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User Guide

NETLink S7-Compact

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1 About this guide

1.1 Read me first

Please read this guide carefully before using the device to ensure safe and proper use. Softing does not assume any liability for damages due to improper installation or operation of this product.

This document is not warranted to be error-free. The information contained in this document is subject to change without prior notice. To obtain the most current version of this guide, visit the product website.

1.2 Target audience

This guide is intended for experienced operation personnel and network specialists responsible for configuring and maintaining field devices in process automation networks. Before installing and operating the NETLink S7-Compact make sure that you have read and fully understood the safety requirements and working instructions in this guide.

1.3 Typographic conventions

The following conventions are used throughout Softing customer documentation:

Keys, buttons, menu items, commands and other elements involving user interaction are set in bold font and menu sequences are separated by an arrow	Open **Start → Control Panel → Programs**
Buttons from the user interface are enclosed in brackets and set to bold typeface	Press **[Start]** to start the application
Coding samples, file extracts and screen output is set in Courier font type	`MaxDlsapAddressSupported=23`
Filenames and directories are written in italic	Device description files are located in *C:\<Application name>\delivery\software\Device Description files*

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in damage or injury.

Note

This symbol is used to call attention to notable information that should be followed during installation, use, or servicing of this device.

Hint

This symbol is used when providing you with helpful user hints.

1.4   Document history

Document version	Changes since last version
1.00	first version

1.5   Related documentation and videos

The following link direct you to additional product information and downloads.

1.6   Document feedback

We would like to encourage you to provide feedback and comments to help us improve the documentation. You can write your comments and suggestions to the PDF file using the editing tool in Adobe Reader and email your feedback to support.automation@softing.com.

If you prefer to write your feedback directly as an email, please include the following information with your comments:

- document name

- document version (as shown on cover page)

- page number

2   About NETLink S7-Compact

The NETLink S7-Compact 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:

- a proprietary protocol used to connect to the proprietary NETLink S7-Compact driver

- the S7-TCP/IP protocol often NETLink S7-Compact used by visualization system manufacturers which is known as RFC1006 or ISO-on-TCP.

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

The TCP/IP end of the NETLink S7-Compact 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 resp. auto baud).

Internet tele servicing with NETLink S7-Compact should only take place through additional encoding mechanisms and the usual security criteria. The usual VPN technology (Virtual Private Network) is suitable for this purpose. Further components are necessary to incorporate a NETLink S7-Compact gateway into such a virtual tunnel.

> **Note**
>
> The TCP/IP communication is not encoded to the extent that no direct IP Internet tele servicing should take place via a NETLink S7-Compact gateway.

The NETLink S7-Compact has the shape of a PROFIBUS connector with a PG female connector and it is plugged directly into the MPI/PPI/PROFIBUS interface of the automation system. Because it is active, no spur line is created that could interfere with the bus.

The TCP/IP end of the NETLink S7-Compact is electrically isolated from the MPI/PPI/PROFIBUS.

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

The NETLink S7-Compact can draw the necessary power supply either from the bus interface of the programmable controller or via an external power supply.

The use of the NETLink S7-Compact driver makes it possible to use the NETLink S7-Compact as the following at the PC end

- programming adapter, or

- operator control and monitoring unit

The RFC1006 interface also enables you to use third-party soft-ware that supports this protocol to communicate with S7-200/S7-300 and S7-400 systems.

A NETLink S7-Compact can generally be connected to the PC via a switch, hub or directly via LAN cable.

2.1   Intended use

The NETLink S7-Compact must only be used as a communication and signaling system. Any other use is deemed non-intended use.

NETLink S7-Compact Gateways are exclusively for use with a S7-200 and S7-300/S7-400 programmable controller from Siemens.

CAUTION

Safety-related functions must not be controlled via a NETLink S7-Compact alone.

Make sure in the software that uncontrolled restarts cannot occur.

2.2   Specifications

Dimensions in mm (LxWxH)	64 x 40 x 17
Weight	Approx. 110 g
Current consumption	200 mA
Displays	2 LEDs, including 1 three-color LED, for general status information

Operating voltage	24 V DC ±25 %
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
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)

2.3 Supported features

NETLink S7-Compact supports the following features:

- direct communication with one or several controllers in any kind of TCP network structure

- support of up to 16 simultaneous connections

- use of standard TCP/IP for communication within plant or company networks and with the Internet

- interference-free integration into existing control systems

- power supply directly from controller or via external power supply

- expansion of participants using MPI or PROFIBUS via pass-through PG port

- interface for programming controllers via Ethernet

- compatibility with STEP7, TIA-Portal, WinCC and WinCC flexible

- display and configuration of the adapter in STEP7 or TIA portal

- connection to HMI station and PLC directly via RFC1006 Ethernet protocol

- support of OPC and OPC UA by using uaGate, edgeConnector, or dataFEED OPC Suite products for integration into higher-level systems, e.g. for production management

2.4 System requirements

- 24V power supply

- PC with a 32/64 Bit Microsoft operating system, only valid when installing the driver (driver for SIMATIC NETLink-S7-NET only Windows XP, 7, 8.1, 10, 2K3 R2, 2K8 R2, 2K12 R2)

2.5 Safety precautions

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
CAUTION indicates a potentially hazardous situation which, if not avoided, may result in damage or injury.

Note
This symbol is used to call attention to notable information that should be followed during installation, use, or servicing of this device.

Hint
This symbol is used when providing you with helpful user hints.

General

NETLink S7-Compact Gateway is only used as part of a complete system. 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.

Note

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

CAUTION

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

CAUTION

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.

CAUTION

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).

CAUTION

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

Restriction of access

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.

Note

Only authorized persons must have access to the modules!

2.6   LED status indicators

NETLink S7-Compact has two operating status LEDs and two RJ45 connection status LEDs:

LEDs on the RJ45 network jack

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

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

Operating status LEDs on the NETLink S7-Compact

These LEDs are located on the front of the housing behind a white inspection window.

LED status for operating status	Power LED (blue)	Bus LED (orange)	Active LED (green)	Bus LED (red)
Seeking for network partner and TCP configuration	BLINK			
Ready for operation	ON			
Expects MPI/PPI/PROFIBUS parameters for login	ON	BLINK		
Actively logged on to the MPI/PPI/PROFIBUS	ON		ON	
Data exchange with a programmable controller	ON		BLINK	
Transferring firmware update	ON			BLINK

3   Installation

3.1   Hardware installation

3.1.1   Mounting and dismounting

CAUTION

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

NOTE

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.

NOTE

Installation and inspection must be carried out by qualified personnel only (personnel qualified according to the German standard TRBS 1203 - Technical Regulations for Operational Safety). The definition of terms can be found in IEC 60079-17.

Mounting

1.   Plug NETLink S7-Compact directly into the SUB D female connector of the PROFIBUS station.

2.   Fix it by tightening the integrated hexagon-head housing screws.

Dismounting

1.   Loosen the integrated hexagon-head housing screws.

2.   Unplug NETLink S7-Compact from the SUB D female connector of the PROFIBUS station.

Mounting orientation

The NETLink S7-Compact can be installed in any orientation.

Minimum spacing

NOTE

Provide a minimum clearence of 60 mm above and below and 10 mm at the sides.

By maintaining minimum spacings

- NETLink S7-Compact gateways 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.

3.1.2 Connections

The NETLink S7-Compact is completely embedded in a bus connector. This compact device represents also an active cable, which means there is no spur line which avoids interference with higher baud rates.

NETLink S7-Compact has the following connections:

- RJ45 female connector for connecting a 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 socket for 24 V DC power supply. This power supply option can be used optional, if the used programmable controller does not provide any or only insufficient power on the bus connector.

Note

NETLink S7-Compact is shipped with the factory default IP address 192.168.4.49.

Further bus nodes for diagnostic devices can be connected to the integrated PG female connector. Only CAT5-TCP cables with an RJ45 connector can be connected to the NETLink S7-Compact housing. No further outlets, for example, PROFIBUS cable, can be installed on the device. Therefore no termination is possible on the connector housing and the ON/OFF switch for this is not been incorporated.

3.1.2.1 Profibus DP connector

Below you see the front view of the PROFIBUS DP connector (female D-Sub 9) and the function of the available signals. The connector pins are assigned according to the international standard IEC 61158-2 (Industrial communication networks - Fieldbus specifications - Part 2: Physical layer specification and service definition).
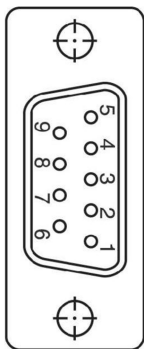
Pin	Signal	Description
1	-	optional - not in use
2	GND	ground power supply (looped through)
3	RxD/TxD-P	receive / transmit data (+)
4	-	optional - not in use
5	DGND	ground for bus termination (looped through)
6	DVCC	5Vdc for bus termination (looped through)
7	VCC	24 V DC for power supply (looped through)
8	RxD/TxD-N	receive / transmit data (-)
9	-	optinal - not in use

3.2   Connecting to the network

1. Connect the NETLink S7-Compact the network of your PG/PC (LAN card) to the RJ45 LAN socket of the NETLink S7-Compact adapter using and Ethernet cable.

2. Connect NETLink S7-Compact to the MPI or PROFIBUS interface of your automation system.
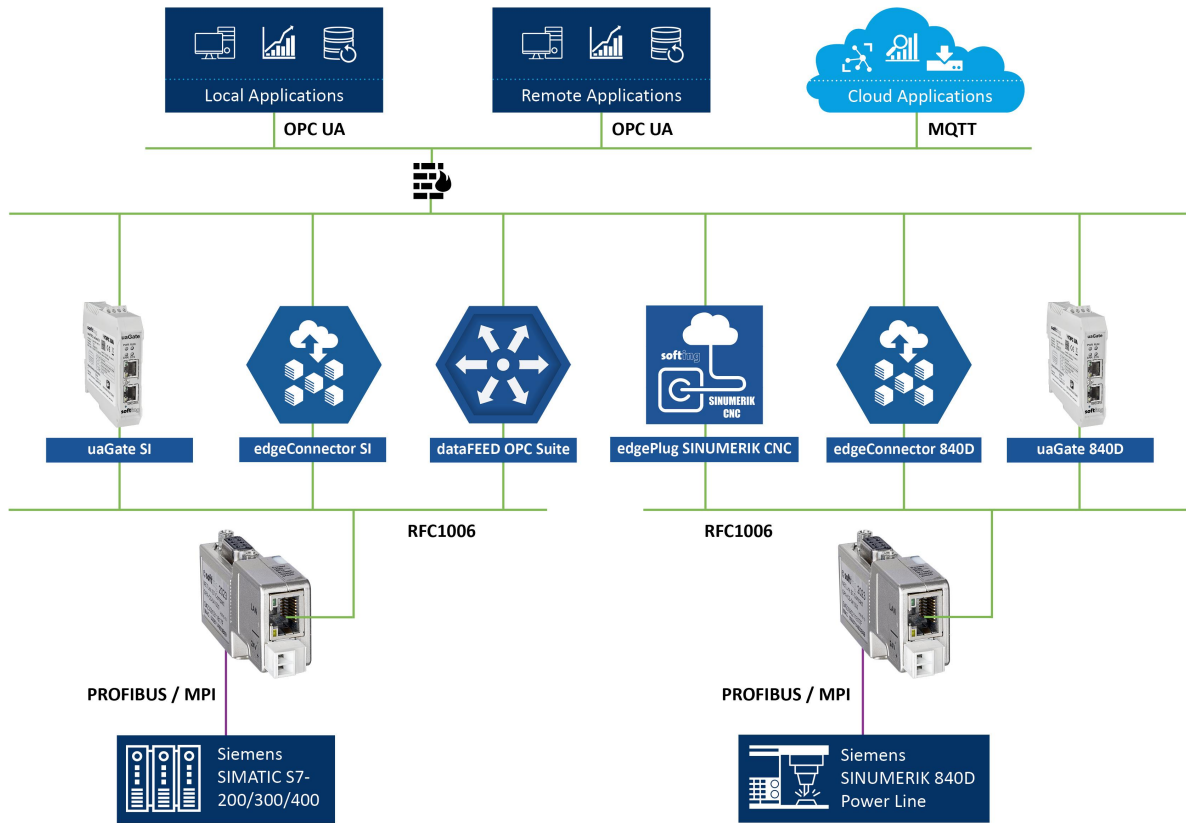
3.3   Powering up the device

After having connected the NETLink S7-Compact to the MPI or PROFIBUS interface of your automation system, the required 24V DC are normally available at the bus interface. Alternatively, an external DC voltage source can be connected to the two-pole connector.

4 Software installation

With installation of the NETLink S7-Compact, it is easy to access controllers with a MPI/PPI/PROFIBUS interface from the PC via TCP/IP.

4.1 Installation of the driver software

The NETLink S7-Compact 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.).

Access is possible to any controllers of the Simatic S7-200, S7-300, or S7-400 series via a NETLink S7-Compact.

4.1.1 System requirements

A PC with a 32/64 Bit Microsoft operating system with administrative rights is required for the installation and operation of the current NETLink S7-Compact driver on the PG side. The functionality has been successfully tested with Windows XP/2003R2/7/2008R2 /8.1/2012 R2/10.

A further requirement is the existence of a Simatic engineering tool, which ensures that the PG/PC interface is installed on the computer.

The most recent driver version was tested with:

- Siemens TIA Portal from V13 and higher

- SIMATIC Manager from version 5.5 and higher

- STEP7 Micro/Win as of version 4.0.

A functioning network link using TCP/IP must have been set up on the PCs that are used. The network configuration of the PC must be known. Commercially network cards and, for the connection, crossover- 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.

4.1.2 Adding the interface to the PG/PC interface

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

> **Note**
> This installation step is not needed in Windows 7 operating systems. If you are using a computer with Windows 7, please skip ahead to the next section.

Start the program module **Set PG/PC Interface** with the Control Panel of your Windows PC. When the **[Select...]** button is displayed under **Add/remove** interfaces, click it.
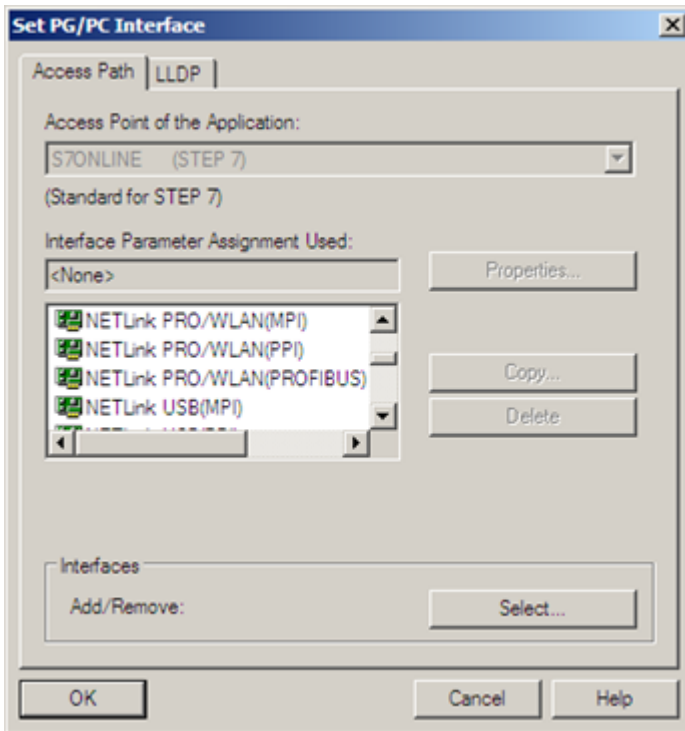
This opens the **Install/uninstall interface** dialog box.
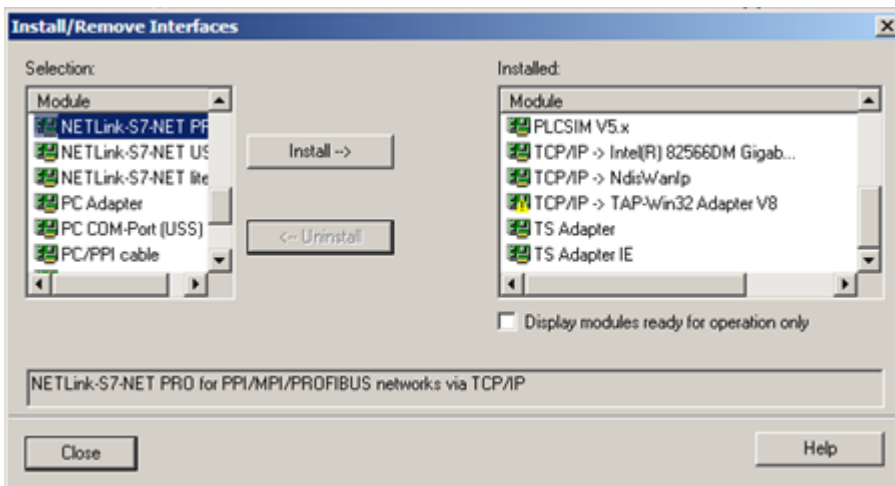
After you have selected the entry **NETLink-S7-NET PRO family** from the left-hand list, click the **[Install-->]** button.

The **NETLink-S7-NET PRO** has now been included in the selection list so that it is available for selection in future.
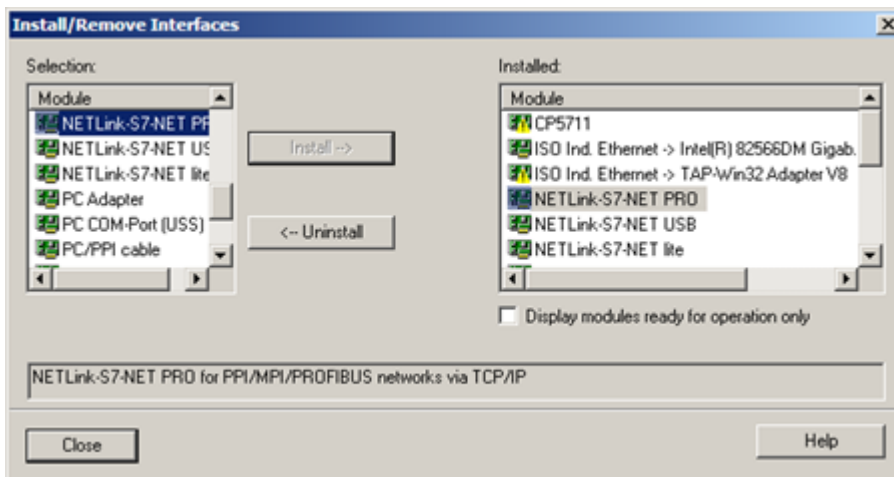
The access path in the **Set PG/PC Interface** dialog box is set when this window is closed.

4.1.3 Selecting the required interface parameterization

The selection list for the interface parameter sets now contains an additional three items for NETLink®.
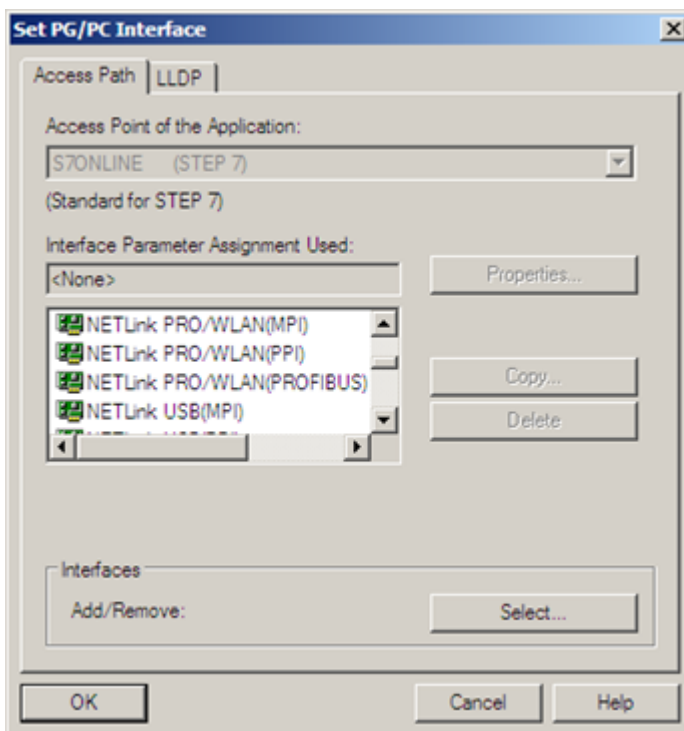
All relevant settings of a NETLink S7-Compact driver can be made via the **[Properties]** access field. With the button **[Diagnostics...]** it is possible to show the nodes connected to the bus and the parameters the bus is working with. These fields are explained in Section Configuration via the NETLink S7-Compact driver[18] .

5 Configuration

5.1 Configuration via the NETLink S7-Compact driver

NETLink S7-CompactOnce a NETLink Interface (MPI, PPI, PROFIBUS) 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 Interface is selected, it is possible to read the bus configuration and scan connected nodes.

The properties of the access NETLink Interfaces are divided into three subareas:

- **Bus settings**
  Here it is possible to state the bus configuration (e.g. station address) with which the NETLink S7-Compact will enter the bus system (See Section Bus settings[20]).

- **Local connection** (TCP configuration)
  Here, you set the IP address via which the required connection with the programmable controller will be established (See Section Local connection (TCP parametrization)[24]).
  The NETLink® Switch 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 (See Section Options of the driver[31]).

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 (See Section Bus members[32]).

- **Bus parameters**
  If possible, a list of all available bus parameters will be displayed (See Section Bus parameters[32]).

5.1.1 Setting the IP address of your PC

Before you can operate the connected NETLink S7-Compact you will have to change the default IP address of the NETLink S7-Compact so that your PC can communicate with the device.

The following steps apply to Windows 10:

1. Click **Start → Windows System → Control Panel** from your task bar.

2. Select **Network and Internet → Network and Sharing Center →** Relevant **Ethernet adapter →**
   Change adapter settings
   The following window opens.

3. Click **[Properties]**.

4. Select **Internet Protocol Version 4 (TCP/IPv4)**.
   The following window opens.

5. Select **Use the following IP address** and enter a specific IP address and Subnet mask.

   > **Note**
   > NETLink S7-Compact is supplied with the IP address 192.168.4.49. This means that you
   > will have to use the same address range for your computer.
   >
   > The IP address to be set here must fall within the 192.168.4.x address range, the
   > subnet mask should be identical to the one of the NETLink S7-Compact (255.255.0.0)

   > **Note**
   > If your PG/PC is used in a network with proxy, it may be the case that you need to
   > deactivate the proxy server function in the configuration of your browser to be able to
   > establish a connection to the NETLink S7-Compact.

   No entries need to be made with the default gateway and preferred DNS server. Once
   the settings are applied, the LAN connection should be recognized.

6. Click **[OK]** to confirm
   The LAN connection should be recognized.

5.1.2 Bus settings

The NETLink S7-Compact Gateway can be operated on three different bus systems: MPI, PPI, and PROFIBUS.

From the NETLink S7-Compact Gateway 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.
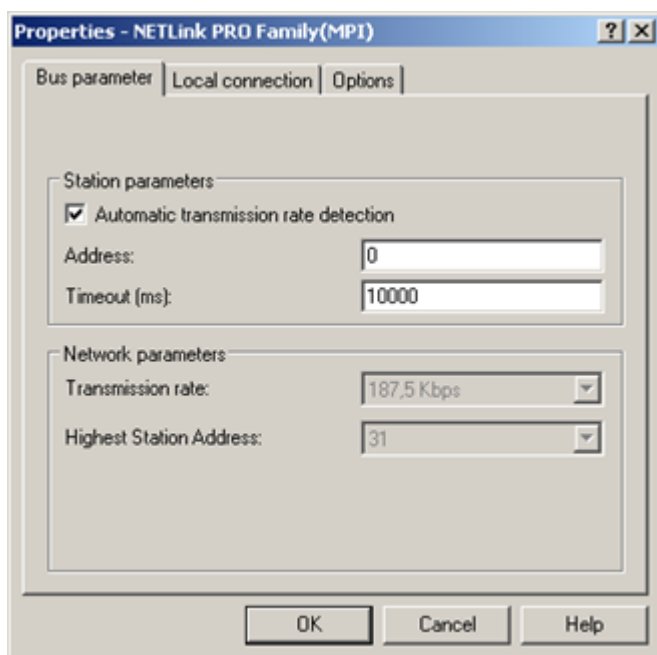
The bus configuration is passed to the NETLink S7-Compact during the runtime of the NETLink S7-Compact driver and is not stored in the device.

It is possible to use NETLink S7-Compact without providing bus-related information. In this case, NETLink S7-Compact will independently attempt to receive the transmission rates and the bus parameters from a master CPU, and can then be operated without resetting the NETLink S7-Compact driver in various automation systems, possibly with different transmission speeds.

This auto-baud function is only supported when the **Cyclical distribution of the bus parameters** is activated in the involved automation system. This function is not available in S7-200 systems in general.

5.1.2.1 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 S7-Compact 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-Compact 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 S7-Compact fails to sign onto the bus system automatically (can happen with passive bus participant).

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.
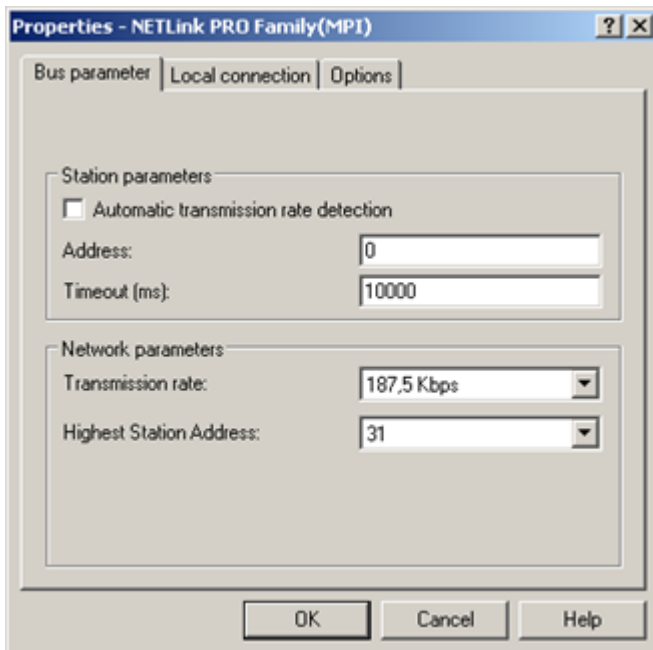
Note

Enabling the **Automatic transmission rate detection** option will make connections take a little longer to initialize, since it will make it necessary to find out what the corresponding online parameters are. This function may not work reliably with slow bit rates (e.g., 19.2 kbps) and global data communications.

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.

5.1.2.2 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 MPI [20] , PROFIBUS also has parameter field for selecting the bus profile and bus parameters.

If the NETLink S7-Compact Gateway 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.
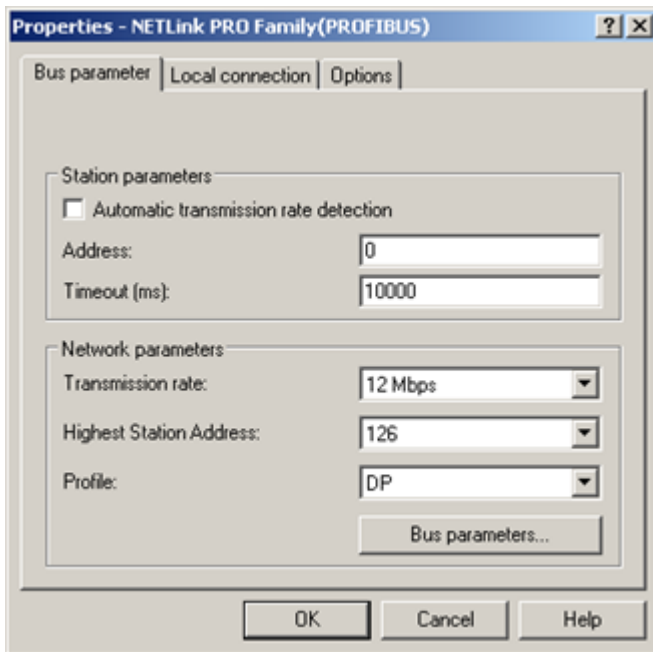
Profile:

- 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:
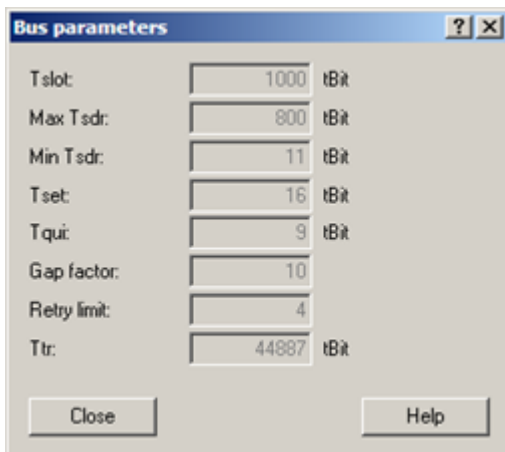
- Unlike the MPI bus profile, the bus parameters for PROFIBUS are not constant and change with the type and number of PROFIBUS stations used.

- Always set the PROFIBUS parameters that are set in the currently used programmable controller (see current STEP7 project).

  Whenever an active CPU is involved, which transmits the profibus parameters, we recommend activating the **Automatic transmission rate detection**.

  In this way you avoid the laborious steps involved in manual configuration, and most importantly ensure that profibus networks work with many participants of the NETLink S7-Compact with the correct profibus parameters.
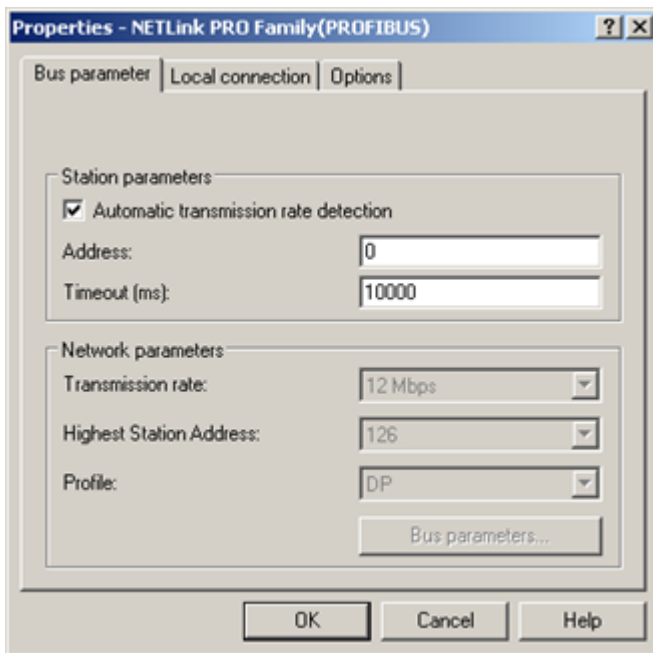
Under PROFIBUS, please note that the auto baud function works best if the **Cyclic distribution of the bus parameters** function is activated in the programmable controller used.
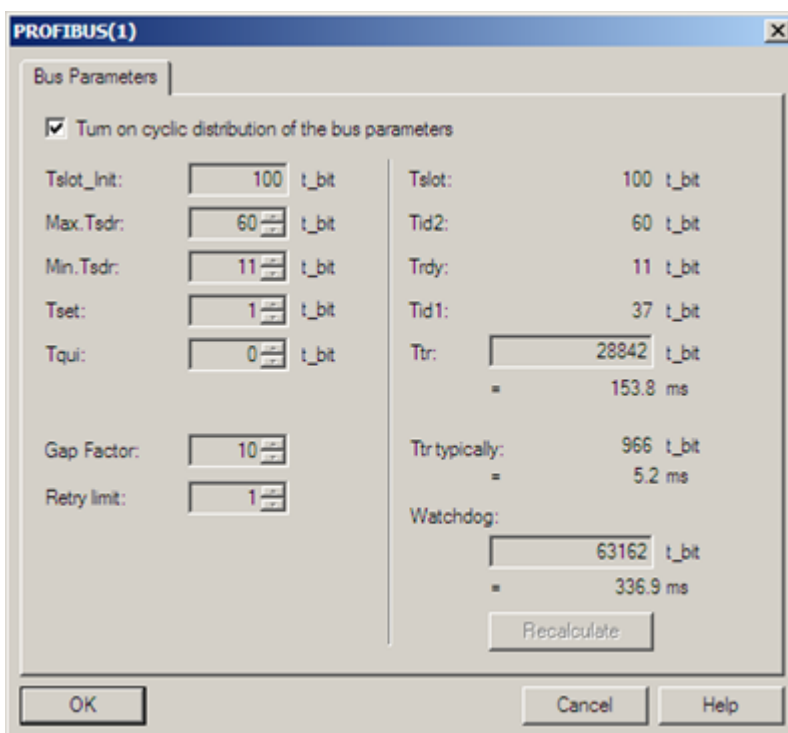
Note

Note regarding the Ttr (Target Token Rotation Time) parameter:

Make sure that the value for the Ttr parameter is not too small. If it is too small, one of the masters on the bus may not get enough time to send data frames. The STEP 7 NetPro module has an option that increases the Ttr time every time a master is added. Siemens provides the following recommended calculation guideline for custom profiles:

Minimum Ttr = 5000 x HSA (highest station address)

5.1.2.3 PPI configuration

Generally, the same thing applies under PPI as for the MPI configuration. However, it should be noted that passive participants never transmit the Profibus parameters, and that it is thus not possible to automatically determine the bus parameters.
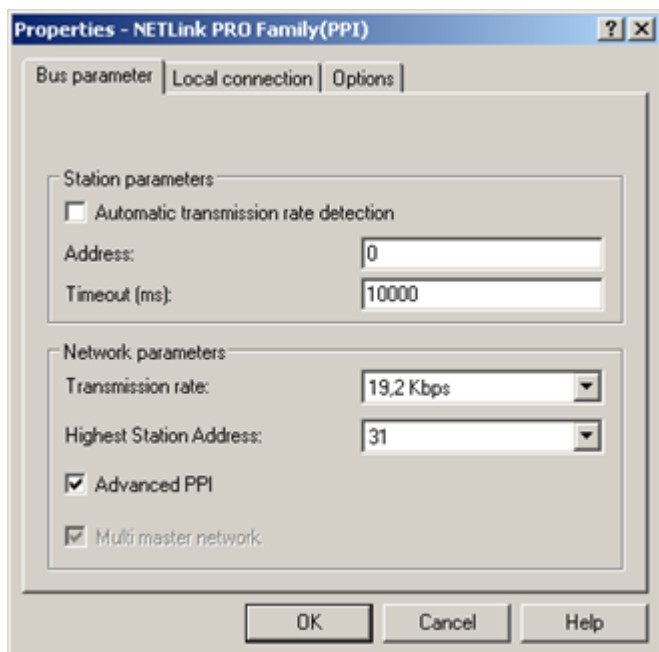
> **Note**
> Normally the baud rate cannot be detected automatically at PPI systems.

In addition to the parameter transmission rate already addressed under section MPI[20] and the Highest Station Address, the parameter field for Advanced PPI is also available for selection under PPI:

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.

> **Note**
> For communications with an EM 277 unit, the **Advanced PPI** option must be enabled.

5.1.3 Local connection (TCP parametrization)

There are three basic ways of parameterizing NETLink S7-Compact devices at the TCP end:

- Parameterization via **Set PG/PC interface**
  Existing stations can be reparameterized using the **[Change]** button

- Parameterization via the NETLink PRO configuration tool (see Section The Tool: NETLink Pro Family Configuration[34]).

- Parameterization via the web interface of the NETLink S7-Compact Gateway (see Section Status[44]).

If a NETLink S7-Compact is configured via the NETLink S7-Compact driver, the following points must be considered:

If the NETLink S7-Compact is active on the bus when reparameterization is required (e.g. a variable table or block is being viewed), reparameterization is not performed.

The subsequent reset would interrupt the NETLink S7-Compact link.
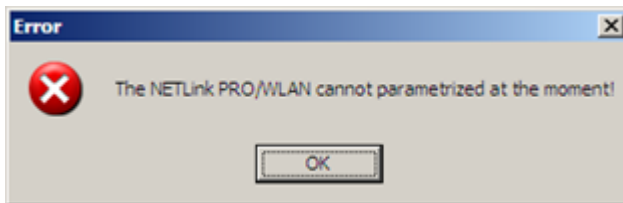
- NETLink S7-Compact Gateways be protected against unauthorized reparameterization via a password.

> **Note**
> The default password is **admin**.

> **Note**
> The password query must be answered correctly and confirmed with **[OK]**.

If an attempt is made to save a parameter set with an incorrect password, the following messages is displayed:
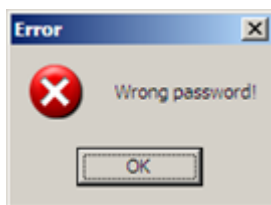
- If the password is correct during parameterization, the new parameter set will be saved and the following message displayed:
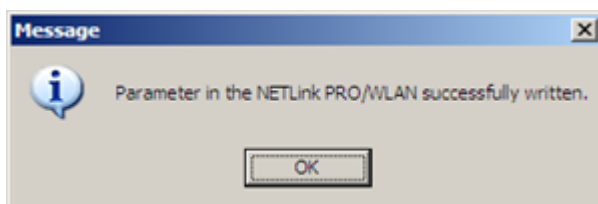
- The NETLink S7-Compact is now restarted.

> **Note**
> Rebooting can take up to 15 seconds.

5.1.3.1 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 S7-Compact device and any name for easier assignment.

> **Note**
> The NETLink S7-Compact is shipped with the factory default IP address 192.168.4.49.
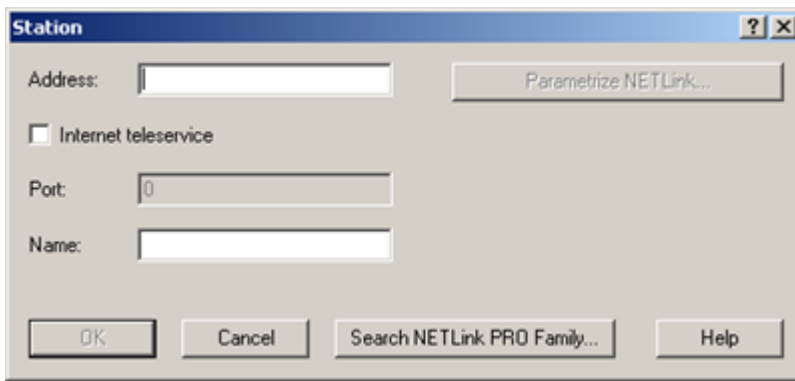
To able to access a NETLink S7-Compact with the NETLink S7-Compact driver, a station must be set up first. This station is virtually and is not stored in the NETLink S7-Compact Gateway hardware – it permits easier differentiation if several NETLink S7-Compact devices are used.

Alternative ports can be set with the option **Internet teleservice**. If, for example, several NETLink S7-Compact devices are located in a network behind a router/switch, these can also be addressed with a port addressing (PAT) adapted here.

Note

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

The router/switches used must be appropriately configured for this by the responsible network administrator, so that all TCP/IP packages addressed to the router/switch via a predefined port are forwarded by this to the NETLink S7-Compact located behind it.

When the NETLink S7-Compact is connected in the local network (LAN) or is not located behind a router/switch, the **Internet teleservice** option must be deactivated.
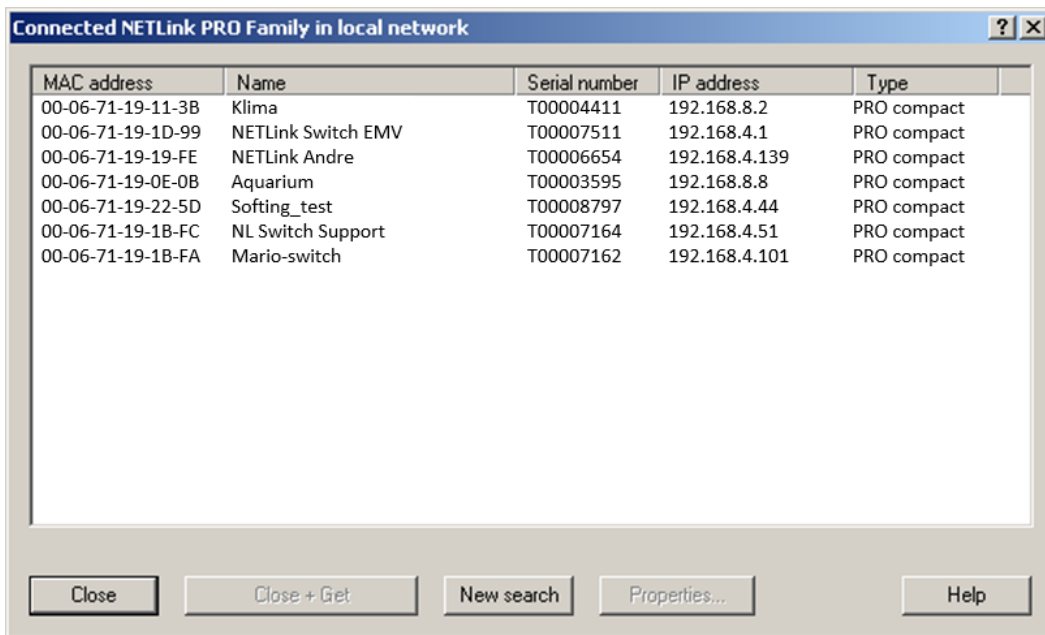
Internet tele servicing to networks outside of the LAN should always be realized through secured and encoded procedures, such as VPN!

[OK] stores this station, which can now be used.

It is easier to search for an existing NETLink S7-Compact device in the local area network. Just click the **[Search NETLink PRO Family...]** button.
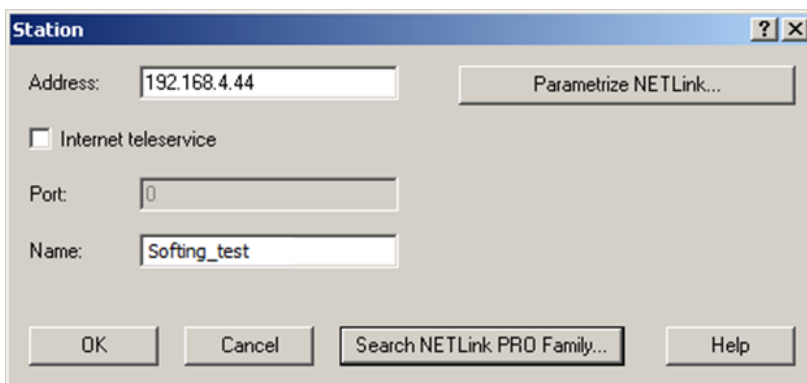
Note

For the search function of the NETLink S7-Compact devices, the UDP ports 25342 and 25343 may not be blocked by a firewall.

If you now select the required NETLink S7-Compact Gateway and click the **[Close + Get]** button, the following dialog box will appear again:

If you do not want the name that is stored in the NETLink S7-Compact to be the same as the station name, you can overwrite the station name (e.g. replacing the name **Softing_test** with the name **Workshop** in the example below).
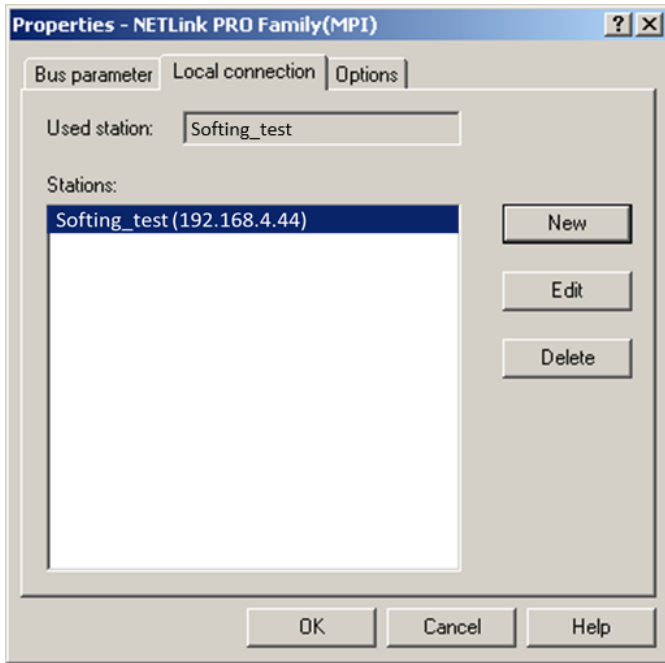
This completes parameterization of the driver.

It may now be necessary to adapt the NETLink S7-Compact Gateway to the situation in the existing TCP/IP network.

5.1.3.2   Setting TCP parameters

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

> **Note**
>
> As a default, the S7-Net driver attempts to address the NETLink S7-Compact via the fixed port 7777
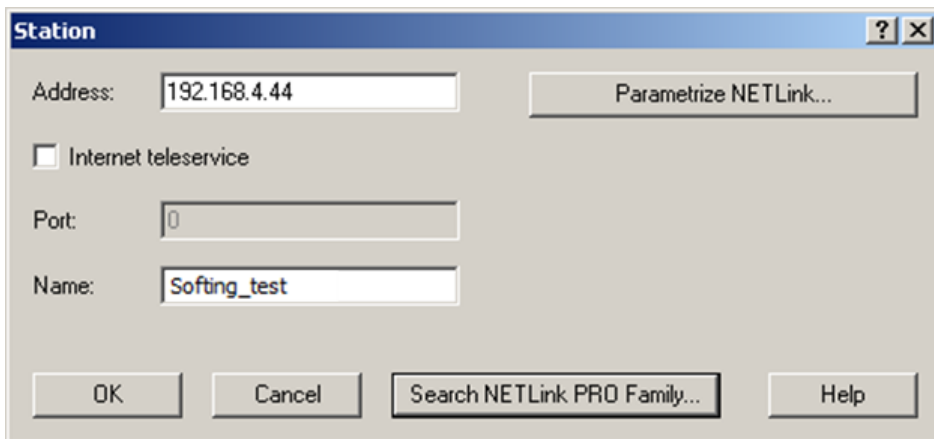
The **[Parameterize NETLink …]** button takes you to a new input form that already contains the current parameters of the NET-Link®:

If no NETLink S7-Compact Gateway can be accessed via the stated IP address, the following message will appear:
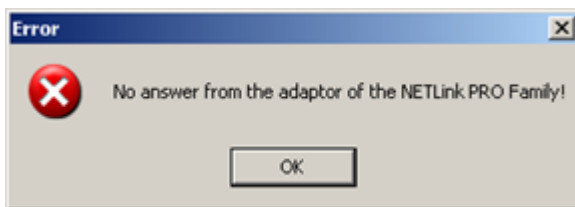
This message can have two causes:

- There is no NETLink S7-Compact device 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 S7-Compact (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.

5.1.3.3   Operation without the DHCP

If a NETLink S7-Compact is used in a network without a DHCP server (or you want the NETLink S7-Compact 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 S7-Compact Gateway.

5.1.3.4   DHCP

To have the NETLink S7-Compact 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 S7-Compact Gateway 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 S7-Compact.

DHCP has the drawback that a NETLink S7-Compact Gateway 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 DHCP server can counter this informing the DHCP server of the MAC address of the NETLink S7-Compact device. However, this is additional work for the system administrator.

5.1.3.5 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® Gateway 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 S7-Compactcan be viewed and changed, if necessary, in any standard Browser (tested with Firefox and Chrome) as long as the password (if one has been set) is known. Section RFC1006-Function (S7-TCP/IP)[36] provides more detailed information about what you can do with the web interface.

- **Changing the password**:

  A password must first be defined during the initial start-up. Please note the instructions in Section Login to web interface[43] !

  A password that you have already set can be changed here. The configuration of the NETLink S7-Compact can only be changed with the help of the password.This applies to parameterization both via the driver and via the web interface.

Clicking the 'Save in NETLink®' button saves the parameters in the NETLink S7-Compact device in this case, too.

5.1.4 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.
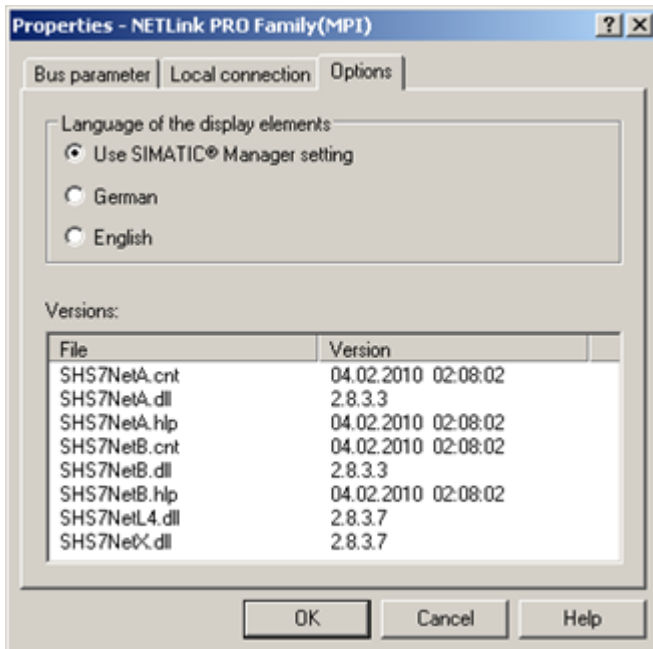
It is also possible to read out the version numbers of the driver files used.

5.1.4.1 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.

5.1.4.2 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.

5.1.5 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.

5.1.5.1   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.
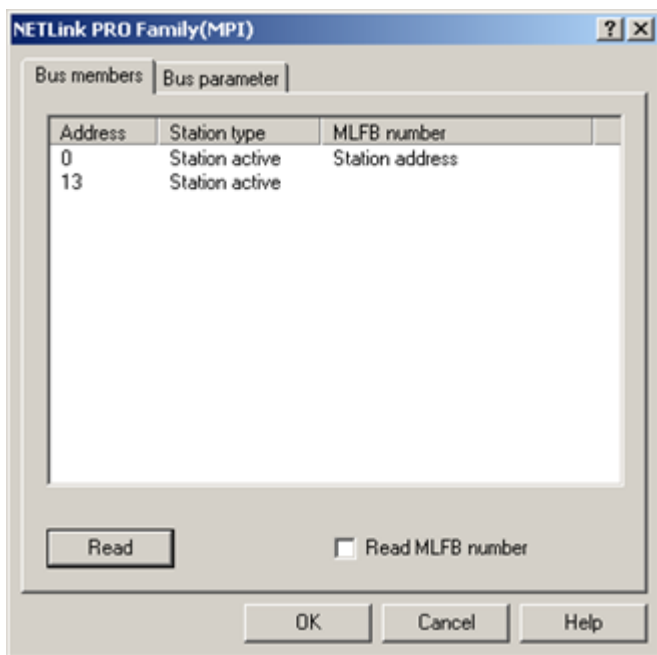
Note

The **Station type** column lists both active (master) and passive (slave) stations.

The NETLink unit being used will be shown as a Station address.

5.1.5.2   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.

NETLink PRO Family(MPI)		
Bus members	Bus parameter	
Own address	0	
Transmission rate	187500 bps	
Highest Station Address	31	
Min Tsdr	20 tBit	
Max Tsdr	400 tBit	
Tset	12 tBit	
Tqui	0 tBit	
Tslot	415 tBit	
Gap factor	5	
Retry Limit	2	
Ttr	9984 tBit	

Read

OK   Cancel   Help
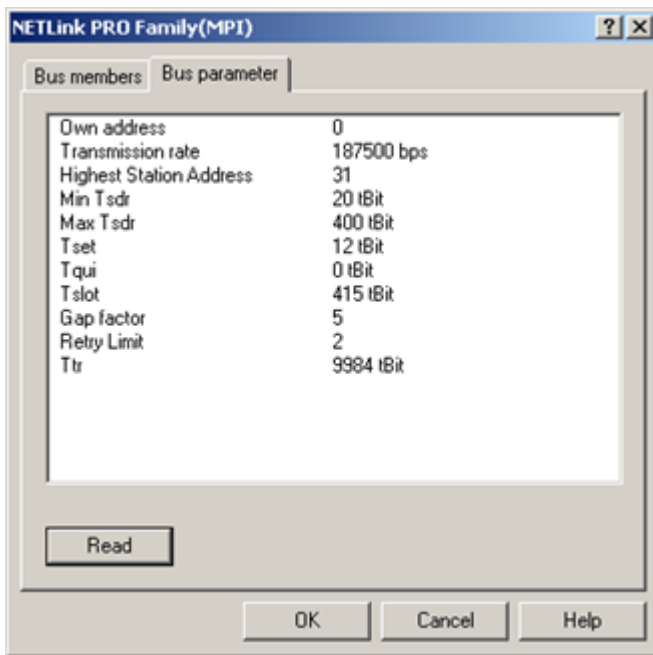
6   The Tool: NETLink PRO Configuration

If a Simatic Engineering Tool is present on the configuration computer that installed the PG/PC interface, it is possible to configure a NETLink S7-Compact both via the integrated web interface (see section Status⁴⁴) and with the configuration tool.

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

Note

The set IP address of the connected NETLink S7-Compact 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.
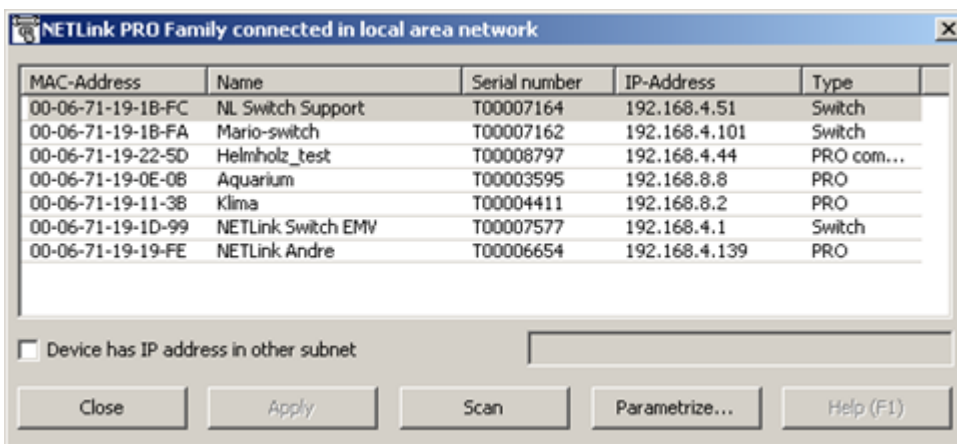
The scan can be repeated at any time by pressing the **[Scan]** button again. Having chosen any NETLink S7-Compact adapter out of the provided list, it is possible to configure the device after clicking **[Parameterize…]** as described in Section Configuration via the NETLink S7-Compact driver¹⁸ .

Note

In order to be able to use the scan function to find NETLink S7-Compact devices, make sure that UDP ports 25342 and 25343 are not being blocked by a firewall.
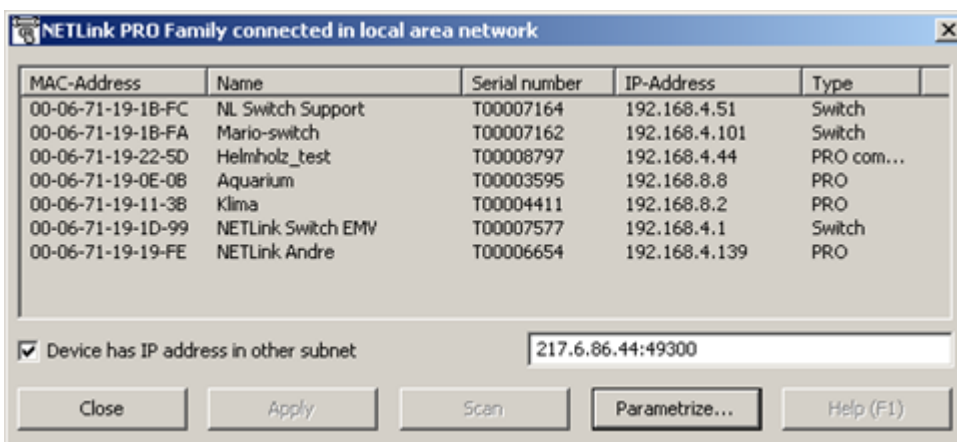
An extended function enables direct parameterization across network boundaries. To do this, activate the radio button and enter the known IP address of the NETLink® (the example includes the optional address of the port – separated by a colon) in the empty field. The corresponding configuration menu then opens when **[Parameterize...]** is clicked.

7   RFC1006-Function (S7-TCP/IP)

As an additional option, the NETLink S7-Compact Gateway can implement the RFC1006 protocol (also known as S7-TCP/IP or as ISO-on-TCP). RFC mode is always active and does not have to be specifically enabled. A NETLink S7-Compact Gateway 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), a NETLink S7-Compact with RFC1006 is an alternative to communication with these visualization systems.

The RFC1006 functionality of the NETLink S7-Compact Gateway is also supported by S7-200 systems.

The following software packages with RFC1006 support have so far been tested in conjunction with the NETLink S7-Compact:

Visu

RFC1006 / ISO-on-TCP

MPI / PROFIBUS

Automatisierungsgerät (AG)
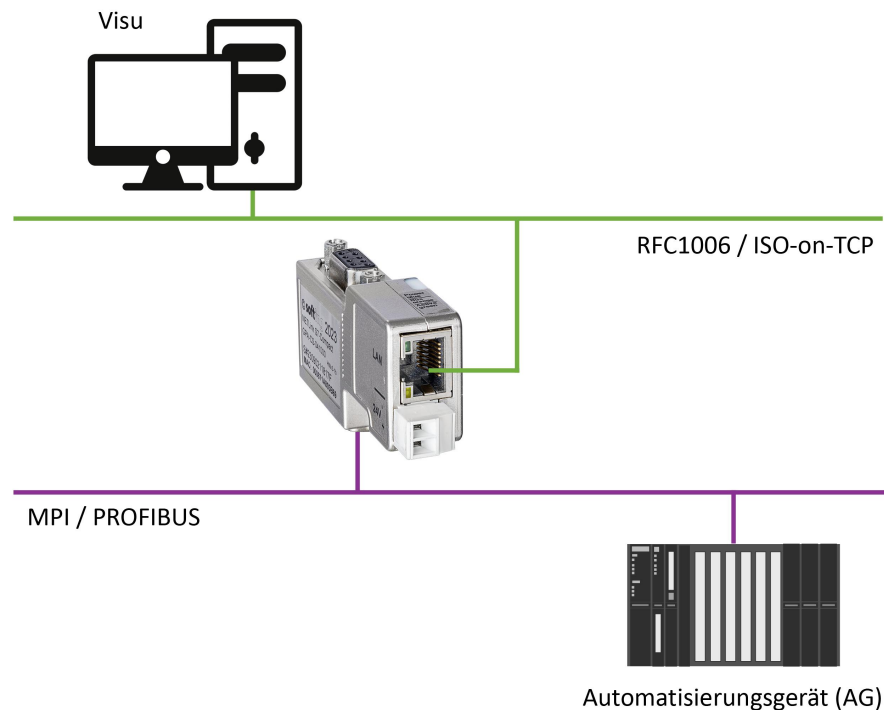
- ▪ OPC Suite (Softing Industrial Automation GmbH)

- ▪ uaGate SI (Softing Industrial Automation GmbH)

- ▪ uaGate 840D (Softing Industrial Automation GmbH)

- ▪ edgeConnector Siemens (Softing Industrial Automation GmbH)

- ▪ edgeConnector 840D (Softing Industrial Automation GmbH)

- ▪ edgePlug SINUMERIK CNC (Softing Industrial Automation GmbH)

- ▪ 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 (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)

7.1   CPU Adressing with Rack/Slot and TSAP

These RFC 1006 functions can be used to access specific modules on an automation system. For this to be possible, direct communications are only allowed with a single preconfigured station. This station will then forward all data packets that are not meant for it to the desired rack/slot and relay the corresponding answer back to the NETLink S7-Compact unit. To use this feature, you will have to enter the rack and slot numbers for the target address into the relevant RFC 1006 driver on the SCADA/HMI application you are using.

For example, if you wanted to communicate with target address 2, you would enter the following on Visu 1: Rack 0, Slot 2.

If, on the other hand, you wanted Visu 2 to communicate with target address 49, you would enter the following on Visu 2: Rack 1, Slot 17.
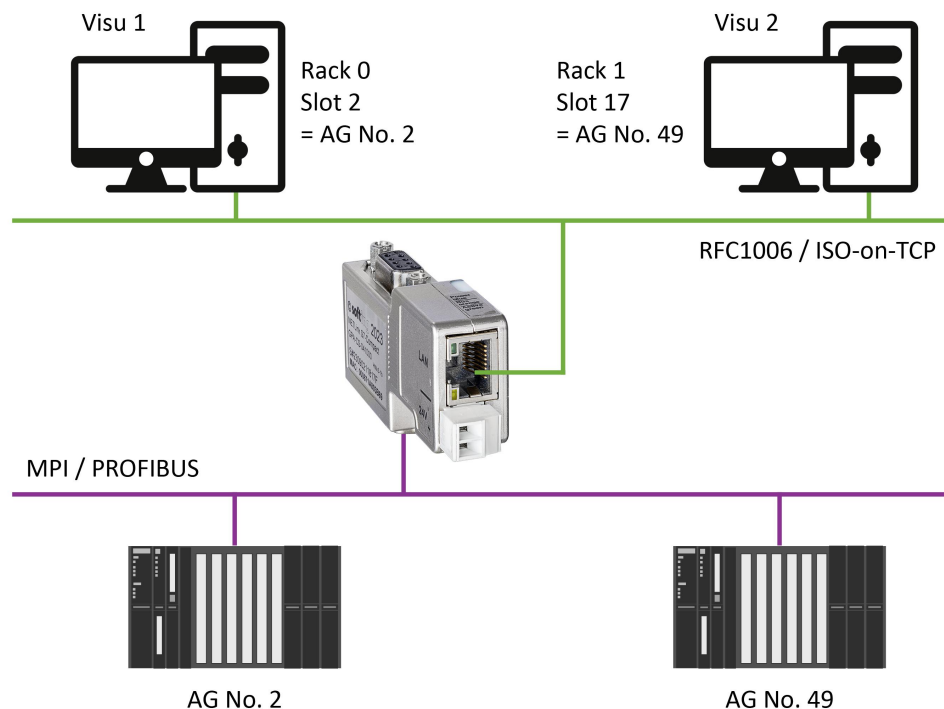
Section [Address conversion table]⁴⁹ includes a table that shows addresses converted into rack and slot values.

There are many parameter configuration tools that do not have fields with the names **Rack** and **Slot**. Instead, these tools usually have an input field called **Remote TSAP** that is two bytes long and needs a hex format value. This field, of which only the lower byte is important for our purposes, is configured as shown in the following examples:

If you wanted to communicate with target address 2, you would enter the following: Remote TSAP 0202hex.

If, on the other hand, you wanted to communicate with target address 49, you would enter the following: Remote TSAP 0231x.

Section [Address conversion table]⁴⁹ includes a table that shows addresses converted into remote TSAP values.

If you want to do the calculation yourself, you can use the following simple formula:

Rack * 32 + Slot = Address.

8 Bus parameters in Single Master Operation

If the NETLink S7-Compact Gateway is connected to a bus system on which no other master is active, the NETLink S7-Compact generates the token itself. This feature can be enabled on the web interface under **Basic Configuration**. In most cases, it will also be necessary to configure the corresponding bus parameters accordingly.

The **[NETLink Bus Address]** field must be used to assign the NETLink S7-Compact device its own station address, i.e., the station address that it will use to communicate on the bus (the address is set to 0 by default).

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.

8.1 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 12000.

- **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.

> **Note**
>
> Incorrect bus parameters can interfere with the bus considerably!

Please note that under unfavorable circumstances an incorrectly parameterized NETLink S7-Compact Gateway can interfere with the bus to the extent that regular bus operation is no longer possible.

8.2 Addressing with Routing over RFC

Since the RFC 1006 protocol normally cannot be used to transmit PLC routing information (MPI<->PROFIBUS) in a connect request frame, it was necessary to implement various addressing methods in order to make the device compatible with all possible communication setups. The parameters that are required for this purpose can all be configured on the web interface used to manage NETLink S7-Compact.

> **Note**
>
> The required paths within the automation system are defined and managed by the CPU => Routing.

These addressing methods are:

- RFC Multicomputing with TSAP (see Section RFC Mullticomputing with TSAP[40]) and

- RFC Routing via CPs with TSAP (see Section RFC Routing over CP with TSAP[41]).

These two addressing methods, which cannot be used together, make it possible to use most communication setups that can also be used with NETLink-S7-NET drivers.

8.2.1 RFC Mullticomputing with TSAP

This function makes it possible to communicate with more than one CPU on a rack (=> multicomputing) in S7-400 systems with-out any need for the additional CPUs to be connected to the same PROFIBUS cable.

For this to be possible, direct communications take place with on-ly one single configured station (CPU address 49 in this example). This station then forwards data packets to the desired rack/slot.

If you use this mode, the following settings must be configured on the web interface configuration page:

- **RFC Multi Computing with TSAP** must be enabled (ON)

- **RFC Routing over CP with TSAP** must be disabled (OFF)

- Enter the address for the communication station that will be communicating with the multicomputing system as the bus address
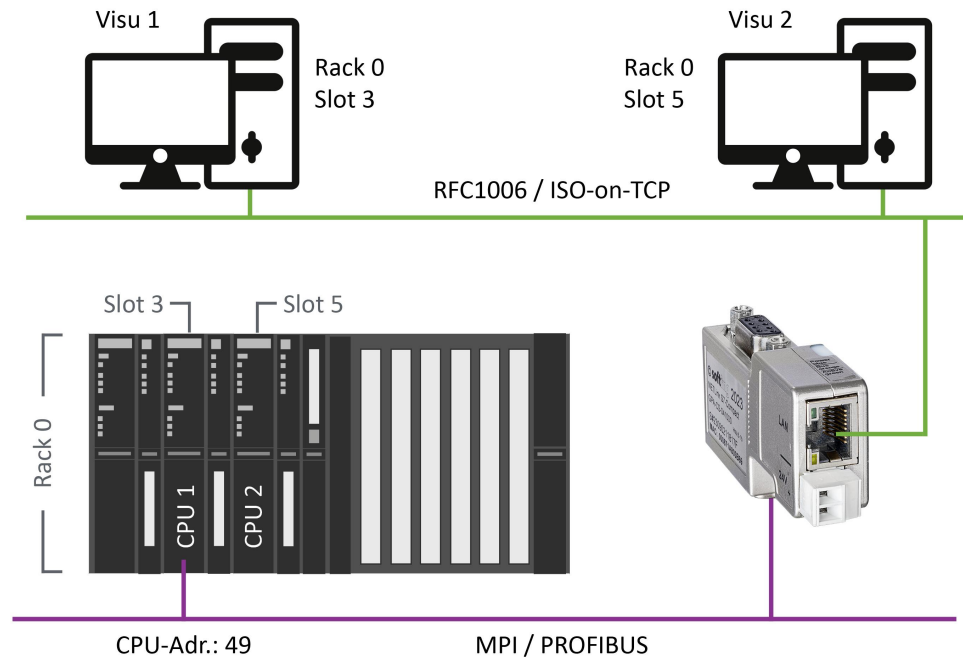
The rack/slot address for the station that will be used to communicate on the rack must be configured in the communication software (in the above example: R/S = 0/3 for CPU 1 and R/S = 0/5 for CPU 2)

8.2.2   RFC Routing over CP with TSAP

The rack/slot address for the station that will be used to communicate on the rack must be configured in the communication software (in the above example: R/S = 0/3 for CPU 1 and R/S = 0/5 for CPU 2)

For this to be possible, direct communications only take place with one single configured station (CP address). This station then forwards data packets to the desired rack/slot.

If you use this mode, the following settings must be configured on the web interface configuration page:

- **RFC Multi Computing with TSAP** must be disabled (**OFF**)

- **RFC Routing over CP with TSAP** must be enabled (**ON**)

- The numeric values for the rack/slot combination being used must be entered into the **Rack** and **Slot** fields
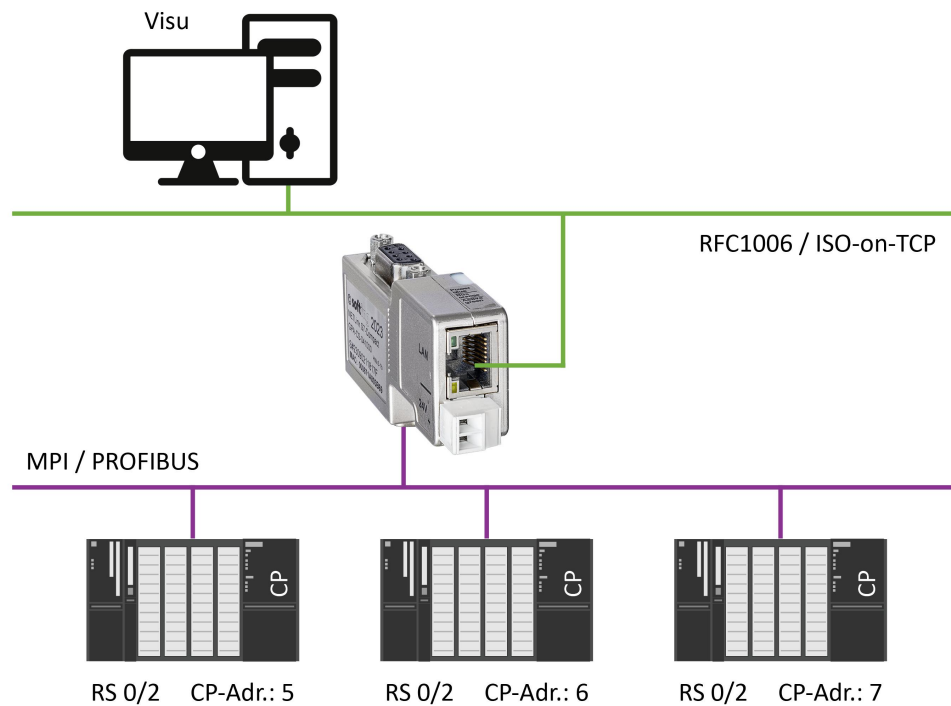
In this case, it is necessary to make sure that all CP/CPU combinations are working with the same rack/slot value pairs (stored on the web interface) (in the example above: Rack 0; Slot 2).

Experience has shown that CP-CPU routing works well with 0/2 rack/slot combinations when using CPUs from the 300 series.

> **Note**
>
> If the CP modules are not sending the required bus parameter frames, the **Single Master** function must be enabled on the NETLink S7-Compact web interface.

In addition, the corresponding parameters in the communications software (SCADA application) need to be configured accordingly. The **Remote TSAP -> Slot numbers** must match those of the corresponding CP address (in the example above: 5, 6, an 7).

9 Web interface

9.1 Prerequisites

The web interface of the NETLink S7-Compact can be opened with any standard browser (tested with Firefox and Chrome).

9.2 Opening the web interface

- Open your Internet browser and enter the IP address of your NETLink S7-Compact: http://192. 168.4.49

The web interface Home page, opens.

From here you can access the status page.

> **Note**
> All other menus are only accessible following prior identification with user name and password.

9.3 Login to web interface

Initial login

As of firmware version 2.58, when you access the web interface for the first time you will be asked to specify a password.

Please follow the on-screen instructions:

> **Note**
> Default password: last 8 characters of the device MAC address
>
> Example:
>
> MAC address: 00:06:71:19:1B:FC or 000671191BFC -> Password: **71191BFC**
>
> You will find the MAC address on the device housing.

> **Note**
> The new password to be set by you may not exceed 8 characters and spaces are not permitted. The characters after the 8th character are cut off!

NETLink PRO Compact

Please enter default password of your device

Please enter the default password of the device. From delivery this is the **last 8** hexadecimal characters of the MAC address (**last 4** bytes). This info is printed on the housing.
Example MAC address: 00:06:**71:19:1B:FC** -> outcoming password: 71191BFC.

default password

Please enter new password

Recommended characters:
- ! "# $ () * +, - /:;?. = @ [\] ^ _ A-zA-Z0-9 \
- spaces are not allowed.
- the password should be at least 5 and may be up to 8 characters long.

new password

repeat new password

Set new password

The device will restart to apply the new password!

Standard login

Use following credetials for the standard login:

Username: NETLink PRO Compact

Password: Your personal password

9.4 Working with the web interface

The Home page provides you access to the following pages:

- Status

- Basic Configuration

- Security

- Observe Variables

9.4.1 Status

The status page, accessible via a link on the home page, provides the user with information without allowing unauthorized reconfiguration of a NETLink S7-Compact.

The page provides general information:

- firmware version, number of possible connections, etc.), and specific information (baud rate, active stations, DHCP status, etc.)

Note

The values shown on this page are all volatile!

Because the NETLink S7-Compact 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.

Diagnostic function

The implemented diagnostic function can be useful for troubleshooting.

Perequisites:

The adapter must be logged into the bus system. This can be done with an engineering tool such as STEP7 or by activating the **[Go Online]** button on the status page.

- Click **[Diagnostic Page]** to activate the function.
  The recognized communication parameters are listed or a status report is issued.

NETLink PRO Compact Diagnostic

[Clear List]

Diagnostic Messages

Fri, 23 Jun 2023 12:28:08	Successfully gone online.
Fri, 23 Jun 2023 12:28:07	Bus parameters received: from PLC = **2**, baud rate= **187.5 KBit/s**, HSA = **31**.
Fri, 23 Jun 2023 12:28:07	Baud rate detected: **187.5 KBit/s**.
Fri, 23 Jun 2023 12:28:07	Going online after bootup, Autobaud: own address = **0**.
Fri, 23 Jun 2023 12:27:42	System start-up...

Note

This function can also be switched on permanently on the Basic Configuration page.

9.4.2 Basic Configuration

Before this page is opened, the user name and the password must be entered.

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

- It can be used to modify device-specific parameters, TCP parameters, and bus-specific parameters, as well as to change the unit's default username and password.

Note

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 inter-face with your access data.

The bus parameters can also be adapted to the single master functionalities. For further details on the RFC1006 function see section RFC1006-Function (S7-TCP/IP)[36] .

With 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.

Before the parameters are actually saved, you will be shown all the changes you made the way they will be stored in the NETLink S7-Compact unit's non-volatile memory (after you click on the **[Store]** button). After clicking on the **[Store]** button, the NETLink S7-Compact unit will be automatically restarted so that the configuration you set up can take effect.

With the Web interface, a NETLink S7-Compact could be started both locally and remotely. This is done by clicking the **[Device Reboot]** button.

Note

Rebooting can take up to 15 seconds.

Note

Every submenu features a Help button that can be used to access descriptions of relevant details and functions.

9.4.3 Security

The security page serves as a configuration interface that allows users to set up access restrictions.

After the security query (see section Basic Configuration[] 45) has been correctly answered, the user has write-access to all parameters that are implemented for TCP security etc.

Up to 12 IP addresses can be added to the device's whitelist. In order to use the TCP access list, the corresponding **ON** option must be enabled (individual list entries are disabled by default). Whitelisted IP addresses must be entered using the four-octet format (e.g.: 192.168.4.59). If you want to delete a whitelisted address or undo its addition to the whitelist, simply select **OFF** in the corresponding row.

Once the configuration is saved, only stations that are whitelisted in this table will be able to establish TCP connections to the NETLink S7-Compact unit.

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 S7-Compact is also prevented.

Note

If you forget the IP addresses on the whitelist, you will no longer be able to reconfigure the NETLink S7-Compact device from an external PG/PC.

It is also possible to activate additional write protection (primarily for CPUs) for any bus nodes connected to the NETLink S7-Compact. If the NETLink S7-Compact 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 S7-Compact web interface are secure.

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 a NETLink S7-Compact Gateway is not guaranteed.

Note

Notice deviation by usage of proxy servers.

With the button **[Factory defaults]** it is possible to restore all parameters to the as-delivered state of the NETLink S7-Compact device. All user-defined configurations will be deleted by this function.

By clicking 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 your settings are consistent, you will be shown the changes you made the way they will be stored in the NETLink S7-Compact unit's non-volatile memory after you click on the **[Store]** button.

After the new parameterization data have been stored, the NETLink S7-Compact is restarted to activate the new configuration.

> **Note**
>
> Rebooting can take up to 15 seconds.

A NETLink S7-Compact can be started both locally and remotely via the security interface. This can be done by clicking the **[Device Reboot]** button.

> **Note**
>
> Every submenu features a Help button that can be used to access descriptions of relevant details and functions.

9.4.4   Observe Variables

In addition to the Observing Variables function in the Simatic engineering tools, NETLink S7-Compact also provides this function via the web interface. The operating menu can be accessed via the **Observe Variables** link. A RFC 1006 communication channel is assigned for these functions.

You can use the drop-down menu to select an active MPI/PB ad-dress, while the number of variables you want to monitor can be set within a range of 1 to 10 according to your own preferences. The page only supports decimal, hexadecimal, and binary display formats, making the output values easy to read and use for diagnostic purposes. The page supports monitoring for the following units (for the address range):

AB, AW, AD, EB, EW, ED, MB, MW, MD, DBB, DBW, DBD, counter, and timer.

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

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 a NETLink S7-Compact. 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.

Once you have configured all the settings you want on the page, click on the **[Save Configuration]** button (with all the variables and free-text descriptions—consisting of a maximum of 32 characters — you created) to save them on the NETLink S7-Compact unit.

> **Note**
>
> Every submenu features a Help button that can be used to access descriptions of relevant details and functions.

10   Troubleshooting

Please refer to the following link for FAQ: <u>Industrial Gateways FAQs</u>

11 Appendix

11.1 Assignment of the Ethernet Interface (host interface)

Connection	Signal	Meaning
1	TX+	Transmit data
2	TX-	Transmit data
3	RX+	Receive data
4		Not in use
5		Not in use
6	RX-	Receive data
7		Not in use
8		Not in use

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 Power supply socket

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

11.3 Address conversion table

The following table is a parameterization aid for finding the correct setting for Routing over RFC or for remote TSAP in addressed mode. Please note that the rack and slot together fill only one byte which is divided as follows:

- Rack fills the upper three bits (11100000bin)

- Slot fills the lower five bits (00011111bin)

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

Bus-addr.	Rack	Slot	TSAP	Bus-addr.	Rack	Slot	TSAP	Bus-addr.	Rack	Slot	TSAP	Bus-addr.	Rack	Slot	TSAP
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				

Bus-addr.	Rack	Slot	TSAP	Bus-addr.	Rack	Slot	TSAP	Bus-addr.	Rack	Slot	TSAP	Bus-addr.	Rack	Slot	TSAP
31	0	31	021F	63	1	31	023F	95	2	31	025F				

12   Declaration of conformity

This device is compliant with EC directive 2014/30/EG, "Electromagnetic Compatibility" (EMC directive) and meets the following requirements:

- EN 55032:2012/AC:201   Electromagnetic compatibility of multimedia equipment (MME) and interference emission
- EN 61000-6-4:2007/+A1:2011   Electromagnetic compatibility (EMC); Part 6-4: generic standard – emission for industrial environments
- EN 61000-6-2:2005/AC:2005   Electromagnetic compatibility (EMC); Part 6-2: generic standard - immunity for industrial environments
- EN IEC 6300:2018   Technical documentation for the assessment obf electrical and electronic products with respect to the restriction of hazardous substances

Note
To fulfill the EMC requirements, the other components of your installation (DC adapter, Industrial Ethernet devices, etc.) also have to meet the EMC requirements. A shielded cable must be used. In addition, the cable shield must be grounded properly.

CAUTION
This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures!

CE
The CE marking indicates conformity with the above standards in a Declaration of Conformity which can be requested from Softing Industrial Automation GmbH.

RoHS
This product is compliant the Restriction of Hazardous Substances under Directive 2002/95/EC.

WEEE
Electrical and electronic equipment must be disposed of separately from normal waste at the end of its operational lifetime in compliance with Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. Packaging material and worn components shall be disposed of according to the regulations applicable in the country of installation.

13   Glossary

Terms & Abbreviations	Definition
ANP	Auto negotiation describes a function that automatically recognizes and configures communication partners in the network
DHCP	Dynamic Host Configuration Protocol
GND	Ground
IP	Internet Protocol
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
HTTP	Hypertext Transfer Protocol
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.
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
PD	Acronym for "Powered Device," a device that consumes energy as per the PoE standard.
PG socket	The programming unit socket of the bus connector allows further bus nodes to be plugged in.
PPI	Point-to-point interface, interface with S7-200 systems with a maximum baud rate of 187.5 kbps
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.
TCP	Transmission Control Protocol
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
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.