

# S5/S7-TimeServer

**user manual**

**V1.01**

English



User manual compatible with software V1.00 or higher!

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# 1 General

## 1.1 About the manual

This manual describes the device S5/S7-TimeServer, sometimes only named device within the following pages. The device has built in GPS, WLAN and LTE and is available in an Europe and a World edition. Furthermore the S5/S7-TimeServer has some integrated digital and analog IO ports which can be used for small controlling and messaging tasks additionally to the function as a time server.

This documentation can be downloaded on the web page of the product via downloads → documentation.

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 the manual.

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 it. For this you will need the included plug-in power supply.

Furthermore you will need to connect the GPS antenna to device and make sure that you have a GPS signal on the location of the antenna.

If you want to do the setup of the device via cable you will additionally need a LAN cable.

When you instead of this want to do the access the device via WLAN you will have to screw the WLAN antennas to the SMA connectors of the device and make sure that your PC is in the range from the device.

### 2.2 Software

If you want to access the web server of the device to check the status or make changes on the configuration you only need an internet browser (e. g. Microsoft Internet Explorer, Mozilla Firefox or Google Chrome). The using of the device is independent of your operating system and browser from your computer, tablet or mobile phone.

#### **Important:**

For viewing the website correctly you should check that JavaScript is enabled in your browser.

## 3 Commissioning

Please make sure that all requirements who are listed within the chapter “System requirements” are met. Afterwards you can connect to the device and then access the web server of it.

### **Important:**

This chapter describes the factory defaults of the device. Via the web interface you can configure the single interfaces individually, so an access to the web interface is also possible via another interface.

### 3.1 Connect to the device

Before you can start to configure and later use your device you have to access it first. For the S5/S7-TimeServer the three LAN ports as well as the WLAN network which is offered from the device by default are a common interface.

When you want to access your device via WLAN you first have to make sure that the WLAN interface of your laptop or tablet is enabled. Then you should open the list with available WLAN networks. There you should now see a WLAN network with the SSID “RUT955\_\*\*\*\*”. The exact SSID as well as the needed password can be found on the labeling on the bottom of the device.

If you want to access the device through one of the LAN ports, you only have to connect your computer and the device with a cable.

As soon as you are connected with the device via WLAN or LAN you have to check and maybe adjust your IP configuration. The device is configured that a DHCP server is running on this interface. If your device, which should be connected with the S5/S7-TimeServer, is set up that it requests an IP address via DHCP automatically no further action is required. Otherwise you have to enable DHCP on your device or alternatively assign an address between 192.168.1.2 and 192.168.1.254 manually.

## 3.2 Access to the web server

As soon as your PC has a valid IP address you can now access the integrated web server of your device. For this you have to open a web browser and enter the IP address 192.168.1.1 into the address line. Now you should see the start page of the device. There you will now be able to configure the PLC stations where you want to do a time adjust.

The description of this page as well as all other pages for the integrated web server can be found within the section “web server” in the chapter “Control elements”.

## 4 Control elements

### 4.1 status LEDs

The S5/S7-TimeServer has multiple different status LEDs on the front side of the device.

The first green LED is located on the bottom left corner next to the power connector and lights when the device is powered.

For a simple diagnostic of the RJ45 interfaces every connector has its own green LED. This LED lights when a link state is detected and blinks on data transfer.

Furthermore there are some more LEDs on the bottom right corner for a diagnostic of the mobile connection. The five green LEDs below the bars are showing up the signal strength. This means the more LEDs are light up the better the signal is. The LED directly below the mobile symbol is a multi color LED and gives more information about the current general mobile connection:

colors	behavior	meaning
green + red	blinks alternatively every 500ms	no SIM card detected or bad pin code
green + red + orange	blinks alternatively every 500ms	GSM connection gets established
red	blinks every 1s	GSM connection without data connection
	lights / blinks	GSM connection with data connection <i>(blinks on data transfer)</i>
orange	blinks every 1s	UMTS connection without data connection
	lights / blinks	UMTS connection with data connection <i>(blinks on data transfer)</i>

green	blinks every 1s	LTE connection without data connection
	lights / blinks	LTE connection with data connection <i>(blinks on data transfer)</i>

## 4.2 buttons

The device has a single button on the rear of the case, which can be pressed with the help of the supplied needle or a paper clip. The usage of the button can be individually configured on the web interface from Teltonika. From factory default the following actions are executed depending on the time span where the button is pressed:

min time	max time	meaning
0	5	restart
6	11	restoring user defaults
12	20	restoring factory defaults

### **Important:**

When restoring the user or factory defaults the S5/S7-TimeServer software is removed from the device too. Only to this step in conjunction with the technical support.

## 4.3 web server

The operation of the device for configuration and status checking is done via the integrated web server. The access to the web server is possible via all enabled interfaces who have an IP configuration.

### 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 or monitor sizes (e. g. smart phones).

If you want to show the menu you have to click on the icon or the 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.

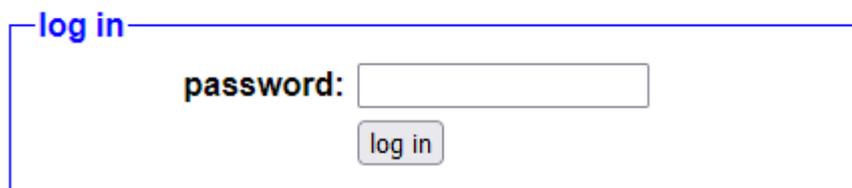
Furthermore the logo from Teltonika Networks is shown on the left side of the footer. When you have clicked on this logo the web interface of the RUT955 from Teltonika gets opened. There you can then parameterize some further settings which are independent of the S5/S7-TimeServer software. For more information about this settings please look into the manual from Teltonika.

### 4.3.2 access protection

To avoid an inadvertent change of the configuration as well as enabling, disabling or triggering a time adjust for a station the complete web page can be protected with a password.

The configuration of the password is done on the page “configuration”. If an empty password is specified, as it is the case on factory defaults, no password query will be shown and all pages can be accessed directly.

If you have configured a password, you will be queried to enter a password with the following dialog:



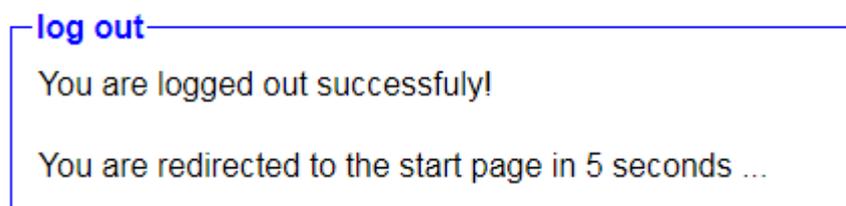
The screenshot shows a dialog box with a blue border. At the top left, the text "log in" is written in blue. Below it, the text "password:" is followed by a white rectangular input field. Underneath the input field is a button with the text "log in" inside it.

After you have entered the password and clicked on “log in” you will be redirected to the page, which was requested before.

Because of security reasons we recommend to log out of the device after you have finished your work. Therefore you will see the menu entry “log out” on the menu:



After you have clicked on the menu entry you will see the following message and will be redirected to the start page after 5 seconds, which then queries for a password again:



The screenshot shows a dialog box with a blue border. At the top left, the text "log out" is written in blue. Below it, the text "You are logged out successfully!" is displayed. Underneath that, the text "You are redirected to the start page in 5 seconds ..." is shown.

## Hint:

If you have executed a device restart or the loading of factory defaults, no log out have to be done, because thereby all users are getting logged out automatically.

### 4.3.3 page stations

current system time: 25.03.2022 10:30:52

add station

✓	<b>head control (192.168.1.160)</b> <i>time adjust successful (25.03.2022 10:27:32)</i>	⏹️ ⏪ ⏩ ⚡ 🔍
?	<b>S7 PLC shredder (192.168.1.161)</b> <i>time adjust not executed yet</i>	▶️ ⏹️ ⏪ ⏩ ⚡ 🔍
✗	<b>S5 PLC press (192.168.1.162)</b> <i>TCP connection failed (25.03.2022 10:29:12)</i>	⏹️ ⏪ ⏩ ⚡ 🔍

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The page “stations” is the start page of the device and allows you the diagnosis as well as configuration of the PLC stations where a time adjust should be executed.

On the page you can see on the upper right corner the current system time of the device and in the middle the list of stations. A new station can be added by clicking on the button “add station”. Thereby the same dialogue will be shown as for editing an already existing station. The description of the dialog and the list itself can be found in the following sections.

### 4.3.3.1 list with stations



Every configured station will be shown as one entry in the list.

On the left side the symbols shows the current state of the station:

-  time adjust was not executed yet
-  time adjust is currently executed
-  time adjust was executed successfully
-  time adjust was not successful

Next to the status symbol the name and IP address is shown in the first line and the current state or last result as well as the last time of the time adjust in the second line. Further information about the current state can be found in the diagnosis dialog.

On the right side of the entry there are a few symbols which allows you to manage the station:

-  enable automatic time adjust
-  disable automatic time adjust
-  show or change settings of station
-  remove station
-  execute time adjust manually
-  show diagnosis information of station

#### Hint:

Stations where the automatic time adjust is disabled are colored with a light gray background color.

### 4.3.3.2 settings of a station

**settings » station "head control"**

name:	head control
IP address:	192.168.1.160
channel type:	OP connection
rack number:	0
slot number:	1
automatic:	<input checked="" type="checkbox"/> adjust time automatically
interval:	3600 seconds
target / format:	DB S7 LDT
block number:	10
block offset:	0

save close

If you add a new station or open the settings of an existing station a dialog with the following parameters will be shown:

- |                  |                                                                                                                                 |
|------------------|---------------------------------------------------------------------------------------------------------------------------------|
| name:            | A freely definable name for the station which is used for display only.                                                         |
| IP address:      | The IP address of the PLC, the CP or the S5-LAN++ or S7-LAN module.                                                             |
| channel type:    | The channel type or resource which is used for the connection to the PLC.                                                       |
| rack number:     | The number of the rack where the PLC is connected to. ( <i>default 0</i> )                                                      |
| slot number:     | The number of the slot where the PLC is connected to. ( <i>default 2 for S5 or S7-200/300/400 or 1 for S7-1200/1500</i> )       |
| automatic:       | Determines if an automatic time adjust should be executed for this station.                                                     |
| interval:        | The interval in seconds where the automatically time adjust should be executed.                                                 |
| target / format: | Determines if the time should be directly written into the PLC or in which format the time should be written into a data block. |

- **PLC clock:** directly into the hardware clock of the PLC (*only S7-300/400*)
- **DB S7 DATE\_AND\_TIME:** into a DB with the S7 format DATE\_AND\_TIME / DT (*only S7-300/400/1500*)
- **DB S7 LDT:** into a DB with the S7 format LDT (*only S7-1500*)
- **DB S7 DTL:** into a DB with the S7 format DTL (*only S7-1200/1500*)
- **DB binary:** into a DB with a binary format (*see below*)
- **DB ASCII:** into a DB with a ASCII format (*see below*)

block number: The number of the data block where the time should be written to.

block offset: The offset in bytes within the data block where the time should be written to.

If you want to submit the changes you will have to click on the “submit” button. When you click on the button “close” all inputs will be discarded.

#### structure of format “DB binary”

address	description	example
DW0	year	2022
DB2	month (1 till 12)	3
DB3	day (1 till 31)	25
DB4	day of week (0 for Sunday, 1 for Monday, ... till 6 for Saturday)	5
DB5	hour (0 till 23)	10
DB6	minute (0 till 59)	27
DB7	second (0 till 59)	32

DB8	daylight saving time active (bit 0)	0
DB9	time adjust executed (bit 0)	1

### structure of format “DB ASCII”

address	description	example
DD0	year (four digits)	'2' '0' '2' '2'
DW4	month (two digits, 1 till 12)	'0' '3'
DW6	day (two digits, 1 till 31)	'2' '5'
DW8	hour (two digits, 0 till 23)	'1' '0'
DW10	minute (two digits, 0 till 59)	'2' '7'
DW12	second (two digits, 0 till 59)	'3' '2'
DB14	daylight saving time active (Bit 0)	0
DB15	time adjust executed (Bit 0)	1

#### Hint:

The bit “time adjust executed” within the formats of “DB binary” and “DB ASCII” can be used from the PLC to determine if the S5/S7-TimeServer has updated the data block. For this the PLC only needs to reset the bit as soon as the data were read.

#### 4.3.3.3 diagnosis of a station

**diagnosis » station "head control"**

current state:	-
last result:	time adjust successful
last time adjust:	25.03.2022 10:27:32
next time adjust:	25.03.2022 11:27:32

When you open the diagnosis of a station a dialog will be shown with the following information:

current state:                    The current state of the time adjust if a time adjust is executed in this moment.

last result: The result (success or corresponding error) of the last time adjust.

last time adjust: The time of the last time adjust.

next time adjust: The time for the next automatically time adjust.

With the button “adjust time manually” you can trigger a time adjust for this station manually. This button has the same effect as the symbol in the list.

### 4.3.4 page configuration

system

device type: S5/S7-TimeServer  
software version: 1.00  
device name:

access protection

current config password:

config password

change password:  change password  
new password:   
repeat new password:

general

restart:   
factory default:   
support request:

date and time

current system time: 24.03.2022 10:56:33  
time zone:

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On the configuration page (menu item “configuration”) you have the possibility to set various settings. This allows you to configure the device as needed for your usage. The configuration settings are divided in groups and described in the next points in more detail.

#### 4.3.4.1 system

**system**

device type: S5/S7-TimeServer  
software version: 1.00  
device name:

The group “system” in the first place shows some information about the device. The update of the software can be done on the page “software update”.

With the parameter “device name” you are able to give your device an individual name. This name will then be shown on the web page of the device.

#### 4.3.4.2 access protection

**access protection**

current config password:

**config password**

change password:  change password  
new password:   
repeat new password:

Within the block “access protection” you have the possibility to configure the password which is needed for accessing the web interface of the device. 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 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.

#### 4.3.4.3 general



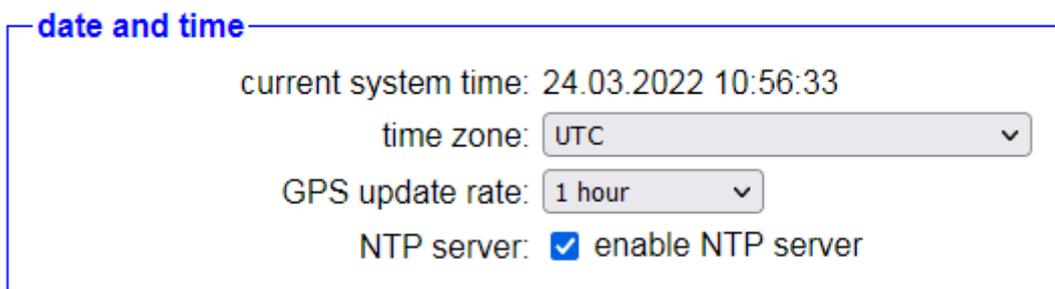
Within the area “general” you can execute a restart of your device or set it back to factory defaults. Therefore you only need to click on the corresponding button and confirm the safety message.

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 device.

#### **Important:**

If you set your device to factory defaults all settings of the device will be lost.

#### 4.3.4.4 date and time



The group “date and time” contains a few general settings for the device:

current system time: The current date and the current time of the device (this value can't be changed directly).

time zone: The time zone where the device is located.

GPS update rate: The update rate in which the device should adjust it's system time via GPS.

NTP server: Determines if the device should offer it's system time as NTP server to other network participants.

**Hint:**

On the NTP protocol the UTC time, thus without the time zone, is used always. If needed you will have to configure the time zone on the devices who query the time from the S5/S7-TimeServer separately.

**4.3.4.5 LAN settings**

**LAN settings**

MAC address: 00:1e:42:27:95:6a

DHCP mode:

IP address:

subnet mask:

gateway:

DNS server:

The settings in this group are used for the network attachment and belong to the LAN interface:

- MAC address: The MAC address of the interface (this value can't be changed).
- DHCP mode: - The device is reachable via the specified address.
- client The device refers an IP address from a DHCP server.
- server The device is reachable via the specified address and provides IP addresses to other devices.
- IP address: The IP address of the device.
- subnet mask: The subnet mask of the device.
- gateway: The IP address of the gateway (optional).
- DNS server: The IP address of the DNS server (optional).

**Hint:**

If the web server should not be reachable through this interface, you just have to disable the DHCP mode and leave the fields IP address and subnet mask empty.

When you want to connect the device via the LAN interface do an already existing network you may want to disable the DHCP server, if you don't want that the S5/S7-TimeServer offers IP address to other network participants.

**Important:**

Within the delivery status from the S5/S7-TimeServer the device offers an own WLAN network. This network belongs to the LAN ports and thus to the settings of the LAN interface.

#### 4.3.4.6 WLAN settings

**WLAN settings**

deactivate WLAN:  deactivate WLAN

interface:  use WiFi WAN

MAC address: 00:1e:42:27:95:6c

DHCP mode:

IP address: -

subnet mask: -

gateway: -

DNS server: -

search:

mode:

SSID:

security type:

password:

hide SSID:  hide SSID

channel:

**WLAN-AP settings**

deactivate WLAN-AP:  deactivate WLAN-AP

SSID:

security type:

password:

hide SSID:  hide SSID

In the group “WLAN settings” you can specify the configuration of the WLAN interface:

- deactivate WLAN: Specifies if the WLAN interface should be disabled or not.
- interface: Specifies if the interface should be used.
- MAC address: The MAC address of the interface (this value can't be changed).
- DHCP mode: - The device is reachable via the specified address.

	client	The device refers an IP address from a DHCP server.
	server	The device is reachable via the specified address and provides IP addresses to other devices.
IP address:		The IP address of the device.
subnet mask:		The subnet mask of the device.
gateway:		The IP address of the gateway (optional).
DNS server:		The IP address of the DNS server (optional).
mode:	Access Point	The device provides an own WLAN network.
	client	The device connects to an existing WLAN network.
SSID:		The SSID / name of the WLAN network.
security type:		The security type / encryption of the WLAN network.
password:		The password, which is needed for logging in to the WLAN network.
hide SSID:		Specifies if the SSID should be hidden (only applicable if the mode is Access Point).
channel:		The channel of the WLAN network. <i>(auto channel = best WLAN channel will be used)</i>

If you are not sure about the settings of your existing WLAN network you can scan for all available WLAN networks. Therefore you just have to click on the button “start search”.

The following message should be shown:

search:  search is running ...

After a few seconds a list with all available WLAN networks is shown:

BSSID	SSID	security	channel	signal
c4:93:00:09:34:bd	TINA WiFi	open	1	▬▬▬
00:1e:c0:1a:83:67	EtherSens WiFi	WEP	3	▬▬▬
c0:56:27:9d:98:db	Test-WLAN	WPA2	7	▬▬▬

To select the configuration of one of the founded WLAN networks you have to click on the row of the entry in the table. Now all required fields (mode, SSID, security type and channel) are filled in with the information. Of course the password have to be entered manually, if necessary.

If you want to configure your device to operate as an Access Point (AP) it can be useful to determine which WLAN channel is least charged. Therefore the device can show you the channel work load. This can be done by clicking on the 🔍 icon behind the channel selection list.

After clicking on the search icon a load symbol will appear instead. A few seconds later the channel work load is determined and shown in a table. This should look similar to the following:

**channel usage**

1	2	2	4	5	6	1	8	9	10	11
channel										
1	TINA WiFi Service							-53 dBm	▬▬▬	
3	EtherSens WiFi							-82 dBm	▬▬▬	
3	Test-AP							-56 dBm	▬▬▬	
7	Test-WLAN							-47 dBm	▬▬▬	

**Hint:**

If the web server should not be reachable through the WLAN interface, you just have to disable the DHCP mode and leave the fields IP address and subnet mask empty. Alternatively you can also just disable the usage of the interface. This is also the factory default of the device.

**WLAN-AP settings**

deactivate WLAN-AP:  deactivate WLAN-AP

SSID:

security type:

password:  

hide SSID:  hide SSID

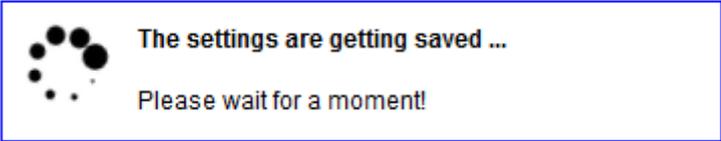
Furthermore you will find the subordinate group “WLAN-AP settings” with some more parameters to configure the WLAN network which is offered by the device from default and belongs to the LAN interface:

- deactivate WLAN-AP: Specifies if the WLAN-AP should be disabled or not.
- SSID: The SSID / name of the WLAN network.
- security type: The security type / encryption of the WLAN network.
- password: The password, which is needed for logging in to the WLAN network.
- hide SSID: Specifies if the SSID should be hidden.

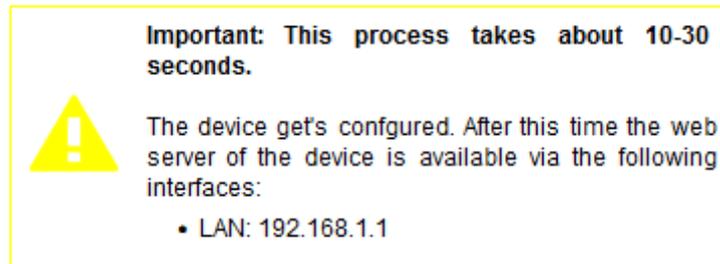
**Hint:**

The WLAN and WLAN-AP settings from the device are completely independent of each other. Only the global deactivation as well as the configured channel belongs to both networks. Because the WLAN-AP belongs to the three LAN interfaces the network uses the same IP parameter as the LAN interface.

If you want to save the configuration you have to click on the button “submit configuration”, which is located at the bottom of the page. Now you should see the following message:



If your device does not respond within the next 5 seconds the following message will be shown:



This message indicates that the device is currently not available under the current IP address (e. g. because the IP address or the WLAN network has changed). In the message you will see under which interface and IP address the device will be available in a few seconds. The web page will still try to reconnect to the web page periodically in the background.

If the automatically re-connection does not work within about 1 minute, please check that the computer is connected with the correct interface. Please do also check the WLAN connection and the IP settings of your computer.

**Hint:**

After the configuration was saved and the device is available again you will be redirected to the start page.

**Important:**

If you have enabled the DHCP client on the device, no automatically redirection to the start page occurs for this interface, because the IP address of the interface is not known yet.

## 4.3.5 page software update

☰ menu

software update

device version: 1.00

software file:  Keine Datei ausgewählt.



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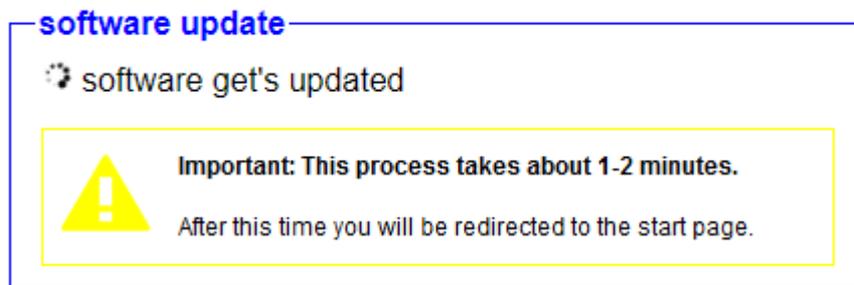
If you want to update the software of your device you should click on the menu item “software update”. On this page you can see your current version of the device and have the possibility to select a file.

After you have selected a software file (this is a file with the extension .ipk) you can click on the button, which will starts the update process. Now you should see the following message:

software update

🔄 file get's uploaded and checked ...

If the file was uploaded and verified as valid software, you will see the following message:



The update process takes about 1-2 minutes. If the process has completed you should be redirected to the start page automatically.

## 5 Technical data

<b>Supply voltage:</b>	9-30V DC
<b>Power consumption:</b>	7 watt
<b>Display:</b>	web browser status LEDs
<b>Handling/Configuration:</b>	web browser
<b>Interfaces:</b>	4 x 10/100BaseT RJ45-ethernet-plug (3 x LAN, 1 x WAN) 2 x Antenna-connector RP-SMA(f) (2.4 GHz IEEE 802.11 b/g/n) 2 x Antenna-connector SMA(f) (FDD LTE / TDD LTE / 3G / 2G) 1 x Antenna-connector SMA(f) (GNSS / GPS) 1 x RS485 port via plug-connector 1 x RS232 port via D-Sub 9 pins female 2 x digital input (1 x 0-3V, 1 x 0-30V) 1 x analog input (0-24V) 1 x digital output (open collector, 30V, 250mA) 1 x SPST relay output 1 x USB 2.0 socket type A 2 x SIM card slot
<b>Operating temperature:</b>	-40 - 75°C
<b>Case:</b>	metal housing for table or wall mounting
<b>Dimensions:</b>	106 x 80 x 46 mm

### Hint:

The hardware of the S5/S7-TimeServer is equivalent to the RUT955 from Teltonika Networks.