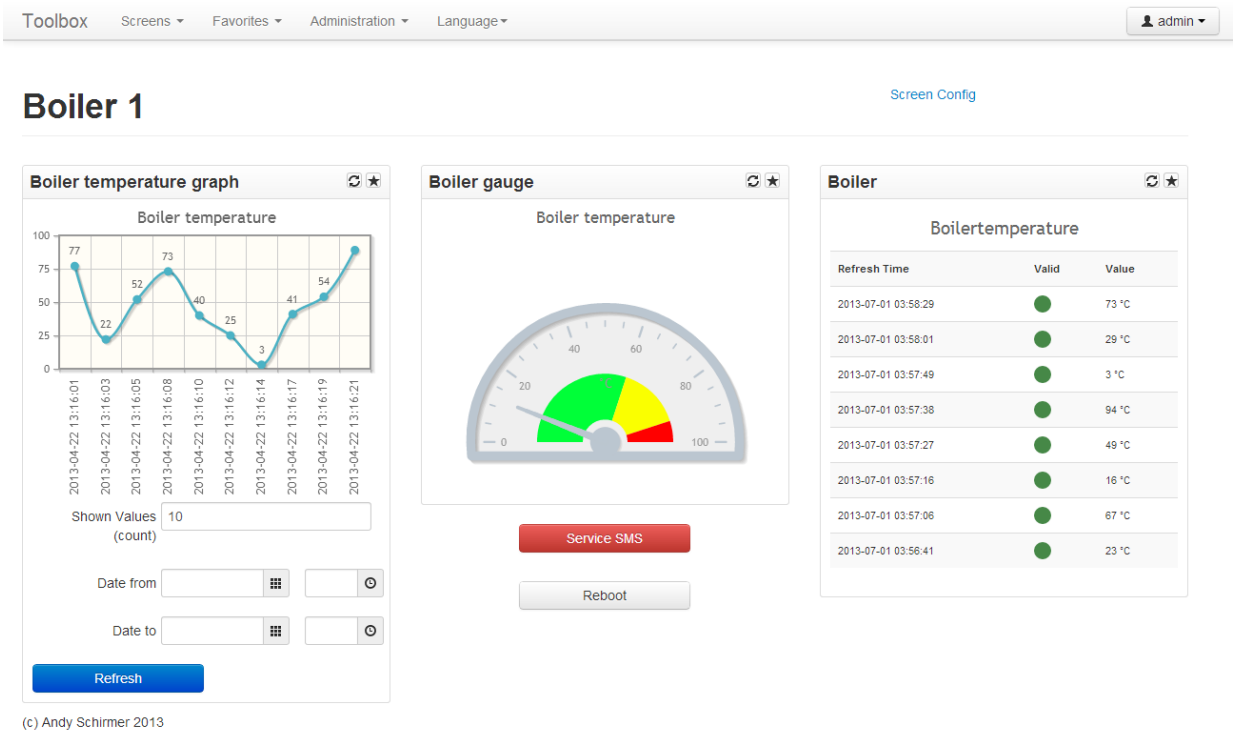

REX 300 – Toolbox

Manual

Version 1 – 6/25/2013

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REX FW V3.1.1

Toolbox V2.0.0

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Notes

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We welcome all ideas and suggestions.

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1. General Information

This manual explains how to use the Toolbox add-on for REX 300 routers.

1.1. Target Group for This Manual

This manual is intended for all project engineers, design engineers, technicians (skilled workers with electrical training), and users who work with REX 300 routers.

1.2. Symbols Used Throughout This Manual

The following symbols are used throughout this manual:

Used for tips and general information, e.g., to point out potential sources of error.

CAUTION!

Risk of property damage or malfunction.

WARNING!

Risk of bodily injury, e.g., due to electric shock.

1.3. Safety Instructions

For your own safety, and for the safety of others in the vicinity of the equipment, please follow the safety instructions below.

WARNING!

All applicable accident prevention and safety regulations must be complied with when planning the use of, installing, and operating this equipment! The company operating the equipment is responsible for ensuring compliance with these regulations!

WARNING!

Any processes in the equipment that have the potential of resulting in property damage or bodily injury must be safeguarded with the use of additional external devices. These devices must ensure that the equipment will remain in a safe operating state even in the event of a fault or malfunction. These devices include, but are not limited to, electromechanical safety switches, mechanical interlocks, etc. (please refer to EN 954-1, Risk Assessment!).

WARNING!

The REX 300 Toolbox add-on can be used to change values in PLC systems. Do not use it for any functions that are relevant to safety!
Emergency stop devices as per EN 60204/IEC 204 must remain fully functional and effective in all of the equipment's operating modes.
The equipment must not be able to restart in an uncontrolled or undefined manner! Uncontrolled restarts must be rendered impossible by means of appropriate programming!

2. Introduction

The Toolbox add-on for REX 300 routers is made up of a series of software add-ons for REX 300 industrial routers with FW 3.1.1 or higher. Toolbox runs in its own space and provides access to the corresponding router's ports, interfaces, and logs.

The user programs included in this add-on component can communicate via TCP/IP, Modbus/TCP, and S7 ISO-on-TCP or serially using the switchable RS-232/485 port. In addition, its integrated web visualization component makes it possible to display variable values graphically on any standard browser.

A responsive web design approach provides Toolbox with the necessary flexibility to accommodate the specific requirements of any device, making it possible to display images and navigation elements with the ideal layout for the device in question. In practical terms, this means that Toolbox supports smartphones among many other devices.

In order to provide users with a customizable visualization interface, the included, modifiable widgets (display and control elements) are linked to an internal database. This does not require any special clients or apps.

The visualization interface layout is configured by simply changing the corresponding parameters, and does not require any HTML or programming skills.

Finally, the monitoring service can be used to define custom messages and alarm messages that are sent via SMS or by e-mail as soon as a specific event occurs or a limit is exceeded or fallen below. In addition, custom scripts can also be run in these cases.

2.1. Requirements

The following requirements must be met in order to be able to run the REX 300 Toolbox add-on:

- REX 300 with order number ending in 02 and firmware version 3.1.1 or higher
- USB storage medium (must be plugged in!) **containing**
- The Toolbox .bin file (toolbox2.0.0.bin; available for download at www.helmholz.de)
- A PLC system (for widgets requiring variable values)

Please note that the toolboxX.X.X.bin file (where "X" stands for the version number) must be stored in the root directory of the USB storage medium that is plugged in. In other words, make sure not to save the file in a subfolder and not to change its filename!

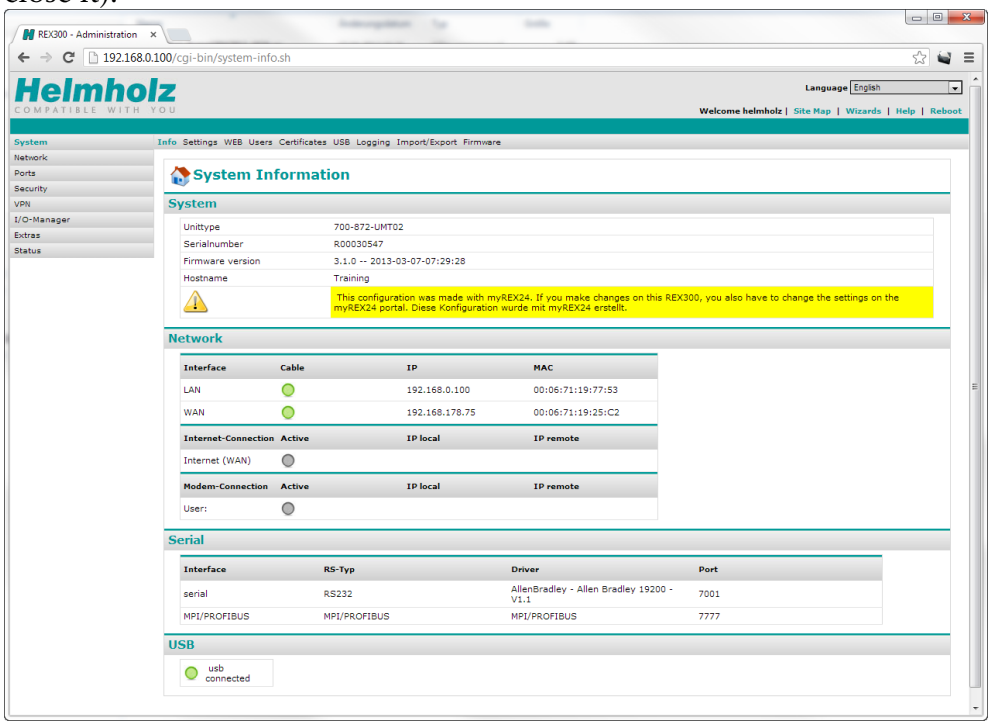
CAUTION!

Do not remove the USB storage medium if Toolbox is enabled and the REX 300 router is running, as Toolbox will be reading files from the USB storage device and writing files to it as well (the status light under "Extras" > "Toolbox" will turn green as soon as Toolbox starts running). Please note that removing the USB storage medium will result in loss of data and/or data inconsistencies.

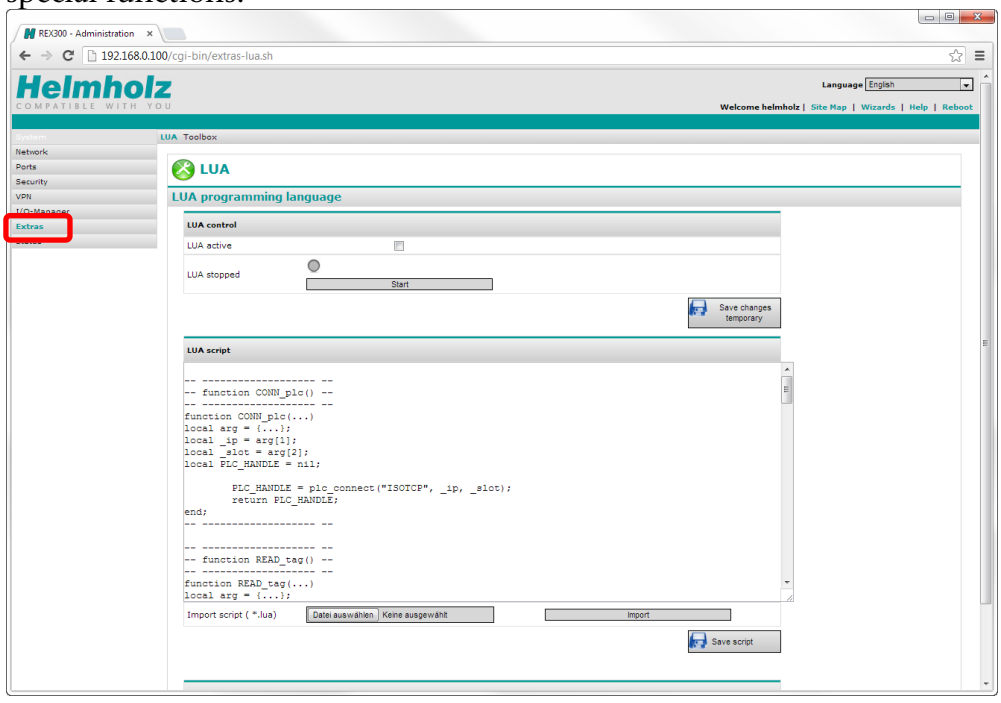
2.2. Required Settings

In order to be able to follow the steps below, you will need to have the corresponding information on hand.

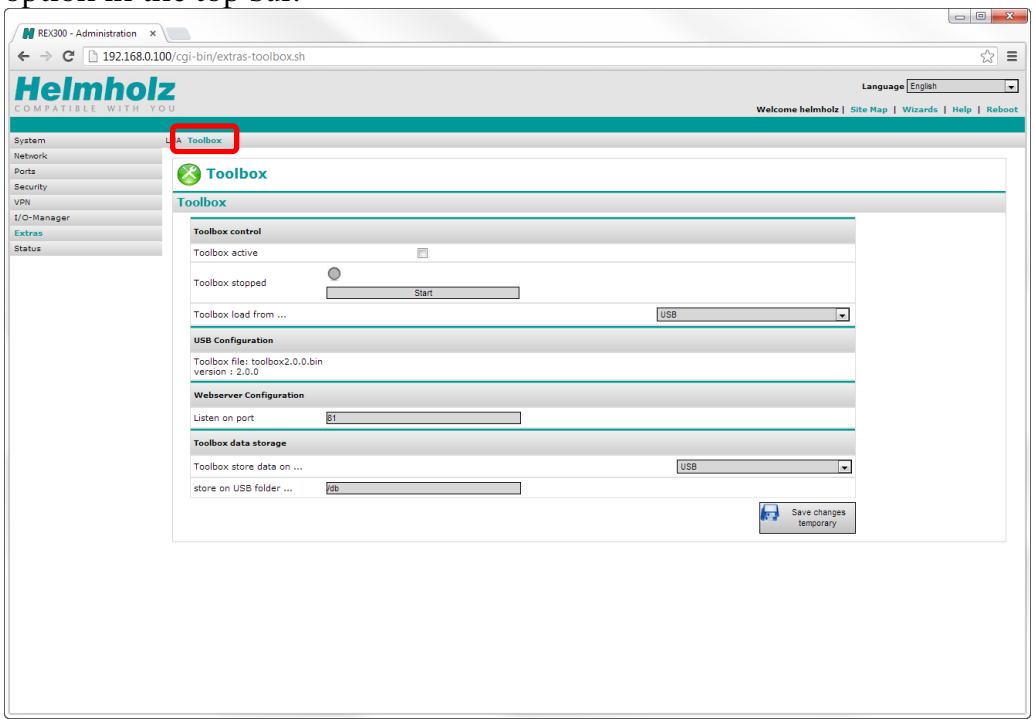
1. Open your web browser and enter your REX 300 router's LAN IP address into the address bar in order to access the router's web interface. The default address is http://192.168.0.100.
   Once you have entered your username and password (default username: helmholz / default password: **router**) for the configuration page, the following overview will appear (if the Setup Wizard opens automatically, simply click on the "Cancel" button to close it):



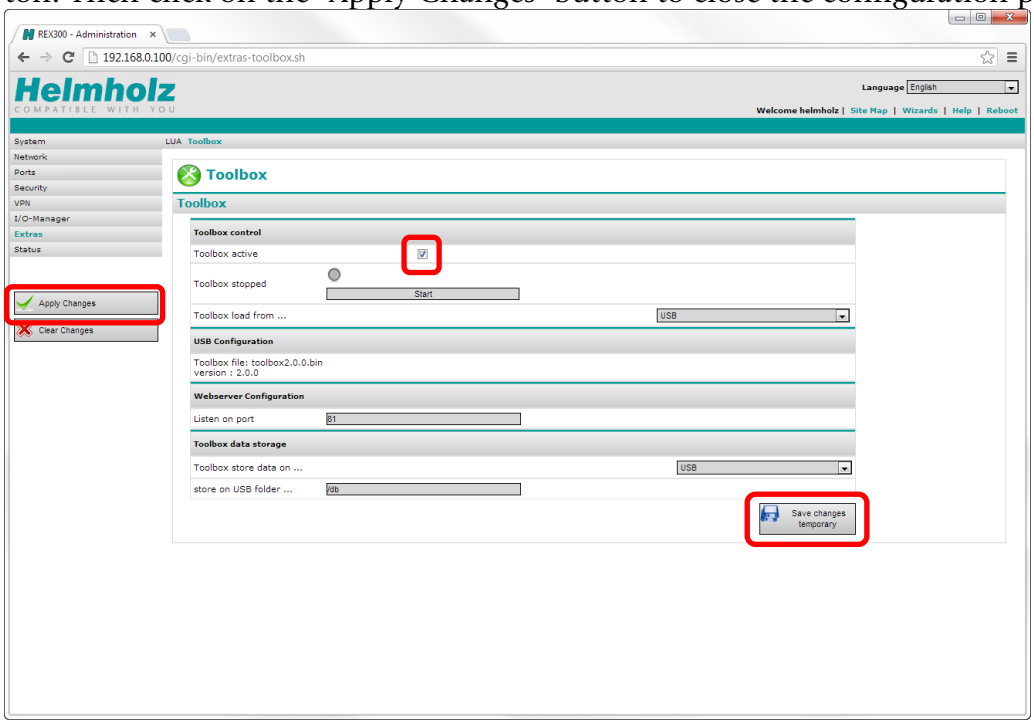
2. Open the "Extras" menu on the left menu bar in order to access the REX 300 unit's special functions.



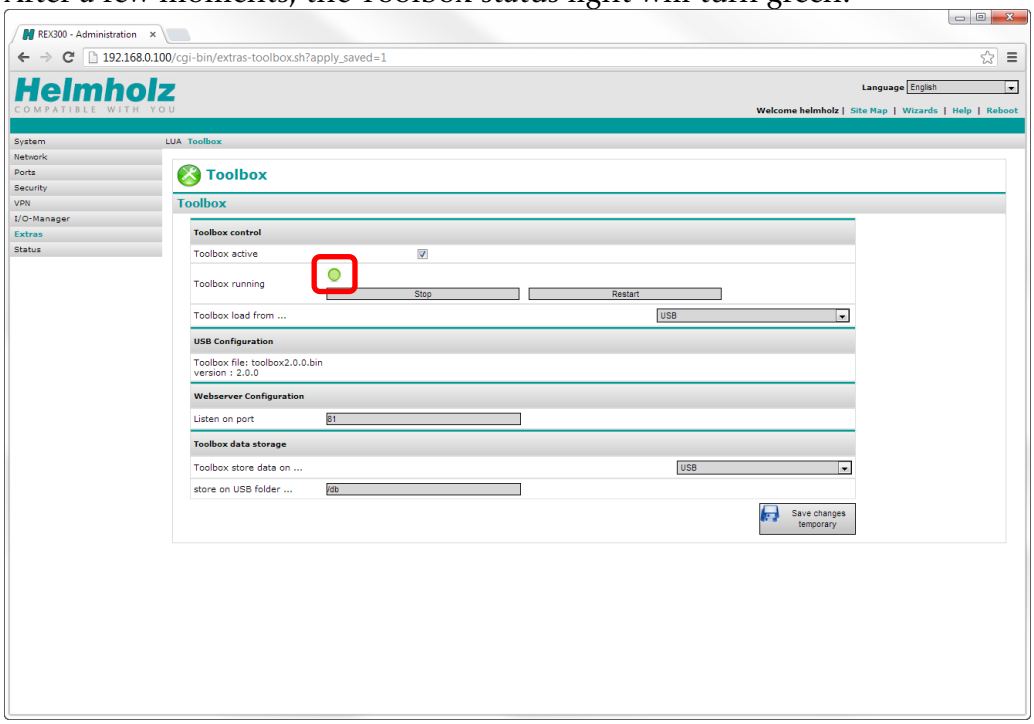
3. Now open the "Toolbox" configuration page by clicking on the corresponding menu option in the top bar.



4. Enable the "Toolbox active" check box and click on the "Save changes temporary" button. Then click on the "Apply Changes" button to close the configuration page.



5. After a few moments, the Toolbox status light will turn green.



6. As soon as the status light turns green, you will be able to access Toolbox by using the REX router's IP address and the port specified in "Webserver Configuration" > "Listen on port." You can change this port if you need to. However, make sure not to use any of the ports that the REX 300 router is already using for its functions (e.g., 21, 23, 25, 53, 80, 110, 123, 443, 1194, etc.).

List of configuration options found on the "Extras" > "Toolbox" configuration page:	
Toolbox control	
Toolbox active	If this check box is enabled, Toolbox will run automatically every time the REX 300 router is restarted.
Toolbox running	This status light is used to indicate whether Toolbox is running or not. If you want to control Toolbox manually, you can use the "Start/Stop" and "Restart" buttons.
Toolbox load from...	As of this writing, the Toolbox add-on can only be loaded from a USB storage device.
USB Configuration	
Shows the Toolbox version currently loaded from the USB storage device.	
Webserver Configuration	
Listen on port	Toolbox is run on a separate web server on the router. The default port for web servers is port 80, but this port is already taken up in the router's default configuration, which uses it for the configuration page. This is why the default port for the Toolbox web server is instead set to port 81. To reach the web server, use the following address: http://[router LAN IP address]:81.
Toolbox data storage	
Toolbox store data on...	As of this writing, Toolbox can only save your configuration files on a USB storage device.
store on USB folder...	This field is used to specify the folder in which Toolbox's configuration and log files will be stored.

3. Access

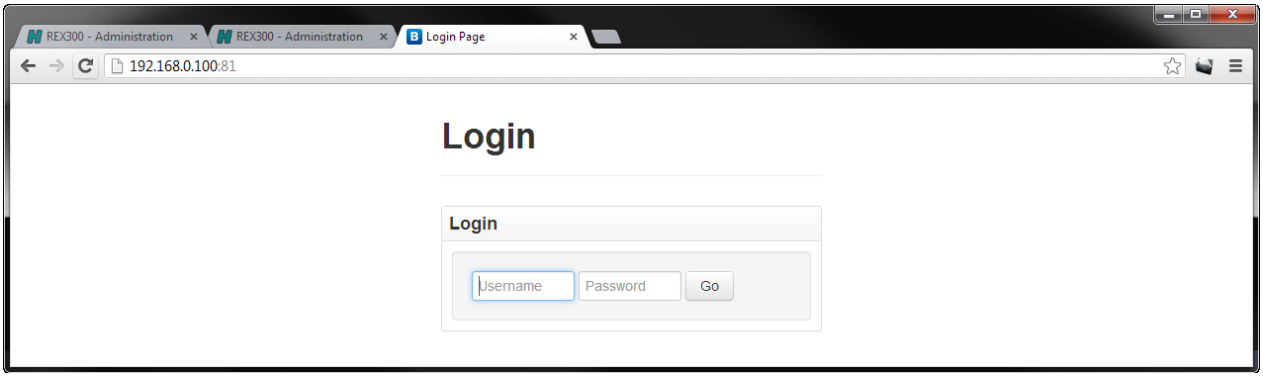
This section explains how to access the Toolbox web user interface. To access Toolbox, you will have to use the LAN IP address of your REX 300 router and the port you entered in the configuration menu (under "Extras" > "Toolbox") as follows: Open your browser and enter the LAN IP address of your REX 300 router into the address bar, followed by a colon and the number of the port you entered. For example: http://192.168.0.100:81/ (this particular example uses default port 81)

Once you have entered the address into your browser's address bar, the screen below should appear. As you can see, the Toolbox add-on is protected against unauthorized access by means of a username and password prompt. The default admin login data for Toolbox is:

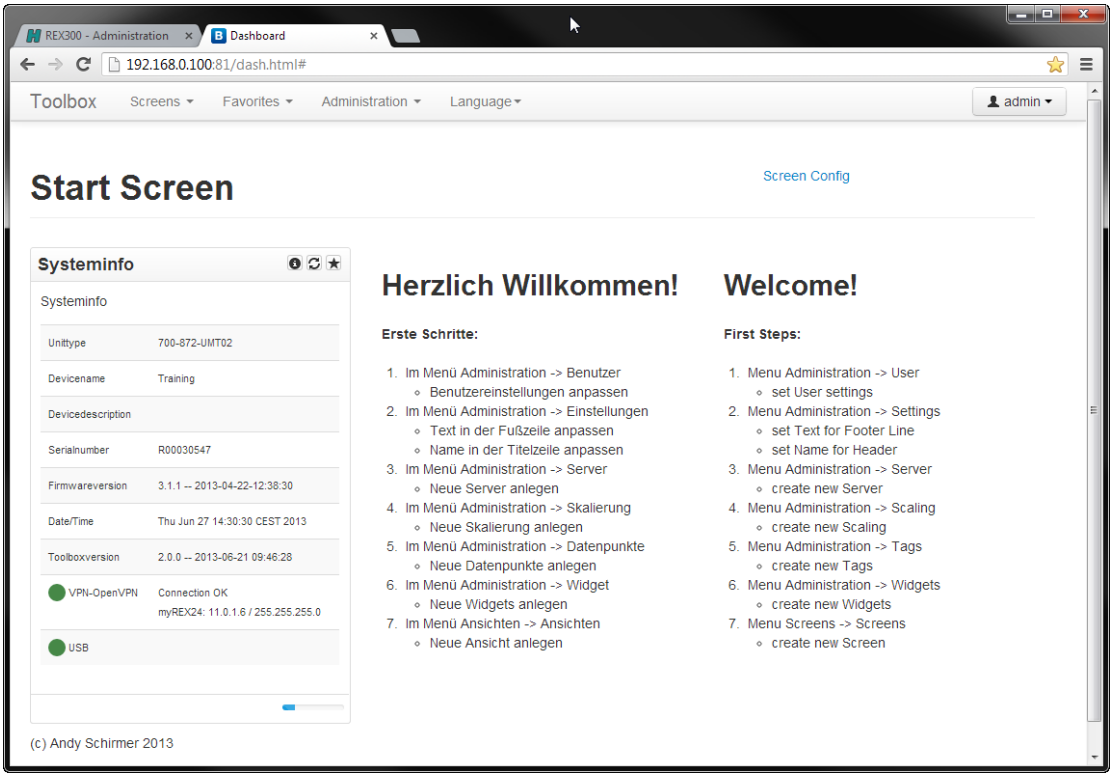
Username: **admin**

Password: **admin**

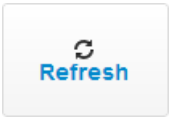
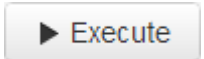
Please enter the above username and password into the corresponding fields and click on the "Go" button.



The following screen will appear and enable you to start putting together your Toolbox web user interface layout. For a sample configuration, please refer to section 6:



3.1. Basic Display and Control Elements

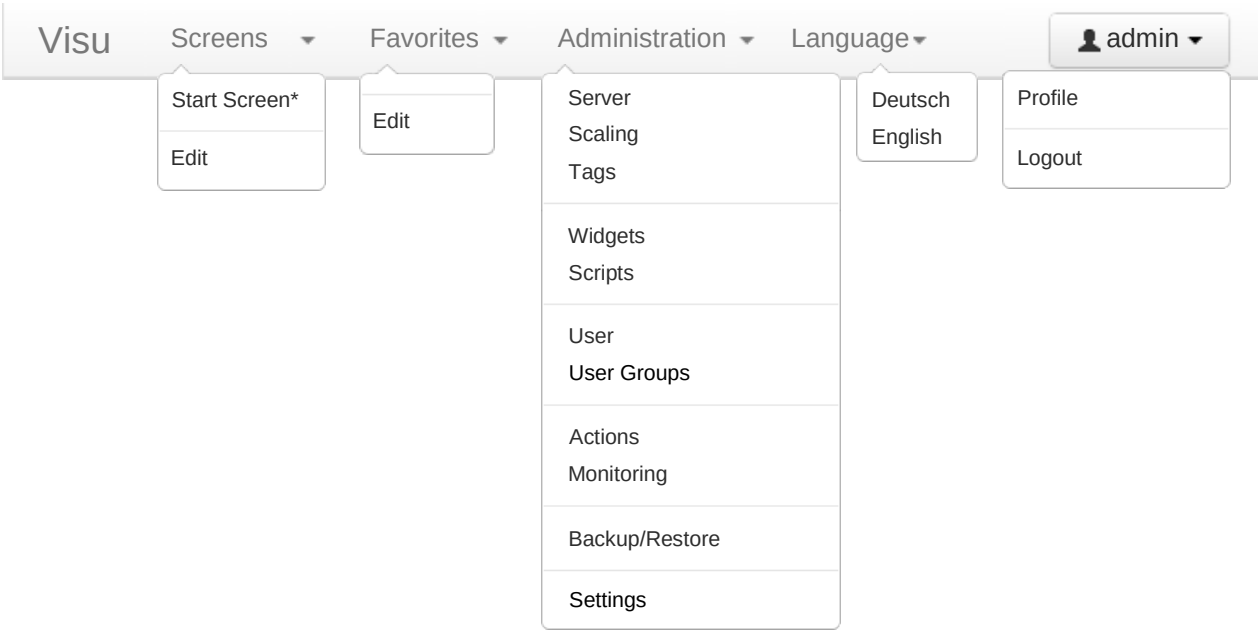
Basic display and control elements	
Widget controls	
	Shows information regarding the corresponding widget when the cursor rests on the icon.
	Updates the corresponding widget.
	Adds the corresponding widget to your Favorites.
	Deletes the corresponding widget from the current screen when in the "Screen Config" mode.
Configuration and display elements	
	This button is used on various configuration pages to create a new element on the open configuration page.
	This button appears in the "Administration" > "Tags" and "Scripts" menus. It is used to refresh the variable values shown in the "Status" column in the tag menu and in the "Running" column in the scripts menu.
	This button appears in the "Administration" > "Tags" menu. It is used to import tags stored in a CSV file.
	This drop-down menu is used to select from various existing elements, such as tags, servers, and pre-defined setting options.
	This field is used to enter text. It can be used, for example, to name elements such as scripts.
	These buttons are used to create, duplicate, and delete elements on various configuration pages.
	This button can be used to download a Lua script stored on the REX 300 router under "Administration" > "Scripts."
	This button can be used to set a Lua variable to a specific value directly from the "Administration" > "Tags" menu. Once you click on this button, a box where the desired value can be entered will appear.
	This field is used on various configuration pages in order to search for/filter by elements you have created.
	This control element is used on various configuration pages in order to sort elements in ascending or descending order.
	These buttons are used on various configuration pages in order to save or discard changes.
	Whenever the "Save" button looks the same way it is shown here, a save operation is in progress. If this is the case, please wait until the save operation is completed.
	This button will appear whenever you create or edit a script, and is used to run the script directly. This makes it possible to quickly check whether a script works properly.

Basic display and control elements	
	Whenever this information box is shown, Toolbox is switching between pages. If this is the case, please wait until Toolbox is done.
	This bar shows when the corresponding widget will next be refreshed.

Rotating controls indicate that an operation is currently in progress. If this is the case, please wait until Toolbox is done.

4. Toolbox Overview

The following information provides a general overview of the options available in Toolbox. In order to get to the corresponding section, you can click directly on the menu bar and the corresponding submenus shown here. For an application example, please refer to Section 6 S7 Sample Configuration.



4.1. Visu

To change this text, go to the "Settings" menu and edit the "Value in Title Bar" parameter. Clicking on the text will take you to the defined start screen.

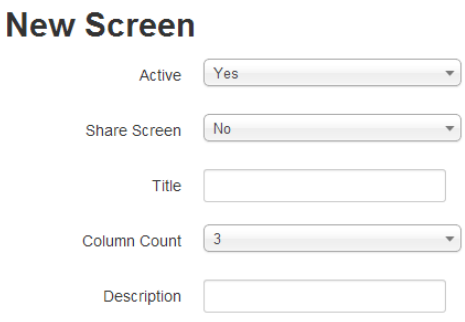
4.2. Screens

This menu will show all the screens that you have created using the Screen Manager. For instructions on how to create new screens, please refer to the following section.

4.2.1. Edit

This menu option is used to create and delete screens. You can create a maximum of 64 screens.

To create a new screen, click on the "Add" button.



Screens – Add/Edit		
Parameter	**Available options**	**Description**
Active	Yes	Enables the screen you are configuring so that it will be shown when the Screens menu is opened.
	No	Disables the screen you are configuring so that it will not be shown when the Screens menu is opened.
Share Screen	Yes	Shares the screen with other users. When a screen is shared, other Toolbox users on your system will be able to select it when they open their Screens menu.
	No	Locks the screen so that other users are unable to access it.
Title	-	Enter the title that will be shown when the Screens menu is opened.
Column Count	3	Select this value in order to create a three-column screen.
	2	Select this value in order to create a two-column screen.
	1	Select this value in order to create a single-column screen.
Description	-	Enter a brief description into this field in order to make it easier to manage your elements.

4.3. Favorites

This menu can be used to quickly access the widgets that you have selected as Favorites. All widgets will be shown in a single-column screen here.

4.3.1. Edit

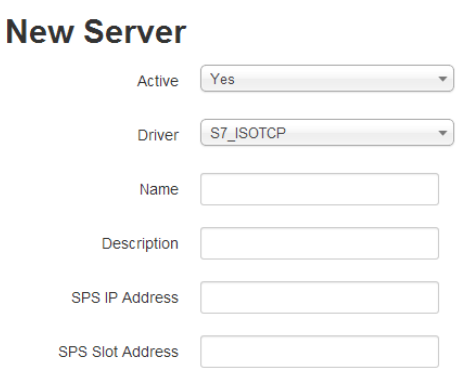
This menu can be used to remove widgets from your Favorites list.

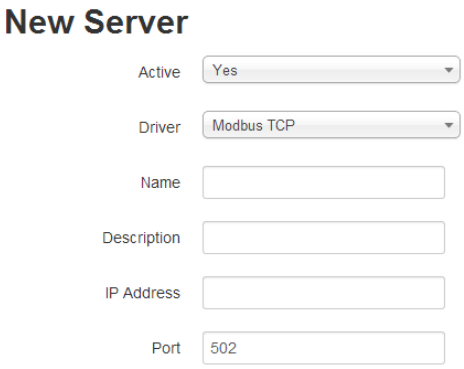
4.4. Administration

The main menu for managing Toolbox.

4.4.1. Server

Opening this menu option and clicking on the "Add" button will create a server, which is needed for Toolbox's other functions. You can create a maximum of 4 servers total.

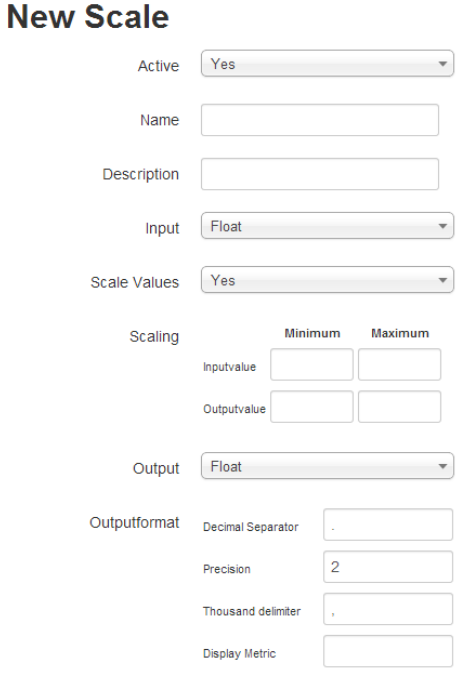




Server – Add/Edit		
Parameter	**Available options**	**Description**
Active	Yes	Enables the server you are configuring so that it will be shown in other relevant drop-down menus.
	No	Disables the server you are configuring so that it will not be shown in other relevant drop-down menus.
Driver	S7_ISOTCP	Used for direct access to Ethernet S7 PLCs or to access MPI/PROFIBUS PLCs via the integrated MPI/PROFIBUS interface (if the REX 300 LAN IP address is entered as the "SPS IP Address").
	LUA	Used to assign variables freely, independently of the "Address Mask" drop-down menu in Section 4.4.3 Datenpunkte.
	Modbus TCP	For access to Modbus/TCP devices.
Name	-	Enter a name for your server into this field. This name will be shown in other relevant drop-down menus.
Description	-	Enter a brief description into this field in order to make it easier to manage your elements.
(SPS) IP Address	-	Use this field to enter the IP address of the device that should be accessed. This device may be an S7 or a Modbus/TCP device.
SPS Slot Address Port (if using Modbus/TCP)	-	Use this field to enter the PLC slot address for your S7 device or the port for your Modbus/TCP device.

4.4.2. Scaling

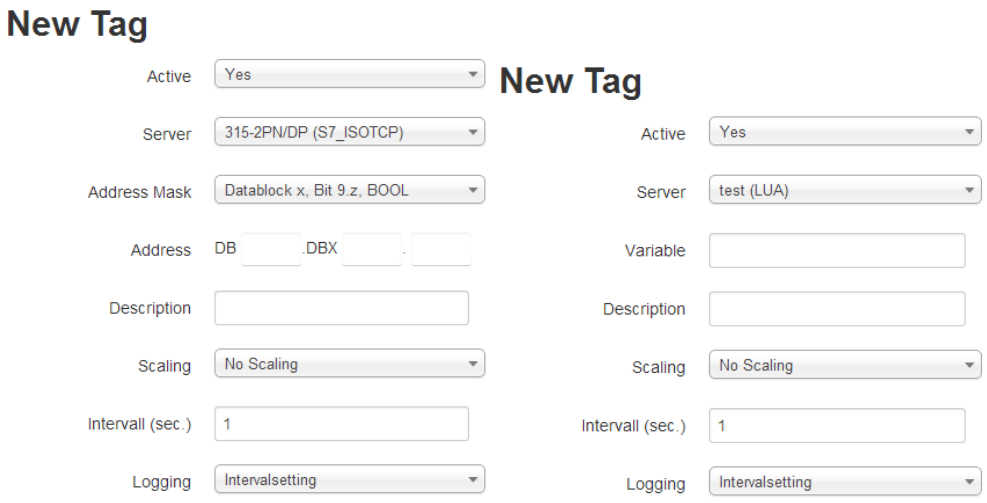
Scaling is used to dynamically scale the raw value of a variable read from the machine controller before said value is displayed on a widget. To create a scale, click on the "Add" button after opening this menu option. You can create a maximum of 256 scales.



Scaling – Add/Edit			
Parameter	**Available options**	**Description**	
Active	Yes	Enables the scale you are configuring so that it will be shown in other relevant drop-down menus.	
	No	Disables the scale you are configuring so that it will not be shown in other relevant drop-down menus.	
Name	-	Enter a name for your scale into this field. This name will be shown in other relevant drop-down menus.	
Description	-	Enter a brief description into this field in order to make it easier to manage your elements.	
Input (data type)	String	Used to set the data type for the input to string.	
	Float	Used to set the data type for the input to floating point.	
	Integer	Used to set the data type for the input to integer.	
Scale Values	Yes	Shows the settings used to define how values will be scaled.	
	No	Input values will be displayed without being scaled first. The only setting that will need to be configured in this case is the input/output format.	
Scaling	**Parameters**	**Minimum**	**Maximum**
	Inputvalue	Minimum value for input	Maximum value for input
	Outputvalue	Minimum value for output	Maximum value for output
Output (data type)	String	Used to set the output value that should be used in the visualization interface to the string data type.	
	Float	Used to set the output value that should be used in the visualization interface to the floating point data type.	
	Integer	Used to set the output value that should be used in the visualization interface to the integer data type.	
Outputformat	**Additional parameters**	**Description**	
	Decimal Separator	Use this field to enter the character that should be used to separate whole-number float values from decimal places.	
	Precision	Use this field to enter the number of decimal places for float values.	
	Thousand delimiter	Use this field to enter the character that should be used as a thousands separator for float values.	
	Display Metric	Enter the unit for your variables into this field. This unit will be used in any widgets that use this scale.	

4.4.3. Tags

Tags correspond to the variables that you want to display on your Toolbox visualization interface. Normally, the corresponding values will be scaled before being output. To create a tag, click on the "Add" button after opening this menu option. You can create a maximum of 256 tags.

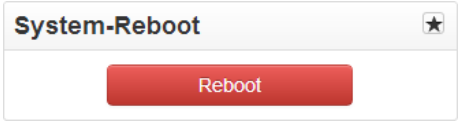


Tags – Add/Edit		
Parameter	**Available options**	**Description**
Active	Yes	Enables the tag you are configuring so that it will be shown in other relevant drop-down menus.
	No	Disables the tag you are configuring so that it will not be shown in other relevant drop-down menus.
Server	[The servers you have created; please refer to Section 4.4.1.]	Use this drop-down menu to select the server that should be used for the tag.
Address Mask	Datablock [Bit, Byte, Word, Doubleword] Flag [Bit, Byte, Word, Doubleword] Input [Bit, Byte, Word, Doubleword] Output [Bit, Byte, Word, Doubleword] Periphery Input [Bit, Byte, Word, Doubleword] Timer Counter	Use this drop-down menu to select the address format for the variable that will be read from the PLC. With the exception of "Timer" and "Counter," every configuration option supports bit, byte, word, and double word values.
Address	-	Use this field to enter the address of the variable that should be used for the tag. For example, this parameter could be set to DB **1** DBX**1** . **0**.
Description	-	Enter a brief description into this field in order to make it easier to manage your elements.
Scaling	No Scaling	The variable's value will not be scaled. If this is the case, the configured data type will be used to determine how the tag will be shown or accessed.
	[The scales you have created; please refer to Section 4.4.2.]	Select one of the scales you have created previously in order to apply it to the current tag.
Interval (sec.)	-	Use this field to specify the interval, in seconds, at which the tag should be read. The value you enter must be an integer.

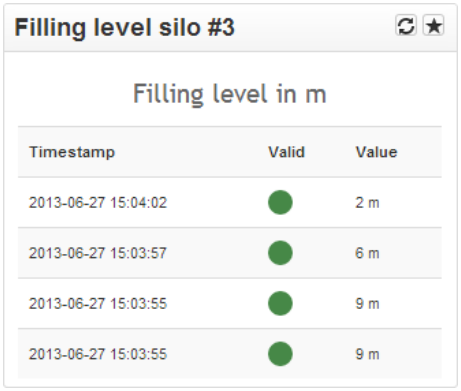
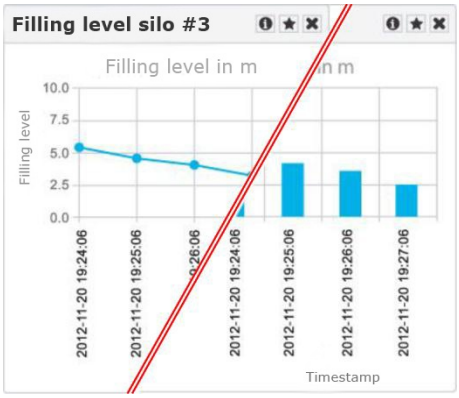
Tags – Add/Edit		
Parameter	**Available options**	**Description**
Logging	Intervalsetting	The tag's value will be stored in a log file on the USB storage device at the defined interval. Please note that this setting is mandatory for widgets that use log data to display information.
	Never	The tag's value will not be logged. This setting is OK for widgets used to display live (real-time) data, for example.
	When value changes	The tag's value will only be stored in a log file on the USB storage device if it changes. Please note that this setting is mandatory for widgets that use log data to display information.

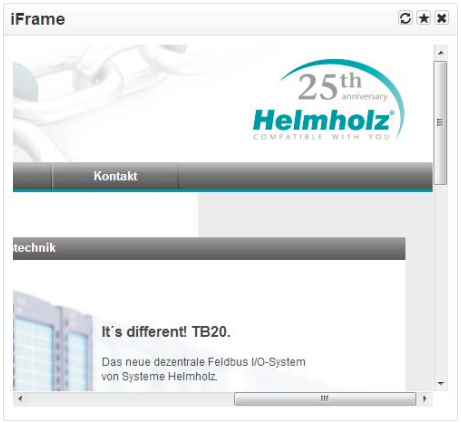
4.4.4. Widgets

This section provides a list of the widgets available together with a short description of each one. For more detailed information, please refer to Section 5 Detailed Widget Descriptions or click directly on the widget icons in the following table (left column). You can create a maximum of 64 widgets.

Widgets		
Widget icon	**Description**	**Visualization image (example)**
Monitoring	Shows active and archived messages and, depending on how it is configured, prompts the user to acknowledge read messages. Note: Acknowledging a message in the Toolbox web user interface will not have any effect on the corresponding server.	
Button	Used to manually trigger a predefined (Reboot, SMS, and E-Mail) or custom script.	
Gauge	Indicator used to graphically represent a tag from one of the servers that have been created. The corresponding colors, scale, units, and ranges can be customized as necessary.	

Widgets

Widget icon	Description	Visualization image (example)
View Value 	Used to show the values corresponding to a tag (from one of the servers that have been created) in the form of a list. Various additional information, such as timestamps, validity data, etc. can be shown as well.	
Graph 	Diagram used to graphically represent a tag from one of the servers that have been created. The diagram can either be a line chart or a bar chart. In addition to the type of chart, the scale and the labels for the X and Y axes can be customized as necessary. The data used to draw the chart can also be switched between stored data and real-time data.	
Input 	Input field used to pass a value to a tag on the selected server. This widget will also display the corresponding tag's value.	
Info 	Used to display: • Custom information text and image files (.jpg, .png, and .gif with a limit of 4 MB per image file) • Device information (model, serial - number, firmware version, Toolbox version), status of LAN/WAN network ports and status of USB port. It can also be used to display an extract from the system log	

Widgets		
Widget icon	**Description**	**Visualization image (example)**
iFrame 	This widget can be used to embed a webpage in the form of an inline frame. There are many potential uses for this widget, including embedding a network camera's webpage.	

4.4.5. Scripts

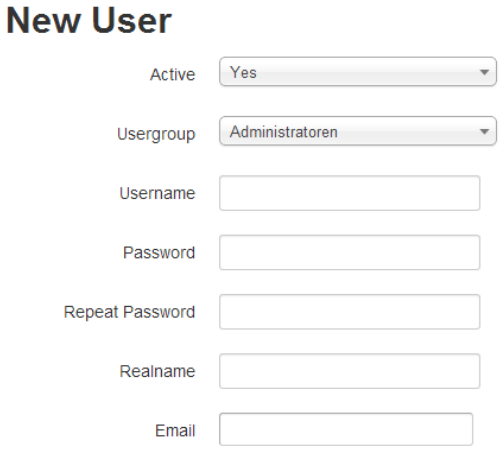
Scripts are custom programs that execute a sequence of commands when they are called. To create a script, click on the "Add" button after opening this menu option. To update a script's "Running" status, click on the "Refresh" button. You can create a maximum of 64 scripts.

Scripts – Add/Edit		
Parameter	**Available options**	**Description**
Name	-	Enter a name for your script into this field. This name will be shown in other relevant drop-down menus.
Type	Loop	The script will run in an infinite loop.
	Callable Script	The script will be executed once every time it is called.
	Plugin	The script will be stored as a callable script. However, the script's source text will not be displayed when this option is selected (the purpose of this option is to make it possible for programmers to hide code that they do not wish to share).
Script File	Select file	This button can be used to import a previously written script into your REX 300 router. In order to be able to import the file, it must be in .txt or *.lua format. You can also enter the script directly into the text box below the button if you so wish.
or Script	-	You can enter your script directly into this box or paste it using copy & paste.

The "Script Output" and "Script Log Messages" fields are used to analyze and debug scripts. "Script Output" will show the script's output, while "Script Log Messages" will output error messages (if any).

4.4.6. User

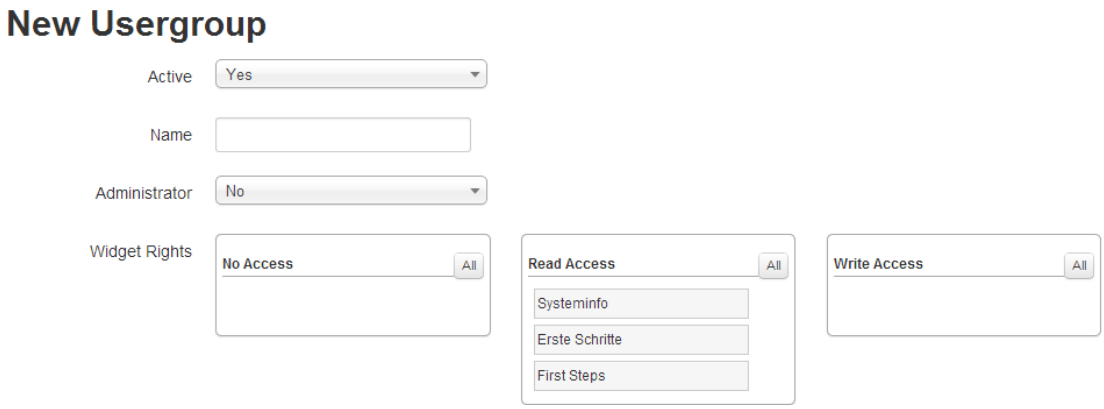
This is the menu used to manage Toolbox users. It can be used to assign write and read permissions to users or to keep them from accessing the system or parts thereof. For example, you could allow User A to see and control a widget while not allowing User B to either see or control the same widget. If you have admin rights, you can also use this menu to create and delete users, assign users to user groups, and modify user data (e.g., name, password, etc.). To create a user, click on the "Add" button. You can create a maximum of 64 users.



User – Add/Edit		
Parameter	**Available options**	**Description**
Active	Yes	Enables the user you are configuring so that they will be able to log in to Toolbox.
	No	Disables the user you are configuring so that they will not be able to log in to Toolbox anymore.
Usergroup	[The user groups you have created; please refer to Section 4.4.7.]	Select a user group you have created previously (or the admin user group) in order to assign the user to it.
Username	-	Enter the username for the user into this field.
Password	-	Enter the initial password for the user into this field. The user will be able to change their own password if necessary.
Repeat Password	-	Enter the password once again (this is in order to prevent accidental errors).
Realname	-	Enter the user's full name into this field.
Email	-	Enter the user's e-mail address into this field.

4.4.7. User Groups

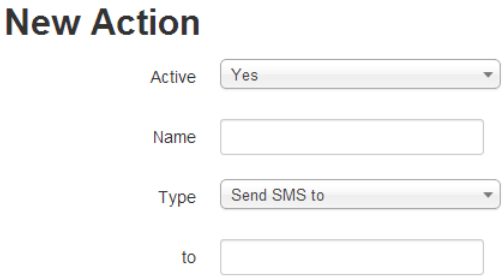
To create a user group, click on the "Add" button after opening this menu option. You can create a maximum of 64 user groups.

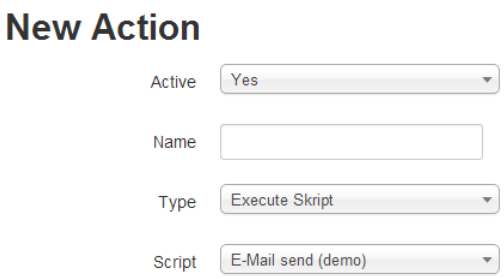


User Groups – Add/Edit		
Parameter	**Available options**	**Description**
Active	Yes	Enables the user group you are configuring so that it can be selected when creating users and so that the users belonging to the group will be able to log in.
	No	Disables the user group you are configuring so that the corresponding users will not be able to log in to Toolbox anymore.
Parameter	-	Enter a name for the user group into this field. The name you enter will be shown in the "Usergroup" drop-down menu when you create or edit a user.
Administrator	Yes	Adds admin rights to the user group, allowing its members to carry out system administration tasks. Users belonging to the group will be able to see the Administration menu in Toolbox's menu bar.
	No	Bans the user group's members from administration tasks, i.e., they will not be able to create tags, etc. Users belonging to the group will not be able to see the Administration menu in Toolbox's menu bar.
Widget Rights	-	Drag and drop widgets to these panes in order to define the widgets to which the user group being created should have read access, write access, or no access. If you click on the "All" button, every widget will be added to the corresponding pane.

4.4.8. Actions

Open this menu option if you want to define actions that should be performed as soon as a monitoring element (Section 4.4.9) is triggered. To create an action, click on the "Add" button. You can create a maximum of 64 actions.

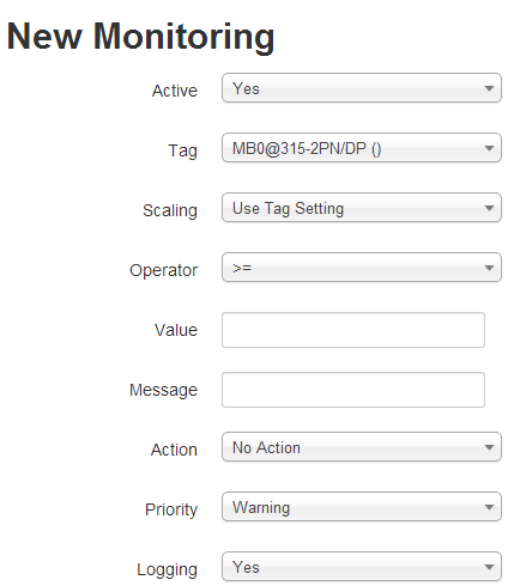




Actions – Add/Edit		
Parameter	**Available options**	**Description**
Active	Yes	Enables the action you are configuring so that it can be selected when you are creating a monitoring element.
	No	Disables the action you are configuring so that it cannot be selected anymore when you are creating a monitoring element.
Name	-	Enter a name for the action into this field. The name you enter will be shown in the "Action" drop-down menu when you create or edit a monitoring element.
Type	Send SMS to	Select this type if you want an SMS with the message from the corresponding monitoring element to be sent to a phone number.
	Send e-mail to	Select this type if you want an e-mail with the message from the corresponding monitoring element to be sent to an e-mail address.
	Execute Script	If you select this type, a script will be run and you will be able to select the corresponding script from the drop-down menu below. To be able to select a script, you must have previously created a script with the "Scripts" menu option.
to	-	Use this field to enter the e-mail address or phone number to which the text should be sent (the text is defined in the corresponding monitoring element).
Script	[The scripts you have created; please refer to Section 4.4.5.]	Use this drop-down menu to select the script that should be run when the action is called (actions are called by monitoring elements).

4.4.9. Monitoring

Monitoring elements can be used in order to check whether tags hit specific values and to perform actions and/or output a message on a widget depending on the result of said check. To create or edit a monitoring element, click on the "Add" button after opening this menu option. You can create a maximum of 64 monitoring elements.

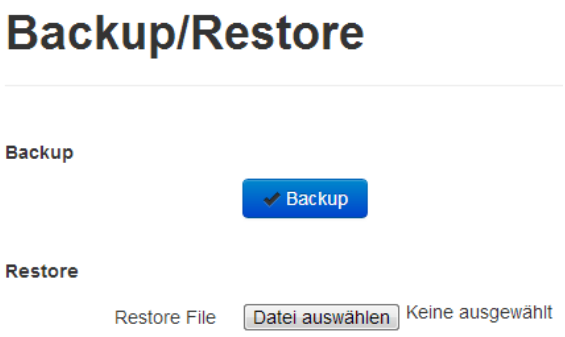


Monitoring – Add/Edit		
Parameter	**Available options**	**Description**
Active	Yes	Enables the monitoring element you are configuring so that it can be selected when you are creating a monitoring widget.
	No	Disables the monitoring element you are configuring so that it cannot be selected when you are creating a monitoring widget.
Tag	[The tags you have created; please refer to Section 4.4.3.]	Use this drop-down menu to select the tag that should be monitored.
Scaling	Use Tag Setting	The scale set for the tag will be used.
	[The scales you have created; please refer to Section 4.4.2.]	Select one of the scales you have created previously in order to use it for the current monitoring element.
Operator	Use this drop-down menu in order to select the relational operator that should be used to monitor the tag. The following relational operators are available:	
	==	Equal to
	<	Less than
	<=	Less than or equal to
	>	Greater than
	>=	Greater than or equal to
Value(s)	-	Enter the value with which the tag value that is read should be compared. Make sure to enter a properly scaled value if the tag value is being scaled!
Message	-	Use this field to enter the message that should be sent if the defined condition is met. If the condition is met, the message will be shown on the corresponding widget and/or passed to the selected action as applicable.
Action	No Action	No action will be performed if the condition is met, i.e., the message will simply be shown on the monitoring widget.

Monitoring – Add/Edit		
Parameter	**Available options**	**Description**
	[The actions you have created; please refer to Section 4.4.8.]	Use this field to select the action that should be performed if the defined condition is met.
Priority	You can use this drop-down menu to select a priority for the message displayed on the widget. This priority will also be passed as text to an SMS or e-mail action if one has been configured. The following priorities are available:	
	Fault	Declares the message as a fault.
	Warning	Declares the message as a warning.
	Message	Declares the message as a message.
Logging	Yes	The monitoring element's messages will be archived. This way, it will be possible to display these messages on the monitoring widget even after the REX 300 router is restarted.
	No	The monitoring element's messages will not be archived. All messages will be deleted as soon as the REX 300 router is restarted.

4.4.10. Backup/Restore

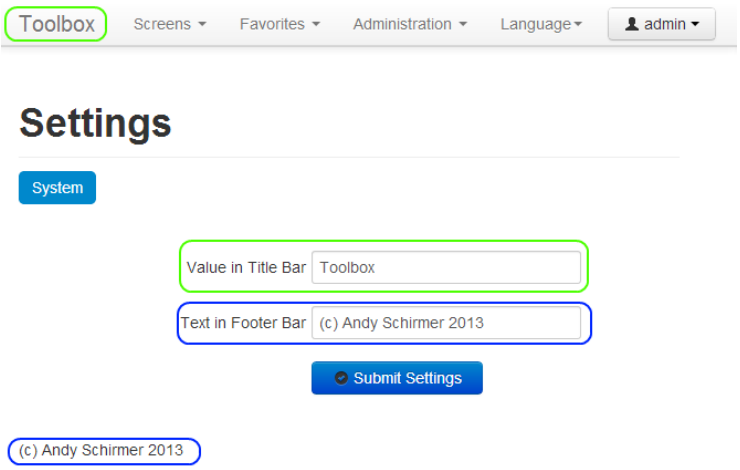
Use this menu option to back up and, if necessary, restore your entire Toolbox configuration.



4.4.11. Settings

Use this menu option to configure system parameter settings. The following settings can be configured:

- The title bar text (Value in Title Bar)
- The footer text (Text in Footer Bar)



4.5. Language

Use this menu option in order to switch between system languages. The following languages are available:

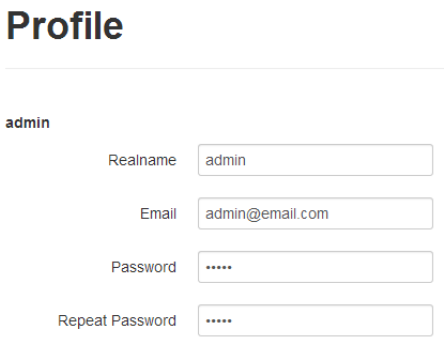
- German
- English

4.6. admin Button

Clicking on this button will show the user that is currently logged in and will also give the option of accessing their profile or logging out of the system.

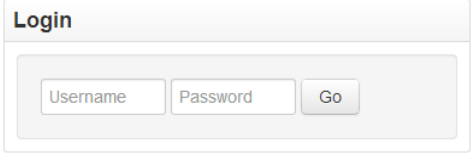
4.6.1. Profile

Use this menu option to change your profile settings (name, e-mail, and password).



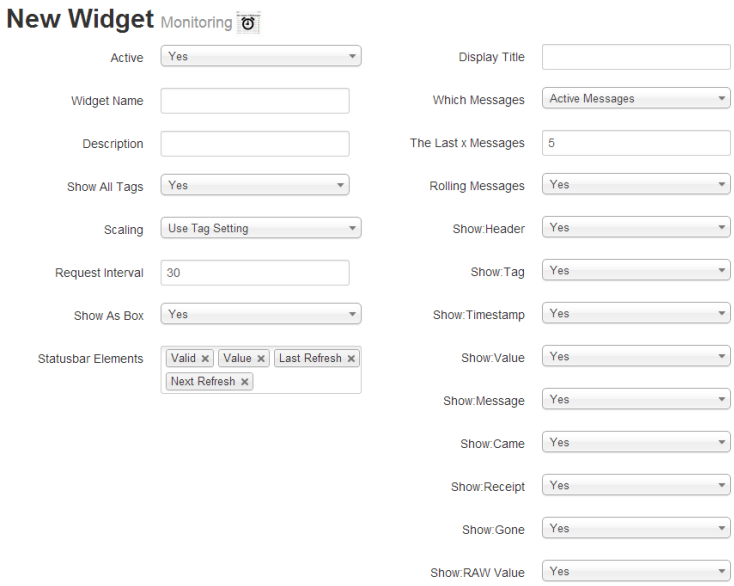
4.6.2. Logout

Click on this menu option in order to log out of Toolbox. Once you are logged out, the login window with the username and password prompt will appear.



5. Detailed Widget Descriptions

5.1. Monitoring



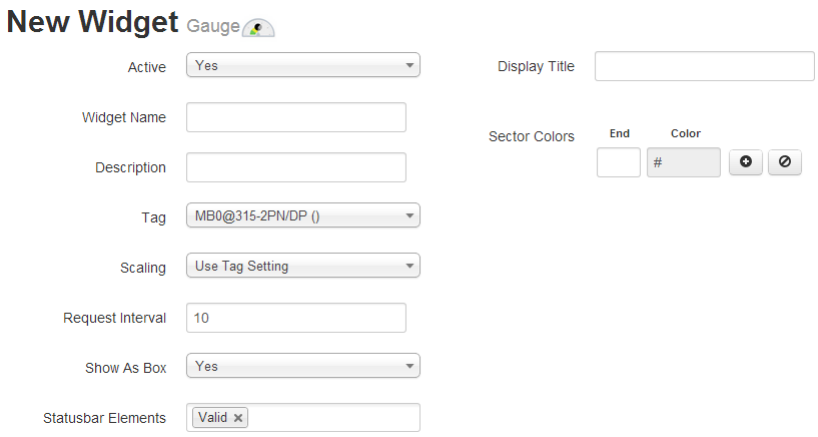
Monitoring – Add/Edit		
Parameter	**Available options**	**Description**
Active	Yes	Enables the widget your are configuring so that it can be added to visualization interface screens.
	No	Disables the widget your are configuring so that it cannot be added to visualization interface screens anymore. This will also remove the widget from all existing screens.
Widget Name	-	Enter a name for the widget into this field. This name will be shown in the "Add Widget" list when you are configuring a screen.
Description	-	Enter a brief description into this field in order to make it easier to manage your elements.
Show All Tags	Yes	Shows all messages for all the tags in this widget.
	No	Makes it possible to select a previously created tag for the widget.
Scaling	Use Tag Setting	The scale set for the tag will be used.
	[The scales you have created; please refer to Section 4.4.2.]	Select one of the scales you created previously in order to apply it to the selected tag in the widget.
Request Interval	-	Use this field to specify the interval, in seconds, at which the widget should be updated. The value you enter must be an integer.
Statusbar Elements	Click on the elements that should be displayed on the widget's status bar.	
	Valid	Displays a LED icon on the status bar in order to indicate whether the system was able to read the last value properly or not.

Monitoring – Add/Edit		
Parameter	**Available options**	**Description**
	Value	Displays the value that was last read.
	Last Refresh	Displays the time when the widget was last refreshed / the time when a value was last read.
	Next Refresh	Displays a bar that indicates when the widget will be refreshed / a value will be read next.
Show As Box	Yes	The widget will be shown with the widget controls in Section 3.1 and will be surrounded by a frame.
	No	The widget will be shown without a frame and without any widget controls.
Display Title	-	Enter a title for the widget into this field. This title will be shown above the widget on the relevant screens.
Which Messages	Active Messages	The widget will only show active messages (the number of messages shown will depend on the "The Last x Messages" setting).
	Archived Messages	The widget will also show archived messages (the messages shown will depend on the "The Last x Messages" setting).
The Last x Messages	-	Use this field to enter the number of messages that the widget should display. The number you enter must be an integer.
You can enable and disable the options that follow with "Yes" and "No," respectively.		
Rolling Messages	Yes / No	If enabled, the oldest messages will be overwritten (based on the "The Last x Messages" setting).
Show: Header	Yes / No	Shows/hides the descriptions (e.g., "Tag," "Timestamp," etc.) for the items below on the widget.
Show: Tag	Yes / No	Shows/hides the tag on the widget.
Show: Timestamp	Yes / No	Shows/hides the timestamp on the widget.
Show: Value(s)	Yes / No	Shows/hides the value (at the time the monitored value was read) on the widget.
Show: Message	Yes / No	Shows/hides the sent message on the widget.
Show: Came	Yes / No	Shows/hides the time when the monitoring element message was turned on.
Show: Receipt	Yes / No	Shows/hides the time when the message was acknowledged, or the acknowledging button itself, on the widget.
Show: Gone	Yes / No	Shows/hides the time when the monitoring element message was turned off.
Show: RAW Value	Yes / No	Shows/hides the raw (not scaled) value of the corresponding tag on the widget.

5.2. Button

Function – Add/Edit		
Parameter	**Available options**	**Description**
Active	Yes	Enables the widget your are configuring so that it can be added to visualization interface screens.
	No	Disables the widget your are configuring so that it cannot be added to visualization interface screens anymore. This will also remove the widget from all existing screens.
Widget Name	-	Enter a name for the widget into this field. This name will be shown in the "Add Widget" list when you are configuring a screen.
Description	-	Enter a brief description into this field in order to make it easier to manage your elements.
Show As Box	Yes	The widget will be shown with the widget controls in Section 3.1 and will be surrounded by a frame.
	No	The widget will be shown without a frame and without any widget controls.
Function Type	Restart	The function button will restart the device.
	Execute Script	The function button will call a script that you have created previously.
Script	[The scripts you have created; please refer to Section 4.4.5.]	Use this drop-down menu to select the script that should be run when the button is activated.
Button Caption	-	Use this field to enter the text that should be shown on the button.
Button Type	Default	Use this drop-down menu to select the color for the button. The "default" color is simply the default gray color.
	Blue	
	Cyan	
	Green	
	Orange	
	Red	
	Black	

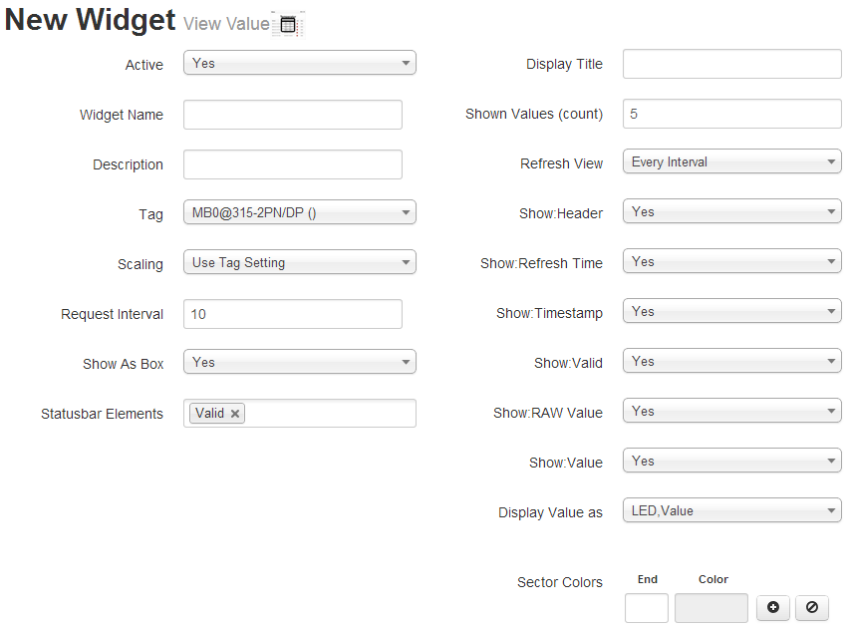
5.3. Gauge



Gauge – Add/Edit		
Parameter	**Available options**	**Description**
Active	Yes	Enables the widget your are configuring so that it can be added to visualization interface screens.
	No	Disables the widget your are configuring so that it cannot be added to visualization interface screens anymore. This will also remove the widget from all existing screens.
Widget Name	-	Enter a name for the widget into this field. This name will be shown in the "Add Widget" list when you are configuring a screen.
Description	-	Enter a brief description into this field in order to make it easier to manage your elements.
Tag	[The tags you have created; please refer to Section 4.4.3.]	Use this drop-down menu to select the tag that should be used for the widget.
Scaling	Use Tag Setting	The scale set for the tag will be used.
	[The scales you have created; please refer to Section 4.4.2.]	Select one of the scales you created previously in order to apply it to the selected tag in the widget.
Request Interval	-	Use this field to specify the interval, in seconds, at which the widget should be updated. The value you enter must be an integer.
Show As Box	Yes	The widget will be shown with the widget controls in Section 3.1 and will be surrounded by a frame.
	No	The widget will be shown without a frame and without any widget controls.
Statusbar Elements	Click on the elements that should be displayed on the widget's status bar.	
	Valid	Displays a LED icon on the status bar in order to indicate whether the system was able to read the last value properly or not.
	Value	Displays the value that was last read.
	Last Refresh	Displays the time when the widget was last refreshed / the time when a value was last read.
	Next Refresh	Displays a bar that indicates when the widget will be refreshed / a value will be read next.

Gauge – Add/Edit		
Parameter	**Available options**	**Description**
Display Title	-	Enter a title for the widget into this field. This title will be shown above the widget on the relevant screens.
Sector Colors	-	Use this function to define ranges and assign colors to them. Enter the value up to which a range should be created into the "End" field. For example, entering a value of 18 will create a range of 0 to 18. Use the "+" button to add additional ranges and the "–" button to delete existing ranges. To choose a color, click inside the "Color" field and hold down the mouse button in order to select the color you want with the use of the color selection element. Make sure to scale the range values according to the scale you are using!

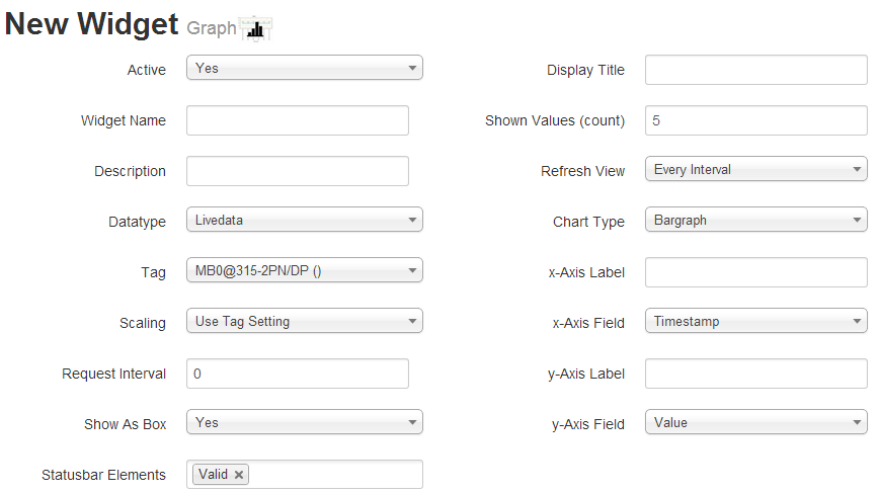
5.4. View Value



Value(s) – Add/Edit		
Parameter	**Available options**	**Description**
Active	Yes	Enables the widget your are configuring so that it can be added to visualization interface screens.
	No	Disables the widget your are configuring so that it cannot be added to visualization interface screens anymore. This will also remove the widget from all existing screens.
Widget Name	-	Enter a name for the widget into this field. This name will be shown in the "Add Widget" list when you are configuring a screen.
Description	-	Enter a brief description into this field in order to make it easier to manage your elements.
Tag	[The tags you have created; please refer to Section 4.4.3.]	Use this drop-down menu to select the tag that should be used for the widget.
Scaling	Use Tag Setting	The scale set for the tag will be used.

Value(s) – Add/Edit		
Parameter	**Available options**	**Description**
	[The scales you have created; please refer to Section 4.4.2.]	Select one of the scales you created previously in order to apply it to the selected tag in the widget.
Request Interval	-	Use this field to specify the interval, in seconds, at which the widget should be updated. The value you enter must be an integer.
Show As Box	Yes	The widget will be shown with the widget controls in Section 3.1 and will be surrounded by a frame.
	No	The widget will be shown without a frame and without any widget controls.
Statusbar Elements	Click on the elements that should be displayed on the widget's status bar.	
	Valid	Displays a LED icon on the status bar in order to indicate whether the system was able to read the last value properly or not.
	Value	Displays the value that was last read.
	Last Refresh	Displays the time when the widget was last refreshed / the time when a value was last read.
	Next Refresh	Displays a bar that indicates when the widget will be refreshed / a value will be read next.
Display Title	-	Enter a title for the widget into this field. This title will be shown above the widget on the relevant screens.
Shown Values (count)	-	Use this field to enter the number of values that the widget should show on top of each other. The number you enter must be an integer.
You can enable and disable the options that follow with "Yes" and "No," respectively.		
Show: Header	Yes / No	Shows/hides the descriptions (e.g., "Tag," "Timestamp," etc.) for the items below on the widget.
Show: Refresh Time	Yes / No	Shows/hides the time the widget is refreshed.
Show: Timestamp	Yes / No	Shows/hides the timestamp on the widget. This timestamp shows when the tag's value was read.
Show: Valid	Yes / No	Shows/hides the status light on the widget. This light indicates whether the system was able to read the corresponding value or not.
Show: RAW Value	Yes / No	Shows/hides the raw (not scaled) value of the corresponding tag on the widget.
Show: Value(s)	Yes / No	Shows/hides the value (at the time the value was read) on the widget.
Display Value as	Value(s)	Shows the scaled values as numbers.
	LED	Shows the scaled values as LEDs with different colors. You can define the colors for these LEDs with ranges much like with the gauge widget.
	LED, Value	Shows the scaled values as LEDs with different colors, plus the corresponding values as numbers. You can define the colors for these LEDs with ranges much like with the gauge widget.

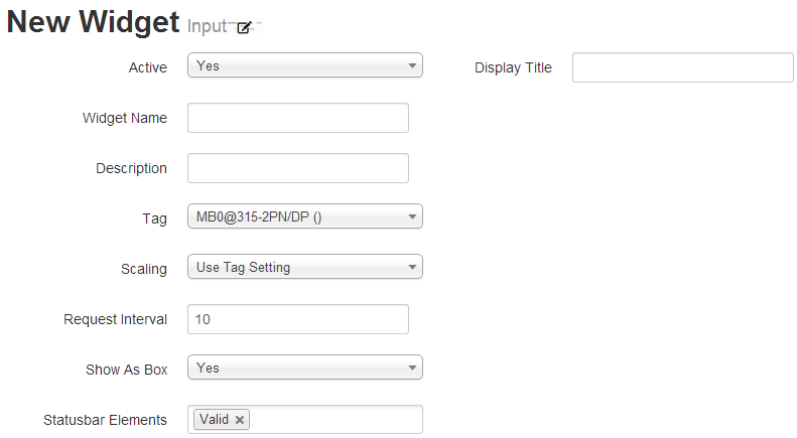
5.5. Graph



Graph – Add/Edit		
Parameter	**Available options**	**Description**
Active	Yes	Enables the widget your are configuring so that it can be added to visualization interface screens.
	No	Disables the widget your are configuring so that it cannot be added to visualization interface screens anymore. This will also remove the widget from all existing screens.
Widget Name	-	Enter a name for the widget into this field. This name will be shown in the "Add Widget" list when you are configuring a screen.
Description	-	Enter a brief description into this field in order to make it easier to manage your elements.
Data type	Log data	In order to draw the chart, the widget will use the log data that is stored for the relevant tag on the USB storage device. This makes it possible to track the past values of the selected tag. The configured interval for the tag being used will affect the chart in this mode.
	Livedata	The widget will only use currently read values starting from the moment it is called (e.g., via a screen).
Request Interval	-	Use this field to specify the interval, in seconds, at which the widget should be updated. The value you enter must be an integer. This setting will only be available if the widget has been configured with the live data data type.
Tag	[The tags you have created; please refer to Section 4.4.3.]	Use this drop-down menu to select the tag that should be used for the widget.
Scaling	Use Tag Setting	The scale set for the tag will be used.
	[The scales you have created; please refer to Section 4.4.2.]	Select one of the scales you created previously in order to apply it to the selected tag in the widget.
Show As Box	Yes	The widget will be shown with the widget controls in Section 3.1 and will be surrounded by a frame.
	No	The widget will be shown without a frame and without any widget controls.

Graph – Add/Edit		
Parameter	**Available options**	**Description**
Statusbar Elements	Click on the elements that should be displayed on the widget's status bar.	
	Valid	Displays a LED icon on the status bar in order to indicate whether the system was able to read the last value properly or not.
	Value	Displays the value that was last read.
	Last Refresh	Displays the time when the widget was last refreshed / the time when a value was last read.
	Next Refresh	Displays a bar that indicates when the widget will be refreshed / a value will be read next.
Display Title	-	Enter a title for the widget into this field. This title will be shown above the widget on the relevant screens.
Shown Values (count)	-	Use this field to enter the number of values that the widget should show. The number you enter must be an integer.
Chart Type	Bargraph	The values for the selected tag will be shown as bars.
	Line	The values for the selected tag will be shown as a line. The values for the spaces between readings will be automatically interpolated.
x-Axis Label	-	Enter a label for the widget's X-axis into this field.
x-Axis Field	Timestamp	The time when the data was read will be used for the X-axis.
	Refresh Time	The time when the widget was refreshed will be used for the X-axis.
y-Axis Label	-	Enter a label for the widget's Y-axis into this field.
y-Axis Field	Value(s)	The scaled values will be shown as the Y-axis values.
	RAW Value	The raw (not scaled) values will be shown as the Y-axis values.
	Valid	The relevant validity information will be shown as the Y-axis value. A value is valid if a 1 is shown.

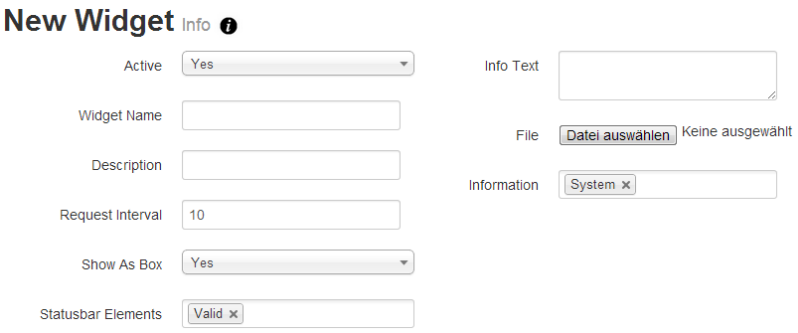
5.6. Input



Input Field – Add/Edit		
Parameter	**Available options**	**Description**
Active	Yes	Enables the widget your are configuring so that it can be added to visualization interface screens.
	No	Disables the widget your are configuring so that it cannot be added to visualization interface screens anymore. This will also remove the widget from all existing screens.
Widget Name	-	Enter a name for the widget into this field. This name will be shown in the "Add Widget" list when you are configuring a screen.
Description	-	Enter a brief description into this field in order to make it easier to manage your elements.
Tag	[The tags you have created; please refer to Section 4.4.3.]	Use this drop-down menu to select the tag that should be used for the widget.
Scaling	Use Tag Setting	The scale set for the tag will be used.
	[The scales you have created; please refer to Section 4.4.2.]	Select one of the scales you created previously in order to apply it to the selected tag in the widget.
Request Interval	-	Use this field to specify the interval, in seconds, at which the widget should be updated. The value you enter must be an integer.
Show As Box	Yes	The widget will be shown with the widget controls in Section 3.1 and will be surrounded by a frame.
	No	The widget will be shown without a frame and without any widget controls.
Statusbar Elements	Click on the elements that should be displayed on the widget's status bar.	
	Valid	Displays a LED icon on the status bar in order to indicate whether the system was able to read the last value properly or not.
	Value	Displays the value that was last read.
	Last Refresh	Displays the time when the widget was last refreshed / the time when a value was last read.
	Next Refresh	Displays a bar that indicates when the widget will be refreshed / a value will be read next.

Input Field – Add/Edit		
Parameter	**Available options**	**Description**
Display Title	-	Enter a title for the widget into this field. This title will be shown above the widget on the relevant screens.

5.7. Info

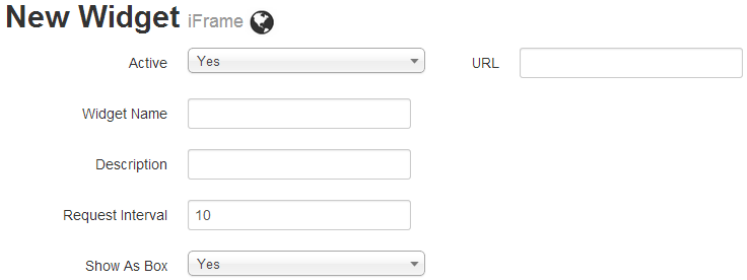


Info – Add/Edit		
Parameter	**Available options**	**Description**
Active	Yes	Enables the widget your are configuring so that it can be added to visualization interface screens.
	No	Disables the widget your are configuring so that it cannot be added to visualization interface screens anymore. This will also remove the widget from all existing screens.
Widget Name	-	Enter a name for the widget into this field. This name will be shown in the "Add Widget" list when you are configuring a screen.
Description	-	Enter a brief description into this field in order to make it easier to manage your elements.
Request Interval	-	Use this field to specify the interval, in seconds, at which the widget should be updated. The value you enter must be an integer.
Show As Box	Yes	The widget will be shown with the widget controls in Section 3.1 and will be surrounded by a frame.
	No	The widget will be shown without a frame and without any widget controls.
Statusbar Elements	Click on the elements that should be displayed on the widget's status bar.	
	Valid	Displays a LED icon on the status bar in order to indicate whether the system was able to read the last value properly or not.
	Value	Displays the value that was last read.
	Last Refresh	Displays the time when the widget was last refreshed / the time when a value was last read.
	Next Refresh	Displays a bar that indicates when the widget will be refreshed / a value will be read next.

Info – Add/Edit		
Parameter	**Available options**	**Description**
Info Text	-	You can use this field to enter an information text that can be formatted with HTML tags before being output. Example: First step: will show the text in bold. For additional HTML text tags, please refer to Section 7.1 HTML.
File	Select file	You can use this button to import an image file to be shown underneath the information text. You can import any .jpg, .png, or *.gif image file within a 4 MB limit.
Delete file	Yes / No	Used to delete a previously imported image file.
Information	You can use this field to select the system information that should be shown on the widget. Clicking on the field will show the following options:	
	System	The following information will be shown: • Model number • Serial number • Firmware version • Toolbox version
	WAN	The IP address, the MAC address, and the status of the WAN port will be shown.
	LAN	The IP address, the MAC address, and the status of the LAN port will be shown.
	USB	The USB port's status will be shown.
	System log	An extract from the last system log will be shown.

5.8. iFrame

Inline frames are used in order to embed web contents (e.g., the website for a network camera) in a defined area of a browser window. In the REX 300 Toolbox add-on, iframes are shown in the form of widgets.



iFrame – Add/Edit		
Parameter	**Available options**	**Description**
Active	Yes	Enables the widget your are configuring so that it can be added to visualization interface screens.
	No	Disables the widget your are configuring so that it cannot be added to visualization interface screens anymore. This will also remove the widget from all existing screens.
Widget Name	-	Enter a name for the widget into this field. This name will be shown in the "Add Widget" list when you are configuring a screen.
Description	-	Enter a brief description into this field in order to make it easier to manage your elements.
Request Interval	-	Use this field to specify the interval, in seconds, at which the widget should be updated. The value you enter must be an integer.
Show As Box	Yes	The widget will be shown with the widget controls in Section 3.1 and will be surrounded by a frame.
	No	The widget will be shown without a frame and without any widget controls.
URL	-	Use this field to enter the URL of the HTML page that should be shown inside the iFrame widget. For example: http://www.helmholz.de/. You could also enter the IP address of a network camera, for example.

6. S7 Sample Configuration

6.1. Overview

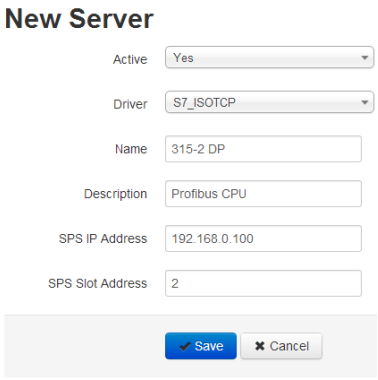
The example in this section assumes that the conditions in Section 2 Introduction are being met.

This section explains how to configure Toolbox in such a way that a connection to a PROFIBUS CPU with PROFIBUS address 2 will be established via the REX 300 router's integrated MPI/PROFIBUS interface.

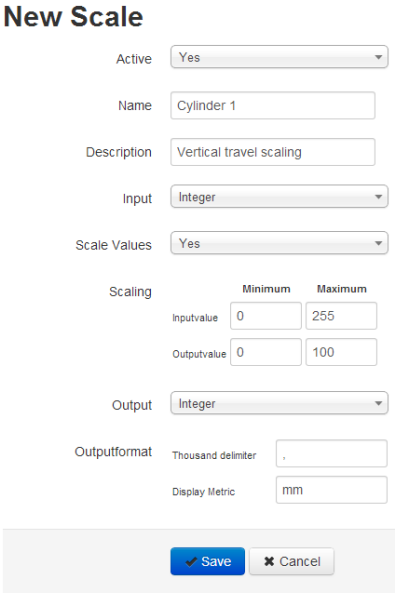
6.2. Example

1. Create a new server by clicking on the "Administration" > "Server" menu option and clicking on the "Add" button.

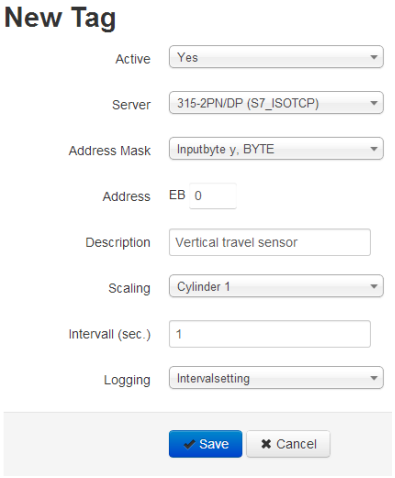
2. Enter the REX 300 router's LAN IP as the "SPS IP Address." Save the new server with the "Save" button. Please enter "2" as the "SPS Slot Address."



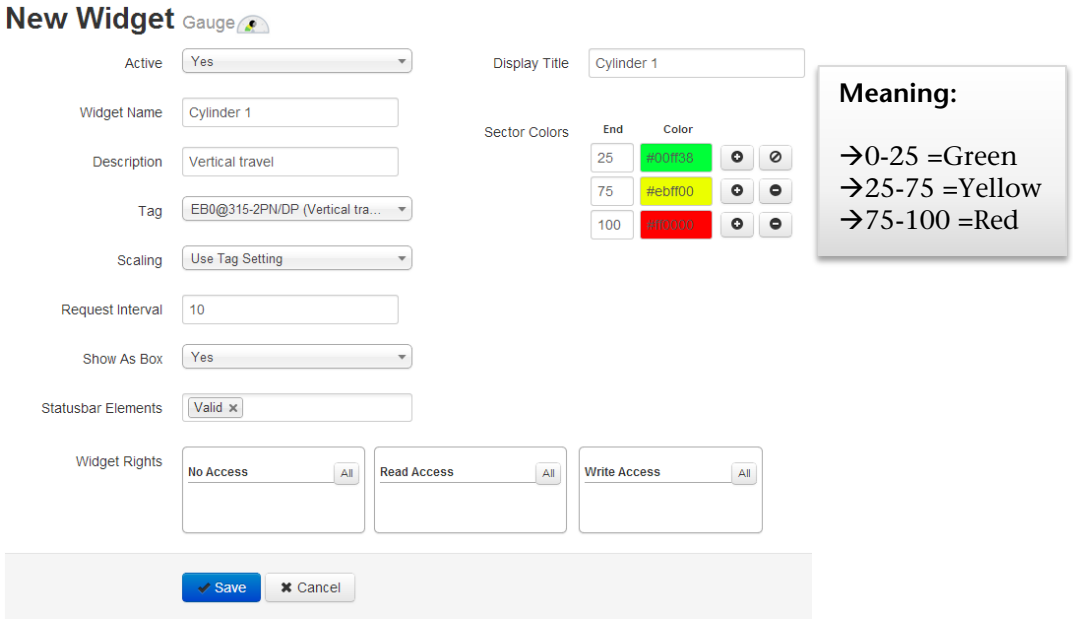
3. Create a new scale (in order to convert an input byte into values within a range of 0–100) by clicking on the "Administration" > "Scaling" menu option and clicking on the "Add" button. Save the new scale with the "Save" button.



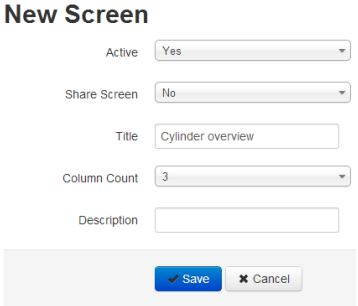
4. Create a new tag by clicking on the "Administration" > "Tags" menu option and clicking on the "Add" button. Save the new tag with the "Save" button.



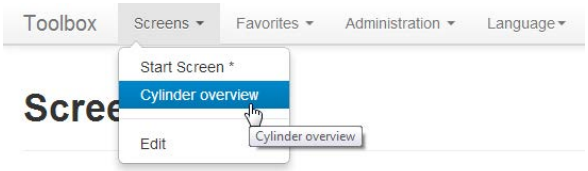
5. Create a new widget by clicking on the "Administration" > "Widgets" menu option and clicking on the corresponding button. We will be using a gauge for this particular example. To select the colors for the ranges, click on the corresponding "Color" fields. You can add additional ranges by using the "+" button. Save the new widget with the "Save" button.



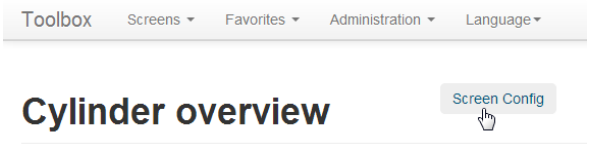
6. Create a new screen by clicking on the "Screens" > "Edit" menu option and clicking on the "Add" button. Save the new screen with the "Save" button.



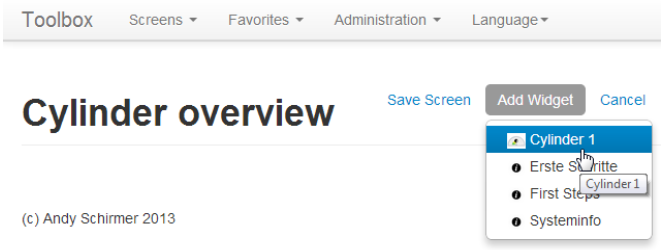
7. Open the screen you just created by clicking on the "Screens" > "Cylinder overview" menu option.



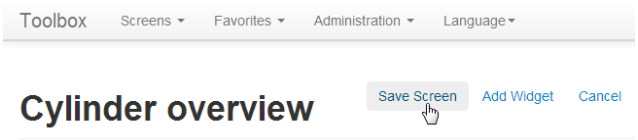
8. Click on the "Screen Config" link to edit the screen.



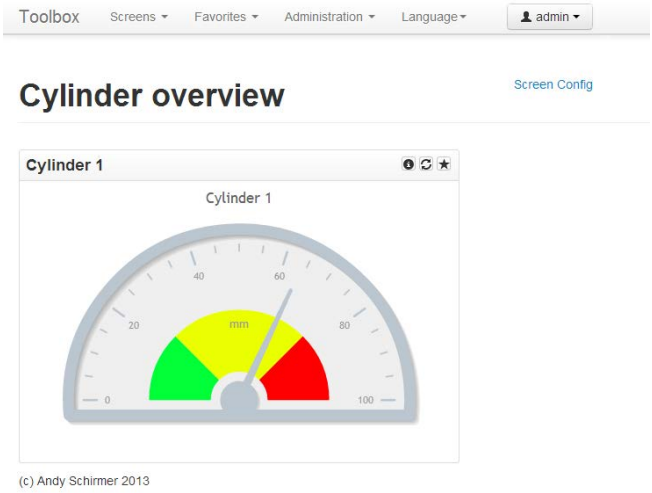
9. Select the widget you created previously from the "Add Widget" list.



10. Now save the screen by clicking on the "Save Screen" link.



11. Your screen should look like the screenshot below:



Provided the REX 300 router can reach the PLC, the widget will now refresh the corresponding values and display them after scaling them. You can follow the same basic procedure to add additional widgets to existing or new screens.

7. Appendix

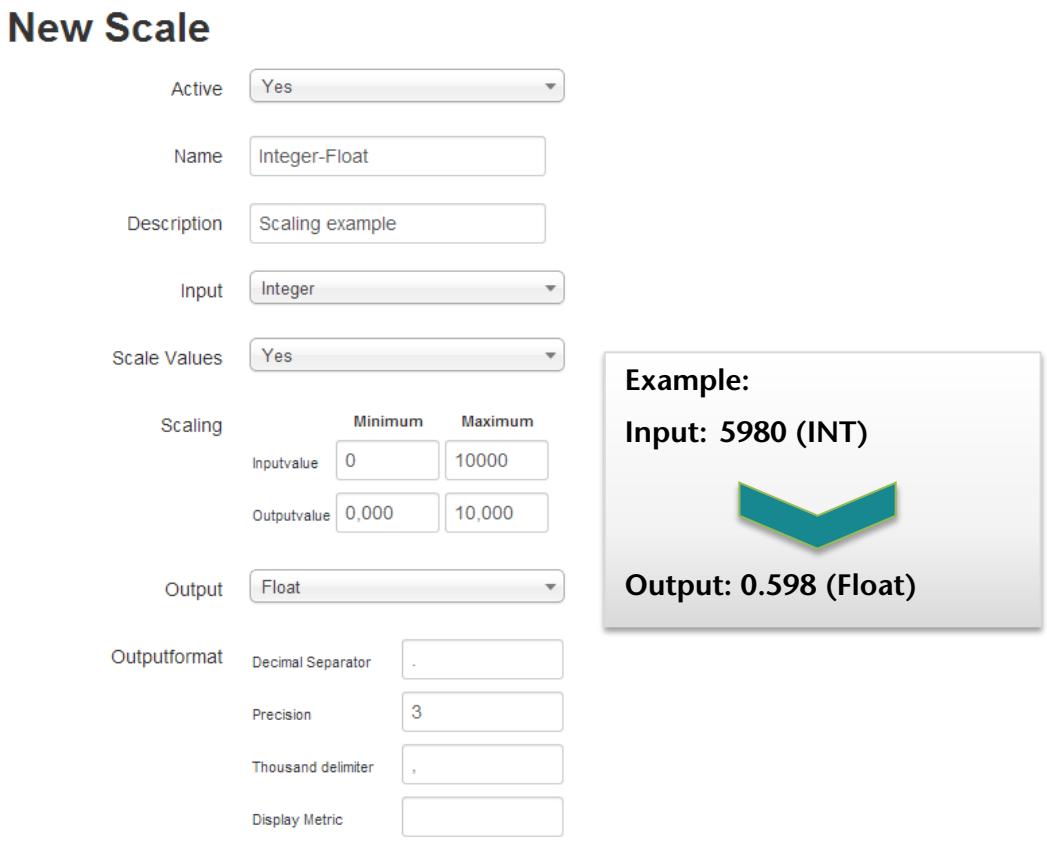
7.1. HTML

HTML tags			
Tag	Example	Effect	Effect (illustrated)
	bold	Shows texts in bold	**bold**
	italics	Shows texts in italics	*iterativ*
<tt>	<tt>Teletype</tt>	Shows texts as monospace texts	`Teletyper`
<u>	<u>underline</u>	Underlines texts	underline
<s>	<s>striked</s>	Strikes texts through	~~striked~~
<big>	<big>bigger</big>	Shows texts in a bigger font size	bigger
<small>	smaller	Shows texts in a smaller font size	smaller
<sup>	^{superscript}	Shows texts as superscript	superscript
<sub>	_{subscript}	Shows texts as subscript	subscript

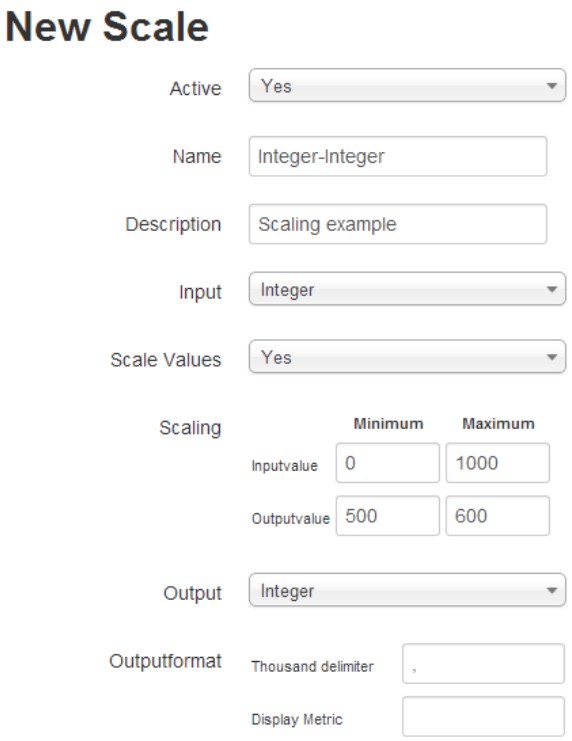
To learn more about tags and formatting, you can visit http://www.w3schools.com/tags/.

7.2. Scaling Examples

7.2.1. Integer – Float



7.2.2. Integer – Integer

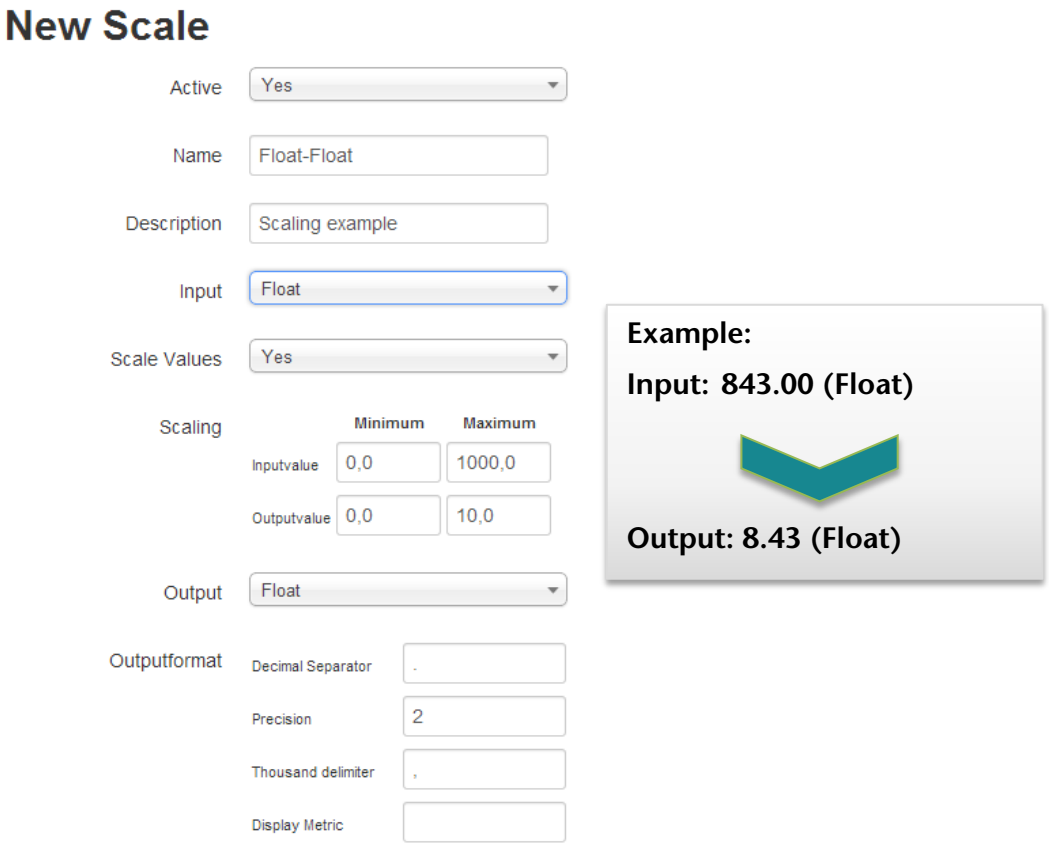


Example:

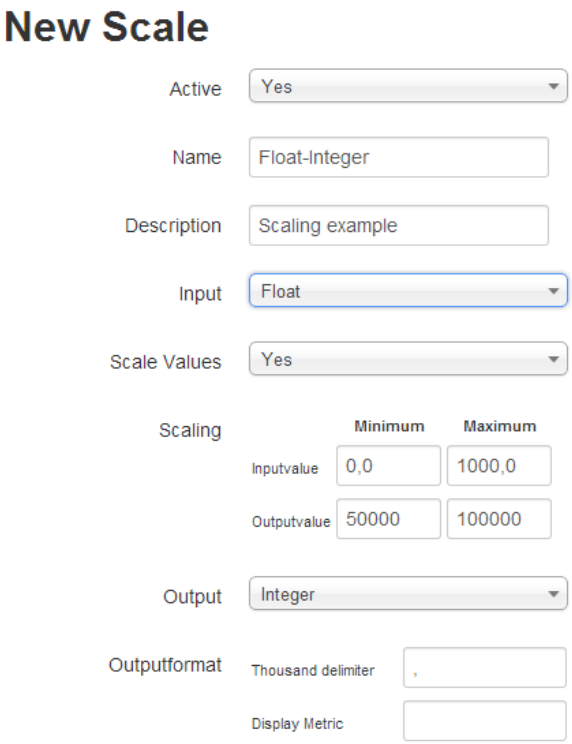
Input: 790 (INT)

Output: 579 (INT)

7.2.3. Float – Float



7.2.4. Float – Integer



Example:

Input: 997.4 (Float)

Output: 9987 (INT)