S7-Firewall
user manual

(english)

Art.Nr. 9373-S7-FIREWALL

17.05.2019

© PI 2019

Content

1 Installation 3
1.1 Power connection 3
1.2 LAN-connector 3
1.3 introduction 3
1.4 hardware execution 3
1.4.1 standard hardware execution 3
1.5 configuration 4
1.6 configuration 4
1.7 network configuration 5
1.8 DHCP fixed MAC /IP address mapping 7
1.9 NTP client 7
1.10 web user 7
1.11 S7 firewall settings 8
1.12 entering of the HMI / PG station 8
1.13 entering of the SPS station 8
1.14 entering of the S7 firewall connections 9
1.15 The rulescript 9
2 Technical data 10
2.1 pin assignment power supply 10
2.2 Pinning Ethernet 10

1 Installation

1.1 Power connection

For the power supply to the device is either the included AC adapter or an existing local power supply with min. 24V DC 350mA power connected to the 3-pin green plug. In the included AC plug adapter the power poles are marked with colored sleeves.

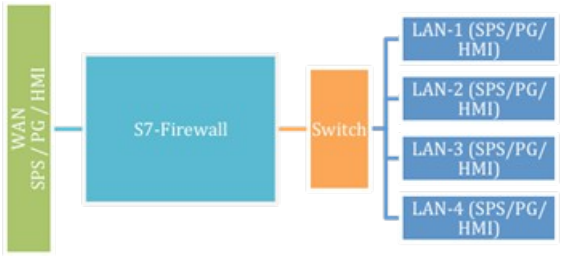
The PLUS-pole with the color "red", the MINUS pole with the color "blue". Connect the POSITIVE pole of the left screw terminal and the NEGATIVE pole on the right (outer) screw terminal. The middle connector is used to ground and must be connected to PE.

1.2 LAN-connector

This connector is an autosensing 10/100 Mbit/s connector. For the connection to a Hub or a network connector, you should use a socalled patch-cable (both sided RJ-45, 1to1, shielded).

1.3 introduction

The S7 firewall is a scalable "SPS firewall", which not only filters IP / MAC addresses. For user-defined connections the access can be restricted to any data areas of the SPS or be set. The S7 firewall can be incorporated between any SPS and operating / programming level. The S7 firewall automatically detects the installation direction. There are only configured connections permitted.



1.4 hardware execution

1.4.1 standard hardware execution

In the standard execution the S7 firewall is equipped with a WAN port and 4 LAN ports configured as a switch.

Betriebsarten	S7-Firewall
Services	DHCP Client/Server NTP Client/Server
Anschlüsse	1 x WAN 4x LAN-Port als Switch

1.5 configuration

In the configutation the network settings etc. can be configured. The entry forms are self-explanatory in general. But we will like to receive suggestions from users to make operation even easier.

In delivery the following IP addresses are set:

192.168.1.57

192.168.2.1

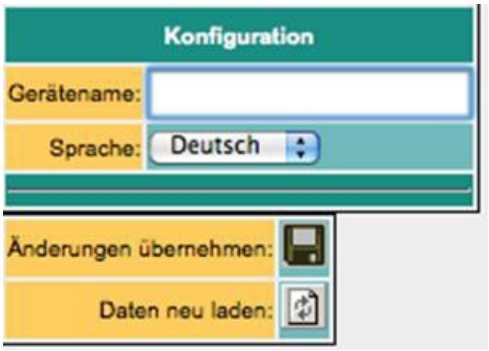
You have the following options, to address the S7 firewall via web browser:

On the PC an IP address from the corresponding line segment awarded (eg 192.168.1.100 or 192.168.2.100) and connect the corresponding PC with LAN or WAN via Ethernet. Enter http://192.168.1.57, bzw. http://192.168.2.1 in your web browser. Or set your computer to automatically obtain IP address and connect him to the LAN port of the TeleRouter. TeleRouter automatically tells the PC an IP address. In your browser, you can use the device with http://telerouter
That the S7 always starts with these basic settings without the made settings get lost, proceed as follows:

- place a paper clip or something similar ready to operate the factory reset button. Do not worry, we make no factory reset. The button is hidden between WAN and LAN ports. There is a small hole. There, insert the paper clip.
- unplug the device
- turn power back
- When the four LED's go out and only the Power LED is on, hold down the button with the paper clip until all 4 LEDs flash quickly.
- release the button
- If the LED S3 (bottom right) lights press the button again.

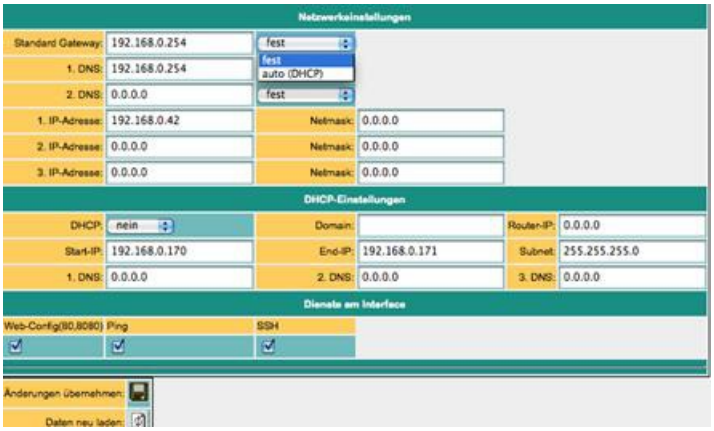
Then the device will boot in the default settings. Now, the desired changes to the Network settings can be made. These settings are only after restart the device active.

1.6 configuration



parameters	possible settings	purpose
device name	"as desired"	
language	deutsch english	specifies the language of the user level Maybe after the change relod the page in the web browser
standard gateway	as specified from WAN via DHCP from WAN via PPPoE from LAN via DHCP from modem via PPP	
1. DNS		
2. DNS		
routing mode	office	LAN -> routing interface
	Maschine	routing interface -> LAN
routing interface	WAN/IP	IP routing via WAN
	modem	IP routing via modem
	WAN/PPPOE	IP routing via PPPoE at the WAN-Port
	WAN/OVPN	routing via OVPN at the WAN-Port
	WAN/Bridge	ethernet routing at the WAN-Port

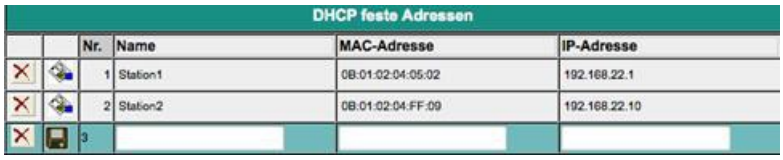
1.7 network configuration



parameters	possible setting	purpose
standard gateway	as desired via DHCP	
1. DNS		
2. DNS		
1-3. IP address with netmask	IP address / netmask	If the netnask is 0.0.0.0 the netmask will automatically calculated depending to A, B, C-B network. e. g. 192.168.0.x -> 255.255.255.0 10.x.x.x -> 255.0.0.0 When using fixed IP addresses at least 1 IP address is to configure. Otherwise the device starts with the factory settings.
DHCP	no	kein DHCP verwenden The remeaining DHCP parameters will not be used
	client	The network interface is a client and obtains the IP address automatically from a DHCP server. The remeaining DHCP parameters will not be used
	server	The Netzwerkinterface provides a DHCP server. The remeaining DHCP parameters will be used.
start IP	start IP address	start IP address when operating as a dhcp server
end IP	end IP-Adresse	end IP address when operating as a dhcp server
subnet	subnet address	address of the subnet for the award of IP addresses as a DHCP server
domain	free	name of the domain by using the DHCP server
router IP	IP address	Is the IP address that the operation as a DHCP server as a gateway is passed

The WAN / LAN port has shared IP addresses. Up to 3 different IP addresses and subnets are configured. The port can also be used as a DHCP server or client. The necessary data for the IP assignment to be entered here. For the operation as a DHCP / server there can be set fixed assignments MAC IP address (See below "DHCP fixed MAC /IP address mapping"). Further defines what services are available at the port (Web config), ping, SSH (for developers only)

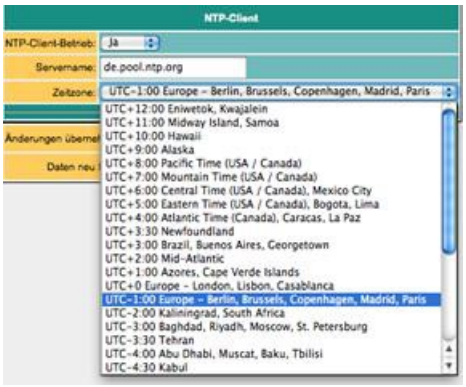
1.8 DHCP fixed MAC /IP address mapping



If the built-in DHCP server (at the WAN or LAN) is operated, it can be useful, to allocate specific IP stations always the same IP address. Here you can specify which MAC address is replaced by which IP address.

1.9 NTP client

So that TeleRouter always runs at the current time, we have implemented an NTP client. So TeleRouter can automatically via internet or by any other available in the network time server synchronize the date and time.

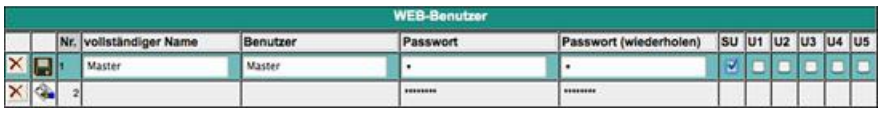


paramters	possible settings	purpose
NTP client operation	yes no	Turns the NTP client on or off.
service name	IP address / domain name of the NTP servers	Enter the IP address or the domain name of the NTP server. Make sure that theses servers through the specified routing path is accessible
time zone	time zone, in which the TeleRouter is operated	necessary, for the correct local time at the TeleRouter

1.10 web user

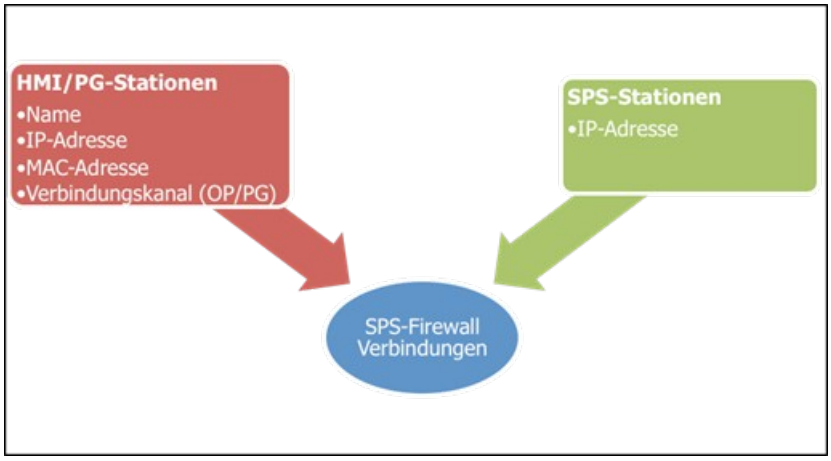
Here the mask for entering the web user interface. Different permissions can be assigned per user.

Generall, only one user is allow to make "SU"-changes. U1 - U5 only can use the interface. In the TeleRouter expansion modules "U1" - "U5" have more precisely specified operation rights.



1.11 S7 firewall settings

The SPS firewall connections consits of the HMI/PG station and the SPS station



1.12 entering of the HMI / PG station

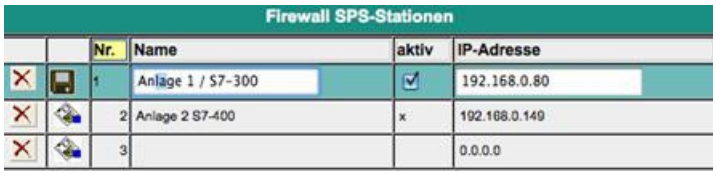
Firewall HMI/PG-Stationen

		Nr.	Name	aktiv	IP-Adresse	MAC-Adresse	Verbindungskanal
✕	💾	1	OP1 (70)	☑	192.168.0.70	00:0C:29:55:E4:79	OP/HMI
✕	🔧	2	PG1 (71)	x	192.168.0.71	00:00:00:00:00:00	OP/HMI / PG
✕	🔧	3	OP2 (72	x	192.168.0.72	00:0C:29:55:E4:79	PG
✕	🔧	4	PG2 (120)	x	192.168.0.120	00:00:00:00:00:00	PG
✕	🔧	7		x	0.0.0.0	00:00:00:00:00:00	OP/HMI

parameters	possible setting	purpose
No.	automatically	ongoing number
name	freely entered by the user	name oft the station
active	yes (x)	connections with this station are processed by the firewall
	no ()	connections with this station will not be processed, i. e. they are blocked
IP address	IP address of the HMI / PG device	identification of the sender input necessarily necessary
MAC address	MAC address of the HMI / PG device	Identifies the HMI / PG addition on the MAC address. 00:00:00:00:00:00 means that the MAC address is not cheked. When equal to 0, the MAC address of the station must match to the input.
connecting conduit	used channel of communication	In Simantic S/ PG and OP channels are available. This channel is used as an additional characteristic for identification of the sender. On each of two channels in both PG and OP functions are possible. HMIs / WinCC etc. typical use OP channels. The Siemens PG software always uses the PG channel. Unfortunately, different software on the market is in use, which does not have the know-how to set this channel. To figure that out, you have to

		check the logfile. A reasonable HMI software, respectively, the corresponding software driver provides the adjustability of this channel. Should for example from the same computer the PG and HMI (IP / MAC identicial to PG / HMI) running, remeans only the PG / OP channel to identify the sender.

1.13 entering of the SPS station



Parameter	mögliche Einstellung	Zweck
Nr.	automatisch	fortlaufende Nummer
Name	frei vom Benutzer einzugeben	Name der Station
aktiv	ja (x)	Verbindungen mit dieser Station werden von der Firewall verarbeitet
	nein ()	Verbindungen mit dieser Station werden nicht verarbeitet, d.h sie werden geblockt
IP-Adresse	IP-Adresse der SPS-Station	Identifikation des Absenders Eingabe unbedingt notwendig

1.14 entering of the S7 firewall connections

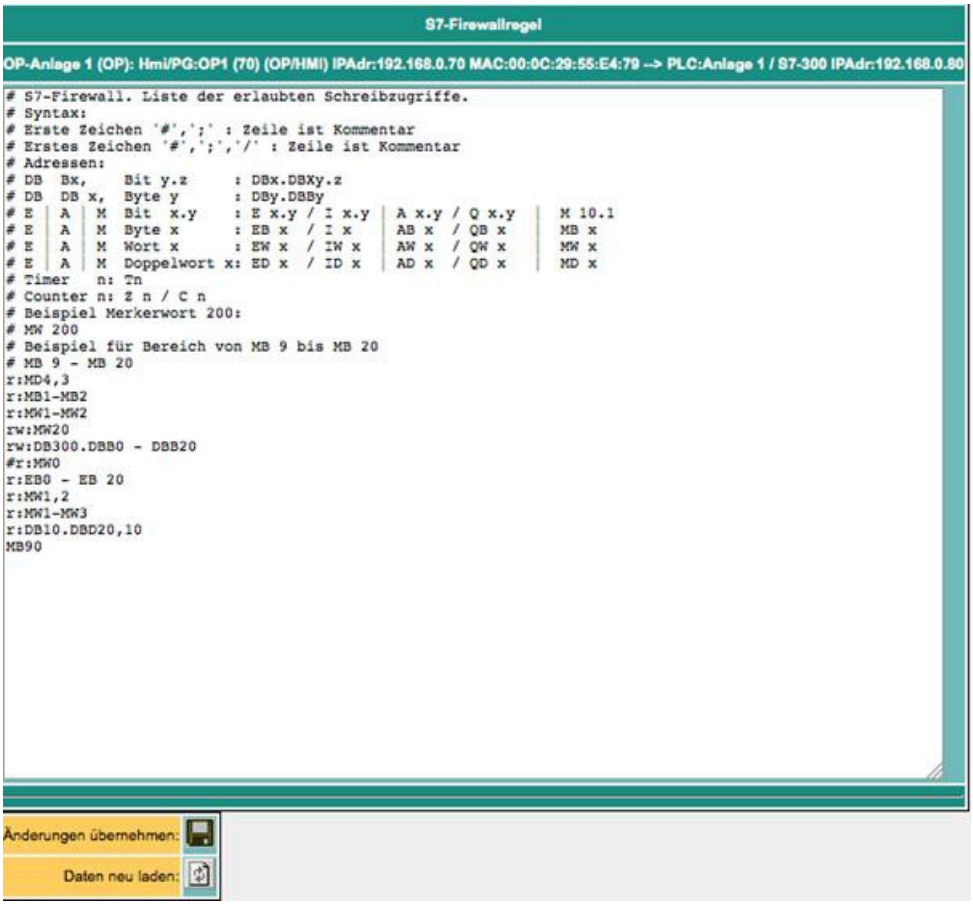
The connections are formed from the combination of HMI /PG station and SPS station. Each HMI / SPS station can be used repeatedly. By changing from MAC or IP address, you must only be chang this in the HMI / PG station and SPS station. Every connection is organized to a connection rule. If "allow PG full-function" is selected, this connection has full access. In the future, this access is to be divided in more detail (read / write defined blocks, SPS start / stop, general reset, read / write system data).

parameters	possible setting	purpose
No.	automatically	ongoing number
name	freely entered by user	name of the connection also serves as a "link" to open and edit the control script
active	yes (x)	connections with this station are processed by the firewall
	no ()	connections with this station will not be processed, i. e. they are blocked

allow PG full function	yes (x)	This connection is a PG connection and can be perform all functions
	no ()	This connection is a limited connection. There are only accesses to the shared functional and data areas allows, as definied in the accompanying control script.

1.15 The rulescript

In the rule script, the data areas or possible requests for that connection are defined. The script can be accessed via the link of the name of the connection.



syntax of the rule script

first signs	function	rest of the line
#	the line is a comment	free text
//		
(no sign it follows the same operand / area)	The following area is only to read (read only)	operand / area (see below)
r:		
w:	The following area is only to write (write only)	
rw:	The following area is to read and to write (read/write)	

In a control line, a single operand, or I a area entered. **Example for the inputting of indiviudal operands:** (Source from Siemens STEP-S7 PG-Software)

allowed operands	data type	example (mnemonic german)	example (mnemonic english)
Input | output | flag	BYTE	EB 1 | AB 10 | MB 10	IB 1 | QB 10 | MB 10
Input | output | flag	WORD	EW 1 | AW 10 | MW 10	IW 1 | QW 10 | MW 10
Input | output | flag	DWORD	ED 1 | AD 10 | MD 10	ID 1 | QD 10 | MD 10
peripheral (Input | Output)	BYTE	PB 0 | PEB 0 | PAB 1	PB 0 | PIB 0 | PQB 1
peripheral (Input | Output)	WORD	PW 0 | PEW 0 | PAW 1	PW 0 | PIW 0 | PQW 1
peripheral (Input | Output)	DWORD	PW 0 | PED 0 | PAD 1	PD 0 | PID 0 | PQD 1
times	TIMER	T 1	T 1
counter	COUNTER	Z 1	C 1
data block	BOOL	DB1.DBX 1.0	DB1.DBX 1.0
data block	BYTE	DB1.DBB 1	DB1.DBB 1
data block	WORD	DB1.DBW 1	DB1.DBW 1
data block	DWORD	DB1.DBD 1	DB1.DBD 1

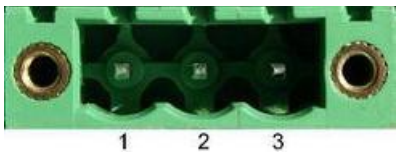
Hint: The inputting of "DB0. .." is not allowed because internal use.

Example for entering areas with Number of Units: from Memory bit 60, 10 byte: MB60, 10 from DB10, word 2, 5 words: DB10.DW2, 5
After the decimal point follows the desired number of units (depending on the address type, BOOL, BYTE, WORD, DWORD)

For example, the input areas of "from" - "to" byte 70 to byte 200: 70 MB - 200 MB
Output A Output 10.2 to 14.7: A 10.2 - A14.7
Easy to start with operands, -, specify the end operands (end address). The end address is included!

2 Technical data

2.1 pin assignment power supply



Pin number	Short form	Designation	Direction
1	P24V	24V DC voltage	input
2	PE	earthing	input
3	M24V	mass	input

2.2 Pinning Ethernet

Pin no.	Short name	Notation	Direction
1	TX +	receive line +	Out
2	TX –	receive line –	Out
3	RX +	send line +	In
6	RX –	send line –	In