

## LogicMachine5 Lite

### Product Manual



March, 2022

Technical support:  
[support@openrb.com](mailto:support@openrb.com)

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## Introduction

LogicMachine (LM) is the easiest way to implement complex logic in KNX, Modbus, BACnet, ZigBee, EnOcean and other networks. LM enables efficient building automation process customization, providing virtually unlimited flexibility to the end users in a cost-effective way.

LM5 is an embedded platform with an integrated Ethernet, USB, KNX/TP and RS-485/RS-232 serial interfaces. LM can be used as a cross-standard gateway (Modbus, BACnet/IP), logic engine, visualization platform, KNX/IP Router. It can be integrated with various cloud/web services and 3<sup>rd</sup> party devices. Scripts (logic engine) allows LM to simultaneously act as a thermostat, security panel, lighting controller, etc. Additional applications can be installed to further extend the device functionality.

## Technical support

Any faulty devices should be returned to Embedded Systems.

For any other technical questions use our forum at [forum.logicmachine.net](https://forum.logicmachine.net)

Firmware updates are available at [openrb.com/firmwares/](https://openrb.com/firmwares/)



## Caution Security advice

Risk of damage to property and personal injury due to wrong installation.

Electrical installation can only be ensured if the person can prove knowledge in the following areas:

- Installation of networks
- Mounting electric cables
- Installation of KNX networks

These skills are possessed by certified specialists who are trained in electrical installation technology. If these requirements are not met, you are personally liable for any damage to property or personal injury.

## Electrical connection

The devices are constructed for the operation of protective low voltage (SELV). Grounding of devices is not needed. When switching the power supply on or off, power surges must be avoided.

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# 1. Security recommendations

It is recommended to install LM on a secure network without public access. Where possible separate network segments either physically, by using VLANs or firewalls.

If communication between several LMs is required in one building - provide a KNX Backbone key and set the "Enable only secure communication" option.

Disable KNX/IP features after the project has been fully commissioned if KNX/IP Routing is not needed.

LM cloud can be used for remote control. For remote commissioning and diagnostics either ZeroTier or OpenVPN should be used. Do not use port forwarding.

Use HTTPS instead of HTTP where possible. Install the *SSL certificate* application from the LM app store to obtain a valid certificate for your LM. Using HTTP over ZeroTier or OpenVPN is allowed as the tunneling connection is already encrypted.

Perform LM project backups periodically and store them in a safe place.

ZeroTier example: [openrb.com/zerotier-remote-maintenance-of-lm5/](https://openrb.com/zerotier-remote-maintenance-of-lm5/)

In case you find cyber security incidents or vulnerabilities, please contact us through this page: [openrb.com/contact-us/](https://openrb.com/contact-us/)

Embedded Systems SIA cannot be held responsible for performance problems and incompatibilities caused by applications, services or devices from third-party providers. Failure to follow these instructions can result in equipment damage.



## 2. Quick startup guide

### 2.1. Connection

- Mount the device on the DIN rail
- Connect the KNX/TP bus cable
- Connect 24V power supply to the device (red pole to 24V+, grey pole to GND)
- Connect LM to the local network using an Ethernet cable

### 2.2. Default network and access configuration

Login name	admin
Password	admin
IP address	192.168.0.10
Network mask	255.255.255.0

Make sure that your PC is on the same sub-network as LM or the connection will not be possible.

The device can be accessed by opening a web browser (Chrome, Firefox, Safari are supported) and entering IP of the device <http://IP>

Secure access to the device is available via <https://IP>. LM comes with a self-signed certificate for which the browser will display a warning. Install the *SSL certificate* application from the LM app store to obtain a valid certificate for your LM or accept the warning.

### 2.3. Discover LogicMachine IP address

LM has a built-in mDNS/zeroconf support. *LogicMachine* application for Android and iOS can be used to discover LM devices on the network.

The following applications can discover LM devices on the local network:

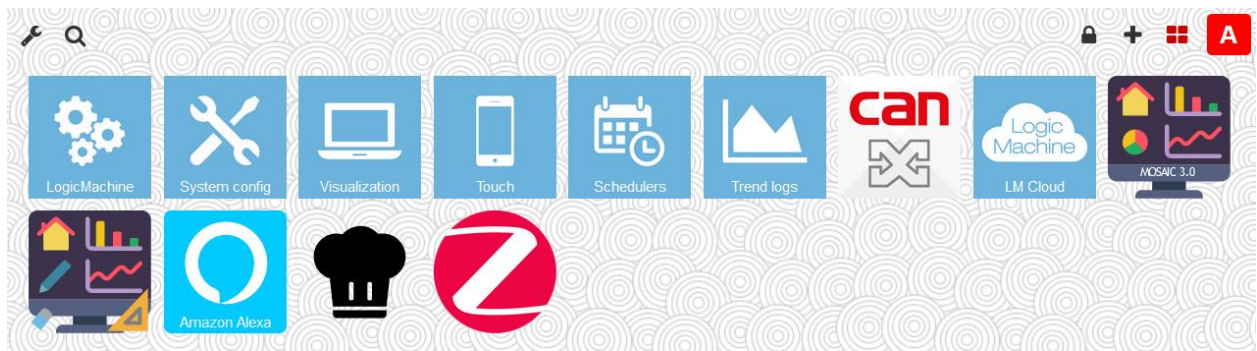
- Android - *LogicMachine*
- iOS - *LogicMachine*

### 2.4. Firmware upgrade and update installation

See [System → Upgrade firmware](#) and [Utilities → Install updates](#).

### 3. Graphical user interface


After a successful login the main page appears:

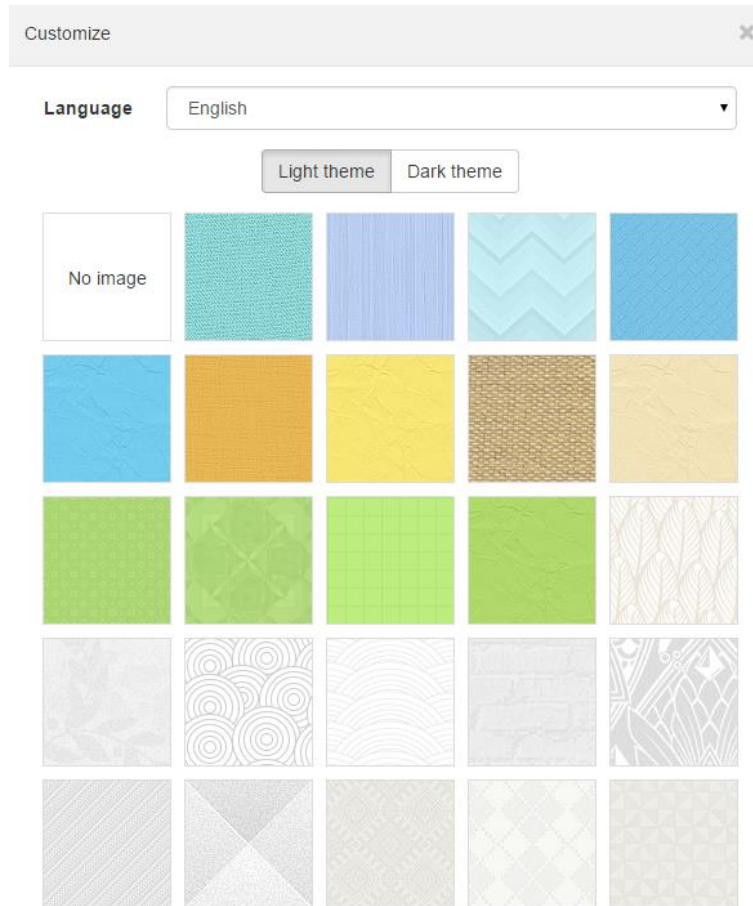


- *LogicMachine* - objects and object logs, scripts, schedulers, trends, visualization editor, user access, alerts and error logs
- *System config* - network, KNX and other built-in service configuration, package management and firmware upgrade, general system status
- *Visualization* - main graphical visualization (plan view)
- *Touch* - graphical visualization for touch devices
- *Schedulers* - user-defined schedulers
- *Trend logs* - chart view for time-series data
- *Mosaic app* - graphical visualization application

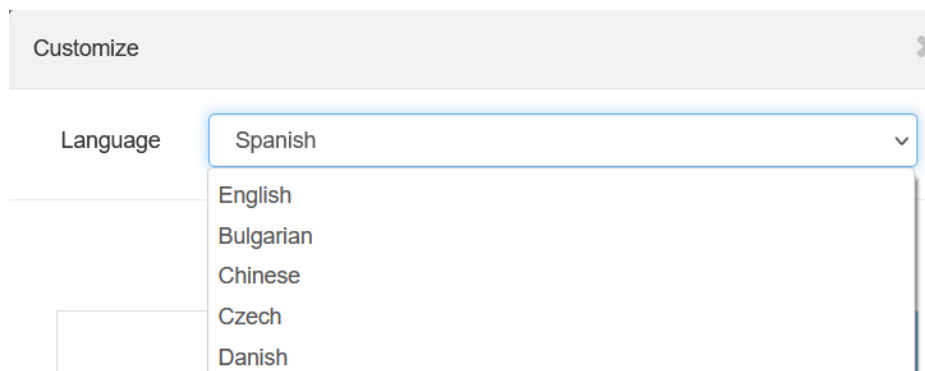
The main screen of the interface is a list of installed applications. It is possible to change the application order, hide selected applications. Each user can customize the background, light/dark theme and interface language. The admin user can install and update applications.

### 3.1. Customizing the background / Language

Click *Customize*  to change the interface language, color theme and the background image.




The interface language can be chosen by clicking the *Language* drop-down menu.

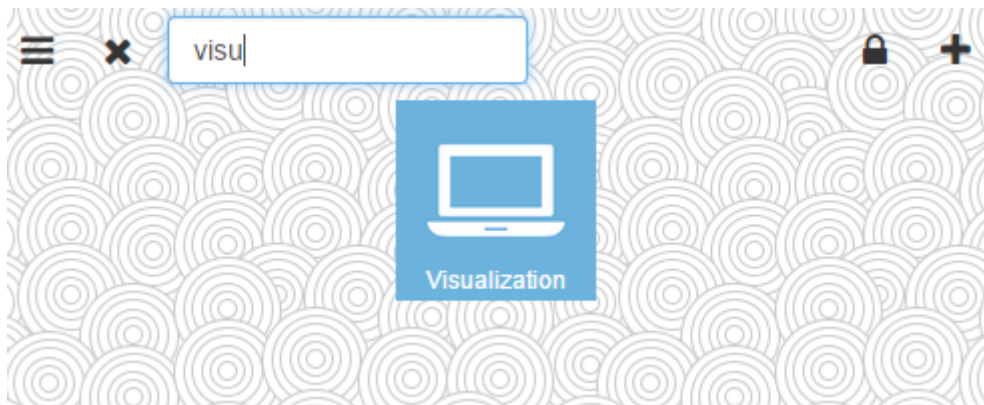


The background image is applied automatically when chosen.




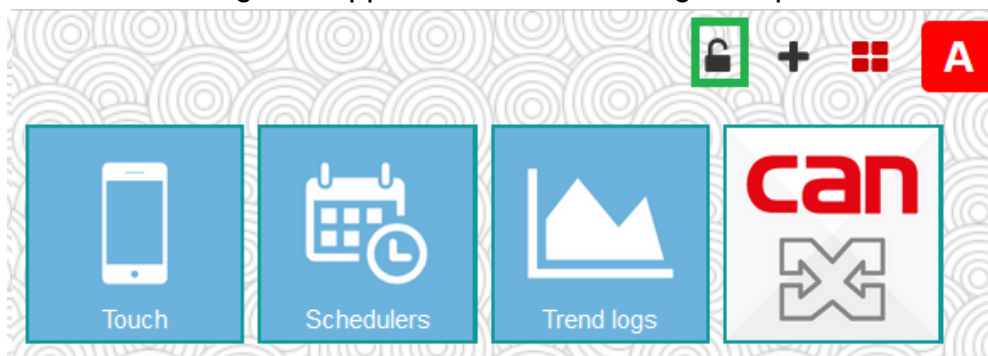
### 3.2. Search function

Click *Search*  to open the search box to find applications containing the given search phrase.

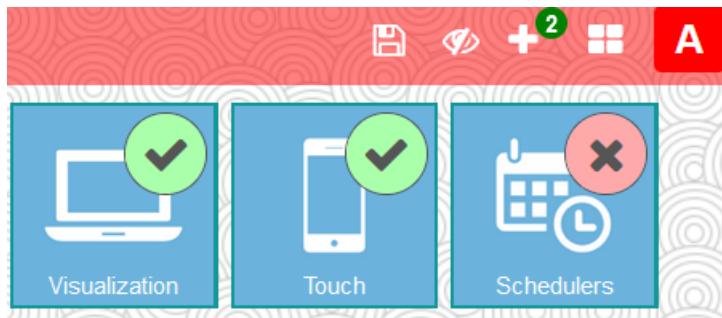



### 3.3. Unlock the application list

Click *Unlock*  to change the application order via drag & drop.



To hide certain applications for users click *Grid*  and then click *Visibility* .

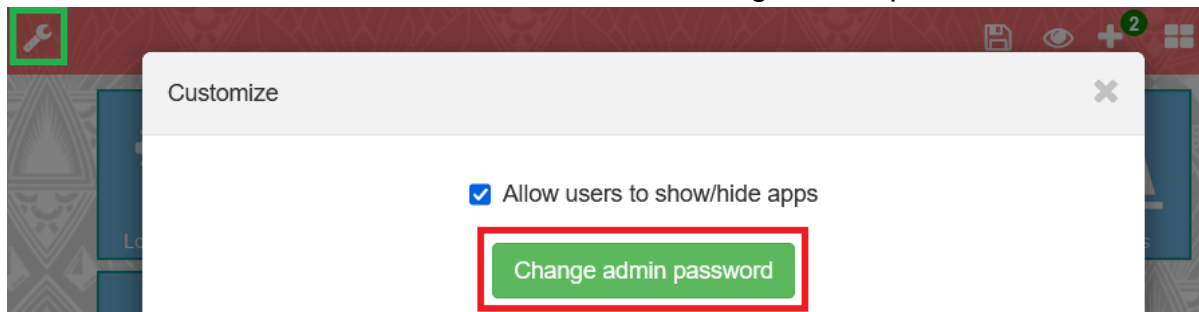


After selecting which apps will be visible to users click Save .

### 3.4. Admin mode


#### 3.4.1. Admin mode settings

Click *Grid*  then *Customize*  and click *Change admin password*.




*Allow users to show/hide apps* enables/disables the possibility for non-admin users to to show or hide apps themselves.

#### 3.4.2. Change default page view for users

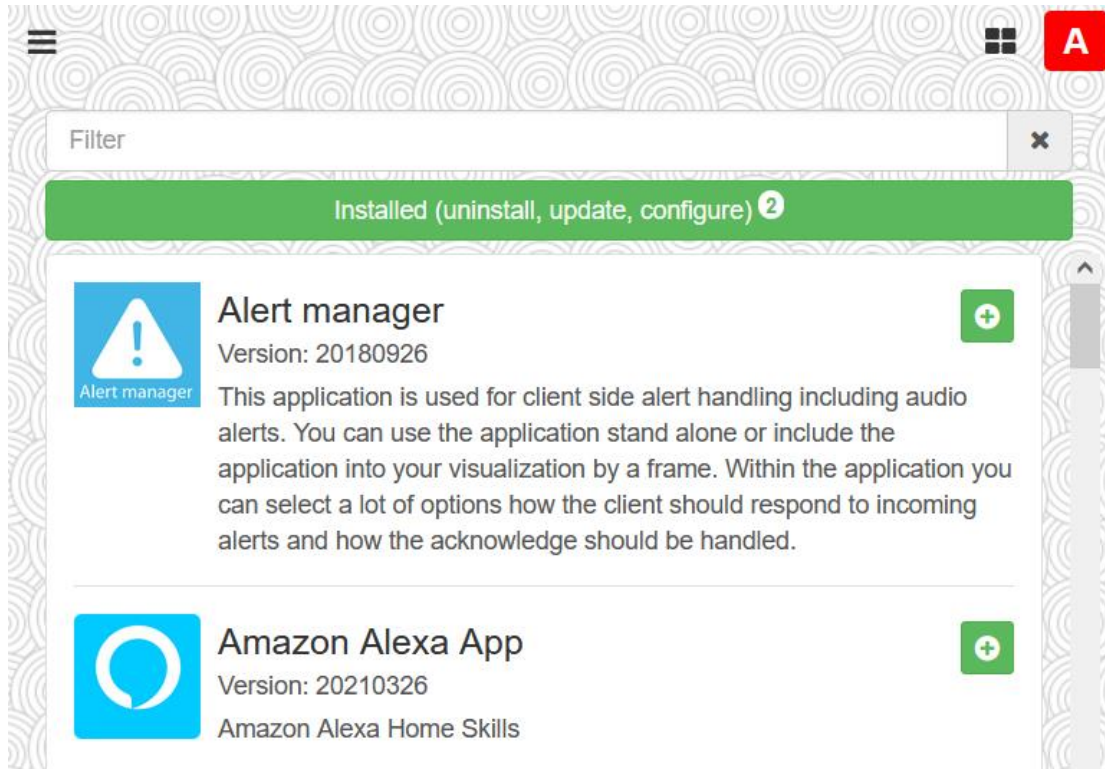
While in admin mode it is possible to change the default view for all users - the background image, hide/unhide/sort apps the same way as described in 3.3. Once the all the necessary changes have been made click Save .




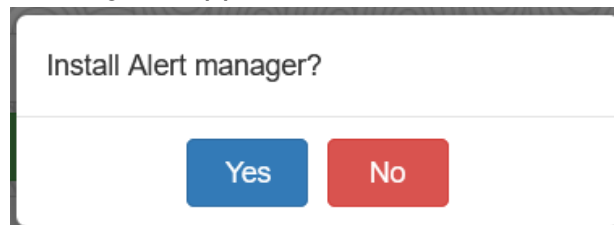
### 3.4.3. Add or remove applications

Click *Plus*  to enter the application administration page. If an error message appears, provide valid DNS settings as described in [System Configuration → Network → Interfaces](#).

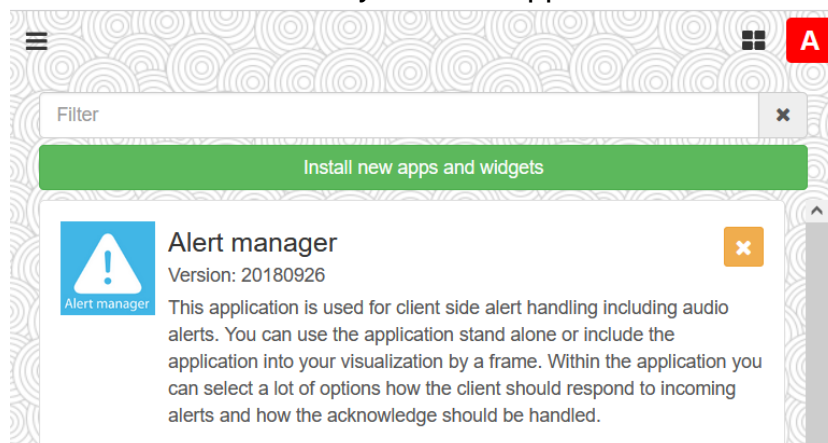
The list of available applications is displayed.



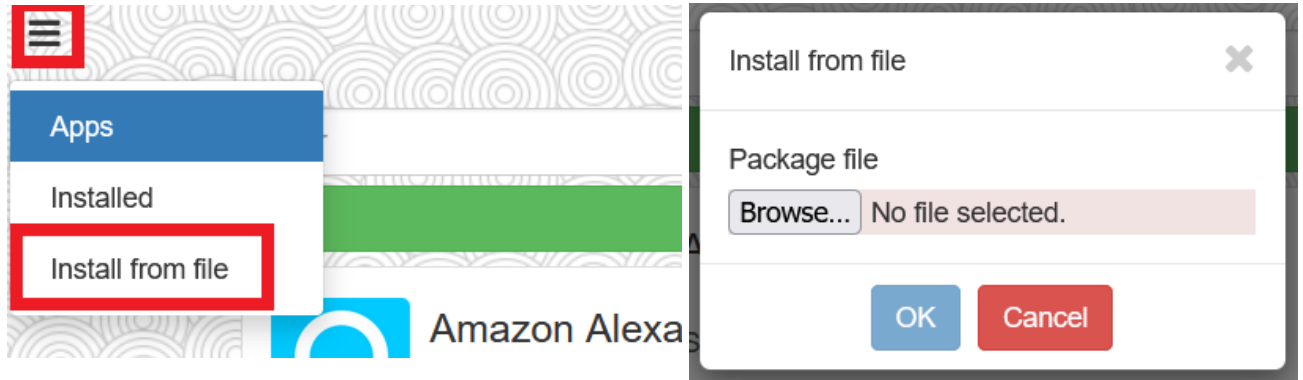
Click *Install*  to install a given application into LM.





Click *Installed* to view a list of currently installed applications on LM.




Applications can be installed manually by providing an appropriate application package file.



Click *Update*  to install a newer version of a selected application.

Click *Grid*  to return to the main page.

#### **3.4.4. Exit admin mode**

Click  to exit perform logout.

#### **3.5. Application development**

Visit our forum: [forum.logicmachine.net](http://forum.logicmachine.net)

## 4. LogicMachine configuration

This is the main page of the LogicMachine configuration and management. It consists of the following tabs:

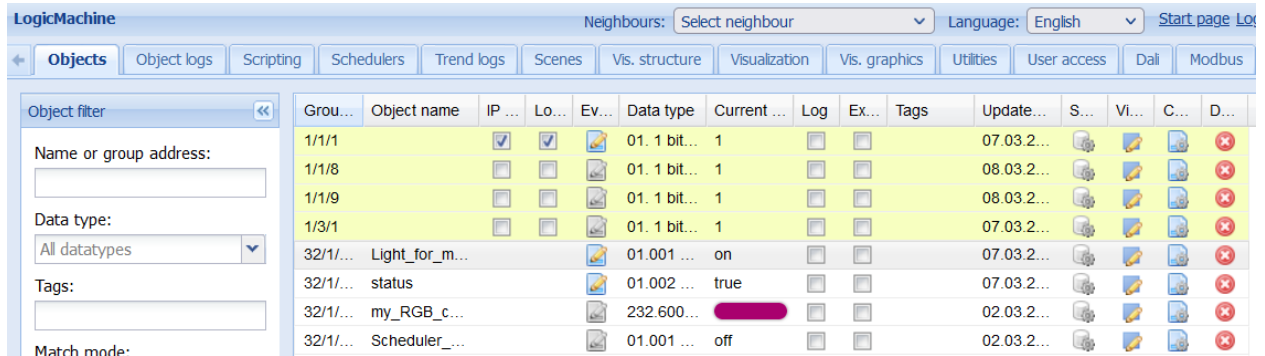
- *Objects* - object management
- *Object logs* - object logs
- *Scripting* - scripting repository management
- *Schedulers* - user scheduler managements
- *Trend logs* - time/series value log managements
- *Scenes* - scenes for object control
- *Vis. structure* - visualization structure definition
- *Visualization* - visualization editor
- *Vis. graphics* - icon, background, font management
- *Utilities* - utilities including import from ETS, reset, backup, restore
- *User access* - user management and access logs
- *Modbus* - Modbus mapper
- *Alerts* - user and system alert messages
- *Logs* - script logs
- *Error log* - script and system error messages



## 4.1. Objects

Objects can be added to this list in several ways:

- Manually by clicking *Add new object*
- New group addresses seen on the bus are added automatically (if *Bus sniffer* enabled in [Utilities](#) → [General configuration](#))
- Importing `KNXPROJ` or `ESF` file (in [Utilities](#))

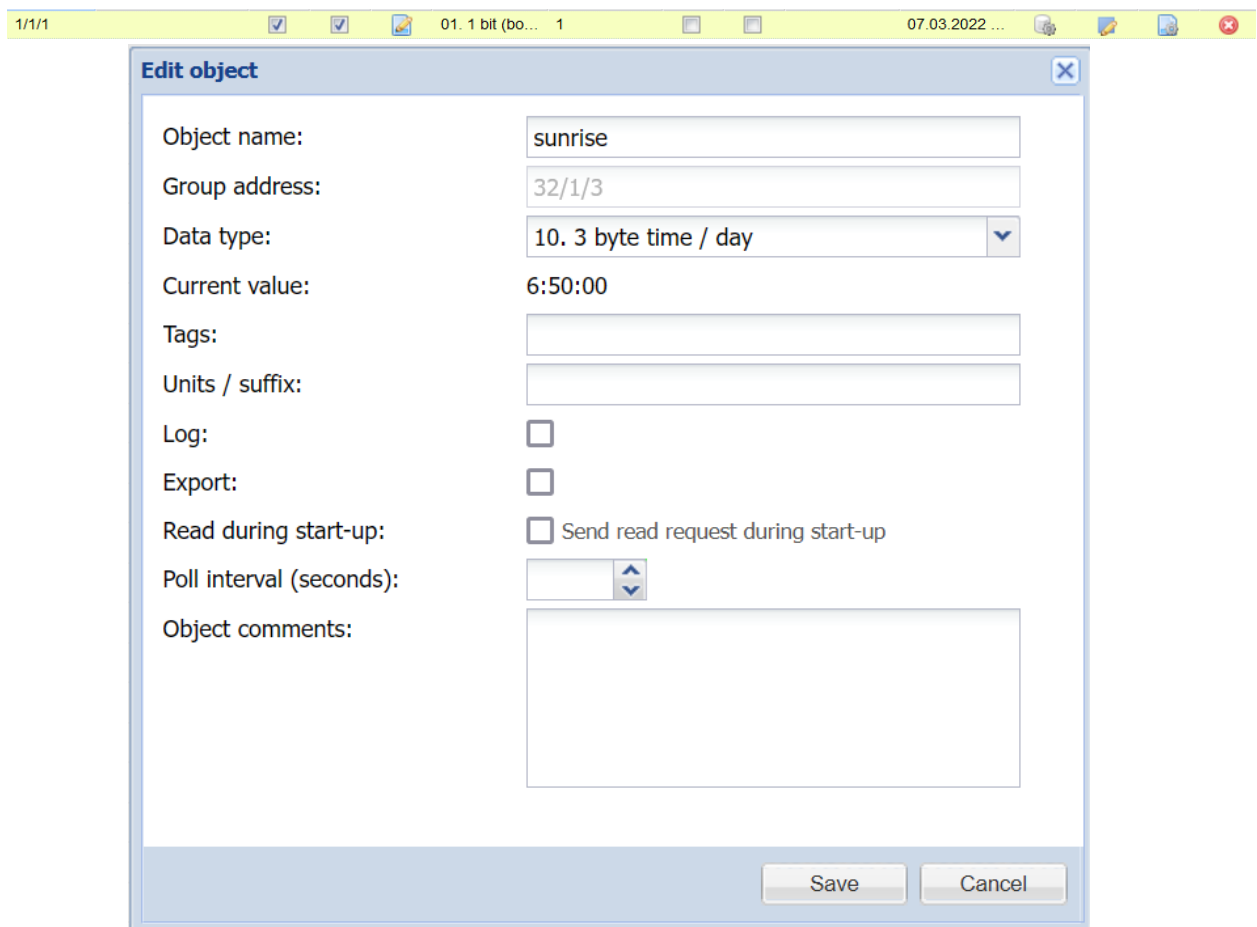


The screenshot shows the LogicMachine interface with the 'Objects' tab selected. On the left, there is an 'Object filter' section with fields for 'Name or group address', 'Data type' (set to 'All datatypes'), and 'Tags'. The main area displays a table of objects with columns: Group, Object name, IP, Location, Event, Data type, Current value, Log, Export, Tags, Update date, and icons for edit, delete, and refresh. The table contains several rows, with some highlighted in yellow.

Group...	Object name	IP ...	Lo...	Ev...	Data type	Current ...	Log	Ex...	Tags	Update...	S...	Vi...	C...	D...
1/1/1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		01. 1 bit...	1	<input type="checkbox"/>	<input type="checkbox"/>		07.03.2...				
1/1/8		<input type="checkbox"/>	<input type="checkbox"/>		01. 1 bit...	1	<input type="checkbox"/>	<input type="checkbox"/>		08.03.2...				
1/1/9		<input type="checkbox"/>	<input type="checkbox"/>		01. 1 bit...	1	<input type="checkbox"/>	<input type="checkbox"/>		08.03.2...				
1/3/1		<input type="checkbox"/>	<input type="checkbox"/>		01. 1 bit...	1	<input type="checkbox"/>	<input type="checkbox"/>		07.03.2...				
32/1/...	Light_for_m...				01.001 ...	on	<input type="checkbox"/>	<input type="checkbox"/>		07.03.2...				
32/1/...	status				01.002 ...	true	<input type="checkbox"/>	<input type="checkbox"/>		07.03.2...				
32/1/...	my_RGB_c...				232.600...		<input type="checkbox"/>	<input type="checkbox"/>		02.03.2...				
32/1/...	Scheduler_...				01.001 ...	off	<input type="checkbox"/>	<input type="checkbox"/>		02.03.2...				

### 4.1.1. Object parameters

Click the object name or group address to edit object parameters.



The screenshot shows the 'Edit object' dialog box. It contains the following fields and options:


- Object name:
- Group address:
- Data type:
- Current value:
- Tags:
- Units / suffix:
- Log:
- Export:
- Read during start-up:  Send read request during start-up
- Poll interval (seconds):
- Object comments:

Buttons: Save, Cancel

- *Object name* - name of the object
- *Group address* - group address of the object (cannot be changed once object is created)
- *Data type* - KNX data type of the object  
*Note:* in some cases objects added via bus sniffer or ESF import might have incorrect data type
- *Current value* - current value of the object
- *Tags* - allows grouping several objects via common tags which then can be used in scripting
- *Units / suffix* - text value that appears after the object value. Some data types have units by default (% , °C etc.)
- *Log* - enable logging for this object. Logs will appear in the *Objects logs* tab
- *Export* - this will allow object access from BACnet/IP (if enabled). Can also be used to limit objects that can be accessed via Remote services (configurable)
- *Read during start-up* - send a read request to this object when the system starts.
- *Poll interval (seconds)* - periodically send read requests to this KNX object
- *Object comments* - used comments about this object

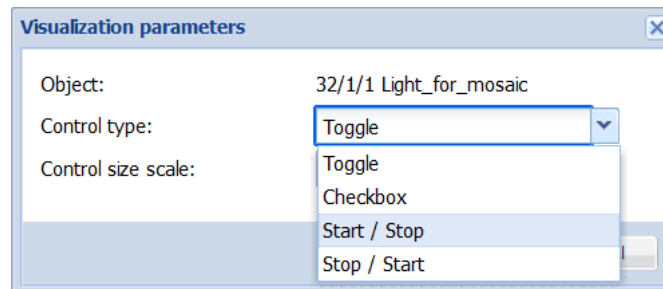
The object list can be sorted by one of the following parameters - Name, Group address, Data type, Current value, Tags, Comments.

#### **4.1.2. Object visualization parameters**

Click  in the object list to set specific visualization parameters for the selected object.

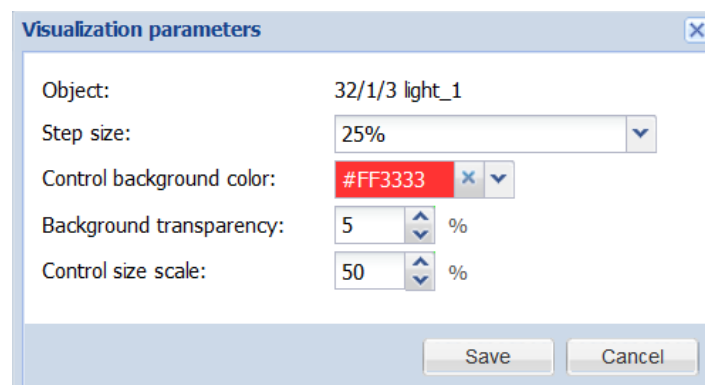
**Note!** Some properties like background color are only visible in the *Visualization* viewer but not in the editor.

### 4.1.2.1. 1 bit



- *Control type* - control element appearance (*Touch Visualization* or in *Show control* mode)
  - *Toggle*
  - *Checkbox*
  - *Start / Stop* - send *1/true* on press, *0/false* on release
  - *Stop / Start* - send *0/false* on press, *1/true* release
- *Control size scale* - size of the control element (only in *Show control* mode)

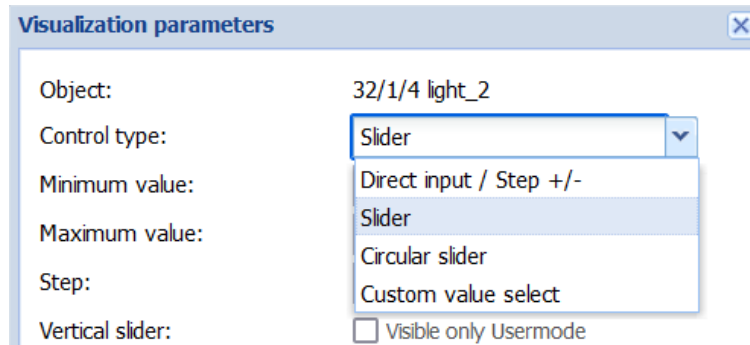
### 4.1.2.2. 4 bit (3 bit controlled)



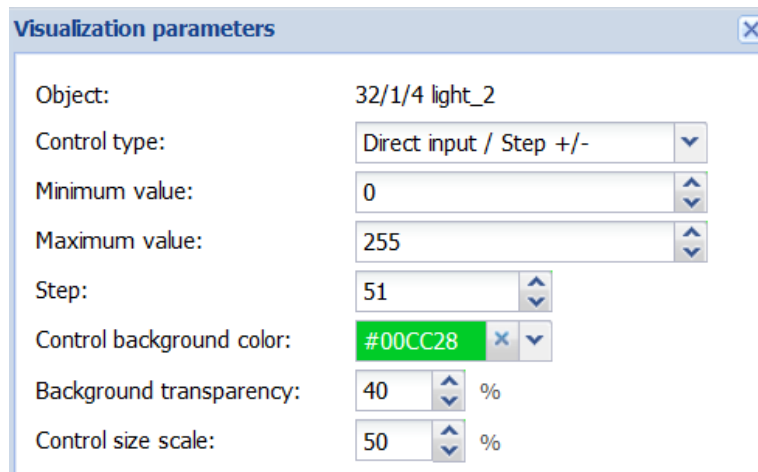
- *Step size* - step size for the value change, pressing +/- sends *up/down* command with the defined step size respectively, releasing sends *stop*

- *Control background color* - custom background color for this control element
- *Background transparency* - custom background transparency
- *Control size scale* - size of the control element

#### 4.1.2.3. Numerical data types (*integer and floating point*)

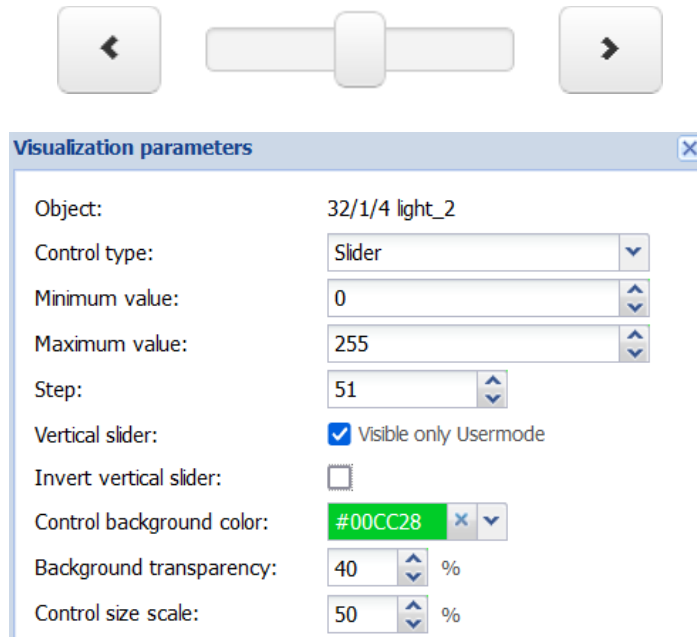


#### 4.1.2.4. Direct input / Step +/-



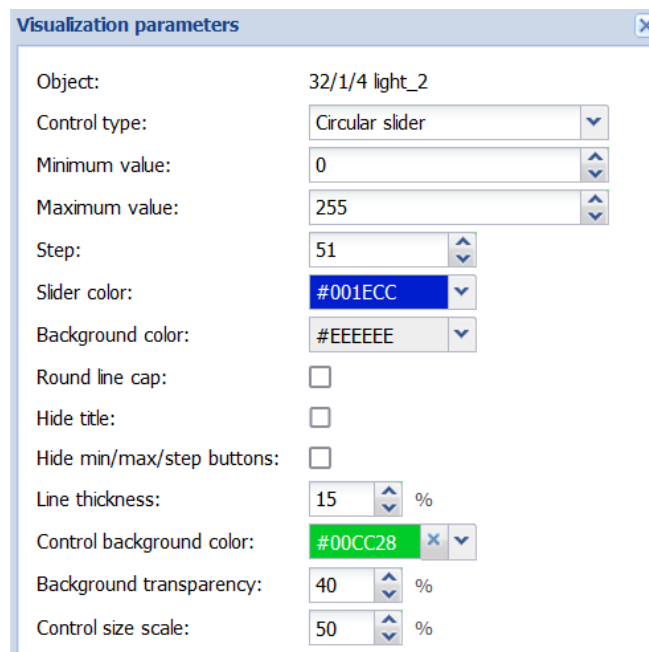
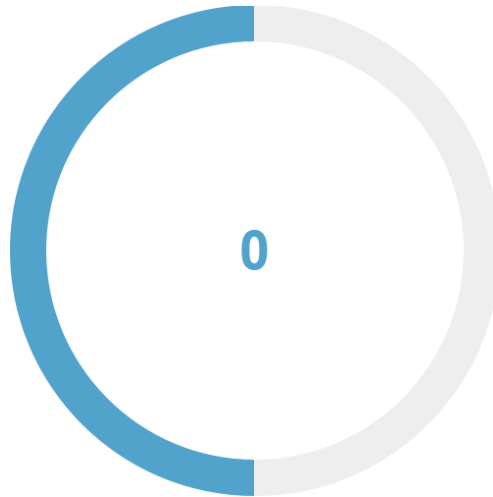
- *Minimum value* - minimum allowed value
- *Maximum value* - maximum allowed value
- *Step* - step size for each +/- button press
- *Control background color* - custom background color for this control element
- *Background transparency* - custom background transparency
- *Control size scale* - size of the control element

### 4.1.2.5. Slider




- *Minimum value* - minimum allowed value
- *Maximum value* - maximum allowed value
- *Step* - step size for each < and > button press, when dragging or clicking the slider the final value will be adjusted to the closest value matching the step size
- *Vertical slider* - change the slider orientation to vertical (not available in *Touch mode*)
- *Invert vertical slider* - top becomes the minimum value, bottom becomes the maximum
- *Control background color* - custom background color for this control element
- *Background transparency* - custom background transparency
- *Control size scale* - size of the control element

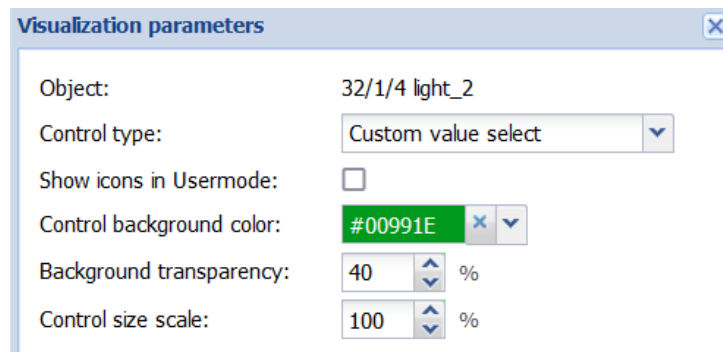
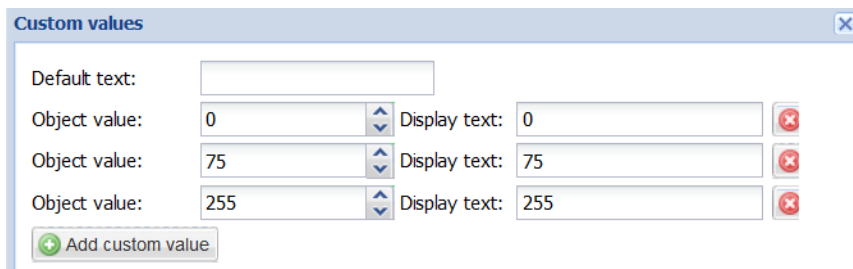
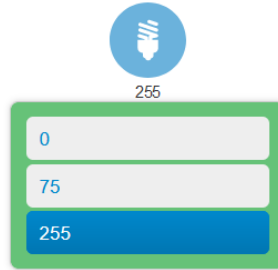
#### 4.1.2.6. Circular slider



- *Minimum value* - minimum allowed value
- *Maximum value* - maximum allowed value
- *Step* - step size for each < and > button press, when dragging or clicking the slider the final value will be adjusted to the closest value matching the step size
- *Slider color* - color of the active part of the slider's line
- *Background color* - color of the inactive part of the slider's line
- *Round line cap* - use round line cap for the slider's line
- *Hide title* - whether to hide the title (object name)
- *Hide min/max/step buttons* - whether to hide up/down buttons
- *Line thickness* - thickness of the slider line
- *Control background color* - custom background color for this control element
- *Background transparency* - custom background transparency
- *Control size scale* - size of the control element

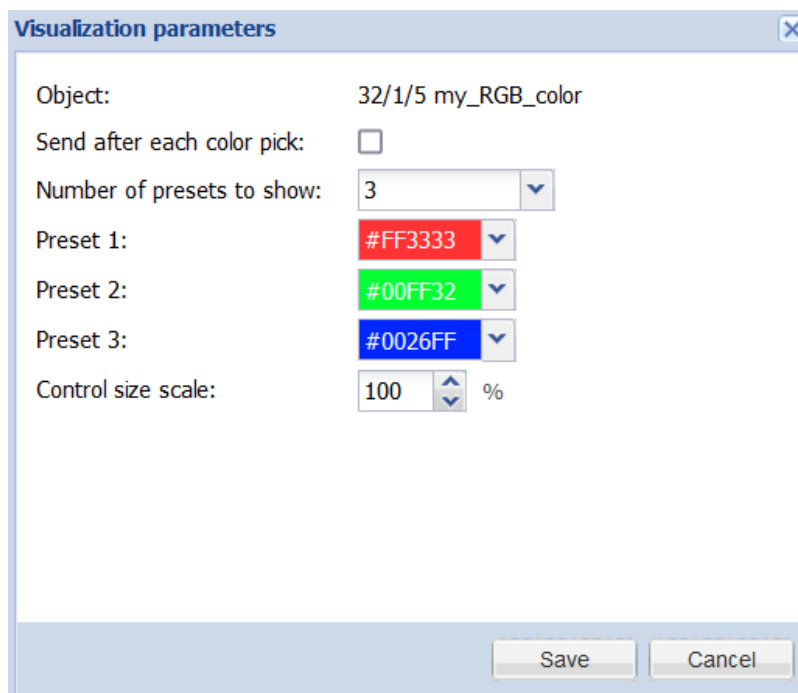
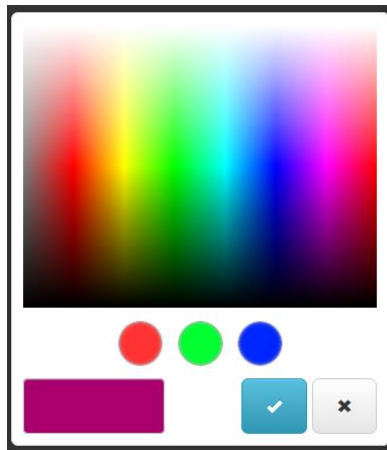
#### 4.1.2.5. Custom value select

Select from a list of custom values. Values can be defined in *Vis. parameters* 



- *Show icons in Usermode* - use icons instead of textual values, icons can be defined in the *Visualization* editor (*Additional icons*)
- *Control background color* - custom background color for this control element
- *Background transparency* - custom background transparency
- *Control size scale* - size of the control element

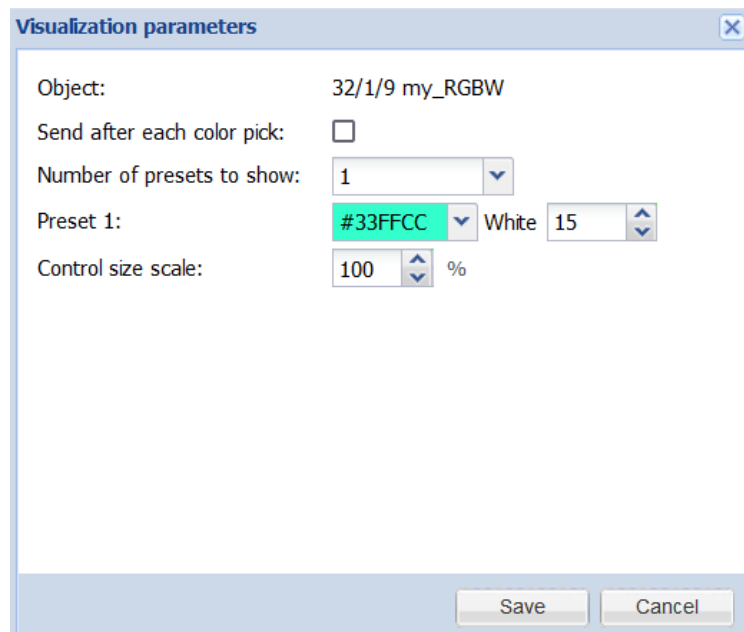
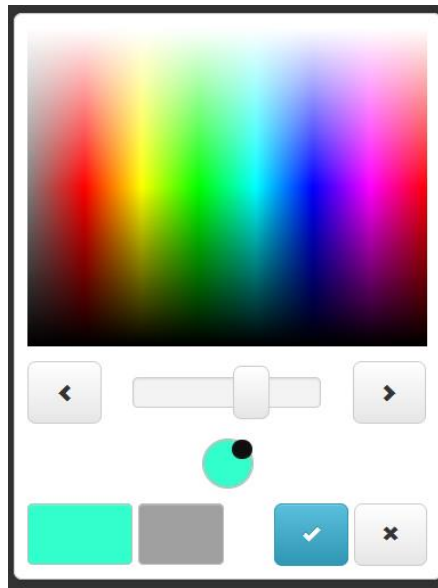
#### 4.1.2.6. RGB



- *Send after each color pick* - specifies whether to send the new value after each color pick or only when *Ok*  is clicked
- *Number of presets to show* - the number of predefined presets to show
- *Preset* - preset color
- *Control size scale* - size of the control element

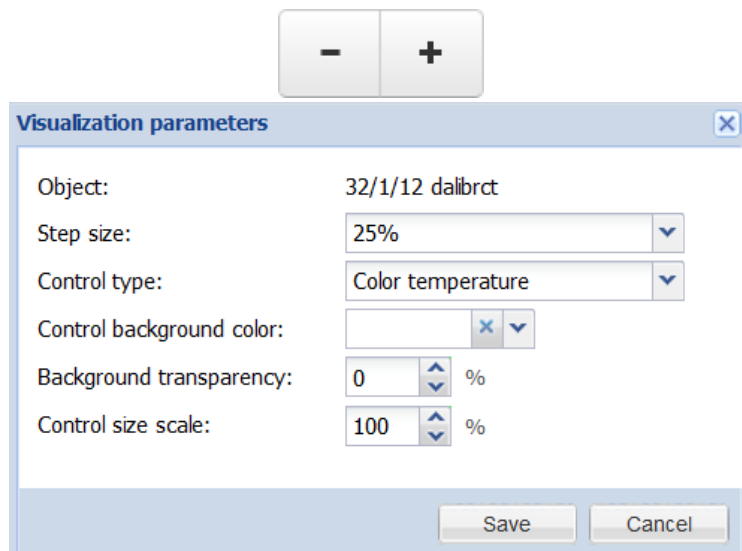


### 4.1.2.7. RGBW



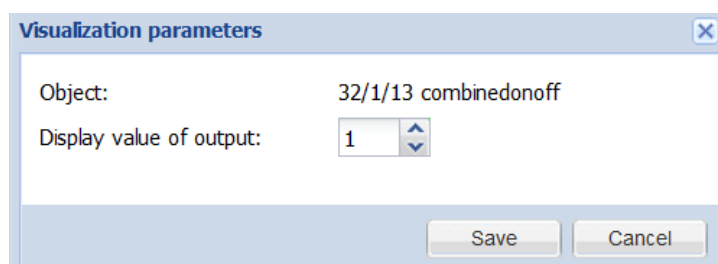
- *Send after each color pick* - specifies whether to send the new value after each color pick or only when *Ok*  is clicked
- *Number of presets to show* - the number of predefined presets to show
- *Preset* - preset color and white % value
- *Control size scale* - size of the control element

#### 4.1.2.8. DALI brightness and color temperature



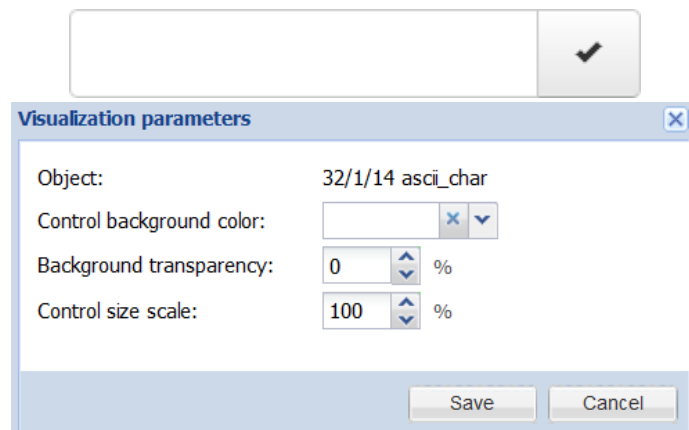
- *Step size* - step size for the value change, pressing +/- sends *up/down* command with the defined step size respectively, releasing sends *stop*
- *Control type* - selects which property to control - either brightness or color temperature
- *Control background color* - custom background color for this control element
- *Background transparency* - custom background transparency
- *Control size scale* - size of the control element

#### 4.1.2.9. Combined On/Off (read-only)



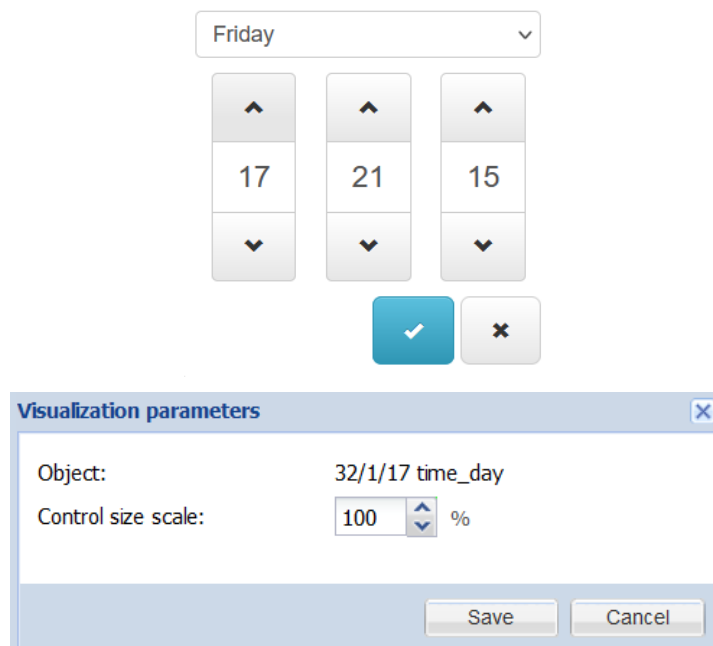
- *Display value of output* - selects which object number (1..16) is used for value display

#### 4.1.2.10. Text (ASCII character, 14 byte string, 250 byte string)



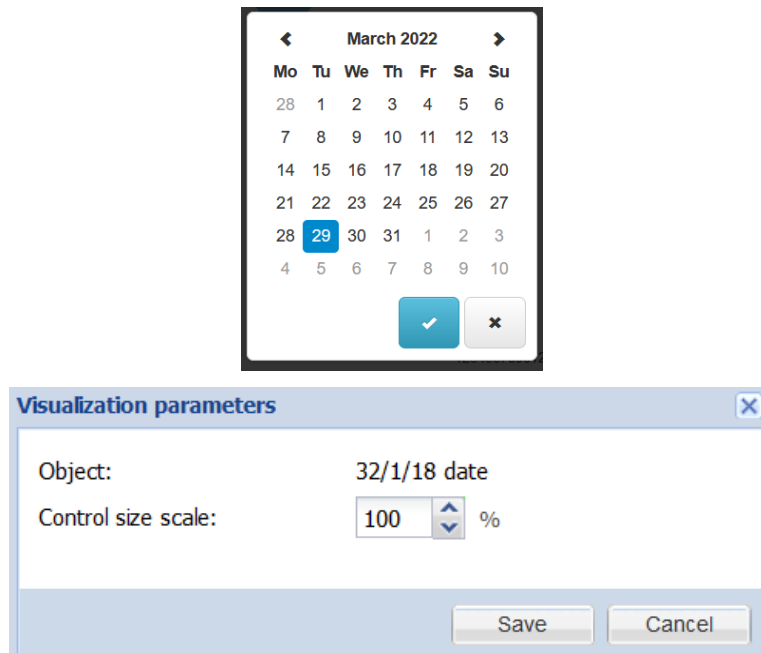
- *Control background color* - custom background color for this control element
- *Background transparency* - custom background transparency
- *Control size scale* - size of the control element

#### 4.1.2.11. Time / day



- *Control size scale* - size of the control element

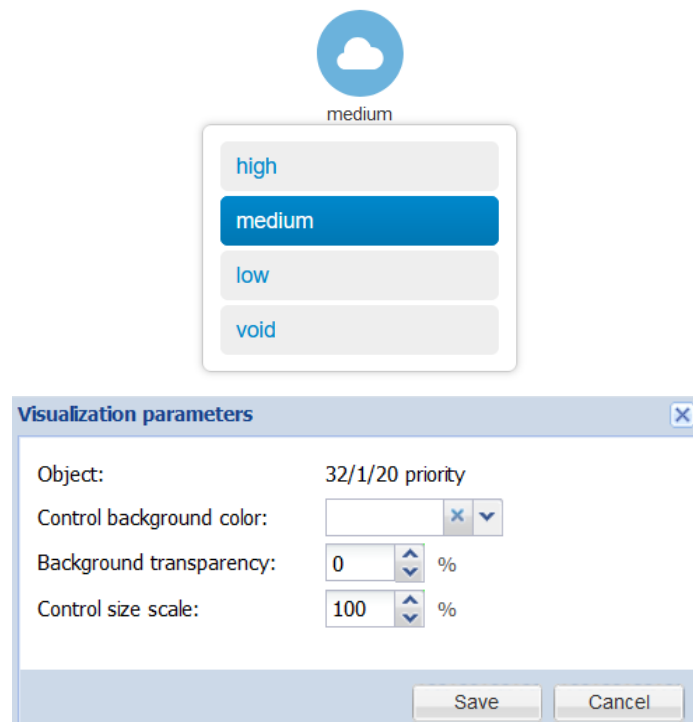
#### 4.1.2.12. Date



- *Control size scale* - size of the control element


#### 4.1.2.13. 1 byte enumeration

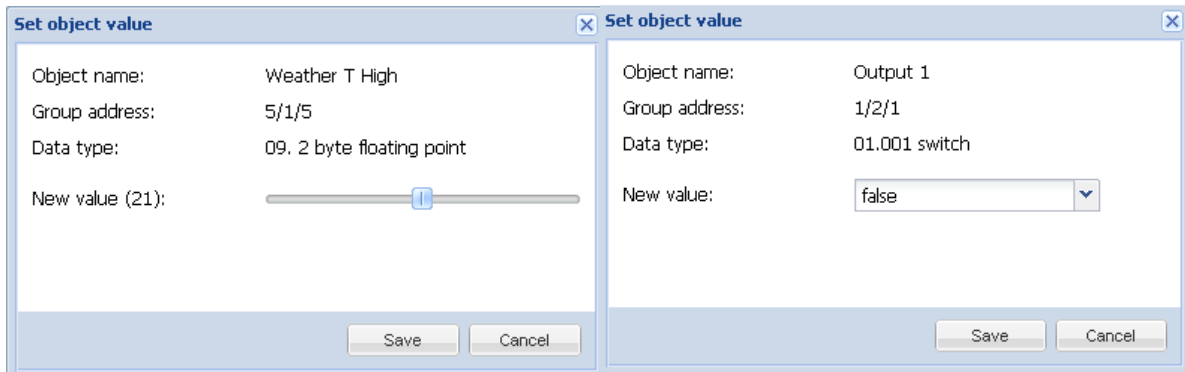
If a sub data type is selected (20.x) the control behaves like a *Custom value select* with predefined values depending on the data type.




- *Control background color* - custom background color for this control element
- *Background transparency* - custom background transparency
- *Control size scale* - size of the control element

### 4.1.3. Change the object value

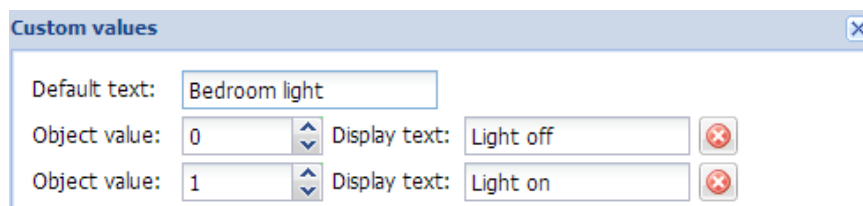
Click  to change the object value. Control elements depend on the object data type and visualization parameters.



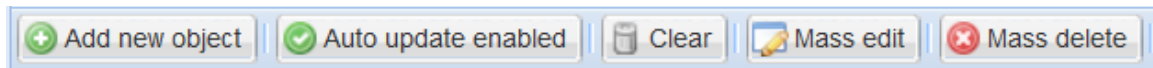
### 4.1.4. Custom values

Click  to map textual values to certain numerical object values. When the *Default text* is set it will be shown when no matching object value has been found. Otherwise raw object value is displayed.

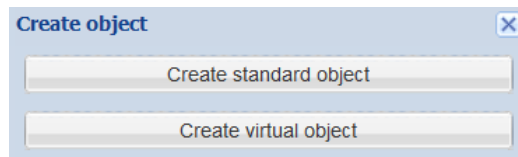
Custom values are available only for Boolean and integer data types. For Boolean data type use *0* for *off/false* and *1* for *on/true*.



### 4.1.5. Object control bar

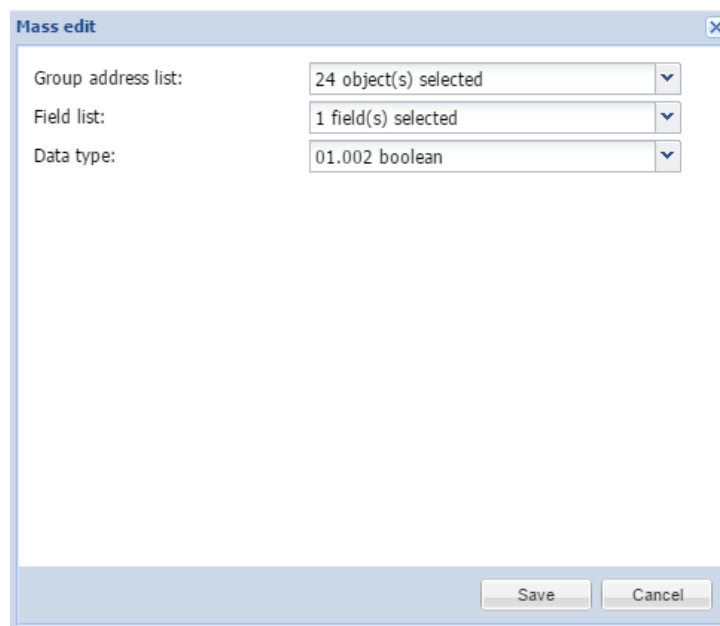


- *Add new object* - manually add new object to the list



Virtual objects cannot appear on KNX/TP and KNX/IP, but can be accessed via BACnet and Remote services. Use virtual objects for values that are internal to the LM.

- *Auto update enabled* - whether the object list is updated automatically or not when object values are changed
- *Clear* - clear the list of group addresses
- *Mass edit* - edit certain parameters of multiple objects at once:
  - object properties
  - visualization parameters
  - custom values



- *Mass delete* - delete all objects that either have no name set, no data type set or all objects matching the current filter

### 4.1.6. Object filter

Object list can be filtered by name/group address, data type and tags.

Wildcard(for example 1/1/\*) can be used for filtering multiple groups addresses. Several filters can be specified, separated by comma.

Group add...	Object name	IP > L...	Loc >...	Event...	Data type	Current value
1/1/1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		01. 1 bit (boolean)	1
1/1/8		<input type="checkbox"/>	<input type="checkbox"/>		01. 1 bit (boolean)	1
1/1/9		<input type="checkbox"/>	<input type="checkbox"/>		01. 1 bit (boolean)	1
1/3/1		<input type="checkbox"/>	<input type="checkbox"/>		01. 1 bit (boolean)	1
32/1/1	Light_for_mosaic				01.001 switch	off
32/1/2	status				01.002 boolean	false
32/1/3	light_1				03. 4 bit (3 bit c...	No control, Break
32/1/4	light_2				05. 1 byte unsig...	255
32/1/5	my_RGB_color				232.600 RGB c...	
32/1/6	Scheduler_object				01.001 switch	off
32/1/7	Scheduler_on_off_object				01.001 switch	on

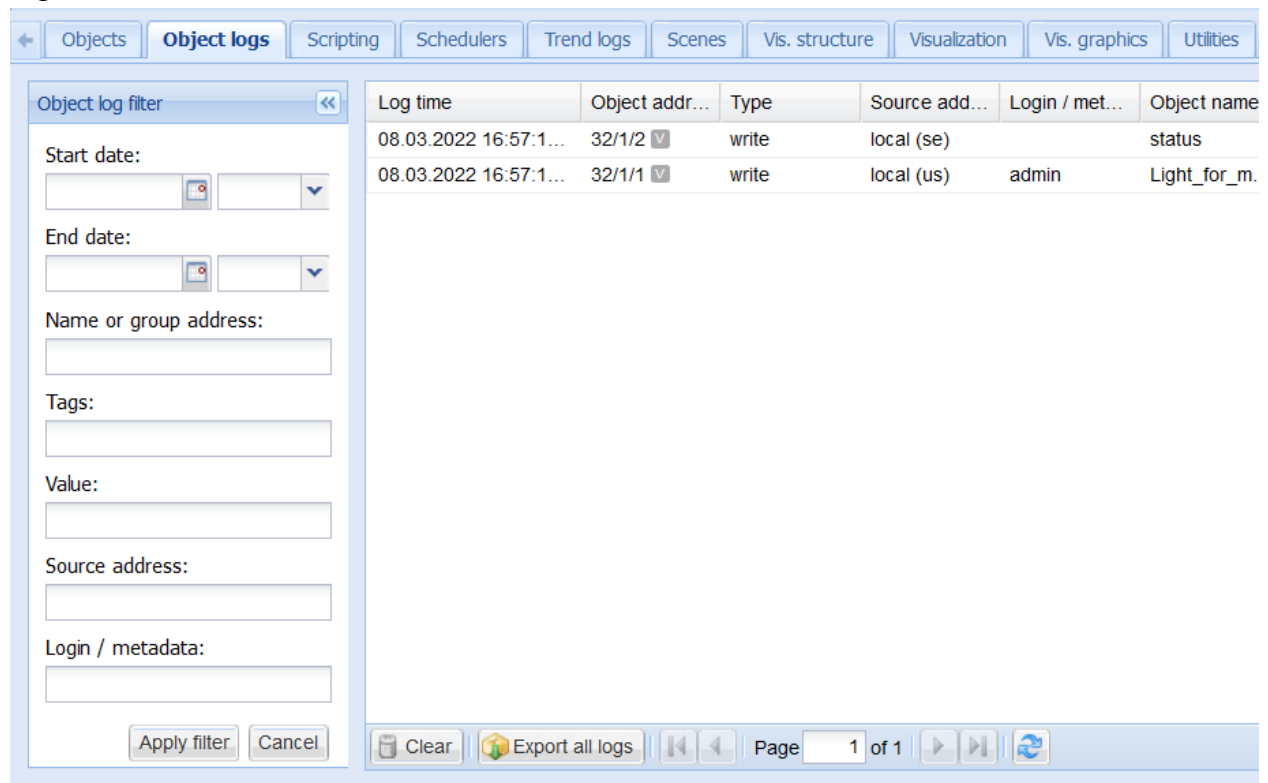
**Match mode:**

*All tags* - represents *AND* function when all tags must match

*Any tag* - represents *OR* function when at least one of tags must match

## 4.2. Object logs

Telegrams from objects that have the *Log* property enabled are available in the *Object logs* tab.



The screenshot shows the 'Object logs' tab in a software interface. On the left is a filter panel with fields for 'Start date', 'End date', 'Name or group address', 'Tags', 'Value', 'Source address', and 'Login / metadata'. Below these fields are 'Apply filter' and 'Cancel' buttons. The main area is a table with the following data:

Log time	Object addr...	Type	Source add...	Login / met...	Object name
08.03.2022 16:57:1...	32/1/2 ✓	write	local (se)		status
08.03.2022 16:57:1...	32/1/1 ✓	write	local (us)	admin	Light_for_m.

At the bottom of the table area are buttons for 'Clear', 'Export all logs', and navigation controls. The page indicator shows 'Page 1 of 1'.

Logs can be filtered by the following criteria:

- *Start date* - start date and time
- *End date* - end date and time
- *Name or group address* - specific name or group address of the object (\* wildcard allowed)
- *Tags* - object tags
- *Value* - object value
- *Source address* - source address when the telegram comes from KNX/TP or KNX/IP, *local* otherwise
- *Login / metadata* - additional telegram information. For example: login and IP address if the value has been changed by a local or a cloud user

Click *Clear* to remove all object logs.

Object log size can be changed in [LogicMachine](#) → [Utilities](#) → [General Configuration](#).



### 4.3. Scripting

The Lua programming language is used for scripting (LuaJIT, compatible with Lua 5.1). Most of the Lua language aspects are covered in the first edition of "Programming in Lua" which is freely available at [www.lua.org/pil/](http://www.lua.org/pil/)

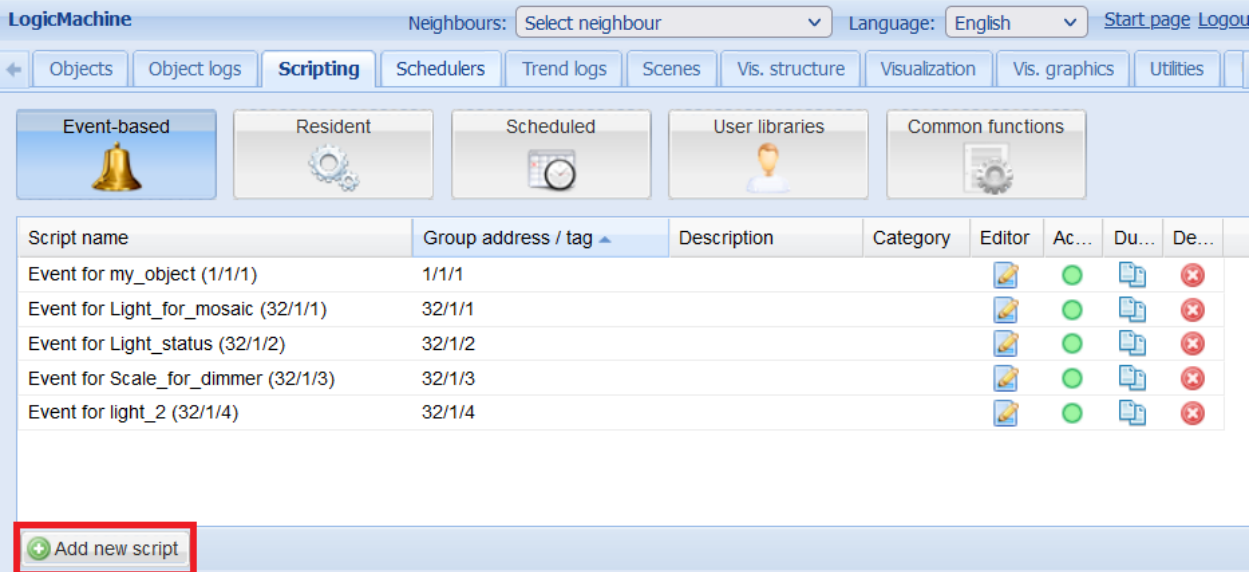
**Note!** the latest Lua reference manual for LogicMachine can be found at [openrb.com/docs/lua.htm](http://openrb.com/docs/lua.htm)

Scripts types:

- *Event-based* - executed when a group event occurs (read/write/response)
- *Resident* - function executed in an infinite loop with a defined sleep time between each iteration
- *Scheduled* - executed at a defined time and date
- *User libraries* - custom function libraries that are used in other scripts
- *Common functions* - common functions that are used by other scripts
- *Start-up (init) script* - executed when the system starts

#### 4.3.1. Adding a new script

Click *Add new script* at the bottom of the *Event-based*, *Resident* or *Scheduled*

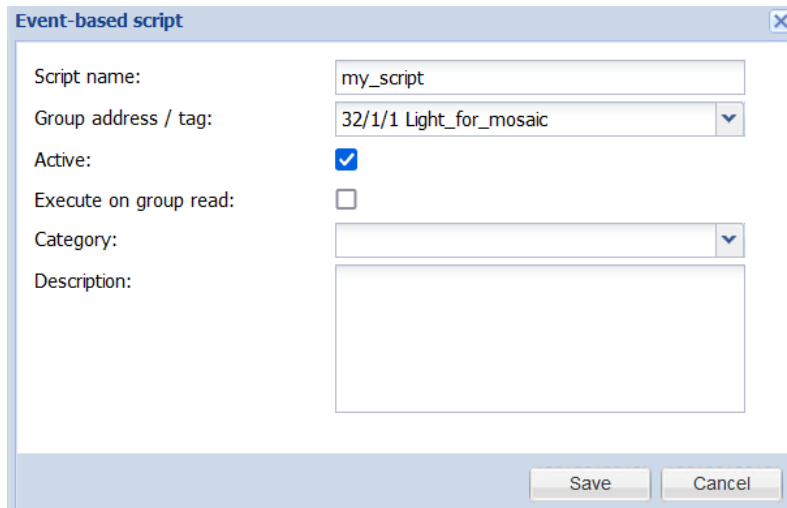


The screenshot shows the LogicMachine web interface. At the top, there are navigation tabs: Objects, Object logs, **Scripting**, Schedulers, Trend logs, Scenes, Vis. structure, Visualization, Vis. graphics, and Utilities. Below the tabs, there are five category buttons: Event-based (selected), Resident, Scheduled, User libraries, and Common functions. Each button has an icon representing its category. Below the buttons is a table of existing scripts:

Script name	Group address / tag	Description	Category	Editor	Ac...	Du...	De...
Event for my_object (1/1/1)	1/1/1						
Event for Light_for_mosaic (32/1/1)	32/1/1						
Event for Light_status (32/1/2)	32/1/2						
Event for Scale_for_dimmer (32/1/3)	32/1/3						
Event for light_2 (32/1/4)	32/1/4						

At the bottom left of the interface, there is a button labeled "Add new script" with a green plus icon, which is highlighted with a red box.

### 4.3.1.1. Event-based



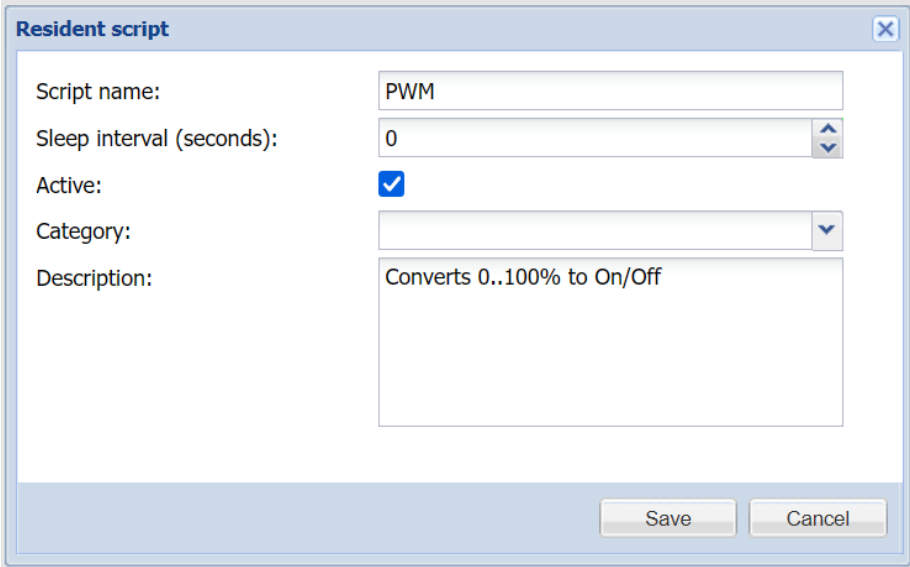
- *Script name* - name of the script
- *Group address / Tag* - specific group address or a tag name which triggers the script
- *Active* - whether the script is active (green circle) or disabled (red circle)
- *Execute on group read* - whether the script is executed when a group read telegram is received. By default scripts are triggered by group write/response telegrams
- *Category* - new or existing category for the script. This allows filtering scripts by category, it is also shown in the *Tools - Print* script listings page
- *Description* - description of the script

Event-based scripting can be used to implement custom logic for group address or tag events. User-defined function is executed when a “group write/response” or “group read” (if enabled) event occurs for a given group address. Event information is stored in the global *event* variable. Variable contents:

- *dstraw* (integer) - raw destination group address
- *srcraw* (integer) - raw source individual address
- *dst* (string) - decoded destination group address (for example: 1/1/4)
- *src* (string) - decoded source individual address (for example: 1.1.2)
- *type* (string) - type of the event, either 'groupwrite', 'groupread', 'groupresponse'
- *dataraw* (string) - event data as a binary string
- *datahex* (string) - event data as a hex-encoded string

To get the event value use the following command: `value = event.getvalue()`

### 4.3.1.2. Resident



The image shows a dialog box titled "Resident script" with a close button in the top right corner. It contains the following fields:

- Script name: PWM
- Sleep interval (seconds): 0
- Active:
- Category: (empty dropdown menu)
- Description: Converts 0..100% to On/Off

At the bottom right, there are "Save" and "Cancel" buttons.

- *Script name* - name of the script
- *Sleep interval (seconds)* - delay between each script execution
- *Active* - whether the script is active (green circle) or disabled (red circle)
- *Category* - new or existing category for the script. This allows filtering scripts by category, it is also shown in the *Tools - Print* script listings page
- *Description* - description of the script

**Note!** Even though resident scripts are executed in parallel they should not have internal infinite loops or it will not be possible to reload scripts after editing.

### 4.3.1.3. Scheduled

The screenshot shows a 'Scheduled script' dialog box with the following fields and values:

- Script name: Floor heating off
- Minute: 0
- Hour: 8,19
- Day of the month: \*
- Month of the year: Every month of the year
- Day of the week: Every day of the week
- Active:
- Category: (empty dropdown)
- Description: Turns floor heating OFF at 8:00 and 19:00

Buttons: Save, Cancel

- *Script name* - the name of the script
- *Minute, Hour, Day of the month, Month of the year, Day of the week* - specifies when the script is executed
- *Active* - whether the script is active (green circle) or disabled (red circle)
- *Category* - new or existing category for the script. This allows filtering scripts by category, it is also shown in the *Tools - Print* script listings page
- *Description* - description of the script

Scheduled scripts are executed when the system date/time matches the specified script start date/time. Scheduled script is run only once for each matching date/time.

Scheduled scripts use standard *cron* format for date/time parameters. Valid values are:

\* – execute script every minute, hour or day.

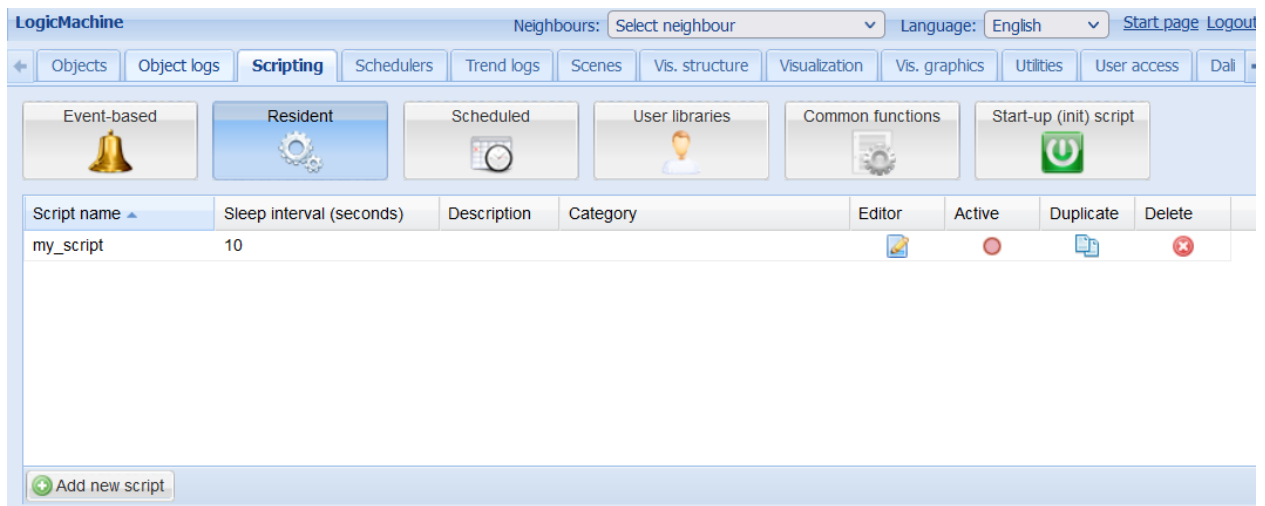
*\*/N* – execute script every N minutes, hours or days. N is an integer, script is executed when the current value divided by N gives 0 in modulo. For example, script with hour parameter set to *\*/8* will be executed when hour is 0, 8 and 16.

*N* – execute script exactly at Nth minute, hour or day.

*N-K* – execute script when minute, hour or day in the N-K range (inclusive).

*N,K* – it is possible to specify several *N* and *N-K* type parameters separated by a comma. For example, script with minute parameter set to 15,50-52 will get executed when minute is 15, 50, 51 and 52

### 4.3.2. List of scripts

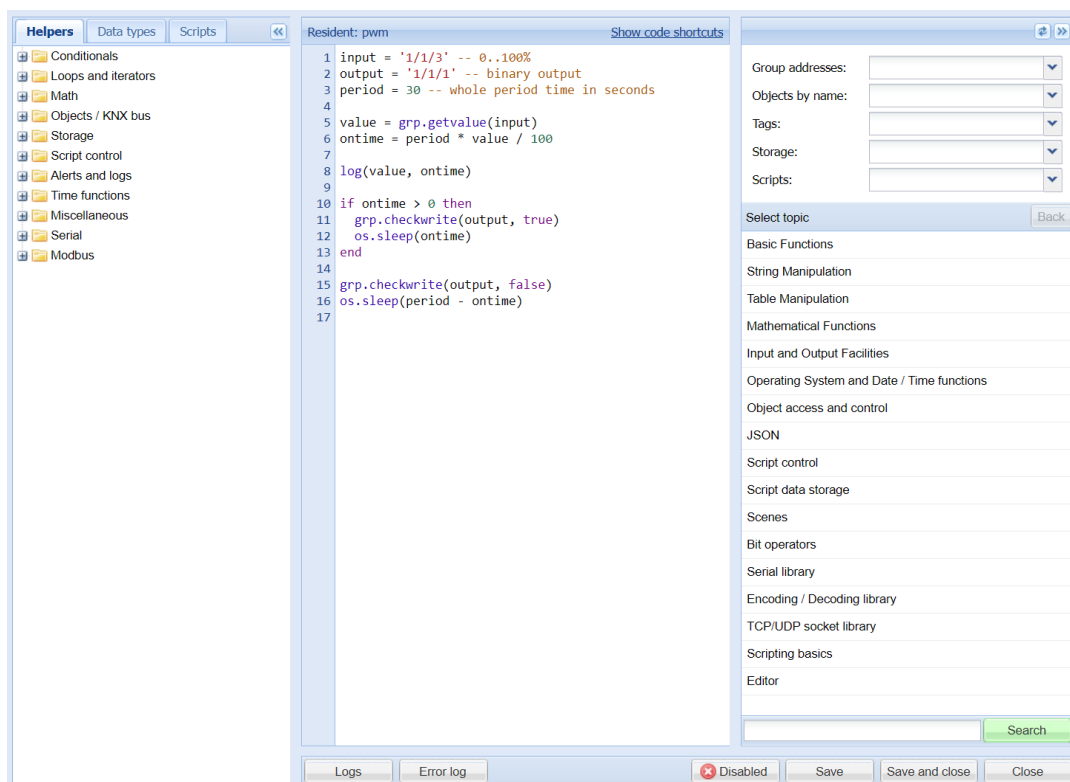


Available actions:

- *Editor* - open scripting editor interface
- *Active* - activate (green) or deactivate (red) the selected script
- *Duplicate* - duplicate the selected script
- *Delete* - delete the selected script

### 4.3.3. Script editor

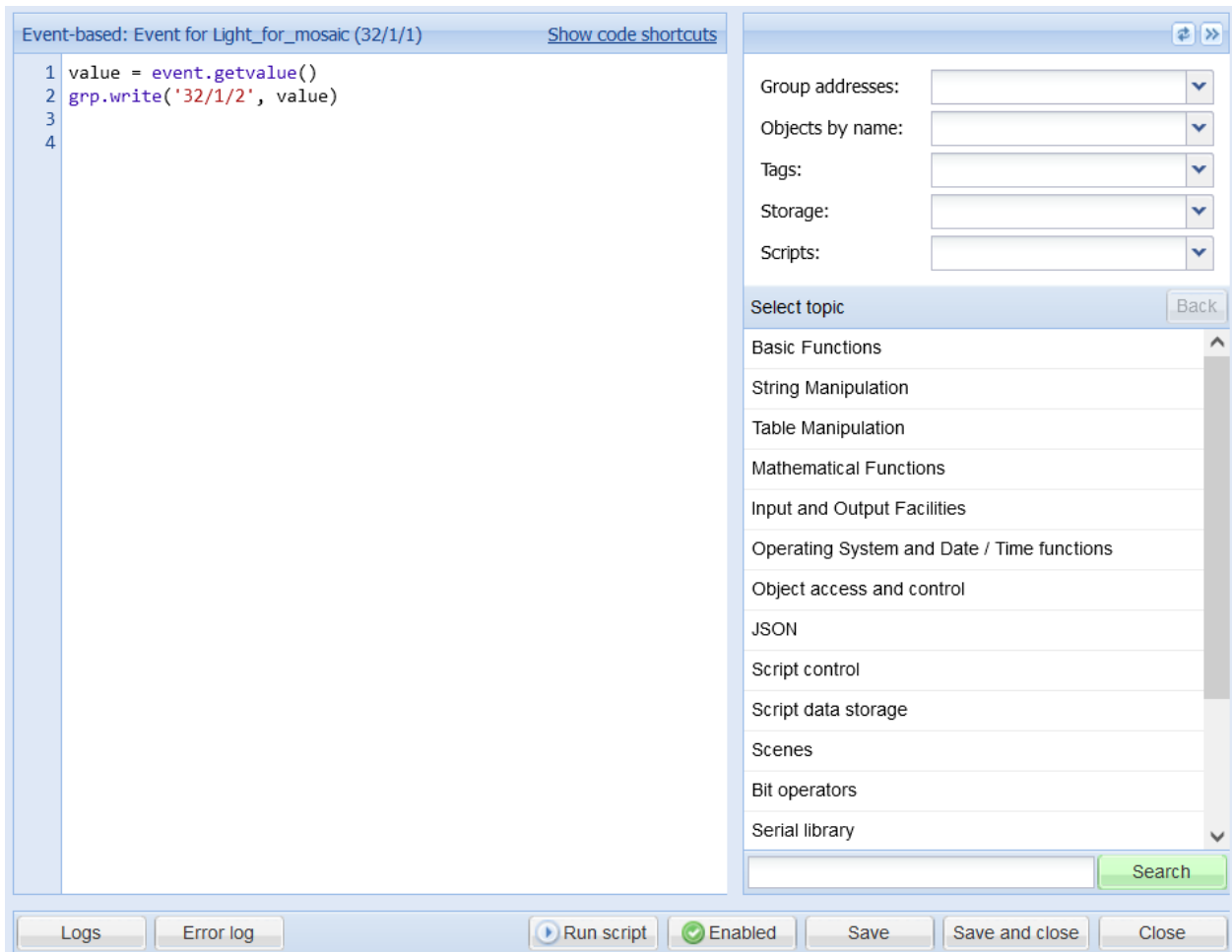
Click  to open the editor.



### 4.3.3.1. Left sidebar

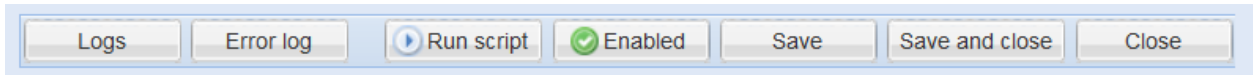
- *Helpers* - predefined code snippets categorized by the use case, click an entry to insert it into the script
- *Data types* - list of available data type constants, click an entry to insert it into the script
- *Scripts* - list of all scripts for quick switching

### 4.3.3.2. Right sidebar



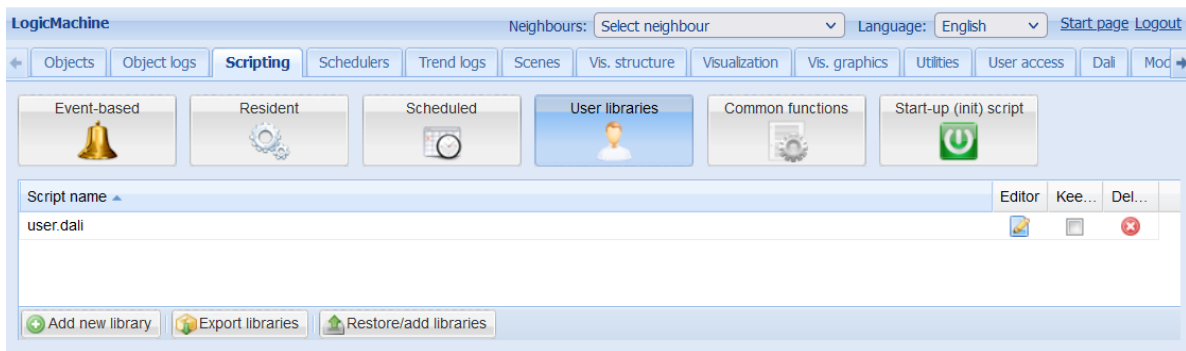
- *Group addresses, Objects by name, Tags, Storage, Scripts* - drop-down lists of all relevant values, click an entry to insert it into the script
- *Built-in help* - Lua function documentation, click plus to insert a code snippet into the script

### 4.3.3.3. Bottom toolbar

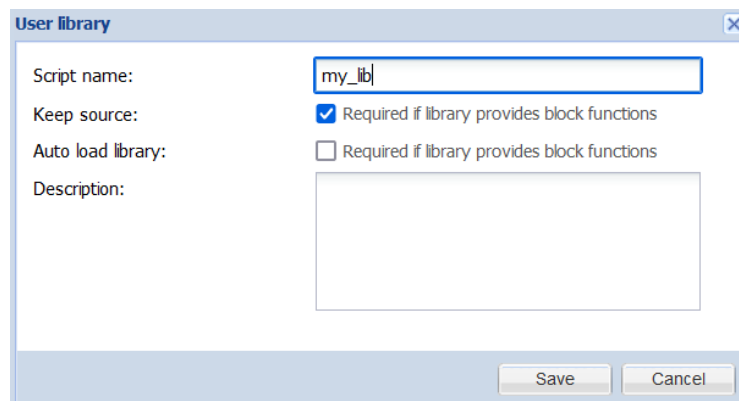


- *Logs* - display a floating window containing Error logs
- *Error logs* - display a floating window containing Error logs
- *Run script* - execute the script (not available for resident and libraries)
- *Enabled/Disabled* - toggle script status
- *Save* - save the script and continue editing
- *Save and close* - save the script and close the editor window
- *Close* - close the editor window without saving the script

### 4.3.4. User libraries



User libraries contain custom functions that are used in other scripts.



- *Script name* - unique library name
- *Keep source* - library is converted to a binary form that cannot be edited when this option is disabled. Make sure to keep a backup of the source code when disabling this option
- *Auto load library* - automatically load this library in all scripts
- *Description* - description of the library

User libraries are manually included in other scripts by calling `require('user.library_name')` unless *Auto load library* is enabled.

### 4.3.5. Common functions

Common functions is a library that is automatically included in all other scripts. Functions like *sunrise/sunset*, *email* are included by default.

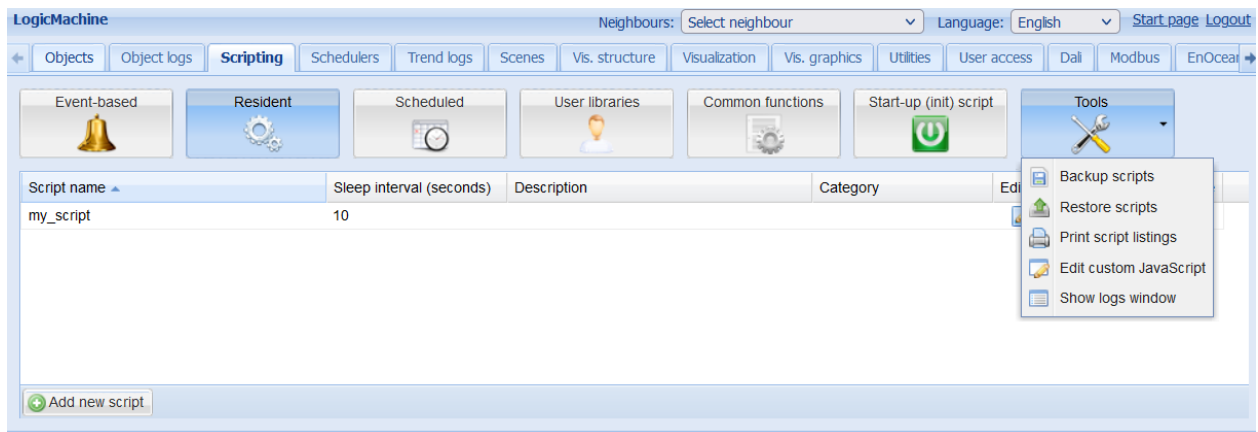


### 4.3.6. Start-up (init) script

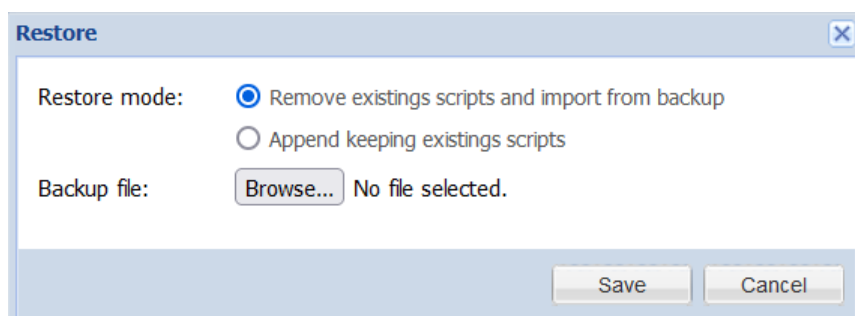
Init script is run once each time the system starts.



### 4.3.7. Tools



- *Backup scripts* - backup all scripts in \*.gz file, *Common function* and *Start-up script* can be included in the backup if needed
- *Restore scripts* - restore scripts from a backup



- *Print script listing* - shows all scripts in a single page ordered by Category



## Event for Light\_for\_mosaic (32/1/1)

Type: Event-based

Active: Yes

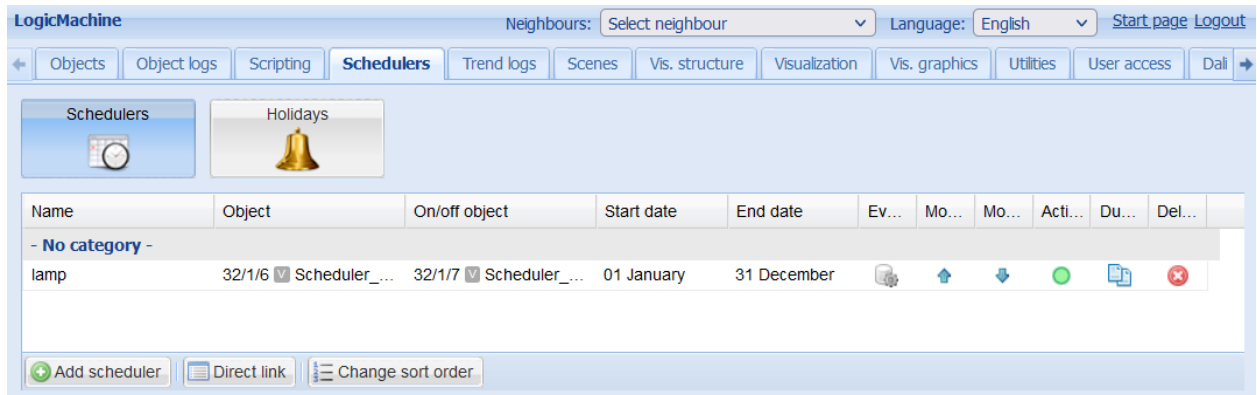
Group address / tag: 32/1/1

```
value = event.getvalue()  
grp.write('32/1/2', value)
```

- *Edit custom JavaScript* - allows adding certain actions for the user visualization, schedulers and trends that are not possible by the built-in functionality. See examples at [forum.logicmachine.net/showthread.php?tid=275](http://forum.logicmachine.net/showthread.php?tid=275)
- *Show logs window* - show script logs in a separate floating window

## 4.4. Schedulers

Schedulers are used to specify events based on date/time when an object should be set to a predefined value. Correct date, time and timezone must be set in *Utilities*. Location coordinates can be provided to make sunrise and sunset event time more accurate. It is recommended to enable time synchronization (NTP).



### 4.4.1. Add scheduler (admin interface)

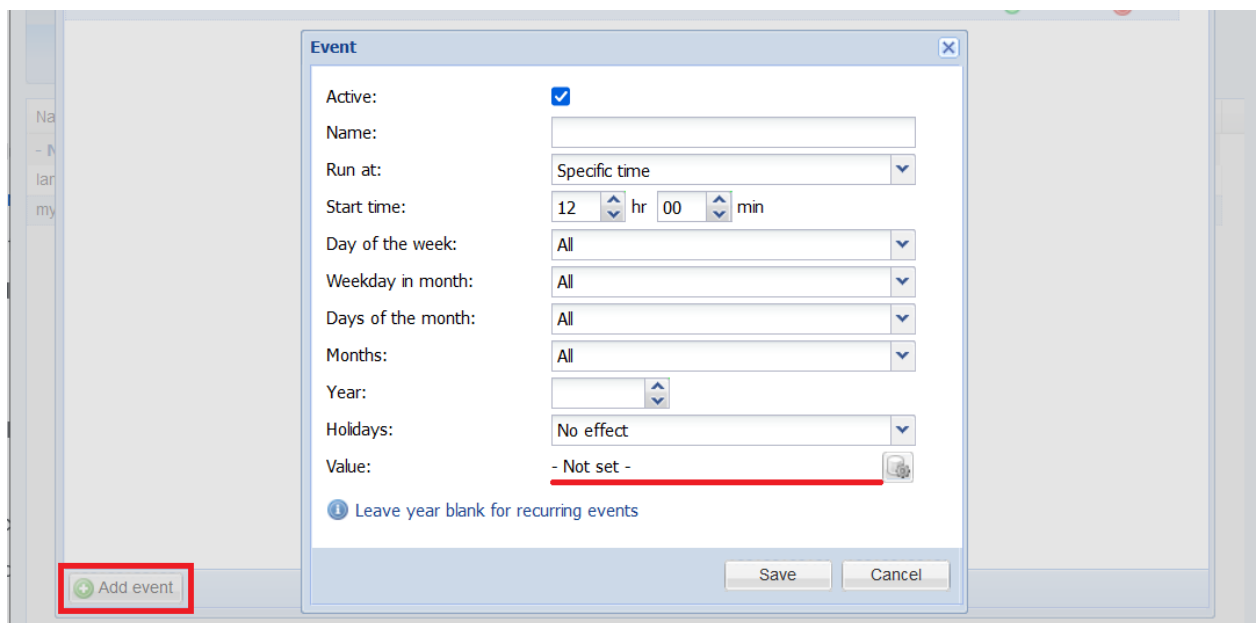
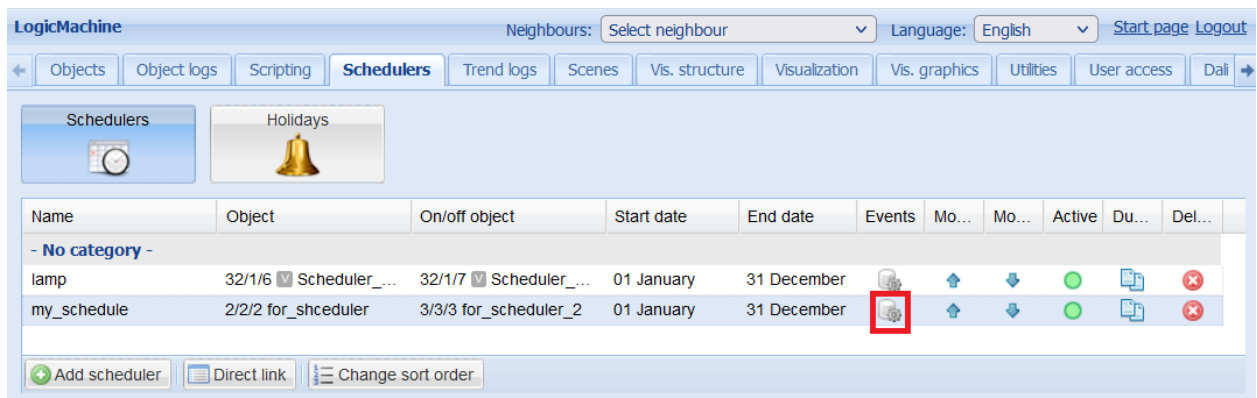
The screenshot shows the 'Scheduler' configuration dialog box. It contains the following fields and controls:

- Object: 2/2/2 for\_shceduler (dropdown menu)
- Active:
- Scheduler on/off object: - Not set - (dropdown menu)
- Name: my\_schedule (text input)
- Category: (dropdown menu)
- Start date: 01 (calendar icon) January (dropdown menu)
- End date: 31 (calendar icon) December (dropdown menu)
- Buttons: Save, Cancel

- *Object* - the object group address which will be controlled by scheduler
- *Active* - whether the scheduler is active or not
- *Scheduler on/off object* - object that can be used to enable/disable this scheduler
- *Name* - name of the scheduler
- *Category* - category of the scheduler
- *Start date* - start date of the scheduler
- *End date* - end date of the scheduler

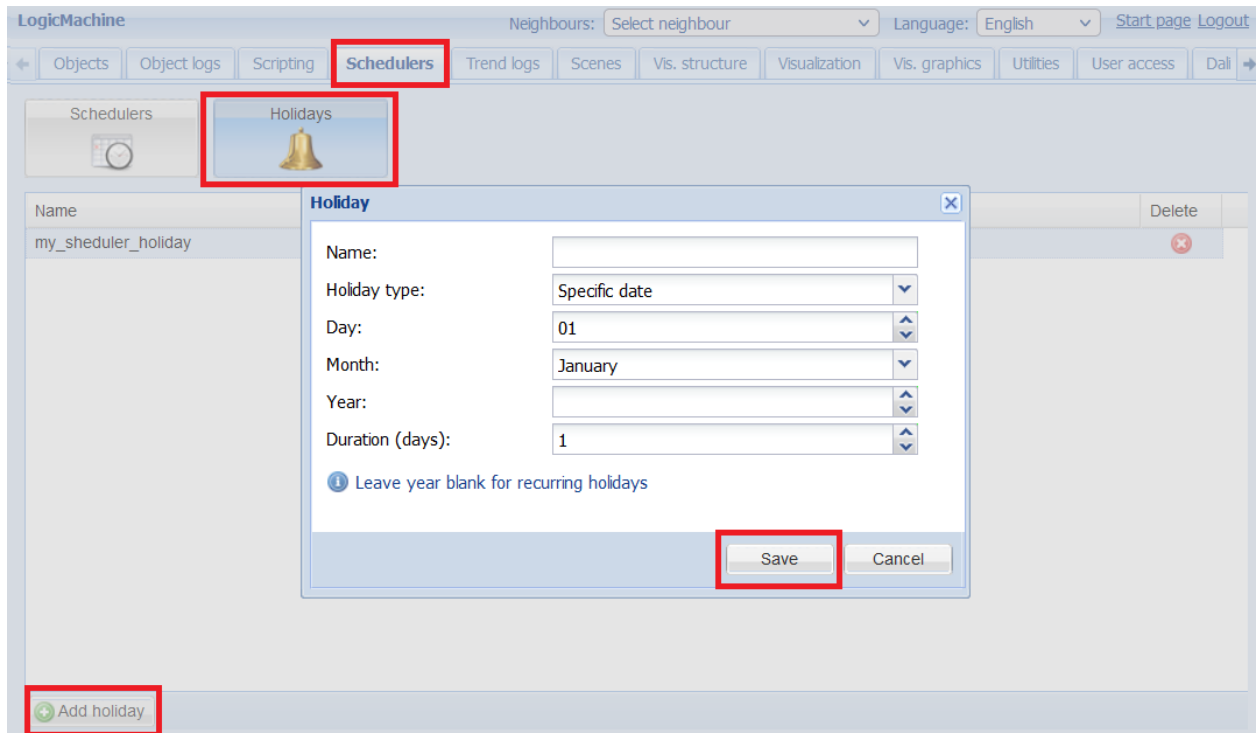
## 4.4.2. Scheduler events (admin interface)

Events can be added both in the admin and the end user interfaces.



- *Active* - whether the event is active or not
- *Name* - name of the event
- *Run at* - specific time, sunrise, sunset
- *Start time* - start time for the event
- *Days of the week* - days of the week when the event will be triggered
- *Weekday in month* - weekdays of the month when the event will be triggered
- *Days of the month* - days of the month when the event will be triggered
- *Months* - months of the year when the event will be triggered
- *Year* - year when the event will be triggered
- *Holidays* - “do not run on holidays” or “run only on holidays”
- *Value* - value to send to the group address when the event is triggered

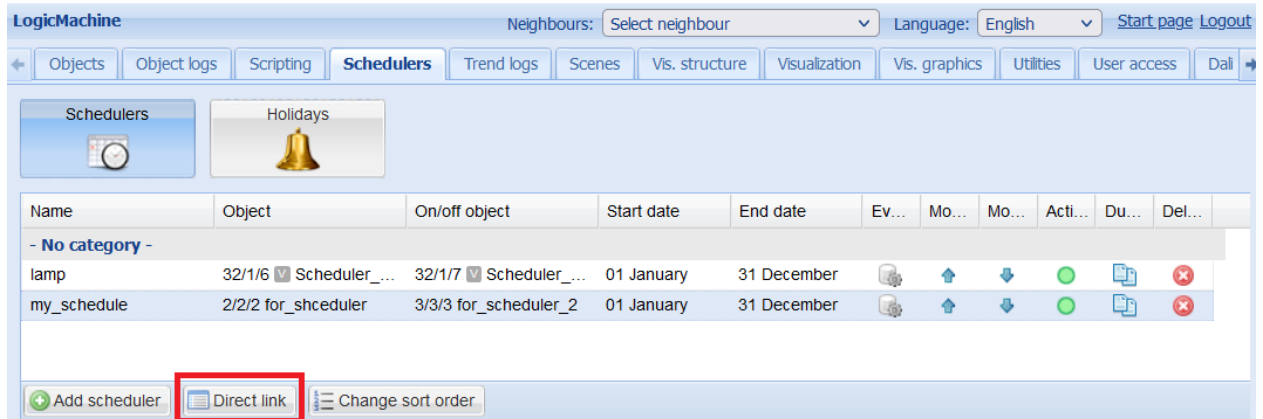
### 4.4.3. Scheduler holidays (admin interface)



- *Name* - holiday name
- *Holiday type* - either *Specific date* or *Day of the week*
  - *Specific date*:
    - *Day* - day of the month value
  - *Day of the week*:
    - *Day of the week* - specific day of the week (e.g. 2<sup>nd</sup> Monday)
- *Month* - holiday month value
- *Year* - holiday year value, leave blank when a holiday recurs every year
- *Duration (days)* - holiday length in days

#### 4.4.4. Direct link (admin interface)

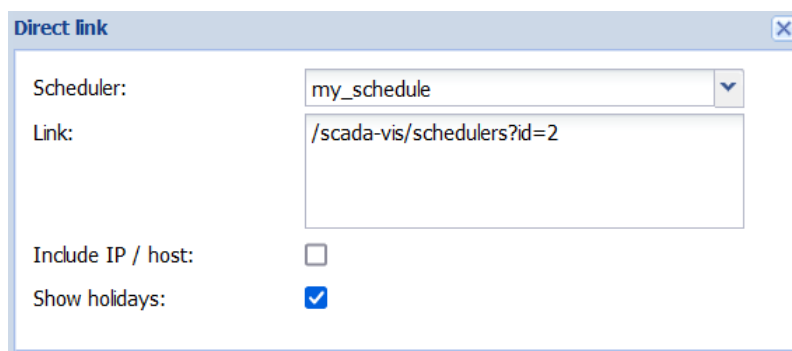
To get a direct link to a specific scheduler click the *Direct link* button. This link can be used to include scheduled in the *Visualization* via the *Frame* element.



The screenshot shows the LogicMachine web interface. At the top, there are navigation tabs: Objects, Object logs, Scripting, Schedulers, Trend logs, Scenes, Vis. structure, Visualization, Vis. graphics, Utilities, User access, and Dal. Below the tabs, there are two main sections: Schedulers and Holidays. The Schedulers section contains a table with the following data:

Name	Object	On/off object	Start date	End date	Ev...	Mo...	Mo...	Acti...	Du...	Del...
- No category -										
lamp	32/1/6 Scheduler_...	32/1/7 Scheduler_...	01 January	31 December						
my_schedule	2/2/2 for_shceduler	3/3/3 for_scheduler_2	01 January	31 December						

At the bottom of the Schedulers section, there are three buttons: 'Add scheduler', 'Direct link' (highlighted with a red box), and 'Change sort order'.



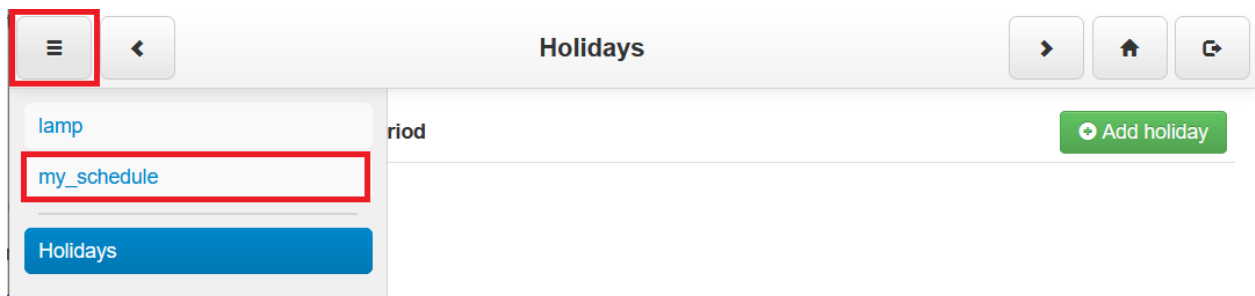
The 'Direct link' dialog box is shown. It has the following fields and options:

- Scheduler: my\_schedule (dropdown menu)
- Link: /scada-vis/schedulers?id=2 (text input field)
- Include IP / host:
- Show holidays:

#### 4.4.5. Scheduler events (user interface)



The screenshot shows the LogicMachine user interface navigation bar. It contains several icons: LogicMachine, System config, Visualization, Touch, Schedulers (highlighted with a red box), Trend logs, and can. The can logo is a red square with the letters 'can' in white.



The screenshot shows the LogicMachine user interface showing the 'Holidays' screen. The 'Holidays' screen has a header with a hamburger menu icon (highlighted with a red box), a back arrow, the title 'Holidays', and navigation buttons for forward, home, and refresh. Below the header, there is a list of items: 'lamp' and 'my\_schedule' (highlighted with a red box). A green button labeled 'Add holiday' is visible on the right side of the screen.

Status: active  
1 January - 31 December

Edit

Name	Run at	Value	
	10:58	1	<span>Edit</span> <span>Delete</span>

Add event

my\_schedule

Run at	Value
10:58	1

### Add event

Event is active

Name  
New event

Run at  
Specific time

Start time  
- 12 + - 00 +

Day of the week  
All

Weekday in month  
All

Days of the month  
All

Months  
All

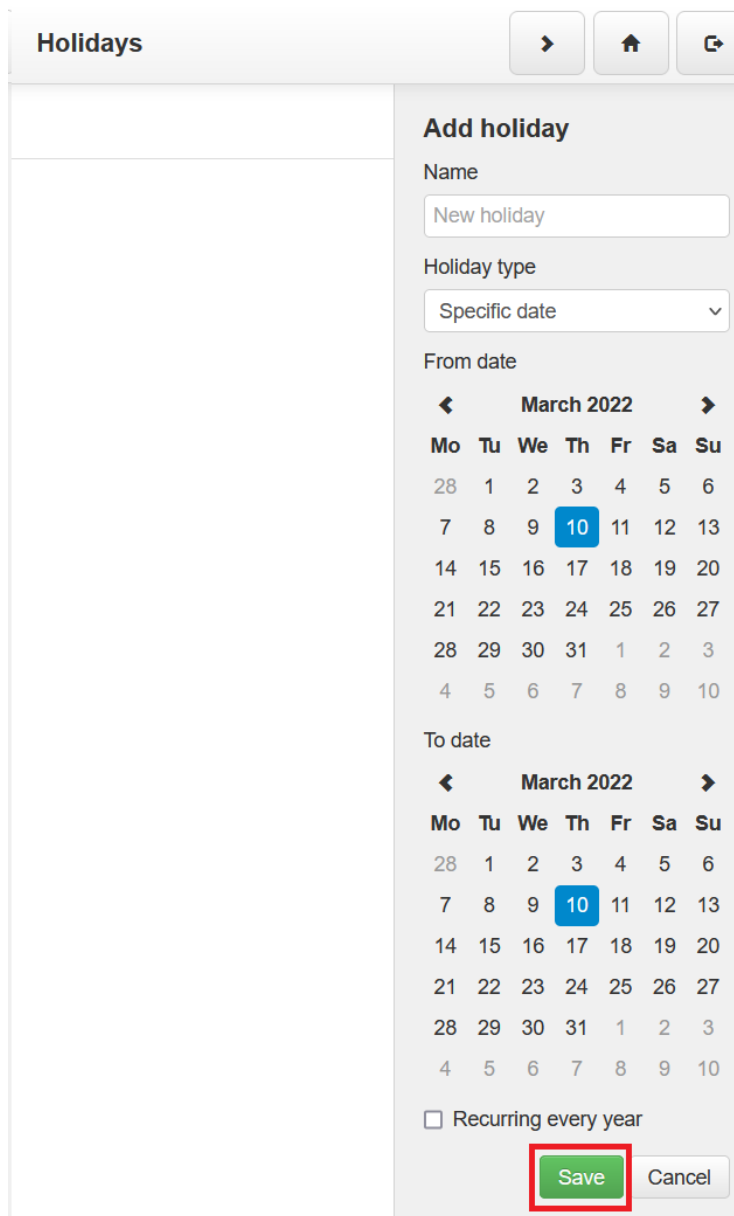
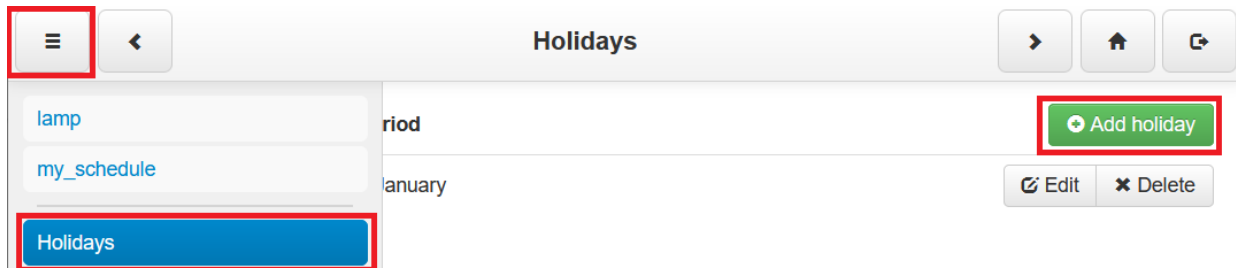
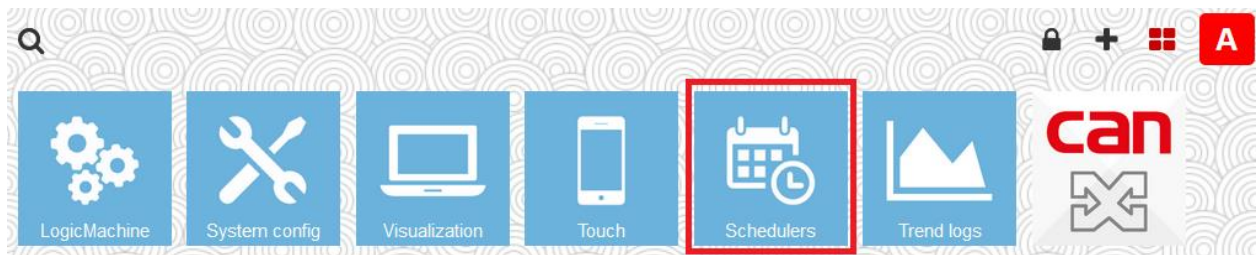
Recurring every year

Holidays  
No effect

Value  
0

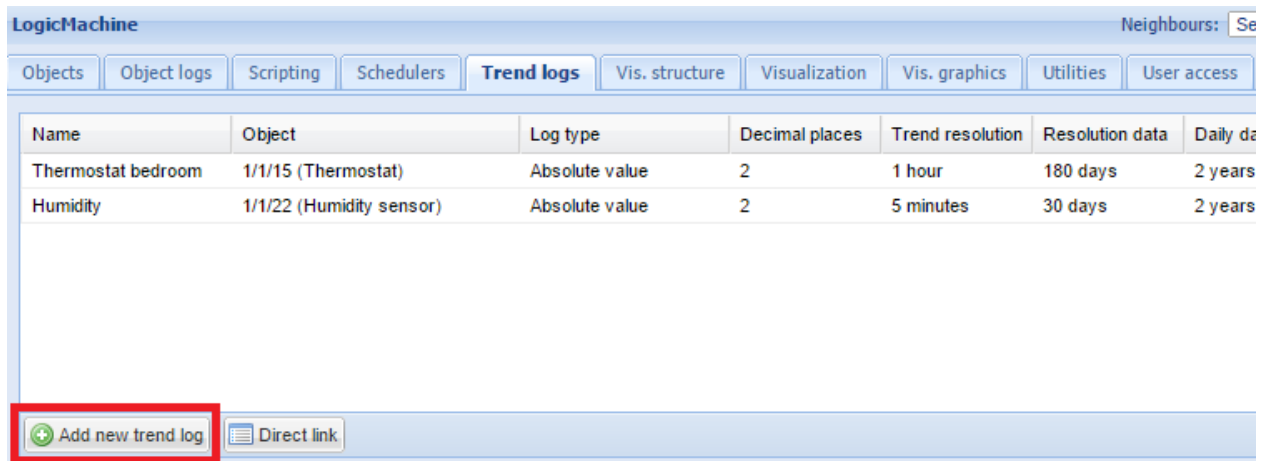
Save Cancel

#### 4.4.6. Scheduler holidays (user interface)



## 4.5. Trend logs

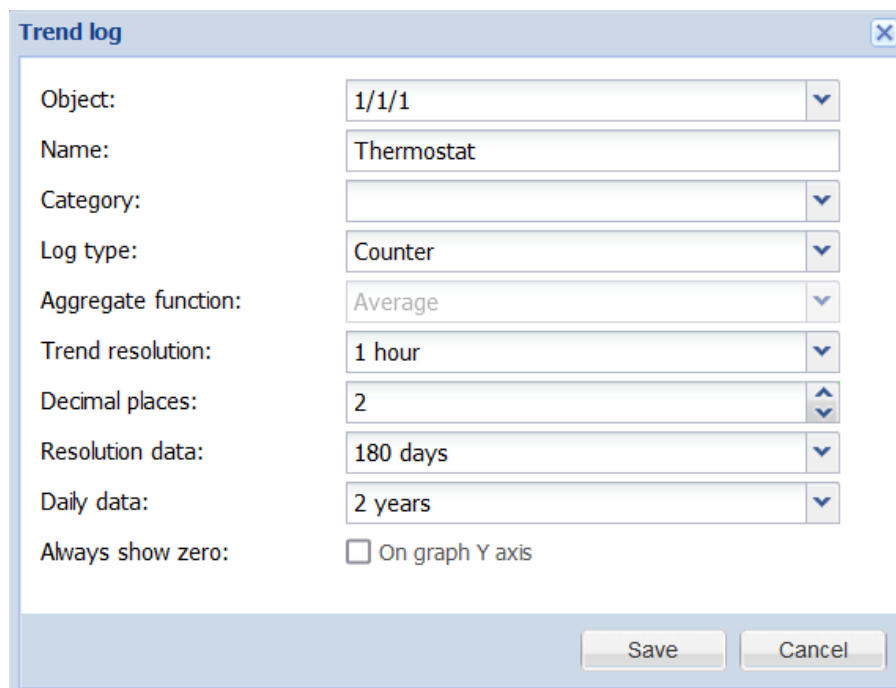
Trend logs store object data for a certain period of time with a predefined interval between each value.



The screenshot shows the LogicMachine interface with the 'Trend logs' tab selected. A table lists existing trend logs, and a red box highlights the 'Add new trend log' button at the bottom left.

Name	Object	Log type	Decimal places	Trend resolution	Resolution data	Daily data
Thermostat bedroom	1/1/15 (Thermostat)	Absolute value	2	1 hour	180 days	2 years
Humidity	1/1/22 (Humidity sensor)	Absolute value	2	5 minutes	30 days	2 years

### 4.5.1. Add new trend log (admin interface)



The 'Trend log' dialog box contains the following fields and options:

- Object: 1/1/1
- Name: Thermostat
- Category: (empty)
- Log type: Counter
- Aggregate function: Average
- Trend resolution: 1 hour
- Decimal places: 2
- Resolution data: 180 days
- Daily data: 2 years
- Always show zero:  On graph Y axis

Buttons: Save, Cancel

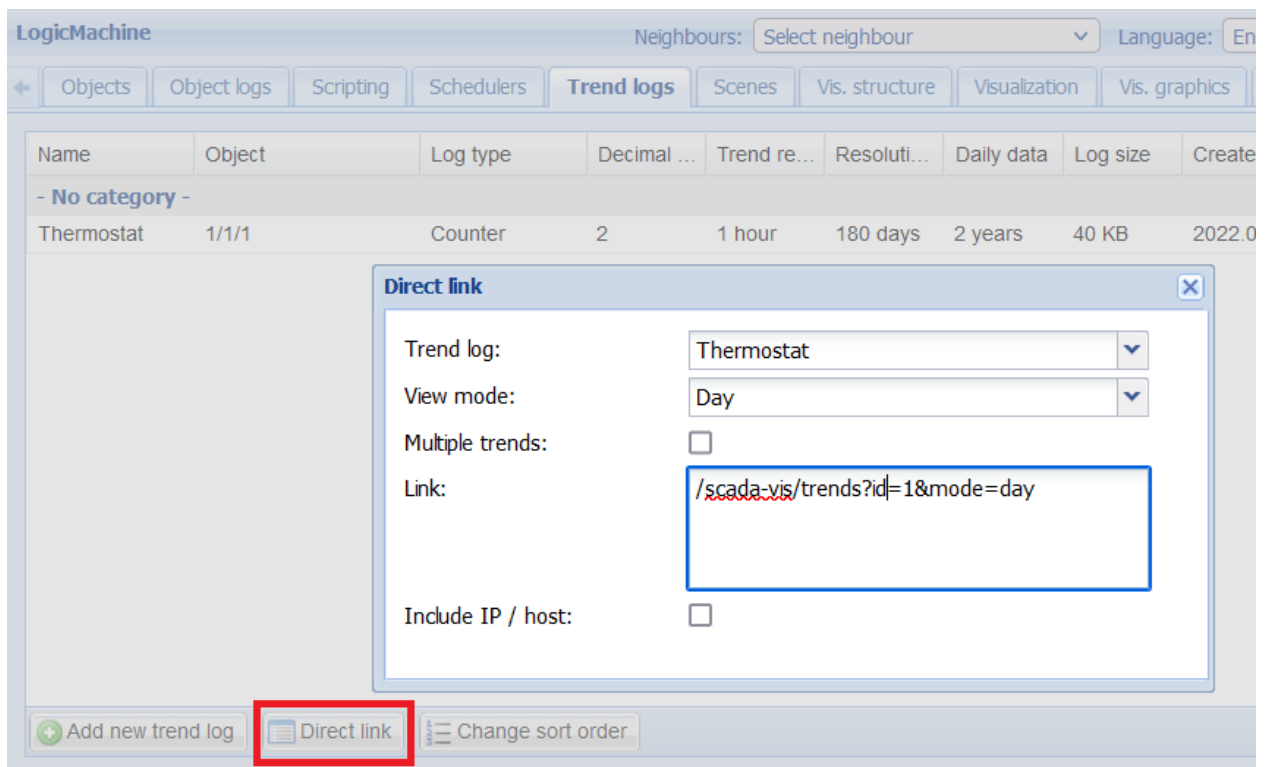
- *Object* - object which value is used as trend data source
- *Name* - name of the trend
- *Category* - category of the trend
- *Log type* [*Counter*, *Counter with negative delta*, *Absolute value*] - type of the log. *Counter* type is used for metering data which is always growing (electricity, water, gas), *Absolute value* is used for temperature, humidity sensor data. *Counter with negative delta* is used for metering data that can change both ways (solar installations connected to the grid).



- *Aggregate function [Average, Minimum, Maximum, Last value]* - function which aggregates trend data into lower resolution, only available for the *Absolute value* type.
- *Trend resolutions [5 min .. 1 hour]* - how often the trend value is stored
- *Decimal places* - decimal places for the object value
- *Resolution data* - time period for which the data at the defined resolution is kept
- *Daily data* - time period for which the daily data is kept
- *Always show zero* - whether to always show zero on the graph Y axis

#### 4.5.2. Direct link (admin interface)

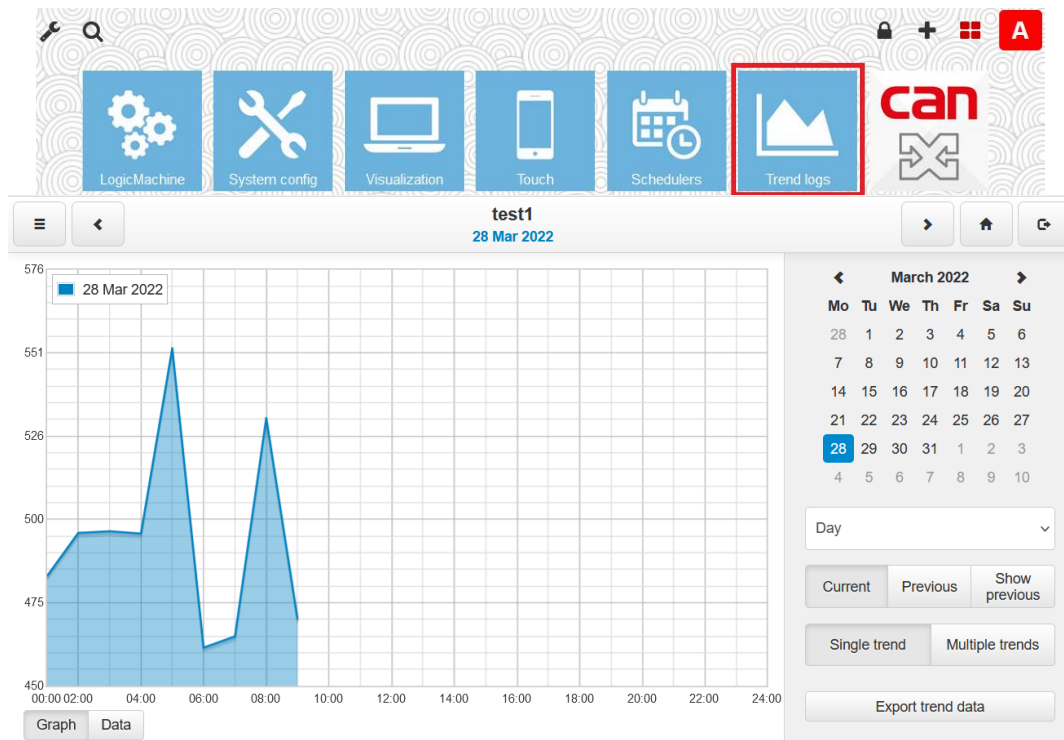
To get a direct link to a specific trend log click *Direct link*.




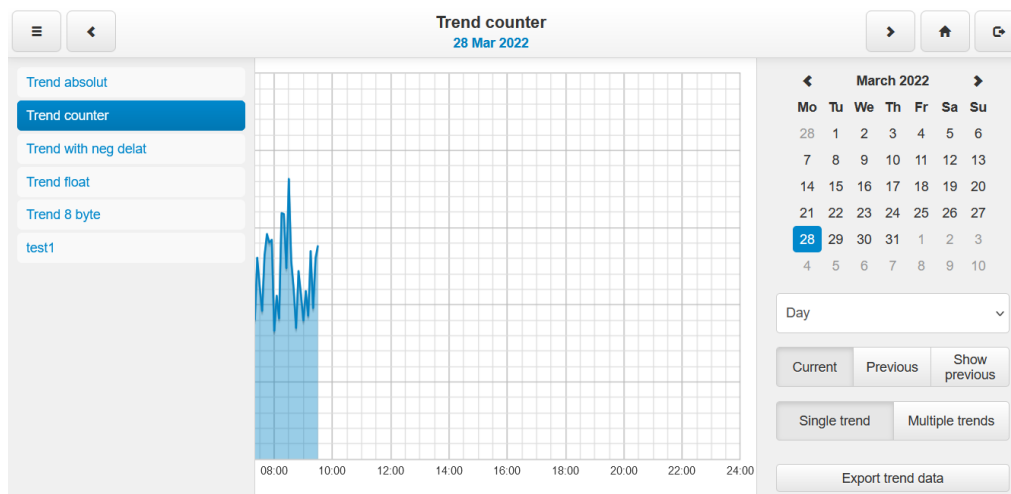
#### 4.5.3. Trend log functions for scripts

[openrb.com/docs/trends-new.htm](http://openrb.com/docs/trends-new.htm)

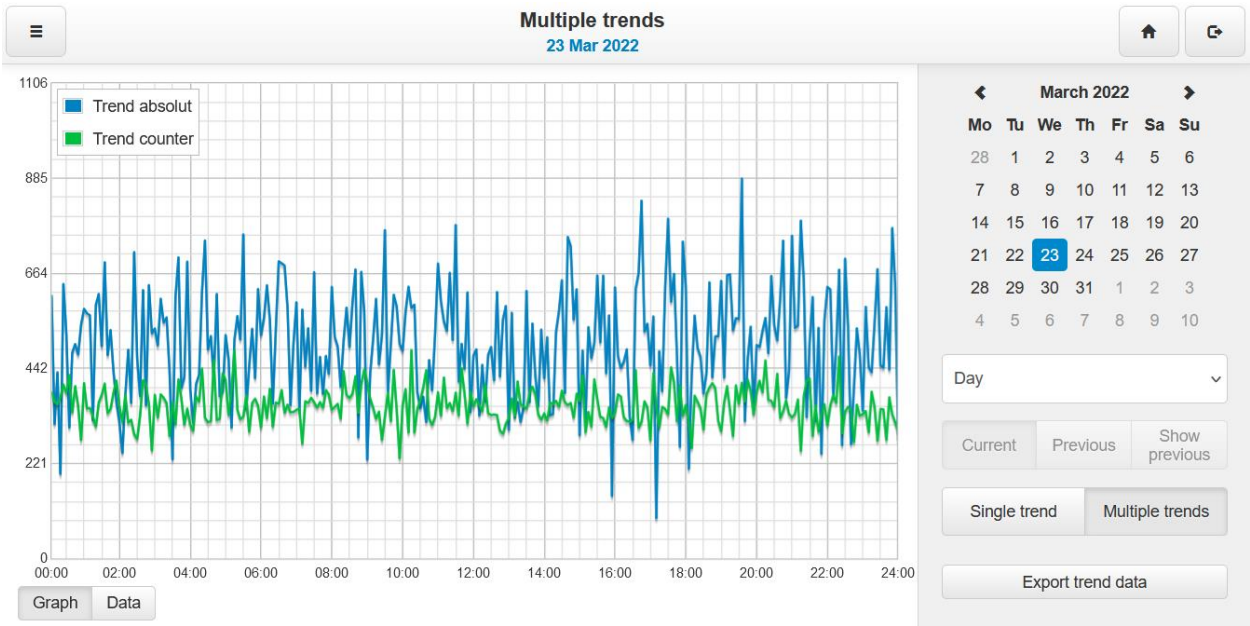
#### 4.5.4. Trend log example (user interface)



Click *Menu*  to select which trend log to view. In *Multiple trends* view click each trend to toggle its display.



- *Day/Week/Month/Year* - change between different view
- *Current* - select the date for the current data
- *Previous* - select the date for the previous data
- *Show previous* - toggle previous data display, current and previous data can be shown together for comparison
- *Single trend / Multiple trends* - toggle between single and multiple trend log display
- *Export trend data* - export selected trend data into a CSV file



Click *Data* to view trend data in a table view.

**Trend absolut**  
23 Mar 2022 / 28 Mar 2022

	23 Mar 2022	28 Mar 2022
00:05	613.6	458
00:10	313.2	500.4
00:15	433.2	571.6
00:20	196.8	561.2
00:25	638.8	417.2
00:30	524.4	548.4
00:35	305	453
00:40	479.4	364.8
00:45	499.2	390.2
00:50	474.6	716.6
00:55	545	474.4
01:00	581.2	343.2
01:05	570.6	205.2
01:10	565.8	460

Graph | Data

◀ March 2022 ▶

Mo	Tu	We	Th	Fr	Sa	Su
28	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3
4	5	6	7	8	9	10

Day

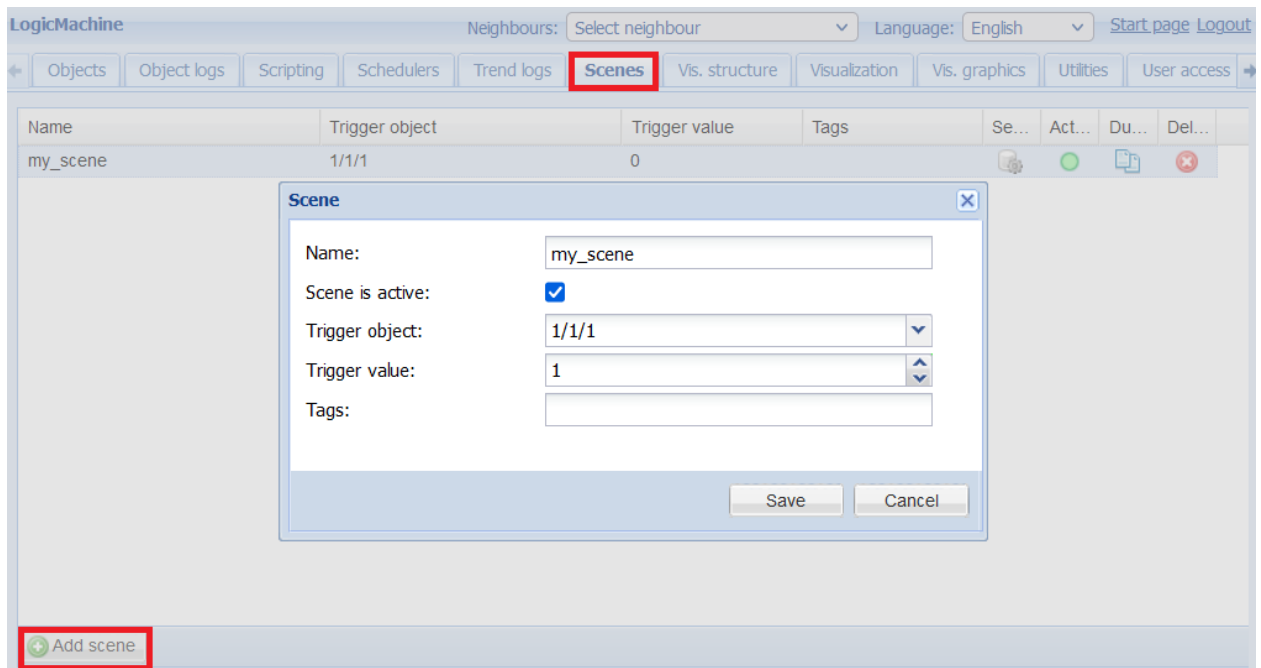
Current Previous Show previous

Single trend Multiple trends

Export trend data


## 4.6. Scenes

### 4.6.1. Add a scene

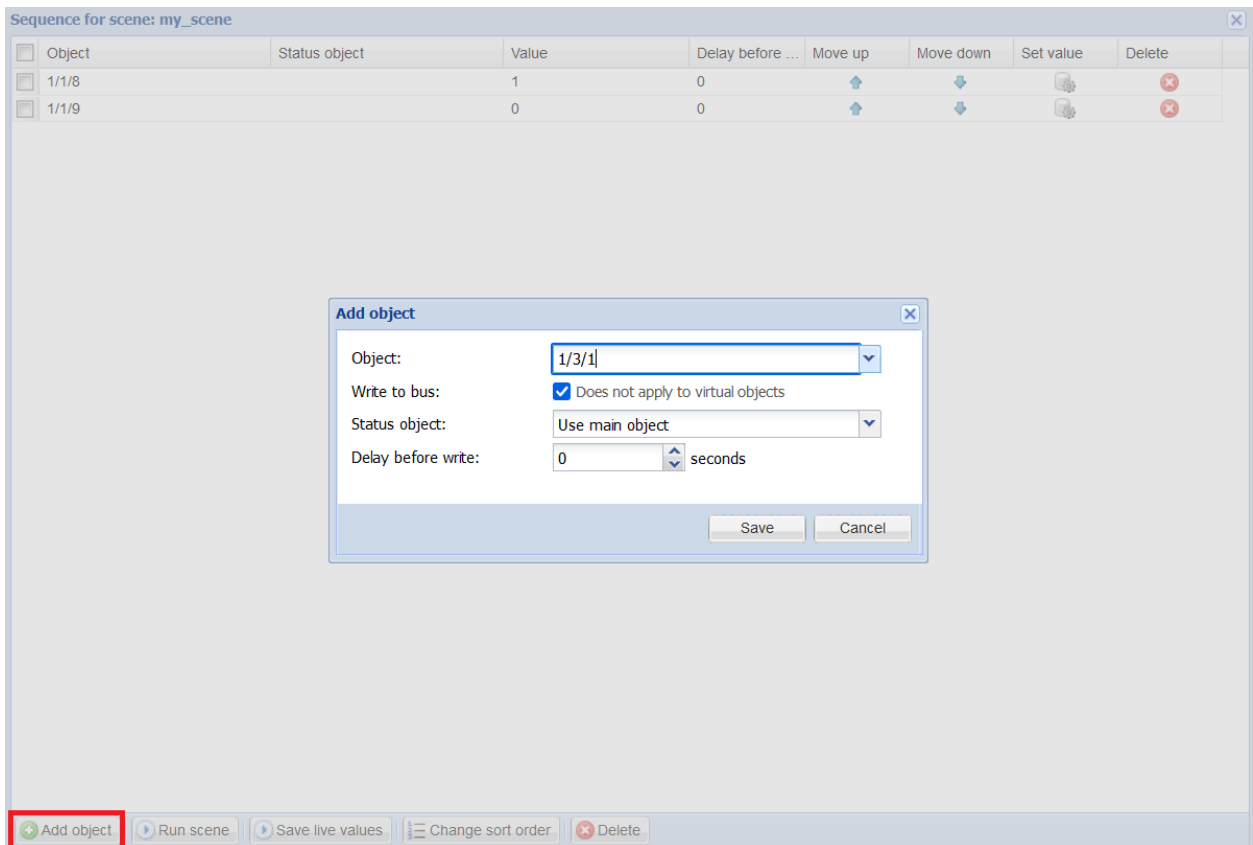


- *Name* - name for the scene
- *Scene is active* - whether the scene is active
- *Trigger object* - object that triggers the scene
- *Trigger value* - object value that triggers the scene
- *Tags* - tags of the scene, can be used in scripts to run multiple scenes

### 4.6.2. Add objects to the scene sequence

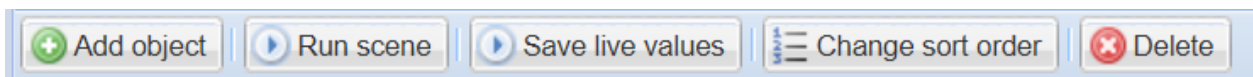
Click *Sequence*  to add objects that will be controlled by the scene





- *Object* - sequence object
- *Write to bus* - where the write will be sent to KNX/TP bus
- *Status object* - optional object that can be used to get the value when saving live values
- *Delay before write* - delay in seconds before the object value is written

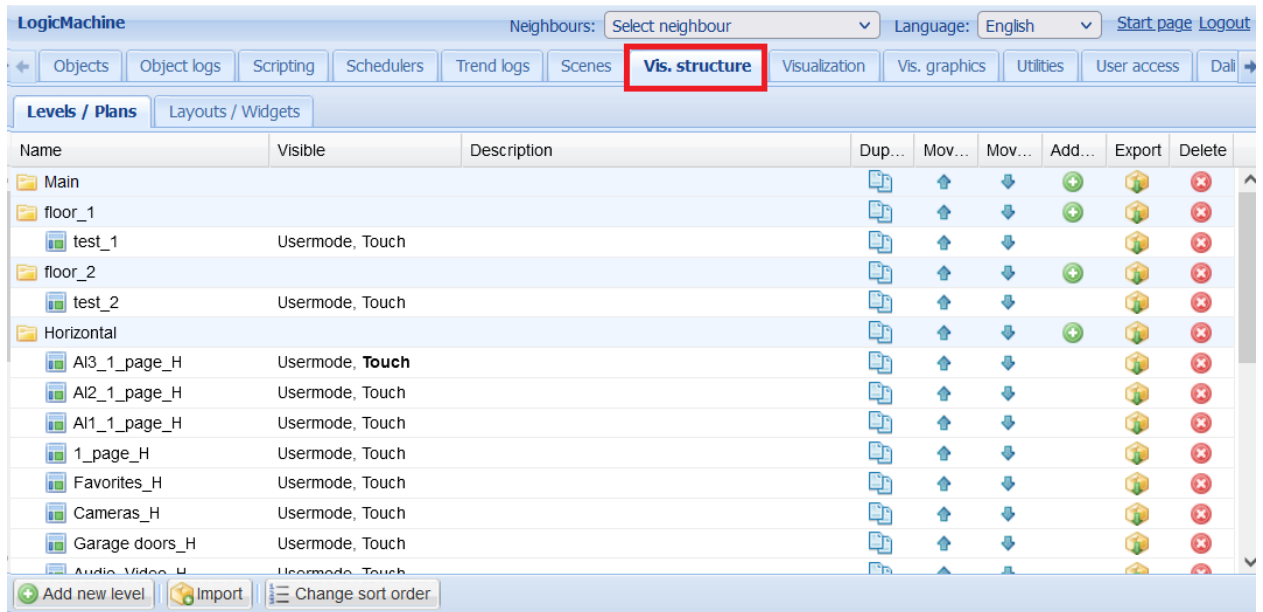
#### 4.6.3. Scene sequence toolbar



- *Run scene* - execute this scene
- *Save live values* - use current object value as sequence values
- *Change sort order* - change sequence object order via drag&drop
- *Delete* - delete selected objects from the sequence

## 4.7. Visualization structure

### 4.7.1. Levels/plans



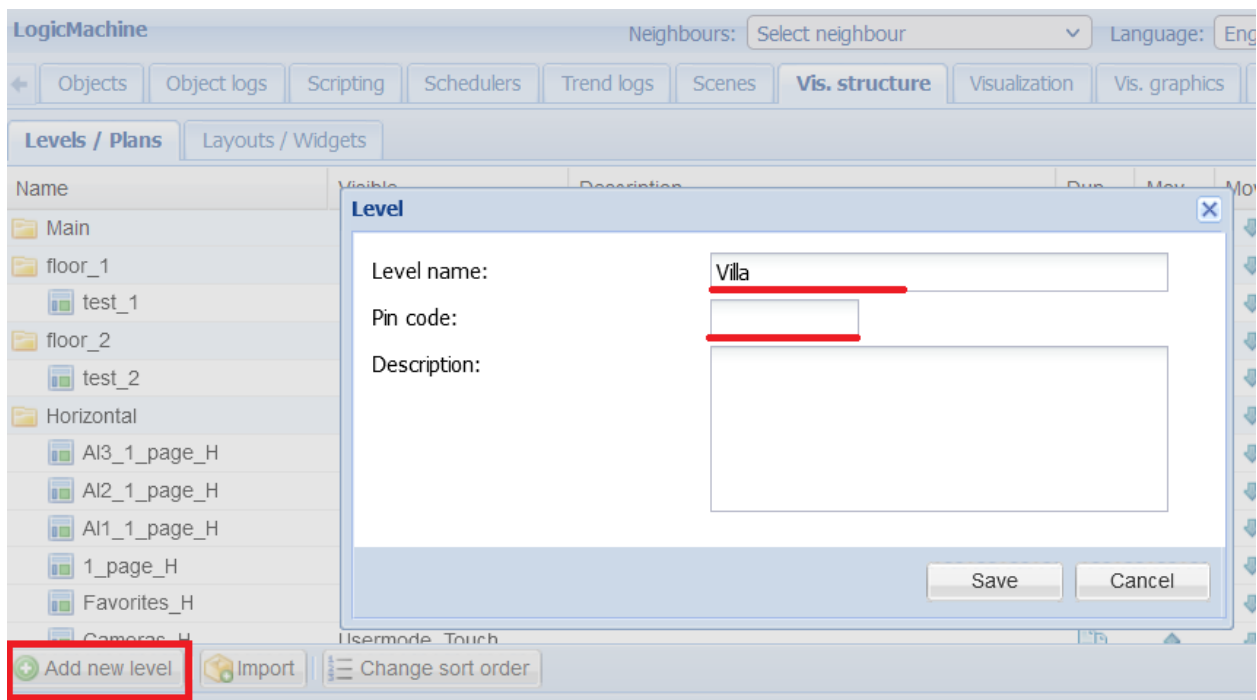
Controls:


- *Duplicate* - create a copy of the level/plan structure
- Up/Down - move the level/plan up/down in the list (alternatively use *Change sort order* to re-order the structure via drag&drop)
- *Add* - add a secondary level or a plan
- *Export* - create a backup containing the selected structure that can be imported into another LM
- *Delete* - delete the selected plan/level including any secondary levels and plans

#### 4.7.1.1. Add new level

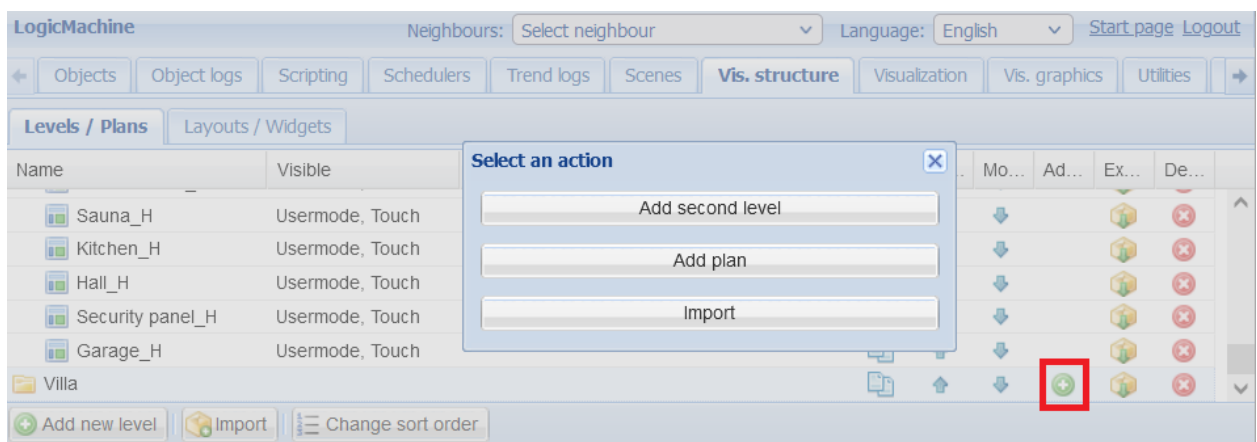
The *Main* level is added by default. Each top level can have several secondary levels. Each level can have several plans.

Click *Add new level* to add a new level. It is possible to protect this level and all secondary levels/plans by adding a PIN code.



Click **Add**  to perform one of the following actions:

- *Add second level* - add a secondary sublevel to this level
- *Add plan* - add a plan to this level
- *Import* - import levels/plans from a backup file



Select *Import* to import levels and plans from a file (it can be exported from another LM). Object links between visualization elements and group addresses can either be cleared or kept.

### 4.7.1.2. Add new plan

Plan

Parent: Villa

Name: 1\_page\_2

Plan size: 1024 768

Layout: -

Usermode visualization: Show

Touch visualization: Show

Pin code:

Primary background image:

Secondary background image:

Background color:

Touch background color:

Repeat background image:

Fixed primary background:

Save Cancel

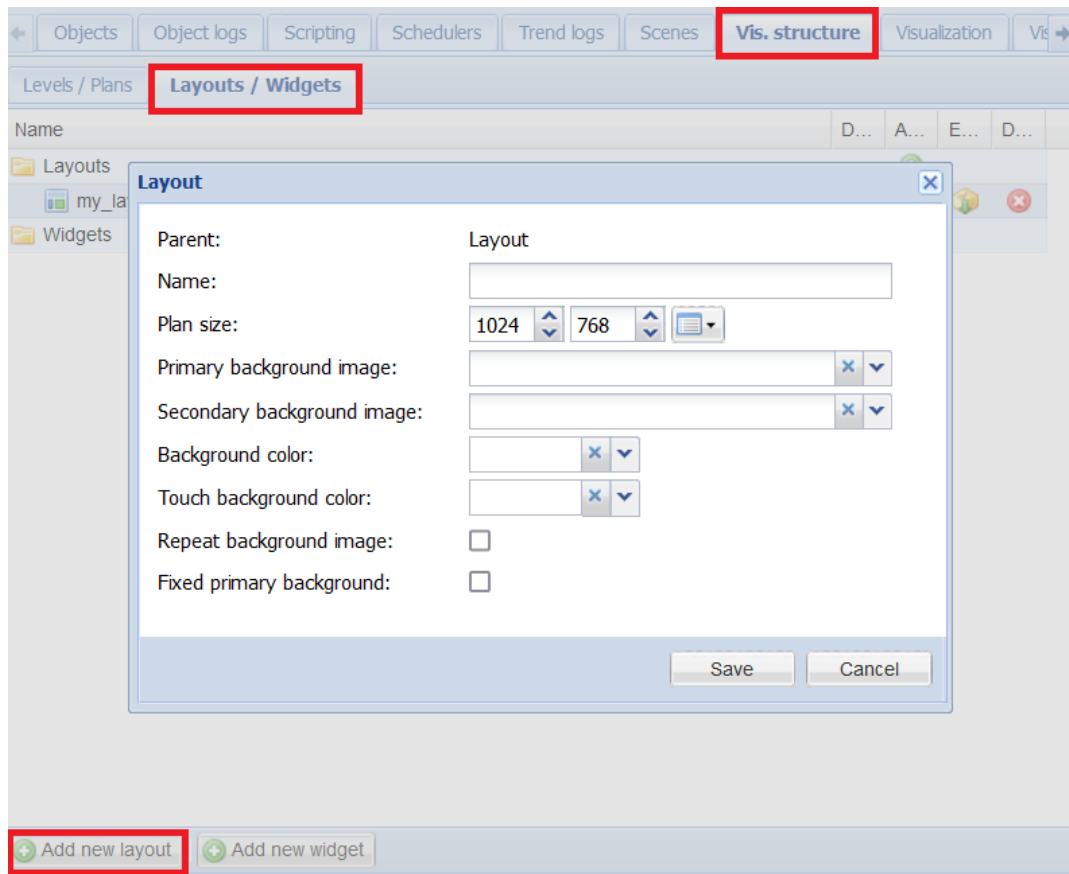
- *Parent* - name of parent level
- *Name* - name for the plan
- *Plan size* - plan size in pixels
- *Layout* - layout for this specific plan. Layout is a plan that is displayed under the current plan
- *Usermode visualization* [*Show*, *Show and make default*, *Hide*] - plan visibility in the *Usermode* visualization
- *Touch visualization* [*Show*, *Show and make default*, *Hide*] - plan visibility in the *Touch* visualization
- *PIN code* - protect plan access via PIN code
- *Primary background image* - primary background image from *Vis. graphics - Images/Backgrounds*
- *Secondary background image* - secondary background image from *Vis. graphics - Images/Backgrounds*
- *Background color* - background color for the *Usermode* visualization
- *Touch background color* - background color for the *Touch* visualization
- *Repeat background image* - background image display mode, should be enabled for tiled background images
- *Fixed primary background* - whether to fix the background image when scrolling



## 4.7.2. Layouts / Widgets

### 4.7.2.1. Add new layout

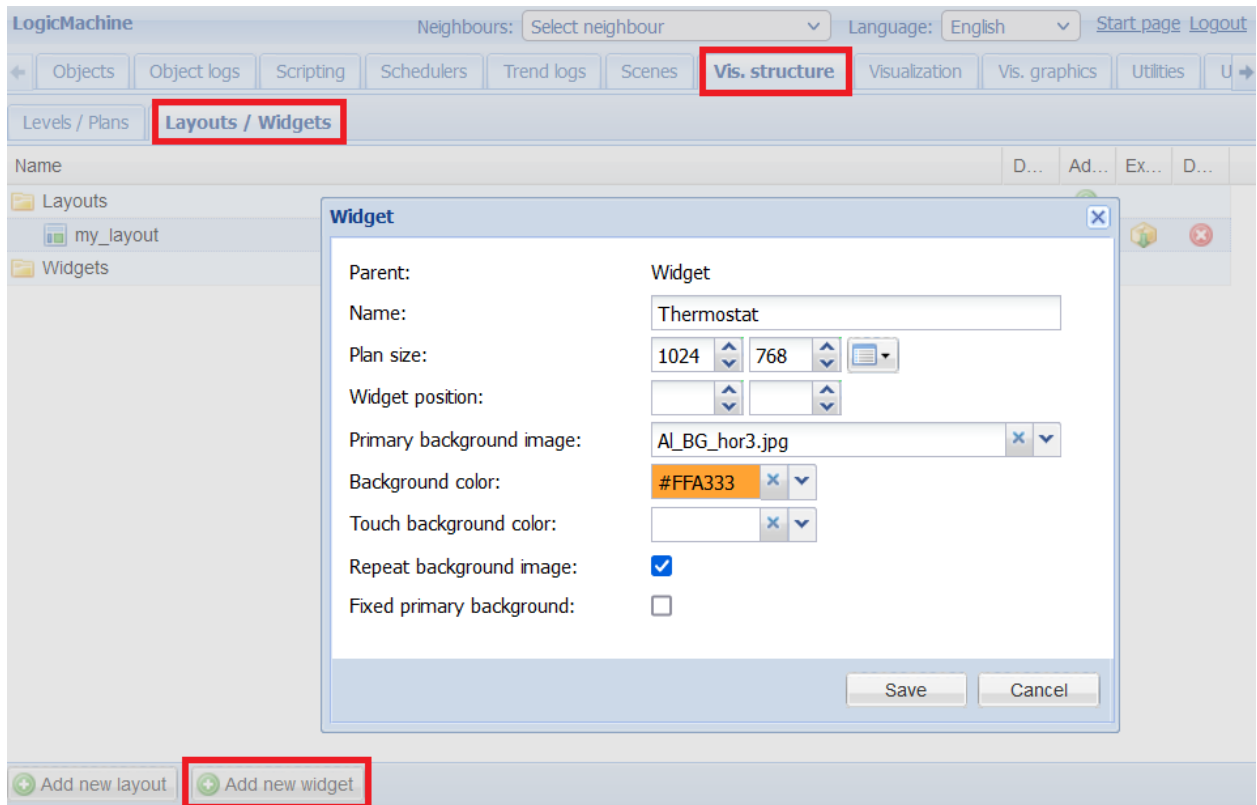
*Layouts* are plans that can be displayed under visualization plans to provide common controls, menus etc. *Layouts* cannot be used in the *Touch* visualization.



- *Name* - layout name
- *Plan size* - layout size in pixels
- *Primary background image* - primary background image from *Vis. graphics - Images/Backgrounds*
- *Secondary background image* - secondary background image from *Vis. graphics - Images/Backgrounds*
- *Background color* - background color for the *Usermode* visualization
- *Touch background color* - background color for the *Touch* visualization
- *Repeat background image* - background image display mode, should be enabled for tiled background images
- *Fixed primary background* - whether to fix the background image when scrolling


### 4.7.2.1. Add new widget

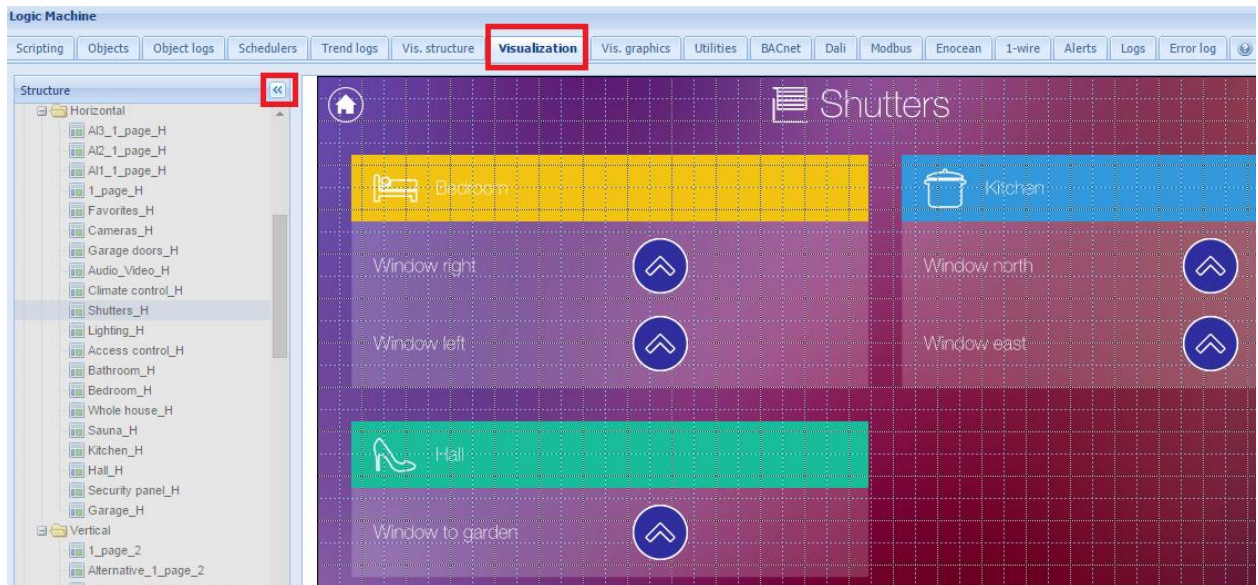
Widgets are plans that are shown in a pop-over window on top of the visualization plan. Only one widget can be visible at a time.



- *Name* - widget name
- *Plan size* - widget size in pixels
- *Widget position* - fixed widget position in pixels relative to the top left corner of the plan. Leave empty to automatically position the widget relative to the element that it is linked to
- *Primary background image* - primary background image from *Vis. graphics* - *Images/Backgrounds*
- *Background color* - background color for the *Usermode* visualization
- *Touch background color* - background color for the *Touch* visualization
- *Repeat background image* - background image display mode, should be enabled for tiled background images
- *Fixed primary background* - whether to fix the background image when scrolling

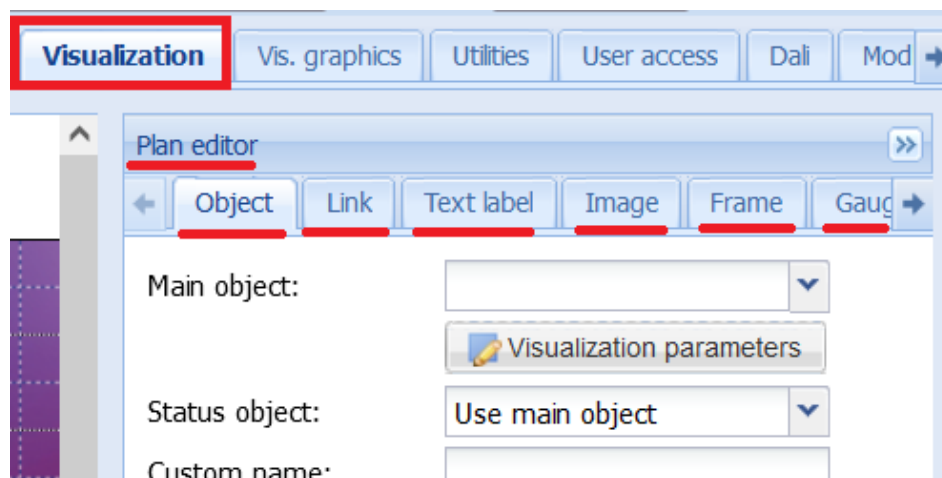
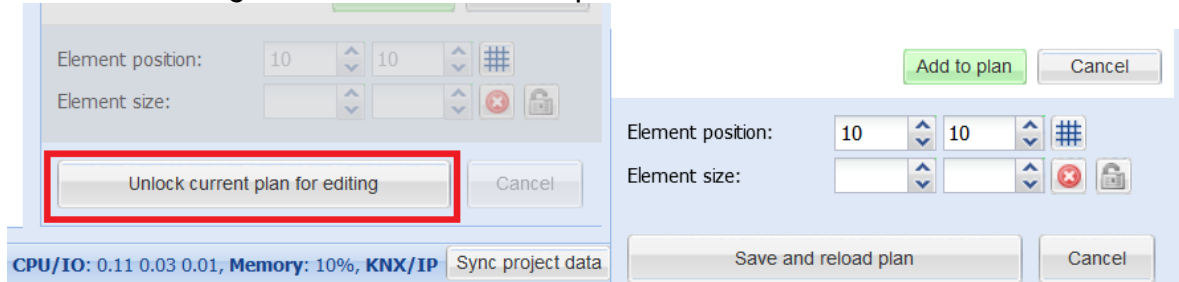
## 4.8. Visualization

Both left and right sidebars can be minimized by pressing on  icon.



### 4.8.1. Plan editor

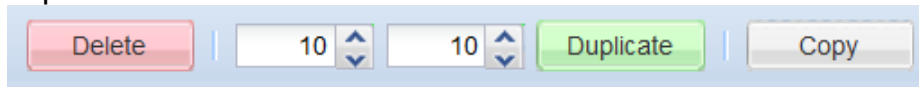
*Plan editor* is located on the right side of the visualization map. Click *Unlock current plan for editing* button to add/edit visualization elements. Click *Save and reload plan* to save all changes made to the current plan.



- *Object* - object controls, either as an icon/value or inline control element

- *Link* - link to a different plan, internal or external resource
- *Text Label* - text label
- *Image* - image
- *Frame* - inline frame for displaying internal or external resources
- *Gauge* - metering gauge
- *Camera* - IP web camera integration
- *Graph* - real time graph for displaying object logs

A selected element can be deleted, moved to a predefined position, duplicated and copied.



Element position and size can be set directly. Click *Grid* to toggle snap to grid functionality when dragging the element. Click *Lock* to keep the aspect ratio when resizing width or height.



## 4.8.2. Object

Plan editor

Object Link Text label Image Frame Gauge

Main object: 1/1/1

Visualization parameters

Status object: Use main object

Custom name:

Read-only:

Hide in Touch:

Hide background:

Send fixed value:

No bus write:  In Usermode/Touch

Pin code:

Widget: No widget

Display mode: Icon and value

Touch icon:

On icon:

Off icon:

Additional classes:

Font size: 12

Text styles:  B  I  U

Custom font:

Font color:

Show value background:

Show control:  Inline in Usermode

Add to plan Cancel

- *Main object* - object that is used for control and status when status object is empty
- *Status object* - object that is used for the current value display
- *Custom name* - custom object name, also used in Touch visualization
- *Read-only* - object control is not allowed when enabled
- *Hide in touch* - do not display this object in the *Touch* visualization
- *Hide background* - do not display the default object icon background
- *Send fixed value* - sends a predefined value when not empty, otherwise a toggle is performed for Boolean data type or a control element is shown
- *No bus write* - do not send the value to KNX/TP bus
- *PIN code* - protect writing to this object via PIN code
- *Widget* - if specified, shows an attached widget when the object is clicked instead of sending a value or showing a control element
- *Display mode [icon and value, icon, value]* - object display mode
- *Default icon* - default object icon (except for Boolean data type)
- *On/Off icon* - icons for on/off state of Boolean objects
- *Touch icon* - icon for the *Touch* visualization
- *Additional classes* - addition CSS classes for the element
- *Show control* - show inline control instead of icon in the *Usermode* visualization, not available for all object types

Visualization parameters can be changed for each element separately (*Local parameters*). When not set the mapped object parameters are used.

Additional icons can be added for numerical objects. Each icon can be mapped to a certain value range. These icons can also be used in the *Custom value select* display mode.

Min value	Max value	Icon	Delete
-10	0	sun-moon-off	X
0	10	sun-moon-on	X
10	20	sun-rain-on	X
20	30	sun-rain-off	X

Buttons: Add icon, Save, Cancel

### 4.8.3. Link

Plan editor

Object Link Text label Image Frame Gauge

Link to: [dropdown]

Custom name: [text input]

Hide in Touch:

Hide background:

Display mode: [dropdown: Icon]

Icon: [dropdown]

Active state icon: [dropdown: x]

Additional classes: [text input]

Add to plan Cancel

Element position: 10 10 [grid icon]

Element size: [spinners] [red x icon] [lock icon]

Save and reload plan Cancel

- *Link to* - linked to another plan, *Schedulers/Trends*, etc. or an *External Link* (it should start with *http://* or *https://*)
- *Custom name* - custom link name
- *Hide in touch* - do not display this link in the *Touch* visualization
- *Hide background* - do not display the default link background
- *Display mode [Icon; Value]* - link display mode
- *Icon* - default link icon
- *Active state icon* - icon that is displayed when the link points to the current plan. Can be used in Layouts to create a plan menu
- *Additional classes* - additional CSS classes for the element

#### 4.8.4. Text Label

Text labels are only visible in the *Usermode* visualization.

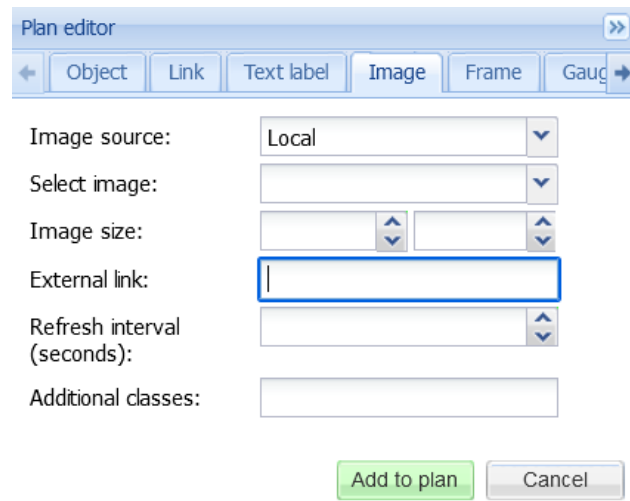
The screenshot shows the 'Plan editor' dialog box with the 'Text label' tab selected. The dialog contains the following fields and controls:

- Text:** A text input field.
- Font size:** A dropdown menu showing '14'.
- Text styles:** Three checkboxes for Bold (B), Italic (I), and Underline (U).
- Custom font:** A dropdown menu.
- Font color:** A color selection dropdown with a close button (X).
- Additional classes:** A text input field.
- Buttons:** 'Add to plan' (green) and 'Cancel' (grey).
- Element position:** Two numeric input fields (both showing '10') and a grid icon.
- Element size:** Two numeric input fields and icons for a red 'X' and a lock.
- Bottom Buttons:** 'Save and reload plan' (grey) and 'Cancel' (grey).

- *Text* - label text
- *Font size* - label font size
- *Text style* - old, italic, underscore
- *Custom font* - font name
- *Font color* - label font color
- *Additional classes* - additional CSS classes for the element



## 4.8.5. Image



The screenshot shows the 'Plan editor' dialog box with the 'Image' tab selected. The dialog has a title bar with a close button and a navigation bar with tabs for 'Object', 'Link', 'Text label', 'Image', 'Frame', and 'Gaug'. The 'Image' tab contains the following fields:

- Image source:** A dropdown menu with 'Local' selected.
- Select image:** A text input field with a dropdown arrow.
- Image size:** Two spinners for width and height.
- External link:** A text input field.
- Refresh interval (seconds):** A spinner.
- Additional classes:** A text input field.

At the bottom of the dialog are two buttons: 'Add to plan' (highlighted in green) and 'Cancel'.

- *Image source* [*Local, Remote*] - image source type
- *Source url / Select image* - image source URL (external) or select an existing local image
- *Image size* - image width and height in pixels
- *External link* - optional external URL which is open when the image is clicked
- *Refresh interval (seconds)* - reload the image once in X seconds, can be used to display a snapshot from a camera
- *Additional classes* - additional CSS classes for the element

#### 4.8.6. Frame

- *Source [Url, Schedulers, Trend logs]* - frame source
- *Url* - source URL
- *Frame size* - frame width and height in pixels
- *Custom name* - custom frame name
- *Refresh interval (seconds)* - reload the frame once in X seconds
- *Hide in Touch* - do not display this frame in the *Touch* visualization
- *Persistent (Do not unload when hidden)* - do not unload then frame when it is not visible anymore
- *Additional classes* - additional CSS classes for the element

The screenshot shows the 'Plan editor' dialog box with the 'Frame' tab selected. The dialog has a title bar with a close button and a navigation bar with buttons for 'Object', 'Link', 'Text label', 'Image', 'Frame', and 'Gaug'. The main area contains the following fields:

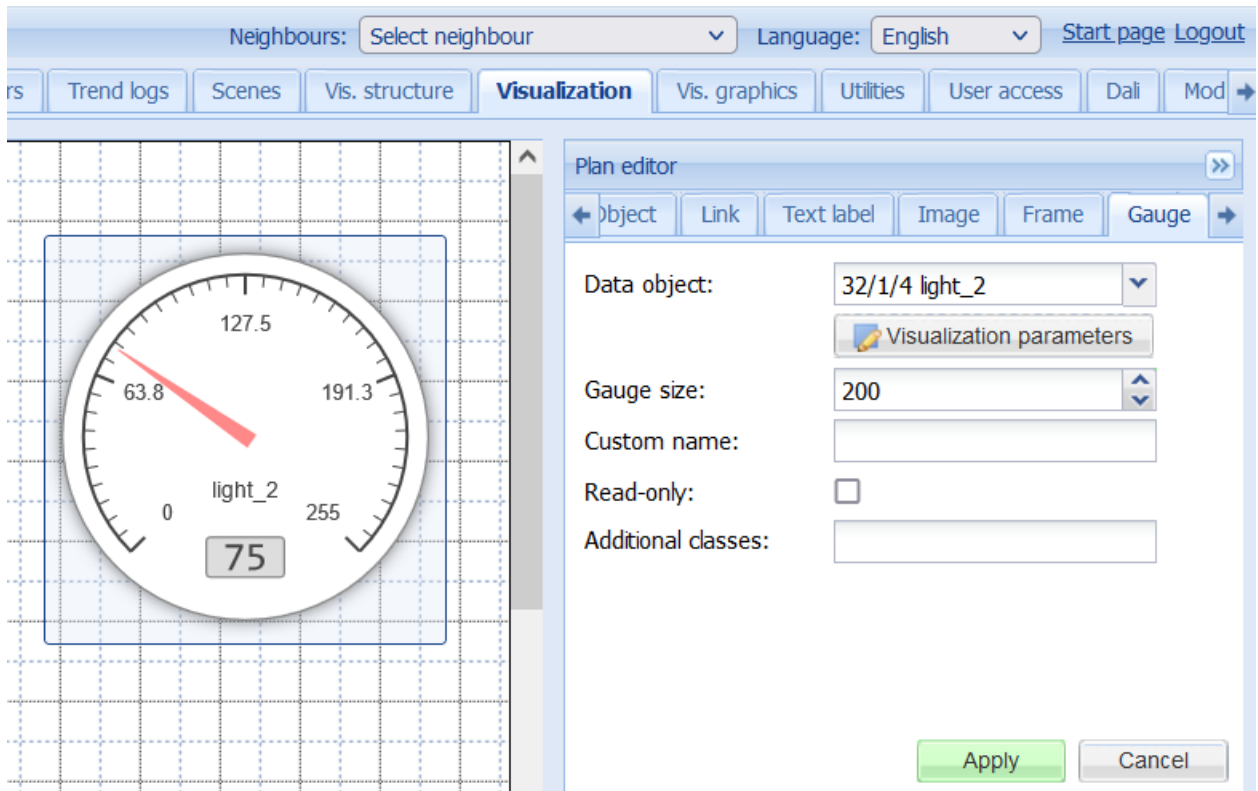
- Source:** A dropdown menu with 'Url' selected.
- Url:** A text input field.
- Frame size:** Two spinners for width (480) and height (320).
- Custom name:** A text input field.
- Refresh interval (seconds):** A spinner field.
- Hide in Touch:** An unchecked checkbox.
- Persistent:** An unchecked checkbox with the label 'Do not unload when hidden'.
- Additional classes:** A text input field.

At the bottom, there are two buttons: 'Add to plan' (highlighted in green) and 'Cancel'.

**Note!** Some websites do not allow their content to be placed into an inline frame. In this case the frame will be empty.

## 4.8.7. Gauge

Gauge allows visualizing and changing object value in the gauge.

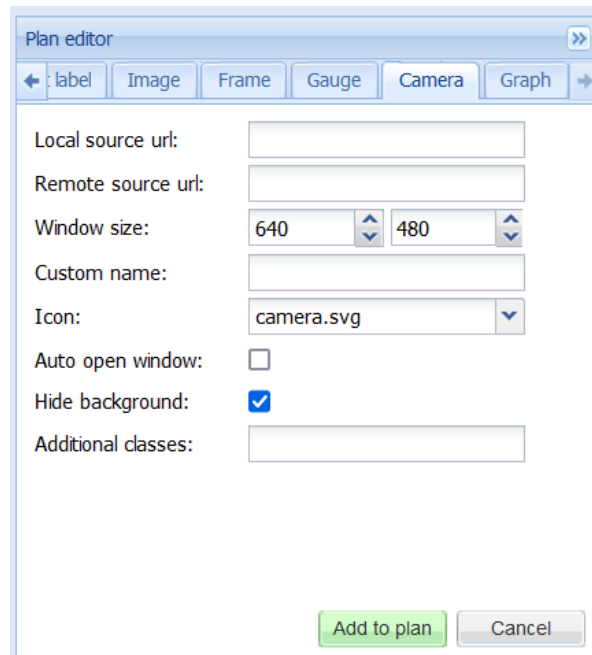


The screenshot shows a web interface for configuring a gauge. On the left, a gauge is displayed on a grid background. The gauge has a red needle pointing to the value 75. The scale ranges from 0 to 255, with major ticks at 0, 63.8, 127.5, 191.3, and 255. The text 'light\_2' is centered below the needle, and the value '75' is shown in a box at the bottom. On the right, the 'Plan editor' window is open, showing the 'Gauge' configuration panel. The 'Data object' is set to '32/1/4 light\_2'. There is a 'Visualization parameters' button. The 'Gauge size' is set to 200. The 'Custom name' field is empty. The 'Read-only' checkbox is unchecked. The 'Additional classes' field is empty. At the bottom right of the panel are 'Apply' and 'Cancel' buttons.

- *Data object* - group address
- *Gauge size* - gauge size (width/height) in pixels
- *Custom name* - custom gauge name
- *Read only* - does not show a control element when gauge is clicked if enabled
- *Additional classes* - additional CSS classes for the element

### 4.8.8. Camera

Shows a window with an IP camera stream when the icon is clicked. Note that RTSP streams are not supported.



The screenshot shows a 'Plan editor' dialog box with a 'Camera' tab selected. The dialog contains the following fields and options:

- Local source url: [text input]
- Remote source url: [text input]
- Window size: 640 [spin] 480 [spin]
- Custom name: [text input]
- Icon: camera.svg [dropdown]
- Auto open window:
- Hide background:
- Additional classes: [text input]

At the bottom, there are two buttons: 'Add to plan' (green) and 'Cancel' (grey).

- *Local source url* - source address of the video stream
- *Remote source url* - remote source address of the video stream when accessing LM outside of the local network
- *Window size* - camera window size in pixels
- *Custom name* - custom camera name (window title)
- *Icon* - camera element icon
- *Auto open window* - automatically open the camera window when the camera's plan is shown
- *Hide background* - do not display the default camera icon background
- *Additional classes* - additional CSS classes for the element

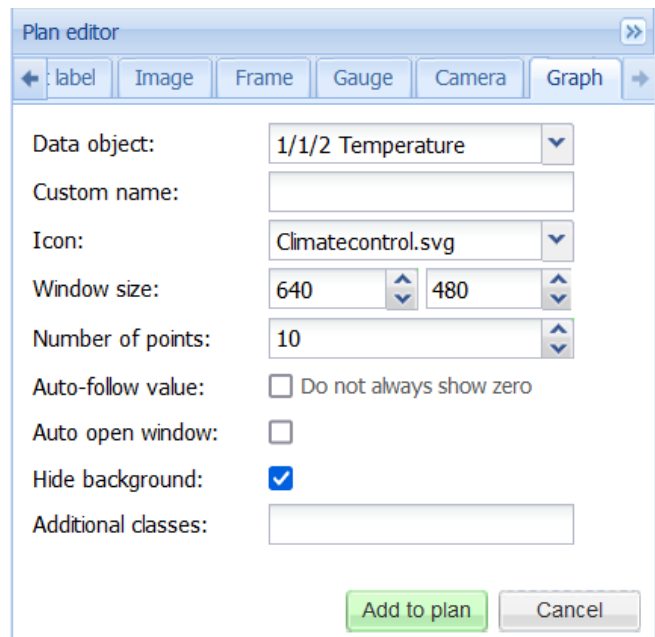
**Note!** Due to browser security policies it's **not possible** to pass credentials in the URL using the the following format: <http://USER:PASSWORD@IP>

Certain cameras allow passing credentials in a different way. Consult the camera's manual for more information.

**Note!** Only cameras that support HTTP MJPEG streaming in the web browser can be visualized

## 4.8.9. Graph

The graph element displays object logs for a certain object. Make sure that the *Log* option is enabled for the object that is displayed.

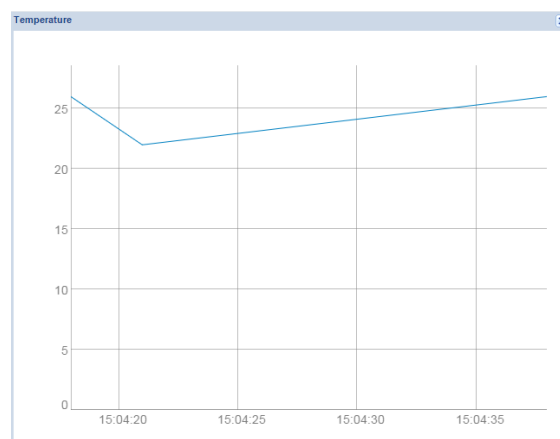


The screenshot shows the 'Plan editor' dialog box with the 'Graph' tab selected. The dialog contains the following fields and options:

- Data object:** A dropdown menu showing '1/1/2 Temperature'.
- Custom name:** An empty text input field.
- Icon:** A dropdown menu showing 'Climatecontrol.svg'.
- Window size:** Two spinners for width (640) and height (480).
- Number of points:** A spinner set to 10.
- Auto-follow value:** A checkbox labeled 'Do not always show zero' which is currently unchecked.
- Auto open window:** An unchecked checkbox.
- Hide background:** A checked checkbox.
- Additional classes:** An empty text input field.

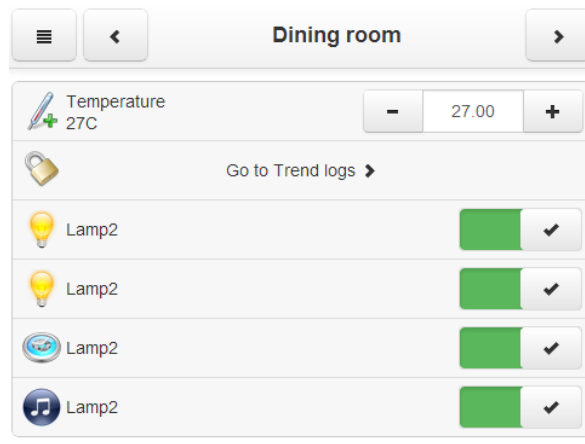
At the bottom of the dialog are two buttons: 'Add to plan' (highlighted in green) and 'Cancel'.

- *Data object* - source data object
- *Custom name* - custom graph name (window title)
- *Icon* - graph element icon
- *Window size* - graph window size in pixels
- *Number of points* - number of data points to display in the graph
- *Auto-follow value* - does not always show zero on the Y axis when enabled
- *Auto open window* - automatically open the graph window when the graph's plan is shown
- *Hide background* - do not display the default graph icon background
- *Additional classes* - additional CSS classes for the element

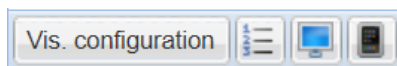


#### 4.8.10. Touch visualization

*Touch* visualization is designed for touchscreen devices (iPhone/iPad/Android). By default all objects from the main visualization are visible here. *Hide in touch* option allows hiding certain objects from this view.



#### 4.8.11. Left sidebar bottom toolbar



- *Vis. configuration* - open visualization configuration from *Utilities*
- *Change Touch object order* - change object order for *Touch* visualization via drag&drop
- *Usermode view* - open current plan in *Usermode* visualization
- *Touch view* - open current plan in *Touch* visualization

## 4.9. Visualization graphics

### 4.9.1. Icons, Images / Backgrounds

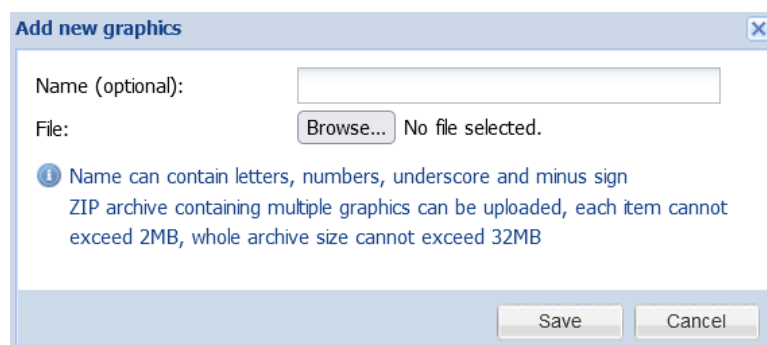


It is possible to filter graphical elements by name.

Multiple elements can be deleted at once. Click each element to select it.

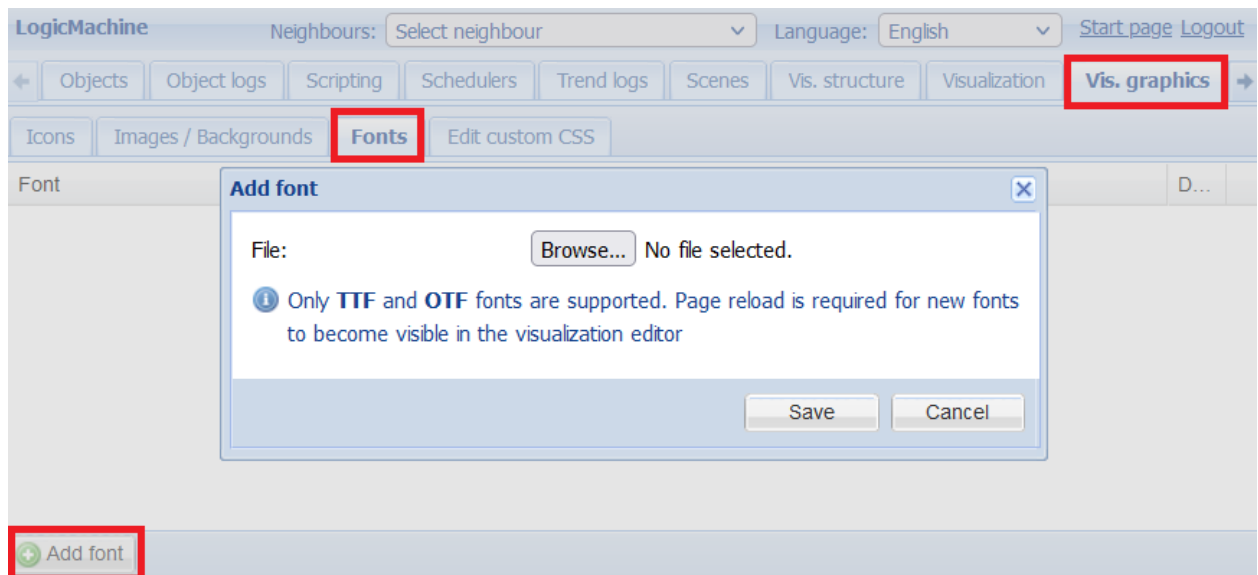
A preview for large graphical elements is shown when hovering the mouse cursor over.

Click *Add icons (Add images)* to add new graphics elements. It is possible to upload a single element or a ZIP-archive containing multiple elements.



- *Name (optional)* - the name of the graphic element
- *File* - element file

## 4.9.2. Fonts



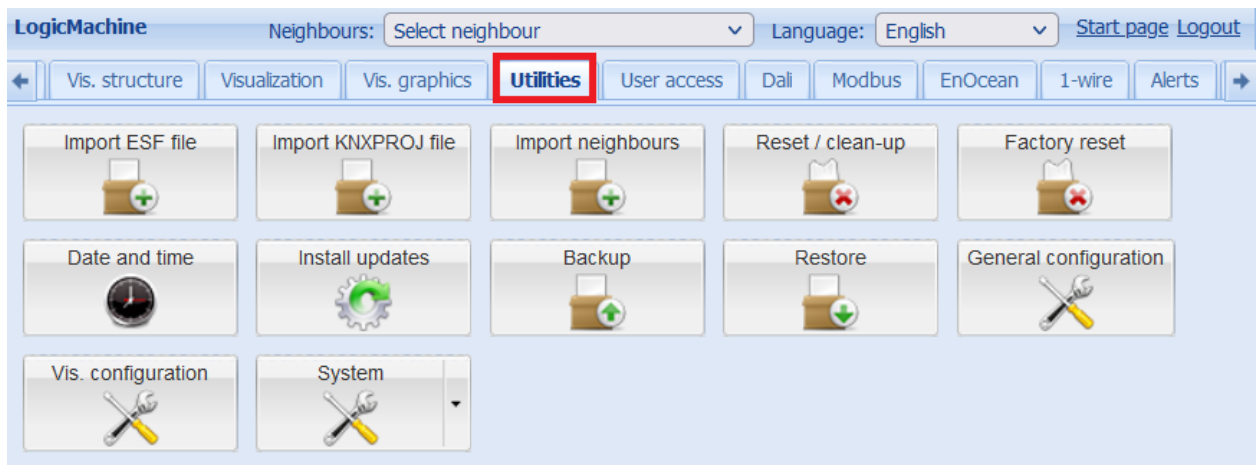
Custom fonts can be added for visualization use. TTF and OTF formats are supported.

## 4.9.3. Custom CSS

*Custom CSS* allows customizing *Usermode* and *Touch* visualizations, *Trends* and *Schedulers* by providing custom CSS rules. *Additional classes* for visualization elements can be used to customize a specific element or a group of elements.

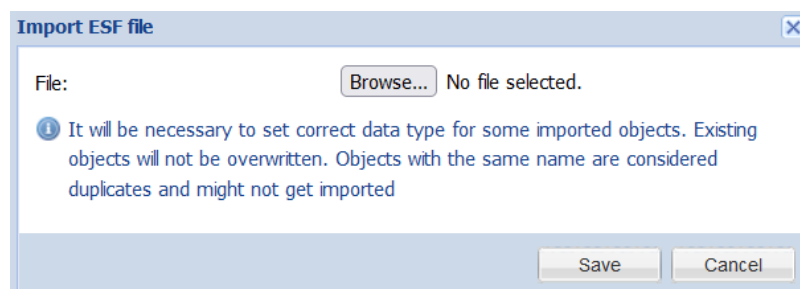


## 4.10. Utilities

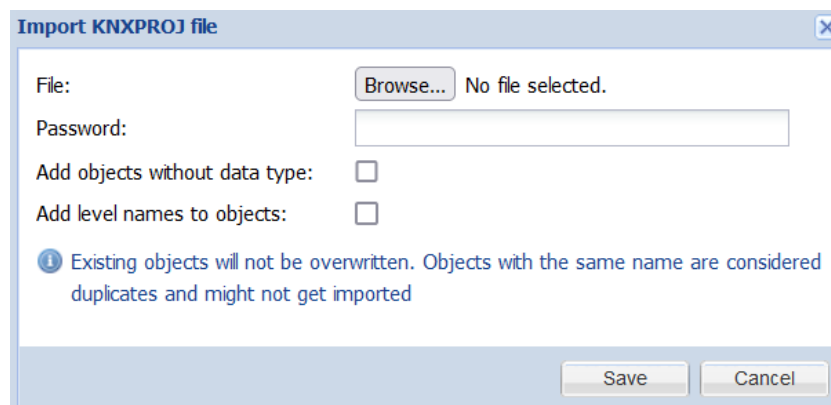


### 4.10.1. Import ESF file

Where possible KNXPROJ files should be imported instead. ESF does not provide full data type description of objects meaning that some data types will have to be corrected manually.



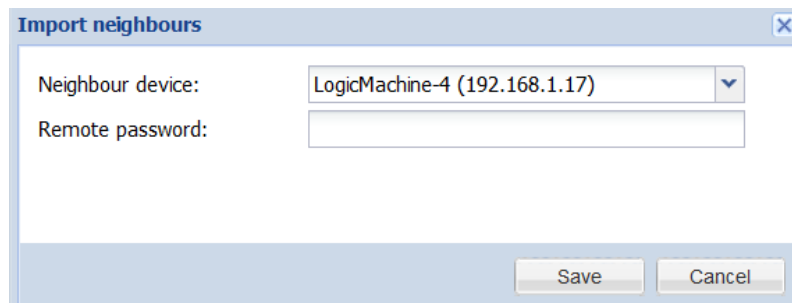
### 4.10.2. Import KNXPROJ file



- *Password* - ETS project password (optional)
- *Add objects without data type* - whether to import objects that do not have a data type assigned
- *Add level names to objects* - when enabled the object name is formatted as *Main group name - Middle group name - Group address name*

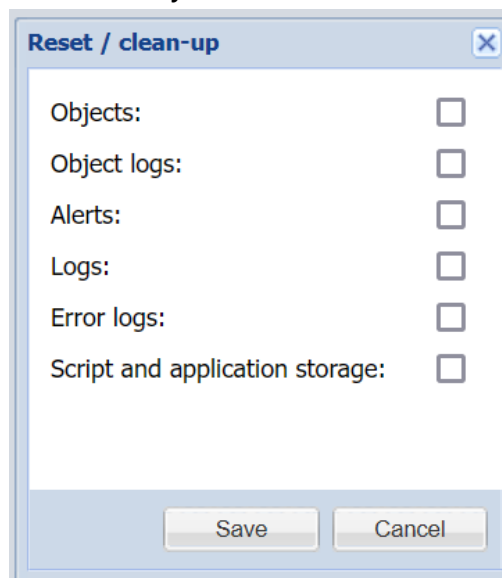
### 4.10.3. Import neighbours

Import objects from another LogicMachine on the network. Remote services must be enabled on the neighbour device.



### 4.10.4. Reset / clean-up

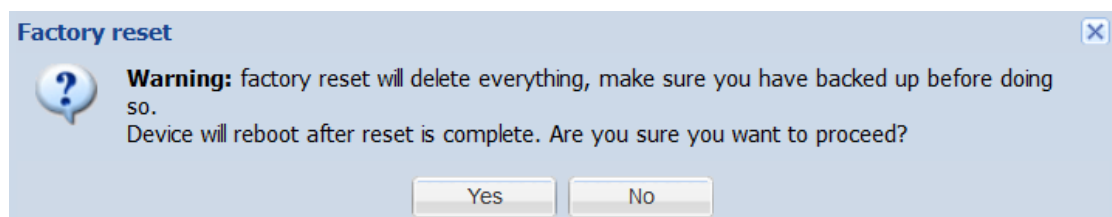
Use *Reset / clean-up* to delete certain system



**Warning:** clearing script and application storage will delete configuration for installed applications.

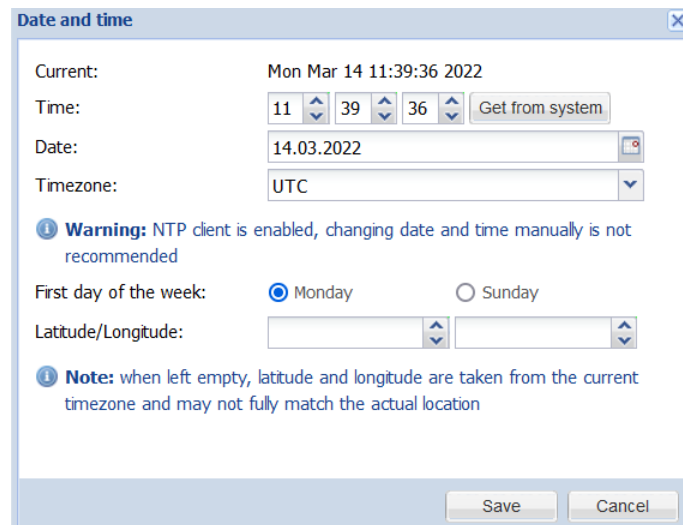
### 4.10.5. Factory reset

Delete current configuration and return to factory defaults. Does not affect System configuration settings.



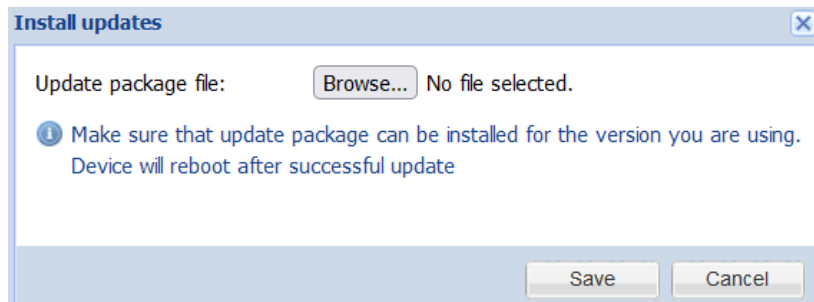
#### 4.10.6. Date and time

For better precision of *Scheduler* sunrise/sunset functionality it is recommended to provide exact coordinates of the Latitude/Longitude.



#### 4.10.7. Install updates

Updates are provided via \*.Imup package files. Depending on an update an automatic system reboot might be performed after installation.

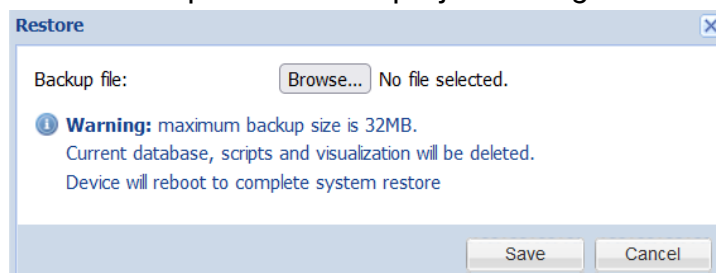


#### 4.10.8. Backup

Perform project backup as a single archive.

#### 4.10.9. Restore

Restore project from a backup. The current project configuration will be overwritten.



#### 4.10.10. General configuration

**General configuration**

Interface language: English

Automatic address range start: 1/1/1

Virtual address range start: 32/1/1

Discover new objects: Yes, bus sniffer enabled

Object log size: 1000

Default log policy: Log only selected objects

Log read telegrams:

Alert log size: 200

Log size: 200

Error log size: 200

Code editor tab size: 2

**i** • If log size is changed to a smaller value, excess logs will be deleted on next auto clean-up (every 10 minutes)  
• Log policy only affects new objects, current per-object log settings are kept unchanged

**Warning:** excessive object logging degrades performance

Save Cancel

- *Interface language* - interface language
- *Automatic address range start* - starting group address for standard objects
- *Virtual address range start* - starting group address for virtual objects
- *Discover new objects* - whether to enable KNX bus sniffer to automatically add newly discovered objects
- *Object log size* - maximum number of entries for *Object logs*
- *Default log policy* - whether to enable the *Log* property automatically for newly discovered objects
- *Log read telegrams* - whether to log read telegrams, otherwise only write and response telegrams are logged
- *Alert log size* - maximum number of entries for *Alerts*
- *Log size* - maximum number of entries for *Logs*
- *Error log size* - maximum number of entries for *Error logs*
- *Code editor tab size* - number of spaces to insert when pressing *Tab* in the scripting editor

#### 4.10.11. Visualization configuration

Vis. configuration

Usermode sidebar: Show as overlay (auto-hide) ▾

Usermode view: Center plans, enable auto-sizing ▾

Usermode page transition: No transition ▾

Usermode auto-size upscaling:

Usermode background color:

Usermode background image:

Custom font:

Use dark theme:

Enable swipe gesture:

Disable object click animation:

Hide Home button in Touch:

Dim inactive visualization after:  minutes

Dimming level:  %

Show alerts in visualization:

Allow external access via iframe:

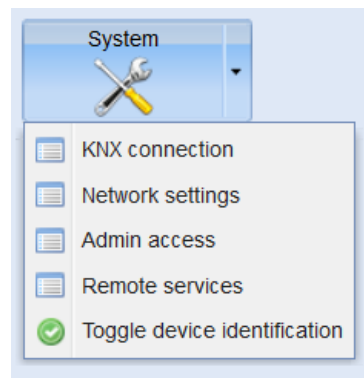
Save Cancel

- *Usermode sidebar* - sidebar navigation menu mode for *Usermode* visualization:
  - *Show docked* - sidebar is always visible on the left side next to the plan
  - *Show as overlay (auto-hide)* - sidebar can be toggled by the end user, it is shown over the plan
  - *Hide (full-screen mode)* - sidebar is hidden
- *Usermode view* - plan display mode:
  - *Align plans to top left* - plans are shown as is aligned to top left screen corner
  - *Center plans* - plans are centered both vertically and horizontally, content is cropped from sides if it does not fit inside the scree
  - *Center plans, enable auto-sizing* - plans are centered both vertically and horizontally, downscaled automatically to fully fit inside the screen
  - *Center horizontally, auto-size width* - plans are centered horizontally and can be scrolled vertically when the plan height is larger than screen height
- *Usermode page transition* - apply selected animation when changing plans
- *Usermode auto-size upscaling* - when auto-sizing is enabled the plan is only downscaled by default, enabled this option to allow upscaling as well
- *Usermode background color* - default background color for *Usermode* visualization
- *Usermode background image* - default background image for *Usermode* visualization
- *Custom font* - default visualization font

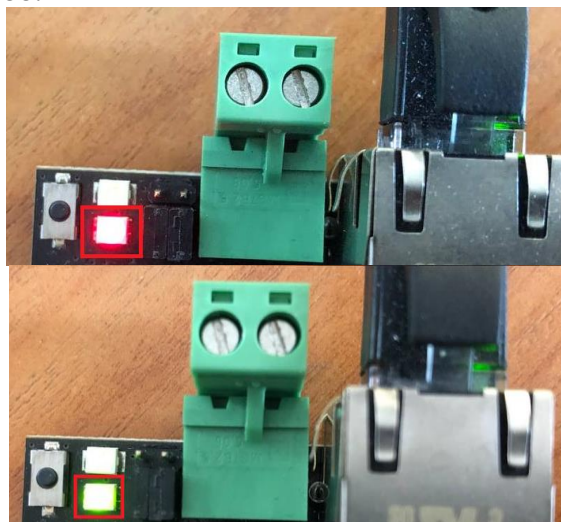
- *Use dark theme* - whether to use dark theme for *Usermode, Touch, Schedulers and Trends*
- *Enable swipe gesture* - allows changing between plans by performing a horizontal swipe gesture
- *Disable object click animation* - disable object click animation for visualization
- *Dim inactive visualization after*- show a dark overlay after a defined number of minutes
- *Dimming level* - overlay opacity in %
- *Show alerts in visualization* - show alert message when *alert()* is called from a script
- *Allow external access via iframe* - allow *Usermode, Touch, Schedulers and Trends* to be included in an iframe element

#### 4.10.12. System

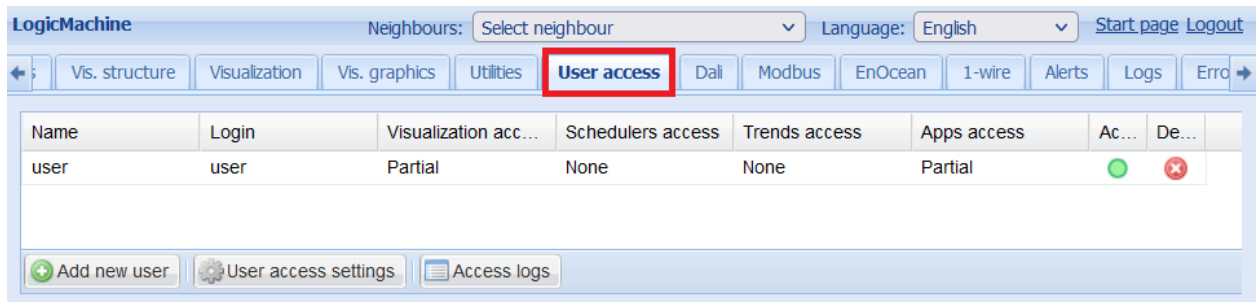
Quick access to certain *System configuration* settings.



When *Toggle device identification* is clicked, LED2 starts blinking red and green. Click it again to stop this process.



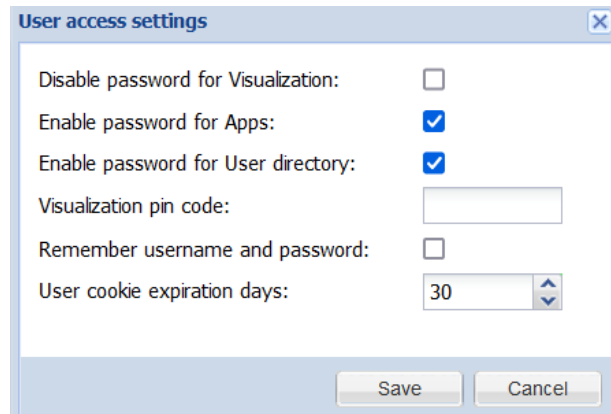
## 4.11. User access



Name	Login	Visualization acc...	Schedulers access	Trends access	Apps access	Ac...	De...
user	user	Partial	None	None	Partial	●	●

Buttons: Add new user, User access settings, Access logs

### 4.11.1. User access settings



**User access settings**

Disable password for Visualization:

Enable password for Apps:

Enable password for User directory:

Visualization pin code:

Remember username and password:

User cookie expiration days:

Buttons: Save, Cancel

- *Disable password for Visualization* - disable password access for the visualization
- *Enable password for Apps* - enable password for the main application page
- *Enable password for User directory* - enable password access for the *user* directory
- *Visualization pin code* - global pin code for the visualization
- *Remember username and password* - whether to save credentials on the client device. Does not apply to the *admin* user. Credentials become invalid if client IP address changes
- *User cookie expiration days* - how many days the saved credentials are stored

### 4.11.2. User directory

HTTP server-side scripts (.lp) files can be placed into the *user* directory to provide additional functionality. FTP server must be enabled to upload files to this directory. Visit our forum for examples: [forum.logicmachine.net](http://forum.logicmachine.net)

### 4.11.3. Adding users

The screenshot shows a 'User' configuration window with the following fields and values:

Field	Value
Name:	user
Login:	user
Cloud login (e-mail):	example@openrb.com
Active:	<input checked="" type="checkbox"/>
Password:	
Repeat password:	
Visualization access:	Partial
Schedulers access:	Partial
Trends access:	Partial
Apps access:	Partial
Mosaic access:	Partial

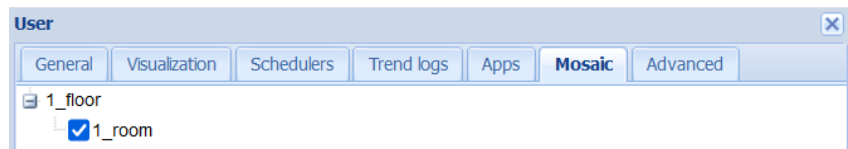
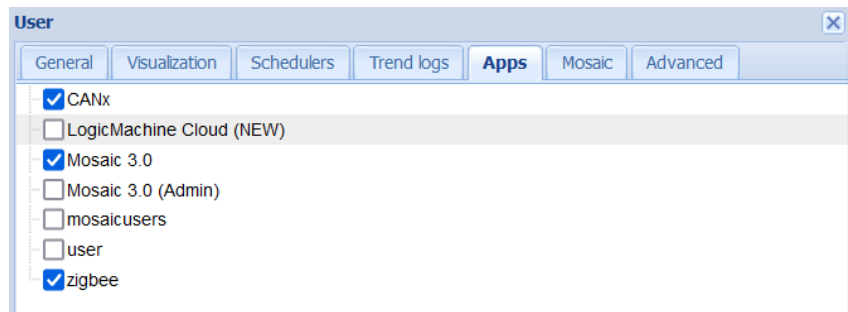
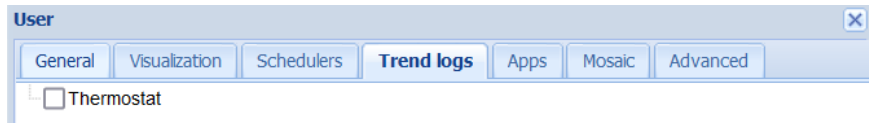
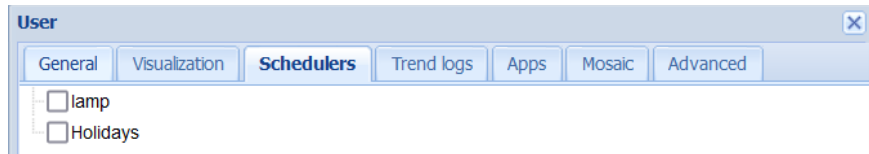
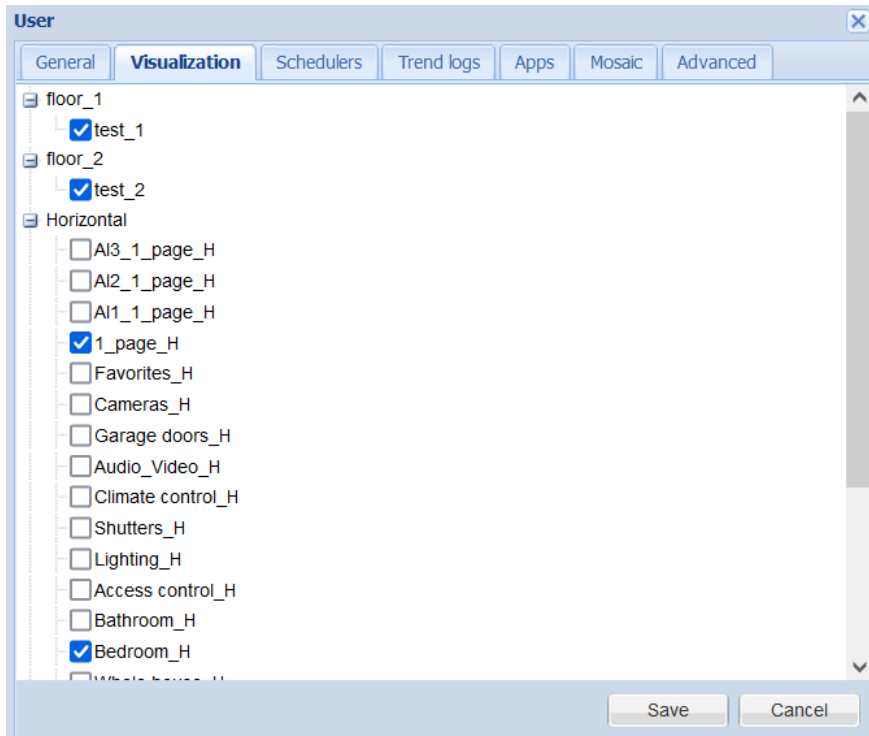
Buttons: Save, Cancel

- *Name* - name of the user
- *Login* - user login name
- *Cloud login (e-mail)* - login for cloud (e-mail address)
- *Active* - whether the user is active or not. Inactive users can't access the system
- *Password* - user password
- *Visualization access [None, Partial, Full]* - Visualization access rights
- *Schedulers access [None, Partial, Full]* - Schedulers access rights
- *Trends access [None, Partial, Full]* - Trends access rights
- *Apps access [None, Partial, Full]* - Apps access rights
- *Mosaic access [None, Partial, Full]* - Mosaic access rights

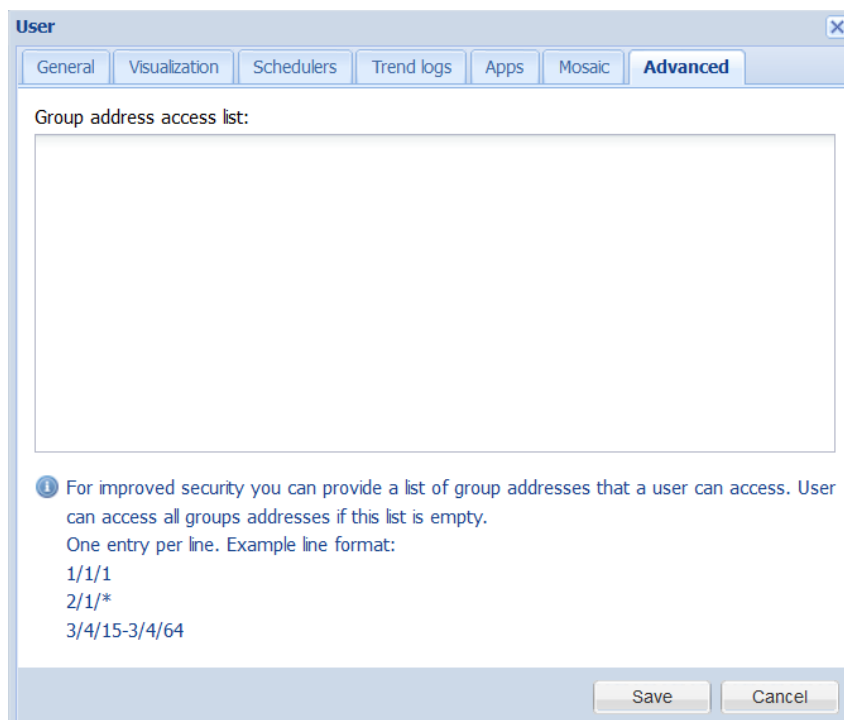
Access rights:

- *None* - no access
- *Partial* - access to specific elements is defined in a relevant tab
- *Full* - full unrestricted access





Advanced tab allows specifying group address access filter for each user. This feature is recommended for improved security especially when a single LogicMachine is shared by multiple independent clients.



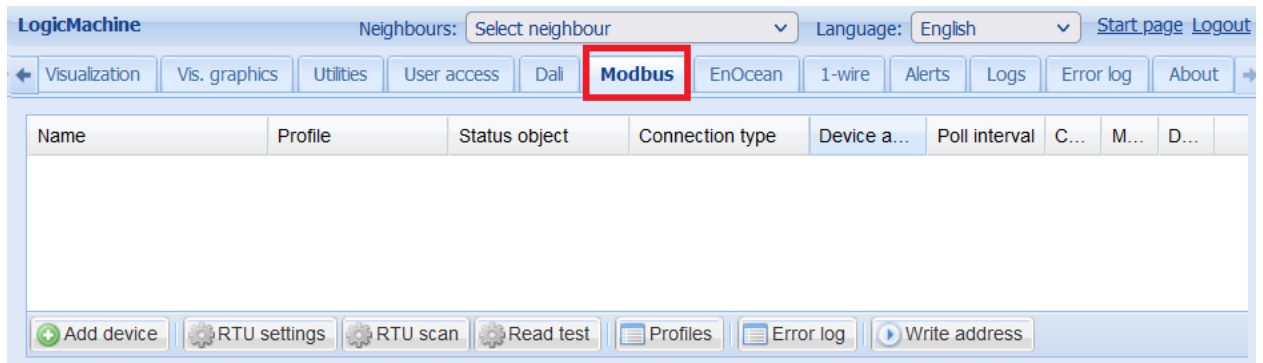
#### 4.11.4. Access logs

Access logs contain information on successful and unsuccessful login attempts into the system. Login, IP address and access time is provided for all entries.

The screenshot shows a window titled 'Access logs' containing a table with the following data:

Name	Login	IP address	Accessed at
	admin	192.168.1.213	15.03.2022 09:19:00
	admin	192.168.1.213	15.03.2022 09:06:48
	root [ssh]	192.168.1.213	15.03.2022 09:06:24
	root [ssh]	192.168.1.213	14.03.2022 16:30:19
	root [ssh]	192.168.1.213	14.03.2022 16:14:31

## 4.13. Modbus master (RTU/TCP)

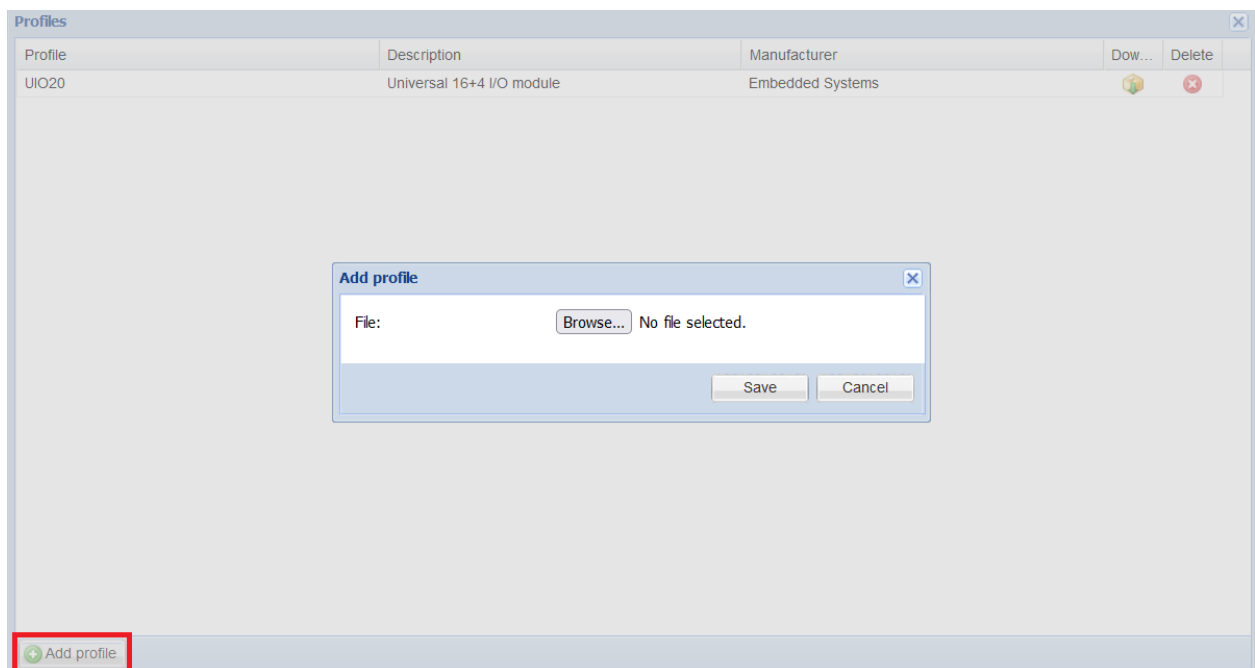


### 4.13.1. Modbus devices profile

Each Modbus device requires a JSON profile which specifies the list of available Modbus points and their respective data formats.

Profile format description: [openrb.com/docs/modbus.htm](https://openrb.com/docs/modbus.htm)

Click *Profiles* and then click *Add profile* to upload a new profile.



**Note!** Device entry must be created from scratch when a new or updated profile is added.

### 4.13.2. RTU settings

Up to three different RTU connections can be defined.

The screenshot shows a dialog box titled "RTU settings" with a close button (X) in the top right corner. It contains three sections for RTU 1, RTU 2, and RTU 3. Each section has a "RTU (serial) enabled:" checkbox, a "Port:" text field, a "Baud rate:" dropdown menu, a "Parity:" dropdown menu, and a "Duplex:" section with radio buttons for "Half-duplex" and "Full-duplex".

**RTU 1**  
RTU (serial) enabled:   
Port: /dev/RS485-1  
Baud rate: 115200  
Parity: Even  
Duplex:  Half-duplex  Full-duplex

**RTU 2**  
RTU (serial) enabled:   
Port:   
Baud rate: 115200  
Parity: Even  
Duplex:  Half-duplex  Full-duplex

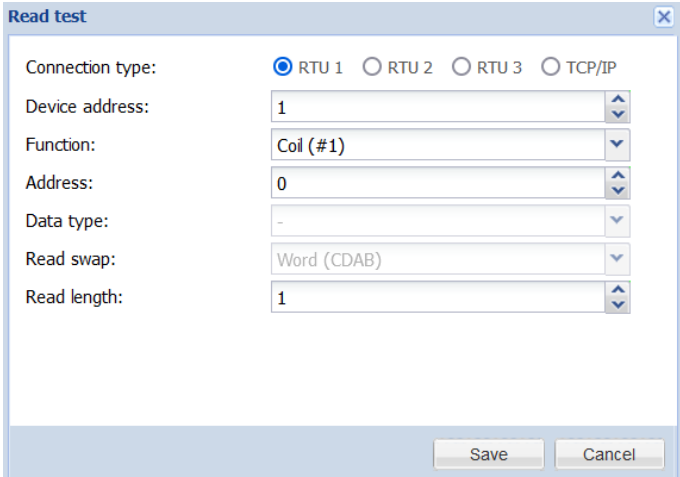
**RTU 3**  
RTU (serial) enabled:   
Port:   
Baud rate: 115200  
Parity: Even  
Duplex:  Half-duplex  Full-duplex

Below the RTU 3 section is a "Reset to defaults" button. At the bottom of the dialog are "Save" and "Cancel" buttons.

- *RTU (serial) enabled* - whether to enable this connection
- *Port (/dev/RS485-1; /dev/RS485-2)* - serial port name or leave blank for automatic detection
- *Baud rate (1200..500000)* - serial baud rate.
- *Parity (None 1 stop bit; Odd; Even; None 2 stop bits)* - parity/stop bits
- *Duplex* - either use half or full duplex communication

### 4.13.3. Read test

Click *Read test* to read values from a Modbus RTU/TCP device.



Read test

Connection type:  RTU 1  RTU 2  RTU 3  TCP/IP

Device address: 1

Function: Coil (#1)

Address: 0

Data type: -

Read swap: Word (CDAB)

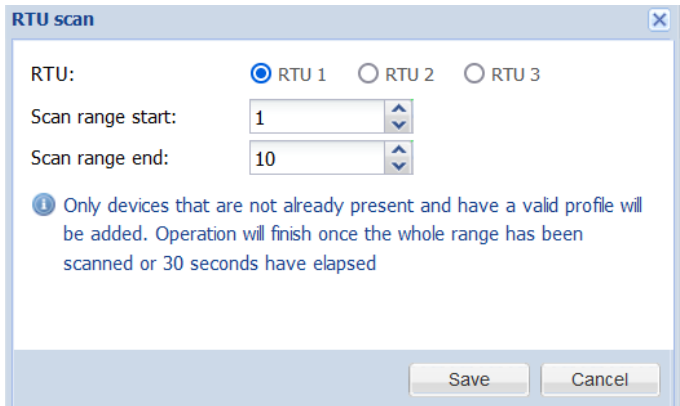
Read length: 1

Save Cancel

- *Connection type* - either *RTU 1*, *RTU 2*, *RTU 3* or *TCP/IP*
- *Device address* - Modbus device address
- *Function (Coil, Discrete input, Holding register, Input register)* - Modbus function
- *Address* - starting data address
- *Data type* - data type, only available for registers
- *Read swap (None (ABCD); Word (CDAB), Byte (BADC), Byte and word (DCBA))* - sets word/byte order
- *Read length* - number of registers/coil to read, disabled when a predefined data type is selected

### 4.13.4. RTU Scan

Click *RTU Scan* to scan one of RTU ports for new devices in a selected address range. Only devices that are not already present and have a valid profile will be added. Operation will finish once the whole range has been scanned or 30 seconds have elapsed.




RTU scan

RTU:  RTU 1  RTU 2  RTU 3

Scan range start: 1

Scan range end: 10

 Only devices that are not already present and have a valid profile will be added. Operation will finish once the whole range has been scanned or 30 seconds have elapsed

Save Cancel

### 4.13.5. Adding Modbus device

Click *Add device* to add a new Modbus device with a predefined profile.


The screenshot shows a 'Modbus device' configuration window. It includes the following fields and options:












- Connection type:** Radio buttons for RTU 1, RTU 2, RTU 3, and selected TCP/IP.
- Name:** Text input field.
- Status object:** Dropdown menu with a green plus icon for adding a new object.
- Write to bus:** Checkbox labeled 'Does not apply to virtual objects'.
- Profile:** Dropdown menu.
- IP:** Text input field.
- Port:** Spinner box set to 502.
- Persistent connection:** Checkbox.
- Device address:** Spinner box set to 1.
- Poll interval (seconds):** Spinner box set to 5.
- Timeout (seconds):** Spinner box.

At the bottom of the window, there is an information icon and the text: 'Default timeout is 0.5 seconds for RTU and 3 seconds for TCP'. Below this are 'Save' and 'Cancel' buttons.

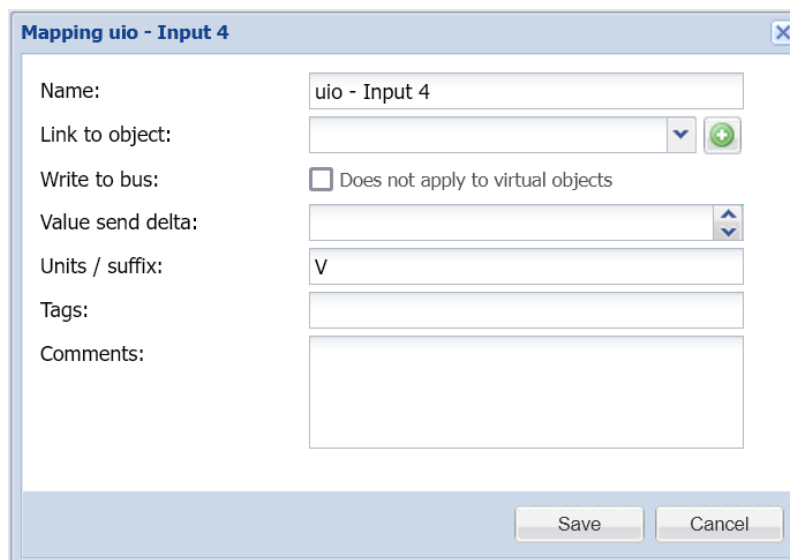
- *Connection type* - either one of RTU ports or a TCP/IP connection
- *Name* - device name
- *Status object* - status object of Modbus device (online/offline)
- *Write to bus* - whether to write status to KNX/TP
- *Profile* - device profile
- TCP/IP properties:
  - IP - IP address of the Modbus device
  - Port - communication port of the Modbus device
  - *Persistent connection* - when enabled the connection is not closed after each read cycle
- *Device address* - slave ID of the Modbus device
- *Poll interval (seconds)* - number of seconds between each read cycle
- *Timeout (seconds)* - time to wait for a reply from the device

### 4.13.6. Object mapping

Clicking the  icon to map Modbus data points to objects.

Object mapping for UIO20			
Name	Linked to object	Current value	Type
UIO20 - Output 1			Coil: 0 
UIO20 - Output 2			Coil: 1 
UIO20 - Output 3			Coil: 2 
UIO20 - Output 4			Coil: 3 
UIO20 - Output 5			Coil: 4 
UIO20 - Output 6			Coil: 5 
UIO20 - Output 7			Coil: 6 
UIO20 - Output 8			Coil: 7 
UIO20 - Output 9			Coil: 8 
UIO20 - Output 10			Coil: 9 
UIO20 - Output 11			Coil: 10 

Click on a specific object to perform mapping and configuration.



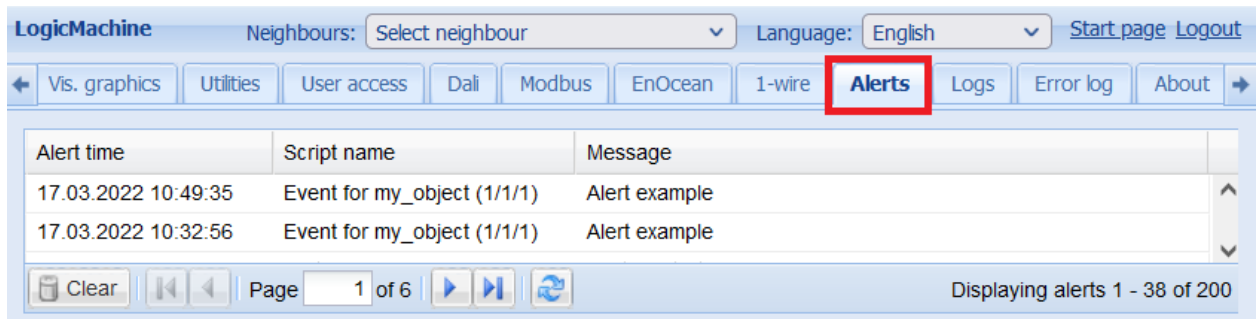
The dialog box titled "Mapping uio - Input 4" contains the following fields and controls:

- Name: uio - Input 4
- Link to object: A dropdown menu with a green plus icon to the right.
- Write to bus:  Does not apply to virtual objects
- Value send delta: A numeric input field with up/down arrows.
- Units / suffix: V
- Tags: An empty text input field.
- Comments: A large empty text area.
- Buttons: Save and Cancel.

- *Name* - mapping entry name
- *Link to object* - link this value to a new or existing object
- *Write to bus* - whether to write object value to KNX/TP bus
- *Value send delta* - (only applies to registers) value is sent when the difference between the current and previously sent values is larger than the defined delta. Leave blank to always send the new value
- *Units / suffix* - (only applies to registers) object units
- *Tags* - object tags
- *Comments* - entry comments

## 4.14. Alerts

Contains a list of alert messages from scripts (*alert()* function), KNX connection status messages and system start messages.



LogicMachine Neighbours: Select neighbour Language: English Start page Logout

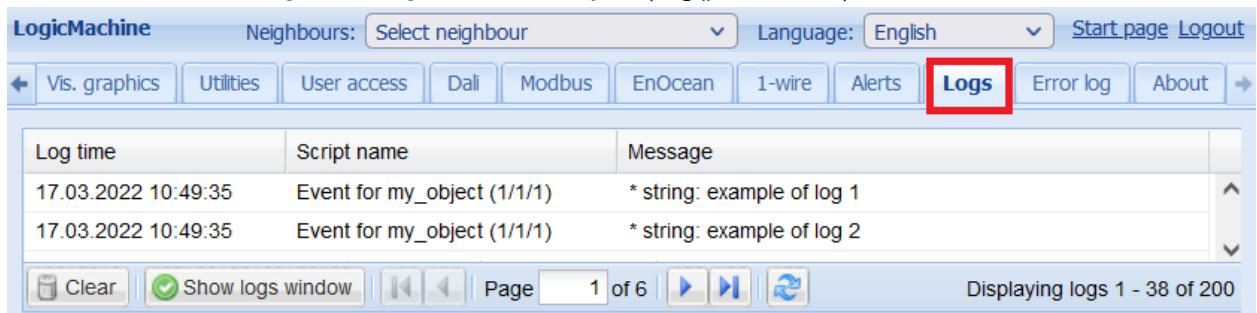
← Vis. graphics Utilities User access Dali Modbus EnOcean 1-wire **Alerts** Logs Error log About →

Alert time	Script name	Message
17.03.2022 10:49:35	Event for my_object (1/1/1)	Alert example
17.03.2022 10:32:56	Event for my_object (1/1/1)	Alert example

Clear Page 1 of 6 Displaying alerts 1 - 38 of 200

## 4.15. Logs

Contains a list of log messages from scripts (*log()* function).



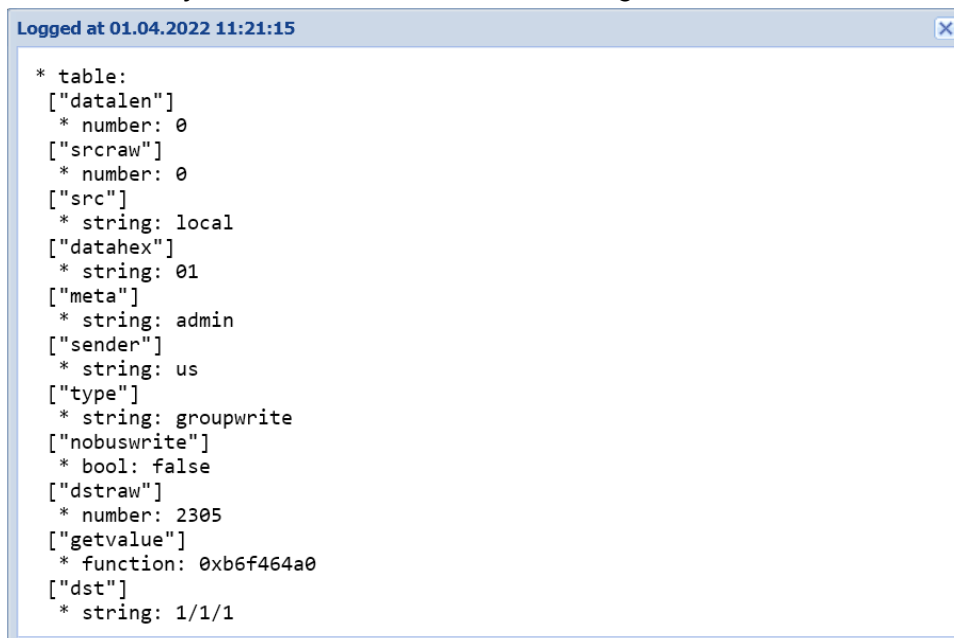
LogicMachine Neighbours: Select neighbour Language: English Start page Logout

← Vis. graphics Utilities User access Dali Modbus EnOcean 1-wire Alerts **Logs** Error log About →

Log time	Script name	Message
17.03.2022 10:49:35	Event for my_object (1/1/1)	* string: example of log 1
17.03.2022 10:49:35	Event for my_object (1/1/1)	* string: example of log 2

Clear Show logs window Page 1 of 6 Displaying logs 1 - 38 of 200

Click an entry to show a window with full log text in a readable format.



```
Logged at 01.04.2022 11:21:15
* table:
  ["datalen"]
  * number: 0
  ["srcraw"]
  * number: 0
  ["src"]
  * string: local
  ["datahex"]
  * string: 01
  ["meta"]
  * string: admin
  ["sender"]
  * string: us
  ["type"]
  * string: groupwrite
  ["nobuswrite"]
  * bool: false
  ["dstrow"]
  * number: 2305
  ["getvalue"]
  * function: 0xb6f464a0
  ["dst"]
  * string: 1/1/1
```



## 4.16. Error log

Error messages from scripts and applications are displayed in the *Error log* tab.

Error time	Script name	Error description
14.03.2022 15:57:17	zigbee	
10.03.2022 11:08:55	Event for my_object (1/1/1)	User script:1: module 'user.dal' not found: no field package.preloa...

Click an entry to show a window with full error log text.

## 4.17. User Interface status information

CPU/IO: 0.00 0.00 0.00, Memory: 9%, KNX/IP Sync project data

- *CPU/IO* - Load average. The load average represents the average system load over a period of time. It conventionally appears in the form of three numbers which represent the system load during the last one-, five-, and fifteen-minute periods. The lower a number the better.

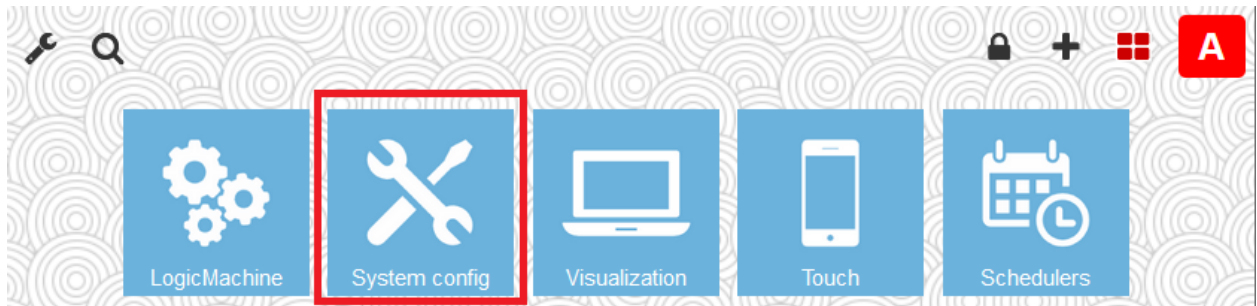
**Note!** Inspect your running tasks if the load exceeds a level of 0.70!

More on UNIX style load calculation can be found here:  
[http://en.wikipedia.org/wiki/Load\\_\(computing\)#Unix-style\\_load\\_calculation](http://en.wikipedia.org/wiki/Load_(computing)#Unix-style_load_calculation)

- *Memory* - RAM usage in %
- *KNX/IP / KNX/TP* - type of the KNX bus connection. Current connection status is provided for KNX/TP mode
- *Sync project data* - save all project data to the internal storage. The project is synchronised automatically every 30 minutes, or when *Reboot* or *Shutdown* commands are executed
- *KNX/TP load graph* - shows average KNX bus load, click the graph to open full KNX/TP statistics

## 5. System configuration

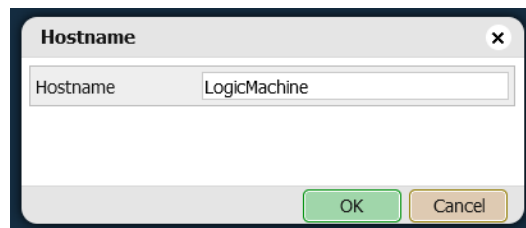
System configuration allows changing system parameters, configure services, upgrade firmware and check system status.




### 5.1. System

#### 5.1.1. Hostname

Hostname can be changed in *System - Hostname*. This name is displayed in the browser title, it is also added to the backup file names. It appears when searching for the device using *LogicMachine* applications.



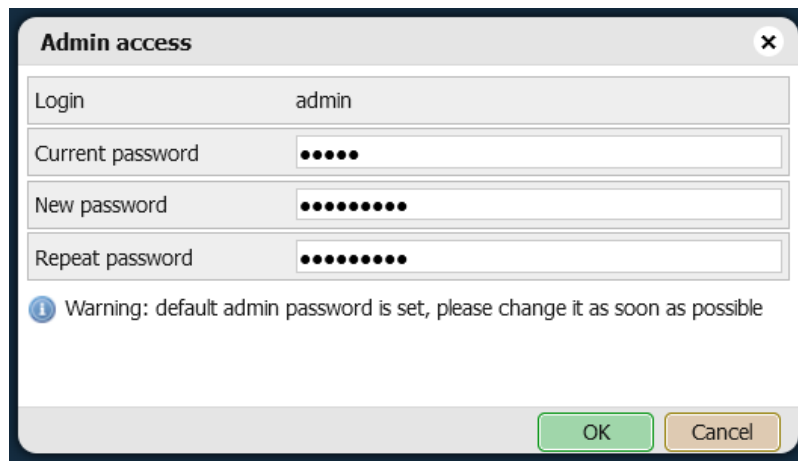
#### 5.1.2. Packages

Displays a list of currently installed packages. Click  to add new packages.



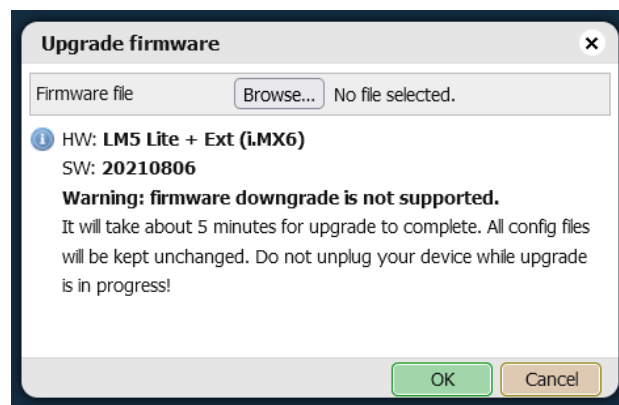
### 5.1.3. Admin access

Allows changing the *admin* user password.



### 5.1.4. Upgrade firmware

Used to perform a full system upgrade (both OS and LogicMachine parts).



**Note!** It is recommended to perform a project backup in *LogicMachine - Utilities - Backup* before upgrading the firmware.

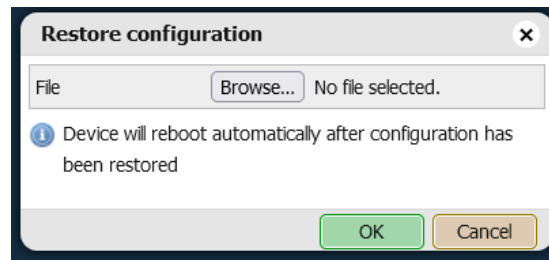
**Make sure that the new firmware matches the hardware model that is being used.**

### 5.1.5. Backup configuration

System configuration backup contains all LM service configuration files (including password) and the KNX filtering table.

### 5.1.6. Restore configuration

Allows restoring a system configuration backup. Note that this might change the device IP address.



### 5.1.7. Reboot


Performs project save to disk and reboots the system.

### 5.1.8. Shutdown

Performs project save to disk and shuts down the system. Power can be safely removed once LED1 stops blinking and LED2 turns off. To prevent accidental shutdowns the system will be restarted automatically after several minutes.

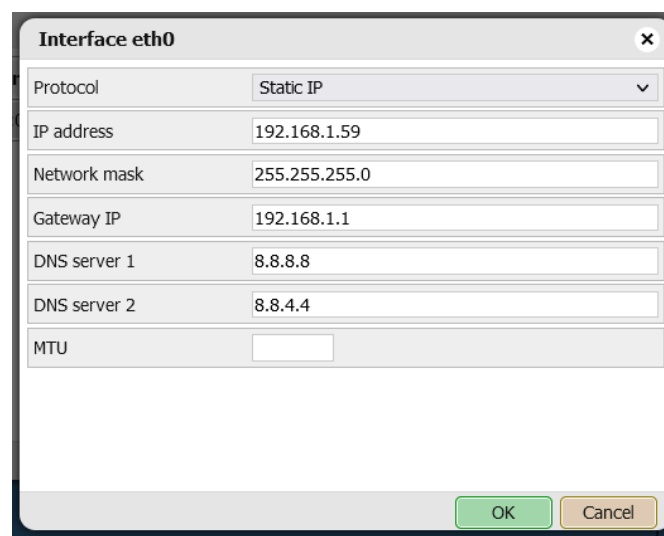
## 5.2. Network

### 5.2.1. Interfaces



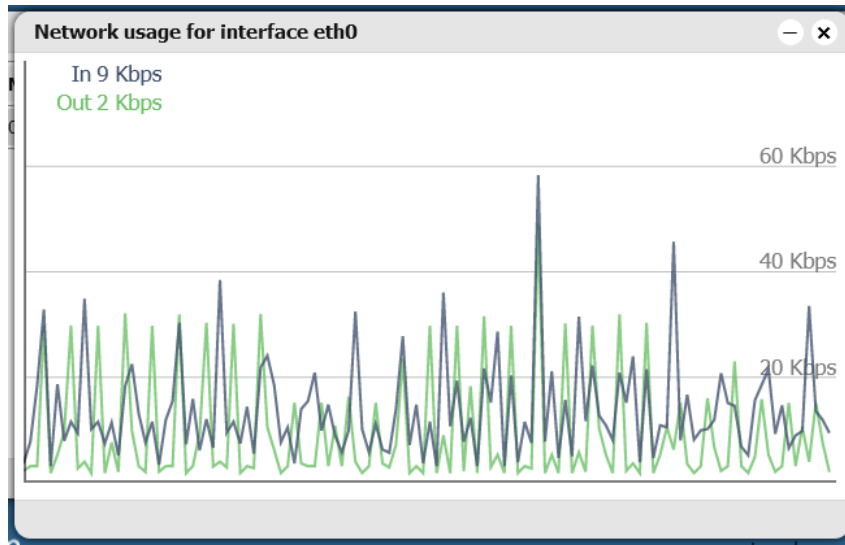
Name	MAC address	IP address	MTU	TX Bytes	RX Bytes	Errors
eth0	00:1B:C5:00:46:0B	192.168.1.59	1500	1 MB	2 MB	0 / 0

Click the interface name to change parameters.



- **Protocol:**
  - *Static IP* - static IP address
  - *DHCP* - use DHCP protocol to get IP configuration automatically
- **IP address** - static IP address
- **Network mask** - network mask. (255.255.255.0 by default)
- **Gateway IP** - gateway IP address
- **DNS server** - DNS server IP address
- **MTU** - maximum transmission unit, the largest size of the packet which could be passed in the communication protocol (1500 by default)

Click  to view a real-time graph of the interface traffic flow.



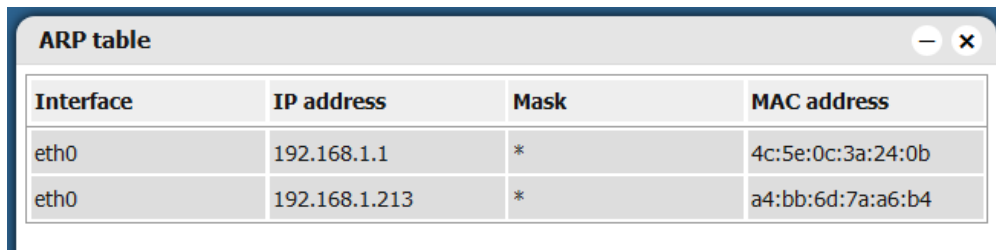
### 5.2.2. Routes

Displays a list of current network routes.

Interface	Destination	Gateway	Network mask
eth0	0.0.0.0	192.168.1.1	0.0.0.0
eth0	192.168.1.0	0.0.0.0	255.255.255.0
eth0	224.0.0.0	0.0.0.0	240.0.0.0

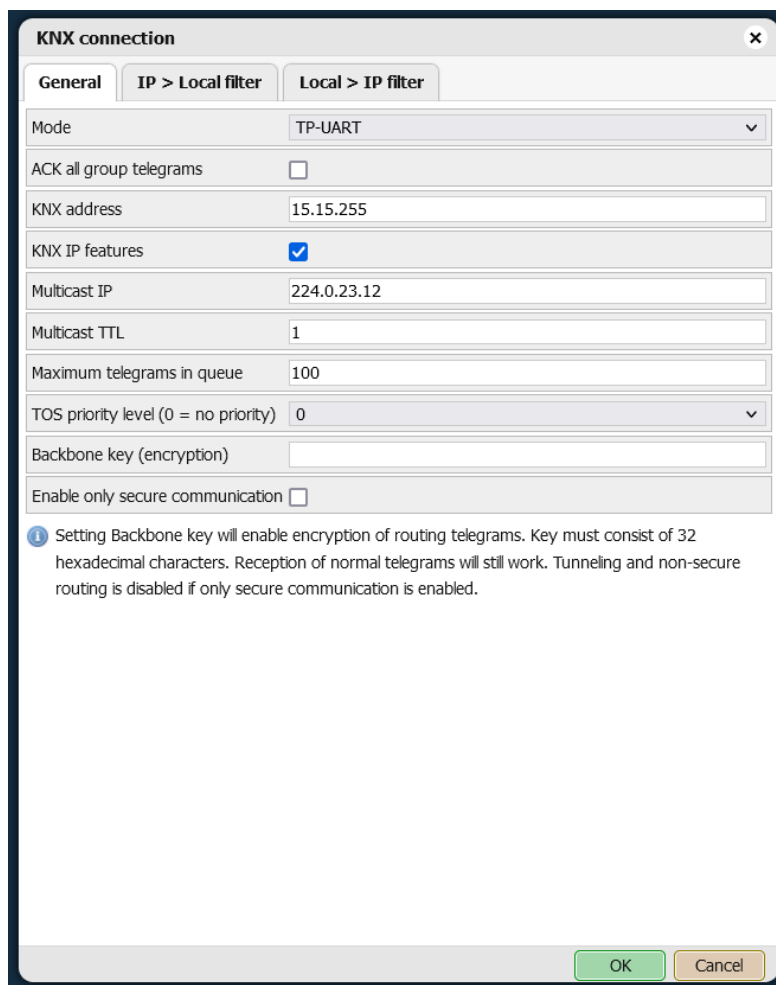
### 5.2.3. ARP table

Displays a list of known IP and MAC addresses.



Interface	IP address	Mask	MAC address
eth0	192.168.1.1	*	4c:5e:0c:3a:24:0b
eth0	192.168.1.213	*	a4:bb:6d:7a:a6:b4

### 5.2.4. KNX connection



**KNX connection**

General | IP > Local filter | Local > IP filter

Mode: TP-UART

ACK all group telegrams:

KNX address: 15.15.255

KNX IP features:

Multicast IP: 224.0.23.12

Multicast TTL: 1

Maximum telegrams in queue: 100

TOS priority level (0 = no priority): 0

Backbone key (encryption):

Enable only secure communication:

**i** Setting Backbone key will enable encryption of routing telegrams. Key must consist of 32 hexadecimal characters. Reception of normal telegrams will still work. Tunneling and non-secure routing is disabled if only secure communication is enabled.

OK Cancel

#### 5.2.4.1. General tab

- *Mode* - KNX connection mode:
  - *TP-UART* - KNX/TP bus connection over a built-in TP-UART interface. KNX/IP communication is still possible with this mode when KNX IP features are enabled

- *IP Routing* - KNX/IP Routing multicast mode with unacknowledged data exchange
- *IP Tunneling* - KNX/IP Tunneling connection to an external router. Router IP address must be specified in this mode, router port can be added using IP:PORT format. This is a unicast mode with acknowledged data exchange
- *IP Tunneling (NAT mode)* - same as *IP Tunneling* but allows connecting to a router outside of the LM subnetwork.
- *ACK all group telegrams* - acknowledge reception of all group telegrams received via KNX/TP
- *KNX address* - physical KNX address of the device
- *KNX IP features* - enable KNX/IP Routing and Tunneling connections
- *Multicast IP* - multicast IP address for KNX/IP Routing
- *Multicast TTL* - Time-To-Live for multicast telegram (maximum number of hops)
- *Maximum telegrams in queue* - maximum number of telegrams that can be queued
- *TOS priority level (0 = no priority)* - Type-Of-Service priority for KNX/IP telegrams, requires a router/switch with TOS support
- *Backbone key (encryption)* - backbone key for secured telegrams for KNX/IP Routing
- *Enable only secure communication* - disables KNX/IP Tunneling and non-secure KNX/IP Routing, only encrypted KNX/IP Routing is supported in this mode

## 5.2.4.2. IP > Local filter

Filtering table for incoming telegrams from KNX/IP..

The screenshot shows the 'KNX connection' dialog box with the 'IP > Local filter' tab selected. The dialog has three tabs: 'General', 'IP > Local filter', and 'Local > IP filter'. The 'IP > Local filter' tab contains the following elements:

- 'Apply filter to tunneling' checkbox: unchecked.
- 'SRC policy' dropdown menu: set to 'No filter'.
- 'Ind. address list' text area: empty.
- Information icon (i) with text: 'One address/range per line. Use \* (e.g. 1.1.\*) to filter all addresses in the given line.'
- 'DST group policy' dropdown menu: set to 'No filter'.
- 'Group address list' text area: empty.
- Information icon (i) with text: 'One address/range per line. Use \* (e.g. 1/1/\*) to filter all addresses in the given line.' followed by a **Note:** 'by default Local > IP filter only applies to telegrams from TP connection, unless update telegrams are also filtered. Filtering lists are updated at once, changing policies requires restart.'
- 'OK' and 'Cancel' buttons at the bottom right.

- *Apply filter to tunneling* - whether to apply filter policy to telegrams in tunneling mode. If ETS is used it is recommended to turn this feature off
- *SRC policy* [*No filter* / *Accept selected individual addresses* / *Drop selected individual addresses*] - policy for source individual addresses
- *Ind. address list* - list of individual addresses. One address/range per line. Use \* (e.g. 1.1.\*) to filter all addresses in the given line
- *DST group policy* [*No filter* / *Accept selected group addresses* / *Drop selected group addresses*] - policy for destination group addresses
- *Group address list* - list of group addresses. One address/range per line. Use \* (e.g. 1/1/\*) to filter all addresses in the given line

It is also possible to set filtering per-object in *LogicMachine* - *Objects* tab:



LogicMachine													
Objects	Object logs	Scripting	Schedulers	Trend logs	Scenes	Vis. structure	Visualzation	Vis. graphics	Utilities	User access	Dali	Modbus	EnOcean
Object filter	Group address	Object name	IP > Loc filter	Loc > IP filter	Event script	Data type	Current value						
Name or group address:	1/1/1	my_object	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		01.001 switch	off						
	22/1/1	Light for people				01.001 switch	off						

### 5.2.4.2. Local > IP filter

Filtering table for outgoing telegrams to KNX/IP.

**KNX connection** ✕

General **IP > Local filter** Local > IP filter

Filter local update telegrams

SRC policy No filter

Ind. address list

One address/range per line. Use \* (e.g. 1.1.\*) to filter all addresses in the given line.

DST group policy No filter

Group address list

One address/range per line. Use \* (e.g. 1/1/\*) to filter all addresses in the given line.  
**Note:** by default Local > IP filter only applies to telegrams from TP connection, unless update telegrams are also filtered.  
 Filtering lists are updated at once, changing policies requires restart.

OK Cancel

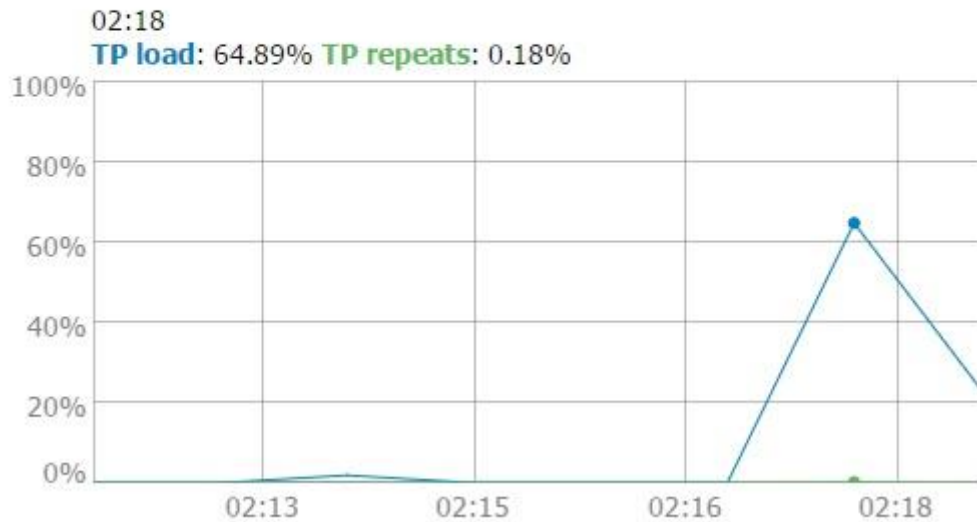
- *Filter local update telegrams* - whether to apply filter rules to update telegrams (called by grp.update() or when *Write to bus* is disabled)
- *SRC policy* [No filter / Accept selected individual addresses / Drop selected individual addresses] - policy for source individual addresses
- *Ind. address list* - list of individual addresses. One address/range per line. Use \* (e.g. 1.1.\*) to filter all addresses in the given line
- *DST group policy* [No filter / Accept selected group addresses / Drop selected group addresses] - policy for destination group addresses
- *Group address list* - list of group addresses. One address/range per line. Use \* (e.g. 1/1/\*) to filter all addresses in the given line



### 5.2.5. KNX statistics

Displays KNX/TP and KNX/IP statistics, including TP bus load, number of TP repeat telegrams and a number of sent and received KNX/TP and KNX/IP telegrams.

Period	TP load	TP repeats	TP RX/TX	IP RX/TX
Last minute	23.34%	0	86 / 124	124 / 74
Last hour	11.27%	1	325 / 486	486 / 280
Total	11.27%	1	325 / 486	486 / 280



## 5.2.6. BACnet server settings

Field	Value
Server enabled	<input type="checkbox"/>
Device ID	127001
Device name (optional)	
Password	mybacpwd
Object priority	16
Add group address to object name	<input type="checkbox"/>
Use comment as object description	<input type="checkbox"/>
Convert object units to BACnet units	<input type="checkbox"/>
Port	47808
BBMD IP	
BBMD port	
BBMD lease time (seconds)	

- *Server enabled* - whether the BACnet server is enabled
- *Device ID* - BACnet device ID
- *Password* - device password
- *Object priority* - priority array position for values that are written from any other source than BACnet
- *Add group address to object name* - append group address (X/Y/Z) to object names
- *Use comment as object description* - use object comment field value as BACnet object description
- *Convert object units to BACnet units* - whether to convert textual object units to BACnet units automatically
- *Port* - server port number
- *BBMD IP* - BACnet router IP. When a router IP and port are set, LogicMachine will act as a foreign device and will attempt to register with a BACnet router
- *BBMD port* - BACnet router port. When router IP and port are set, LogicMachine will act as a foreign device and will attempt to register with a BACnet router
- *BBMD lease time (seconds)* - registration resend interval

Only binary and numeric objects with *Export* enabled can be accessed via BACnet.

### 5.2.7. BACnet objects

Displays a list of exported BACnet objects. It is possible to download a CSV report containing all objects.

**BACnet objects** — ×

Device name: LogicMachine\_222 Download CSV

Device ID: 222

Object priority: 16

Port: 47808

Type	Instance	Device name	Current value
2 (AV)	6500	PassivPlus 1 (3.1.100)	29
2 (AV)	6501	PassivPlus 2 (3.1.101)	29

### 5.2.8. BACnet COV settings

Change Of Value (COV) delta can be set for each numeric object. The maximum number of COV subscriptions can be increased up to 4096.

**BACnet COV settings** ×

Maximum COV subscriptions

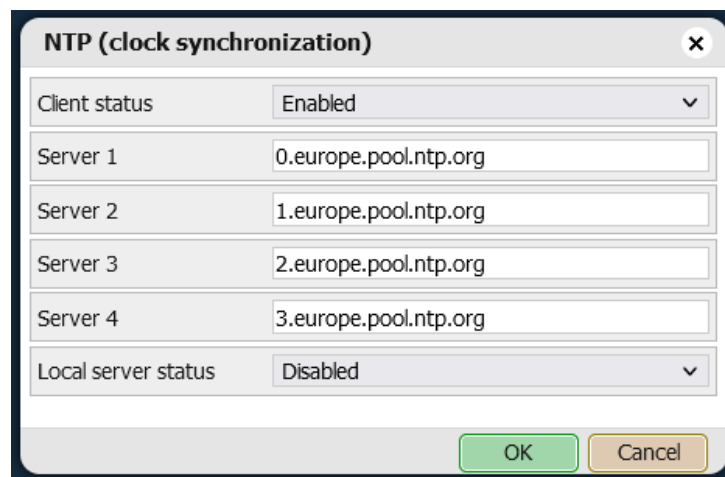
! Changing COV values will cause all active COV subscriptions to be cancelled, priority array values will be reset

Temperature

## 5.3. Services

### 5.3.1. NTP client/server

Network Time Protocol (NTP) service synchronizes LM date and time with external servers. Up to four NTP servers can be specified. LM can also act as an NTP server for other devices on the same network.

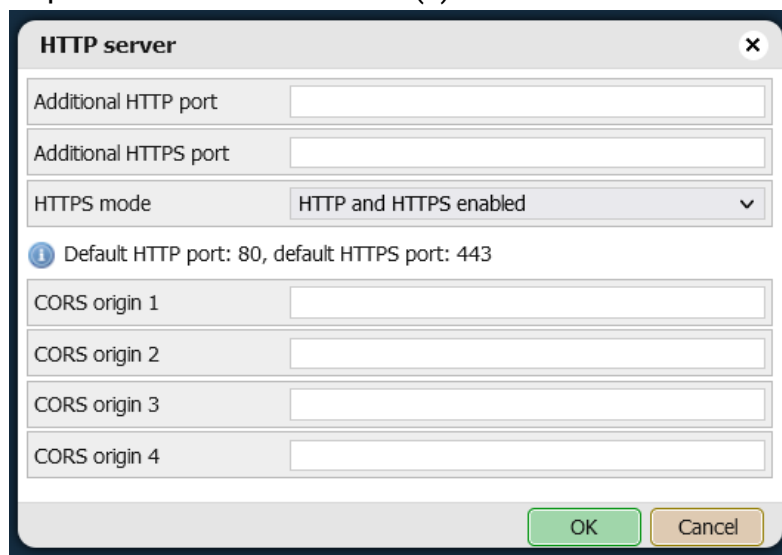


The screenshot shows a dialog box titled "NTP (clock synchronization)". It contains the following fields and controls:

- Client status:** A dropdown menu set to "Enabled".
- Server 1:** A text input field containing "0.europe.pool.ntp.org".
- Server 2:** A text input field containing "1.europe.pool.ntp.org".
- Server 3:** A text input field containing "2.europe.pool.ntp.org".
- Server 4:** A text input field containing "3.europe.pool.ntp.org".
- Local server status:** A dropdown menu set to "Disabled".
- Buttons:** "OK" and "Cancel" buttons at the bottom right.

### 5.3.2. HTTP server

Allows adding an additional HTTP and HTTPS port. Unsecure HTTP can be disabled. Up to four CORS client IP addresses can be provided to allow certain applications to make external requests to the LM via HTTP(s).



The screenshot shows a dialog box titled "HTTP server". It contains the following fields and controls:

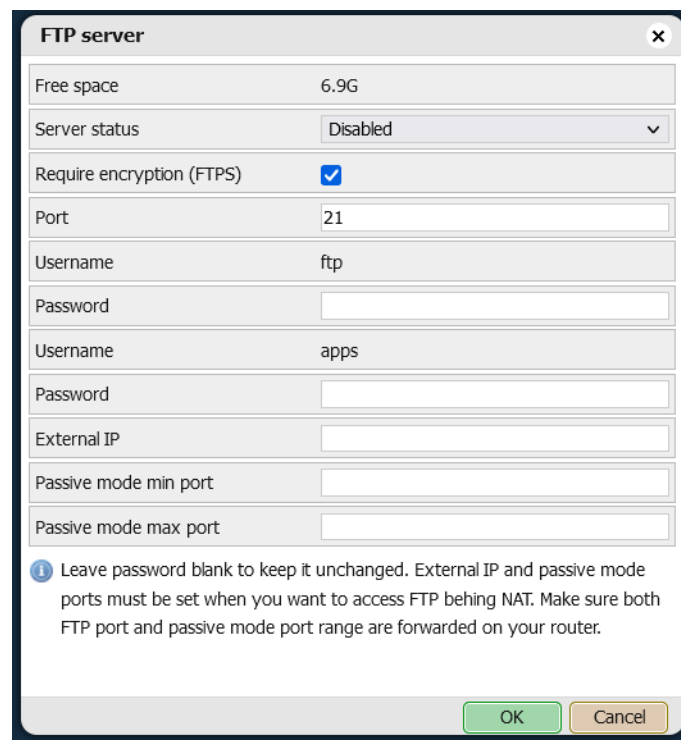
- Additional HTTP port:** An empty text input field.
- Additional HTTPS port:** An empty text input field.
- HTTPS mode:** A dropdown menu set to "HTTP and HTTPS enabled".
- Info:** A blue information icon followed by the text "Default HTTP port: 80, default HTTPS port: 443".
- CORS origin 1:** An empty text input field.
- CORS origin 2:** An empty text input field.
- CORS origin 3:** An empty text input field.
- CORS origin 4:** An empty text input field.
- Buttons:** "OK" and "Cancel" buttons at the bottom right.

### 5.3.3. HTTP SSL certificate

Allows setting a custom private key and certificate. It is also possible to generate a new self-signed key/certificate pair.

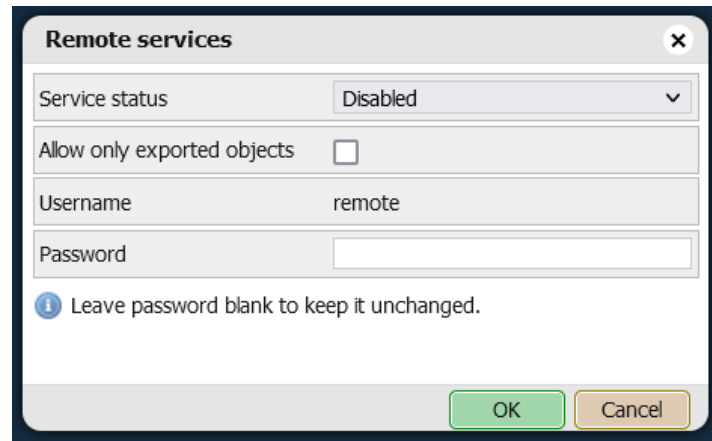


### 5.3.4. FTP server



- *Server status* - whether the FTP server is enabled
- *Require encryption (FTPS)* - whether to force FTP encryption
- *Port* - FTP server port
- *Password* - password for the *ftp* and *apps* users
- *Passive mode min port*, *Passive mode max port* - port range for external clients to use in passive mode

### 5.3.5. Remote services

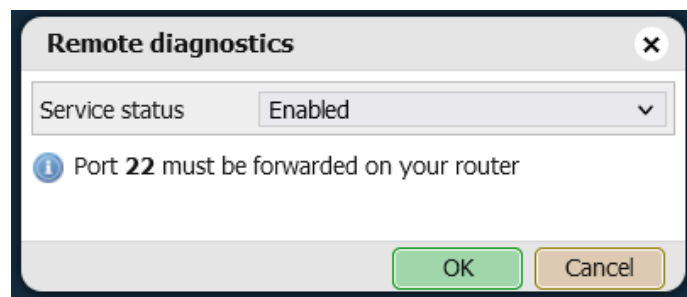


- *Service status* - whether the remote services are enabled
- *Allow only exported objects* - if enabled then only objects with *Export* mark can be access via remote services
- *Password* - password for the *remote* user

Request parameters and examples: [openrb.com/docs/remote-new.htm](https://openrb.com/docs/remote-new.htm)

### 5.3.6. Remote diagnostics

Should only be enabled for remote support provided by Embedded Systems.

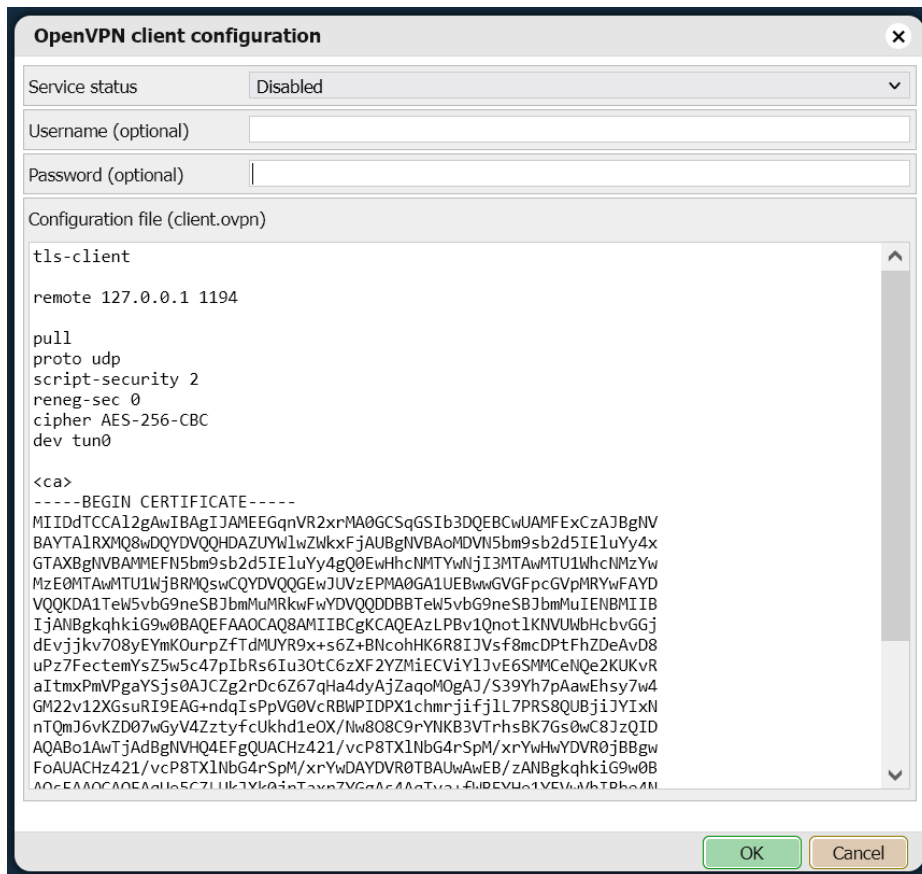


### 5.3.7. OpenVPN client

OpenVPN can be used for secure external access to your LogicMachine. An external OpenVPN server is required.

OpenVPN client example: [openrb.com/lm5-openvpn-tunnel-to-mikrotik-router/](https://openrb.com/lm5-openvpn-tunnel-to-mikrotik-router/)

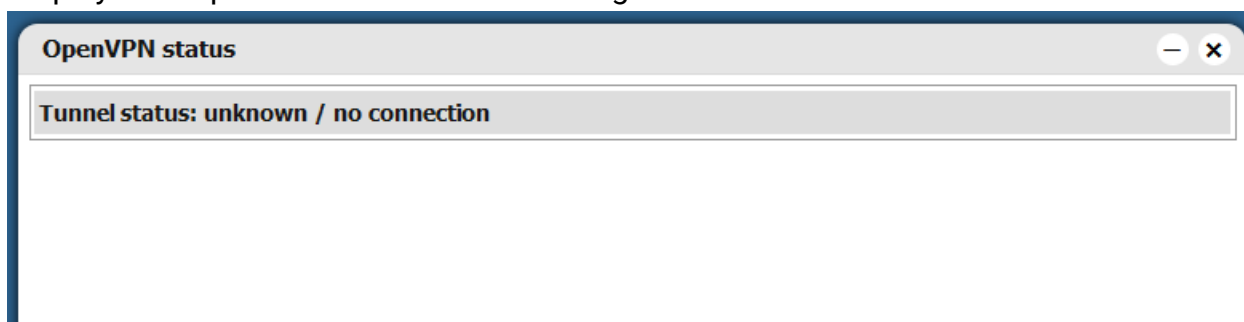




- *Service status* - whether OpenVPN client is enabled
- *Username / Password* - optional credentials
- *Configuration file* - contents of *client.ovpn* configuration file

### 5.3.8. OpenVPN status

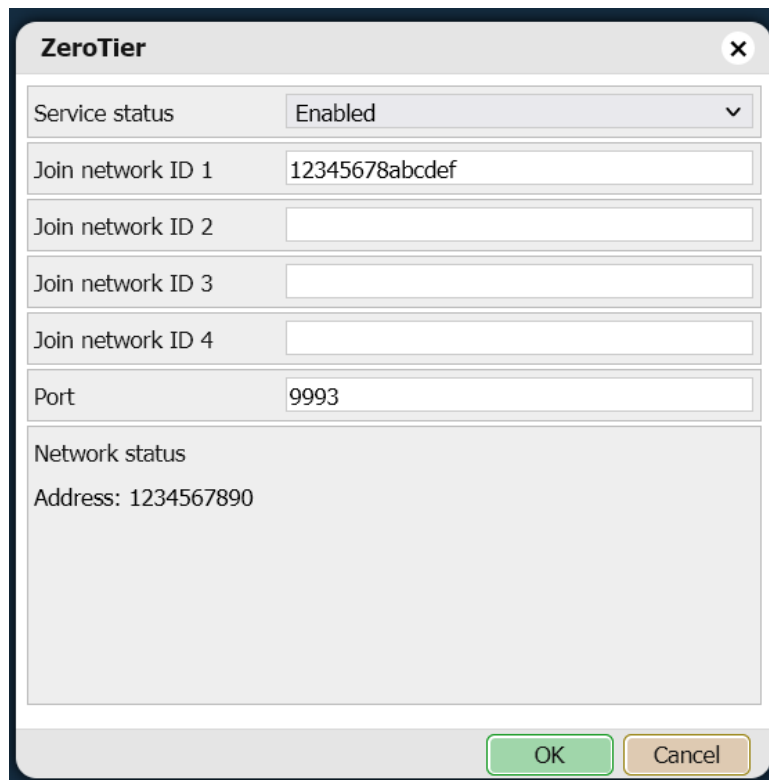
Displays the OpenVPN client connection logs.



### 5.3.9. ZeroTier

*ZeroTier* is a technology for secure external access to your LogicMachine.

ZeroTier set-up example: [openrb.com/zerotier-remote-maintenance-of-lm5/](https://openrb.com/zerotier-remote-maintenance-of-lm5/)



The image shows a dialog box titled "ZeroTier" with a close button (X) in the top right corner. The dialog contains the following fields and sections:

- Service status:** A dropdown menu currently set to "Enabled".
- Join network ID 1:** A text input field containing "12345678abcdef".
- Join network ID 2:** An empty text input field.
- Join network ID 3:** An empty text input field.
- Join network ID 4:** An empty text input field.
- Port:** A text input field containing "9993".
- Network status:** A section with the text "Address: 1234567890".

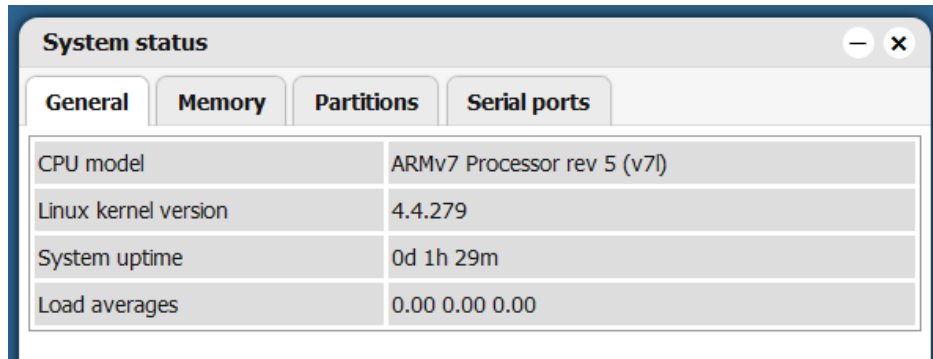
At the bottom of the dialog, there are two buttons: "OK" (green) and "Cancel" (orange).

- *Service status* - whether ZeroTier is enabled
- *Join network ID 1..4* - network IDs to join
- *Port* - UDP port to use
- *Network status* - LogicMachine ZeroTier address and a list of statuses for each configured network

## 5.4. Status

### 5.4.1. System status

Displays general system information including CPU usage, Memory, Partitions and Serial port list.

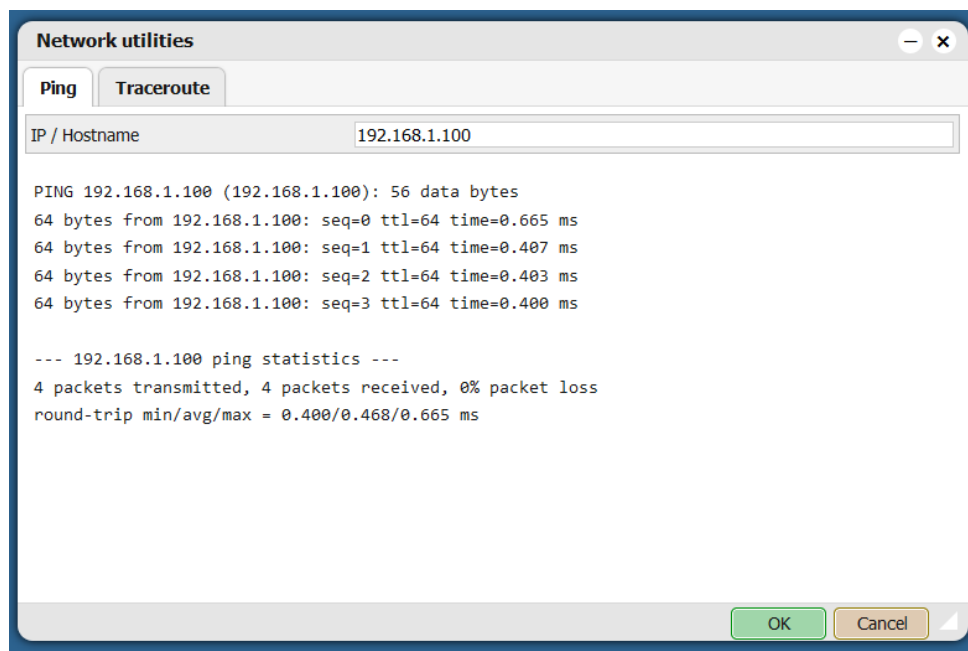


The screenshot shows a window titled "System status" with four tabs: "General", "Memory", "Partitions", and "Serial ports". The "General" tab is selected, displaying the following information:

CPU model	ARMv7 Processor rev 5 (v7l)
Linux kernel version	4.4.279
System uptime	0d 1h 29m
Load averages	0.00 0.00 0.00

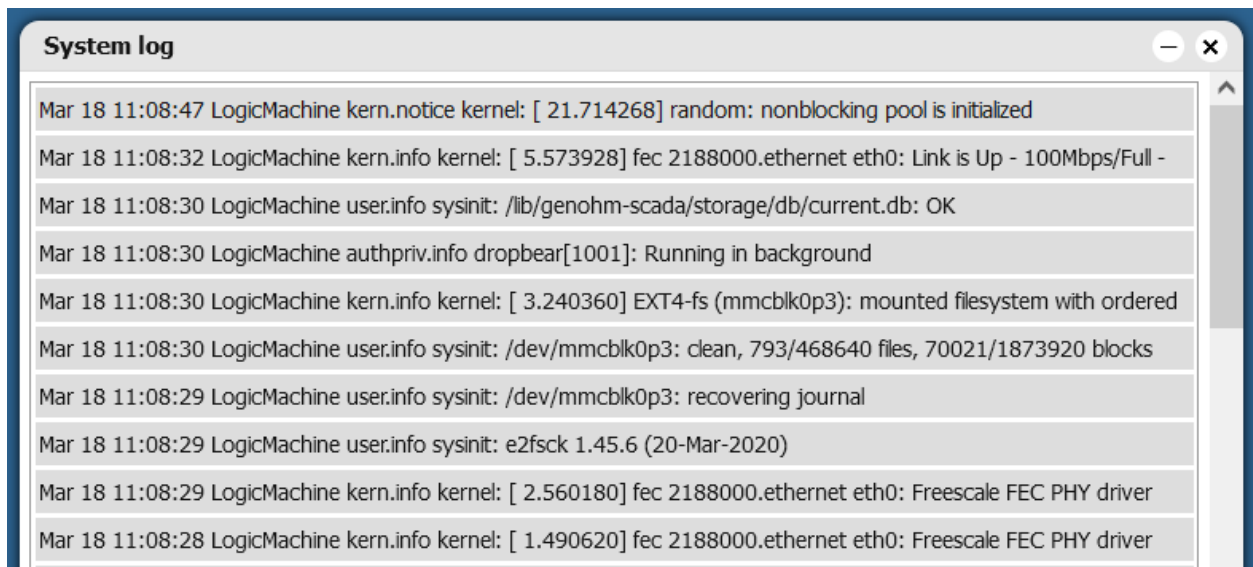
### 5.4.2. Network utilities

*Ping* and *Traceroute* utilities are available. Both IP addresses and DNS names are accepted.



### 5.4.3. System log

Displays the operating system log.



### 5.4.4. Running processes

Displays currently running system processes.

Stopping certain processes can make the system inoperable until a reboot is performed.



## **6. Other examples**

Various examples, 3<sup>rd</sup> party protocol integration and other useful applications can be found on our website and forums:

[openrb.com/all-examples](http://openrb.com/all-examples)

[forum.logicmachine.net](http://forum.logicmachine.net)