S7-Bridge / S5-Bridge

user manual
V1.08

English

User manual compatible with firmware V1.08 or higher!

Content

1 General

1.1 About the manual

This manual describes the devices S7-Bridge and S5-Bridge or within this manual simply called Bridge or device. The devices are combining the advantages of a S7-LAN or S5-LAN++ module and a WLAN Access Point in a single handy device.

This documentation and further documents as well as software and drivers can be found and downloaded from the product page for this device within the "Downloads" section.

This manual only describes the general points as well as the usage of the web server of the Bridge. All further functions and usages of the device are equal to the S7-LAN or S5-LAN++ module and are described within the corresponding manual only.

The manual is aimed to the following user groups:
 • planners
 • operators
 • commissioning staff
 • service and maintenance staff

Before you use this device, you should read this manual and the manual for the S7-LAN or S5-LAN++ device.

If you have questions and / or problems you can contact the technical support from your dealer.

2 System requirements

2.1 Hardware

Before you can start to use the device, you have to supply power to the module. Therefore you can plug the device on your controller. If your controller doesn't supply 24V/DC power on the PG interface you can supply the 24V/DC externally via the small Phoenix connector.

If you want to access the device via a LAN cable, you have to connect your module and PC via such a LAN cable with each other. Alternatively you can also connect your device with a switch, which belongs to your network.

If you want to access the device via WLAN, please make sure that the WLAN antenna is screwed on the SMA connector and your PC is within the radio range of the device.

Important:
If the device is powered with 24V/DC externally, the device itself is protected against reverse polarity, because it has a built-in polarity diode, but if the device is connected in this way to a controller the controller may get damaged.

2.2 Software

If you want to access the web interface of the device, no special software is needed, because the access is done via a simple web browser (e. g. Microsoft Internet Explorer, Mozilla Firefox or Google Chrome). The access to the web interface is independent of the used operating system and web browser of the computer.

Hint:
For the communication between the PC and a controller you may need additionally software. Please read the corresponding chapter in the manual of the S7-LAN or S5-LAN++ module.

3 Commissioning

3.1 Preparation

Before you start to access the web interface of the Bridge or communicate with your controller, you have to satisfy the steps as described in the chapter "System requirements". This means the device have to be powered (via the interface or externally) and maybe connected to your PC or network with a LAN cable.

If you want to access the device via WLAN you have to use a PC or laptop with a WLAN interface. First please check if WLAN is enabled on your computer. In the next step you can search for networks who are within the range of your PC. On this list you should see a network named "S7-Bridge" or "S5-Bridge" (depending on the device type). This network isn't protected with a password and so you can easily connect to it.

The last step before you can start to open the web interface of the device (independently if you access it via LAN or WLAN) is to check and maybe change the IP settings of your PC. The module has the default IP address of 192.168.1.56 (subnet mask 255.255.255.0). Please make sure that your PC is within the same address space, which means it has an IP address within the range of 192.168.1.1 and 192.168.1.254. The IP address 192.168.1.56 can't be used, because it is used by the device itself. If your PC is configured for DHCP, please configure a manual fixed IP address from the range as described above.

If you directly want to attach the device to another subnet you can also use the TIC (for S7-Bridge) or S5-LAN-Manager (for S5-Bridge). This tool allows you to change the IP address of the Bridge or to enable the DHCP functionality on it.

3.2 Access to the web interface

If all preparations are done you can now access the web interface of the device. Therefore you just have to open a web browser, enter the IP address 192.168.1.56 in the address line and confirm the entering. Now the state page of the device should be displayed. For further descriptions please read the section "web server" in the "Control elements" chapter.

Hint:

If you want to access the web interface of the S7-LAN, which is included within the S7-Bridge, you just have to click on the button "open web site", after you have opened the web interface of the Bridge as described above. The explanations about this web pages can be found in the manual of the S7-LAN module. The S5-LAN++ module which is included in the S5-Bridge doesn't have an own web interface.

3.3 Access to the controller

If you want to access your PPI/MPI/Profibus via the S7-Bridge you need the direct driver TIC additionally. The TIC driver then can be used within your programming or visualization software (e. g. SIMATIC Manager or WinCC) to access a controller, panel or other device. For this usage the S7-Bridge behaves equal to a standalone S7-LAN. The integrated S7-LAN module and the S7-Bridge therefore sharing a common IP address. The access to the S7-LAN can be done via LAN or WLAN. For further information about the bus access, please look in the manual of the S7-LAN module.

If you want to access your AS511 interface via the S5-Bridge you need the program PLC-VCOM additionally, which offers you a virtual COM port. This COM port then can be used within your programming software (e. g. STEP 5 or PG200) to access a controller. For this usage the S5-Bridge behaves equal to a standalone S5-LAN++. The integrated S5-LAN++ module and the S5-Bridge therefore sharing a common IP address. The access to the S5-LAN++ can be done via LAN or WLAN. For further information about the access to a controller, please look in the manual of the S5-LAN++ module.

3.4 Usage of the network interfaces

The access to the Bridge as well as the access to the S7-LAN or S5-LAN++ module can be done via the LAN or WLAN interface. This is possible, because both interfaces are grouped together to a network bridge. This means packets between the LAN interface, WLAN interface and the device itself are exchanged without any modifications to the packets (as it e. g. would be the case for routing).

Because of that, you could e. g. connect Profinet participants to the LAN interface of the Bridge and access them with a laptop which is connected to the Bridge via WLAN. The access to the PPI/MPI/Profibus with the help of the TIC driver or to the AS511 interface via the virtual COM port of the PLC-VCOM is still possible in the same constellation.

4 Control elements

The module has multiple control elements, which can be used for diagnostic and configuration of the device. The most important control element of the device is the web server.

4.1 status LEDs

The device has some status LEDs, which can be used for a quick diagnostic of the device status.

LED	color	mode	meaning
front*	green (S7)	off	device has no power supply
		on	device is powered
	green (S5)	off	device has no power supply or S5-LAN++ is not ready
		flashes	devices searches for PLC connection
		on	device is connected with the PLC
	orange	off	WLAN is disabled
		flashes	communication via WLAN running
		on	WLAN is enabled
RJ45 green	green	off	no link state on the LAN jack
		flashes	communication via LAN jack running
		on	link state on the LAN jack available
RJ45 orange	orange	off	S7-LAN or S5-LAN++ is not ready
		flashes	communication with S7-LAN or S5-LAN++ running
		on	S7-LAN or S5-LAN++ is ready

*   The LED on the front (towards the PG interface) is a multi-color LED and has two colors. The LED can also show both colors at the same time.

4.2   buttons

On the right side of the front LED (they can be found in the direction towards the PG interface) you can find a small hole, which includes a small button. This button allows you to set the device back to factory defaults. If you want to set factory defaults you have to press this button with the help of a paper clip for at least 3 seconds and release it again. After that the reset gets executed and your device is available with the default settings as described in this chapter after about 30 seconds.

Important:
The loading of factory defaults with this button applies to the Bridge itself as well as to the within the Bridge integrated S7-LAN or S5-LAN++.

For the S5-Bridge there is another small hole with a button on the left side of the front LED. With the help of a paper clip you can thereby set the included S5-LAN++ module back to its factory defaults. Please use this button when using the operation mode "default" only after the consultation of the support, because thereby DHCP is enabled on the module. For the S7-LAN module which is included in the S7-Bridge such a button for setting factory defaults isn't available.

4.3   web server

If you want to configure the device or check the current state you may want to use the integrated web server of the module.

4.3.1   page structure

All pages consists of a header, a footer and a content area. The menu is hidden by default. With this structure the web page can even be viewed on devices with small resolutions and screen diagonals (e. g. smart phones).
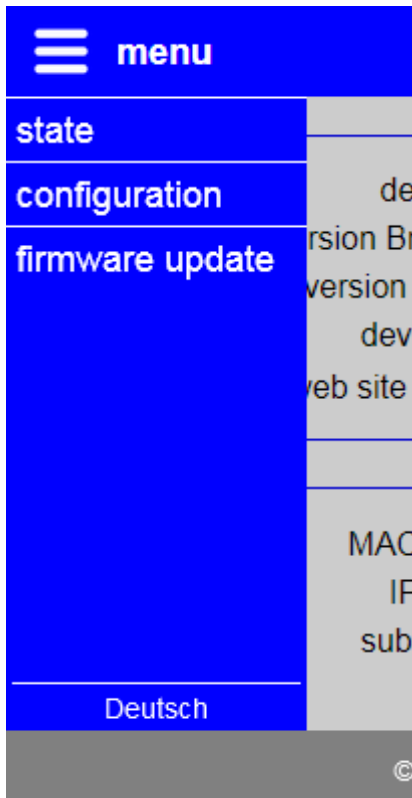
If you want to show the menu, you have to click on the icon or text "menu" on the upper left corner. The menu then gets displayed on the left side. If you want to navigate to one page, you just have to click on the desired entry. If you want to hide the menu you only have to click on the icon or text "menu" again.

The web page language can be changed by clicking on the entry "English" or "Deutsch" on the bottom of the menu. The language selection gets saved within the device.

4.3.2　access protection

The pages „configuration" and „firmware update" can be protected with a password.

The configuration of the password can be done on the page "configuration". If an empty password is set, as it is the case on factory defaults, no password query is displayed and all pages can be accessed directly.

If you have configured a password and want to change the device configuration or execute a firmware update a log in screen will be shown and asks you for the password:

If the password was accepted, you will be redirected to the page you requested originally.

If you are done with your configuration, we recommend to log out from the device. Only thereby you can protect your device against configuration changes by foreigners. A link for the log out can be found on the menu as last entry:

If you have clicked on the entry a message is shown that the log out was recognized. After that you will be redirected to the start page.
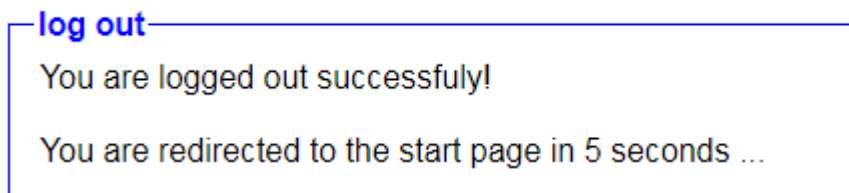
Hint:
If you have executed a device restart, the loading of factory defaults or a firmware update, no log out can be done, because the device executes a restart. Thereby all users are getting logged out automatically.

4.3.3 page state

The page "state" is the start page of the device and shows some status information about the device, the current used network addresses and the connection state for LAN and WLAN. Thereby also some information from the integrated S7-LAN or S5-LAN++ are shown.

Hint:

On S7-Bridge devices there is a button with the text "open web site" within the line "web site PLC part" to open the web server of the integrated S7-LAN module within a new tab or window.

4.3.4 page configuration

On the page "configuration" you can change the settings of your device. This allows you to integrate the device to your network and adapt further parameters as needed for your usage. For a better overview the configuration fields are grouped.

The group „system" shows some information about the device. The update of the firmware from the Bridge part can be done on the page "firmware update". For updating the firmware from the PLC part you will need the TIC (for S7-Bridge) or the S5-LAN-Manager (for S5-Bridge).

With the parameter "device name" you are able to give your device an individual name by entering a name into the field "device name". This name will then be shown on the web page of the device.

Furthermore you can also choose the operation mode of the Bridge. On the operation mode "default", which is set by factory defaults, the access to the Bridge and the corresponding integrated module is done via a common IP address. When you want to configure the Bridge and the integrated module separately you will have to use the operation mode "expert". In this case both devices will have an own IP address.

If you have a S7-Bridge you can open the independent web server of the integrated S7-LAN module by clicking on the button "open web site". For S5-Bridge this button is not available, because the integrated S5-LAN++ module doesn't have an own web server.

The next block is "access protection". There you can configure the password which is needed for changing the device configuration. If you want to change the password you have to enable the "change password" box and enter your old password into the field "current config password". This is used as a verification. Next you have to enter your new password into the two text fields. The repeated input is for your own safety, to reduce the risk of typing errors.

Hint:
An empty password as it is set on factory defaults means that you can access all pages without getting a password prompt.

Within the area "general" you can execute a restart of you device or set it back to factory defaults. Therefore you only need to click on the corresponding button and confirm the safety message.

The button "create file for support" can be used for creating and downloading a file in your browser which contains the configuration and status of your device. This data can be useful for the technical support, if you have any problems with your module.

Within the block "IP settings PLC part" you can change the settings which are used to integrate the PLC part of the device into your network. This parameters apply to the within the Bridge included S7-LAN or S5-LAN++ module and are only available when the operation mode "expert" is used.

field	meaning
name	The name of the included device.
DHCP client	Determines if the included module gets an IP address from a DHCP server on the network. Otherwise the module uses the configured fixed IP address
IP address	The IP address of the included module.
subnet mask	The subnet mask which belongs together with the IP address to the addressable network.
gateway	The IP address of the gateway. *(optional)*

The section "IP settings" or "IP settings Bridge part" allows you to configure the settings which are used to integrate the Bridge into your network. These parameters are when using the operation mode "expert" a complement to the IP settings for the PLC part and applies to the network bridge only. For the operation mode "default" this parameters determines the common IP parameters for the Bridge and the integrated module.

field	meaning	
DHCP mode	-	The Bridge can be reached with the configured fixed IP address.
	DHCP client	The Bridge gets an IP address from a DHCP server on the network.
	DHCP server	The Bridge can be reached with the configured fixed IP address and distributes addresses via DHCP to other participants.
IP address	The IP address of the Bridge.	
subnet mask	The subnet mask which belongs together with the IP address to the addressable network.	
gateway	The IP address of the gateway. *(optional)*	
DNS server	The IP address of the DNS server. *(optional)*	

Important:

When using the operation mode "expert" the IP address of the PLC and Bridge part have to differ. The subnet of both parts is the same on most cases. But the configuration of different subnets is still possible if needed.

The last block on this page is „WLAN settings". Here you can configure the WLAN network of your module. The device also can connect to an already existing network. The following parameters can be configured:

field	meaning	
deactivate WLAN	Determines if the WLAN interface should be disabled.	
MAC address	Determines if the WLAN MAC address should also be used for the IP communication from the bridge. Otherwise an own MAC address for the communication is used.	
search	Allows you to search for WLAN networks.	
mode	Access Point	The device provides an own WLAN network.
	client	The device connects to another existing network.
WDS mode	Determines if the WDS mode should be used for the WLAN interface.	
SSID	The SSID (the name) of the WLAN network.	
security type	The security type / encoding of the network.	
password	The password which is needed for logging in to the WLAN network.	
hide SSID	Determines if the SSID should be hidden. *(can be configured in mode Access Point only)*	

channel	The channel of the network. The setting "auto channel" automatically selects the best channel.

Hint:

The setting for the usage of the WLAN MAC address is set automatically, if the operation mode "default" is used or the mode "client" is selected and the option "WDS mode" is disabled. This setting can't be disabled when using this configuration.

Important:

If you selected the mode "client" and enabled the option "WDS mode" you have to make sure that your Access Point supports the WDS mode. When your Access Point doesn't support this mode, you have to disable this option, because otherwise you won't be able to communicate with your Bridge via WLAN.

If you want to search for WLAN networks who are within the radio area, because you aren't sure which settings are correct for your network, you can simply click on the button "start search" within the line "search". Now you should see the following hint:

search: ☼ search is running ...

After a few seconds the search should be done and you should see the list of available networks:

BSSID	SSID	security	channel	signal
c4:93:00:09:34:bd	TINA WiFi	open	1	▂▃
00:1e:c0:1a:83:1f	EtherSens WiFi	open	1	▂
c0:56:27:8d:ec:d9	Service network	WPA2	10	▂▃
c0:56:27:8d:ec:ff	Service network	WPA2	7	▂▃▄

If you have found your network within the list you can click on the corresponding entry. All parameters except the password for your WLAN network are then filled in automatically.

If you want to use your module in Access Point mode it can be useful to determine which WLAN channel is least burdened. Therefore you can click on the magnifying glass symbol. Now you should see a loading symbol and after a few seconds a list with WLAN networks and a channel load diagram. With this help you can now select which channel you want to use for your module.

channel usage

	2						1			1	
1	2	3	4	5	6	7	8	9	10	11

channel	SSID	signal	
1	TINA WiFi	-57 dBm	
1	EtherSens WiFi	-81 dBm	
7	Service network	-46 dBm	
10	Service network	-65 dBm	
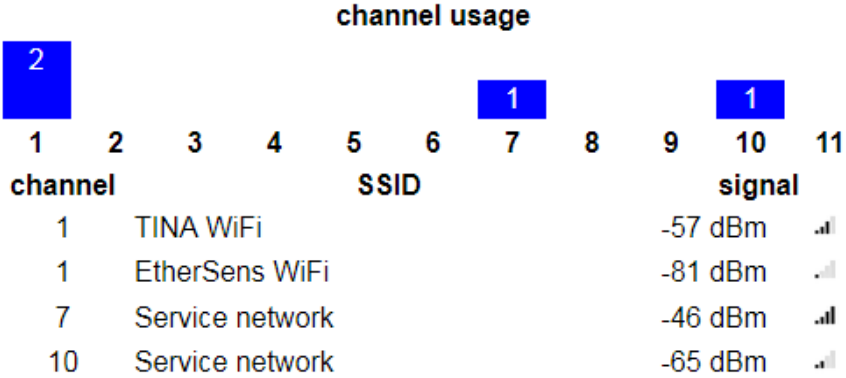
Hint:

The channel with the least networks on itself and on its neighbor channels can offer the best connection.

Important:

Do never connect the LAN and WLAN interface of your module with the same network. This leads to a network bridge and can brick your complete network.

If you have finished your configuration you can click on the button "submit configuration" on the bottom of the page. A hint gets shown that the configuration will be saved and you get redirected to the start page.

> **The settings are getting saved ...**
>
> Please wait for a moment!
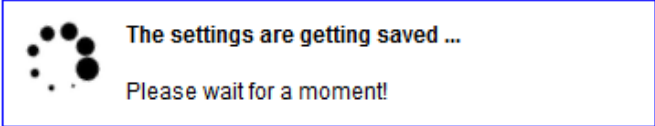
If your module doesn't respond within the next 5 seconds (e. g. because the IP address or the WLAN network has changed) the following hint will be shown:

The web page still tries to connect to the device and would redirect you to the start page after the device is reachable again.

If you aren't get redirected after about 1 minute, please check if the (new) IP address of the device suits to the address of your PC and if you are still connected with the WLAN or LAN of the device.

Hint:
If you have configured the IP mode to "DHCP client", no automatically redirection can be done, because the new IP address of the device isn't known yet.

4.3.5   page firmware update

```
┌ firmware update ──────────────────────────────┐
│   device version: 1.00                         │
│   firmware file:  [ Durchsuchen... ]  Keine Datei ausgewählt. │
│              [ update firmware ]               │
└────────────────────────────────────────────────┘
```

The page "firmware update" can be used to update the firmware of your device. Before you can do a update (if available) you have to download the current firmware from the product page, click on the "Browse ..." button and select the downloaded firmware file. Now you can click on the button "update firmware" to start the update process.

In the first step the file gets uploaded. Thereby you should see the following message:

```
┌ firmware update ──────────────────────────────┐
│  ⟳ file get's uploaded and checked ...          │
│                                                 │
└────────────────────────────────────────────────┘
```

After a few seconds (depending on your connection) when the file is uploaded, checked and accepted the following message will appear:

```
┌ firmware update ──────────────────────────────┐
│  ⟳ firmware get's updated                       │
│   ┌──────────────────────────────────────────┐ │
│   │  ⚠   Important: This process takes about 2-3 minutes. │ │
│   │     After this time you can reconnect to the device and click on │ │
│   │     here to be forwarded to the start page. │ │
│   └──────────────────────────────────────────┘ │
└────────────────────────────────────────────────┘
```

The following update process now takes about 2-3 minutes. After that you should be redirected to the start page of the device. If this isn't the case and you access the device via WLAN you may want to check if your computer is still connected with the WLAN network. When there isn't a connection established you should connect to the network manually.

4.4 EtherSens-Manager

The EtherSens-Manager is a windows program *(requires Visual Studio C++ 2010 Redistributable 2010 x86)* which can be used to search for EtherSens and Bridge devices. The configuration via the program can be done for EtherSens devices only.
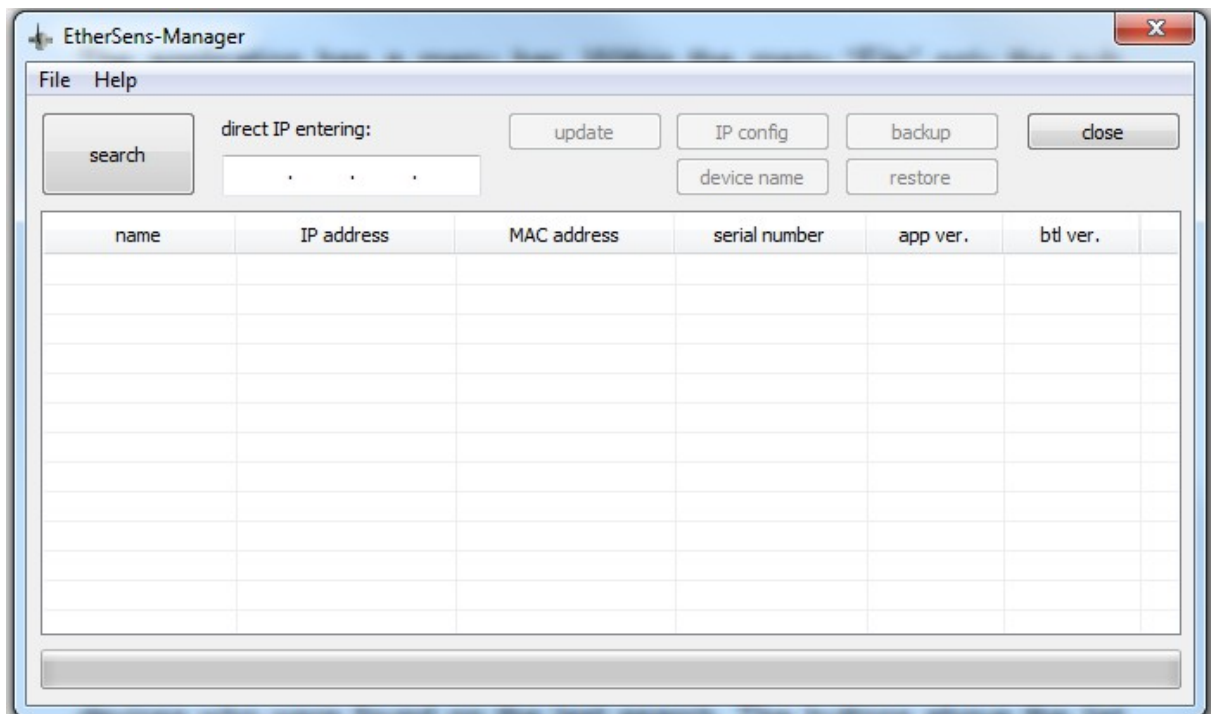
The application has a menu bar. Within the menu "File" only the sub menu item "Close" is located which can be used to close the application. This has the same effect as closing the program with the help of the X icon in the title bar. The menu "Help" consists of the two sub menu items "Language" and "Info".

When clicking on the menu item "Language" a small window will appear where the language of the program can be switched between "German" and "English". This configuration gets saved in your PCs registry.


If you click on the menu item "Info" a dialog will be shown. In the dialog the name, version and copyright of the program gets displayed.

The main component of the window is the list view. The list shows all devices who were found on the last search. The buttons above the list belong to the list, but are mainly available for EtherSens devices only.

4.4.1   Search for devices

If you want to search for devices in the network you have to click on the big "search" button on the top left corner. When the search has completed, all devices who were found will be shown.
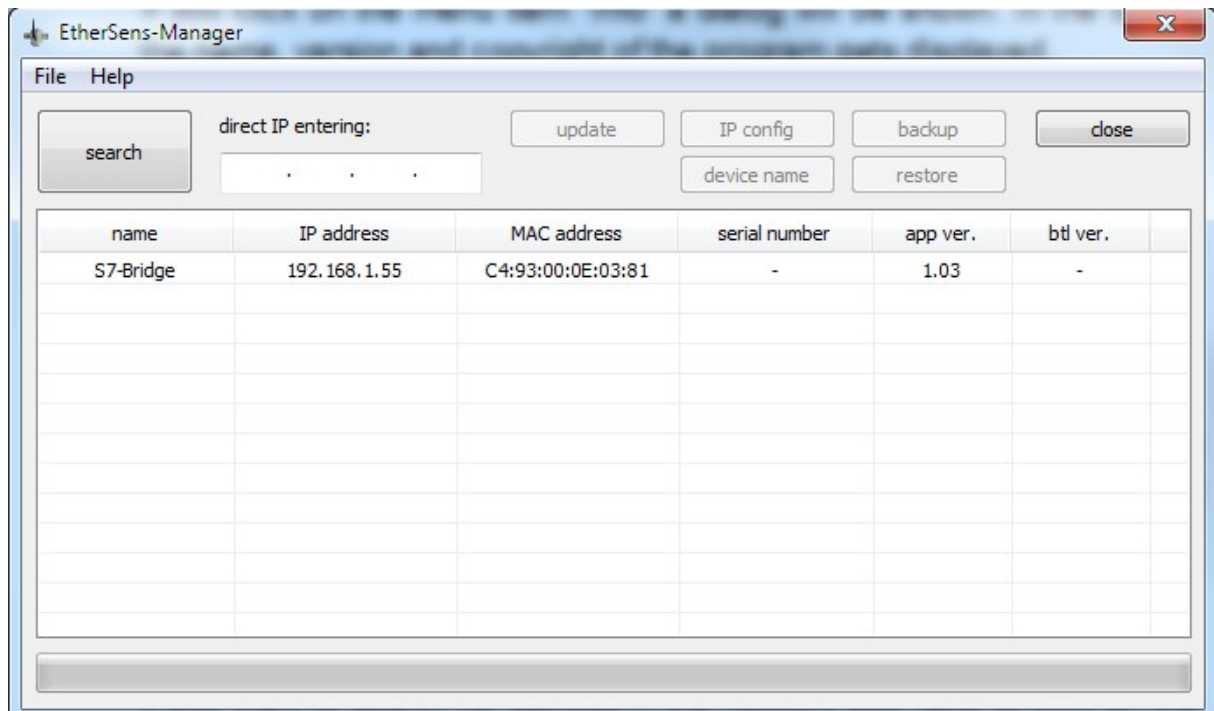
The device search uses a broadcast message. Thereby only devices who are in the same physical subnet can be found. Devices who are located behind a router can't be found.

If you want to check if a device who is located behind a router is available, you have to enter the IP address of the device in the field "direct IP entering". Thereby a separated packet get sent to the specified IP address after clicking on the "search" button.

Hint:
If you can't find any device, even if you have devices in the same network, please verify that the firewall doesn't block the UDP port 293.

5 Technical data

5.1 S7-Bridge

Supply voltage:	24V DC +/- 20%
Power consumption:	3 watt
Display:	web browser status LEDs
Handling/Configuration:	web browser TIC driver and configuration program
Interfaces:	**to the PLC:** PPI/MPI/Profibus interface 9,6 KBd – 12 MBd **to PG/PC:** 9pol. PG/diagnostic jack 10/100 BaseTX RJ45-Ethernet jack antenna-connetor RP-SMA(f) (IEEE 802.11b/g/n)
Operating temperature:	0 - 55°C
Protocols:	RFC1006, DHCP, HTTP
Case:	ABS plastic case
Dimensions:	120 x 43 x 17 mm

5.2 S5-Bridge

Supply voltage:	24V DC +/- 20%
Power consumption:	3 watt
Display:	web browser status LEDs
Handling/Configuration:	web browser S5-LAN-Manager
Interfaces:	**to the PLC:** TTY/20mA current loop **to PG/PC:** 10/100 BaseTX RJ45-Ethernet jack antenna-connetor RP-SMA(f) (IEEE 802.11b/g/n)
Operating temperature:	0 - 55°C
Case:	ABS plastic case
Dimensions:	100 x 58 x 21 mm