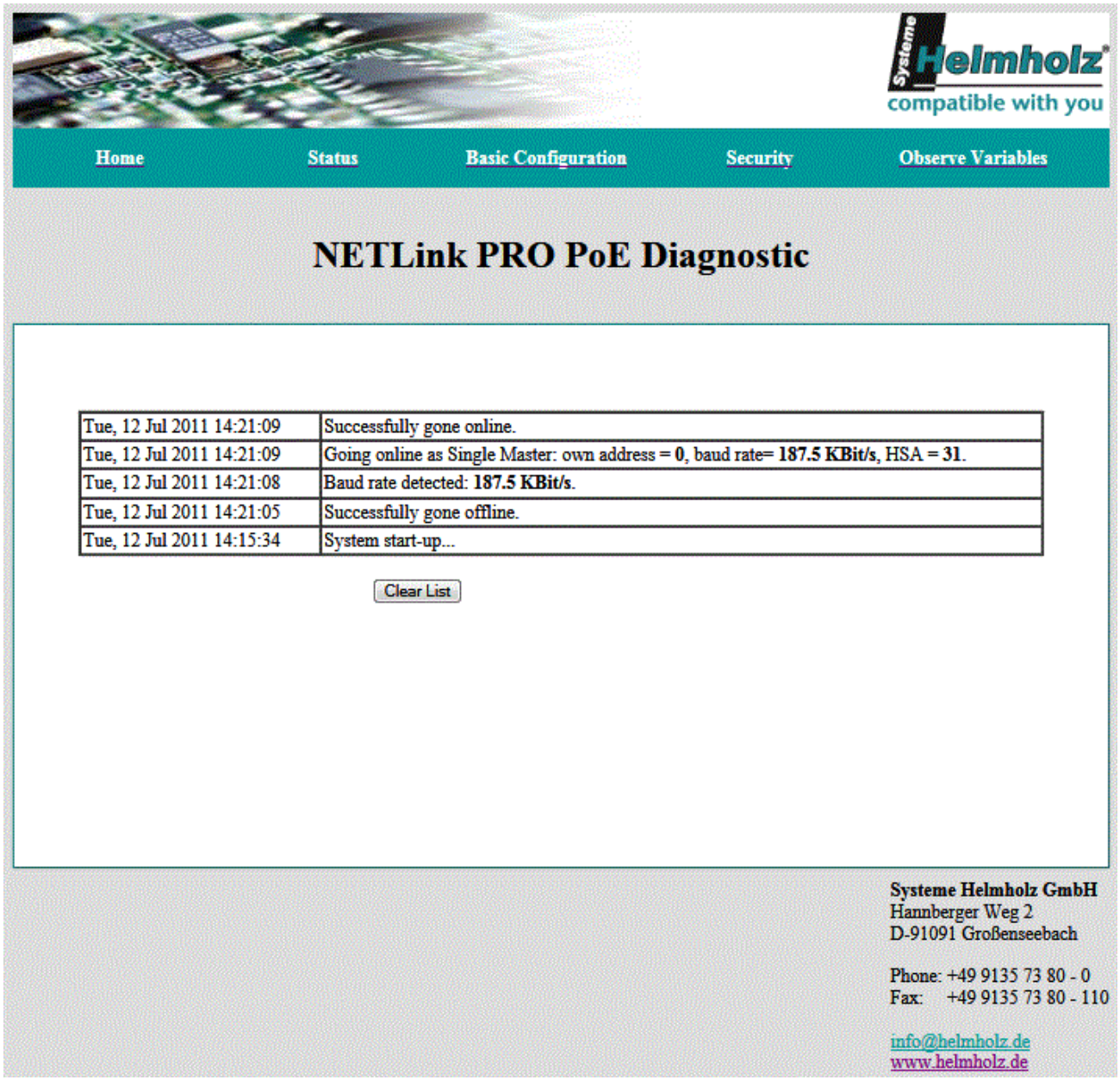
7.2 Status page

The status page, accessible via a link on the home page, provides the user with information without allowing unauthorized reconfiguration of the NETLink® PRO PoE.



The page provides general information (e.g. firmware version, number of possible connections, etc.), and specific information (baud rate, active stations, DHCP status, etc.). A "*Diagnostic Page*" is also implemented, which can be useful for troubleshooting, for example. To make use of this function, "*Go Online*" must be activated for the NETLink® PRO PoE on the bus system. This can be

done with an engineering tool such as STEP7 or by using the "*Go Online*" button on the status page. This function can also be switched on permanently on the *"Basic Configuration"* page (see Section 7.3).

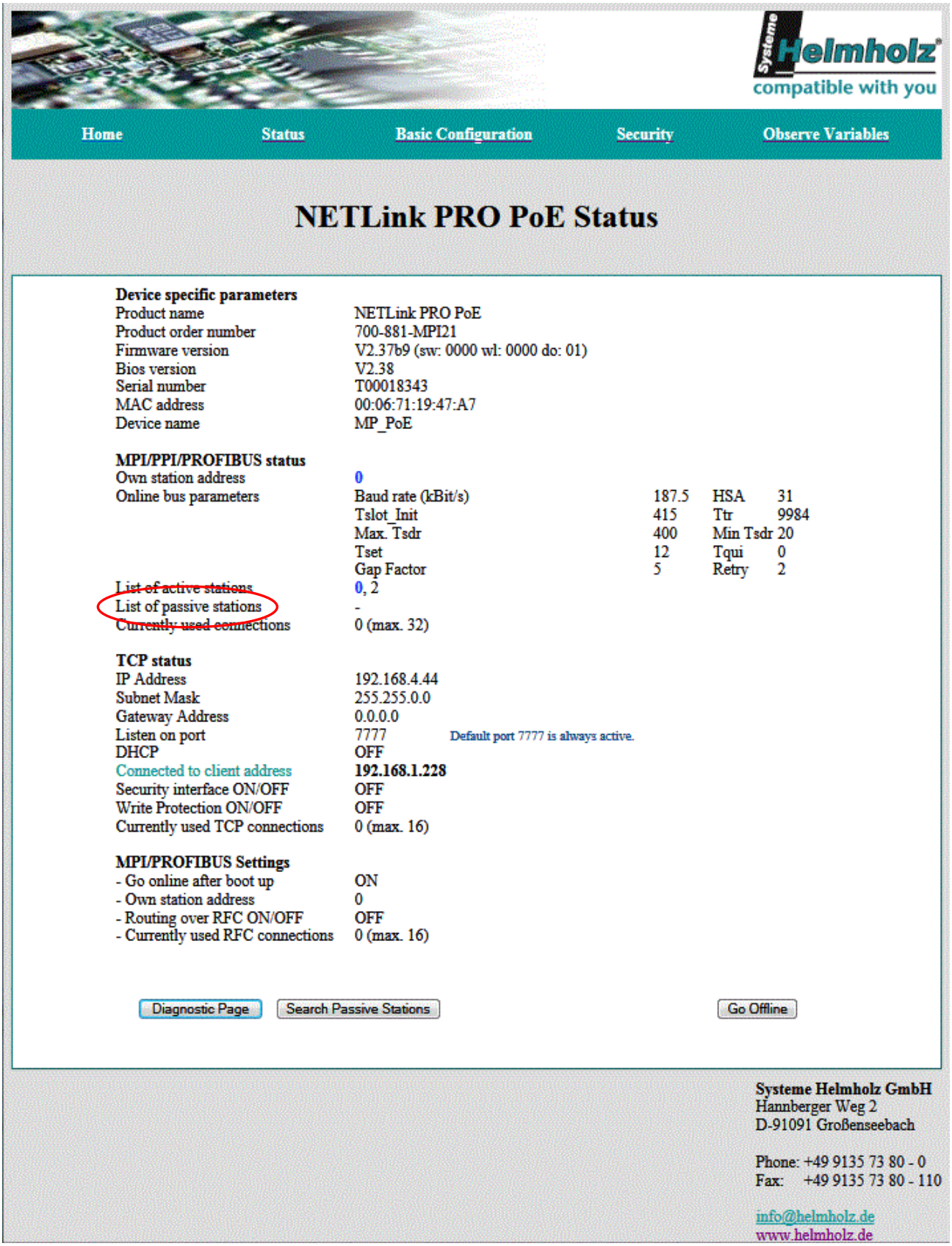


The values shown here are volatile!

When the *"Diagnostic Page"* button is pressed, if the bus system is correctly connected, a list of the currently most important communications parameters will be shown. For a better overview, the table can be emptied with the *"Clear List"* function before a new list is requested.

Because the NETLink® PRO PoE is also active as a single master, it is also possible to search for passive stations only. The search is started by clicking *"Search Passive Stations."* The updated status of verified stations is then displayed.

The result is entered in line: *List of passive stations.*



All displayed elements are shown below in the form of a table.

All the relevant contents appear in the displayed configuration, which means that the NETLink® PRO PoE has signed onto the bus system (is online).

Device-specific parameters:

Product name	NETLink® PRO PoE
Product order number	700-884-MPI21
Firmware version	e.g. V2.30
BIOS version	e.g. V2.240
Serial number	e.g. T00008797
MAC address	e.g. 00:06:71:19:22:5D
Device name	This shows the freely selectable name of the NETLink® PRO PoE, if a name has been assigned.

Bus-specific parameters:

Own station address	If the NETLink® PRO PoE is active on the bus, this is the device's own station address.
Online bus parameters	If the NETLink® PRO PoE is active on the bus, this is the explanation of the bus parameter set, this is transmitted by a CPU.
List of active stations	If the NETLink® PRO PoE is active on the bus, this is the list of the stations that are currently active. The device's own address is shown in red.
List of passive stations	After a search request by a user, a list of passive stations is output here.
Currently used connections	If the NETLink® PRO PoE has opened at least one bus connection, the exact count of open connections will be displayed.

TCP-specific parameters:

IP Address	The currently used IP address of the NETLink® PRO PoE is shown (e.g. 192.168.4.44).
Subnet Mask	The currently used subnet mask of the NETLink® PRO PoE is shown (e.g. 255.255.0.0).
Gateway Address	If it has been set by the user, the standard gateway currently used will be displayed here (e.g. 192.168.1.1).
Listen on Port	Port or ports via which the NETLink® PRO PoE can be reached by the PG/PC interface.
DHCP (- DHCP timeout)	Shows whether the DHCP is activated or not (ON or OFF). In active mode, the DHCP timeout is also displayed here.
Connected to client address	IP address of the computer that has just established a connection to the NETLink® PRO PoE.
Security interface ON/OFF	Indicates whether the IP address access protection is activated.
Currently used TCP connections	If the NETLink® PRO PoE has opened at least one TCP or RFC1006, the exact count of open TCP connections will be displayed here (maximum value shown in brackets).

Bus-specific settings:

- Go online after boot up	Shows whether the function for automatic connection is activated or not (ON or OFF).
- Own station address	Indicates the local station address. This is the address with which the NETLink® PRO PoE will participate in the bus cycle.
- Routing over RFC ON/OFF	Indicates whether Routing over RFC (ON) or addressed mode (OFF) is used (for details, see Section 9.2).
- Currently used RFC connections	If the NETLink® PRO PoE has opened at least one TCP or RFC1006, the exact count of open connections will be displayed here (maximum value shown in brackets).

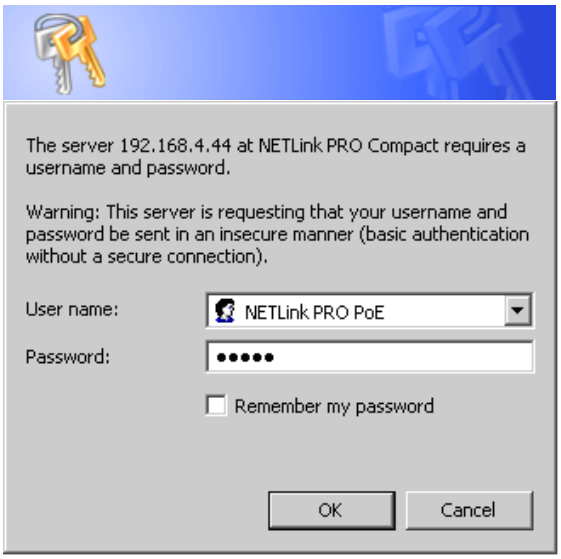
7.3 Configuration page

The configuration page, accessible via a link on the home page, is a configuration interface for the user.

The default user name is "NETLink PRO PoE"

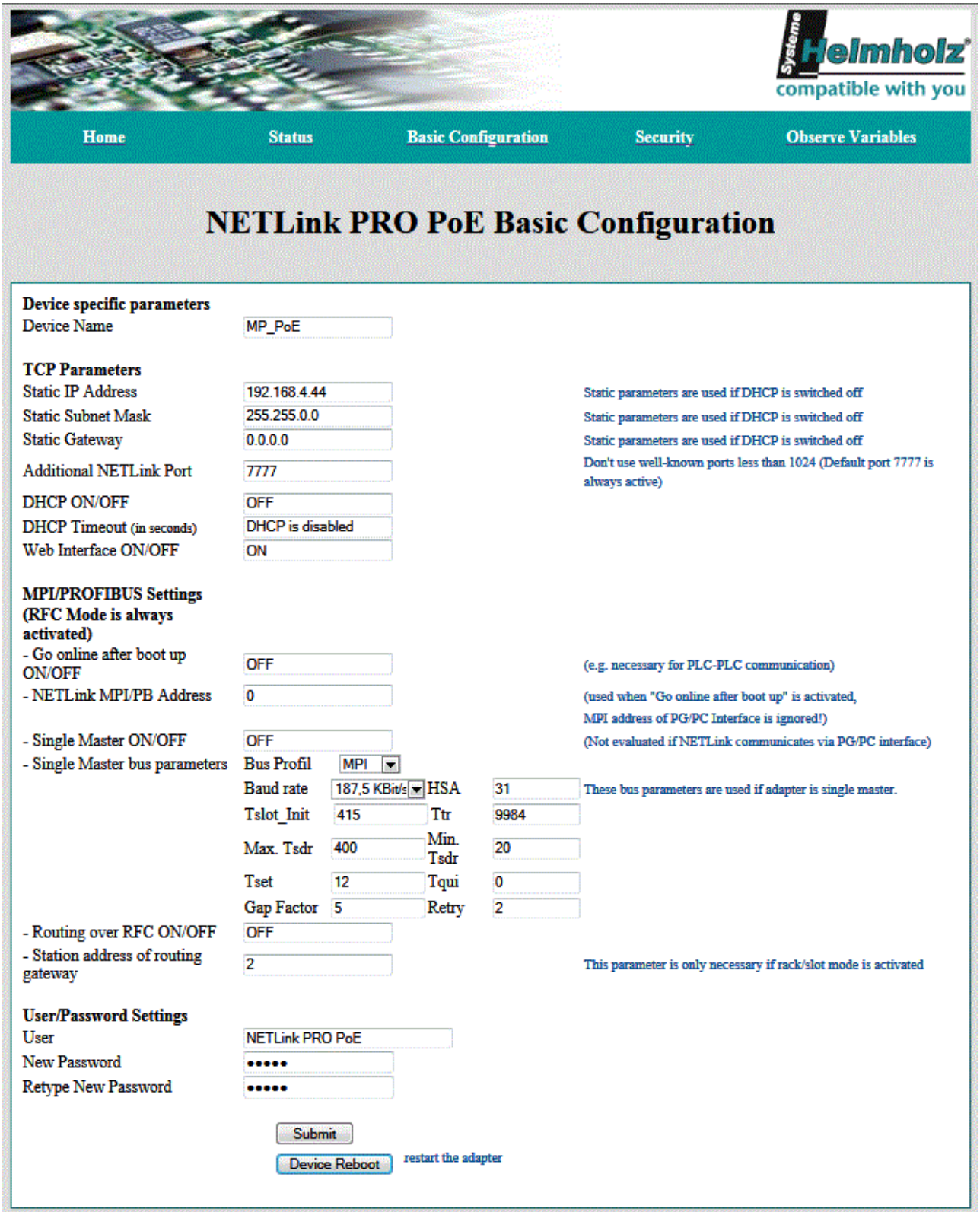
The default password is 'admin.'

Before this page is opened, the user name (default: *NETLink PRO PoE,* if no user-defined user name is entered) and the password (*admin* if no user-defined password has been set) must be entered.



The confirmation prompt is case sensitive. So you must remember which upper and lower case letters you used.

As soon as you have answered the security query, you will have write access to all parameters.



The bus parameters can also be adapted to the single master functionalities. For further details on the RFC1006 function see Section 8.

Device-specific parameters:

Device name	Name consisting of max. 20 alphanumeric characters.

TCP parameters:

Static IP address	IP address that is used if DHCP is deactivated or the DHCP timeout elapses.
Static subnet mask	Subnet mask that is used if DHCP is deactivated or the DHCP timeout elapses.
Static gateway	Gateway that is used if DHCP is deactivated or the DHCP timeout elapses.
Alternative NETLink Port	In addition to the standard port, a further freely selectable port can be stored here in the NETLink® PRO PoE.
DHCP ON/OFF	Automatic fetching of address parameters from a DHCP server ON or OFF.
DHCP Timeout (in seconds)	Possible range: 30 to 65535 seconds. Timeout is deactivated at 65535. In this case, there is no fallback mechanism, i.e. it is essential that a DHCP server is accessible!
Web-Interface ON/OFF	Web interface is ON or OFF

Bus-specific parameters:

Go online after boot up ON/OFF	The need to go “online” immediately is largely only relevant when CPU-to-CPU communication is used.
NETLink MPI/PB Address	This is where the address with which the NETLink® PRO PoE will participate in the bus cycle is entered. Any address assigned at another location (e.g. by the SHS7-Net driver) is then ignored.
Single Master ON/OFF	Can be set to ON, if no other master is active on the bus. Thus, passive participants are directly accessible
Single Master bus parameters	The bus parameters specified here are used if the single master function is active.
Routing over RFC modus ON/OFF	Indicates whether the Routing over RFC mode (ON) or addressed mode (OFF) is used (for details, see Section 9.2).
Station address of routing gateway	If the Routing over RFC mode is activated, all incoming RFC1006 requests are routed to the bus address parameterized here.

For further information, see Section 9

User/password settings:

User	User name needed to sign on to the security-relevant pages of the NETLink® PRO PoE
New password	Password of max. eight characters
Retype new password	The password of max. eight characters must be entered a second time

Please remember that the user names/passwords that you have defined for this configuration interface cannot be reset by any “master reset”. Please contact our technical support if you are no longer able to access the safety-relevant pages of the Web interface with the access data known to you.

If you click the ‘*Submit*’ button, the inputs are checked for plausibility. You may then be shown which inputs are incorrect and what correct input would look like at this point.

If all entries are consistent, the changes are displayed again as they will now be stored non-volatilely in the NETLink® PRO PoE when you click the '*Store*' button again.

Rebooting can take up to 15 seconds.

After the changed parameterization data have been stored, the NETLink® PRO PoE is restarted to activate the desired configuration.

With the Web interface, NETLink® PRO PoE can be started both locally and remotely, as required. This is done by clicking the '*Device Reboot*' button.

7.4 Security page

The security page, which is also accessible via a link on the home page, is a configuration interface available to the user for limiting access.

After the security query (see 7.3) has been correctly answered, the user has write-access to all parameters that are implemented for TCP security etc.

If the TCP access list is switched on by entering '*ON*,' stations, TCP connections can be established with the NETLink® PRO PoE only from stations that have addresses configured in the table '*TCP address 1*' to '*TCP address 12*' (white list).

The IP addresses must be entered in the four-octet pattern (e.g. '*192.168.4.36.*') To clear or reset the TCP address setting, '*OFF*' must be entered.

TCP/IP addresses that are not in the white list have read-only access to the web interface. MPI, PPI, or PROFIBUS functionalities cannot be used. The configuration of the NETLink® PRO PoE is also prevented.

It is also possible to activate additional write protection for any bus nodes connected to the NETLink® PRO PoE. If the NETLink® PRO PoE is used, for example, as a communications adapter for representing visualization values, only data from the connected controllers can be read out if write protection is active. In this way, manipulation of the CPU sequential program is ruled out.

This assumes, of course, that the access data for the NETLink® PRO PoE web interface are secure.

Notice deviation by usage of proxy servers.

Attention: To prevent their use by unauthorized persons, any proxy servers that exist in company networks may not be entered in the white list. If so, safe use of the NETLink® PRO PoE is not guaranteed.

With the button '*Factory defaults*' it is possible to restore all parameters to the as-delivered state of the NETLink® PRO PoE. All user-defined configurations will be deleted by this function.

If you click the '*Submit*' button, the inputs are checked for plausibility. You may then be shown which inputs are incorrect and what correct input would look like at this point.

If all entries are consistent, the changes are displayed again as they will now be stored non-volatile in the NETLink® PRO PoE when you click the '*Store*' button again.

Rebooting can take up to 15 seconds.

After the new parameterization data have been stored, the NETLink® PRO PoE is restarted to activate the new configuration.

Parameters of the TCP access list:

TCP access list ON/OFF	Switch ON/OFF the functionality of the TCP access list.
TCP/IP address 1 and 2	First and second IP addresses that are allowed to access the NETLink® PRO PoE.
TCP/IP address 3 and 4	Third and fourth IP addresses that are allowed to access the NETLink® PRO PoE.
TCP/IP address 5 and 6	Fifth and sixth IP addresses that are allowed to access the NETLink® PRO PoE.
TCP/IP address 7 and 8	Seventh and eighth IP addresses that are allowed to access the NETLink® PRO PoE.
TCP/IP address 9 and 10	Ninth and tenth IP addresses that are allowed to access the NETLink® PRO PoE.
TCP/IP address 11 and 12	Eleventh and twelfth IP that are allowed to access the NETLink® PRO PoE.
SPS write Protection	PLC write-protection ON or OFF

NETLink® PRO PoE can be started both locally and remotely via the security interface. This is done by clicking the '*Device Reboot*' button.

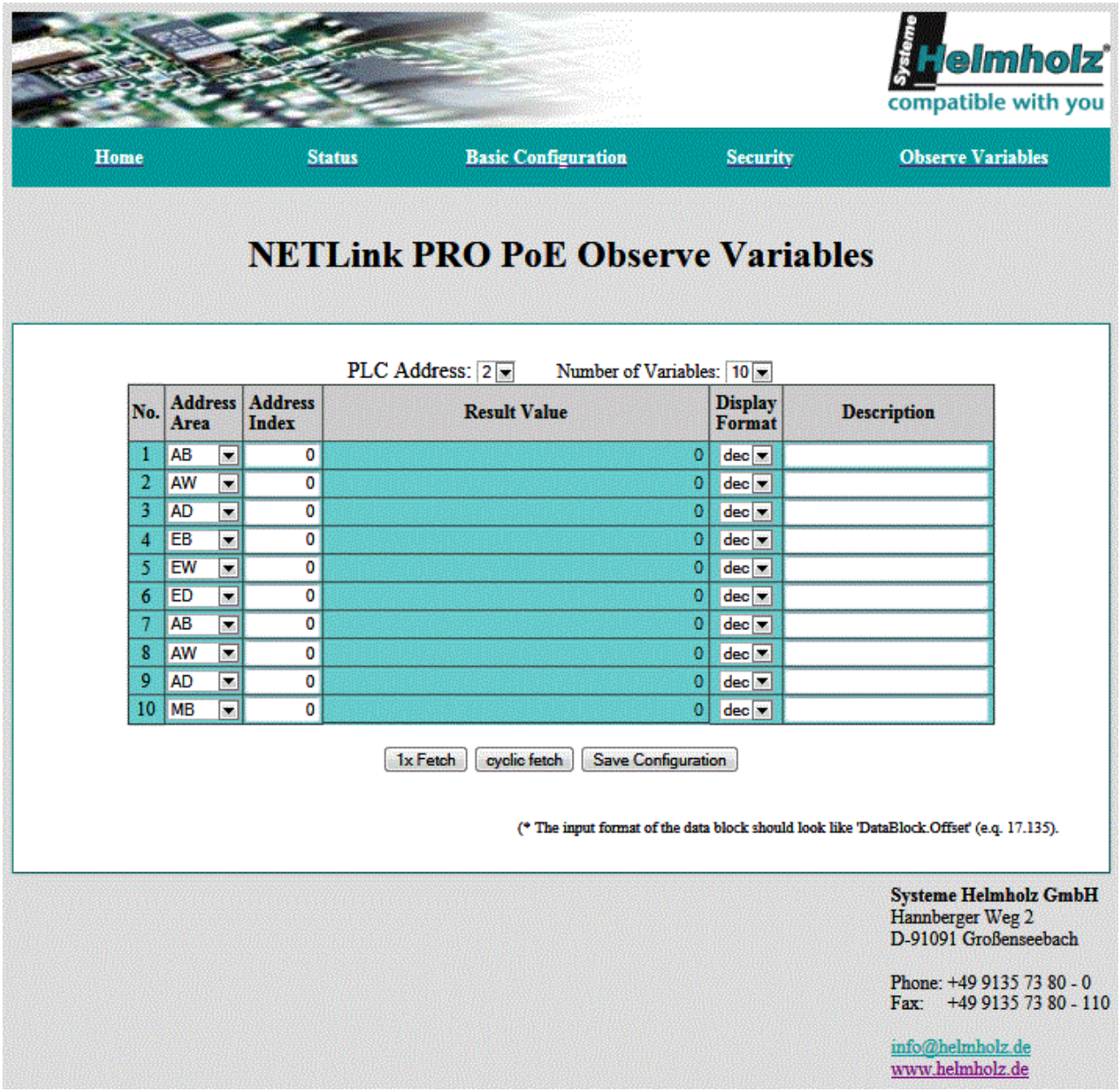
7.5 Observing variables

In addition to the "*Observing Variables*" function in the Simatic engineering tools, NETLink® PRO PoE also provides this function via the web interface.

Setting parameters of the observe variables function:

MPI address	An active MPI/PB address is selected using the dropdown menu.
Number of Variables	The number of variables to be observed can be selected from 1 to 10 for a clearer view.
No.	Consecutive numbering.
Address Area	The following viewable items are supported: OB, OW, OD, IB, IW, ID, MB, MW, MD, DBB, DBW, DBD, counter, and timer.
Address Index*	Address of the bytes to be displayed. * On the case of data blocks with the form "Datablock.Offset"
Result Value	If one of the buttons is pressed, the output value will be displayed here
Display Format	Display formats: decimal, hexadecimal, or binary
Description	Freely selectable description (max. 32 chars)

The operating menu can be accessed via the '*Observe Variables*' link. An RFC 1006 communications channel is assigned for these functions.



To display the desired values, you can use the '*1x fetch*' button for a single value update or '*cyclic fetch*' for a permanent online query.

With '*Save Configuration*', it is possible to store the screen form you have created with all the variables and their descriptions in the NETLink® PRO PoE.

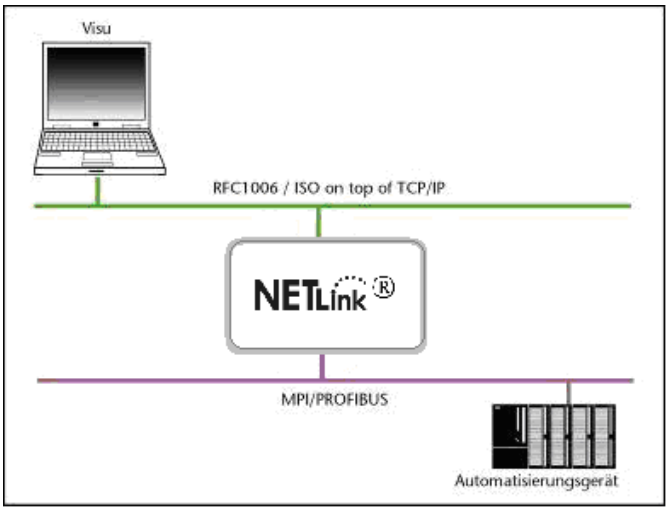
An example of display of various variables:

The value update is currently permanently set to 0.5 seconds. Even if multiple stations access this function from the TCP/IP end, only one connection resource is ever assigned in the NETLink® PRO PoE. Moreover, data exchange via MPI/PB and/or RFC 1006, the '*Observe Variables*' action has the lowest priority. The update time in the Web interface therefore depends on the concurrent bus load.

8 RFC1006 Function (S7-TCP/IP)

As an additional option, the NETLink® PRO PoE can implement the RFC1006 protocol (also known as S7-TCP/IP or as ISO on top of TCP). RFC mode is always active and does not have to be specifically enabled. The NETLink® PRO PoE automatically goes "*online*" as soon as it detects an RFC frame.

Because many visualization system manufacturers have implemented this protocol to implement connections with CPs from Siemens (e.g. CP343 or CP443), NETLink® PRO PoE with RFC1006 is a low-cost alternative to communication with these visualization systems.



The RFC1006 functionality of the NETLink® PRO PoE is also supported by S7-200 systems.

The following software packages with RFC1006 support have so far been tested in conjunction with the NETLink products:

- WinCC V6.0/V7.0 (Siemens AG)
- WinCC flexible 2005/2007/2008 (Siemens AG)
- ZenOn V6.2 (COPA-DATA)
- PROCON-Win V3.2 (GTI Control)
- S7-OPC Server, V3.1 and higher (Systeme Helmholz GmbH)
- AGLink V4.0 (DELTALOGIC Automatisierungstechnik GmbH)
- INAT-OPC-Server (INAT GmbH)
- WinCE 5.0 Terminal TP21AS (Sütron Electronic GmbH)
- KEPserverEx V4.0 (KEPware Inc.)
- InTouch V9.5 (Wonderware GmbH)

Systeme Helmholz GmbH provides additional documentation on the subject of SCADA, HMI, and OPC (example applications) (for information see 11.3).

!

Please also observe the application-specific instructions in Troubleshooting and possibly in other relevant documentation.

9 Bus Parameters in Single Master Operation

If the NETLink® PRO PoE is connected to a bus system on which no other master is active, the NETLink® generates the token itself. In which case it is then usually also necessary to adapt the relevant bus parameters.

The bus address with which the NETLink® PRO PoE signs onto the bus is entered in field "*NETLink MPI/PB Address*".

The value for this address may be anywhere in the range 0 through 126. It is a precondition for this that the selected address is not larger than the HAS (highest station address) and is not already being used for another device on the bus.

9.1 Storing specified bus parameters

For bus profiles MPI and PPI, no other adaptations besides the baud rate are usually necessary. However, the DP setting must be configured carefully.

When parameterizing, please note that all parameters for PROFIBUS are interdependent. That is, if a parameter, e.g. the baud rate, is changed, all the other parameters usually also change.

For MPI, on the other hand, all parameters besides the baud rate are fixed. That is, if an MPI connection of increased from, say, from 187.5 Kbps to 12000 Kbps, all other parameters can/must remain unchanged.

The following parameters must be taken into account:

- Baud rate: The required baud rate is entered in Kbps. For example *'187.5'* or *'12000'*. The possible values are: 9.6; 19.2; 45.45; 93.75; 187.5; 500; 1500; 3000; 6000, and 12,000.
- HSA The highest station address is entered here. For MPI generally *'31'* and for PROFIBUS *'126.'* However, any values can be used that are not equal to the default values.
- TSlot_Init This value is always '415' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.
- Ttr This value is always '9984' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.
- Max. Tsdr This value is always '400' for MPI – whatever the baud rate. For PROFIBUS

the appropriate value should be read from the PROFIBUS project.

- Min. Tsdr — This value is always '20' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.
- Tset — This value is always '12' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.
- Tqui — This value is always '0' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.
- Gap — This value is always '5' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.
- Retry — This value is always '2' for MPI – whatever the baud rate. For PROFIBUS the appropriate value should be read from the PROFIBUS project.

Incorrect bus parameters can interfere with the bus considerably!

Please note that under unfavorable circumstances an incorrectly parameterized NETLink® PRO PoE can interfere with the bus to the extent that regular bus operation is no longer possible.

9.2 Addressing with Routing over RFC

RFC1006 connections are virtual point-to-point links, that is, links from the PC to the programmable controller (possible branching within the programmable controller is handled by the CPU => Routing).

Because NETLink® PRO PoE is a point-to-multipoint communication adapter ('PC to NETLink® PRO PoE ' on the one hand and 'NETLink® PRO PoE to many bus stations' on the other hand), it was necessary to implement different addressing methods to permit all communication variations.

The addressing methods are *'Addressed Mode'* (see Section 9.2.1) and *'Routing over RFC'* (see Section **Fehler! Verweisquelle konnte nicht gefunden werden.**).

These two addressing methods, which are mutually exclusive, permit most types of communication that are also possible via the NETLink-S7-NET.

9.2.1 Addressed mode

If different CPUs are to be accessed on the same MPI/PROFIBUS via RFC1006, addressed mode is suitable.

If this mode is used, the following setting must be parameterized on the configuration page of the Web interface.

- *‚Routing over RFC'* must be deactivated (OFF)
  ⇨ Addressed Mode is active

The destination address now has to be entered in the RFC1006 driver of the Windows application (e.g. WinCC, see Section 9.3.1) instead of the rack and slot.

Please note that the rack and slot together fill only one byte which is divided as follows:

- Rack fills the upper three bits
  (11100000_{bin} for Rack 7, Slot 0)
- Slot fills the lower five bits
  (00011111_{bin} for Rack 0, Slot 31)

If you now want to communicate with destination address 2, the following has to be entered:

Rack 0, Slot 2.

If you want to communicate with destination address 49, on the other hand, the following has to be set:

Rack 1, Slot 17.

Section 11.3.2 contains a table were you can read off already converted values for the rack and slot.

There are also parameterization tools that do not provide fields with names like rack and slot. These tools normally have a parameterization field with a name such as Remote TSAP that is usually two bytes long and in hex format. This field, in which only the lower byte is of interest, is parameterized as follows:

If you want to communicate with destination address 2, the following has to be entered:

Remote TSAP 0202_{hex}.

If you want to communicate with destination address 49, on the other hand, the following has to be set:

Remote TSAP 0231_{hex}.

Section 11.3.2 contains a table were you can read off already converted values for the Remote TSAP.

The formula *Rack * 32 + Slot = Address* can be used for simplicity.

9.2.2 Routing over RFC (Rack/Slot mode)

In Routing over RFC mode, it is possible to access specific modules of the automation system.

This is achieved by only communicating directly with one, pre-parameterized station. This station routes the data packets not intended for it to the required rack/slot and routes the response back to the NETLink® PRO PoE.

This makes it possible, for example, to communicate in S7-400 systems with more than one CPU on a rack (⇨Multicomputing) without having to attach further CPUs to the bus.

To use this functionality, it is necessary to parameterize the following on the configuration page of the Web interface:

- *‚Routing over RFC mode'* must be enabled (ON)
- For *'STATION ADDRESS OF ROUTING GATEWAY'*, the address of the required communication partner must be entered.

No special aspects have to be observed in the visualization system. The settings for the rack and slot or remote TSAP must be made as the described for the specific visualization system.

Section 9.3.1 explains addressed mode using WinCC as an example.

9.3 Example of configuration for WinCC V7.0

The basic parameterization of RFC1006 connections in visualization systems is explained here using the example of the WinCC V7.0 tool from Siemens AG.

It is assumed you are familiar with the development environment of WinCC, so that only points relating specifically to the connection need to be mentioned.

Because it is the Windows RFC1006 driver that is parameterized, all elements you will see in the WinCC example can also be found in similar form on other visualization systems/OPC servers that support RFC1006.

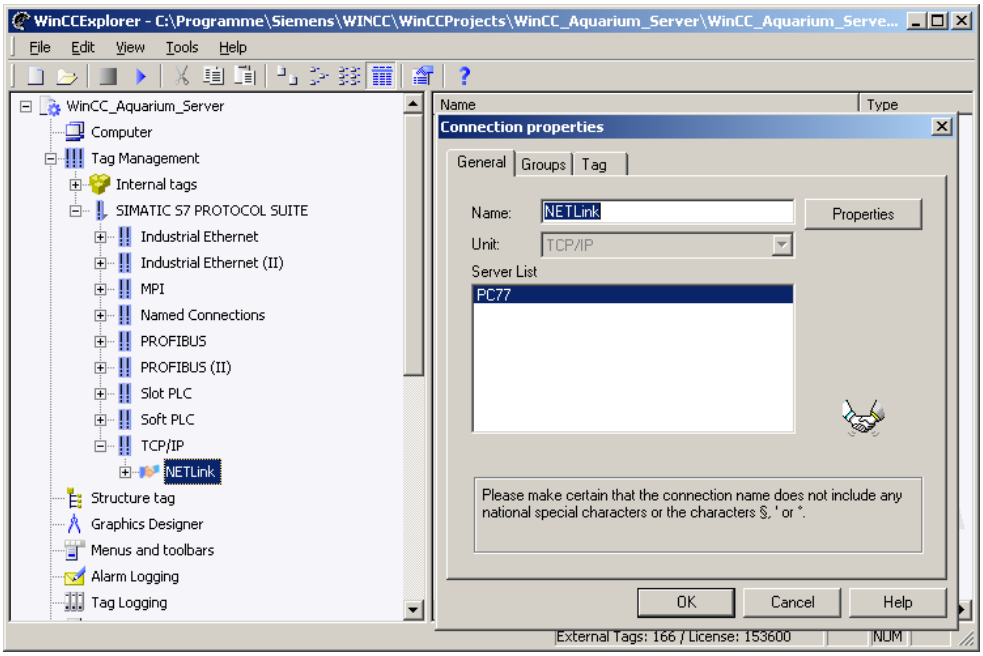
To explain the special aspects of communication with the NETLink® PRO PoE, the same connection is explained once for addressed mode (see Section 9.3.1) and again in Routing over RFC mode (see Section 9.3.2).

9.3.1 Using addressed mode

For the basics of addressed mode at the NETLink® PRO PoE end, see Section 9.2.1.

To parameterize a RFC1006 link in a WinCC project, a new TCP/IP link must first be created in the *'SIMATIC S7 PROTOCOL SUITE.'*

Here, this connection is called *'NETLink.'*

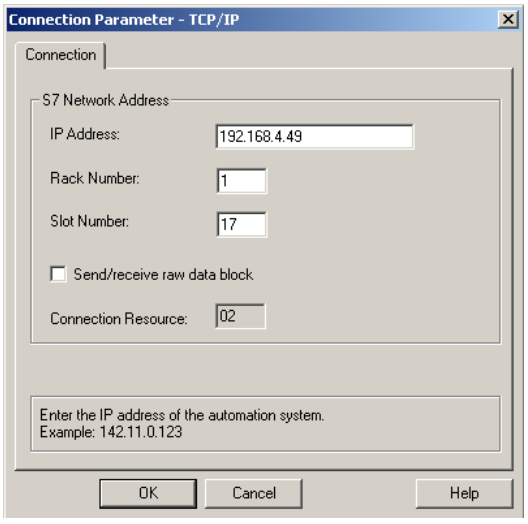


A click on '*Properties*' takes us to a setting form in which the IP address of the NETLink® PRO PoE and the rack/slot combination of the destination have to be entered.

All NETLink have the IP address 192.168.4.49 on delivery from the factory.

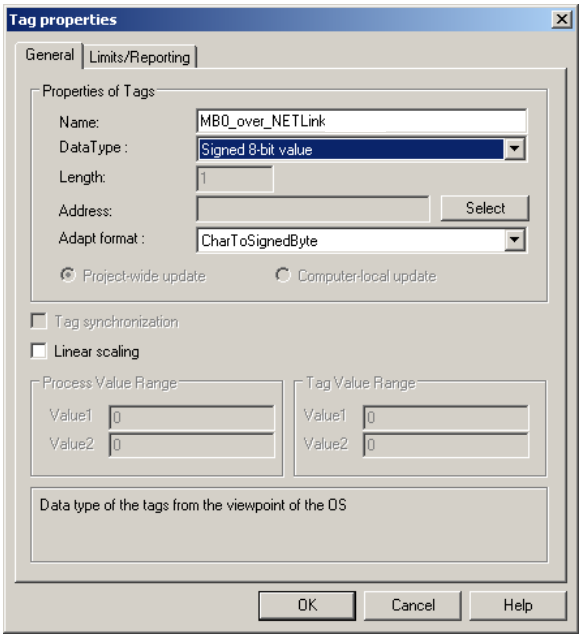
In this case, the NETLink® PRO PoE has the IP address 192.168.4.49.

The destination CPU with which we want to communicate has the PROFIBUS address 49. Because addressed mode is to be used, we can read off the correct value for the rack and slot from the table in Section 11.3.2.



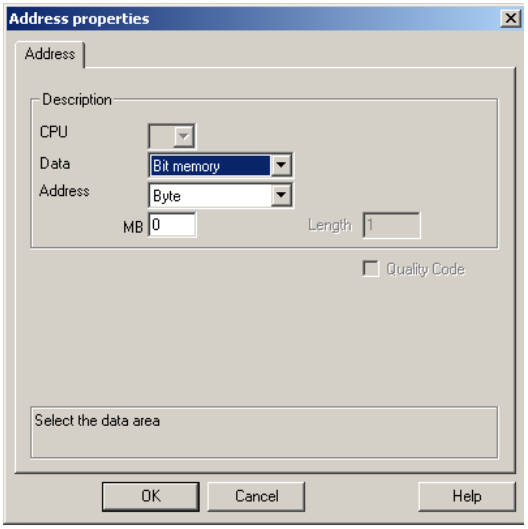
Under this connection we have just configured, we now have to create a variable.

This is done by right-clicking to open the context menu of the new connection and selecting *'New variable...'*.

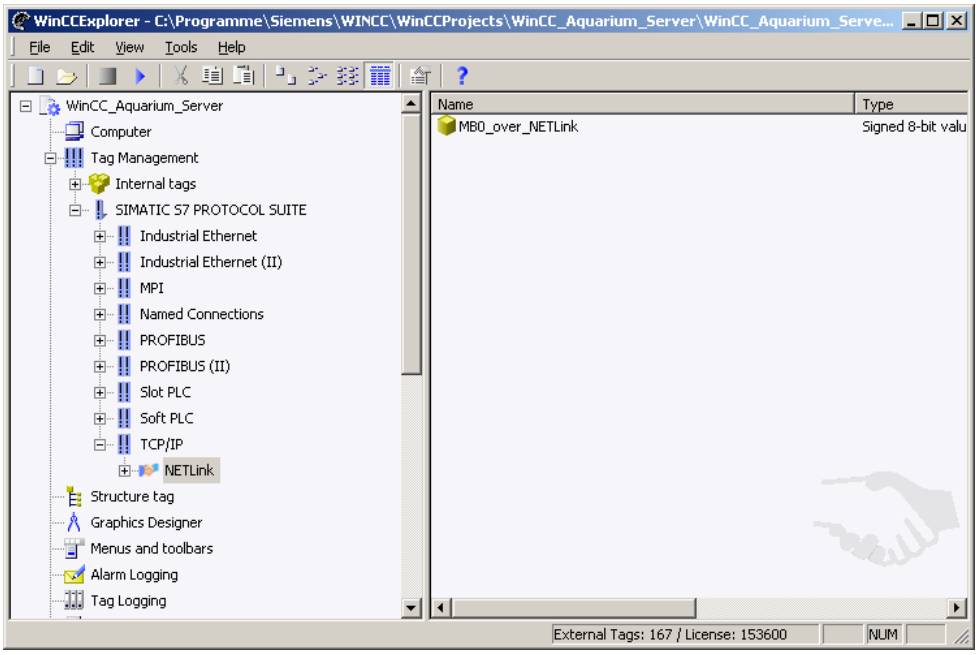


In the properties window of the variable, which was named *'MB0_over_NETLink'* in this case, we can now select the type of variable by clicking the *'Select'* button.

Marker byte 0 is configured here.



The following screenshot shows that a variable named *'MB0_over_NETLink'* now exists under the *'NETLink'* connection.



If this variable is now included in the initial screen of the WinCC project, for example, a connection will be established to the CPU with address 49 via the NETLink® PRO PoE to read or write marker byte 0 from this address.

Further variables of different types can, of course, be created and used according to the same scheme.

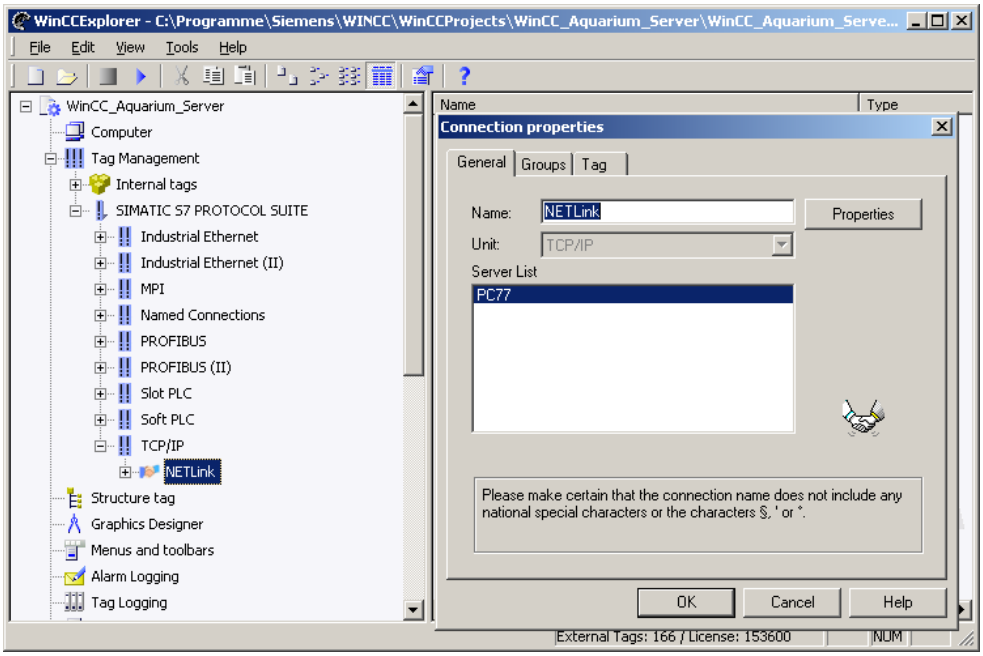
It is also possible to create additional TCP/IP connections in order to communicate not only with the CPU with bus address 49 but also with other CPUs.

9.3.2 Use of Routing over RFC mode

For the basics of Routing over RFC mode at the NETLink® PRO PoE end, see Section **Fehler! Verweisquelle konnte nicht gefunden werden.**.

To parameterize a RFC1006 link in WinCC, a new TCP/IP link must first be created in the *'SIMATIC S7 PROTOCOL SUITE.'*

Here, this connection is called *'NETLink.'*



A click on '*Properties*' takes us to a setting form in which the IP address of the NETLink® PRO PoE and the rack/slot combination of the destination have to be entered.

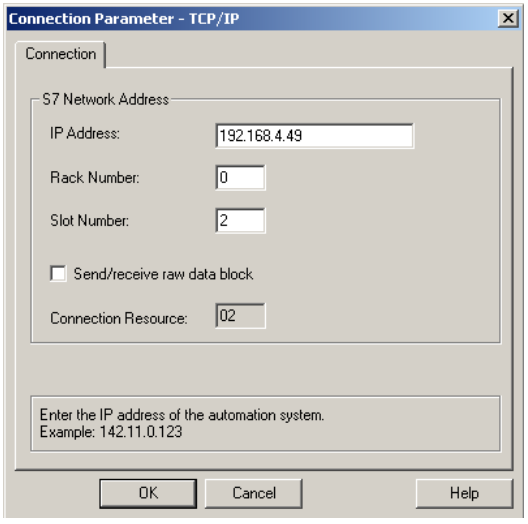
In this case, the NETLink® PRO PoE has the IP address 192.168.4.49.

The destination CPU with which we want to communicate is in Rack 0 on Slot 2. Because Routing over RFC mode we are going to use, WinCC does not have to announce the CPU address. Instead, the real values for rack and slot are specified, in this case rack 0 and slot 2.

Please note that the destination address, 49 in this case, must now be announced to the NETLink® PRO PoE via the Web interface.

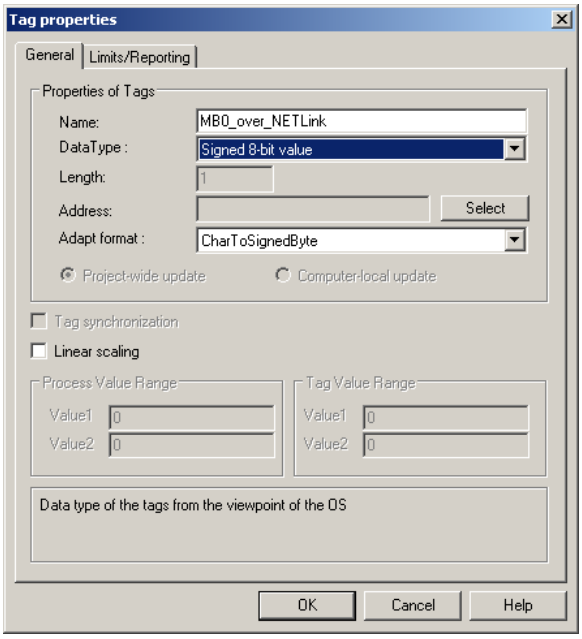
All NETLink have the IP address 192.168.4.49 on delivery from the factory.

Remember to parameterize the NETLink® PRO PoE.



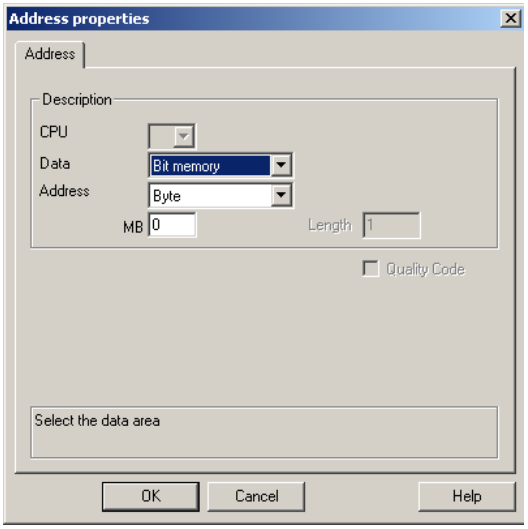
Under this connection we have just configured, we now have to create a variable.

This is done by right-clicking to open the context menu of the new connection and selecting *'New variable...'*.

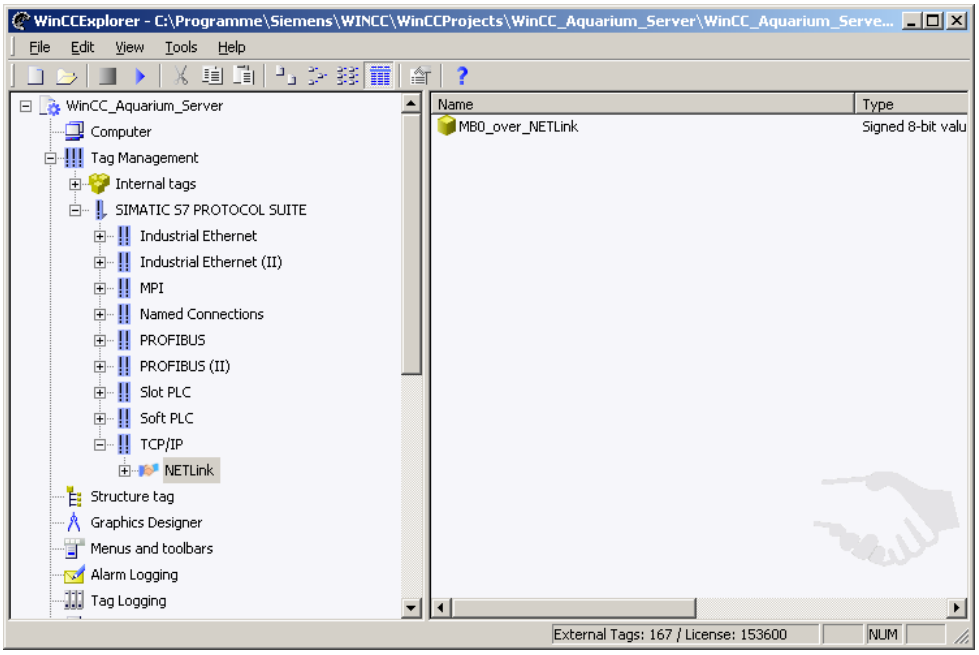


In the properties window of the variable, which was named *'MB0_over_NETLink'* in this case, we can now select the type of variable by clicking the *'Select'* button.

Marker byte 0 is configured here.



The following screenshot shows that a variable named *'MB0_over_NETLink'* now exists under the *'NETLink'* connection.



If this variable is now included in the initial screen of the WinCC project, for example, a connection will be established to the CPU with address 49 via the NETLink® PRO PoE to read or write marker byte 0 from this rack 0, slot 2.

Further variables of different types can, of course, be created and used according to the same scheme.

It is also possible to create additional TCP/IP connections in order to communicate not only with rack 0 / slot 2, for example, but also with rack 0 / slot3. However, all the communication must go via bus address 49.

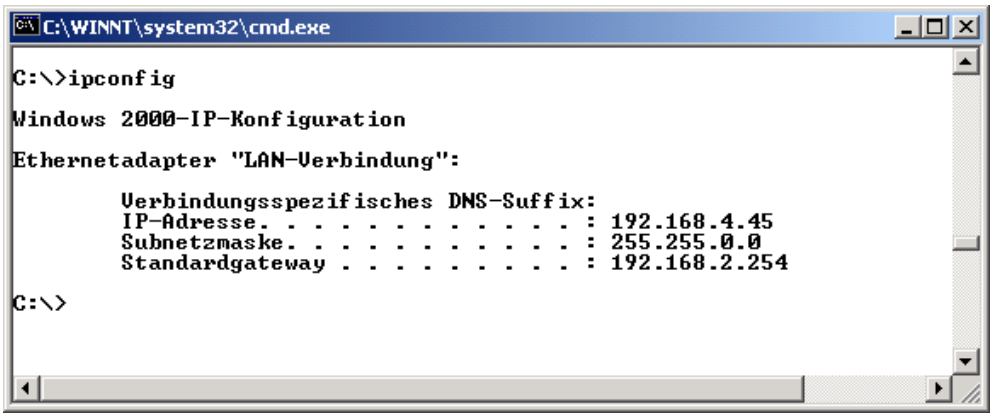
10 Troubleshooting

The points described here show some typical errors that can occur in day-to-day work with the NETLink® PRO PoE.

If any condition during operation is not described here and this manual does not provide any information on how to remedy it, the support of Systeme Helmholz GmbH is available to help you.

Q: I don't know the IP address of my computer.

A: Enter the command '*ipconfig*' after the prompt to show the configuration of the Ethernet interfaces of your computer.



Q: My computer has a firewall. Which ports must I release?

A: The NETLink-S7-NET driver communicates with the NETLink® PRO PoE via TCP port 7777.
UDP ports 25342 and 25343 are also used to search for the NETLink® PRO PoE devices.
Please release at least port 7777 so that the basic functionality of the driver is available.
If you use the RFC1006 functionality (also known as S7-TCP/IP), port 102 must also be released.
ATTENTION: If you want to use the driver option '*Internet teleservice*' (see Section 5.2.1), the specific ports configured there must also be released because this port will be used instead port 7777.

The default user name is "NETLink PRO PoE"

The default password is 'admin.'

Q: Both the configuration tool and the web interface ask me for a password and a user name. But I have never assigned a user name or password.

A: If no user name and/or password were/are specified, the default user name *'NETLink PRO PoE'* and the default password '*admin*' are applied.

Q: Once the configured PROFIBUS slaves have been added on my CPU, communication between NETLink® PRO PoE and STEP7 becomes markedly slower.

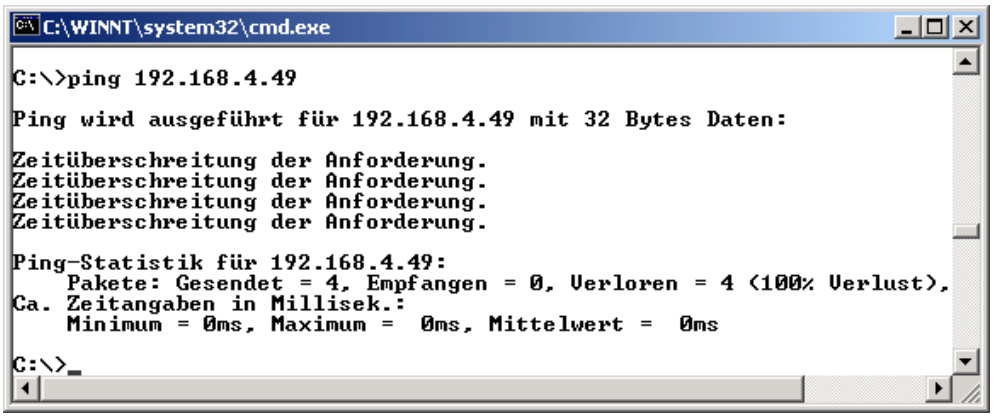
A: The user can influence the allocation of *'cycle load due to communication [%]'* under object properties of the CPU in the hardware configuration. The default value is 20 %.

Q: I get an error message when I access the controller.

All NETLink have the IP address 192.168.4.49 on delivery from the factory.

A: The problem may be the setting of the PG/PC interface (e.g. PROFIBUS instead of MPI, address already allocated, etc.) or the NETLink® PRO PoE if it is not connected or not accessible at this IP address.

Make sure you have set the IP address correctly in the driver configuration. Please also enter the command *PING <IP address>* at the DOS prompt to check whether the NETLink® PRO PoE can also be accessed physically via the network.



Q: The setting dialog boxes are not appearing in the Simatic Manager:

A: Please note that after initial installation the NETLink-S7-NET driver must be added to the PG/PC interfaces.
Make sure you had administrator rights during installation. Reboot your PC after installation if prompted to do so.
You need at least version 5.1 of the Simatic Manager.

Q: The Starter program has problems accessing a Micromaster drive.

A: When you request a *'control priority'* for the Micromaster drive, please increase the Failure monitoring from 20ms to 200ms and the Application monitoring from 2000ms to 5000ms, so that the Starter software remains operable.

Q: Every time I execute a certain function, it fails and the red LED flashes.

A: An exception has occurred in communication. Please contact support and describe how the error can be triggered. The support team will attempt to solve the problem as quickly as possible.

Q: If I set the NETLink® PRO PoE to auto baud in the PG/PC interface and try to go online, the active LED lights up briefly before a message appears telling me that the bus parameters cannot be determined.

A: Either the CPU used does not support the cyclic transmission of bus parameters (disabled via parameterization or function does not exist), or the CPU is so busy with general communication tasks that the lower-priority bus parameter frame is transmitted too infrequently and cannot be detected by the NETLink® PRO PoE.
Please deactivate the auto baud functionality in the NETLink-S7-

NET driver (PG/PC interface) and set the correct baud rate and the correct profile.

Q: I use the Routing over RFC mode of the RFC1006 interface (Routing over RFC mode = ON) and have specified address 2 for my existing CPU in the Web interface in *'STATION ADDRESS OF ROUTING GATEWAY'*.
Although NETLink® PRO PoE online is active (active LED lights up), my visualization system tells me that no link can be established.

A: Make sure you have assigned the correct values to rack and slot in the parameterization. For example, to communicate with a CPU in a 300 rack, you must enter '0' for rack and '2' for slot. Many visualization system manufacturers have grouped together the two fields. In that case, there may be a field with the name 'Remote TSAP' containing a hex value such as '0102.' In this case, the hex value '02' stands for rack 0 and slot 2.

Q: I would like to use addressed mode of the RFC1006 interface (Routing over RFC mode = OFF) because that way I can access several CPUs on the same bus. Unfortunately I am not sure how to parameterize the fields rack and slot in the visualization used.

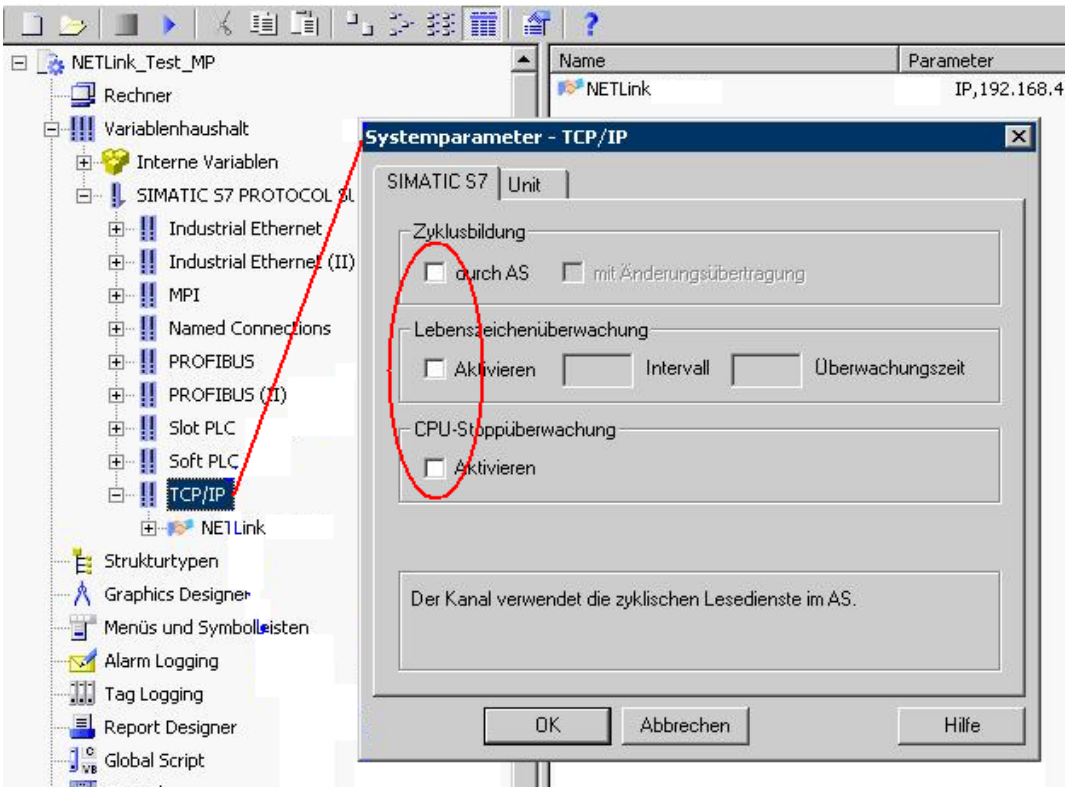
A: If addressed mode is used, a combination of rack and slot specifies the destination address of the automation system.
If the CPU is to be addressed with bus address 2, the value 0 for the rack and the value 2 for the slot must be entered.
Please note that the rack field consists of three bits and the slot field of five bits – i.e. together they comprise one byte and eight bits. That means, for example, the value 1 (00000001_{Bin}; 01_{Hex}) in the rack field must be entered for bus address 49 (00110001_{Bin}; 31_{Hex}) and the value 17 (00010001_{Bin}; 11_{Hex}) in slot field.
For parameterization tools that offer a field with a name like *'Remote TSAP'* for parameterization instead of separately parameterizable rack and slot fields, the value of the bus address can be entered directly without being taken apart and converted.
For example, for bus address 2, the hex value *'0102'* can be entered and for bus address 49 the hex value *'0131.'*
An address conversion table is given in Section 11.3.2 to simplify this task.

Q: If I mix RFC1006 connections and connections via the STEP7 driver, the link sometimes breaks off or error messages appear saying that it is not possible to establish a link.

A: For communication with S7-300 modules it may be necessary to parameterize the communication resources.
The user can influence the allocation of existing *'connection resources'* under object properties of the CPU in the hardware configuration.

Q: The variables from my S7 200 CPU are not updated in my WINCC project.

A: The default settings of the system parameters in register *SIMATIC S7* for *Cycle Formation, Sign-of-Life Monitoring* and *CPU-Stop Monitoring* must be deactivated.



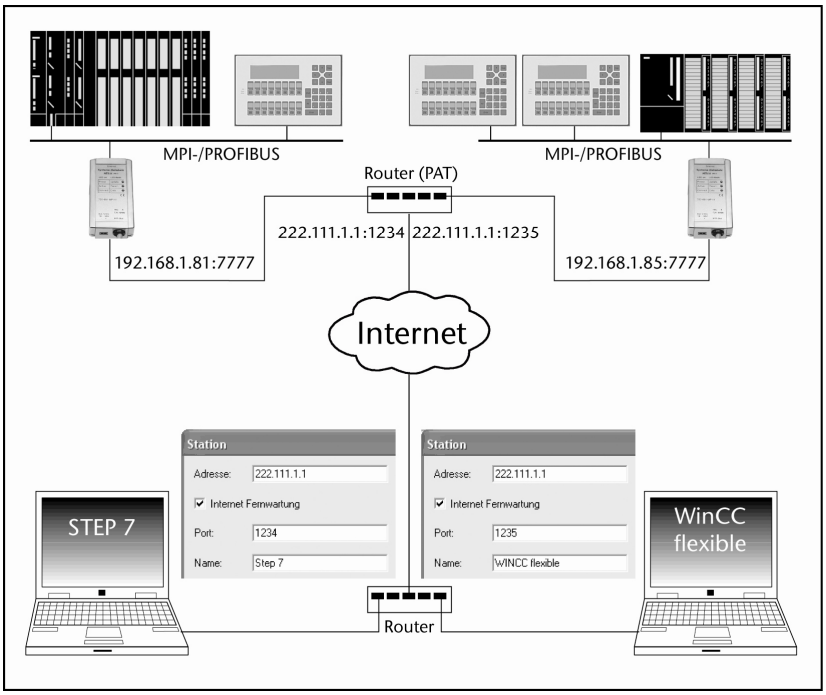
Q: When the adapter is plugged onto the PROFIBUS, no online connection is possible.

A: If possible, use the auto baud functionality.
If this is not possible or not desired, check the timing parameters for the PROFIBUS in the STEP7 configuration. Enter the read values into the advanced bus parameter settings via the '*Bus parameters'* button. If on-line access is still not possible, set a higher 'Ttr' both in the NETLink® PRO PoE and on the CPU.

Q: What should I look out for when implementing Internet teleservice via a router?

A: If the NETLink® PRO PoE devices are in a private network behind a router, they cannot be addressed by their private IP address on the fixed NETLink® PRO PoE port 7777 from the Internet.
To be able to address the devices from the Internet despite this, a 'public' port is configured in the router for each NETLink® PRO PoE.

After that, access is possible via the public IP address of the router and the configured port.



By default, the S7 network driver attempts to address the NETLink® PRO PoE via fixed port 7777, which would not work in the above scenario.

For that reason the "*Internet Teleservice*" option has been installed in the SHS7-NET driver, with which the port of a NETLink® PRO PoE configured in the router can be set.

This configuration can be made in the 'Station' dialog box.

There is a detailed description of the settings for a 'station' in Section 5.1.2.

For explanations, see the figure above:

Private NETLink® address → Public NETLink® address

NETLink 1: 192.168.1.81 Port 7777 → 222.111.1.1 Port 1234

NETLink 2: 192.168.1.82 Port 7777 → 222.111.1.1 Port 1235

Q: What must I observe when calling your technical support?

A: Please have all relevant data of your system constellation with the connected stations and program modules at hand when you contact technical support at Systeme Helmholz GmbH.

11 Appendix

11.1 Technical Data

Dimensions in mm (LxWxH)	102 x 54 x 30
Weight	Approx. 180 g
Operating voltage	24 V DC ±25 %
Operating voltage PoE	48 V as specified by IEEE 802.3af/at
PoE power level	Class 1 (0.44 to 3.84 Watt)
PoE+	Type 1 (see also 802.3af)
Current consumption	150 mA
Ethernet interface	10 Base-T / 100 Base-TX, Auto - (MDI)X
Ethernet connection	RJ45 socket
Ethernet transmission rate	10 Mbps and 100 Mbps
MPI/PROFIBUS interface	RS485, electrically isolated
MPI/PROFIBUS transmission rate	9.6 Kbps; 19.2 kbps 45.45 kbps 93.75 kbps 187.5 kbps 500 kbps 1.5 Mbps 3 Mbps 6 Mbps 12 Mbps
MPI/PROFIBUS connection	SUB-D connector, 9-way with programming unit interface
MPI/PROFIBUS protocols	FDL protocol for MPI and PROFIBUS
Displays	3 LEDs, including 2 two-color LED, for general status information 2 LEDs at the Ethernetport for Ethernet status
Degree of protection	IP 20
Ambient temperature	0 °C ... 60 °C
Storage and transportation temperature	-20 °C to +90 °C
Relative humidity during operation	5 % to 85 % at 30 °C (no condensation)
Relative humidity during storage	5 % to 93 % at 40 °C (no condensation)

11.2 Pin assignments

11.2.1 MPI/PROFIBUS interface pin assignments

Connector	Signal	Meaning
1	-	Unused
2	GND	Ground power supply (looped through)
3	RxD / TxD-P	Receive / transmit data-P
4	-	Unused
5	DGND	Ground for bus termination (looped through)
6	DVCC	5 V DC for bus termination (looped through)
7	VCC	24 V DC for power supply (looped through)
8	RxD / TxD-N	Receive / transmit data-N
9	-	Unused

11.2.2 Pin Assignment of the Ethernet interface (host interface)

Connection	Signal	PoE Power Supply	Meaning
1	TX+	P – DC+	Transmit data / phantom power
2	TX-	P – DC+	Transmit data / phantom power
3	RX+	P – DC-	Receive data / phantom power
4		S – DC+	Spare Pair Supply
5		S – DC+	Spare pair supply
6	RX-	P – DC-	Receive data / phantom power
7		S – DC-	Spare Pair Supply
8		S – DC-	Spare pair supply

The NETLink® PRO PoE comes with a shielded cross-over category 5 TCP cable with a length of three meters.

The maximum cable length between two TCP interfaces is 100 meters according to IEEE802.

If distances greater than 100 meters have to be covered, the use of switches or hubs is recommended.

11.2.3 Power supply socket

If an external power supply is used, please make sure the polarity is correct and all technical data are complied with.

11.2.4 Power over Ethernet

The NETLink® PRO PoE is a Powered Device (PD) according to the IEEE 802.3af (POE) and IEEE 802.3at (POE+) standards. The is the generally accepted term for technology that supplies devices with power via a commercially available 8 wire RJ 45 Ethernet cable. This standardisation ensures worldwide compatibility and high flexibility when used in PoE installations; for example, that is affected by neither transmission capacity nor range (even in existing networks). The power supply is assured by the Power Source Equipment (PSE). This type of switch, hub or power injector supports the Resistive Power Discovery which ensures that the power delivered via the LAN is only activated when a compatible end-device such as NETLink® PRO PoE has been detected, the 48 V supply is automatically blocked when none-PoE Ethernet devices are detected. In this way both conventional and PoE-compatible devices can be used together in connection with the energy supply devices described above.

As can be seen in the pin assignment of the NETLink® PRO PoE network connector, the energy supply is fed via the Spare-Pair wire pairs 4/5 and 7/8, ensuring that the 4 remaining data transfer wires are not affected. In addition, dependent on the PSE unit in use, the existing wiring can be used for distributing power. Using the Phantom Power the power supply is ensured through its superimposition on the data signals. The NETLink® PRO PoE automatically recognises the current technique and can therefore be used with all types of PSE.

In addition the specification mandates that the PD can be supplied over up to 100 metres of cable without a repeater. In order to ensure that the distribution resistance (and the resulting power loss) is minimised to the greatest possible extent, excessive use of plug/socket extension elements should be avoided where possible.

The connection between PSE and PD can be either a straight or a cross-over cable. Using special input switching, the NETLink® PRO PoE recognises the actual polarity.

The external feed or the bus interface of the automation system have priority for the external 24 V supply to the NETLink® PRO PoE. If one of these fails, PoE is used as a reserve. Due to the internal switchover the device automatically carries out a reset.

Further important concepts behind Power over Ethernet are described in the glossary (Section 12).

11.3 Further documentation

In addition to this manual, the accompanying CD includes additional documentation and example projects for your free use. You will always find further information or new and revised versions at: www.helmholz.de.

Selection as of 08/2011:

- Extended NETLink functions - Project-specific interface
- Communication with OPC, SCADA, HMI - Application examples with RFC 1006
- NETLink WebService – Application examples and software
- Extended NETLink functions – CPU-to-CPU communication

11.3.1 Information in the internet

http://www.helmholz.de

http://www.profibus.com

http://www.siemens.com

http://www.poweroverethernet.com

http://www.ietf.org/rfc

11.3.2 Address conversion table

The following table is a parameterization aid for fining the correct setting for Routing over RFC or for remote TSAP in addressed mode.

Bus addr.	Rack	Slot	TSAP		Bus addr.	Rack	Slot	TSAP		Bus addr.	Rack	Slot	TSAP		Bus addr.	Rack	Slot	TSAP
0	0	0	0200		32	1	0	0220		64	2	0	0240		96	3	0	0260
1	0	1	0201		33	1	1	0221		65	2	1	0241		97	3	1	0261
2	0	2	0202		34	1	2	0222		66	2	2	0242		98	3	2	0262
3	0	3	0203		35	1	3	0223		67	2	3	0243		99	3	3	0263
4	0	4	0204		36	1	4	0224		68	2	4	0244		100	3	4	0264
5	0	5	0205		37	1	5	0225		69	2	5	0245		101	3	5	0265
6	0	6	0206		38	1	6	0226		70	2	6	0246		102	3	6	0266
7	0	7	0207		39	1	7	0227		71	2	7	0247		103	3	7	0267
8	0	8	0208		40	1	8	0228		72	2	8	0248		104	3	8	0268
9	0	9	0209		41	1	9	0229		73	2	9	0249		105	3	9	0269
10	0	10	020A		42	1	10	022A		74	2	10	024A		106	3	10	026A
11	0	11	020B		43	1	11	022B		75	2	11	024B		107	3	11	026B
12	0	12	020C		44	1	12	022C		76	2	12	024C		108	3	12	026C
13	0	13	020D		45	1	13	022D		77	2	13	024D		109	3	13	026D
14	0	14	020E		46	1	14	022E		78	2	14	024E		110	3	14	026E
15	0	15	020F		47	1	15	022F		79	2	15	024F		111	3	15	026F
16	0	16	0210		48	1	16	0230		80	2	16	0250		112	3	16	0270
17	0	17	0211		49	1	17	0231		81	2	17	0251		113	3	17	0271
18	0	18	0212		50	1	18	0232		82	2	18	0252		114	3	18	0272
19	0	19	0213		51	1	19	0233		83	2	19	0253		115	3	19	0273
20	0	20	0214		52	1	20	0234		84	2	20	0254		116	3	20	0274
21	0	21	0215		53	1	21	0235		85	2	21	0255		117	3	21	0275
22	0	22	0216		54	1	22	0236		86	2	22	0256		118	3	22	0276
23	0	23	0217		55	1	23	0237		87	2	23	0257		119	3	23	0277
24	0	24	0218		56	1	24	0238		88	2	24	0258		120	3	24	0278
25	0	25	0219		57	1	25	0239		89	2	25	0259		121	3	25	0279
26	0	26	021A		58	1	26	023A		90	2	26	025A		122	3	26	027A
27	0	27	021B		59	1	27	023B		91	2	27	025B		123	3	27	027B
28	0	28	021C		60	1	28	023C		92	2	28	025C		124	3	28	027C
29	0	29	021D		61	1	29	023D		93	2	29	025D		125	3	29	027D
30	0	30	021E		62	1	30	023E		94	2	30	025E					
31	0	31	022F		63	1	31	023F		95	2	31	025F					

12 Glossary

These are explanations of the most important technical terms and abbreviations from the manual.

Advanced PPI	The extension of the PPI protocol of the S7-200 series, normally only compatible with CPUs of the S7-22x series and higher
ANP	See auto negotiation
ASCII	American Standard Code for Information Interchange describes a character set that includes the Latin alphabet in upper and lower case, the ten Arabic numerals, as well as some punctuation marks and control characters
Autobaud	Also called "auto sensing," is a function supporting automatic adjustment of the baud rates in a network
Auto negotiation	ANP describes a function that automatically recognizes and configures communication partners in the network
Baudrate	The speed set on a bus system
Bit	Binary digit describes the smallest digital information unit. Defines 0 or 1
Broadcast	Data packet transmitted to all stations in a network
Browser	Also known as Web browser, is a program for viewing Internet pages. In addition to addressing and referencing other positions in the text, a graphical user interface be displayed, for example Web interface.
Bus	Buses are connection systems for electronic components. For example, the MPI Bus is a connection medium for S7
Byte	A byte denotes a series of 8 bits that constitute a logical data entity
CAT5-TCP cable	Category 5 Ethernet cable that supports a data rate of 100 Mbps over a distance of 100 m
Client	A device that requests services. The requests are sent to a server, which returns the relevant answers to the client.
Computer	In this manual, this refers to the programmer (PG) or personal computer (PC).
DHCP	Dynamic Host Configuration Protocol, DHCP server can dynamically pass an -> IP address and other parameters to DHCP clients on request.
DNS	Domain Name System is a shared database system in LAN as well as in the internet that transforms IP addresses into plain text addresses
Domain name	The domain is the name of an Internet page. It consists of the name and an extension. The domain of Systeme Helmholz is: www.helmholz.de
Endspan	The Endspan device is also usually a switch which, as PSE, has the PoE functionality.
Firewall	A service running on a server that blocks certain services/ports and prohibits unauthorized access
Flow Control:	A process that sends a break frame if the data buffer is almost full.
Gap	The Gap Update Factor specifies after how many token cycles the master checks whether an additional master is signaling its presence on the bus
Gateway	This is a machine that works like a router. Unlike a router , a gateway can also route data packets from different hardware networks.
HMI	Human-Machine Interface denotes the interface between the human operator and a system through which the operator can operate the system or intervene in the process

HSA	Highest station address that is polled
Hub	A mediation system between LAN segments. Unlike a switch, on a hub, all data arising in the Ethernet are applied to all ports
Interfaces	General definition of interfaces, such as a network interface card that constitutes an Ethernet interface
IP address	Internet protocol address. The IP is the address of a device in a network at which it can be reached. It consists of four bytes and is expressed in decimal notation. Example: 192.168.4.49
ISO on top of TCP	see RFC1006
LAN	Local area network, a network of computers that are relatively close to each other physically.
MAC address	The Media Access Control address is used only once for each single network component that is not changeable. It consists of 6 bytes and is written in hexadecimal notation. Example: 08-FF-FA-9C-ED-5A
Master	Is and active station that is permitted to transmit data to and request data from other stations, when it holds the token
MDI / MDI-X Auto Crossover	Makes it possible to identify if a cross over or a straight cable is connected and configures the port accordingly.
Midspan	Midspan devices are also installed between a none-PoE-compatible switch and a PD as injector for PoE supply. This type of device must be powered from the mains.
MLFB	16-digit Siemens identification number
MPI	Multipoint Interface. Interface that is used for S7-300 and S7-400 systems and that supports baud rates up to 1.5 Mbps
NAT	Network Address Translation is the collective term for procedures for replacing address information in data packets by other address information in an automated and transparent way. This is very useful when connecting private networks via a public line.
Net mask	See subnet mask
Network rules	Network rules determine how the different data packets are handled in a network device. For example, data packets are blocked or forwarded to or from certain network stations
OPC	Object Linking and Embedding for Process Control allows data transfer between applications of different producers, for example, using the RFC1006 protocol
PAT	Port address translation. Used when multiple private IP addresses of a LAN need to be translated into one public IP address
PG socket	The programming unit socket of the bus connector allows further bus nodes to be plugged in.
Phantom supply	In PoE a technique used in 1000Base-T Ethernet to distribute power over the same wires as are used to transport data
PoE/PoEplus	Two different performance classes in Power over Ethernet IEEE 802.3af (POE) and IEEE 802.3at (POE+).
Port	These are address components that are used in network protocols to assign the correct protocols to data segments, also using port forwarding.
Port forwarding	The passing on of requests to ports via a network.

PPI	Point-to-point interface, interface with S7-200 systems with a maximum baud rate of 187.5 kbps
PROFIBUS	Process Field Bus is the protocol that is used mainly for automation, e.g. for the S7-300 and S7-400 systems with a maximum baud rate of 12 Mbps
Profinet	Standard for industrial Ethernet in automation.
Proxy	System for buffering. Requests can be answered faster via a proxy, and the network load can also be reduced. Mainly used to separate a local area network from the WWW.
PSE	Abbreviation for Power Source Equipment Energy supplier according to the PoE standard
Routing over RFC	Rack refers to the configured module rack (default: 0) and slot, to the slot for the module in question (default CPU: 2). The default configuration for an Rack/Slot is therefore 0/2
Resistive Power Discovery	A technique defined by the PoE standard for automatically recognising PoE-capable and none-PoE-capable devices. The autonomous differentiation by the PSE serves to protect all connected network devices
Retry limit	Bus parameter that determines the number of attempts will be made to call a DP slave
RFC1006	Request for comment is a type of protocol. It defines the way an ISO packet is transported in a TCP data packet as "*useful load*"
RJ45 socket	A network socket with 8 wires according to the RJ plug system
Router	This is a machine that ensures in a network that the data of a protocol arriving at it are forwarded to the intended destination network or subnet.
Routing	Routing means a defined function that mediates messages and data between LANs, WANs, MPI, and PROFIBUS
S7-TCP/IP	Interface parameterization in the PG/PC interface that is based on TCP/IP and that is handled via the selected network interface card of the PC
SCADA	Supervisory Control and Data Acquisition. Generic term for a type of process visualization that includes monitoring, control, and data acquisition of automation systems, etc.
Server	A device that provides special services at the request of clients.
Single Line Injector	See Midspan
Single master	Only one master is connected to the system. The NETLink® family members WLAN, Switch, and PRO PoE can also act as single masters
Slave	A station that is only permitted to exchange data with the master if requested to do so by the latter.
Socket	Data links that are created by means of ->TCP or ->UDP work with sockets for the addressing purposes. A socket consists of an IP address and a port (cf. address: street name and house number)
Spare Pair Supply	The power supply for PoE is distributed over the 4 unused free wires in CAT 5 networking cable (wire pairs 4/5 and 7/8)
Subnet mask	Defines the network or host component of the IP address. It permits subdivision of address ranges and prevents direct access to other networks.
Switch	A device that can connect multiple machines with Ethernet. Unlike a hub, a switch is "*smart*" in that it can remember the MAC addresses that are connected to a port and routes the traffic more efficiently than the individual ports
TCP/IP	The Transmission Control Protocol is a transport protocol to permit data exchange

	between network devices. IP is the extension for Internet Protocol.
Timeout	Defines a protocol instruction that is activated if a defined time has been exceeded
Token	Is a frame for permission to transmit in a network. It is passed from master to master
Tqui	Transmitter fall time (bit) is the time that is needed to restore the quiescent signal level on the signal line after transmitting data
TSAP	Transport Service Access Point. The TSAP corresponds to the layer 4 address that has to match crossed-over for a station and the communication partner to be reached. The remote TSAP of Station1 is equivalent to the local TSAP of Station2. Entry of any characters, e.g. numerals is possible
Tsdr	Protocol processing time of the responding station (station delay responder)
Tset	The setup time (bit) is the time that is allowed to elapse between transmitting and receiving telegrams
Tslot_Init	The slot time (bit) is the maximum time that a transmitter waits for a station it has addressed to respond
Ttr	Target rotation time (Bit) is the reference token time. This means teh reference and actual token times are compared. This difference determines how much time is available to the master to transmit its own telegrams to the slaves
UDP	User Datagram Protocol, transport protocol permitting data exchange between network devices. It is a connectionless protocol, that is, data transmission is performed without error detection.
URL	"*Uniform Resource Locator*," denotes the address at which a service can be found in the Web browser. In this manual, the IP address of the NETLink® PRO PoE is usually entered as the URL.
VPN	Virtual Private Network. Logical links, called tunnels, are established iva existing unsecured networks. The end points of these links ("*tunnel ends*") and the devices behind them can be thought of as a separate, logical network. A very high level of security against tapping and tampering can be achieved if data transmission via tunnels is encrypted and the stations in this logical network first authenticate each other.
WAN	Wide Area Network, a network of computers that are physically far apart. The internet is the largest known WAN
Web interface	Is opened using a browser. It contains the data and functions to be able, for example, to interact with the NETLink® PRO PoE.
WWW	World Wide Web. Worldwide communication network, also known as the Internet.