User Guide

for Wiser for KNX

LSS100100

01/2021

rev. 1

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Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

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Version	Description	Created
1.0	Initial release	1.8.2013
A	Version for firmware 1.2.0	8.4.2014
B	Version for firmware 1.2.1	15.5.2014
C	Version for firmware 1.3.0	13.4.2016
D	Version for firmware 1.3.1	6.8.2016
E	Version for firmware 1.5.0	14.4.2016
F	Version for firmware 1.5.1	22.7.2016
G	Version for firmware 2.0.0	1.5.2017
H	Version for firmware 2.1.0	7.9.2017
I	Version for firmware 2.3.0	27.7.2018
J	Template updated	28.11.2018
K	Version for firmware 2.4.0	23.07.2019
L	Version for firmware 2.5.0	30.06.2020
M	Version for firmware 2.6.0	21.1.2021

User Guide

This document describes features and the programming interface for the Wiser for KNX.

The software programming interface is embedded in the Wiser for KNX and requires a web browser. Pre-programming and configuration cannot be performed without a Wiser for KNX product.

Warnings

Read through the following instructions carefully and familiarise yourself with the device prior to installation, operation and maintenance.

The warnings listed below can be found throughout the documentation and indicate potential risks and dangers, or specific information that clarifies or simplifies a procedure.

Please note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

Safety Precautions

⚠ WARNING

HAZARD OF INCORRECT INFORMATION

- Do not incorrectly configure the software, as this can lead to incorrect reports and/or data results.
- Do not base your maintenance or service actions solely on messages and information displayed by the software.
- Do not rely solely on software messages and reports to determine if the system is functioning correctly or meeting all applicable standards and requirements.
- Consider the implications of unanticipated transmission delays or failures of communications links.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Attention - the information provided must be complied with, otherwise program or data errors may occur.

Note - You will find additional information here to make your work easier.

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information that is contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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1 Product Features

1.1 Connectivity

- IP LAN connection 10/100 Mbit
- USB 2.0 (for GMS modem, EnOcean…) 5V, 500 mA max.
- RS-232
- Modbus (RS-485)
- Wi-Fi through IP connection and wireless router
- KNX / EIB TP Bus

1.2 Security recommendation

- Network security must be set up at the appropriate level. Wiser for KNX should be part of a secure network with limited access. In case of connection to the Internet network is strictly recommended to use VPN or HTTPS channel.
- Use secure protocol access HTTPS://IP:Port
- Security method is determined by the ability of other network elements (firewall, protection against viruses and malware threats).
- It is strictly recommended to store the files containing your backups in a safe place without access of unauthorized persons.
- In case you find a cyber security incidents or vulnerabilities, please contact us through this page: http://www2.schneider-electric.com/sites/corporate/en/support/cybersecurity/contact-form.page

1.3 Passwords recommendation

- At least 8 characters recommended —the more characters, the better
- A mixture of both uppercase and lowercase letters
- A mixture of letters and numbers
- Inclusion of at least one special character e.g.! @ # ?] (do not use < or > in your password, as both can cause problems in Web browsers)

A strong password is hard to guess, but it should be easy for you to remember—a password that has to be written down is not strong, no matter how many of the above characteristics are employed.

1.4 Maintenance

In case of problems or questions regarding operation of Wiser for KNX, please contact your supplier or contact the Schneider Electric helpdesk in your country.

Please be aware of higher security risk in case of remote access to your local network.

1.5 Patch Management

- See chapter **"6.6 Install updates"** to install patches and firmware Add-ons.
- Every upgrade must be manually performed. Please backup before an upgrade. See chapter **"6.7 Backup"** for backup procedure.

1.6 Factory Reset

See chapter **"6.3 Reset / clean-up"** for description how to reset the device.

1.7 Firmware upgrade

See chapter **"1.7 Firmware upgrade"** for description how to upgrade firmware of Wiser for KNX.

1.8 Differences between spaceLYnk and Wiser for KNX

Feature	Wiser for KNX 2.6	spaceLYnk 2.6
Modbus GUI	Up to 10 Modbus devices	Up to Modbus addressable range ≥ 31 by default
BACnet Server	Up to 150 exported objects	*No limit (≤ 2000 recommended)
User Administration	Up to 8 users	No limit (≤ 20 recommended)
One click adding to the filter table	N/A	Fully supported

Table 1: Differences between devices.

*Note: Performance testing has been performed on HW3.0 when object value change interval has been set 60s. Recommended limit for HW1.x remains 500 objects.

One click object filtering (spaceLYnk only)

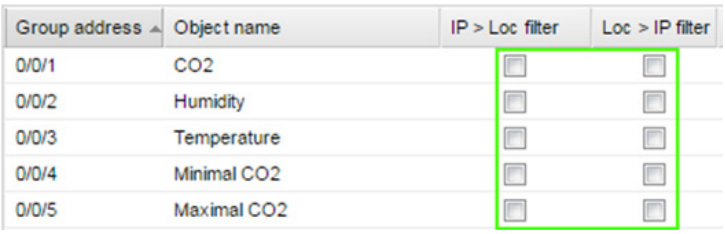


Figure 1: Object filtering.

2 New features

Full list of new features with description is available in changelog.

New features included in FW release 2.6.0.

- KNX IP secure compatibility (page 40)
- Modbus status object (page 89)
- BACnet configuration – BACnet device name (page 113)

3 Getting started

Follow the steps listed to help you get started with Wiser for KNX.

1. Mount the device on DIN rail.

2. Connect the bus cables (KNX, Modbus, and/or RS232) and/or flash drive.

3. Connect 24V power supply to the device (Positive conductor to the red clamp, negative conductor to the blue clamp).

4. Recommended accessory - Power supply REG/24V DC/0,4A, article No.: **MTN693003**

5. Connect Ethernet cable from the PC.

6. Default IP address of the Wiser for KNX device is **192.168.0.10**. Change the IP address of the computer to the same range e.g. **192.168.0.9**; mask **255.255.255.0**.

7. Run Google Chrome or Mozilla Firefox (for OS Windows), Safari (for OS X) and go to **192.168.0.10**.

Internet Explorer is not supported.

8. Default login properties of the Wiser for KNX device are:

User name: **admin**

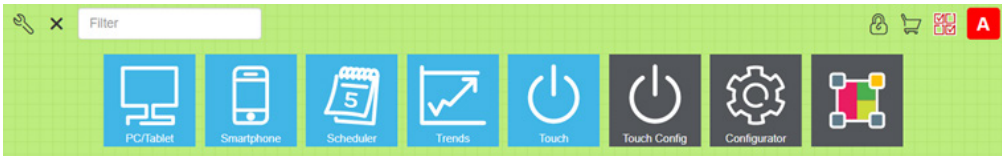
Password: **admin**

You will be prompted to change password see chapter **“2.4 Default Configuration”** for details.

After first login please change your login credentials!!!

3.1 Start page

Start page is providing a dashboard-like view, pointing to the key areas of Wiser for KNX. The following options are located on the start page. Blue icons are leading to the User function, grey icons to the Configurators.



Set User name and Password will be prompted in first login or after factory reset.

Default User name to log as an Admin: **admin**

Default password to log as an Admin is: **admin**

In default there is only Admin account. Users must be created first. See chapter **"18 User access"** for details.

PC/Tablet Visualization – This icon navigates to the rich visualization with plans containing individual objects. It is ideal for PCs, iPads and Android tablets (preferably 10" or bigger display size).

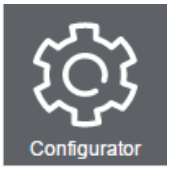
Smartphone Visualization – This icon navigates to the simple list visualization designed for iPhone/iPod/iPad/Android smartphones/ Android tablets (7" or smaller display size). All objects which are added in Wiser for KNX Visualization are visible in this Smartphone visualization (if there is no **Hide in Smartphone** option enabled). Different icons may be set for Smartphone Visualization.

Scheduler – This icon navigates to a user friendly interface for the end-user to manage scheduler tasks for example, to specify thermostat values depending on the day of the week, time and holidays.

Trends – This icon navigates to a user friendly display of Trend logs with the ability to compare values over time. It can display trends for up to 10 years.

Touch – This icon navigates into the visualization created in Touch Config environment.

Touch Config – This icon navigates to the premade widgets visualization creator. Access is restricted to administrators.



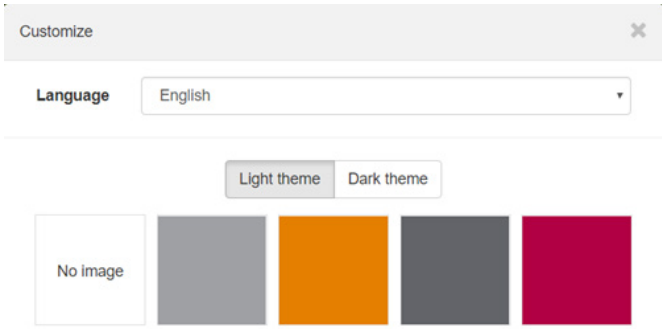
Configurator – This icon navigates to programming, settings and configuration interface. Access is restricted to administrators.

Configurator use is not recommended in mobile devices.

Function blocks editor – This icon navigates to Function blocks editor which is graphics, easy to use alternative to LUA scripting.

3.2 Start page configuration

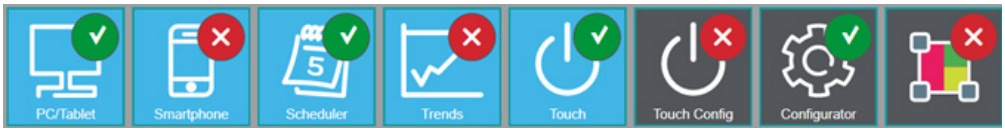
Configuration – This icon navigates to the configurator page. Click to unlock menu for editing. Menu will become orange

Allow users to show/hide apps – allow users to modify visibility of icons on main screen (only available when in admin mode) **Change admin password** - (only available when in admin mode) **Language** – selecting language of the user interface **Light theme / Dark theme** – selecting between normal and inverse colours of the user interface background will be changed to the selected colour /pattern	

Search – will filter menu Apps containing typed letters.

Lock / Unlock – Locking / unlocking grid for sorting order of icons in menu.

Show / hide Apps -locked / unlocked – Allow to show / hide apps on Main screen (only in Admin mode or Use view or when permitted by Admin).



Edit User view – this icon will navigate to the sub-menu allowing to edit User view (Admin mode only).

Save view- save Default view of User home page view.

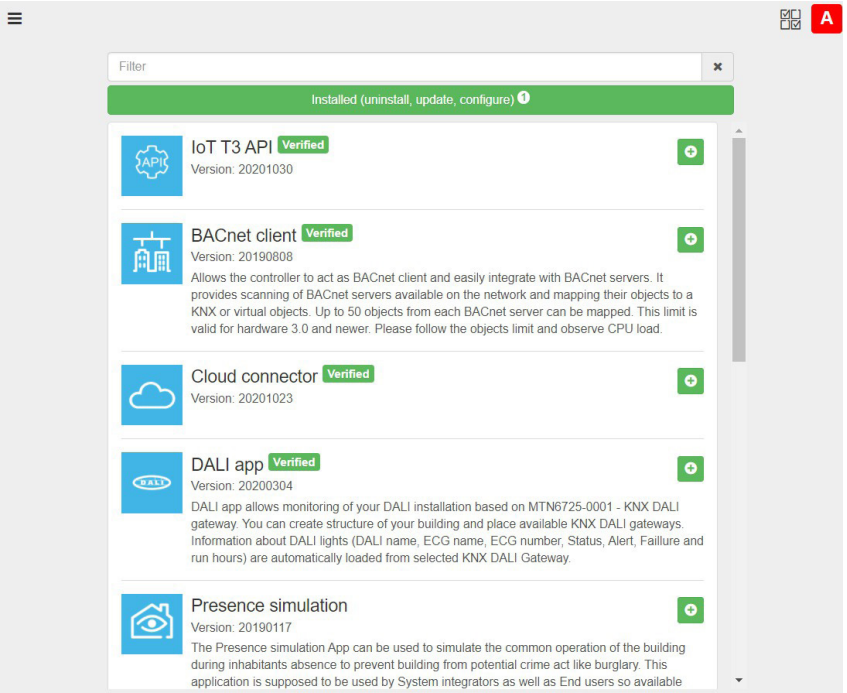
Login (only for Wiser for KNX after firmware upgrade already containing project)

Wiser for KNX is in Admin mode. Click will log off.

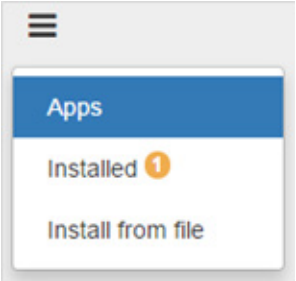
Wiser for KNX is in User mode. Click will log off.

3.3 Marketplace

Marketplace – this icon navigates to the Marketplace page. Available only in admin mode. In case of missing connection to the Internet, only installed Applications are visible without update possibility.



Icon on the left side will open following sub-menu:

Applications – will show all available Applications. **Installed** – will show all installed Applications (yellow number indicate number of installed Applications). **Install from file** – will install Application directly from file.	

Search bar – will filter Apps containing typed letters.

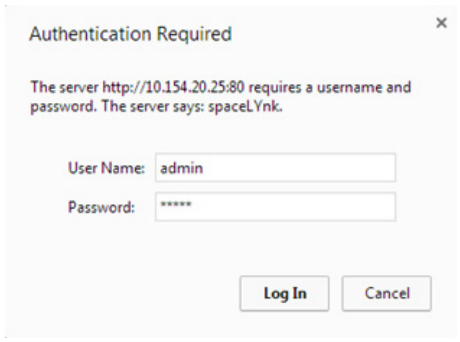
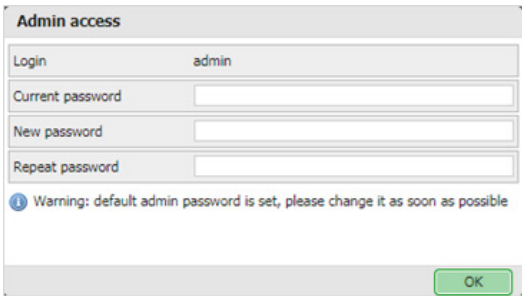
This icon will install selected App.

This icon will update selected App.

This icon will uninstall selected App.

Verified This icon marking Applications verified by Schneider Electric. Applications which are not verified are not supported by Schneider Electric and are used on your own risk

3.4 Default Configuration

	Login	Password
	admin	**admin**
When default password was not changed, you will be prompted to enter Admin access password, if you have brand new spaceLYnk or after firmware upgrade. **Password complexity requirement:** • Length of password is 8-20 characters. • Must contains uppercase letters of European languages (A through Z, with diacritic marks, Greek and Cyrillic characters) • Must contains lowercase letters of European languages (a through z, sharp-s, with diacritic marks, Greek and Cyrillic characters) • Must contains at least one of the base 10 digits (0 through 9)		
IP address on LAN	**192.168.0.10**	
Networks mask on LAN	**255.255.255.0**	

3.5 Change IP settings

Configurator → **Utilities** → **System** → **Network** → **Interfaces** window, click on the specific interface to change the IP settings.

Protocol – Specific protocol used for addressing:

Static IP – Static IP address (default 192.168.0.10).

DHCP – DHCP protocol used to fetch IP configuration. IP address as received from the DHCP server. This field appears only if the IP address is assigned.

Network mask – Network mask (default **255.255.255.0 (/24)**).

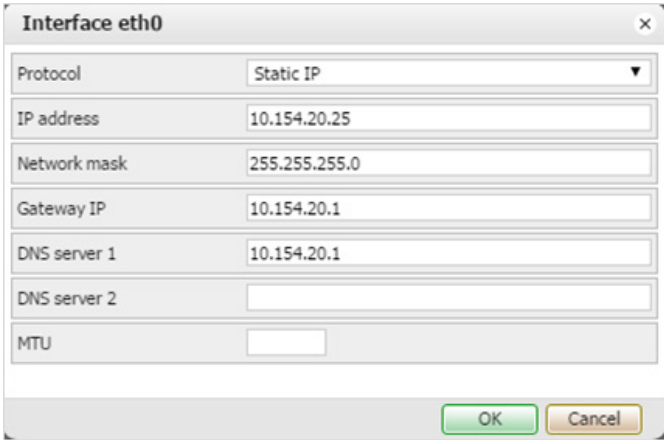
Gateway IP – Gateway IP address.

DNS server 1 – Primary DNS server IP address.

DNS server 2 – Secondary DNS server IP address.

MTU – Maximum Transmission Unit, the largest size of the packet which is passed in the communication protocol (150 by default).

When changes are made, the Apply changes icon appears in the top-right corner. This should be applied for changes to take effect. Wiser for KNX will automatically reboot after changes are applied.



3.6 Discover your Wiser for KNX in IP network

Windows PC

Option 1:

Use the utility Service Browser which can be downloaded here:

http://marknelson.us/attachments/2011/bonjour-windows/ServiceBrowserExe.zip

Apple bonjour is required (it is part of iTunes):

http://support.apple.com/kb/DL999

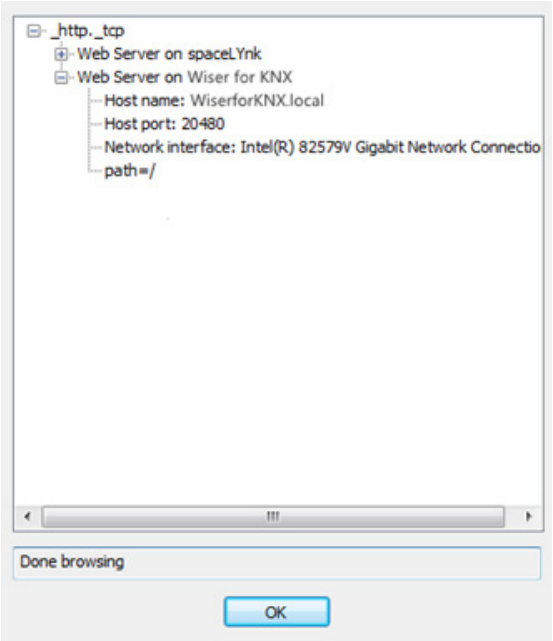
Option 2:

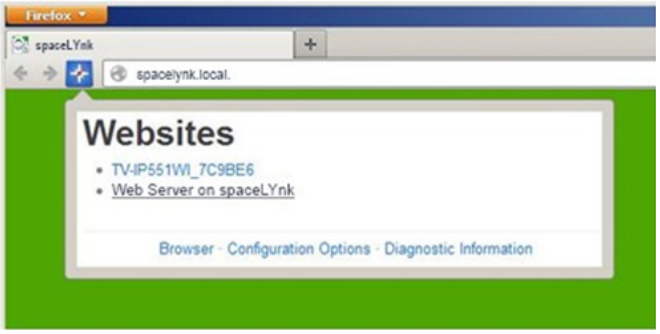
If host is not changed and only **one** Wiser for KNX is on the network, type in browser:

http://Wiser for KNX.local - Firefox

http://Wiser for KNX.local - Chrome

Installed Bonjour service needed.





Linux PC

The utility called **Avahi**, can be downloaded here:

www.avahi.org

Android

The freely available app called **ZeroConf Browser**, can be downloaded in Google Play.

iOS/Mac OS

The freely available app called **Discovery bonjour browser** can be downloaded from the App Store.

For iPad install the iPhone/iPod version of the utility.

4 Import KNX project from ETS

ETS3

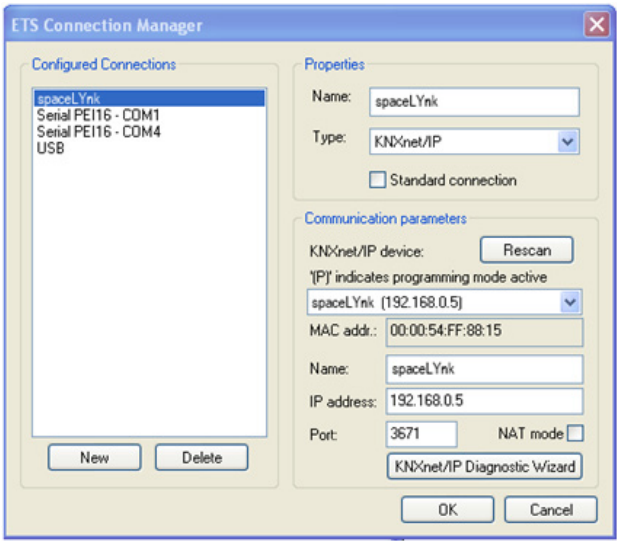
In order to use Wiser for KNX with KNX TP UART/IP functionality and to program with the other KNX bus devices, Wiser for KNX must be added into the **ETS Connection Manager**. ETS programming through Wiser for KNX is available only when KNX IP features are enabled.

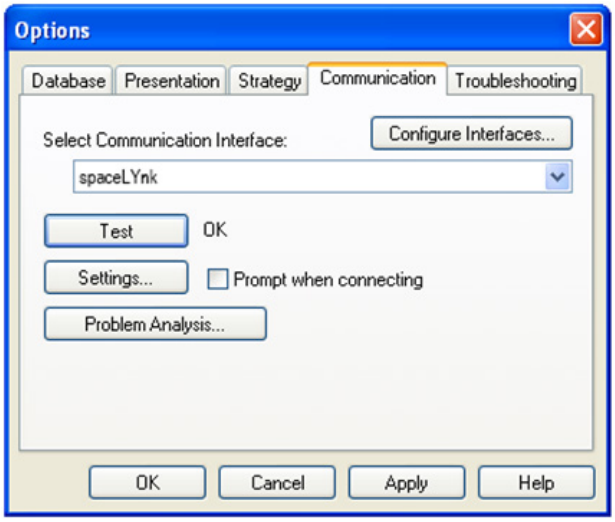
Function **Bus monitor** is not included in the Wiser for KNX.

Extras → Options → Communication → Configure interfaces

Enter any Name for the connection.

1. Choose Type, and select **KNXnet/IP** from the drop-down menu.
2. Press **Rescan**, and then select Wiser for KNX from the drop-down.
3. Press **OK**.
4. In the **Options → Communication** window, select the newly created interface as **Communication Interface** from the drop-down.
5. To test the communication with ETS, press **Test**.
6. Make sure that the bus status is Online – press button in ETS.





ETS4

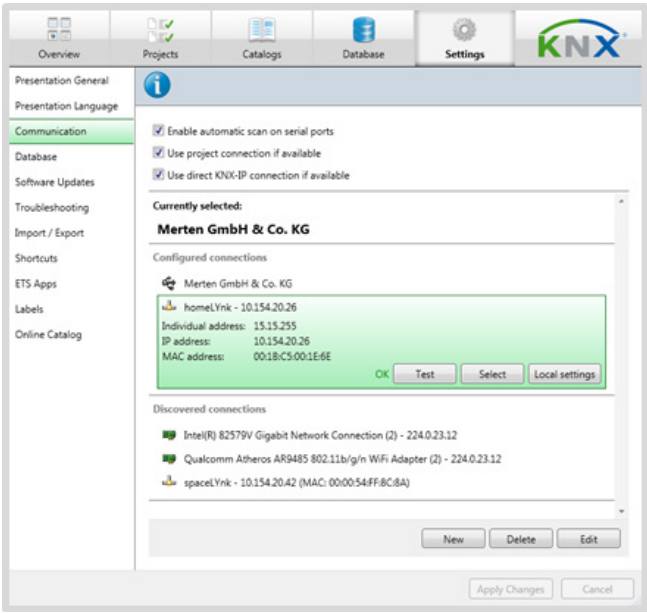
In order to use Wiser for KNX with KNX TP UART/IP functionality and to program with the other KNX bus devices, Wiser for KNX must be added into the **ETS Connection Manager**. ETS programming through Wiser for KNX is available only when KNX IP features are enabled.

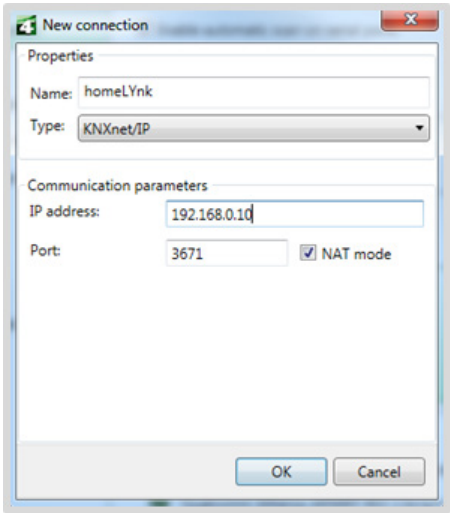
Function **Bus monitor** is not included in the Wiser for KNX.

Settings → Communication

Newly added Wiser for KNX will be discovered automatically if it is connected in the same network as the PC running ETS4 software.

1. Choose **Select** to move it to the **Configured connections**.
2. Wiser for KNX KNX individual address and mask can be set by pressing **Local settings**.
3. Select **Use project connection if available** check box to make it a default project connection.
4. Select **Use direct KNX-IP connection if available** option for direct communication in IP network.
5. Press **New** to add Wiser for KNX manually.
6. Enter any **Name** for the device.
7. Set IP address, Port, and NAT mode (if needed).
8. Press **OK** to save changes.
9. To test the communication with ETS, press **Test**.
10. Press **Apply changes** for changes to take effect.





ETS5

In order to use Wiser for KNX with KNX TP UART/IP functionality and to program with the other KNX bus devices, the device should be added into the ETS Connection Manager. ETS programming through Wiser for KNX is available only when KNX IP features are enabled.

Function Bus monitor is not included by Wiser for KNX.

Bus → Connections → Interfaces

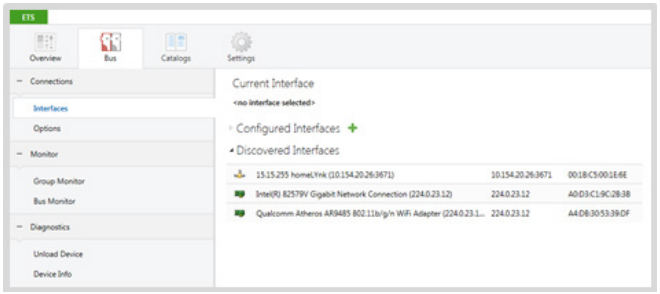
If your Wiser for KNX is in the same network with computer running ETS5, it is possible to discover the Wiser for KNX interface automatically. If your Wiser for KNX is discovered, choose the interface by double-click on item in **Discovered Interfaces** list.

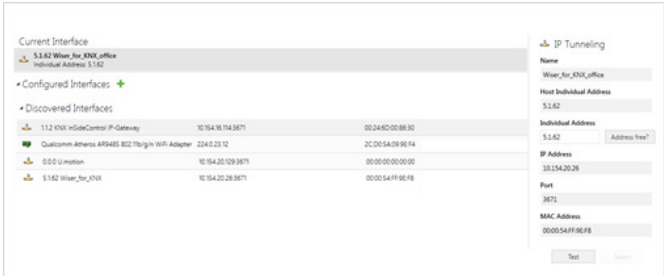
If your interface is not discovered, follow steps below:

1. Click green **+** icon next to the **Configured Interfaces**.
2. Select **IP Tunnelling**.
3. Click **New Connection (0.0.0.0:3671)**, which is created in **Configured Interfaces**.
4. In the setting tab on right-hand side set **Name** of your connection, **Server** (IP address of Wiser for KNX) and **Port**.
5. Select the interface, which you have configured in previous step.
6. To test the communication with ETS, press **Test** in lower-right corner.

If test is OK, select the interface as active by double click on item in list of **Configured Interfaces**.

7. **Current Interface** is set.





4.1 KNX specific configuration

See **Configurator → Utilities → System → Network → KNX connection** for details.

When changes are done this icon appears in the top-right corner. Apply changes

This must be applied for changes to take effect. Wiser for KNX will automatically reboot after these changes are applied.

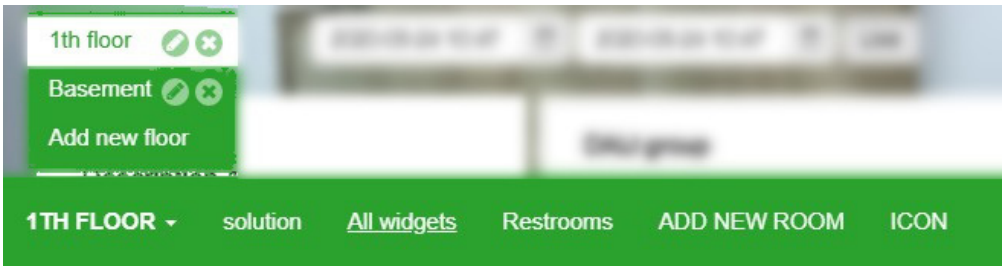
5 Touch 3 visualization

Easy, fast and neat looking visualisation in fraction of time comparing with visualization as described in chapter **Visualization**. As its name says it is perfect for touch screen devices. Pre-made widgets covering all basic automation needs.

5.1 Touch config

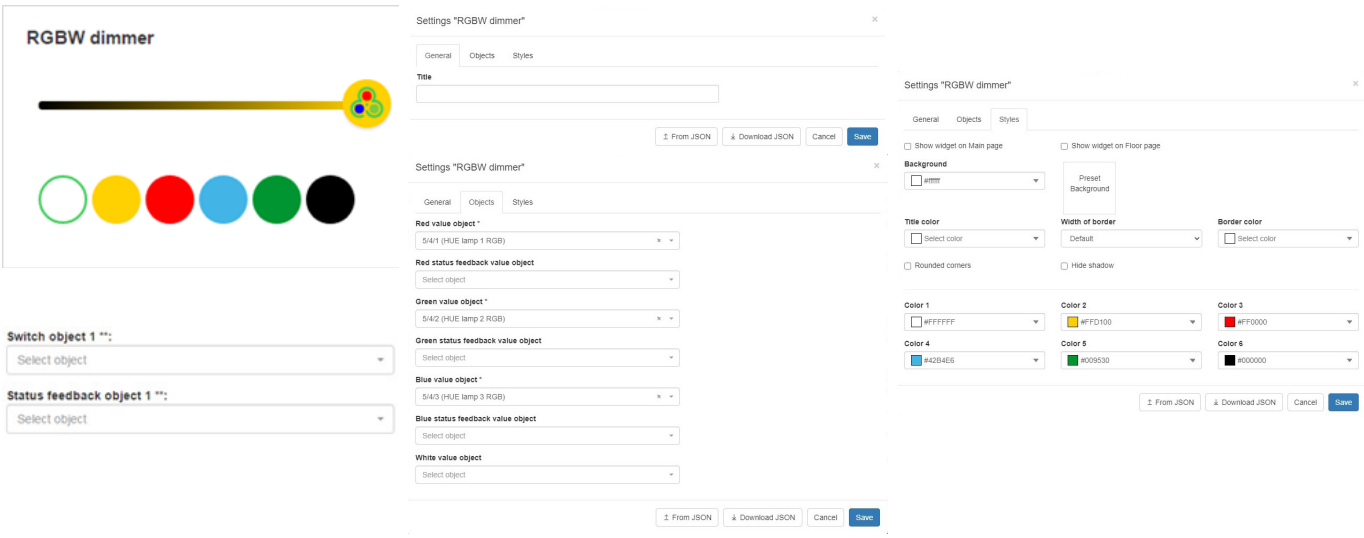
Visualization structure can contain multiple floors. Floors can contain multiple rooms.

Rooms then can be filled with pre-made widgets or with the Widgets created in the Widget creator. Actual position in structure is displayed in the bottom middle.



5.2 Adding widgets

Widgets can be added to the rooms by pressing ADD NEW WIDGET icon located at the left bottom of the page. Custom Widget title and styles can be set for each widget.All mandatory objects must be linked in order to show the widget in the visualization.

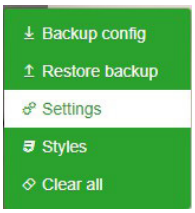


*** symbol** – mandatory object

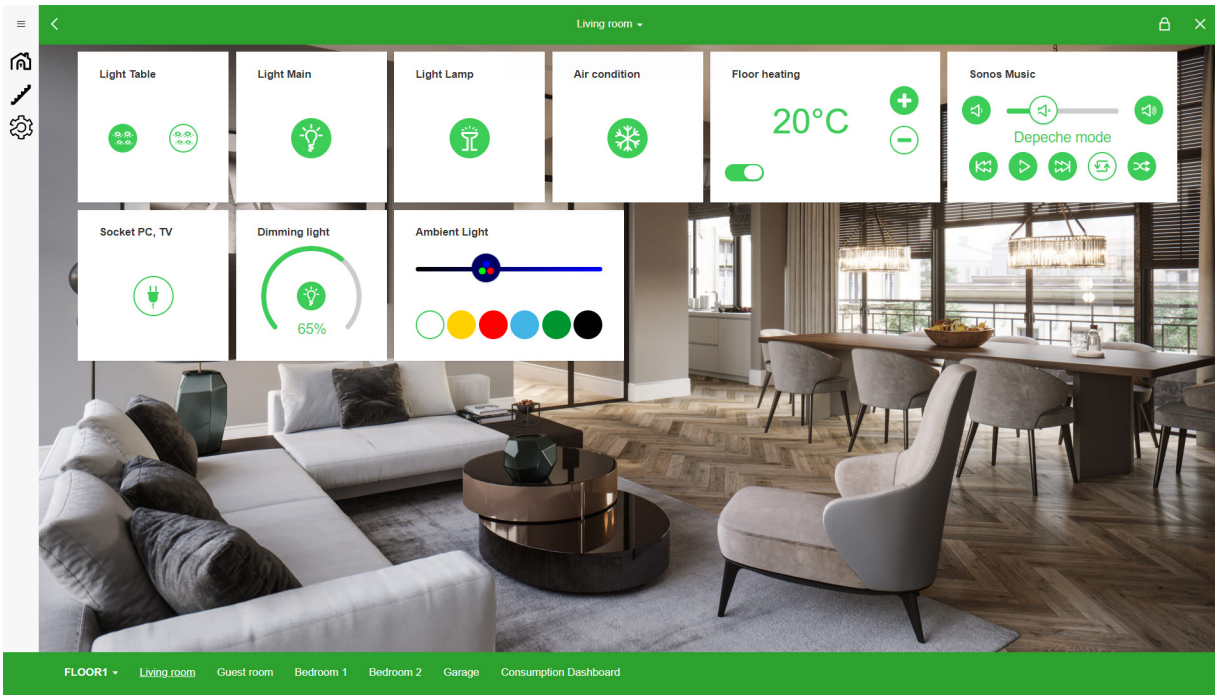
**** symbol** – one of mandatory objects

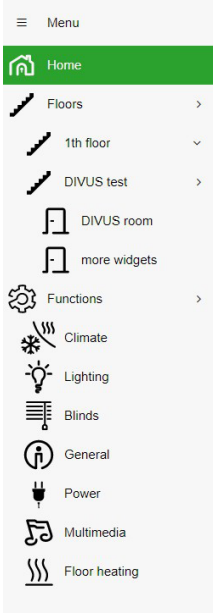
When object contain Alert field it will generate Alert when field is filled and alarm condition is met.

5.3 Tools

Backup config – Touch visualization backup. **Restore** – Touch visualization restore. **Settings** – General setting of the Touch **Styles** – General styles of visualization and widgets **Clear all** – Clear all settings for rooms, widgets and styles	

5.4 Touch application

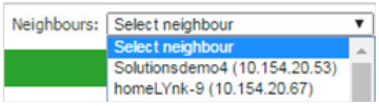


Menu – can be locked by pressing on ≡ (icon will turn vertically |||). **Floors** – will show list of floors and rooms **Functions** – showing groups of widgets according their function.	

6 Configurator's Main Page

Configurator's main page - top bar:

Neighbours - Switch to next Wiser for KNX in the same network. This selection appears only if any other Wiser for KNXs or Wiser for KNXs are discovered.



Language - Switch language of the GUI to English, Bulgarian, Chinese, Czech, Danish, Dutch, French, German, Greek, Italian, Portuguese, Russian, Spanish, Turkish, Hungarian, Polish or Swedish.

Start page - Link to the Start page.

Logout – for secure logout.

Configurator's main page - bottom bar:

Version: 2.6.0 - This is the actual firmware version of the Wiser for KNX.

CPU/IO: 0.43 0.60 0.69, Memory 14% - Load average numbers **0.43 0.60 0.69** represent averages over progressively longer periods of time (one, five and fifteen-minute average). The lower number the better. If value 0.7 is overreached, color of CPU/IO values is change to red.

Bridge traffic analogy to processes:

	≈ Load of 0.50
	≈ Load of 1.00
	≈ Load of 1.70

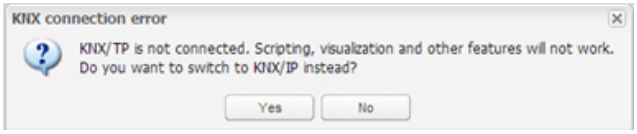
Inspect your running tasks if the load exceeds the level **0.70!**

LED1 and LED2 may be also used for approximate load estimate. See **Operating instructions** for details.

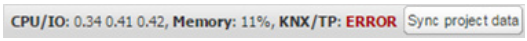
Memory $= \frac{Used\ memory - Buffered - Cached}{Total\ system\ memory}$ (minimum occupied memory in %).

See **System / Status / System status / Memory usage** for details. Beware of Linux terminology. Linux calls cached and buffered memory "used" even if it could be understood as "*free*" for new applications.

KNX/IP: Each time the Configurator is opened, the Wiser for KNX checks if the KNX bus is connected. If not connected, then an error message appears stating that: Scripting, visualization and other features will not work. Do you want to switch to KNX/IP instead?



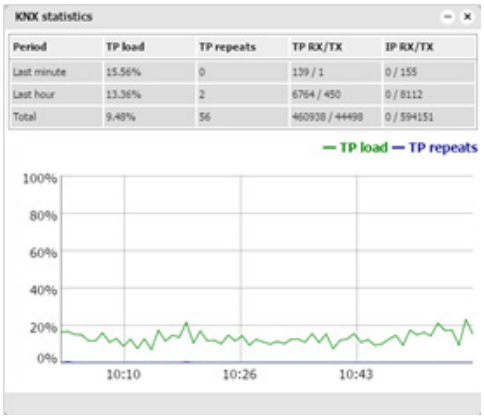
Selected connection and its status are visible in the right bottom corner:



KNX/TP error message indicate Wiser for KNX has no connection to the bus.

KNX interface has to be changed back to TP-UART once KNX bus is connected under **System** → **Network** → **KNX connection** → **Mode**. KNX interface change must be confirmed by rebooting Wiser for KNX (manually or pressing the button):

KNX statistics: This graph shows load on KNX BUS. Click on graph picture will open detailed KNX statistics.



Sync project data: This button is useful after some bigger change in the project. When pressed, project will be immediately saved to the microSD card.

Automatic synchronization is performed every 15 minutes only and all unsaved changes and data may be lost.

7 Utilities

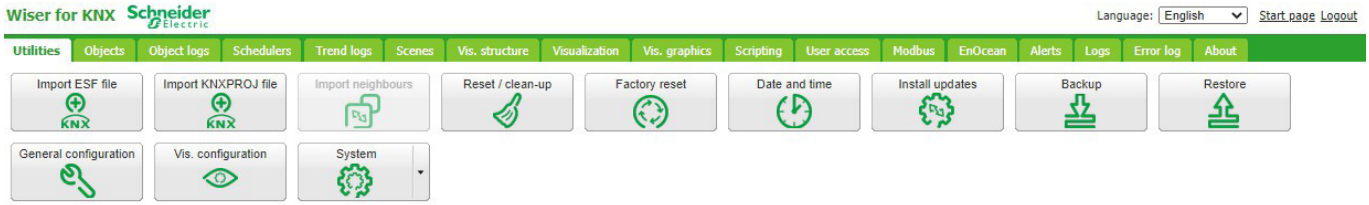
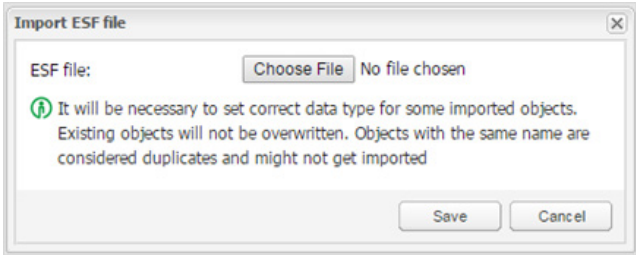


Figure 2: Utilities tab screenshot. Icons will move when window is resized.

7.1 Import ESF file

Imports the *.esf object file. It is essential to set correct data types for imported objects. Existing objects will not be overwritten. Objects with the same name are considered duplicates and might not be imported and marked as discarded. List of imported and discarded object is displayed after each import. Comment “ETS import” will be displayed in Object comments for each ETS imported object.

See chapter **”3 Import KNX project from ETS”** for details.

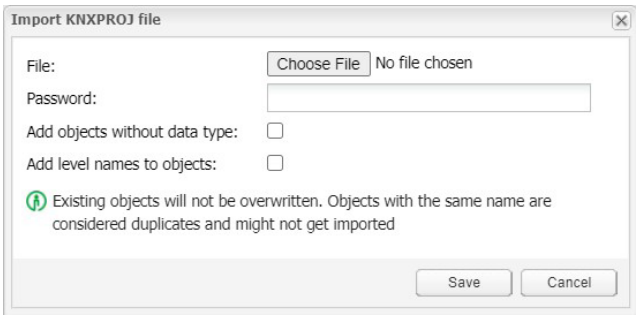


7.2 Import KNXPROJ file

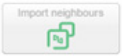
Imports the *.KNXPROJ file directly to the controller. Preserve structure of the project and DPTs of the group addresses including automatic units and suffixes.

Objects with the same name are considered duplicates and might not be imported and marked as discarded. Import allow add objects without data types defined and adding structure level names to objects.

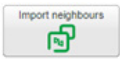
Password protected *.knxproj files requests password set in ETS. Without knowing correct password import process is not possible.



7.3 Import neighbours



Single Wiser for KNX in the IP network



Multiple spaceLYnks / Wiser for KNXs

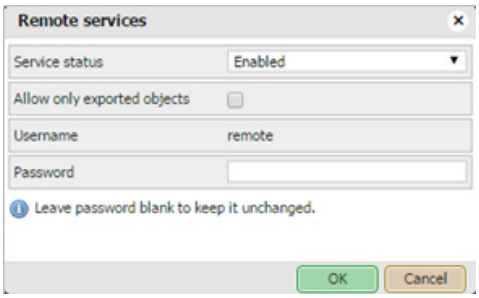
Remote services must be enabled on both devices for object sharing.

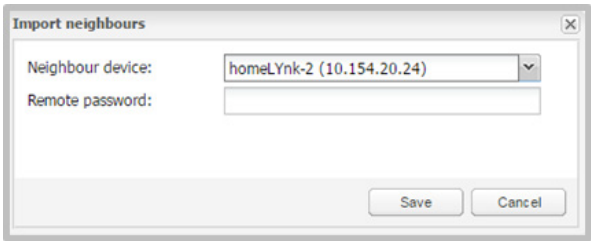
It allows importing the objects marked for export from another sL/hL. System will ask for **Remote password** of the second device from which data will be exported.

For remote access change the IP and password according to your sL/hL settings i.e.:

https://remote:remote@192.168.0.10/scada-remote?m=rss&r=alerts

Export option must be activated for **Objects** to be shared between sL/W4KNX. Enabling will make those objects visible via BACnet and remote services (XML/JSON).

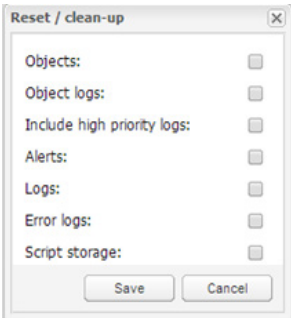




7.4 Reset / clean-up

Delete selected items from the Wiser for KNX. If you select **Objects**, they will be deleted from the visualization part as well.

Backup all important data before proceeding with Reset /clean-up.



7.5 Factory reset

Delete all configurations and reset to the factory default settings. System settings will stay unchanged.

To perform HW factory reset, long press on the RESET button located on the front side of the spaceLYnk device (10 seconds press, release and press again for 10 seconds).

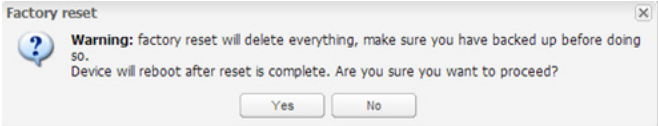
IP address after HW factory reset with HW button is always 192.168.0.10.

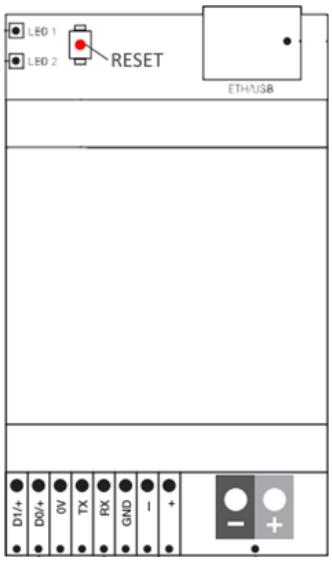
When factory reset is performed by SW button in the main menu:

- IP address will stay unchanged
- Visualization, Apps, graphic and all data will be erased.
- Device name will be reset to default (Wiser for KNX).
- KNX settings will be reset to default
- FTP and Nginx certificate will be deleted. FTP password will be set to empty.
- Lua scripts including planned and init commission will be deleted.

For default IP address 192.168.0.10 with preserved project press HW reset button for 10s. This feature is helpful in case of forgotten or incorrectly set IP address.

Factory reset with hardware button is meant especially for situations where Wiser for KNX is not accessible due to wrong settings.

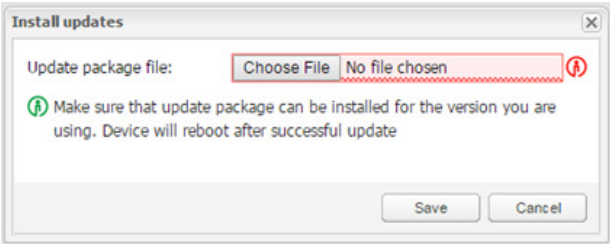




7.6 Install updates

For partial updates/patches or adding of pre-fabricated solutions.

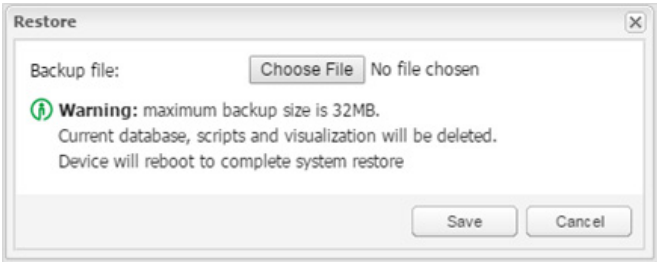
Install Wiser for KNX update file *.lmup. Wiser for KNX will reboot after the successful update.



7.7 Restore

Restores configuration from backup. Maximal backup size is 32 MB. Bigger project will not be restored.

If LED 1 is flashing red/green during restore data are re-calculated. Do not switch off Wiser for KNX until it is finished.



7.8 Date and time

Network time protocol (NTP) is implemented. Along with the internet connection, Wiser for KNX will automatically update time from servers defined in **Utilities/System/Services/NTP client:**

0.schneider.pool.ntp.org

1.schneider.pool.ntp.org

2.schneider.pool.ntp.org

3.schneider.pool.ntp.org

It is important to select correct time zone.

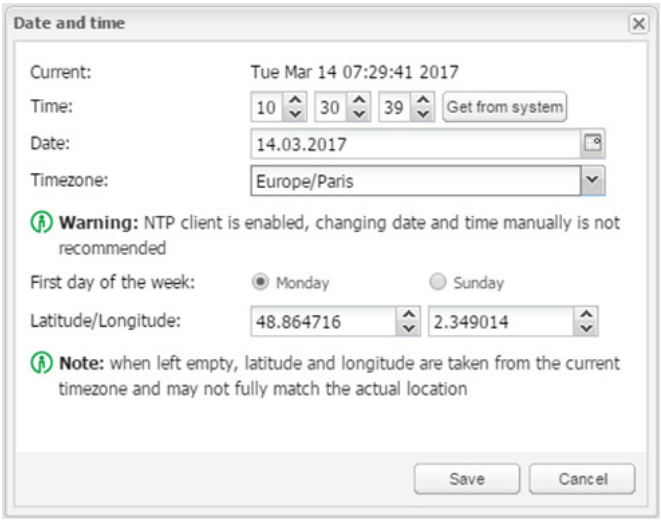
If there is no internet connection, click on **Get from the system** to adopt time from the PC.

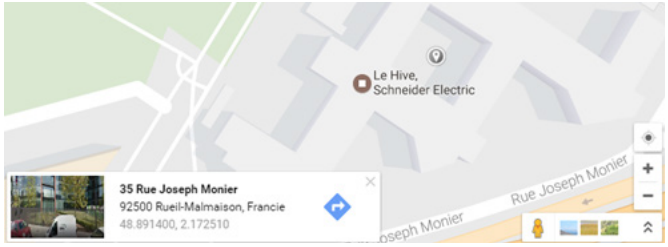
First day of the week: starting day of the week

Latitude/Longitude: Lat/long coordinates of geographic position of Wiser for KNX used for accurate calculation of sunrise/sunset. When not set it is calculated from time zone which may cause inaccurate sunset/sunrise time.

Exact geographic position can be easily found in **Google Maps**, simply by left-clicking on your location.

Without power, Wiser for KNX will maintain time and date settings only for a limited period of time (app. 5 minutes).





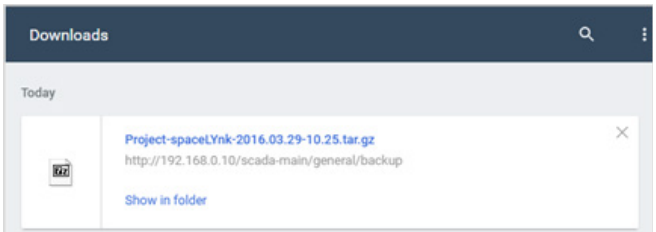
7.9 Backup

Backup all the objects, trends, logs, scripts, icons, images, backgrounds, visualization and KNX filter table to the Project-device name-dd.mm.yyyy-hh.mm.tar.gz file (actual spaceLYnk time and date is used when the backup is generated).

Created backup file is placed into the browser **Downloads** folder.

File can be renamed to match project structure.

Maximum backup size is 32MB. Check the size of the backup once you create it. If it is bigger than 32MB, you won't be able to restore it. System configuration, network settings, passwords or KNX settings are not backed up. Filter table is backed up.



7.10 General configuration

Interface language: Interface language (English, Bulgarian, Chinese, Czech, Danish, Dutch, French, German, Greek, Hungarian, Italian, Polish, Portuguese, Russian, Spanish, Swedish and Turkish).

Automatic address range start: Newly added group objects will start addressing from defined range.

Discover new objects: KNX object sniffer is enabled. If YES is selected all new objects automatically appear in the Objects list. Bus sniffer is enabled by default and it is recommended to disable it when not used especially if multiple Wiser for KNXs are connected in the same network

Object log size: Count of object logs. (Maximum value is 10000).

Default log policy: Log status for all objects or only for checked objects can be selected.

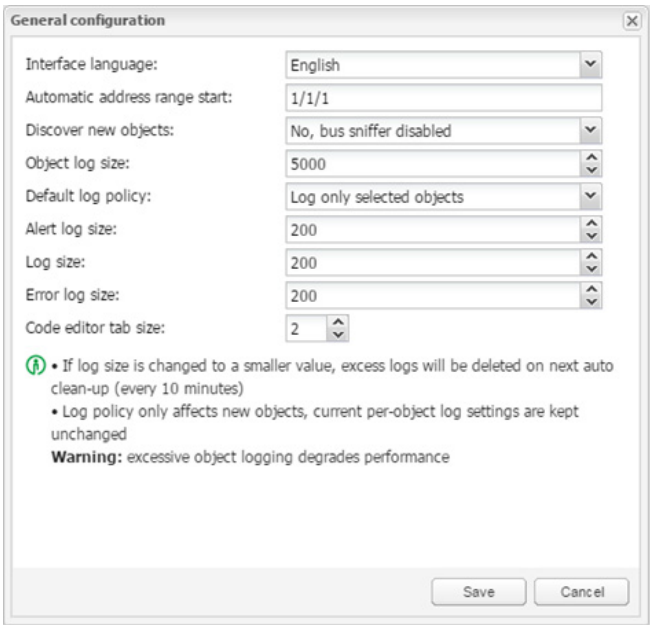
Alert log size: Count of alerts logged. (Maximum value is 5000).

Log size: Count of logs. (Maximum value is 5000).

Error log size: Count of errors logged. (Maximum value is 5000).

Save object values in storage: Script storage is logged and updated when object value is changed.

Code editor tab size: Pressing TAB in scripting editor results in insertion of defined count of spaces.



Wiser for KNX keeps the log objects above the limit for 15 minutes; after the time elapse, all records above the limit will be cleared. It is necessary to be aware while logging large amount of data in time.

Excessive objects logging degrades Wiser for KNX performance.

7.11 Vis. configuration

PC/Tablet sidebar: [*Show docked / Show as overlay / Hide]* Enable sidebar with list of plans in visualization docked/with auto-hide option/ hidden.

PC/Tablet view: *[Align plans to top left, no size limits / Center plans, limit size /Center plans, enable auto-sizing / Center horizontally, auto size width]*

Auto sizing works only in web browsers with Web Kit engine (Chrome, Safari) and Firefox.

PC/Tablet page transition: *[No transition / Flip X / Flip Y / Shrink / Expand / Slide Up / Slide Down / Slide Left / Slide Right / Slide Up Big / Slide Down Big / Slide Left Big / Slide Right Big]* Selection of transition effect for page changing in visualization.

PC/Tablet auto/size upscaling: Enable automatic rescaling for multiple screen resolutions.

PC/Tablet background color: Common background colour for visualization.

PC/Tablet background image: Common background image for visualization.

Custom font: Common font for visualization.

Use dark theme: Inversion of colour, fonts, graphs and controls to match dark palettes visualizations.

Enable swipe gesture: enables swipe gestures for use with touch screen devices i.e. zooming with two fingers.

Hide Home button in Smartphone: Home button can be hidden to avoid the possibility of leaving visualization (kiosk mode)

Disable object click animation: disable icon animation (useful for slower devices)

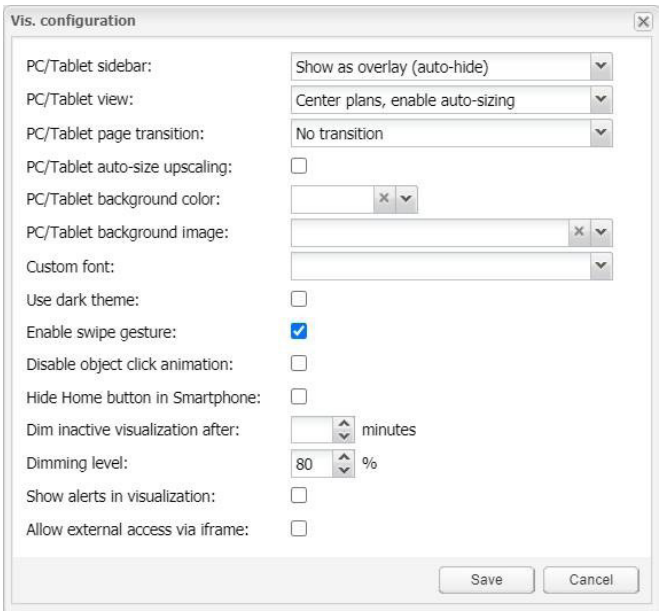
Dim inactive visualization after: ? minutes: Feature to save energy of battery powered devices.

Dim inactive visualization after: ? minutes: Feature to save energy of battery powered devices.

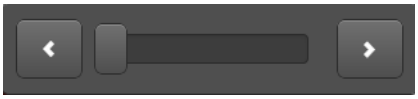
Dimming level?%: Brightness level of dimmed screen.

Show alerts in PC/Tablet: After triggering new alerts, it will appear in PC/Tablet visualization.

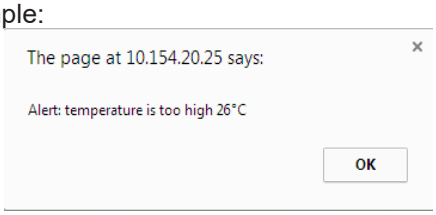
Allow external access via iframe: Controller's content can be allowed to access via iframe. This option is by default disabled.



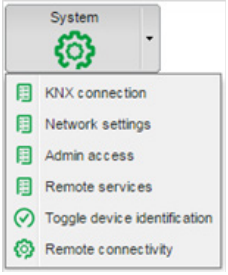
Dark theme control an Gauge sample:



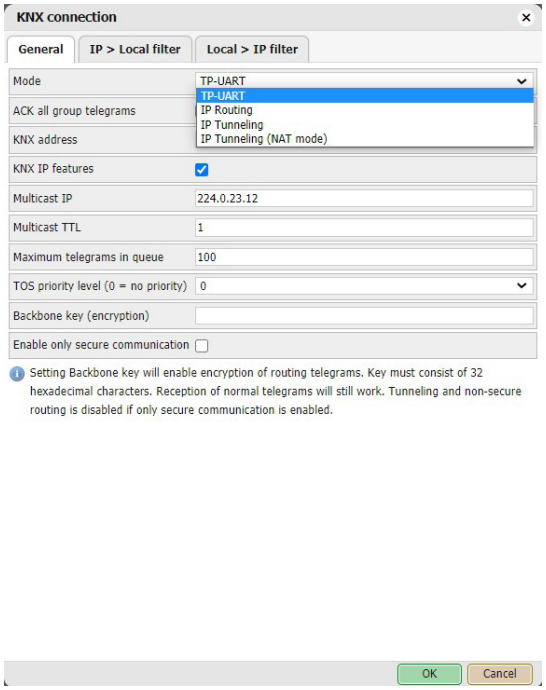
Alert sample:



8 System - quick menu

Click on arrow on the right side to open menu with most used system settings.	

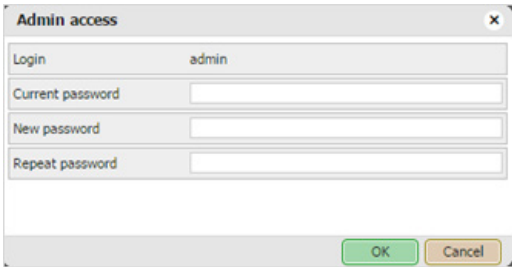
8.1 KNX connection

See chapter **“3 Import KNX project from ETS”** for details.	

8.2 Network settings

See chapter **“8.20 Network utilities”** for details.	

8.3 Admin access

Password settings for administrator account. Username is admin by default. The login and password configuration for User access is located in main menu.	

8.4 Remote services

For enabling/disabling remote access of Wiser for KNX for maintenance, control and export purposes.

Service status – for change status of Remote services

Allow only exported objects – when ticked only objects marked as exported are available for Remote services

Username – remote by default

Password – 8-20 characters

URL

Change the IP and password according to your Wiser for KNX settings i.e.:

https://remote:remote@192.168.0.10/scada-remote?m=rss&r=alerts

Request parameters

m – set the return value format

- json
- xml
- rss

r – requested function name

alerts – for 50 newest alerts

- **alert** alert text
- **time** alert time (UNIX timestamp)
- **date** alert date (RFC date)

errors – for 50 newest errors

- **error** error text
- **script** error script name
- **time** error time (UNIX timestamp)
- **date** error time (RFC date)

objects - list of return values of export

marked objects ordered by their update time

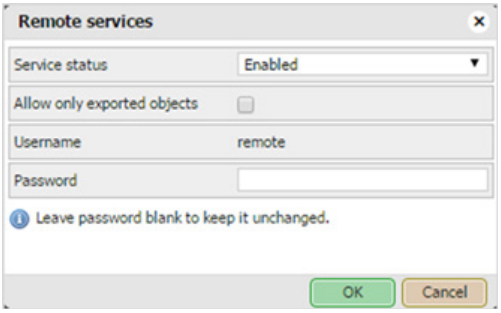
- **address** object address e.g. 1/1/1
- **name** object name e.g. **My object**
- **data** decoded object value e.g **42** or **01.01.2012**
- **datatype** object datatype e.g. **1** or **5.001**
- **time** object update time (UNIX timestamp)
- **date** object update time (RFC date)
- **comment** object comment e.g.

Second floor entry lights

tags optional array of object tags e.g. **Light**, **Second floor**

grp executes one of grp functions:

fn function name, required



Examples:

Write boolean value to **1/1/2** you can use **true** or **false**, as well as **1** or **0**

https://remote:remote@192.168.0.10/scada-remote?m=json&r=grp&fn=write&alias=1/1/2&value=true

Write value of **50** to **1/1/1**

https://remote:remote@192.168.0.10/scada-remote?m=json&r=grp&fn=write&alias=1/1/1&value=50

Explicit datatype setting to scale, send **50** to **1/1/1**

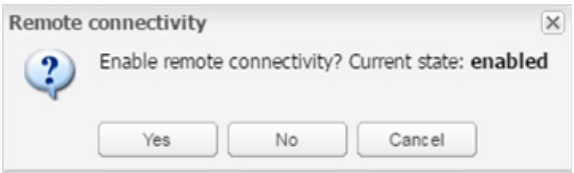
https://remote:remote@192.168.0.10/scada-remote?m=json&r=grp&fn=write&alias=1/1/1&value=50&datatype=scale

• **getvalue** returns current object value if found • **find** return object info • **write** send KNX bus group write telegram • **response** send KNX bus group response **telegram** • **read** send KNX bus group read telegram • **update** update local hL/sL object value without KNX bus group write • **alias** group address or name, required • **value** new value to write, required for write / response / update, except for time and date **time datatypes:** • **day number** (0-7), day of the week, optional • **hour number** (0-23) • **minute number** (0-59) • **second number** (0-59) **date datatypes:** • **day number** (1-31) • **month number** (1-12) • **year number** (1990-2089) **datatype:** optional for write / response / update, data type is taken from the database if not specified: **bool, bit2, bit4, char, uint8, int8, uint16, int16, float16, time, date, uint32, int32, float32, access string**	

8.5 Toggle device identification

Enable flashing of the signalisation LED2 red/green, for easy identification of certain Wiser for KNX.	

8.6 Remote connectivity

Enable/disable Remote connectivity possibility i.e. for cloud connection. Disabled in default in Wiser for KNX.	

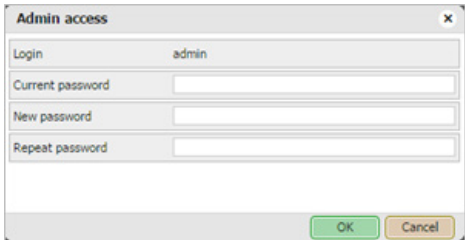
9 System - service page

Click on System icon will open new page with system settings.	

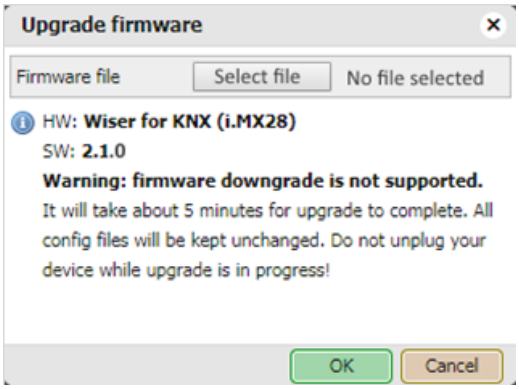
9.1 Hostname

Change name of your Wiser for KNX for easy identification. It will be displayed in Neighbour list or in Backup file.	

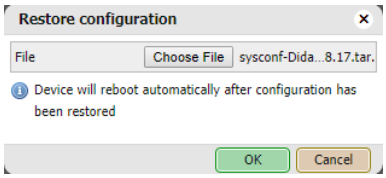
9.2 Admin access

Login admin by default **Current password** – enter current password **New password** – enter new password 8-20 characters **Repeat password** – repeat new password	

9.3 Upgrade firmware

System → Upgrade firmware is used to perform complete upgrade of the system. After each upgrade, it is strongly recommended to clean the browser cache. Downgrade of Wiser for KNX with firmware is not possible. During firmware upgrade the device will not respond, because Wiser for KNX will reboot several times. Upgrade can take up to 10 minutes (especially when lot of trend is used in the project) LED1 is flashing red/green during upgrade. Do not switch Wiser for KNX off until LED1 stop flashing red/green.	

9.4 System configuration backup and restore

System → Backup configuration Wiser for KNX makes backup system configuration and generate backup file. **System → Restore configuration** Wiser for KNX makes restore system configuration from backuped file.	

9.5 Reboot

By executing **System → Reboot** command, Wiser for KNX will restart.	

9.6 Shutdown

By executing **System** → **Shutdown** command, Wiser for KNX will shut down.

It is strongly advised to shut down the system before the unit is powered off, so that the database can be saved securely. The system is shutdown, when LED no. 1 stops blinking and LED 2 is OFF.

Important: The only way to switch Wiser for KNX ON again is to disconnect and re-connect power supply. Wiser for KNX can't be switched ON remotely!

9.7 Network

Interfaces

Ethernet interface is listed in the first tab. Traffic flowchart can be opened by using graph button on the right side.

By clicking on the interface, the configuration window appears.

Protocol – Specific protocol used for addressing.

None – No protocol is used.

Static IP – Static IP address. By default, 192.168.0.10

DHCP – Use DHCP protocol to get IP configuration.

Current IP – The IP address got from DHCP server. This field appears only if the IP address is given otherwise it is hidden.

IP address – By default **192.168.0.10**

Network mask – Network mask. By default, is 255.255.255.0 (/24)

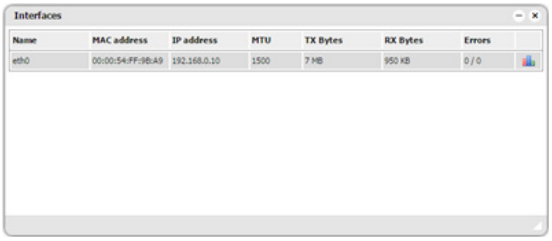
Gateway IP – Gateway IP address.

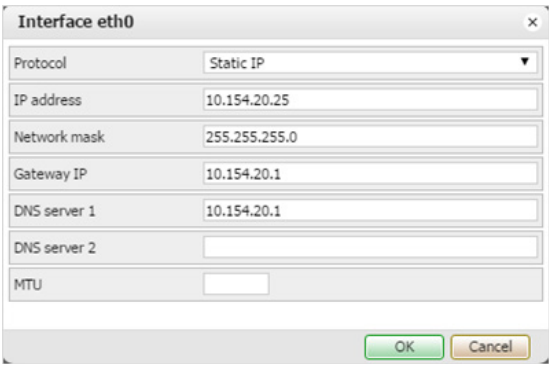
DNS server 1 – Primary DNS server IP address.

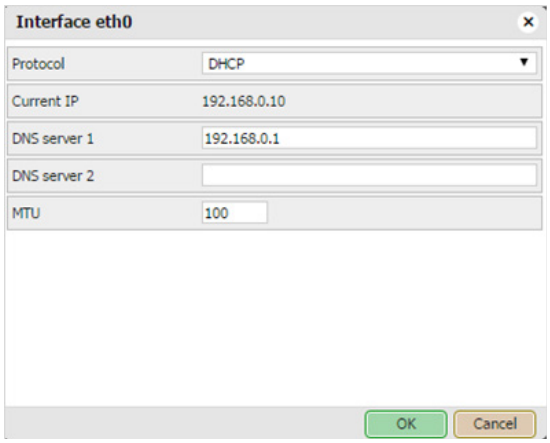
DNS server 2 – Secondary DNS server IP address.

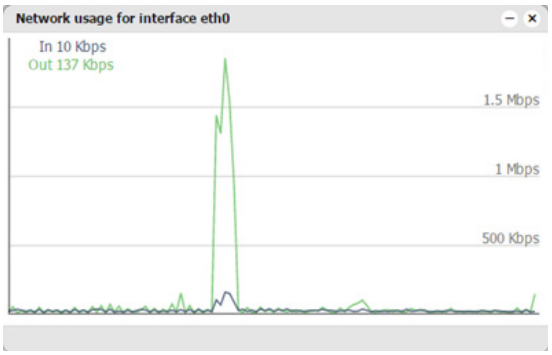
MTU – Maximum transmission unit, the largest size of the packet which could be passed in the communication protocol. (Default 1500).

Ethernet interface data put through graph - On the main window of the **Ethernet** tab, if you click on the button, a new window is opened. It draws a real-time graph of the traffic flow passing the interface (both In and Out). There is a possibility to switch the units of measurement – bite/s or Byte/s and graph Auto Scale follow or Up.









9.8 Routes

Routing table is a data table that lists the routes to a particular network destination. It contains information about the topology immediately around it. System routing table is located in **Network → Routes menu**. The window is divided in two parts – **Dynamic** and **Static** routes.

- **Dynamic**

List of self-learned network destinations and automatic selection of the 'best route'.

Interface – Interface name indicates the locally available interface that is responsible for reaching the gateway.

Destination – Destination subnet IP address describes together with Network mask the Network ID.

Gateway – Gateway IP address points to the gateway through which the network can be reached.

Network mask – Network mask.

- **Static**

Manual entering of routes into the Wiser for KNX routing table, they do not change automatically.

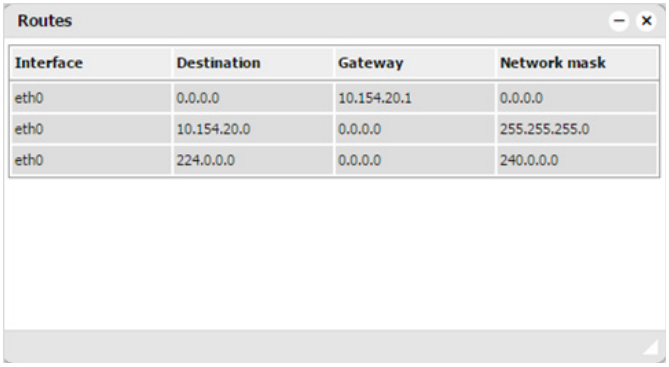
Interface – Interface name.

Destination – Destination IP address.

Gateway – Gateway IP address.

Network mask – Network mask.

Flags – Helps in troubleshooting your network problem, see the attached coding table.



Interface	Destination	Gateway	Network mask
eth0	0.0.0.0	10.154.20.1	0.0.0.0
eth0	10.154.20.0	0.0.0.0	255.255.255.0
eth0	224.0.0.0	0.0.0.0	240.0.0.0

9.9 ARP table

Address Resolution Protocol table is listed in **Network → ARP table**.

It is used for resolution of network layer addresses into link layer addresses; it converts IP address to a physical address.

Interface	IP address	Mask	MAC address	Flags
eth0	10.154.16.243	*	2c:54:2d:00:da:d0	0x2
eth0	10.154.16.248	*	00:0e:b6:a0:68:a2	0x2
eth0	10.154.20.1	*	00:07:7d:a7:e8:2e	0x2

9.10 KNX connection

KNX specific configuration is located in **Configurator → Utilities → System → Network → KNX connection** window.

General

Mode - KNX connection mode. Wiser for KNX has TP-UART interface by default built-in.

TP-UART – Twisted pair connection via black/red plug. Transfer rate 9.6 kB/s.

EIBnet/ IP Tunneling – IP connection, is 1000x faster than TP-UART. Wiser for KNX as a server. Unicast, acknowledged data exchange, additional individual address per tunneling connection.

.**EIBnet/ IP Tunneling (NAT mode) – Network Address Translation mode** – Allows multiple devices to connect to public network using the same public IPv4 address. It modifies the IP address information in the IPv4 headers while in transit across a traffic routing device.

EIBnet/IP Routing – Multicast, unacknowledged data transfer. Wiser for KNX as a Line or Backbone Coupler.

ACK all group telegrams – If Wiser for KNX communicates directly with another KNX device it must acknowledge received telegrams. Unselect if Wiser for KNX operates as a sniffer of group addresses only.

KNX address – KNX individual address of the device.

KNX IP features – Use this device with KNX IP features for example, KNXnet/IP network configuration. If not active, then all IP communication from KNX is blocked.

Multicast IP – Multicast IP address.

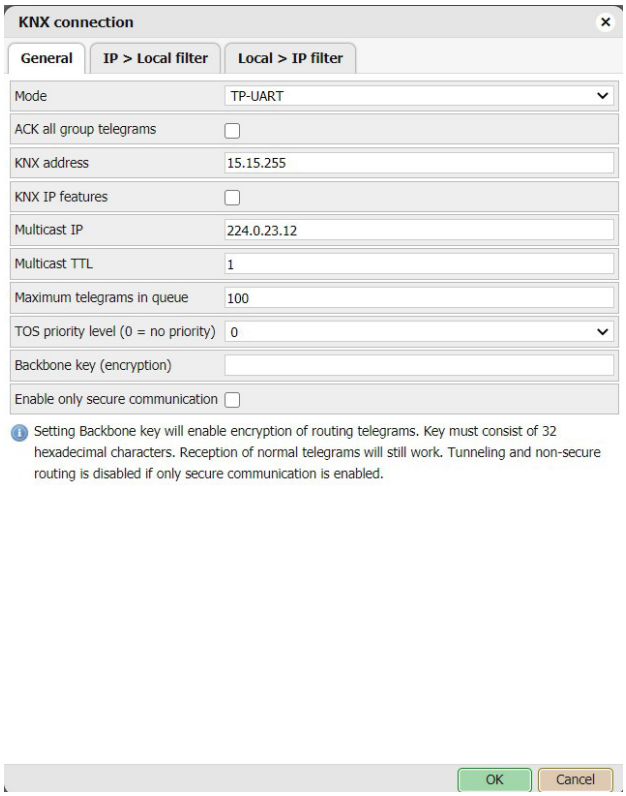
Multicast TTL – Default value is 1; it allows communication between different sub-networks.

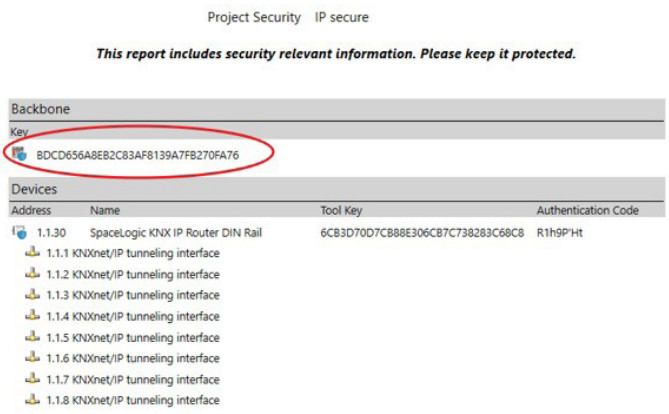
Maximum telegrams in queue – Count of maximum telegrams in the queue.

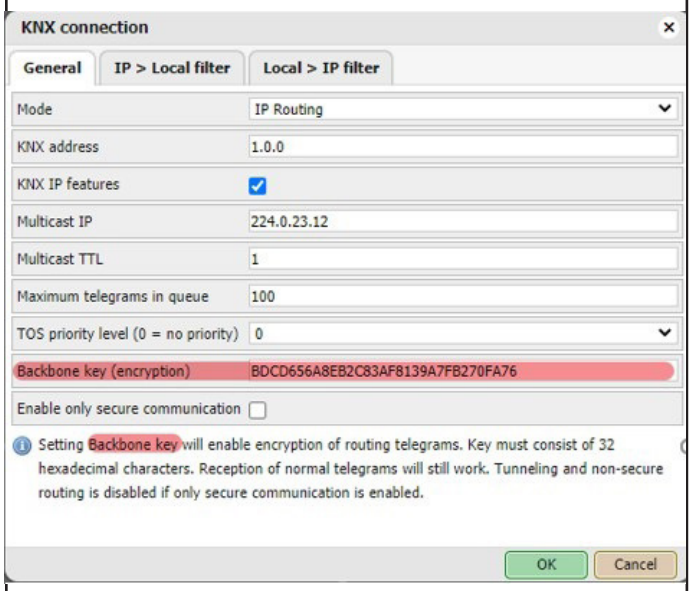
TOS priority level – priority of KNX telegrams from 0-7

Backbone key (encryption) – Backbone key for decrypting secured telegrams for IP routing. Backbone key can be exported from ETS software in Reports => Project Security.

Enable only secure communication - Tunnelling and non-secure telegrams routing are disabled.







⚠ Routing mode should be used in order to ensure the group addresses are updated correctly. Device will reboot after applying the changes.

9.11 IP > Local filter

Filter accepts or drops received telegrams from the defined KNX devices/physical addresses. All outgoing telegrams are not filtered.

Apply filter to tunnelling – This filter was created to provide enhanced functionality in comparison to a standard KNX router. Defined filter can be applied even to tunnelling mode now, by default it passes all telegrams. This option relates to both directions (IP > Local filter & Local > IP filter)

SRC policy *[No filter / Accept selected individual addresses / Drop selected individual addresses]* – Policy to apply to the list of source addresses.

Ind. address list – Lists individual or group addresses. One address per line. Use * (e.g. 1.1.* or 1/1/*) to filter all the addresses in the given line.

DST group policy

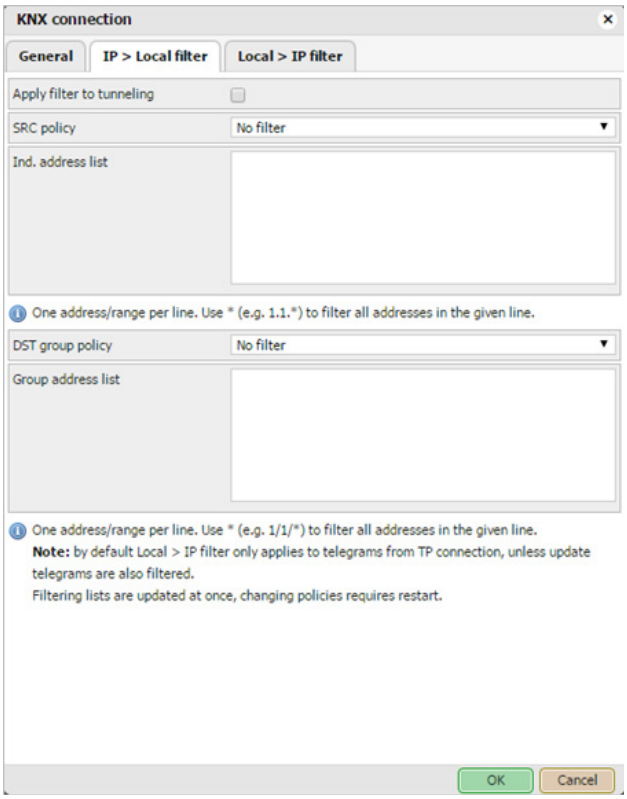
Destination group filter accepts or drops received telegrams belonging to one group as 1/2/3 or subgroup as 1/2/*. All outgoing telegrams are not filtered.

DST group filter *[No filter / Accept selected individual addresses / Drop selected individual addresses]* – Policy to apply to the list of destination group addresses.

Group address list – List of group addresses.

One address per line. Use *(e.g. 1/1/*) to filter all the addresses in the given line.

KNX IP features should be enabled for filters to work.



9.12 Local > IP filter

KNX devices/physical addresses. All outgoing telegrams are not filtered.

Filter accepts or drops received telegrams from the defined ongoing telegrams are not filtered.

Apply filter to virtual objects – Virtual object serves for internal data exchange inside Wiser for KNX (e.g. from Modbus to Visualization). If command **gr.update()** is used in LUA, then the group address is not written to TP, but is written to IP only. If this option is ticked, the listed groups are filtered (=not written) from IP and thus virtual.

SRC policy *[No filter / Accept selected individual addresses / Drop selected individual addresses]* – Policy to apply to the list of source addresses.

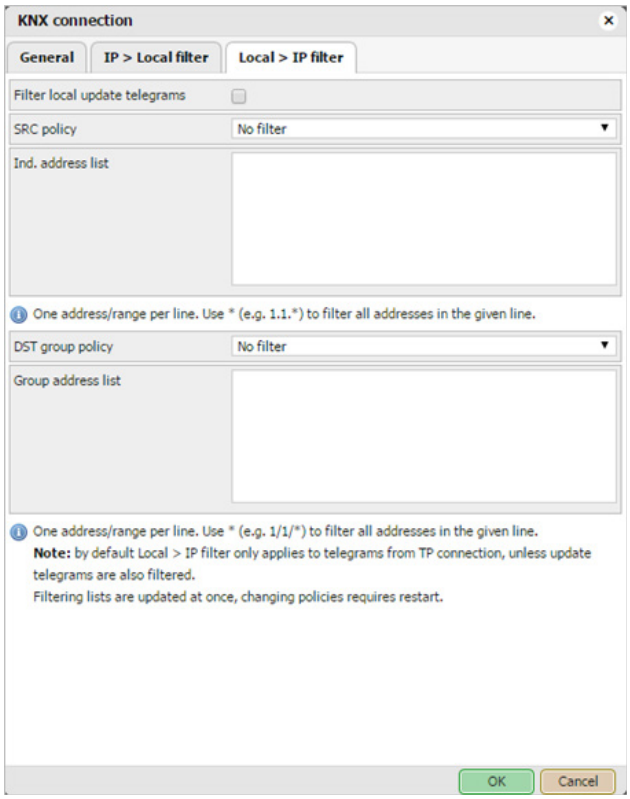
Ind. address list – List of individual addresses. One address per line. Use * (for example, 1.1.* or 1/1/*) to filter all addresses in the given line.

DST group policy – Destination group filter accepts or drops the received telegrams belonging to one group as 1/2/3 or subgroup as 1/2/*. All outgoing telegrams are not filtered.

DST group filter *[No filter / Accept selected individual addresses / Drop selected individual addresses]* – Policy to apply to the list of the destination group addresses.

Group address list – List of group addresses. One address per line. Use *(e.g. 1/1/*) to filter all addresses in the given line.

KNX IP features should be enabled for filters to work. This applies to the incoming telegrams only!



9.13 BACnet settings

See chapter **“27.2 Wiser for KNX Configuration”** for more details.

See chapter **“27.6 BACnet objects”** for more details.

See chapter **“27.7 BACnet COV settings”** for more details.

9.14 NTP-client/server

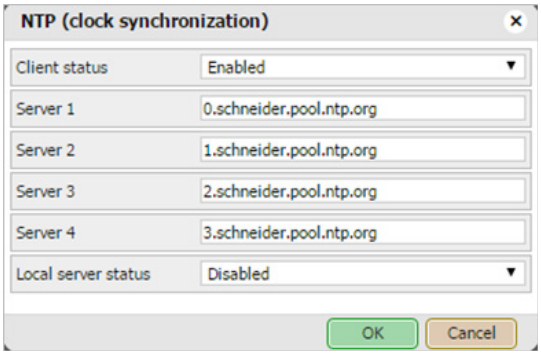
Client status when enabled Wiser for KNX obtaining data from up to four selected servers.

Network Time Protocol (clock synchronization) **Servers 1- 4**

Define the server from which date and time is obtained.

Local server status when enabled Wiser for KNX can serve as local NPT server for other Wiser for KNXs/ Wiser for KNXs or other devices.

Reboot needed. Check availability of NTP server with ping tool if needed.



9.15 HTTP server

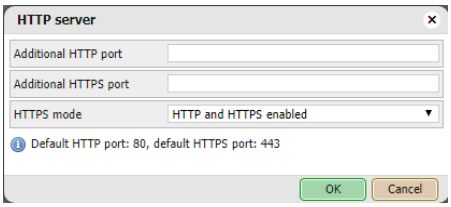
Allow use of additional ports both for HTTP and HTTPS.

Default HTTP port: 80, default HTTPS port: 443

Available HTTPS modes:

- **HTTP and HTTPS enabled** - both HTTP and HTTPS communication is allowed
- **HTTPS only, redirect HTTP to HTTPS** - All communication on HTTP ports will be redirected to HTTPS
- **HTTPS only, HTTP port is disabled** - only secured communication is enabled

Reboot needed.



9.16 HTTP SSL certificate

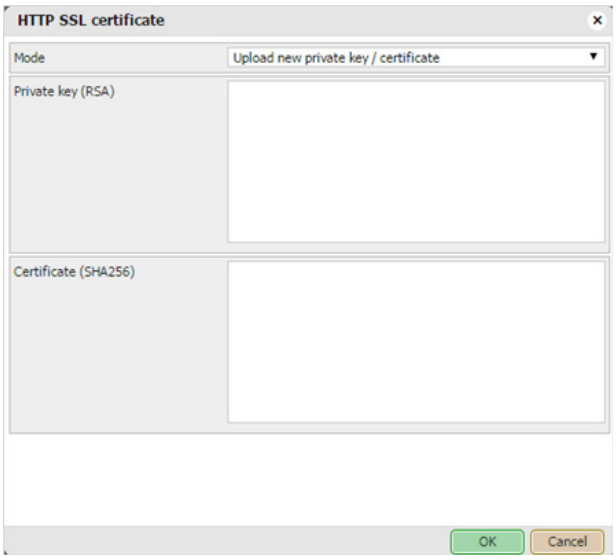
SSL Certificates are small data files that digitally bind a cryptographic key to a device's details. When installed on a web server, it activates the padlock and the https protocol and allows secure connections from a web server to a browser.

There is amount of online SSL certificate providers some SSL certificates are free some are paid.

Mode:

Upload new private key/certificate – for upload existing RSA key/SSL certificate

Generate new private key/certificate – generate RSA private key/SSL certificate from one already installed.



9.17 FTP server

FTP server of spaceLYnk can be accessed by enabling **Service → FTP Server**.

Free space – remaining free space on the build-in USB card.

Server status – setting status of FTP server.

Require encryption (FTPS) – When FTP encryption is required FTP server will not accept unsecured connection. When FTP encryption is not required ftp server will accept FTP and FTPS both.

Port – Port of the service.

Username – Login name (ftp and apps by default for use with SE services)

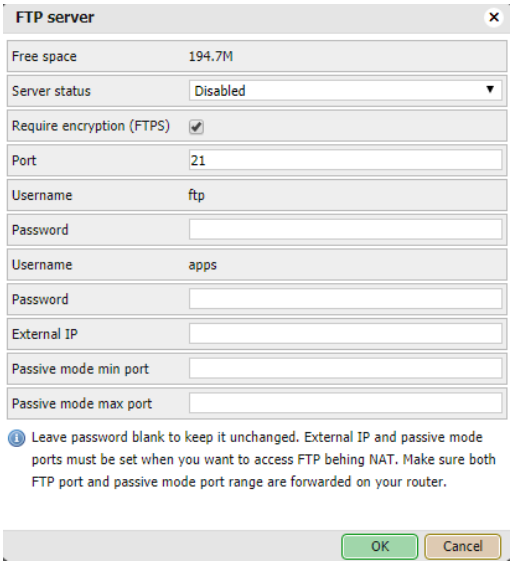
Password – Password, length 6-20 symbol. Default password is empty and must be changed prior to ftp use.

External IP – IP address used for external connection

Passive mode min port– Minimum port for passive mode.

Passive mode max port – Maximum port for passive mode.

Note: Maximum simultaneous FTP connections are limited to 5.



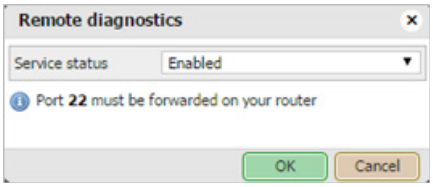
9.18 Remote services

See chapter **"7.4 Remote services"** for details.

9.19 Remote diagnostic

Will able remote diagnostic possibility.

⚠ Port 22 must be forwarded on your router.



9.20 System status

System information is shown is the following tabs:

General

Information about hardware and system details provided by kernel.

Memory usage

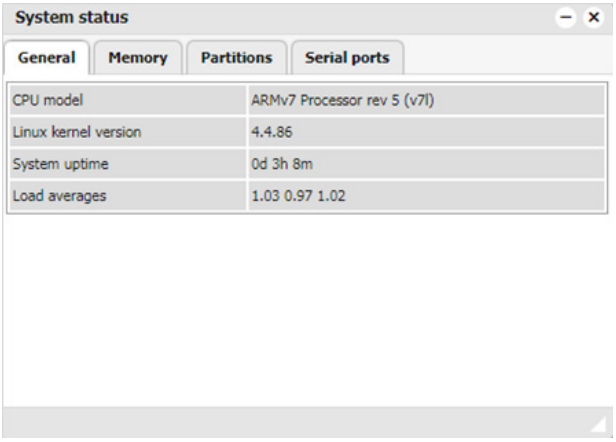
Current memory used by the system.

Partitions

List of partitions available in the system.

Serial ports

List of serial ports available in the system.



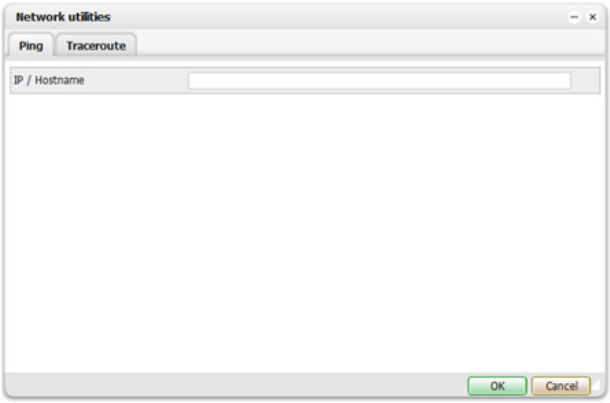
9.21 Network utilities

Ping

The Computer network tool is used to test whether a particular host is reachable across an IP network.

Trace route

The computer network diagnostic tool is used for displaying the route (path) and measuring transit delays of packets across an Internet Protocol (IP) network.



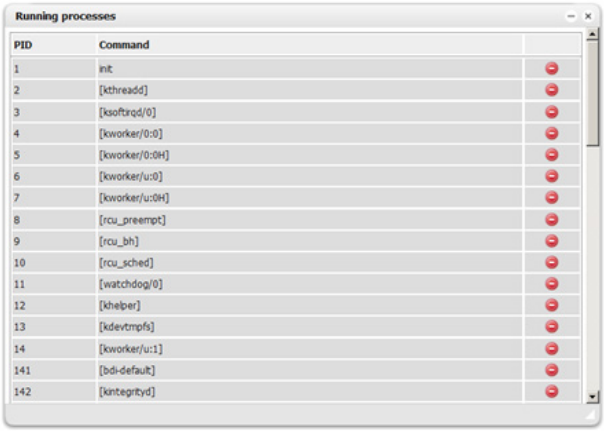
9.22 System log

Log entries

Log files are automatically created and maintained by Wiser for KNX of all the system events.

9.23 Running processes

List of running system processes.



10 Objects

List of KNX network objects appear in the **Objects** menu. The object is listed accordingly:

1. Captured by sniffing the bus for telegrams from unknown group addresses (if enabled in **Utilities**).

2. Added manually.

3. Importing ESF file (in **Utilities**).

0bjects are sorted with the following parameters – **Group address, Object name, IP>TP filter, TP>IP filter, Event script, Data type, Current value, Log, Export, Tags, Updated at, Set value, Vis.parameters and Custom values.**

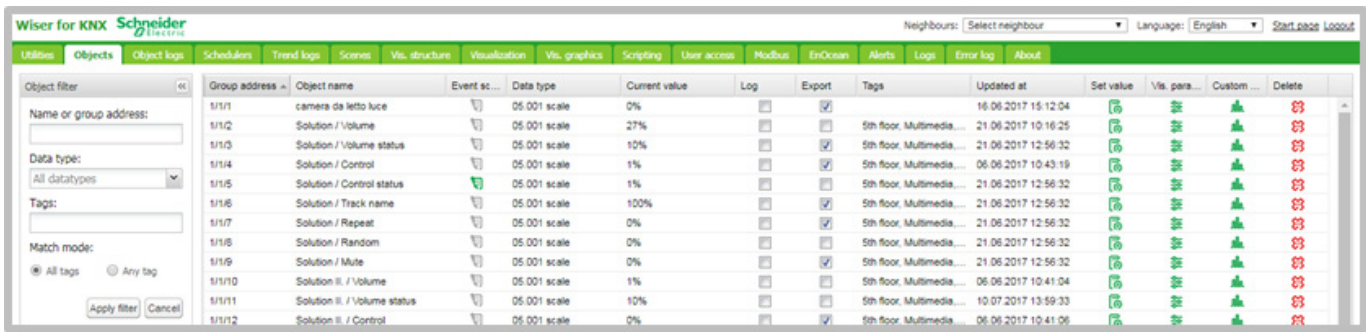
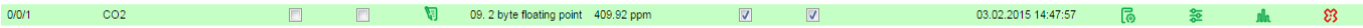


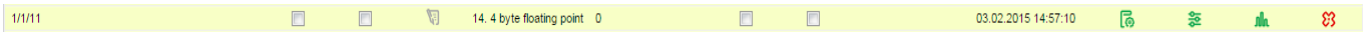
Figure 3: Objects.

Objects are further distinguished by colour of their background for quick overview:

- Green – Object value actually updated.



- Yellow – Object discovered by a bus sniffer.



10.1 Object parameters

Object can be created as standard KNX object or virtual object. Virtual objects are marked with V icon, their range starting from 32/1/1 and therefore they cannot be send to the KNX TP bus. Filtering is disabled for virtual objects. Virtual objects are useful for visualization purposes or communication with 3rd parties i.e. BACnet.

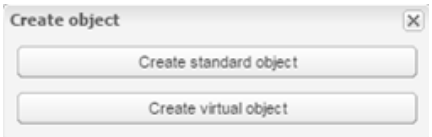
Object name – Name of the object.

Group address – Group address of this object.

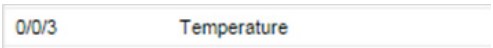
Data type – KNX data type of the object. This has to be set once the Wiser for KNX sniffs the new object for actual object to work.

Current value – Actual value of the object.

Tags – Assigns object to a tag which can be later used in the writing scripts, for example,



To change the settings for existing or new objects, click on the specific list entry address or name.



All_lights_first_floor (Please refer to the Script library for use cases).

Unit/suffix – Add unit/suffix to value of object. Units which cannot be created from keyboard can be created in external editor and pasted into the browser.

Log – Enable logging for this object. Logs appear in the **Object logs** tab.

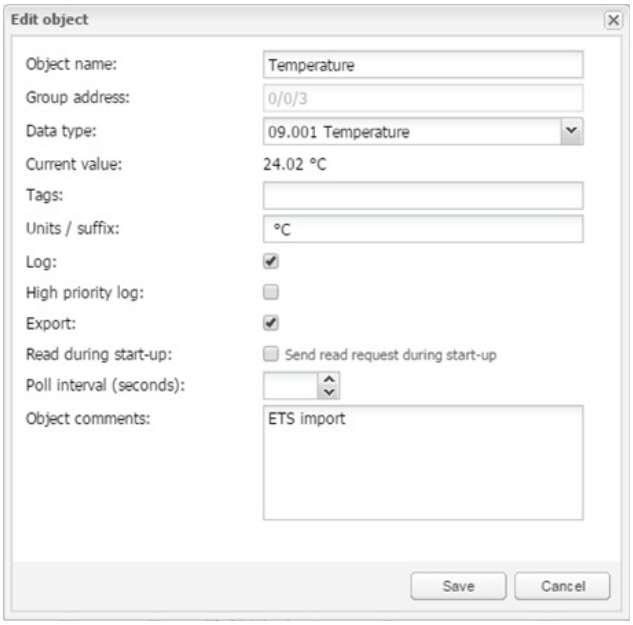
High priority log – This option shifts high priority logs up on the screen listing (tab Logs). If defined limit of logs is exceeded, low priority logs at the end of listing are deleted first. This function secures that high importance logs stay visible for a longer period of time. Object must be logged as well.

Export – Makes object visible by remote XML requests.

Read during start-up – Object actual value will be updated during start of Wiser for KNX. KNX object must have read flag set.

Poll interval (seconds) – Performs automatic object read after the selected time interval.

Object comments –Object's further description. Can be also used for filtering. "ETS import" comment added automatically for objects imported from. ESF file.



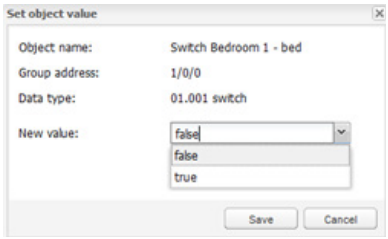
10.2 Event script

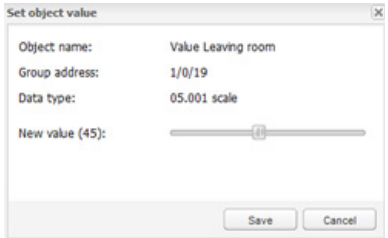
By pressing button in the Object list, the Script editor will open and the event based script can be created. Script will run each time the telegram is sent to the selected group. If the script is attached to a group, icon changes to green .

10.3 Set object value

In the object list, by pressing on the button, the state of the object can be changed.

The appearance of the **New object value** window depends on what the visualization parameters are set for specific objects.





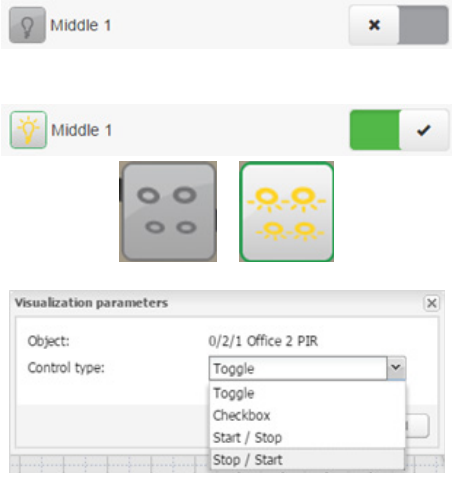
10.4 Object Visualization Parameters

By pressing on the button , the corresponding object specific visualization parameters for this type can be set.

1-bit

Control Type – Types of the visual control element:

- **Toggle**
- **Checkbox**
- **Start / Stop** – object is in On state as long as pressed
- **Stop / Start** – object is in Off state as long as pressed



4-bit (3-bit controlled)

Step size – Step size example for blinds control:

2-bit (1-bit controlled), 1-byte unsigned integer (scale), 1-byte signed integer, 2-byte unsigned integer, 2-byte signed integer, 2-byte floating point (temperature), 4-byte unsigned integer, 4-byte signed integer, 4-byte floating point.

Control type – Types of the visual elements:

- **Direct +/-**
- **Slider**
- **Circular slider**
- **Custom value select**

Minimum value – Define minimum value for visualization only.

Maximum value – Define maximum value for visualization only.

Step – If defined, value changes depending on the defined step.

Vertical slider – Vertical position of slider e.g. for Blinds control.

Invert vertical slider – Inverts direction of vertical slider.

Slider colour – Defines slider filling colour.

Background color – Defines background colour of circular slider.

Round line cap – Rounding edges of circular slider.

Hide title – Hide Object/custom name in visualization.

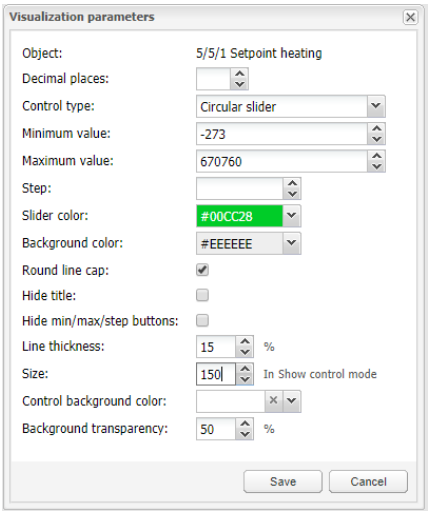
Hide min/max/step buttons – Hide buttons in visualization for touch screen enabled devices.

Line thickness – Thickness of circular slider control line (1-50%).

Size – Size of circular slider (150-500 pixels).

Control Background color – Color of element background.

Background transparency – Element background transparency.



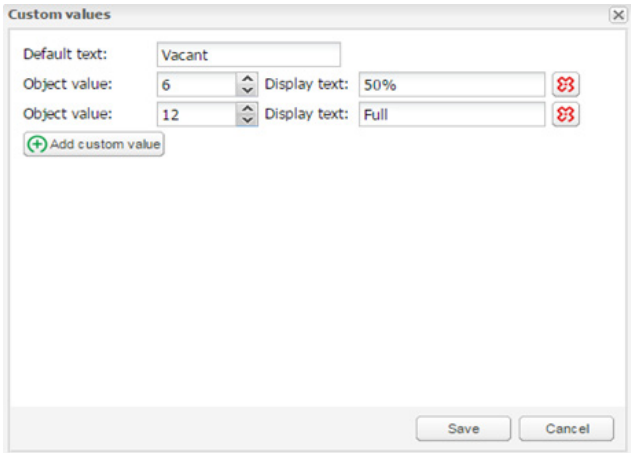
10.5 Custom Text Value

In the object list, by pressing button, custom text can be added to the object values.

Custom text values can be set only to Boolean or integer values.

Default text – Text displayed if value is not defined.

Object value – **Add custom value**, select **Object value** and define **Display** text.



10.6 Object Control Bar

Add new object – Manually add new objects to the list.

Auto update enabled – Specifies either the object list is updated automatically or not.

Clear – Clear the list of filtered group addresses.

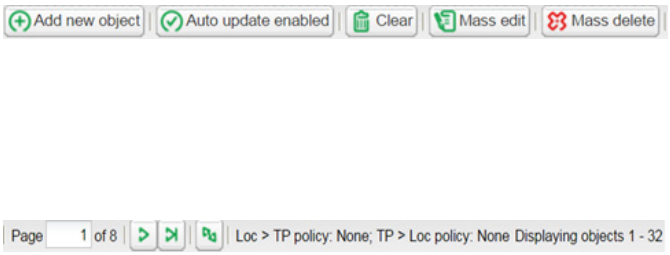
Mass edit – For mass edit of filter selected objects.

Mass delete – For mass delete of selected objects.

Next/Previous page – Move to the next or previous page.

Refresh – Refresh the object list.

TP > IP policy – Selected filtering policy.



10.7 Object filter

On the left side of the object list, you can filter.

Name or group address – filter by name or group address. Digits in address can be replace by a star for filtering in range.

Data type – filter by data type of objects.

Tags – filtering by Tag. Match mode can be selected between All tags and Any tag.

Press Apply filter button for filter to take effect.

Mass edit

Objects filtered in Object filter can be mass edited by:

Object properties – Mass edit based on objects properties as listed in the Objects menu.

Visualization parameters – Mass edit based on Visualization parameters e.g. toggle, checkbox, slider…

Custom values – Mass edit based on Custom values for Boolean and integer datatypes.

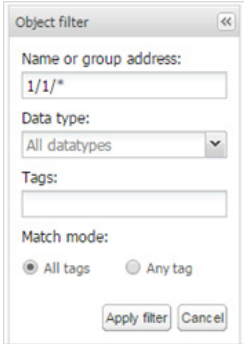
Mass delete

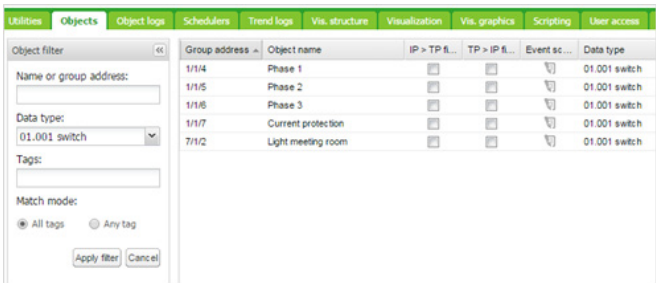
Objects filtered in Object filter can be mass deleted by:

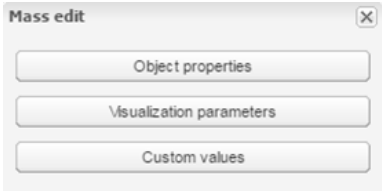
Delete unnamed objects – delete all unnamed object from list.

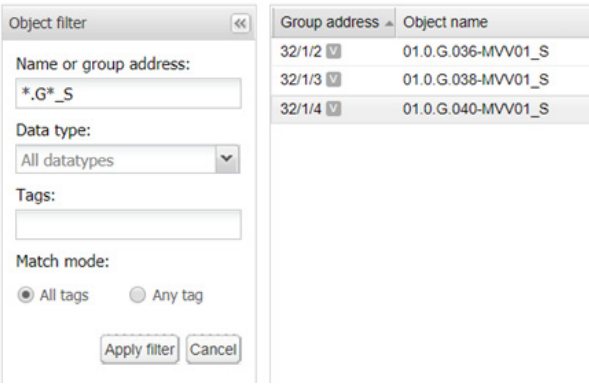
Delete object from current filter – delete all object selected by current filter.

Wildcards search in objects – can filter on all objects with search-string e. g. “*.G*_S”.









11 Object Logs

Object's historical telegrams are available in **Object logs** tab. After logging is enabled for object, all the future data will be logged in.

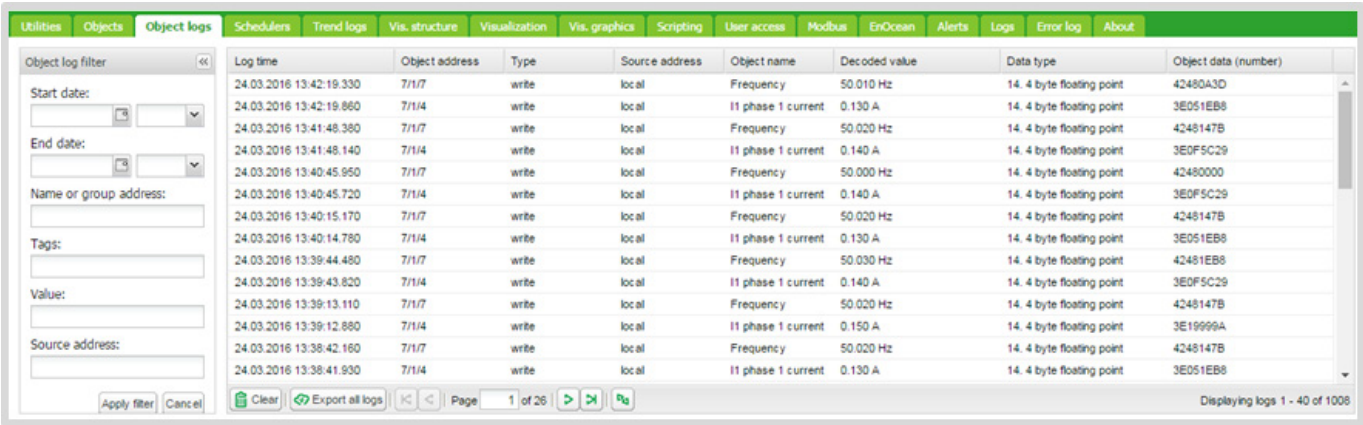


Figure 4: Object Logs.

Filtering is available when there is a need to find specific period information:

- **Start date** – Start date and time for log filtering
- **End date** – Start date and time for log filtering
- **Name or group address** – Specific name or group address of the object
- **Tags** – Group objects with the same tags filtered
- **Value** – Specific object value
- **Source address** – Specific source address

All logs can be cleared by pressing the **Clear** button.

For important objects, activate the parameter **High Priority log** together with **Log** parameter. This function will list the selected objects on the top of the **Object logs** list.

Logging memory properties can be set up in the **Utilities** → **Configurations.**

12 Schedulers

Schedulers allow the end user to control KNX group address values based on the date or day of the week.

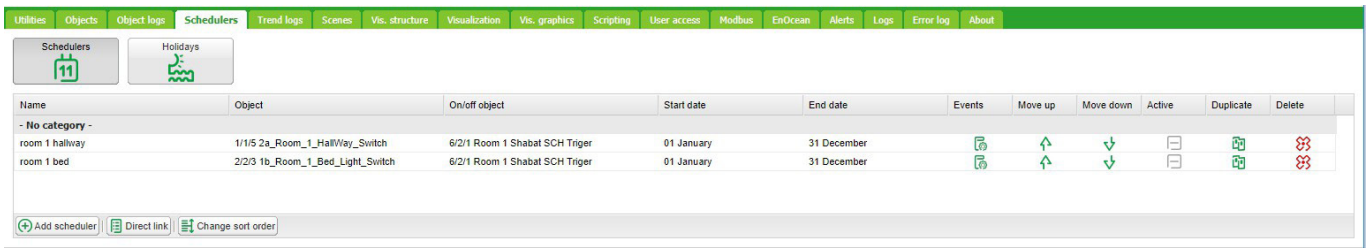


Figure 5: Schedulers.

User view:

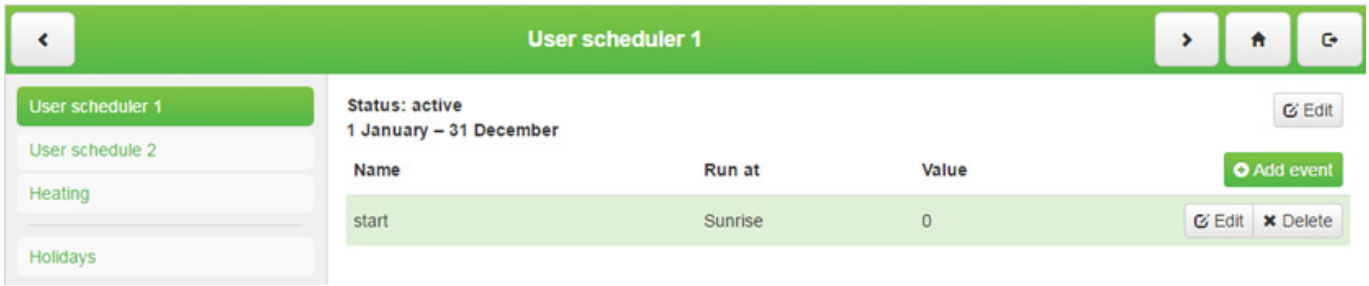


Figure 6: User view.

Events can be added and Schedulers can be enabled/disabled by User.

12.1 Add new scheduler

Object – The object group address which will be controlled by the scheduler.

Active – Defines whether a scheduler is active or not.

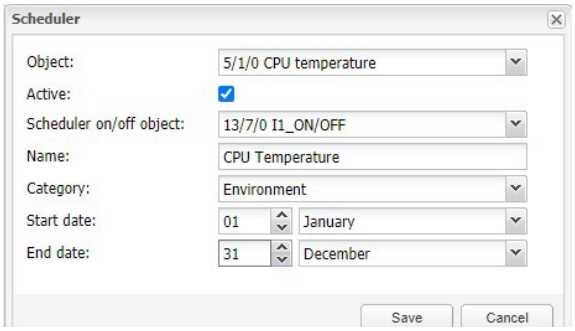
Scheduler on/off object – Scheduler can be enabled or disabled by object

Name – Name of the scheduler.

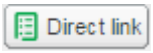
Category - Sort schedulers to created categories for better clarity

Starts date – Start date of the scheduler.

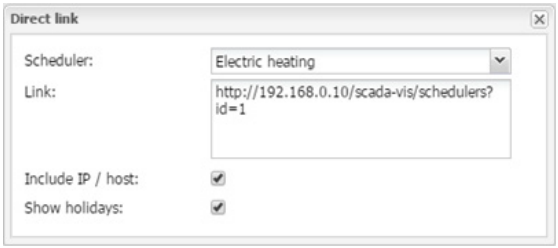
End date – End date of the scheduler.



12.2 Direct link



This icon will open dialog to create direct likn for Scheduler's visulaization. Link can include IP adress of the host and display or not diplays Holidays in Scheduler.



12.3 Scheduler Events

Event can be added both in the administrator interface and by the end user in the **special User mode schedulers** interface. Click icon to open Events list.

Active – Defines the Event to be active or not.

Name – name of the Event

Run at – Even could be triggered by specific time, sunrise or sunset.

Start time offset – offset can be set for sunrise/sunset i.e. when location is in the valley and surrounding hills casting shadows.

Start time – time of Event activation.

Day of the week – days in which Event will be active.

Weekday in month – weekday in which Event will be active i.e. every 1st Monday in the month which may fall to the second week in some months.

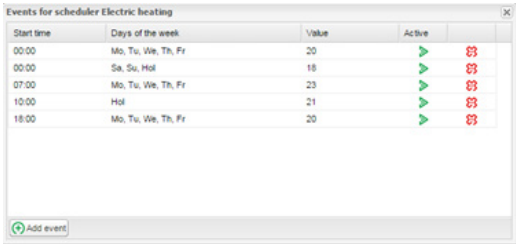
Months – Months in which Event will be active

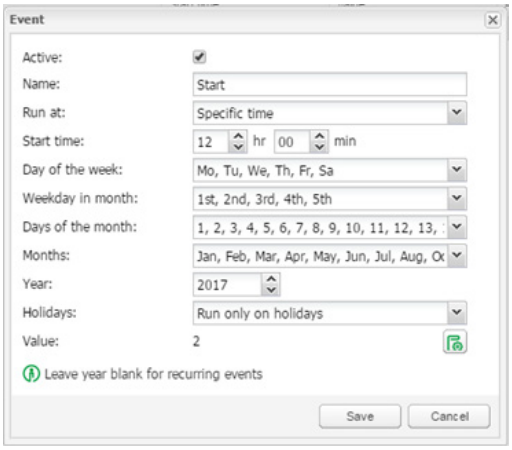
Year– Year in which Event will be active, (leave year blank for recurring events).

Holidays – Holidays which are defined in the **Holidays** - “No effect”, “Do not run on holidays” and “Run only on holidays” options available.

Value – Value to send to the group address when the Event will be triggered.

It is recommended to create all necessary Scheduler by Admin while setting as User can only add events but not Schedulers.





12.4 Scheduler Holidays

Once the event will be marked to run on, **Holidays** entries will be activated.

Name – name of Holidays

Holiday type – type of Holidays, specific date or Day in the week can be selected

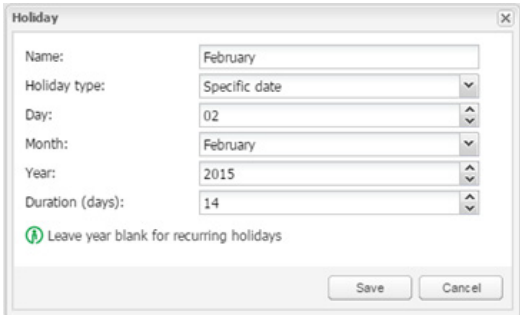
Day – day in which Holidays will be active.

Months – Months in which Holidays will be active

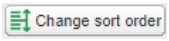
Year– Year in which Event will be active, (leave year blank for recurring events).

Duration(days) – duration of Holidays

Scheduler visualization use is not recommended in the **Smartphone visualization.**

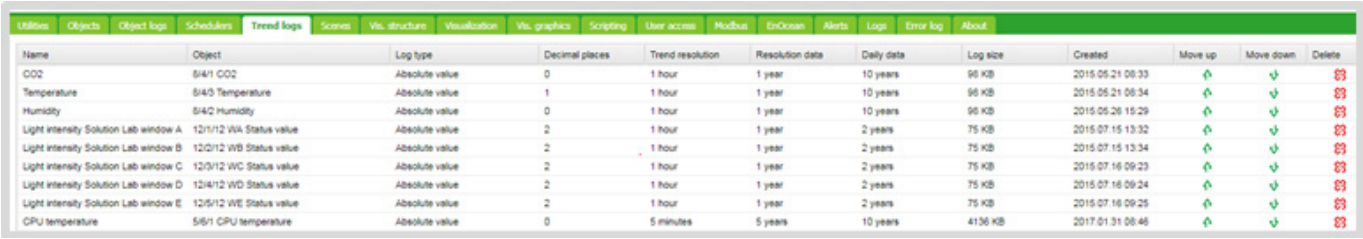


12.5 Chanhe sort ordering

 This icon opens a window for drag&drop ordering of schedulers.	

13 Trend logs

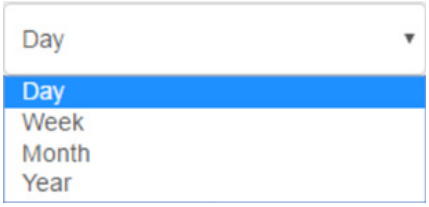
Trend logs or so called data logging allows the end user to store the selected data and compare the different time periods from the past.



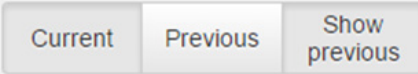
Name	Object	Log type	Decimal places	Trend resolution	Resolution data	Daily data	Log size	Created	Move up	Move down	Delete
CO2	8/4/1 CO2	Absolute value	0	1 hour	1 year	10 years	96 KB	2015.05.21 08:33			
Temperature	8/4/3 Temperature	Absolute value	1	1 hour	1 year	10 years	96 KB	2015.05.21 08:34			
Humidity	8/4/2 Humidity	Absolute value	0	1 hour	1 year	10 years	96 KB	2015.05.26 15:29			
Light intensity Solution Lab window A	12/1/12 WA Status value	Absolute value	2	1 hour	1 year	2 years	75 KB	2015.07.15 13:32			
Light intensity Solution Lab window B	12/2/12 WB Status value	Absolute value	2	1 hour	1 year	2 years	75 KB	2015.07.15 13:34			
Light intensity Solution Lab window C	12/3/12 WC Status value	Absolute value	2	1 hour	1 year	2 years	75 KB	2015.07.16 09:23			
Light intensity Solution Lab window D	12/4/12 WD Status value	Absolute value	2	1 hour	1 year	2 years	75 KB	2015.07.16 09:24			
Light intensity Solution Lab window E	12/5/12 WE Status value	Absolute value	2	1 hour	1 year	2 years	75 KB	2015.07.16 09:25			
CPU temperature	5/6/1 CPU temperature	Absolute value	0	5 minutes	5 years	10 years	4136 KB	2017.01.31 08:46			

Figure 7: Trend logs.

Trend logs User overview:



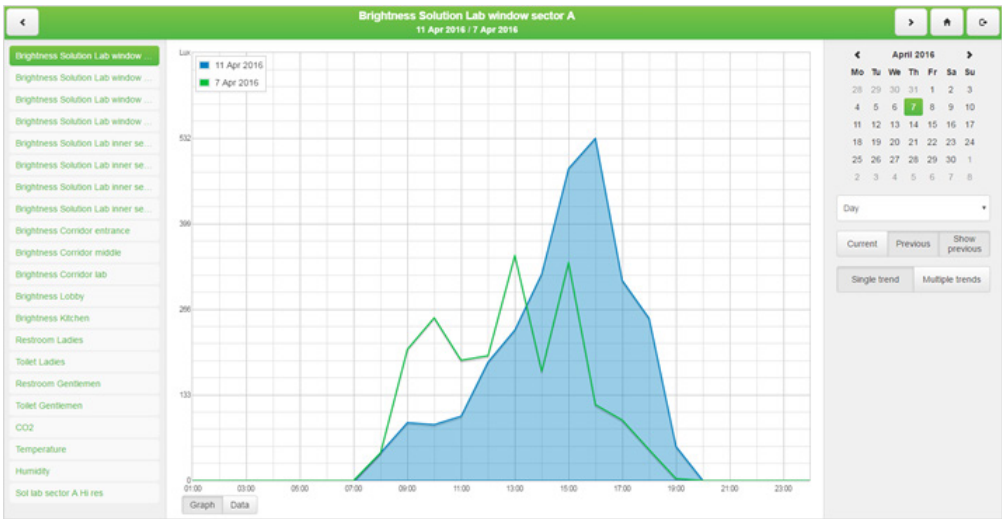
Selecting displayed period of trend(s).

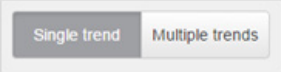


Current – for selection of current date.

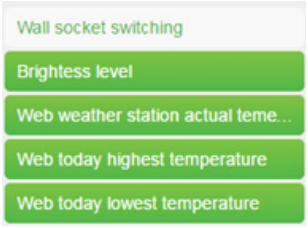
Previous – for selection of previous date.

Show previous – enable/disable function of previous values for selected time period (Day/Month/Year) for data comparison.

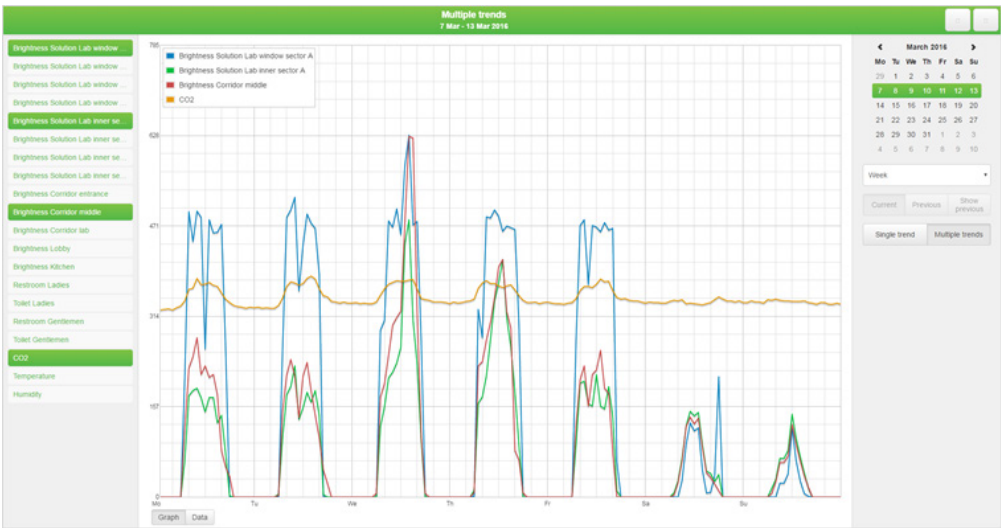




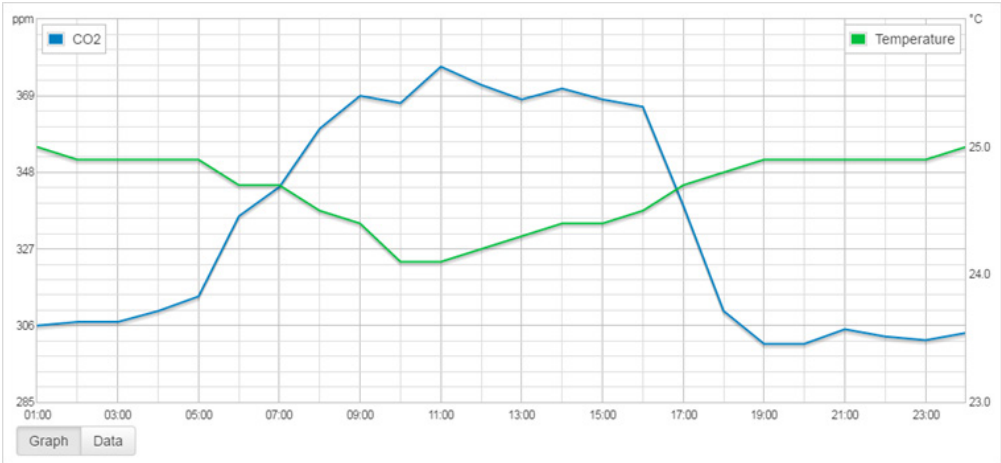
Selection between displaying single and multiple trends in Trends visualization.



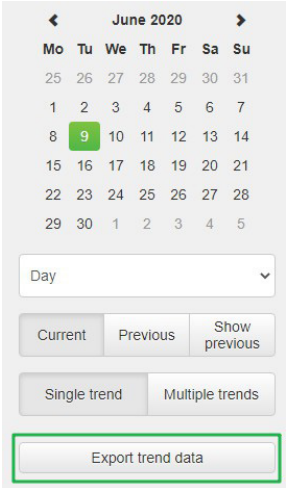
Selection of visible trends is done in Trends list.

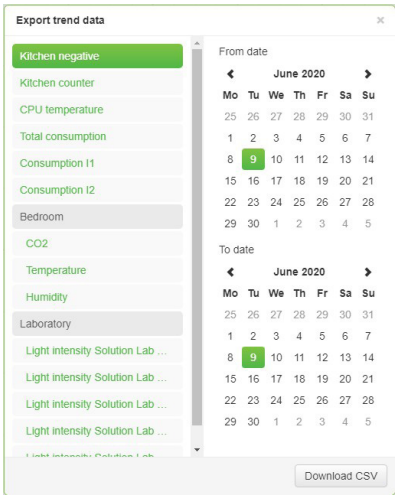


Automatic secondary axis – for two trends with different units / scales.



Data can be also exported in CSV format for further use.





Multiple trends export supported.

Trend's number have flexible limit based on total size of all trends. Each trend reserve part of system memory according to its settings. System will not allow you to create further trends when full. Do not store data for unnecessary long time or use high rate of trend sampling if not necessary. Export your trend data regularly.

13.1 Add New Trend Log

Object – Choose from the list of objects the one to make the trends for.

Name – Name of the trend.

Category - Sort trends to categories for better clarity

Log type – Type of the log.

Counter - Used to count the data.

Counter with negative delta - Used to count the data with alternately increasing/decreasing count. E.g. number of movement detection from PIR per hour.

Absolute value – Saves the actual readings.

Aggregate function – From stored data get one of chosen value (average, minimum, maximum or last value) and show it to graph. Each trend stores data for 3 periods:
1. Every minute (for the last hour) – data are added to the trend once a minute.
2. Once every X minutes (X = user selectable) – data are added to the trend every time which was selected by user.
3. Once in 1 day – data are added to the trend once in a day.
You can choose from: average, minimum, maximum and last value.

Trend Resolution - Average value of counted samples for specific time interval data will be shown on the trend. Example, if 1 hour – trend step will be 1 hour with average 60 readings data.

Decimal places – If the object is floating type, then the precision needs to be selected. Example, 1.1111 = precision is 4.

Resolution data – Time of storage of short term data. (Max.5 years.)

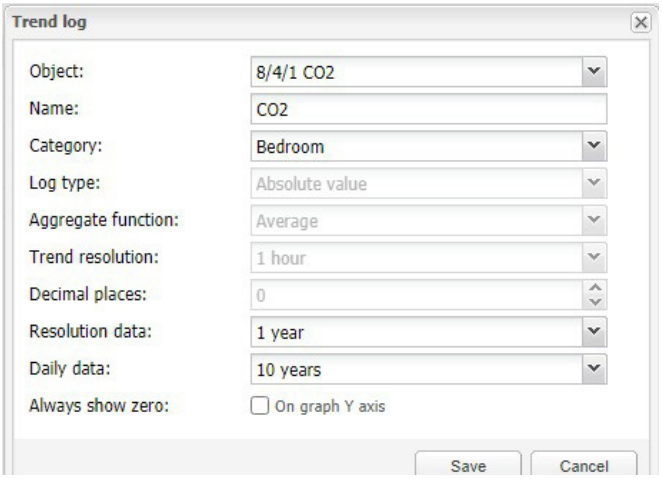
Daily data – Time of storage of long term data. (Max. 10 years).

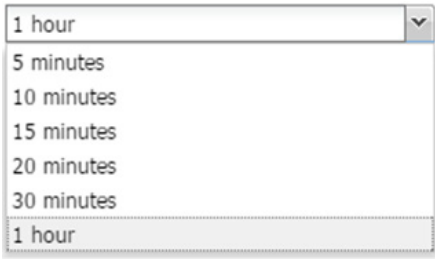
Always show zero: On graph Y axis. When selected Y axis is beginning on zero. Some measures never reach zero (e.g. CO2 level) and starting on lowest real value will improve trend resolution.

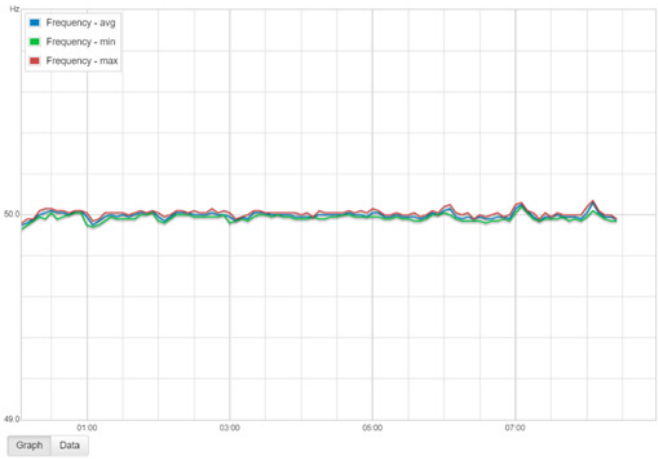
If the log type is set to **Counter**, it cannot have permanently decreasing tendency. For this option use **Counter with negative delta**.

Trend logs are stored in internal SD card memory.

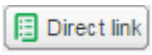
Trends visualization use is not recommended in the **Smartphone visualization**.



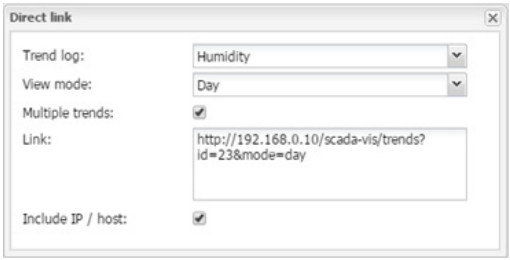




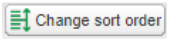
13.2 Direct link



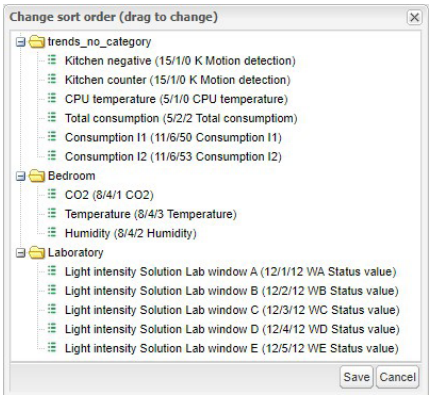
This icon will open dialog to create direct link for Trend's visulaization. View mode in Day/Week/Month/Year. Link can include IP adress of the host and display or not diplays muttiple trends.



13.3 Change sort ordering



This icon opens a window for drag&drop ordering for trend logs.



14 Scenes

Scene module allow to skip time consuming setting of scenes inside ETS and make scenes directly inside Wiser for KNX in few seconds.

Scenes overview

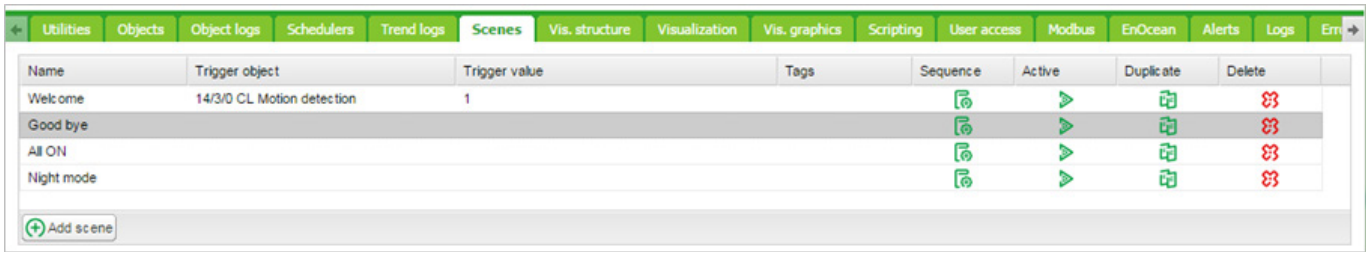


Figure 8: Scenes.

14.1 Adding new scene

press button to add new scene

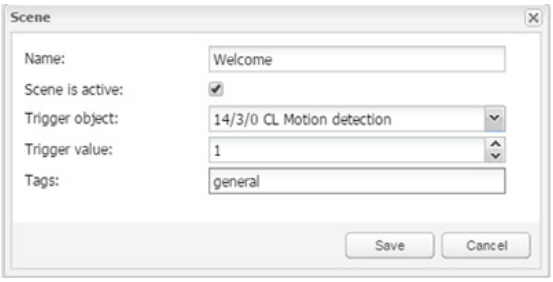
Name – scene name.

Scene is active – to enable disable scene.

Trigger object – object which is activating scene.

Trigger value – value of object for activating scene.

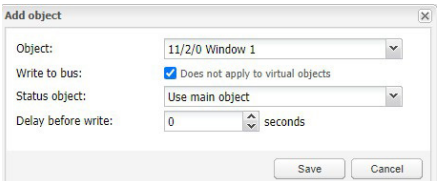
Tags – Scene tag (only for scenes not compatible with object's tags).



14.2 Adding sequence to Scene

click Sequence icon in Scene view.

Add object – add object and status object in order to create a sequence. Live values can be taken from Status object or main object. Possibility to specify a delay before write each sequence.

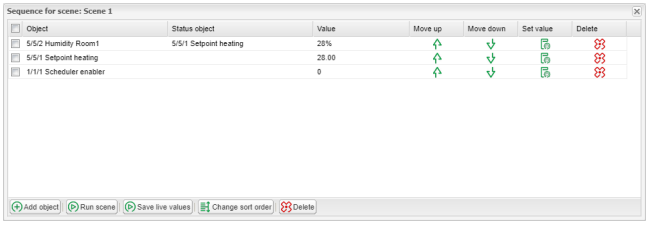


Run scene – run scene instantly

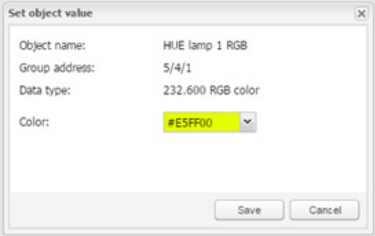
Save live values – save actual values of objects to the scenes

Change sort order – drag&drop ordering for sequence in scenes

Delete – delete sequence



14.3 Setting of object value

click **Set object value** to set value of object manually Scene's objects order can be sorted with move Up/Down arrows or deleted.	

15 Vis. structure

Vis. Structure is used for creating all building levels and visualizations plans. Additionally, it can create **Layouts** and **Widgets** for the plans visualization.

Starting new project, only **Layout** and **Widget** folders are visible. Adding new level, allows the end user to define specific **Plan** of the flat. **Layouts** and **Widgets** are additional tools which are not mandatory for basic visualizations; they can be defined and implemented in other **Plans**.

15.1 Levels

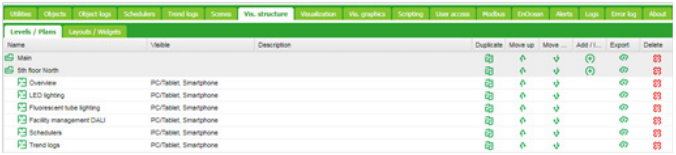
To add new Level, press

button. Main level usually is the project name. Additional levels can be added later.

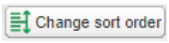
To import Level press

button.

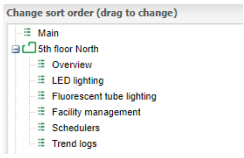
Plans/visualization structures can be imported from other project with possibility to keep/clear linked objects.



15.2 Change sort ordering



This icon opens a window for drag&drop ordering for vis. structure.



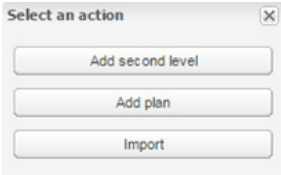
15.3 Second level

Second level is used in buildings with multiple floors.

If you need additional level press button next to the main level.

Select **Add second level** and give it a name and sort order.

Each level can be duplicated or imported together with sublevels and plans by pressing the duplicate icon next to the level.



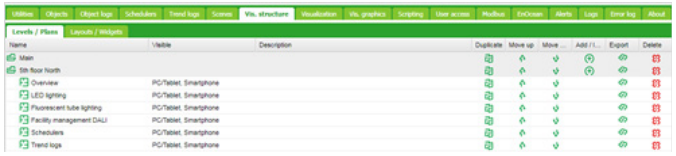
15.4 Plan

Plan can show either one room in a flat with cumulated functions or one function (as lighting or heating) of the whole flat. To add Plans press button next to a level under which the plan is to be added and select **Add plan**.

Name – Name of the plan.

Plan size – Size of the plan. For pre-defined sizes unfold drop-down menu .

Layout – Layout for this specific plan. All objects from Layout will be duplicated on this particular plan, including the background color and the plan image. If they are not defined separately for this specific plan. Layout should be created before adding the Plan.



PC/Tablet visualization

[Show, Show and make default, Hide] –Visibility for this particular plan in the PC/Tablet visualization.

Smartphone visualization

[Show, Show and make default, Hide] – Visibility for this particular plan in the Smartphone visualization.

Pin code – Possibility to protect each plan with Pin code. Minimum PIN is 4 digits with brute force protection.

Primary background image – Choose the primary background of the plan.

Secondary background image – Choose the secondary background of the plan for parallax look of the visualization. Select background previously added to **Vis. graphics -> Images/Backgrounds**.

Background color – Choose the background color of the plan.

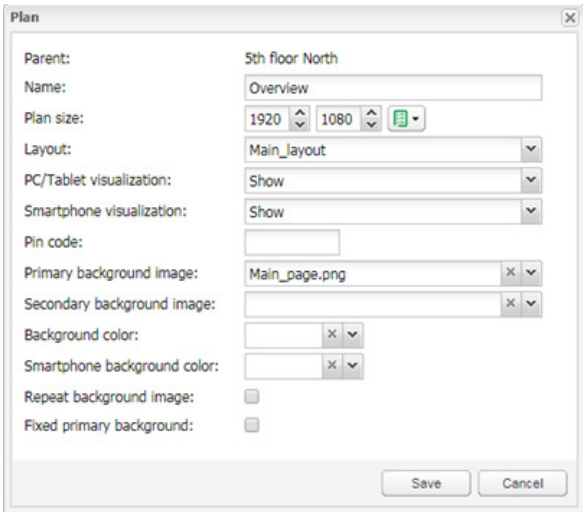
Smartphone background color – Choose the background color of the plan for Smartphone visualization.

Repeat background image – Either to show the image once, or repeat it and fill the whole plan.

Fixed primary background – Static primary picture in Parallax projection.

Each Plan can be duplicated together with all the components on a plan by pressing the duplicate icon next to the plan .

Content of the created Plan should be defined under the Visualization tab. Empty plan (no objects) will be not visible in visualization.

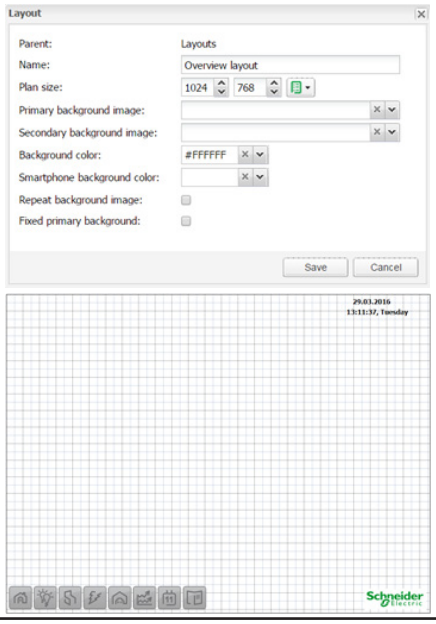


15.5 Layout

Layout is advanced background for plans. Any object from the editor can be placed on the layout which later can be attached to one or many plans. All objects from the layout will be visible on the plan, but all the objects on the plan will be above the objects from the layout.
To add Layout press button next to a Layout folder or Add new layout button.

Each Layout can be duplicated together with all the components by pressing the duplicate icon next to the Layout .

Content of this layout should be defined under the Visualization tab.



15.6 Widget

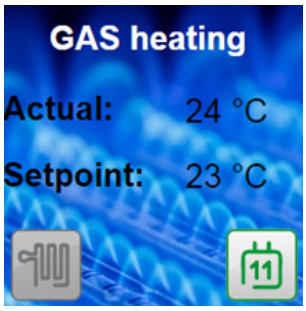
Widget is a small web page which can be attached to a button and pop-up when activated.

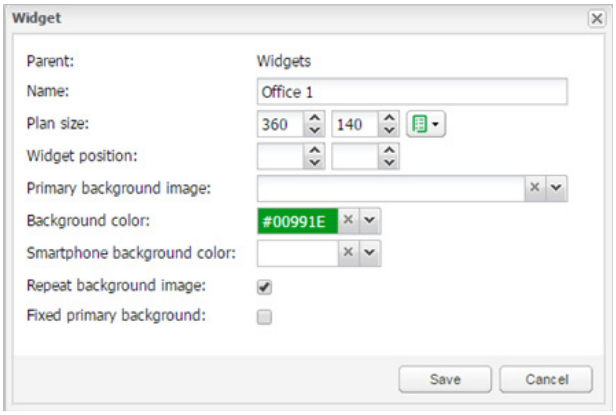
To add the widgets press button next to the widgets folder or Add new widget button. Each widget can be duplicated together with all the components by pressing the duplicate icon next to the widget .

Content of this widget should be defined under the Visualization tab.

Widget size always has to be smaller than the plan on which it is placed on.

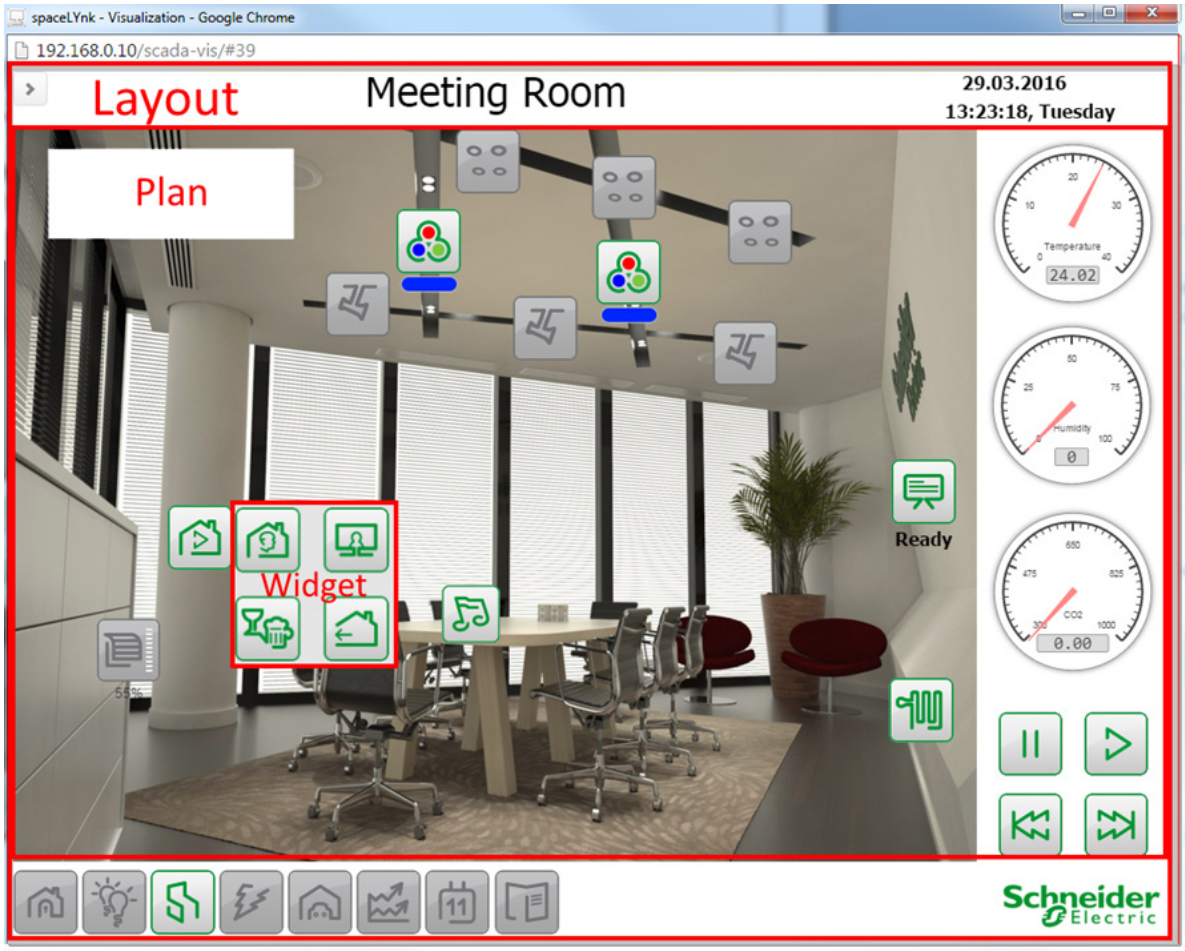
Empty widget (no objects) will be not visible in visualization.



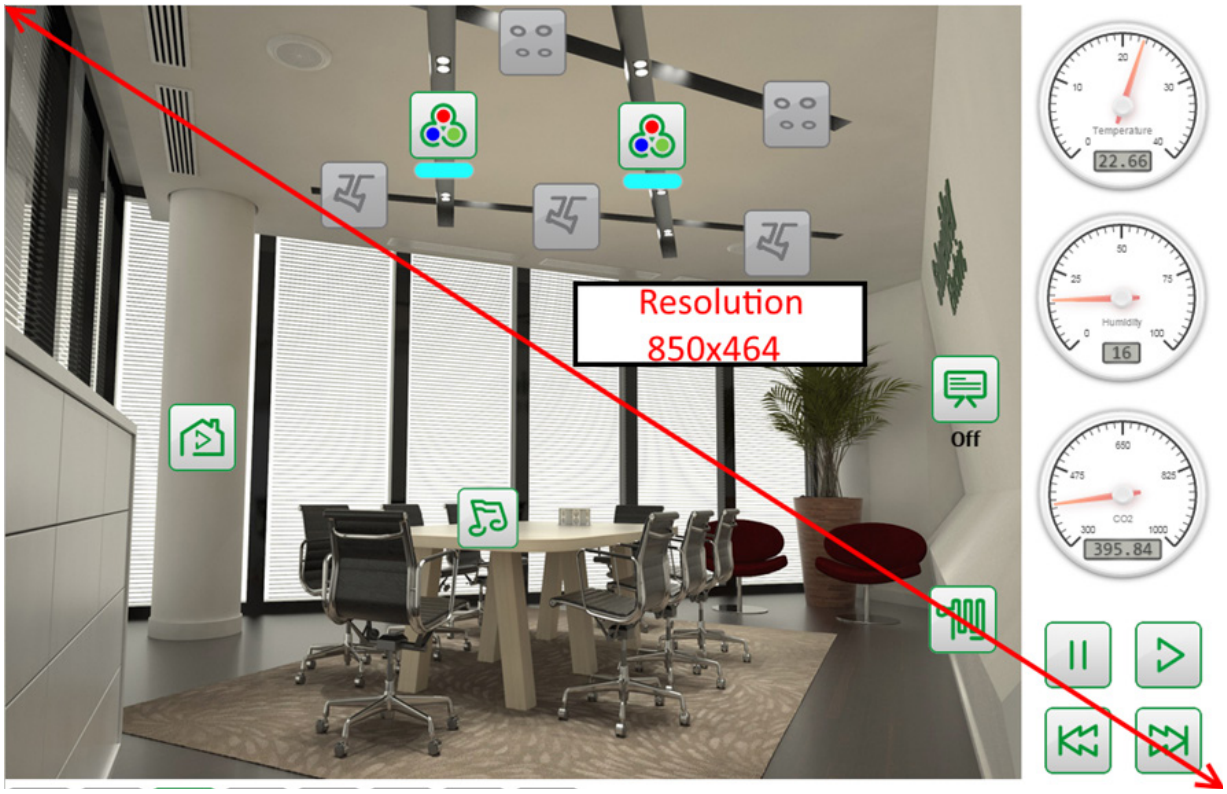


15.7 Visualization Structure Example

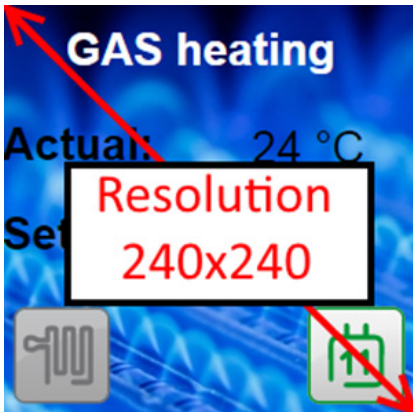
Plan



Layout



Widget



15.8 Visualization Object Order

Each object on visualization, has its priority which is described from the highest to the lowest order:

1. Text label on plan
2. Object on plan
3. Plan link as text on plan
4. Plan link as icon on plan
5. Camera on plan
6. Graph on plan
7. Gauge on plan
8. Image on plan
9. Frame on plan
10. Text label on layout
11. Object on layout
12. Plan link as text on layout
13. Plan link as icon on layout
14. Camera on layout
15. Graph on layout
16. Gauge on layout
17. Text label on layout
18. Image on layout
19. Frame on layout
20. Background of plan
21. Background of layout

Order of objects with the same priority is not defined and it can differ in the editor and PC/Tablet visualization.

16 Visualization

This window split into three sections:

1. Structure – Navigation tree for levels, plans, widgets which were created under the visualization structure tab.

2. Visualization map – Actual visualization field where you can add all visualization components.

3. Plan Editor – All parameters of the component are set up here.

Both side bars can be minimized by pressing icon making the plan more visible especially on small displays.

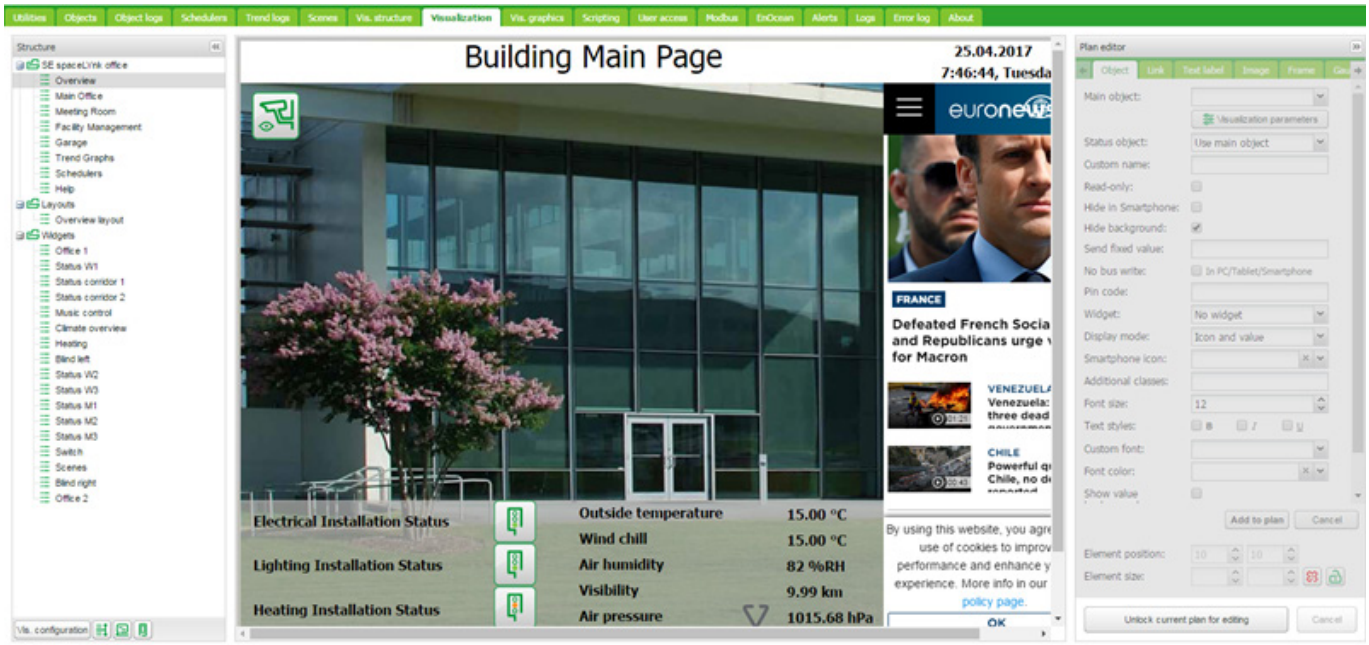


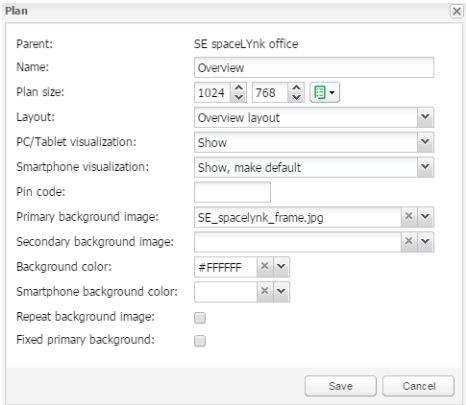
Figure 9: Visualization.

16.1 Structure

To navigate between the plans, layouts and **Structure** widgets using the navigation tree in the structured view.

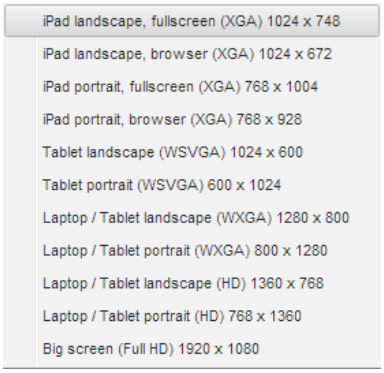
In the editing mode the following additional parameters are available:

- Size of plans, layouts or widgets.
- Source picture / background colour

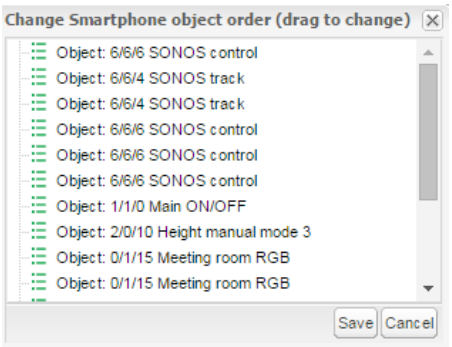


Size of the plan should be positioned correctly against the background. Widget size has to be always smaller than the plan on which it is placed. Always use the component position to align the objects.

Predefined size of the plans:



To order the object in the Smartphone visualization, press **Reorder Smartphone objects** button .



Next to the icon **Reorder Smartphone objects** there are two icons for a quick:

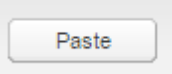
- Preview in PC/Tablet.
- Preview in Smartphone.

16.2 Visualization map

Each newly added object will be placed on the top left corner of the plan with vertical and horizontal spacing predefined in object menu.

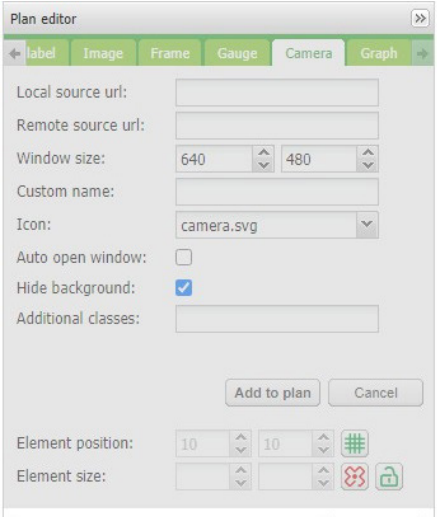
Selected object can be resized by pulling strip on the bottom or right side, deleted or duplicated (duplicated object will be displayed with predefined spacing). Snap to grid feature can be enabled by icon next to element possition.

Copy button provide possibility to copy existing visualization object from one plan to another.



Icon will be available if visualization object vas selected for copying.

Plan editor is located on the right side of the visualization map. Editing mode can be accessed by pressing **Unlock current plan for editing**.



16.3 Object

Every control or monitoring objects are configured under this tab. Different data types have different parameters.

Main object – List of existing group addresses on KNX/EIB bus, the ones available for configuration in the **Objects** tab. In order to speed up the selection, it is recommended to start writing group address.

Status object – List of the status objects on KNX/EIB bus. Control object can also be used as status.

Custom name – Name for the object. Custom name is important for Smartphone Visualization; if the name is left blank, the group address name is used instead.

Read-only – The object is read-only, no write (control) permission.

Hide in Smartphone – Do not show this object in the **Smartphone Visualization**.

Hide background – Hide icon background.

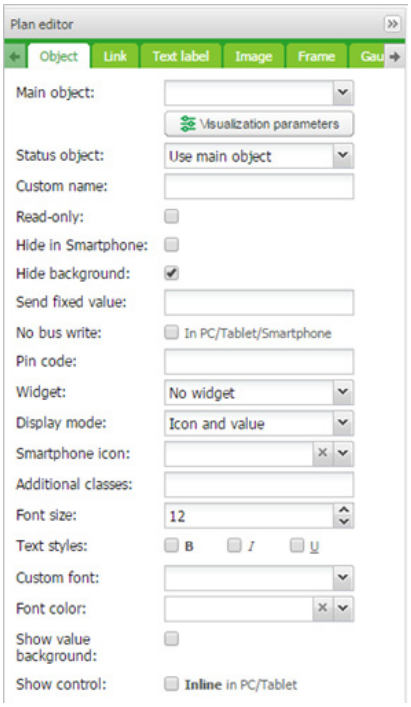
Send fixed value – Allows sending specific value to the bus each time the object is pressed.

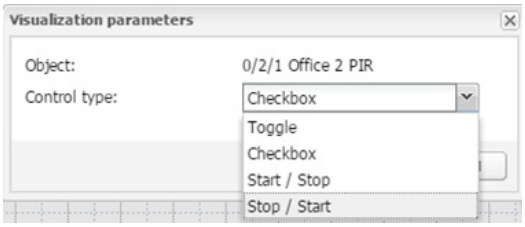
No bus write – Value will not be written in to KNX bus. Useful for triggering scripts with bus load limitation.

Pin code – Via adding a pin you can protect the object. Each time the value is changed the pin code will be requested to enter. Minimum PIN is 4 digits with brute force protection.

Widget –Widget can be attached to a button which needs to be created before. Widget cannot be tested in the editor mode; but only in PC/Tablet Visualization.

Display mode *[icon and value; icon; value]* – How to display the object.





Smartphone Icon – Default icon for Smartphone if differ from PC/tablet one.

On icon – On state icon for binary-type objects.

Off icon – Off state icon for binary-type objects.

Additional classes – Create additional class, which can be used in custom CSS file in order to modify particular group of graphical objects.

Font size – For value display text style can be defined.

Text styles – *[Bold / Italic / Underscore]* option.

Custom font – selection from installed fonts.

Show value background – show value background for improved readability.

Show control – If enabled, any control button graphics will change from a symbol to a switch . Visible only in PC/Tablet Visualization.

For value-type objects, additional button appears while specifying parameters – **Additional icons**.

Different icons for different object values can be defined in the window.

Object visualization parameters can be changed

via pressing icon . It refers to **Vis.parameter** in the **Objects** tab.

Global (per object) parameters – parameters shared for all visualization elements with the same object.

Local (per-element) parameters – settings only for certain visualization element

Override global parameters with local – object will be changed due to local status

Clear local parameters – reset local settings

Visualization parameters – settings of the parameters for visualization controll element. Control type, minimum and maximum value, step, colors and size can be set.

For value display text style can be defined.

After defining the object parameters, press **Add to plan** button and a newly created object appears. The object can be moved to any location of the plan.

Each object can be duplicated via pressing

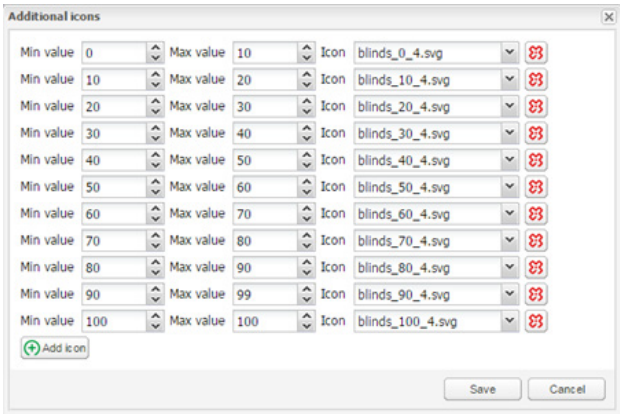
Duplicate button on the left side.

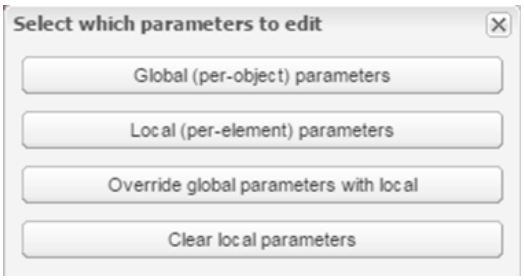
Cancel button will set the object parameters to default settings.

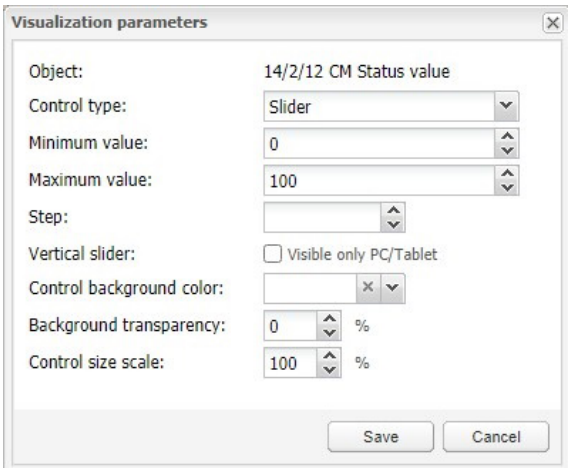
Element position – Can be added manually or by drag and drop of object for X and Y axis position on the plan.

Element size – Can be added manually or by dragging vertical horizontal strip of the object. Minimum value is 5x5 px.

Object size can be reset to default size by pressing reset icon . Aspect ratio of object can be locked by pressing lock icon .







In the editing mode, the object does not work. When all the necessary objects are added, press Save and reload floor plan button so that the objects start functioning.

Each added object can be edited while clicking on it in the Editing mode. Press Apply button after each change.

16.4 Link

In order to make the visualization more convenient, there are plan links integrated. Special icons on the map can be added which would act as a link to other plans.

Link to – Select plan link.

Custom name – Name for the link.

Hide in Smartphone – Do not show this plan link in Smartphone Visualization.

Hide background – Hide the icon background.

Display mode *[icon; value]* – how to display the plan link.

Icon – Icon which will be shown in the visualization. If only text is selected, text parameters are selected.

Active state icon – If icon is selected, then the active plan icon is available.

Additional classes – Create additional class, which can be used in custom CSS file in order to modify particular group of graphical objects.

Font size – Size of font.

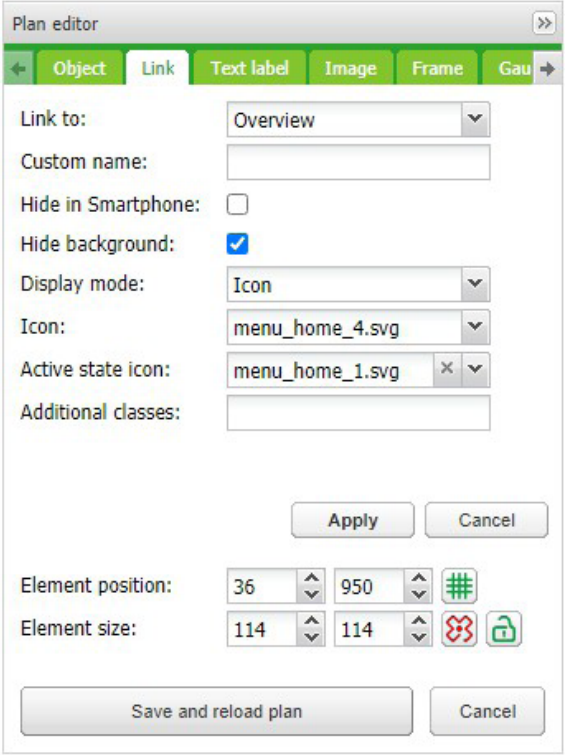
Text style – Text style – bold, italic, underscore.

Custom font – Font name.

Font color – Font color.

Element size and position – see **Plan editor> Object** tab.

It is recommended to use the Layout for menu and plan link creation. You can save time while adding it to different plans and later when making changes. By adding it to different plans it would save time and be beneficial when changes are required.



16.5 Text label

Text labels can be added and moved across the visualization map.

Text – Label text

Font size – Label font size

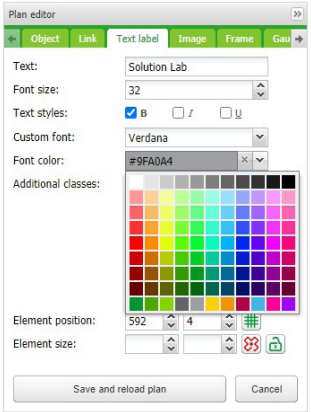
Text style – Style of the text – bold, italic, underscored

Custom font – Font name

Font color– Label font color

Additional classes – For custom CSS styles

Once the label parameters are defined, press **Add new object** button and newly created label will appear on the map. The object can be moved to the desired location. Press on **Save and reload floor plan** button so the label starts functioning.



Last two rows in the color palette refer to the predefined Schneider Electric corporate colours

16.6 Image

Image section allows adding images from Local storage or from the internet into the visualization map. External image is useful for example, to grab dynamic weathercast images.

Image source *[Local, Remote]* – Select image source.

Select image – Select image previously added to **Vis. graphics -> Images/Backgrounds**.

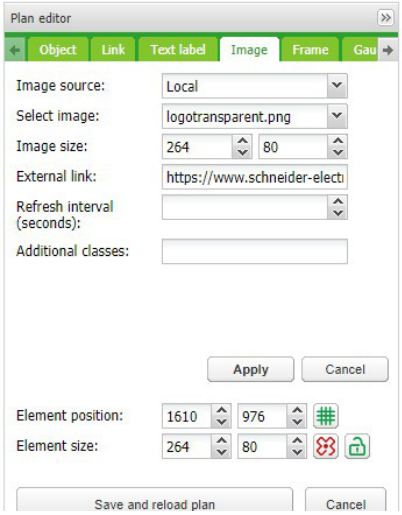
Image size – size of image.

External link – External link URL when pressing the image example: http://www.schneider-electric.com/

Refresh interval – interval of refreshing the picture when used from external source.

Additional classes – For custom CSS styles.

Once the image parameters are defined, press **Add to plan** button and newly created object will appear on the map. The object can be moved to the desired location. Image can be freely resized via holding the edge of the image and move. Press **Save and reload plan** to apply changes.



16.7 Frame

Frame allows displaying internal or external webpage in visualization. **Schedulers** and **Trends** can be integrated into the frame.

Source – Select Scheduler, Trend log or external URL.

Url: - Source URL of external webpage.

Frame Size: Width/Height of the frame

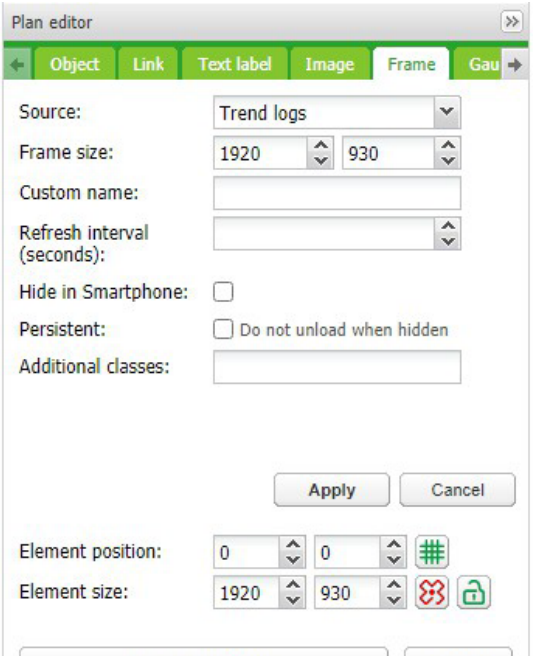
Custom name - Specify the title of the frame.

Refresh interval (seconds): - Refreshing rate for frame content (max. 3600 s).

Persistent: By default, frames are loaded once plan is visible and removed when plan is hidden for performance reasons when many frames are used. Persistent frames are loaded on init and are not removed. This is need i.e. for alerts app.

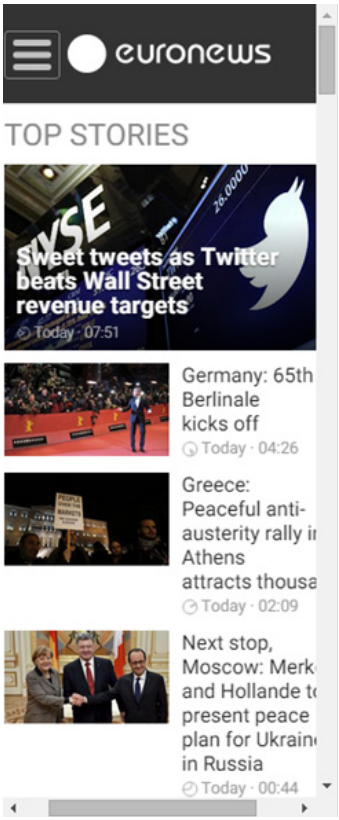
Hide in Smartphone - When ticked, not available in the Smartphone visualization.

After defining the frame parameters, press **Add to plan** button and newly created object will appear on the map. The frame can be moved to the desired location. Frame can be freely resized via holding the edge of the Frame and move. Press **Save and reload plan** button so the frame starts functioning.



Be aware:

- Some web pages have java script which prevent from using frame, if this is implemented, the webpage will open in full screen rather in the frame
- It is recommended to stretch the frame to maximum width if Scheduler or Trend is used. Recommended minimum width is 1024.
- Frame is only visible under PC/Tablet Visualization.
- Do not allow Scheduler or Trend to be viewed from Smartphone visualization. Settings are available in **Vis. structure** under dedicated plan.



16.8 Gauge

Gauge allows dynamic way of visualization and changing the object value in the gauge.

Data object – KNX group address.

Gauge size – Size of the gauge.

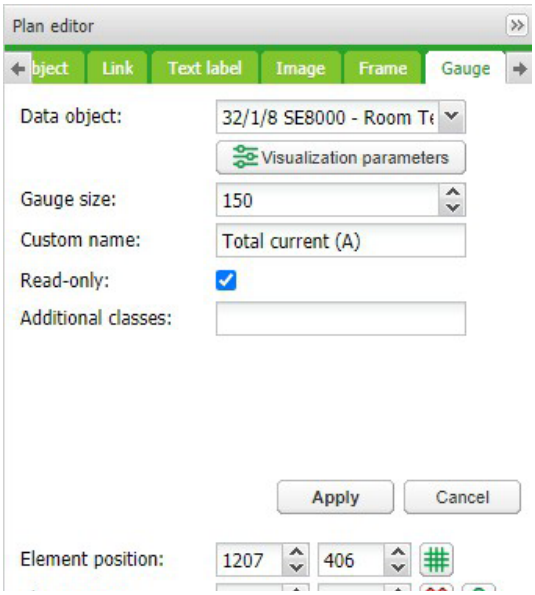
Custom name – Custom name for the object.

Read only – Make the gauge read only.

Additional classes – Create additional class, which can be used in custom CSS file in order to modify particular group of graphical objects.

After defining the gauge parameters press **Add to plan** button and newly created object will appear on the map. The object can be moved to the desired location.

Press **Save and reload plan** button so that the gauge starts functioning.



16.9 Camera

spaceLYnk supports third party IP web camera integration into its visualization.

Only cameras which support HTTP MJPEG streaming in web browser can be visualised.

Local Source url – Local source address of the video stream available on same sub-network.

Remote Source url – Remote source address of the video stream. Remote camera stream is displayed when client IP is from different sub-network than the server.

Window size – Width and height for displaying the graph.

Custom name – Name for the object.

Auto open window – Automatically open video window when plan is open.

Additional classes– Create additional class, which can be used in custom CSS file in order to modify particular group of graphical objects.

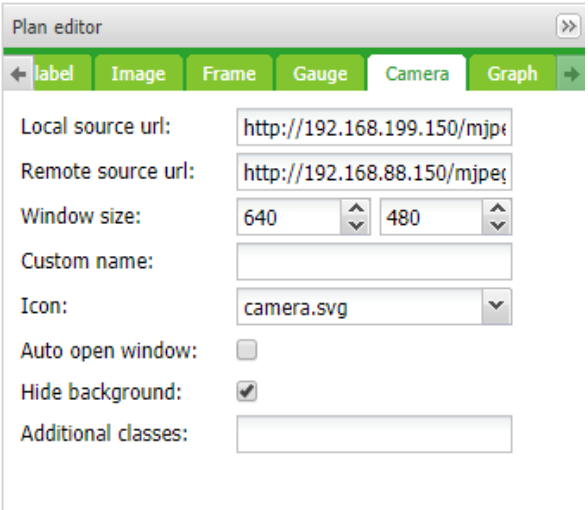
Hide background– Hide icon background.

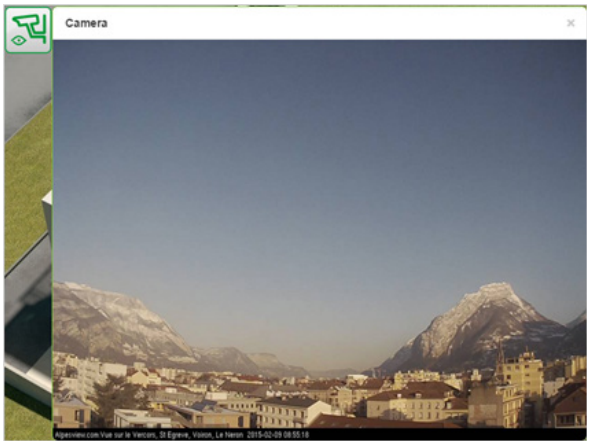
Sort order – Order cameras for touch visualization

If IP camera requires user name and password, enter the Url accordingly: http://USER:PASSWORD@IP

Be aware:

- Feel free to change icon or its label for your camera
- spaceLYnk is only a redirecting stream from camera to the browser. If the stream does not work, it is a web browser issue not the spaceLYnk.
- If it is a cameras issue, please check if the video stream is available in the browser.
- If the camera is available from external, the IP of the camera need to be port forwarded trough the router. While adding the external camera, IP with the correct port has to be used (IP:port). If the local IP is used, then the camera will not be available externally.
- Contact Technical support of the camera manufacturer if the direct video stream is hidden by the manufacturer.





16.10 Graph

Real-time graphs can be integrated into visualization system to monitor the current and the old value of the scale-type objects. Make sure logging is enabled for the object in the **Object** tab where values are planned to be shown in the graph.

Data object – Group address of the object.

Object must have **Log** option activated for **Graph** to be active in **Visualization**.

Custom name – Name of the object.

Icon – Icon to launch the graph.

Window size – Width and height for displaying the graph.

Number of points – Number of data points to show in the graph. (Maximal 200 points).

Auto-follow value – for objects which never reach zero value e.g. CO2 level. Improves graph resolution.

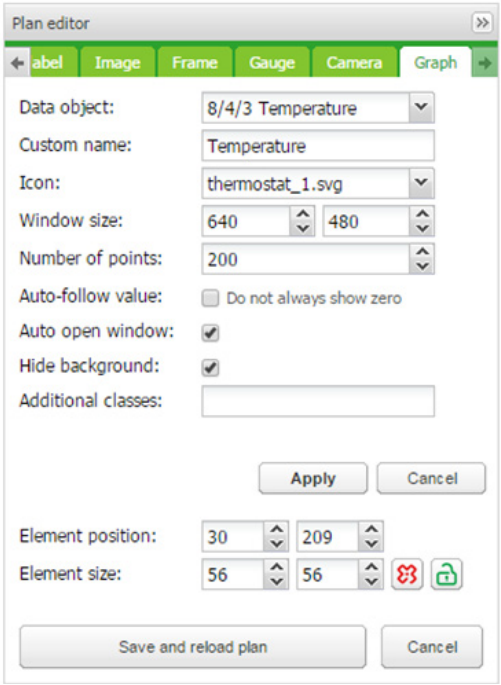
Auto open window – Graph window is automatically opened.

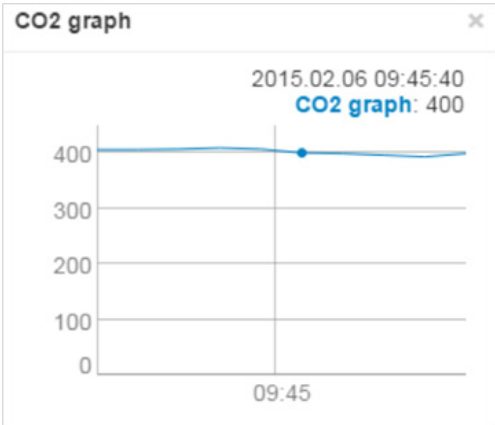
Hide background – Hide icon background.

Additional classes – Create additional class, which can be used in custom CSS file in order to modify particular group of graphical objects.

Once the graph parameters are defined, press **Add to plan** button and newly created object will appear. The object can be moved to the desired location.

In the editing mode, the graph will not work. Press **Save and reload plan** button so that the objects start functioning. (With delay for obtaining relevant data.) Object from which the data are obtained must be set as logged in **Object's properties**.





16.11 Launching Visualization on iPhone

Please follow the next steps:

1. Make sure the iPhone is connected wirelessly to the Wiser for KNX (through separate access point – wireless router).

2. Enter Wiser for KNX IP (default **192.168.0.10**) in iPhone web browser.

3. Click on the **Smartphone visualization** icon

.

4. Application's link can be saved providing a shortcut in the iPhone for easy access with full screen view by pressing "Add to Home Screen" icon in the "Share" menu of the Safari browser.

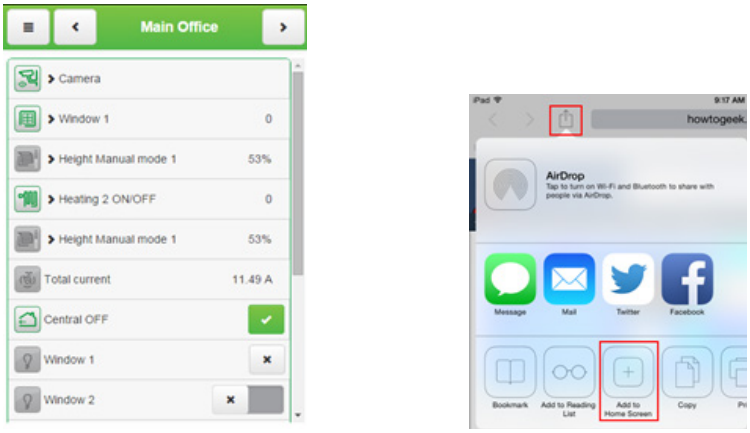


Figure 10: Launching Visualization on iPhone.

16.12 Launching Visualization on PC

For PC, Tablet or Any Other Touch Device with Large Screen, please follow the next steps:

1. Ensure the PC/Tablet device is able to access Wiser for KNX, and enter the IP in the browser (default **192.168.0.10**).

2. Click on **PC/Tablet visualization**

3. Select the desired Plan.

4. Sidebar can be minimized by pressing on icon to make the map more visible.

17 Vis. graphics

This tab is split into three sections. **Icons** where all object icons are located, **Images/ Backgrounds** for all the locally stored pictures and **Edit custom CSS** to create or edit the custom cascade style sheets.

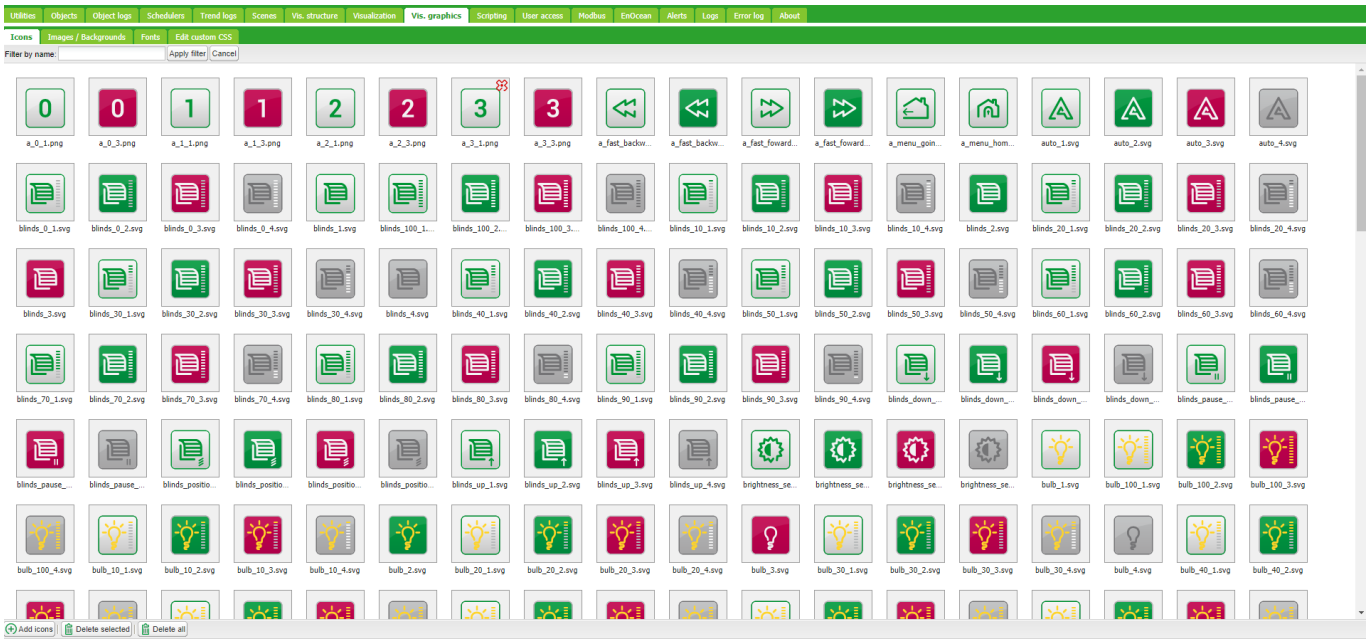
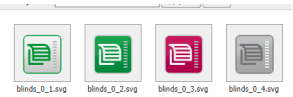


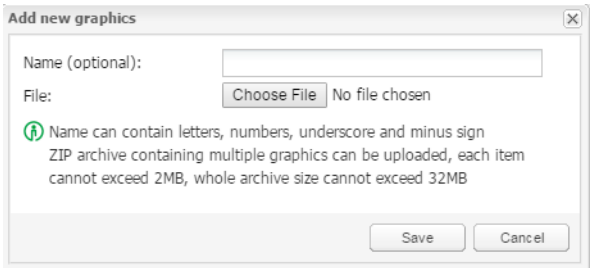
Figure 11: Vis. graphics.

Filter by name - Filter icons or images / backgrounds graphics according name.

Press **Add new icon** button to add a new entry. The system accepts any icon size.



Jpeg, Gif, PNG and SVG formats are supported. Name can contain letters, numbers, underscore and minus sign. ZIP archive containing multiple graphics can be uploaded, each item cannot exceed 2 MB, and whole archive size cannot exceed 32 MB.



Name (optional) – The name of the icon. It will appear in the list when adding new object. It can contain letters, numbers, underscore and minus sign.

File – Icon file location.

CSS style can be changed via uploading new file. CSS define all control buttons, Smartphone visualization, Scheduler and Trend. For more information on how to modify the CSS file, please contact your local front office for additional document.

Clear cache of the browser after uploading new CSS file.

18 Scripting

Scripting menu allows adding and managing various scripts, depending on the type of the script. Lua programming language is used to implement user scripts.

General scripting description

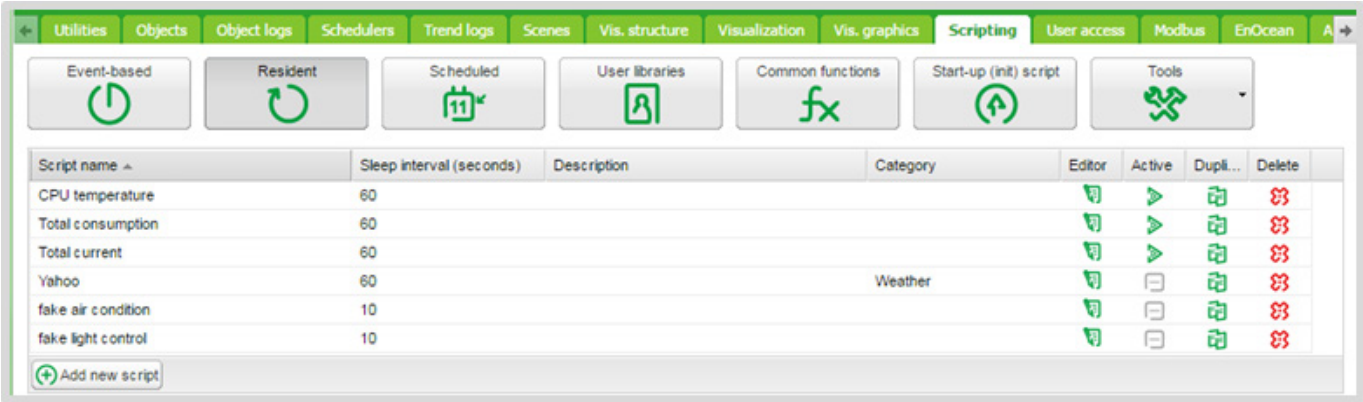


Figure 12: Scripting.

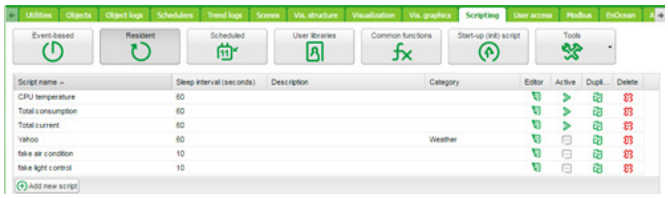
There are four actions you can do with each script:

- **Editor** – Enter scripting editor to write specific code for the particular program.
- **Active** – Make script active (green) or deactivate it (grey).
- **Duplicate** – Duplicate the script with its source code.
- **Delete** – Delete the script. When pressing this icon, the confirmation is asked to accept the delete.

Programing in LUA and code samples are further described in:

AN046_ Programming_in_LUA_with_Wiser for KNX

18.1 Event based

⚠ Data format — in most cases data is stored and transferred between Wiser for KNX parts using hex-encoded strings (2 bytes per 1 byte of data). These are scripts that are executed when a group event occurs on the bus. Usually used when real-time response is required. The following fields should be filled when adding a new script: **Script name** – The name of the script. **Group address/tag** – Group addresses or tag must be entered. It can be entered manually or selected from the drop-down list.	

Group address - Allows to enter only digits from 0 to 15 and / as a separator. When icon appears on the right side of the text-box, wrong address form is used. Correct form of the group-address is, for example, 1/1/1.

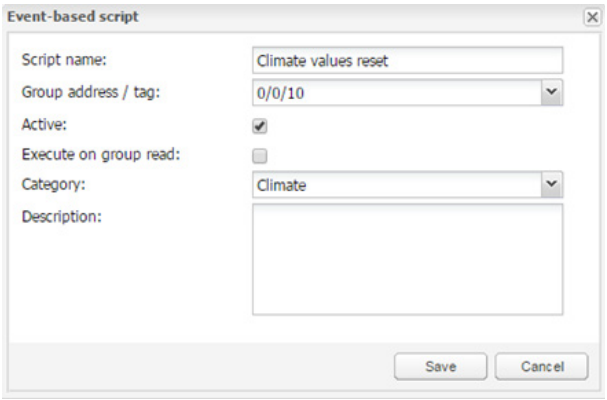
Tag - Script can run on tags. If group addresses have tag attached to and script is using tag, then any telegram which is sent to the group with this tag will execute the script.

Execute on group read - Run script with every group read.

Description – Description of script.

Category – A new or existing name of the category the script will be included. This will not effect on script action, helps only by grouping the scripts and watching by categories in **Tools > Print** script listings page.

Active – Specifies whether the script is active (green circle) or disabled (red circle).



If the script is run only on read request, use the following script example:

```
if event.type == 'groupread' then
-- script here
end
```

18.2 Resident

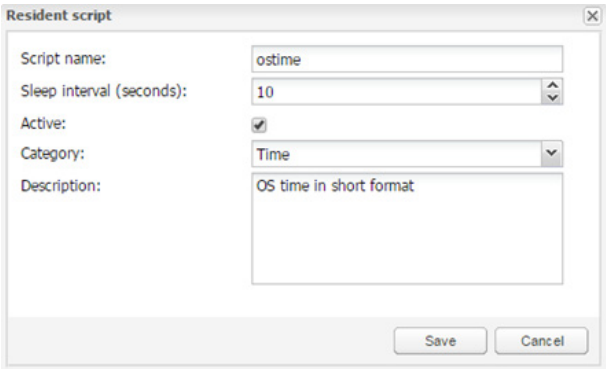
Script name – The name of the script

Sleep interval (seconds) – Interval after which the script will be executed.

Active – Specifies whether the script is active (green circle) or disabled (red circle).

Category – A new or existing name of the category the script will be included. This will not effect on script action, helps only by grouping the scripts and watching by categories in **Tools > Print** script listings page.

Description – Description of the script.



18.3 Scheduled

Script name – The name of the script.

Minute – Minute.

Hour – Hour.

Day of the month – Day of the month.

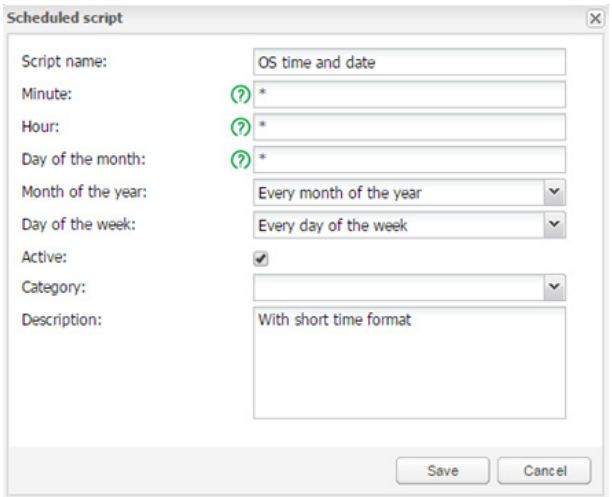
Month of the year – Month of the year.

Day of the week – Day of the week.

Active– Specifies whether the script is active (green circle) or disabled (red circle).

Category – A new or existing name of the category the script will be included. This will not effect on script action, helps only by grouping the scripts and watching by categories in **Tools > Print** script listings page.

Description – Description of the script.



18.4 User libraries

User libraries usually contain user defined functions which could be called from other scripts.

Secure the Code

There is an option **Keep source** available for user libraries. Once disabled, the code is compiled in the binary form and cannot be seen for further editing. If this option is enabled, the source code is seen in the editor.

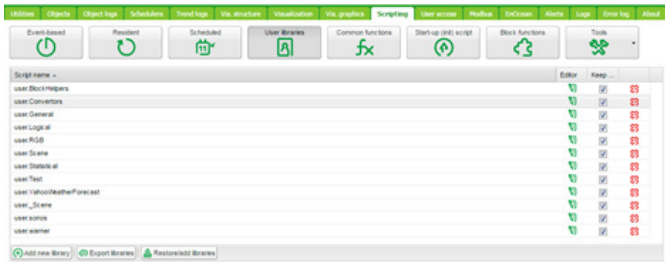
Auto load library option will load selected script when Wiser for KNX starts.

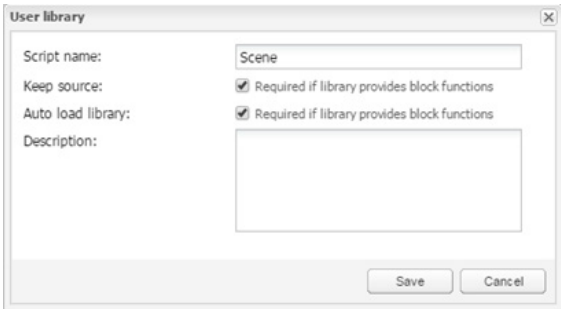
Include the Library in the Scripts

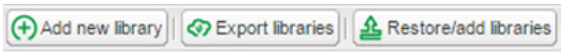
To use functions defined in user library, they should be included in the beginning of the script, for example, user library with the name 'test' should be included as below: **require('user.test')**

User Libraries can be backed up and restored/added from archive.

The existing library will be replaced by imported one.

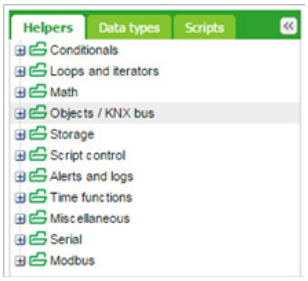






18.5 Common functions

Common functions contain library of globally used functions. They can be called from any script, any time, without special inclusions with **User libraries**. Functions like sunrise/sunset; Email is included by default in **Common functions**.



18.6 Start-up script

Init script is used for initialization on specific system or bus values on system start. Init script is run each time after the system has restarted (power up, reboot in the SW or via hardware **Reset** push button).

18.7 Tools

Backup scripts – Backup all scripts in *.gz file.

Script backup does not backup user libraries, those have to be backed up separately.

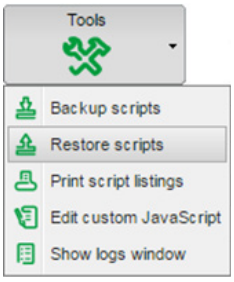
Restore scripts – Restore script from archive (*.gz) file with two possibilities:

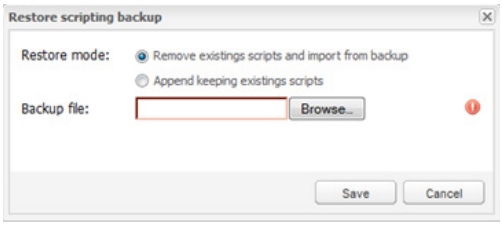
- Remove existing scripts and import from backup.
- Append keeping existing (s) scripts.

Print script listings – Shows all scripts with codes in list format sorted by Categories.

Edit custom JavaScript - insert Java script code for script control.

Show logs window – All log data are listed here; it is a duplicated window **Configuration/Logs**. It allows debugging a script and in parallel checking the logged data.





Example: Sample code for 1byte object 1/0/0 controlling navigation between pages according to page number.

```
$(function(){
 /* Create event listener on 1/0/0 to jump to page with object value */
 addr = Scada.encodeGroupAddress('1/0/0');
 objectStore.addListener(addr, function(obj, type) {
  /* to avoid execution on opening page */
  if (type == 'init') {
   return;
  }
  /* jump to page with objectvaue */
  if ( currentPlanId != obj.value ){
   showPlan(obj.value);
   /* Write object back to 0 */
  setObjectValue({ address: '1/0/0', rawdatatype: 5 }, 0, 'text');
  }
  });
 });
```

18.8 Script Editor

When a script is added icon appears in the Editor column that allows opening a script in the scripting editor and re-working it with built-in code snippets. Code snippets save time and make the coding convenient. After clicking on the appropriate snippet, it automatically adds code to the editor field.

Keyboard shortcuts are implemented for help with script writing.

Logs and error window are also available.

Ctrl + F – Find syntax in a code, text will be highlighted in yellow.

Ctrl + G – After finding a text via Ctrl+F, we can use Ctrl +G to select the next syntax in a script.

Shift + Ctrl + G – Select previous syntax.

Shift + Ctrl + F – Replace syntax in a script by another one. You will be allowed to choose one by one if you want to change it.

Shift + Ctrl + R - Replace all syntaxes in a script by another one at once.

Ctrl + Space – Helps to auto detect code and write for you. Press Ctrl + Space and write first letter of a command, then select the correct one from the list.

There are six main groups of Script editor:

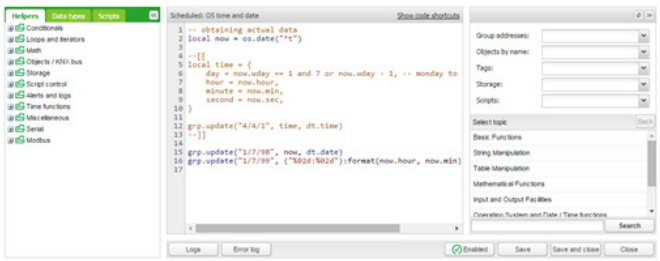
Helpers – Predefined code snippets, like if-then statement. Helpers consist of eleven main sub-groups: **Conditionals** – If Else If, If Then etc.

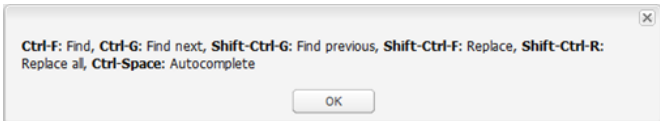
- **Loops and iterators** – Array, Repeat...Until etc.
- **Math** – Random value, Ceiling, Absolute value, Round etc.
- **Objects/KNX bus** – Get object value, Group read, Group write, Update interval etc.
- **Storage** – Get data from storage, Save data to storage.
- **Script control** – Get other script status, enable or disable other scripts.
- **Alerts and logs** – Alert, Log variables, Formatted alert.
- **Time functions** – Delay script execution.
- **Miscellaneous** – Sunrise/sunset etc.
- **Serial** – Communication through internal Wiser for KNX I/O ports.
- **Modbus** – Create RTU/TCP connection, Write register, Read register etc.

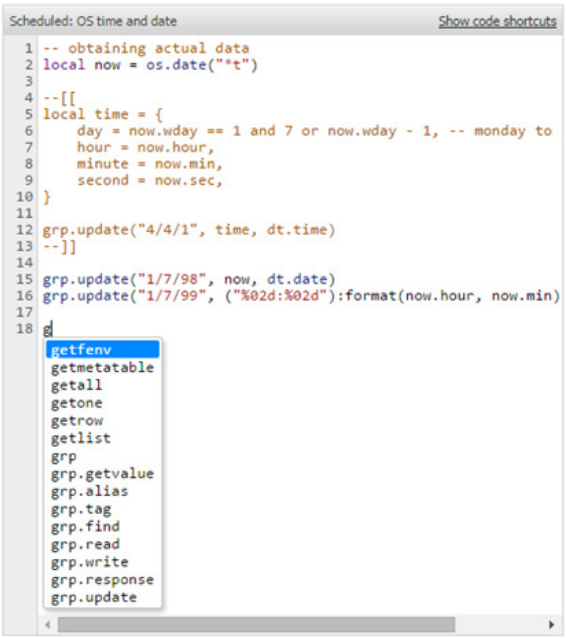
Group addresses – Existing group addresses on the KNX bus.

Objects by name – Chose object by name.

Tags – Choose object by tag.







Data types – Choose object by data type. **Scripts** – List of already made scripts consist 4 sub-groups: **Event** – based- List of event-based scripts. **Resident** - List of resident scripts. **Scheduled** – List of scheduled scripts. **User libraries -** List of common functions a Star-up (init) scripts.	

19 User access

User access menu allows creating and managing user's accounts.

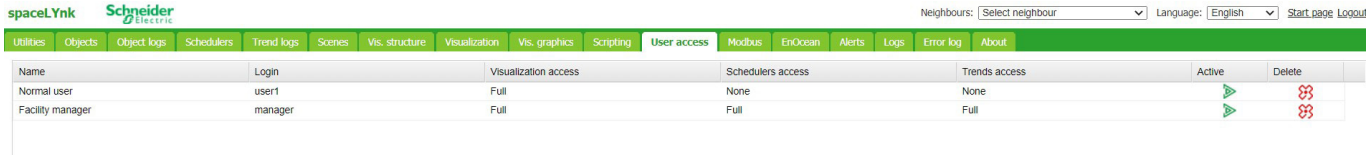


Figure 13: User access.

Amount of users is recommended < 8 in Wiser for KNX.

Add new user

Click on Add new user icon to add new user.

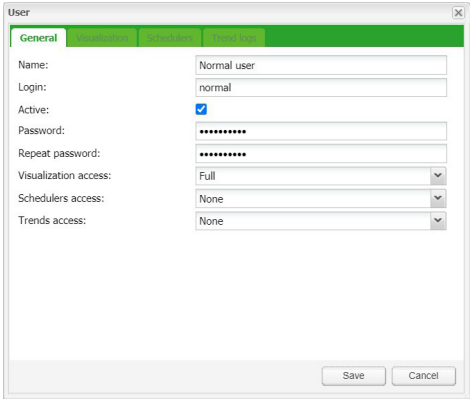
User name – Name of account.

Login – Length 2 to 20 characters, accepted characters: "-", "_", "a-z", "0-9".

Active: Active / deactivate user account

Password – Length 6 to 20 characters. Any character accepted. See chapter **"1.3 Passwords recommendation"** for security recommendations.

Visualization/Schedulers/Trend access – [None/ Partial/Full]. When Partial access selected, particular Visualization plans/Schedulers/Trend logs can be selected.



User access settings

Click on User access settings icon to manage user access settings.

Disable password for visualization – When active password protection is disabled for visualization access.

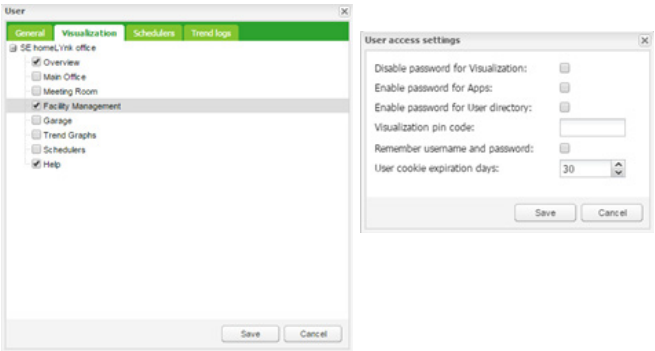
Enable password for Apps – password is requested when entering any App on main page.

Enable password for User directory – user directory on main page is hidden when active.

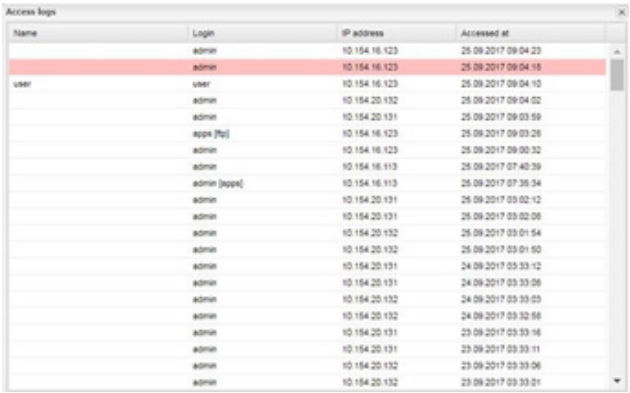
Visualization pin code – When active password protection is disabled the visualization can be protected by PIN code with minimal length 6 digits

Remember username and password – User's credential will be stored.

User cookies expiration days – web browser cookies will be deleted after selected amount of days.



Click on Access logs to view login history.



Unsuccessful logins are marked in red.

FTP and APPS logins are also logged.

20 Modbus

20.1 Characteristics

The Modbus open standard allows you to receive a more in-depth analysis of consumption in all areas of your building.

You can connect up to 31 Modbus slave devices of the following types of meters based on Modbus remote terminal unit (RTU) within one Modbus line:

- Schneider Electric energy meters
- Schneider Electric power meters
- Schneider Electric Smart Interface Modules (SIM10M module)
- Schneider Electric Smartlink
- Other Schneider Electric Modbus devices (e.g. SE8000, Modicon PLCs, etc.)
- Non-Schneider Electric Modbus TCP/RTU devices (offering you greater flexibility)

With the information which the Wiser for KNX provides, you can visualize energy or media consumption. This can also be used to reduce consumption through the use of control strategies within the KNX/IP network.

Modbus RTU is supported over RS485 interface. Modbus TCP is supported over Ethernet port. Modbus communication settings is done using **Modbus** tab in Wiser for KNX **Configurator**. Modbus registers can be easily mapped using predefined Modbus profiles.

Modbus Master can be controlled directly from scripts (usually resident script is used to read Modbus values after some specific time interval and write them into KNX object or visualization).

Once script is added, you can add the code in the Script Editor. There are lots of predefined code blocks in the Helpers.

⚠ Do not use Modbus settings using profiles together with Modbus controlled from scripts. Interference of those two settings can cause communication errors. We strongly recommend you to use rather Modbus device profiles than configuration by scripting.

20.2 Application Example

Requirements

- Measure and visualize how much energy is used for lighting an office building.
- Measure the gas and water consumption of the building.
- Monitor the quality of the network to ensure the operational safety of the IT equipment.

Solution

- Install an iEM3150 meter to measure the energy consumed by the lights.
- Install an iEM3255 meter to determine the power mains quality.
- Install a SIM10M module to measure gas and water consumption using pulse meters.
- Connect the devices to each other via Modbus.

20.3 Modbus RTU Interface

Characteristics of Modbus RTU Interface

Supported over RS 485 physical interface

Can act as Modbus/RTU Master or Modbus/RTU Slave

Supported Function Codes: #01, #02, #03, #04, #05, #06, #07, #0F, #10

Maximum 32 devices on bus (1 master and 31 slaves)

RS 485 interface is not isolated!

RS 485 Bus Topology Characteristics

Main RS 485 Characteristics

- Mode of operation: differential
- Voltage at any bus terminal: -7 V to +12 V
- Receiver Input Sensitivity: +/-200 mV
- Sink/Source current: 60 mA
- Built-in asymmetrical protection against transient voltages resulting from electrostatic discharge (ESD), electrical fast transients (EFT), and lighting.
- Non isolated RS-485 interface.

Connection Type	• point-to-point connections • point-to-multipoint connections
Type of Trunk Cable	shielded cable with 1 twisted pair and at least a third conductor
Maximum Length of Bus	1,000 m (3,280 ft) at 19,200 bit/s with the Telemecanique TSX CSA• cable
Maximum Number of Devices (without repeater)	32 (1 UL) devices, i.e. 31 slaves
Maximum Length of Tap Links	• 20 m (65 ft) for one tap link • a total of 40 m (131 ft) for all tap links available on the bus

Common Ground Wires

- In order to keep the voltage between drivers and receivers within the allowed range (-7 V to +12 V), an additional third wire (in 2-wire systems) is required.
- This wire will be used as common circuit and must therefore be directly connected to protective ground, preferably at one point only for the entire bus.
- As grounding point for the entire bus you should choose the master device or its tap.

⚠ No terminal for cable shield. For longer cable in harsh environment we recommend you to place additional shield clamp close to the controller in order to drain EMC disturbances.

⚠ Earthed connectors from USB, RS232, LAN and Modbus are interconnected. Earth leakage currents may harm the operation of the controller.

Maximum Number of Devices without Repeater

An RS 485 network can principally have a maximum load of 32 devices.

If you want to connect more than 32 devices to a standard RS 485 driver, then integrate a repeater in your network.

Biasing the Network

When there is no data activity on the Modbus bus, i.e. all nodes are in receive mode and there is no active driver available, the state of the line is unknown. In these cases, the line is subjected to external noise or interference. In order to prevent the receivers from adopting improper states, the line needs to be biased, i.e. the constant state of the line must be maintained by an external pair of resistors connected to the RS 485 balanced pair.

RC Termination

To prevent unintended effects, like reflections, from occurring in your Modbus SL application, make sure to terminate the transmission lines properly.

Use RC termination to minimize the loop current and the line reflections. Furthermore, RC termination increases the noise margin.

Choose two serial capacitors of 1 nF (10 V minimum) and two resistors of 120 Ω (0.25 W) as line termination. Integrate these components at both ends of your Modbus SL communication line.

R Termination Only

If the client insists on the R=150 Ohm termination only (not RC), he must connect external polarization resistors himself 450 - 650 Ohm (at the master’s tap).

See the scheme in picture below.

Modbus interface isolation

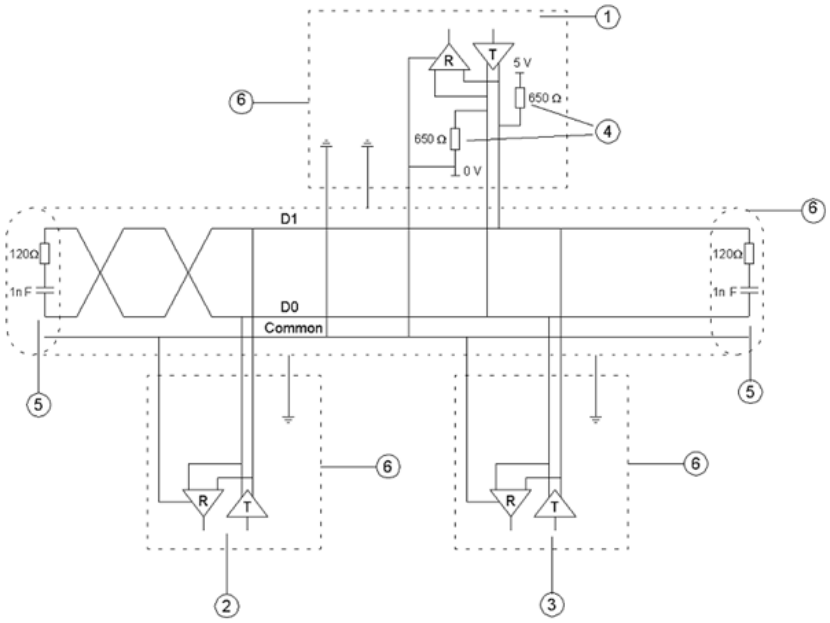
Modbus interface of Wiser for KNX is not isolated. We strongly recommend to use optic-coupler separation of Modbus line and Wiser for KNX RS485 interface. It will increase robustness of the Modbus network and reduce noise in the bus traffic.

Termination, polarization and separation using Schneider Electric devices

Schneider Electric delivers devices for RS 485 termination, polarization and separation Refer to following product numbers:

- TWD XCA ISO
- TWD XCA T3J

TWD XCA ISO and TWD XCA T3J devices can be used in order to ensure recommended RS 485 connection scheme (see the picture below). For more detailed information about TWD XCA ISO and TWD XCA T3J please refer to product documentation on Schneider Electric website.



Elements of the application

No.	Element
1	master
2	slave 1
3	slave n
4	polarization resistors
5	line termination
6	shield

Maximum cable length without termination

When cable is not terminated, you must adjust the transmission rate to cable length.

Maximum cable lengths without termination

Transmission Rate	9600	19,200	57,600	115,200
Bit Time (µs)	104.17	52.08	17.36	8.68
Bit Time/4 (µs)	26.0	13.0	4.3	2.2
Max. Cable Length Without Termination (m)	859	430	143	72

Modbus TCP Interface

Characteristics of Modbus TCP Interface:

- Supported over Ethernet interface 10Mb, 100Mb
- Can act as Modbus/TCP-IP Client or Modbus/TCP-IP Server
- DHCP support
- Max. opened TCP connections: 100
- Supported Function Codes: #01, #02, #03, #04, #05, #06, #07, #0F, #10

Grounding-Isolation

Metal cover of the RJ45 socket is connected to device ground.

20.4 Modbus Settings in spaceLYnk Using Device Profiles

General Procedure of Modbus Settings

All settings regarding Modbus communication in spaceLYnk are available in Modbus tab.

There are plenty of preinstalled device profiles, which are used for mapping the Modbus addresses (registers) to KNX group objects in spaceLYnk. If there is a need to read/write some Modbus register, you only set the mapping rules, which allows you to access Modbus register by read/write of KNX group objects.

In general, the procedure of Modbus communication settings can be divided into following steps:

1. Setting the details of Modbus RTU communication (baud rate, parity, …) in case you use Modbus RTU.
2. Make sure there is device profile uploaded in spaceLYnk. There are preinstalled profiles for Schneider-Electric devices. Custom Modbus profiles can be uploaded and used as well.
3. Add the device to the device list.
4. Configure the register mapping.

Automatic discovery

You can find Modbus devices connected to spaceLYnk over Modbus RTU using scan function. This function is placed here: Configurator -> Modbus -> RTU scan. Devices, which are marked as **“RTU scan = No”**, do not support automatic discovery.

List of preinstalled Modbus profiles in spaceLYnk:

Modbus device	RTU scan	Modbus device	RTU scan	Modbus device	RTU scan
Compact_NSX-Compact_NSX_E	No	PM-PM820	No	EM-EM6400	–
Masterpact_NT_NW-Masterpact_A	No	PM-PM850	No	EM-EM6433	–
Masterpact_NT_NW-Masterpact_H	No	PM-PM870	No	EM-EM6434	–
Masterpact_NT_NW-Masterpact_P	No	PM-PM9C	No	EM-EM6436	–
PM-PM1200	No	SIM10M	No	EM-EM6436 and EM-EM6436dual	-
PM-PM210	No	Smartlink-RTU	Yes	EM-EM6438	–
PM-PM3250	Yes	Smartlink-TCP	No	ION-ION6200	–
PM-PM3255	Yes	SE8300	No	ION-ION7300	–
PM-PM5110	No	SE8600	No	ION-ION7330	–
PM-PM5111	No	SER8300	No	ION-ION7350	–
PM-PM5310	No	TC303	No	ION-ION7550	–
PM-PM5330	No	iEM-iEM2150	Yes	ION-ION7650	–
PM-PM5350	No	iEM-iEM2155	Yes	Masterpact_NT_NW-Masterpact_E	–
iEM-iEM3150	Yes	Vigilohm IM20	Yes	PM-PM500	–
iEM-iEM3155	Yes	Vigilohm IM400	Yes	PM-PM5111	–
iEM-iEM3250	Yes	PowerTag	No	PM-PM5320	–
iEM-iEM3255	Yes	CM-CM3250	–	PM-PM5331	–
iEM-iEM3350	Yes	CM-CM3350	–	PM-PM5340	–
iEM-iEM3355	Yes	CM-CM4000	–	PM-PM5341	–
PM-PM710	No	Compact_NSX-Compact_NSX_A	–	PM-PM5560	–
PM-PM750	No	EM-EM3550	–	PM-PM5561	–
PM-PM810	No	EM-EM3555	–	PM-PM5563	–

20.5 Add new Modbus device

In order to add new Modbus device to spaceLYnk configuration press

button.

Connection type

[RTU(RS-485), TCP/IP]

Select connection type of Modbus device.

Name – Define name of Modbus device.

Status object – Connection with Modbus device can be monitored by Status object. When the communication is broken, status object is set to 0.

Profile – Select Modbus profile of your device. You can use preinstalled profile or your custom device profile. Custom profiles needs to be created and uploaded to spaceLYnk before. Procedure of device profile creation is described in section *New Profile Definition*

Device address – Set slave address of your Modbus device.

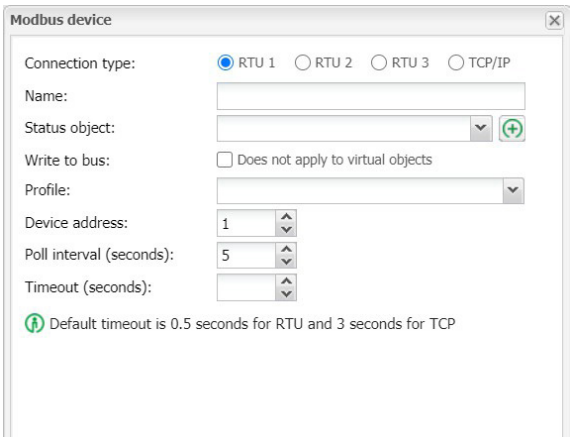
Poll interval – Set how often the values are polled from Modbus slave device. Value 5 means that new values are read every 5 seconds.

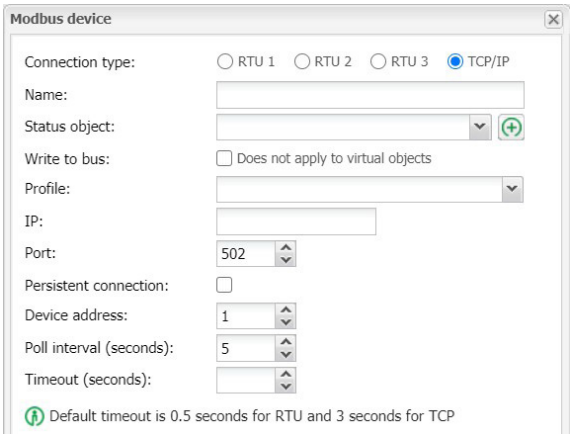
Timeout – if there is error in connection device will wait for set time and then send error message to Error log

IP – Set IP address of the Modbus device (in case you use Modbus TCP). If Modbus device is connected over Modbus gateway, IP address of the gateway has to be set here.

Port – Set port for Modbus TCP communication. Default value given by Modbus standard is 502.

Persistent connection – keeps connection open. When disabled, controller read out all registers and disconnect.





20.6 Modbus RTU settings

In order to communicate with Modbus slaves connected over Modbus RTU (serial), it is necessary to enable the communication and set the connection details.

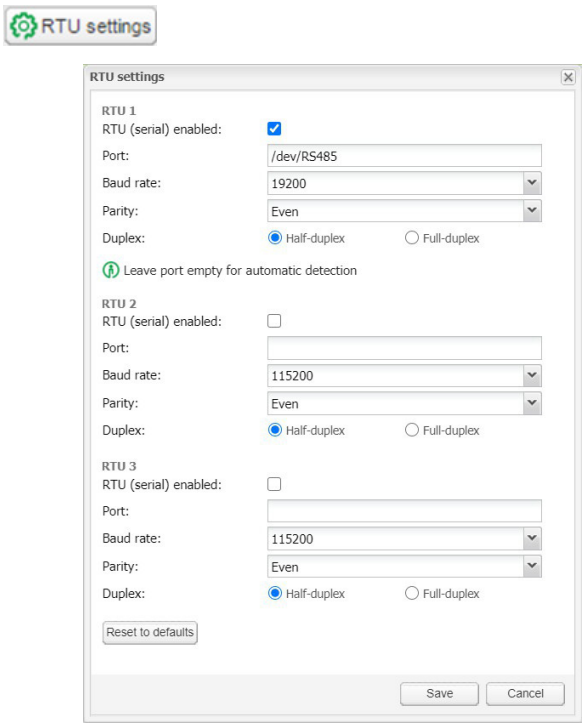
RTU (serial) enabled – This option enables Modbus RTU communication. Only RTU1 can be set for Modbus communication

Port – set the name of serial port. Default settings is /dev/RS485.

Parity – Set parity or stop bits.

Duplex – Set Half-duplex or Full-duplex. Default value is Half-duplex.

Reset to defaults – This button resets all parameters of RTU settings to default.

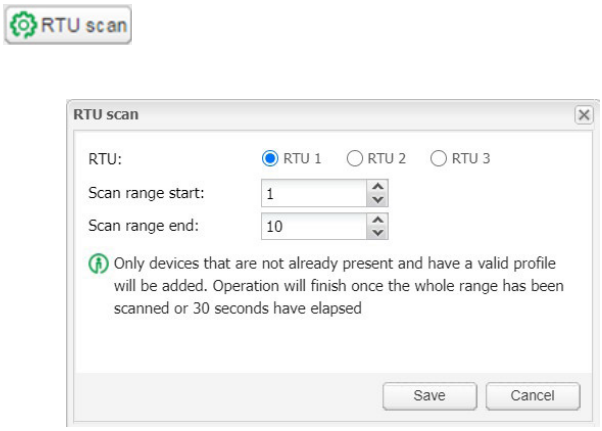


20.7 Modbus RTU Scan

RTU scan feature automatically find and add Modbus devices connected to Modbus RTU.

Note that only devices with valid profile will be added. This feature does not work with custom made profiles.

Devices supporting automatic discovery are listed in chapter **"19.9 Modbus Profiles Table"**.



20.8 RTU read test

For the quick test of RTU communication.

Device address – address of Modbus device

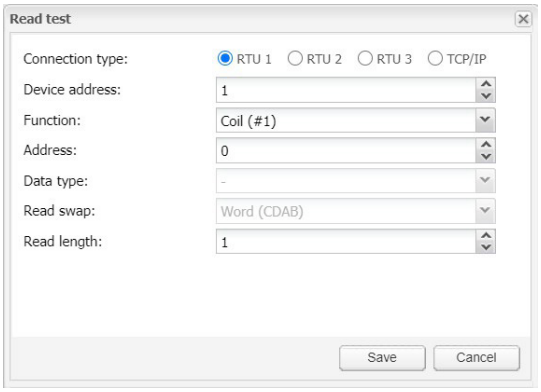
Function – distinction between Coil, Discrete input, Holding register and input register functions

Address – register address

Data type – message data point type

Read swap – Can change order of reading if needed.

Read length – length of read message



20.9 Modbus Profiles Table

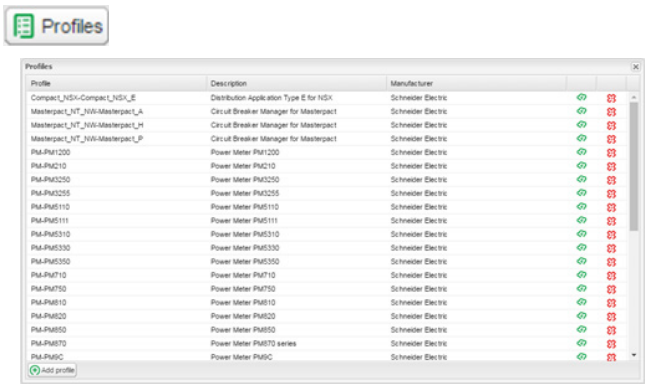
All the Modbus profiles uploaded in Wiser for KNX are displayed in the table, which pops up after pressing of this button Profiles.

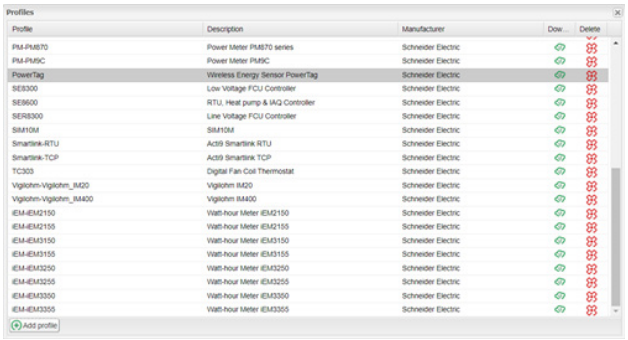
Each profile can be deleted by pressing or downloaded by pressing button and then used for further customization.

It is possible to modify downloaded profile (.json file) and upload it back to Wiser for KNX using Add profile.

If there is a need to read/write registers, which are not available in preinstalled profile, it is recommended to modify the preinstalled profile according to your needs.

There is added profile for PowerTag since firmware version 2.3.0 – Wireless Energy Sensor, which is common for all types of PowerTags.





20.10 Modbus Mapping

Once the Modbus device has been added as described in *Modbus RTU Scan* it is necessary to set the register mapping. It means that bindings between Modbus registers and KNX group objects in spaceLYnk have to be created.

Navigate to **Modbus** tab of spaceLYnk **Configurator**.

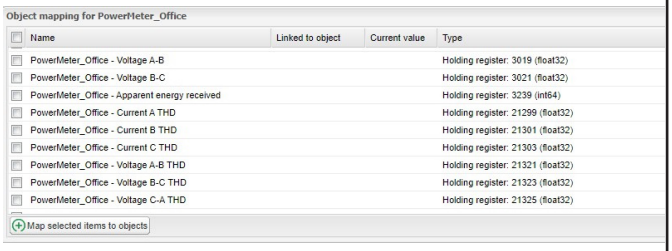
Each device in the list has a green mapping icon on the right side. Press this icon and open Mapping settings.

Each row of the Mapping table represents one of the Modbus registers (defined in the device profile).

Click selected line e.g. **Current A** and Mapping window is shown.

Link to object – Select the spaceLYnk object, where the value read from Modbus register will be saved. You can select existing object from the drop down menu or you can click on and create new object directly from this dialog.

Write to bus – Enable sending data to KNX TP bus. **Note**: If this option is disabled, telegrams to KNX TP are not sent, when Modbus value is changed. Telegrams are sent to KNX IP anyway. In case you do not want to share the values through KNX IP, it is important to set the filtering table properly.



Note: If this option is disabled, telegrams to KNX TP are not sent, when Modbus value is changed. Telegrams are sent to KNX IP anyway. In case you do not want to share the values through KNX IP, it is important to set the filtering table properly.

Value send delta – Set the value of delta. If the change of value read from Modbus register is bigger than this delta, value is send to KNX bus. In case of KNX TP, Write to bus option needs to be enabled.

Unit / suffix –Unit of the Modbus value. This setting is applied to selected group object in Wiser for KNX. This parameter is optional.

Tags – Select a tag, which is applied to selected group object in Wiser for KNX. This parameter is optional.

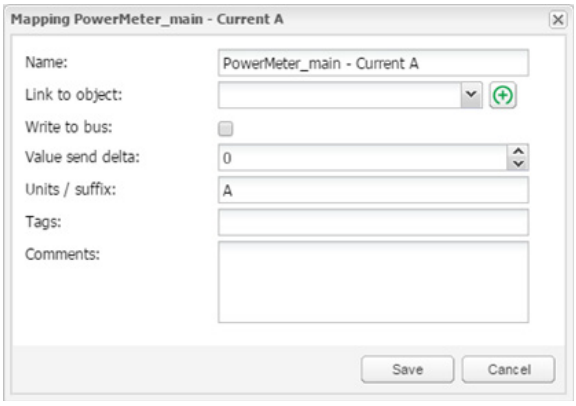
Comments – Select a comment, which is applied to selected group object in Wiser for KNX. This parameter is optional.

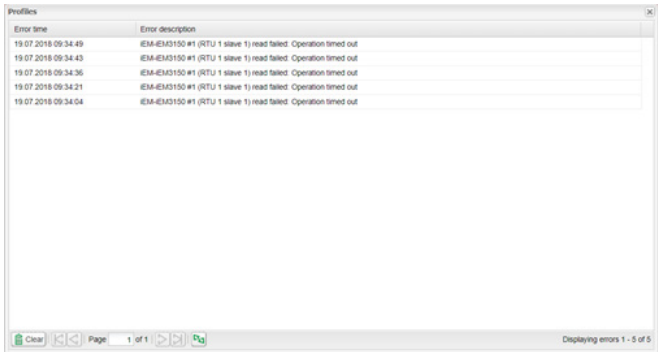
Fast mapping - Select the Modbus registers checking the check box and click button

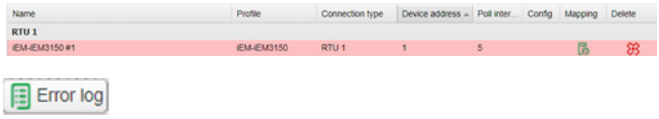
for automatic fast mapping of the selected objects starting with selected GA.

Error logs – All errors related to Modbus are displayed in Error log window under Modbus tab.

Modbus device is highlighted red after 3 unsuccessful poll.







20.11 New Profile Definition

If your Modbus device profile is not present in the list of preinstalled profiles in Wiser for KNX, you can define your own profile.

Modbus device profiles are distributed in *.json files. You can use common text editor (e.g. Notepad or Notepad++) in order to create and edit your profile. While saving the file set extention to *.json. The following example shows the structure of new device profile:

```
{
“manufacturer”: “Schneider Electric”,
“description”: “Example device”,
“mapping”: [
{ “name”: “Output 1”, “bus_datatype”: “bool”, “type”: “coil”, “address”: 0, “writable”: 1
},
{ “name”: “Input 1”, “bus_datatype”: “float16”, “type”: “inputregister”, “address”: 0,
“value_multiplier”: 0.001, “units”: “V” }
]
}
```

Each line of “mapping” table of the json file contains mapping information of one Modbus register, coil, input or output. All the possible mapping settings are listed in the table below.

Parameter	Description	Type	Required
Name	Object name, e.g. Output 2	String	**Yes**
bus_datatype	KNX object **data** type, key from dt table, e.g. float32	String / Number	**Yes**
type	Modbus register type, possible values: coil, discreteinput, register, inputregister.	String	**Yes**
address	Register address (0-based*)*	Number	**Yes**
writable	Set to true to enable writing to register if type is either coil or register.	Boolean	No
write_only	Set to tru to disable reading coil or register value when “writable” is enabled.	Boolean	No
datatype	Modbus value data type. If set, conversion will be done automatically. Possible values: bool, uint16, int16, float16, uint32, int32, float32, uint64, int64, quad10k, s10k	String	No
value_delta	New value is sent when the difference between previously sent value and current value is larger than delta. Defaults to 0 (send after each read).	Number	No
value_base	Add specified number to the resulting value.	Number	No
value_multiplier	Multiply resulting value by the specified number, value = value_base + value * value_multiplier.	Number	No
value_bitmask	Bit mask to apply, shifting is done automatically based on least significant 1 found in the mask.	Number	No
value_nan	Array of 16-bit integers. If specified and read operation returns the same array no further processing of value is done.	Array	No
value_conv	Apply one of built-in conversion functions	String (Int)	No
value_custom	Name of a built-in enumeration or a list of key -> value mapping, resulting value will be 0 if key is not found.	String / Object	No
internal	Not visible to user when set to true, should be used for scale registers.	Boolean	No
units	KNX object units/suffix	String	No
address_scale	Address of register containing value scale, value = value * 10 ^ scale	Number	No
read_count	Number of register to read at once (for devices that only support reading of a specific block of registers)	Number	No
read_swap	Swap register order during conversion (endianness)	Boolean	No
read_offset	Position of first register of data from the block of registers (0-based).	Number	No

timeout	Specify device timeout in seconds. If the slave device does not reply within specified time, it is considered as timeout error. Default values: 0.5s for Modbus RTU, 3s for Modbus TCP	Number	No
write_multiple	This parameter set the multiple writing function (function 15 or 16 is used instead of function 5 or 6). If *"Type"* is set to *"register"* and *"Write_multiple"* is set to *"true"*, Modbus function 16 is used for writing to the register. If *"Type"* is set to *"coil"* and *"Write_multiple"* is set to *"true"*, Modbus function 15 is used for writing to the coil. Default value is "false", which means that Modbus function 5 or 6(depending on register type) is used for writing.	String	No

Table 2: Profile definition.

Once you create your .json file, which contains all the information of your profile, you can upload it easily into your Wiser for KNX by **Configurator** → **Modbus** → **Profiles** → **Add profile**.

It is recommended to use an existing device profile as example or template, when new device profile is creating. It is possible to download existing profiles from Wiser for KNX and see the structure and syntax used there.

For more details about custom device profile creation please refer to application note *AN027_Creation_of_Modbus_profile*

20.12 Modbus Settings in Wiser for KNX Using Scripts

Modbus Function Codes and Corresponding Master Functions

All the possible Modbus function codes, which can be used in Wiser for KNX, are listed below. There is a Lua function in Wiser for KNX for each function code.

All the functions described below can be used both for Modbus TCP and Modbus RTU.

FC#01 Read Coils:

Name	**"Read single coil"**
Command	**coil = mb:readcoils(address)**
Arguments	[address]: address of the coils
Returned values	1: ON, 0: OFF
Exception codes:	01 or 02 or 03 or 04
Name	**"Read Multiple coil"**
Command	**coil= mb:readcoils(start, count)**
Arguments	[start]: address of first coil to read [count]: number of coils to read (max 2000)
Returned values	1: ON, 0: OFF
Exception codes	01 or 02 or 03 or 04
Example	coil1,coil2,coil3= mb:readcoils(1000, 3) Value read from coil address 1000 is returned into variable coil1.

Value read from coil address 1001 is returned into variable coil2.

Value read from coil address 1002 is returned into variable coil3.

FC#02 Read Discrete Inputs:

Name **"Read discrete input"**

Command **value = mb:readdiscreteinputs(address)**

Arguments [address]: address of the input

Returned values 1: ON, 0: OFF

Exception codes: 01 or 02 or 03 or 04

Name **"Read discrete inputs"**

Command **value = mb:readdiscreteinputs(start,count)**

Arguments [address]: address of first input to read

[count]: number of inputs to read (max 2000)

Returned values 1: ON, 0: OFF

Exception codes: 01 or 02 or 03 or 04

Example: bool1, bool2= mb: readdiscreteinputs(10,2)

Value read from discrete input address 11 is returned into variable bool1.

Value read from discrete input address 12 is returned into variable bool2.

FC#03 Read Holding Registers:

Name **"Read registers"**

Command value = mb:readregisters(address,count)

Arguments [address]: address of first register to read

[count]: number of registers to read (max 125)

Returned values 2byte values

Exception codes: 01 or 02 or 03 or 04**Example:** int1, int2= mb: readregisters(1100,3)

Value read from register address 1100 is returned into variable int1.

Value read from register address 1101 is returned into variable int2.

Value read from register address 1102 is returned into variable int3.

FC#04 Read Input Registers:

Name **"Read input registers"**

Command value = mb:readinputregisters(address,count)

Arguments [address]: address of first input register to read

[count]: number of input registers to read (max 125)

Returned values 2byte values

Exception codes: 01 or 02 or 03 or 04

Example:

value1, value2, value3, value4 = mb:readinputregisters(1015,4)

Value read from input register address 1015 is returned into variable value1.

Value read from input register address 1016 is returned into variable value2.

Value read from input register address 1017 is returned into variable value3.

Value read from input register address 1018 is returned into variable value4.

FC#05 Write Single Coil:

Name **"Write single bit"**

Command **value = mb:writebits(1000, value)**

[starting address, value "true" or "false"/"0"]

FC#06 Write Single Register:

Name **"Write single register"**

Command **value = mb:writeregisters(1000, 123)**

[address, value]

FC#0F Write Multiple Coils:

Name **"Write multiple bits"**

Command **value = mb:writebits(1000, true, false,true,…)**

[address, bit value1, bit value2,..{max 1968 bits}]

FC#10 Write Multiple Registers:

Name **"Write multiple registers"**

Command **value = mb:writeregisters(1000, 123, 321,222,..)**

[address, value1, value2, ..{max 123 registers}]

Exception codes

mb:readcoils(start, count)

mb:readdiscreteinputs(start, count)

mb:readregisters(start, count)

mb:readinputregisters(start, count)These commands read one or more registers/ coils from the start address and return all values in case of success. In case of error, three variables are sent back:

- Nil
- Exception code description
- Exception code

The following information is taken from the Modicon Web site (http://modbus.org) and the Modbus application protocol manual.

MODBUS Exception Codes		
Code	Name	Meaning
01	Illegal Function	The Function Code received in the query is not an allowable action for the server (or slave). This may be because the function code is only applicable to newer devices, and was not implemented in the unit selected. It could also indicate that the server (or slave) is in the wrong state to process a request of this type, for example because it is not configured and is being asked to return register values.
02	Illegal Data Address	The data address received in the query is not an allowable address for the server (or slave). More specifically, the combination of reference number and transfer length is invalid. For a controller with 100 registers a request of offset 96 and a length of 5 will generate exception 02.
03	Illegal Data Value	The value contained in the query data field is not an allowable value for the server (or slave). This indicates a fault in the structure of the remainder of a complex request, such as that the implied length is incorrect. It specifically does NOT mean that a data item submitted for storage in a register has a value outside the expectation of the application program, since the MODBUS protocol is unaware of the significance of any particular value of any particular register.
04	Failure In Associated Device	An Unrecoverable error occurred while the server (or slave) was attempting to perform the requested action. (See Note 1)
05	Acknowledge	Specialized in conjunction with programming commands. The server (or slave) has accepted the request and is processing it, but long duration of time will be required to do so. This response is returned to prevent a timeout error from occurring in the client (or master). The client (or master) can next issue a poll program complete message to determine if processing is completed.

06	Busy, Rejected Message	Specialized use in conjunction with programming commands. The server (of slave) is engaged in processing a long-duration program command. The client (or master) should retransmit the message later when the server (or slave) is free.
07	NAK – Negative Acknowledgement	The program function just requested cannot be performed. Issue poll to obtain detailed device dependent error information. Valid for Program/Poll 13 and 14 only.
08	Memory Parity Error	Specialized use in conjunction with function codes 20 and 21 and reference type 6, to indicate that the extended file area failed to pass a consistency check. The server (or slave) attempted to read record file, but detected a parity error in the memory. The client (or master) can retry the request, but service may be required on the server (or slave) device.
0A	Gateway Path Unavailable	Specialized use in conjunction with gateways. Indicates that the gateway was unable to allocate an internal communication path from the input port to the out port for processing the request.
0B	Gateway Target Device Failed to respond	Specialized use in conjunction with gateways. Indicates that no response was obtained from the target device. Usually means that the device is not present on the network.

Table 3: Modbus exception codes.

20.13 Modbus RTU Configuration Commands

Create Modbus RTU object

require('luamodbus')

mb = luamodbus.rtu()

Open Modbus RTU connection

-- 19200 baud rate, even parity, 8 data bits, 1 stop bit, half duplex

mb:open('/dev/RS485', 19200, 'E', 8, 1, 'H')

mb:connect()

Terminal name

'/dev/RS485'

Supported Baud rates

- 300 bit/s
- 600 bit/s
- 1200 bit/s
- 2400 bit/s
- 4800 bit/s
- 9600 bit/s
- **19200 bit/s**
- 38400 bit/s
- 57600 bit/s
- 115200 bit/s
- 230400 bit/s

Parity

- „N“ None

- „E“ Even
- „O“ Odd

Data bits and stop bits

Data bits: [Number of data bits = 5, 6, 7, **8**]

Stop bits: [Number of stop bits **1**, 2]**Duplex**

„H“ **Half duplex**

“F” Full duplex (not supported in RS-485)

The Baud rate is set depending on the distance between Modbus RTU devices. For instance, with a Baud rate of 9600 bit/sec the maximum communication distance between 1 - 15 Modbus RTU device is 1,200 metres. With the Baud rate of 19200 bit/sec the maximum communication distance is 900 metres, as shown in the table:

Baudrate setting	Maximum communication distance for 1 to 15 Modbus RTU devices (Typical with Belden 3105A cables)
9600 bit/sec	1200 m
19200 bit/sec	900 m

Parity refers to the technique of checking if transmission has been successful when transmitting between the devices. It lets you know if some data has been lost during transmission.

Setting of Parity

The Modbus supports only 11 bit frames. “Parity” refers to the number of 1s in a given binary number. Odd parity means there are an odd number of 1s and even parity means that there is an even number of 1s. Parity bits are used as a means of error detection as digital data is transmitted and received.

Both the Gateway and Meter must always be set to the same as one another, odd, even or none. The default parity mode of Modbus is “even” parity.

- Parity = None: choose between one and two stop bits
- Parity = Even: one stop bit is set
- Parity = Odd: one stop bit is set

Delay Between Frames

Some devices require considerable time after the end of response until they are ready to receive the following request from the master. Henceforth, it applies to Schneider Electric SEPAM power devices and legacy slave devices. As they are slow in dealing with the original request they may miss the following request.

The time between the requests should be greater than 3.5 characters according to the Modbus specification. However, these legacy devices need more time. Please use delay command appropriately:

--Wait for 1.5 seconds

os.sleep(1.5)

Communication itself takes care of minimal 3, 5-character delay.

Set slave address:

--set slave address to 123

```
mb:setslave(123)
[1..247]
```

Read registers:

```
--read from address 1000 and write it to value
value = mb:readregisters(1000)
```

Close modbus connection:

```
mb:close()
```

Example:

```
--init modbus on first script execution
if not mb then
    require('luamodbus')
    mb = luamodbus.rtu()
    mb:open('/dev/RS485', 38400, 'E', 8, 1, 'H')
    mb:connect()
end
mb:setslave(30)
mb:flush()
```

Timeout interval between two consecutive bytes of the same message

```
mb:getbytetimeout()
mb:setbytetimeout(timeout)
```

Timeout interval used to wait for a response:

```
mb:getresponsetimeout()
mb:setresponsetimeout(timeout)
```

Timeout interval used to for an incoming indication from master (slave mode only):

```
mb:getreceivetimeout()
mb:setreceivetimeout(timeout)
```

20.14 Modbus TCP configuration commands

Create Modbus TCP object

```
require('luamodbus')
mb = luamodbus.tcp()
```

Open Modbus TCP connection

```
-- IP: 192.168.1.2, port: 1234
mb:open('192.168.1.2', 1234)
mb:connect()
```

All the rest of commands needed to configure the Modbus TCP connection are the same as for Modbus RTU.

20.15 Modbus Master Functions

Functions listed below can be used for Modbus RTU master or Modbus TCP client.

mb:setslave(slaveid)

sets slave id to read/write data from/to

mb:readcoils(start, count) [01]

start – address of first coil to read

count – number of coils to read

mb:readdiscreteinputs(start, count) [02]

start – address of first discrete input to read

count – number of discrete inputs to read

mb:readregisters(start, count) [03]

start – address of first holding register to read

count – number of holding registers to read

mb:readinputregisters(start, count) [04]

start – address of input register to read

count – number of input registers to read

returns all values on success and nil, error description on error

mb:writebits(start, v1, [v2, [v3, ...]]) [05]

writes values to coils from start address

mb:writeregisters(start, v1, [v2, [v3, ...]]) [06]

writes values to registers/coils from the start address

single write will be used when only one value is supplied, multiple write otherwise

returns all of values written on success and nil, error description on error

mb:reportslaveid()

reads slave internal data

returns values on success

returns nil, error description on error

Modbus slave functions

Receive data from master

mb:receive()

receives data from master with 1-minute timeout

returns data as a binary string on success

returns nil, error description on error

Set modbus mapping of slave device

mb:setmapping(coils, inputs, holding_regs, input_regs)

creates memory mapping for the registers with size specified for each type

Handle slave

mb:handleslave()

waits for an incoming indication from master and sends a reply when necessary

Get functions

mb:getcoils(start, count)

mb:getdiscreteinputs(start, count)

mb:getinputregisters(start, count)

mb:getregisters(start, count)

gets one or many register/coil/input values from mapping from the start address

returns all values on success

returns nil, error description on error, exception code if applicable

Set functions

mb:setcoils(start, v1, [v2, [v3, ...]])

mb:setdiscreteinputs(start, v1, [v2, [v3, ...]])

mb:setinputregisters(start, v1, [v2, [v3, ...]])

mb:setregisters(start, v1, [v2, [v3, ...]])

sets value to register/coil mapping from the start address

returns true on success

returns nil, error description on error, exception code if applicable

Callback functions

mb:setwritecoilcb(fn)

mb:setwriteregistercb(fn)

sets a callback function for coil/register write event

callback should accept two parameters - coil/register address and value (boolean or number)

for multiple writes callback is executed for each coil/register separately

use nil to remove a callback.

For more details about Modbus slave settings refer to application note document *AN_016_Wiser for KNX_as_a_Modbus_slave*.

21 EnOcean

EnOcean is energy harvesting wireless technology. It brings the opportunity to interconnect wireless devices such as push buttons, thermostats or PIR sensors with Wiser for KNX. It enlarges the possibilities of the wired KNX installation thanks to easy implementation and configuration in Wiser for KNX. It is necessary to plug in USB EnOcean gateway to enable EnOcean technology in Wiser for KNX. Details are described in following section.

21.1 EnOcean USB gateway

EnOcean functions of Wiser for KNX have been tested with EnOcean USB Gateway LSS10020040. Note that this product reference is not available in all countries. It is possible to use all USB En0cean gateways, which are based on product USB 300 (OEM), delivered by EnOcean organization as OEM product to 3rd parties. Note that different frequencies are used for EnOcean (based on geographical region). Be careful and select the proper USB gateway for your location.

EnOcean frequencies:

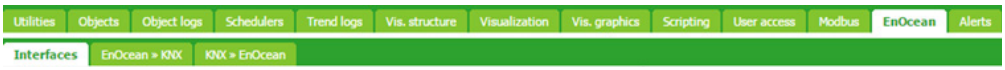
- 868 MHz – Europe
- 902 MHz – USA / Canada
- 928 MHz – Japan
- 2.4 GHz – Worldwide usage

USB gateway is a small USB stick which connects PC's, consumer devices, DSL boxes and other USB master devices to EnOcean based radio products. It is equipped with a TCM 310 transceiver gateway module. It provides bidirectional EnOcean radio and bidirectional serial interface via USB. Radio messages are sent and received via an externally connected USB host.

It is possible to use only 1 EnOcean gateway connected to the USB port on the top of Wiser for KNX case. It can be extended with extension cable (maximum 5m).

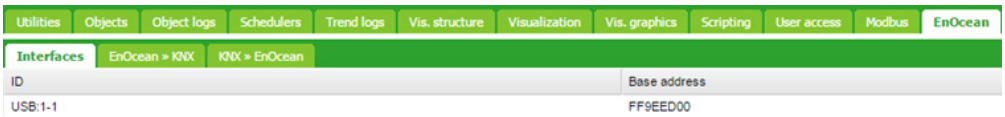
21.2 EnOcean Interfaces

In order to connect USB EnOcean gateway to your Wiser for KNX navigate to **Configurator → EnOcean → Interfaces**.



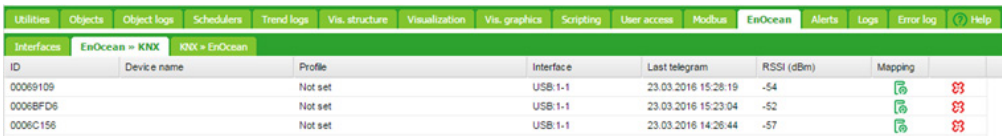
Connect you USB EnOcean gateway to USB port of Wiser for KNX and click Rescan in the left-bottom corner.

Once the device is found it appears in the list of interfaces.

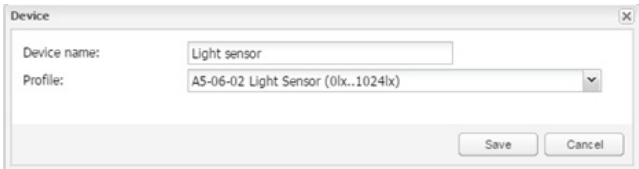


21.3 EnOcean to KNX Mapping

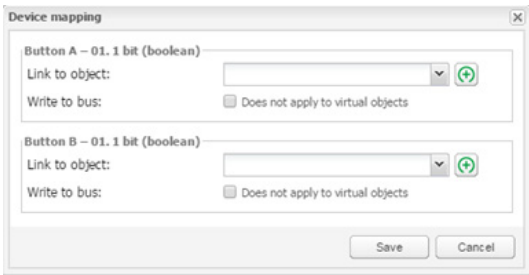
All EnOcean devices send telegrams periodically. When the telegram is received by EnOcean gateway, the device will appear in the section **Configurator** → **EnOcean** → **EnOcean >> KNX**. Most of EnOcean devices have dedicated button, which is used to send telegram immediately without waiting for periodical sending.



Once a specific device needs to be mapped to KNX, corresponding row has to be clicked and the EnOcean **Profile** needs to be specified. You can assign **Device Name** to the device. All supported device profiles are listed in section *Supported EnOcean Profiles.*

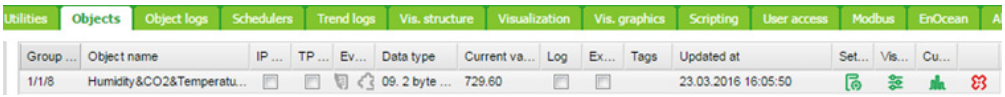


Once the **Profile** of the devices is specified, mapping to KNX objects can be done. Open the **Device mapping** dialog with click on icon on a desired line in the list of devices. Each data object of the EnOcean device can be linked to KNX object in Wiser for KNX. Select the Wiser for KNX object from the drop-down menu or create new object directly from the dialog using button . If parameter **Write to bus** is enabled, value is sent to KNX TP bus.



When EnOcean gateway received telegram from specific device, the respective row is highlighted green.

Respective KNX group address gets updated with the new value coming from EnOcean.



21.4 KNX to EnOcean Mapping

Setting in the section **Configurator → EnOcean → KNX >> EnOcean** enables the possibility to control EnOcean devices (actuators, dimmers, etc.) from KNX installation via Wiser for KNX.

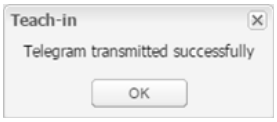
Wiser for KNX simulates behaviour of specific EnOcean device, which can control other EnOcean device.

Example: EnOcean switch actuator can be controlled by EnOcean rocker switch. In order to control this switch actuator from KNX installation, Wiser for KNX simulates function of the rocker switch and control the switch actuator.

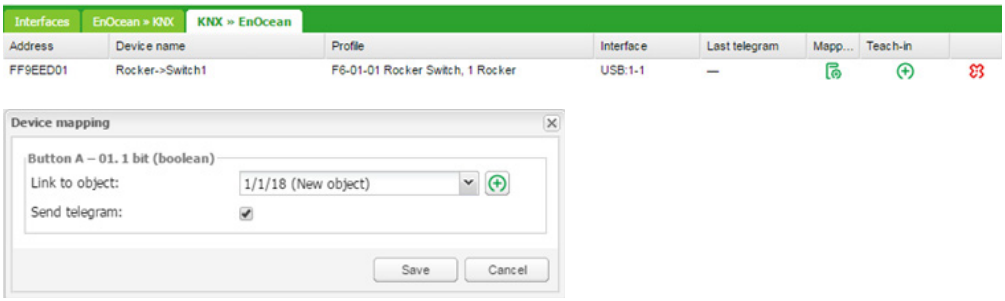
First step of the configuration is definition of the device, which is simulated by Wiser for KNX. Click the Add new device button in the left-bottom corner. In **Device** dialog you select unique **Address, Device name and Profile**, which represents the function of device simulated by Wiser for KNX.

Once the device is added, pair it with specific device in EnOcean network. Set the EnOcean device in learning mode and then press Teach-in button in Wiser for KNX configuration.

When the teaching telegram is sent successfully, following message pops up.



Further this device created in Wiser for KNX can be mapped with specific KNX addresses.



When KNX object value is changed (1/1/18 in the example above), telegram is sent to the device, which has been paired with Wiser for KNX virtual device (F6-01-01 in the example above).

Option “Send telegram” must be ticked. Otherwise the EnOcean telegram is not sent.

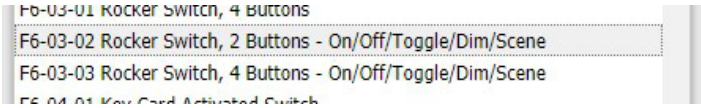
21.5 Supported EnOcean Profiles

ID	Profile name	ID	Profile name
00-00-00	RAW 4-bytes	A5-04-01	Temperature & Humidity Sensor (0C..40C, 0%..100%)
00-00-01	RAW 4-bytes, split	A5-04-02	Temperature & Humidity Sensor (-20C..60C, 0%..100%, Battery)
F6-01-01	Rocker Switch, 1 Rocker	A5-06-01	Light Sensor (300lx..60000lx)
F6-01-02	Rocker Switch, 1 Rocker (inverted)	A5-06-02	Light Sensor (0lx..1024lx)
F6-01-03	Rocker Switch, 1 Rocker (separate)	A5-06-03	Light Sensor (0lx..100lx, 300lx..30000lx)
F6-02-01	Rocker Switch, 2 Rocker	A5-07-01	Occupancy Sensor
F6-02-02	Rocker Switch, 2 Rocker (inverted)	A5-08-01	Light Sensor 0lx to 510lx, Temperature 0°C to +51°C and Occupancy
F6-03-01	Rocker Switch, 4 Buttons	A5-08-02	Light Sensor 0lx to 1020lx, Temperature 0°C to +51°C and Occupancy
F6-04-01	Key Card Activated Switch	A5-08-03	Light Sensor 0lx to 1530lx, Temperature -30°C to +50°C and Occupancy
F6-10-00	Window Handle	A5-09-04	Humidity, CO2, Temperature Sensor
D5-00-01	Single Input Contact	A5-10-01	Temperature Sensor; Set Point, Fan Speed and Occupancy Control
A5-02-01	Temperature Sensor (-40C..0C)	A5-10-02	Temperature Sensor; Set Point, Fan Speed and Day/Night Control
A5-02-02	Temperature Sensor (-30C..10C)	A5-10-03	Temperature Sensor; Set Point Control
A5-02-03	Temperature Sensor (-20C..20C)	A5-10-04	Temperature Sensor; Set Point and Fan Speed Control
A5-02-04	Temperature Sensor (-10C..30C)	A5-10-05	Temperature Sensor; Set Point and Occupancy Control
A5-02-05	Temperature Sensor (0C..40C)	A5-10-06	Temperature Sensor; Set Point and Day/Night Control
A5-02-06	Temperature Sensor (10C..50C)	A5-10-07	Temperature Sensor; Set Point and Fan Speed Control
A5-02-07	Temperature Sensor (20C..60C)	A5-10-08	Temperature Sensor; Fan Speed Control
A5-02-08	Temperature Sensor (30C..70C)	A5-10-09	Temperature Sensor; Fan Speed and Day/Night Control
A5-02-09	Temperature Sensor (40C..80C)	A5-10-0A	Temperature Sensor; Set Point and Single Input Contact
A5-02-0A	Temperature Sensor (50C..90C)	A5-10-0B	Temperature Sensor and Single Input Contact
A5-02-0B	Temperature Sensor (60C..100C)	A5-10-0C	Temperature Sensor and Occupancy Control
A5-02-10	Temperature Sensor (-60C..20C)	A5-10-0D	Temperature Sensor and Day/Night Control
A5-02-11	Temperature Sensor (-50C..30C)	A5-10-10	Temperature and Humidity Sensor; Set Point and Occupancy Control
A5-02-12	Temperature Sensor (-40C..40C)	A5-10-11	Temperature and Humidity Sensor; Set Point and Day/Night Control
A5-02-13	Temperature Sensor (-30C..50C)	A5-10-12	Temperature and Humidity Sensor; Set Point Control
A5-02-14	Temperature Sensor (-20C..60C)	A5-10-13	Temperature and Humidity Sensor; Occupancy Control
A5-02-15	Temperature Sensor (-10C..70C)	A5-10-14	Temperature and Humidity Sensor; Day/Night Control
A5-02-16	Temperature Sensor (0C..80C)	A5-20-10	Generic HVAC interface
A5-02-17	Temperature Sensor (10C..90C)	A5-30-01	Single Input Contact, Battery Monitor
A5-02-18	Temperature Sensor (20C..100C)	A5-30-02	Single Input Contact
A5-02-19	Temperature Sensor (30C..110C)	A5-38-08-02	Dimmer
A5-02-1A	Rocker Switch, 2 Buttons - On/Off/ Toggle/Dim/Scene	F6-03-02	Light and blind control 2 buttons
A5-02-1B	Rocker Switch, 4 Buttons - On/Off/ Toggle/Dim/Scene	F6-03-03	Light and blind control 4 buttons

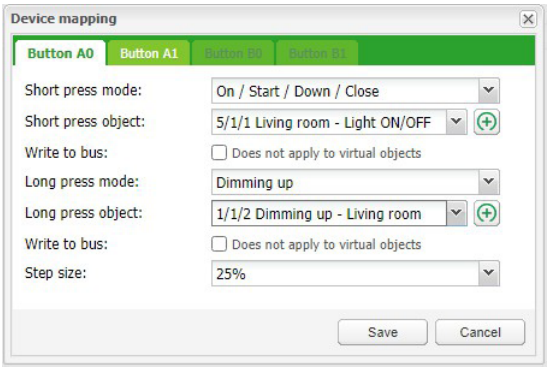
Table 4: Supported EnOcean profiles.

21.6 Blinds and dimming with EnOcean

There is a new EnOcean feature in the controller implemented since fw 2.5.0. This feature allows controller use dimming and blind functions and recognize long/short push of the pushbutton. In EnOcean profiles F06-03-02 and F06-03-03.



Mapping of this EnOcean pushbuttons opens settings dialog with Short and long press settings.



Short press modes:

- On / Start / Down / Close
- Off / Stop / Up / Open
- Toggle
- Start / Stop
- Stop / Start
- Scene

Short press object - link KNX object for short press action.

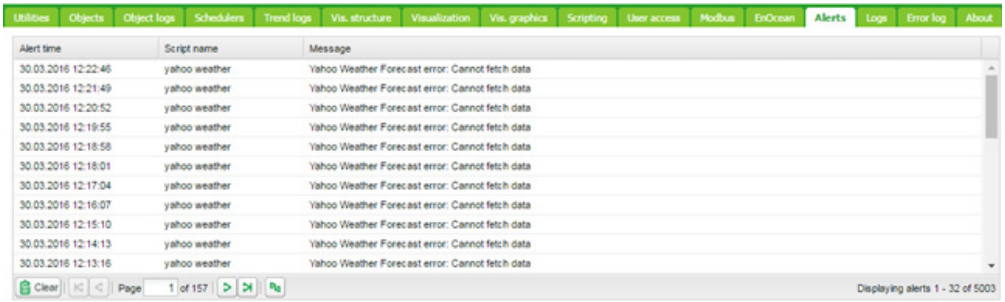
Long press modes:

- No Action (disabled)
- On / Start / Down / Close
- Off / Stop / Up / Open
- Toggle
- Dimming up
- Dimming down

Long press object - link KNX object for long press action.

22 Alerts

Alerts tab displaying a list of alert messages defined with alert function inside scripts. The messages are stored in the main database.



alert(message, [var1, [var2, [var3]]])

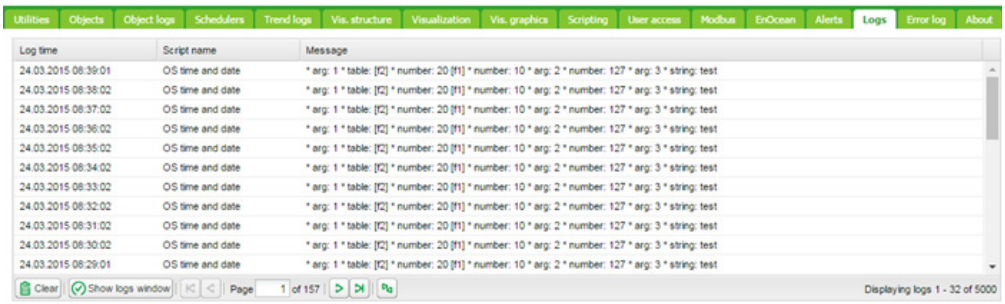
Stores alert message and current system time in the main database.

Example:

```
temperature = 25.3

if temperature > 24 then
-- resulting message: 'Temperature levels are too high: 25.3'

alert('Temperature level is too high: %.1f', temperature)

end
```

23 Logs

Logs can be used for scripting code debugging. The log messages appearance is defined by log function.



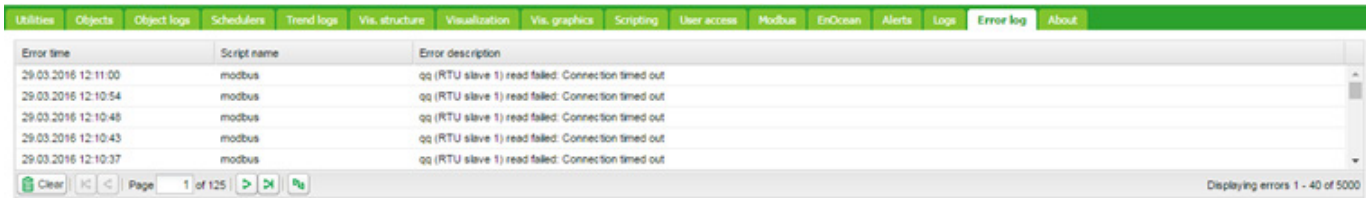
log(var1, [var2, [var3, ...]])

Converts variables to human-readable form and stores them.

Example:

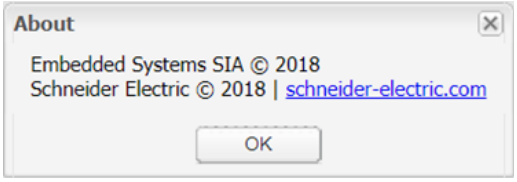
```
-- log function accepts Lua nil, boolean, number and table
(up to 5 nested levels) type variables

a ={ key1 ='value1', key2 =2}

b ='test'

c =123.45

-- logs all passed variables

log(a, b, c)
```

24 Error Log



Error messages are displayed in Error log tab.

25 About



Copyright info and link to Schneider Electric website.

26 Web server software Nginx

New web server Nginx is used for Wiser for KNX. It is improving performance with low memory demand.

More info at: https://www.nginx.com/resources/wiki/

If you are using pre 1.2 versions of firmware, clearing of browser's cache is mandatory after FW upgrade.

You will also need to re-do your links and Tabs as Nginx has different links to pages:

Main page link old versions sample: http://10.154.20.51/cgi-bin/scada-vis/index.cgi

Main page link Nginx sample: http://10.154.20.51/scada-vis

27 Port Forwarding

Introduction

Port forwarding is used to get remote access to IP device on local network, like Wiser for KNX. Settings have to be done in the network router. Manual of the particular router explains, how to set port forwarding. In case of issues, contact of the technical support of the router provider may be needed.

Wiser for KNX uses two possible ways of connection:

- **HTTP**

Default one is through HTTP and port 80. HTTP is not encrypted and is not a secured way of connection. This connection is safe to use on local network, but not recommended to use for remote connection. If this is selected, then in the router, port 80 has to be forwarded with the IP of the Wiser for KNX.

To connect to Wiser for KNX using port forwarding with HTTP connection, following has to be entered in the web browser address bar: HTTP://IP:Port

Where IP is an IP of the internet connection of the house. This information can be found inside the router or the contact the internet provider support.

- **HTTPS**

HTTPS is a secured and an encrypted connection, and is strongly recommended to be used as a remote connection. Using the secure connection, port 443 has to be forwarded in the router.

To remotely connect through the secured HTTPS connection, following has to be entered in the web browser address bar: HTTPS://IP:Port

Where IP is an IP of the internet connection of the house. This information can be found inside the router or the contact the internet provider support.

⚠ Apple devices with OS7.0 and above using the remote connection must forward (port+1) for correct status feedback in visualization. For port 80 it would be feedback port 81. If using a custom port A, you need to forward port A to Wiser for KNX's port 80, and port A + 1 to Wiser for KNX's port 81. For example, if user wants remote access to visualization and uses port 1234 to access his HL, he must forward port 1234 to Wiser for KNX's port 80, port 1235 to Wiser for KNX's port 81.

⚠ If you want to use different port number than default ports 80 and 443, you can set the additional ports in **Configurator** → **Utilities** → **System** → **Services** → **HTTP server**.

28 BACnet

28.1 Characteristics

BACnet is a communication protocol for Building Automation and Control Networks. It is an ASHRAE – American Society of Heating, Refrigerating and Air-Conditioning Engineers, ANSI – American National Standards Institute, and ISO – International Organization for Standardization protocol.

Wiser for KNX has been certified by BACnet Testing Laboratories (BTL) as BACnet Application Specific Controller (B – ASC).

BACnet is designed to allow communication of building automation and control systems for application such as heating, ventilation, air conditioning control, lighting control, access control, fire detection systems and their associated equipment. BACnet protocol provides exchange information for building automation devices, regardless of the particular building service they perform.

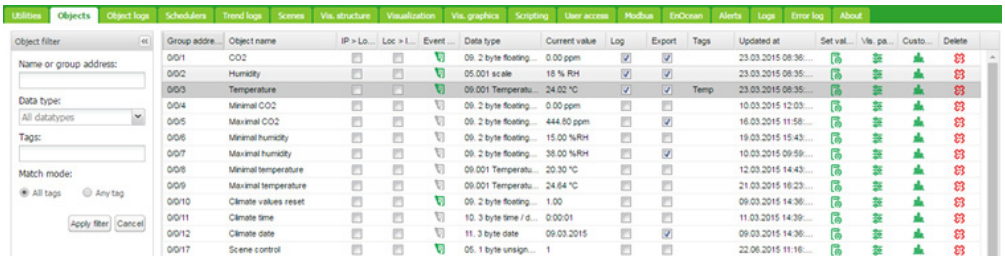
28.2 Wiser for KNX Configuration

Interconnection of Wiser for KNX and other BACnet device is done over Ethernet physical layer. Wiser for KNX can act as a BACnet server only. It means that Wiser for KNX serves data which can be read by BACnet client device and BACnet client device can write data to the server.

As Wiser for KNX is KNX based device the connection to BACnet network comes from KNX group objects, which are exported to BACnet.

28.3 Object export

All the KNX objects in Wiser for KNX object list (**Configurator** → **Objects**) has the parameter “Export”. By selecting this “Export” checkbox the specific KNX object will be visible in BACnet as BACnet object.



Binary objects will appear as binary values, numeric values will appear as analogue values.

Other data types are not supported.

28.4 BACnet Configuration

BACnet configuration consists of setting BACnet server parameters in Wiser for KNX. The BMS - Building Management System discovers the exposed data.

28.5 Configuration

Wiser for KNX acts as a BACnet server which has to be configured under **Configurator → Utilities → System → Network → BACnet settings**

Server enabled – Enable/Disable BACnet server

Device ID – BACnet device ID must be unique on BACnet network.

Device name (optional) – BACnet name is composed of controller's hostname_Device ID by default. If Device name is filled, BACnet name equals Device name

Password – BACnet password

Objects priority – Define to which priority array Wiser for KNX will write to. Wiser for KNX writes to Relinquish Default (RD) property by first reading (Upload from BMS) only – it takes the current value of the object. It is not possible to change the value of Relinquish Default property afterwards. If object read from Wiser for KNX has higher value than RD property, then it raises the Overwritten flag.

Add group address to object name – KNX address will be included in object's name

Use comment as object description – Comment i.e. **ETS import** will be used as object's description

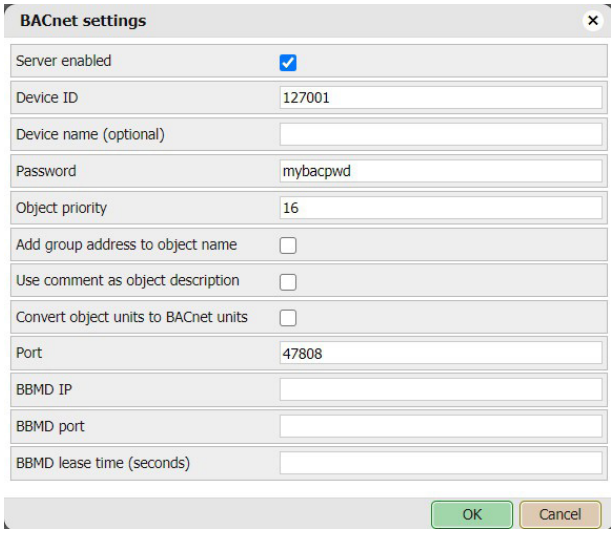
Add group address to object name – Names of BACnet objects contains information about group address, when this option is selected.

Port – BACnet port, default 47808

BBMD IP – BACnet router IP.

BBMD port – BACnet router port

BBMD lease time (seconds) – registration resend interval



28.6 BACnet objects

List of BACnet objects with its parameters is available under:

Configurator → Utilities → System → Network → BACnet objects

BACnet objects can be downloaded to CSV file via Download CSV button

Download CSV button is hidden, if browser does not support this feature.

Type	Instance	Name	Current value
5 (BV)	2048	Switch light central	false
5 (BV)	2058	Living room Light room switch	false
5 (BV)	2061	Kitchen Light room switch	false
5 (BV)	2062	Dining room Light room switch	false
5 (BV)	2065	Guest toilet Light room switch	false
5 (BV)	2066	Hallway Light room switch	false
5 (BV)	2067	Staircase Light room switch	false
5 (BV)	2070	Bedroom Light room switch	false
5 (BV)	2071	Bath room Light room switch	false
5 (BV)	2072	Nursery 1 Light room switch	false
5 (BV)	2073	Nursery 2 Light room switch	false
5 (BV)	2074	Office Light room switch	false

28.7 BACnet COV settings

First 256 objects exported to BACnet can be subscribed by BACnet client using COV (Change of value) subscription.

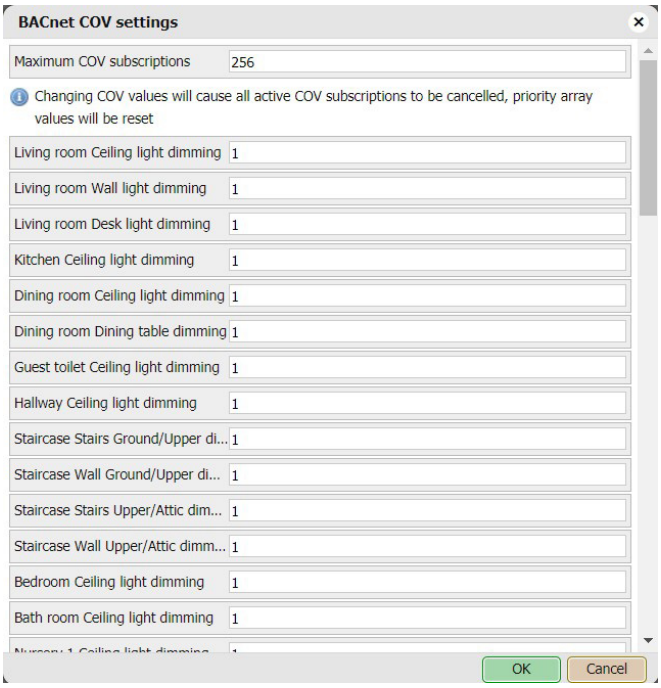
All analogue values, which are active for COV subscription are listed in:

Configurator → Utilities → System → Network → BACnet COV settings

Each analogue value active for COV subscription has parameter COV increment. This parameter defines the minimal change of value (delta), which implies change of the value on the client side. Default value of COV is set to 1. It means, that until the value in Wiser for KNX is not changed by more than 1, value is not change on the client side.

If COV increments parameters are changed in **Configurator → Utilities → System → Network → BACnet COV settings** and saved, all COV subscriptions are cancelled. The COV subscription must be restart from the client side.

Changing COV increment values cause reset of priority array values of all objects.



28.8 BACnet Standardized Device Profile

Wiser for KNX has been tested at the BACnet Testing Labs (BTL) and found to comply with all the necessary interoperability requirements.

More details and results from BTL testing can be found here:

http://www.bacnetinternational.net/catalog/index.php?m=20&p=1201

28.9 List all BACnet Interoperability Building Blocks (BIBBs) Supported

Data Sharing	ReadProperty-B	DS-RP-B
	ReadPropertyMultiple-B	DS-RPM-B
	WriteProperty-B	DS-WP-B
	COV-B	DS-COV-B
Device and Network Management	Dynamic Device Binding-B	DM-DDB-B
	Dynamic Object Binding-B	DM-DOB-B
	DeviceCommunicationsControl-B	DM-DCC-B
	TimeSynchronization-B	DM-TS-B
	UTCTimeSynchronization-B	DM-UTC-B
	ReinitializeDevice-B	DM-RD-B

Table 5: BACnet Interoperability Building Blocks

BACnet Object Types Supported

- Device
- Analog Value
- Binary Value

Data Link Layer Options

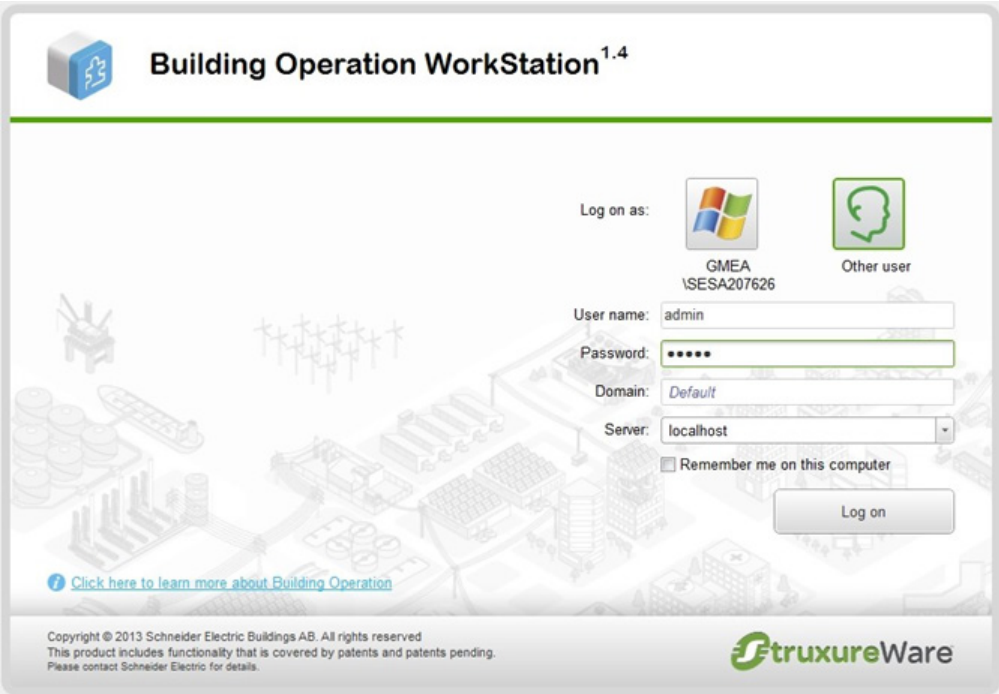
- Media: BACnet IP
- Option: Register as a Foreign Device

28.10 Building Operation Workstation

Schneider Electric StruxureWare is a BACnet certified Building Management System.

Building Operation WorkStation is a software used to configure and commission Enterprise Server and the Automation Server which can retrieve and send data to Wiser for KNX.

There is a dedicated document, which describes the interoperability between Wiser for KNX and Building Operation Workstation over BACnet. If you look for more details about this topic, please refer to application note *AN001_Wiser for KNX_integration_using_ BACnet.*



29 RS-232 Serial Line

29.1 Characteristics

The RS-232 serial interface communication standard has been in use for many years. It is one of the most widely used connections for serial data transmitting because it is simple and reliable.

The RS232 serial interface standard still retains its popularity and remains in widespread use. It is still found on some computers and on many interfaces, often being used for applications ranging from data acquisition to supply a serial data communications facility in general computer environments.

The long term and widespread use of the RS232 standard has meant that products are both cheap and freely available, and in these days of new higher speed standards, the reliable, robust RS232 standard still has much to offer. The interface is intended to operate over distances of up to 15 meter; it is based on one Master/ one Slave rule.

Application Example:

- Connection to simple devices or other bus sub systems.
- Audio/video, IR system integration.

29.2 Configuration Commands

Open connection:

```
require('serial')
port = serial.open('/dev/RS232', {baudrate = 9600})
```

Write to port:

```
port:write('test data')
```

Blocking read:

```
-- script will block until 10 characters are read
data = port:read(10)
```

Timeout read:

```
-- script will wait for 10 characters for 20 seconds
data = port:read(10, 20)
```

Close serial port:

```
port:close()
```

RS-485 serial line is controlled in the same way using the same Configuration Commands as mentioned above. The only diffetend is in the serial.open command: port = serial.open('/dev/RS485', {baudrate = 9600})

For more details about RS-232 communication please refer to application note *AN010_RS232_ control_ with_ Wiser for KNX.*

30 USB 2.0

Characteristics

- USB 2.0 provides a bandwidth of 480 Mbit/s, corresponding to an effective image data rate of 40 MB/s.
- Integrated voltage supply (5 VDC) for devices in the 4-pole cable. Devices complying with the USB specification may consume a total of 500 mA from the bus. Devices with a power of up to 2.5 W can therefore be supplied via the bus.
- USB cable must only be 4.5 m long at the maximum.
- Data transmission is possible in both directions

Application Example:

- USB interface can be used for extending memory capacity via attaching USB flash drive.

30.1 Configuration Commands

io.readfile (file)

Read whole file at once. Returns file contents as a string on success or nil on error.

io.writefile (file, data)

Writes given data to a file. Data can be either a value convertible to string or a table of such values. When data is a table, then each table item is terminated by a new line character. Return Boolean as write result when file can be open for writing or nil when file cannot be accessed.

USB flash drive supports FAT, FAT32 and NTFS file system. Maximum size of Flash drive is 32GB.

Send and receive SMS messages via attaching USB GSM adapter

- Use Huawei E173 modem.
- The modem has to be plugged into USB port of Wiser for KNX and it starts operating immediately.
- Specific functions should be added into user script library with PIN code setting and telephone number white-list which will be able to receive and send SMS messages.

Command syntax

In order to change object value using SMS or read value of object by SMS request, you have to send SMS in the format described below.

Write to bus:

SMS command format: W ALIAS VALUE

Read from bus:

SMS command format: R ALIAS

On read request, script will reply with SMS message containing current value of selected object

ALIAS can be:

Group address (e.g. 1/1/1)

Name (e.g. Obj1). If name contains spaces, then it must be escaped using double quotes (e.g. “Room Temperature”)

Object data type and name must be set in **Configurator** → **Objects** tab. Otherwise; script will not be able to read and write to object.

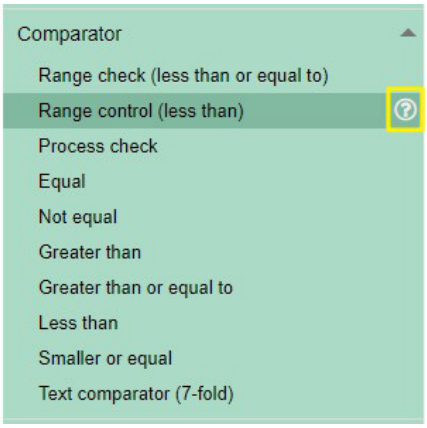
Only ASCII symbols are accepted in the message.

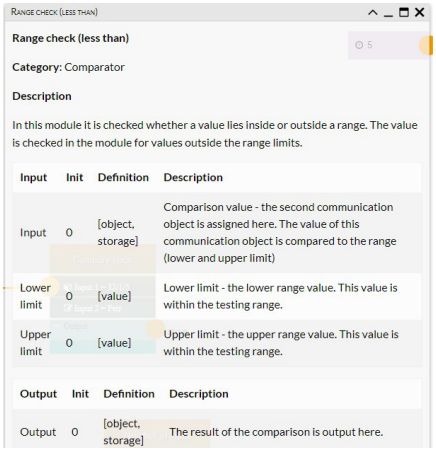
For more details about sending SMS please refer to application note document *AN011_Email SMS_and_ FTP_ in_ Wiser for KNX*

FB (Function blocks) allow easy, PLC like approach to programming in accordance with IEC 61499 standard.

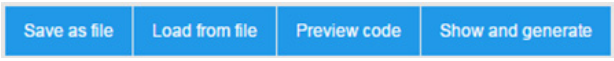
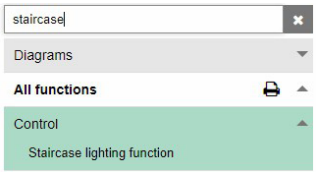
UX helpers

UX helpers contains block, inputs and outputs description. Helpers are transparent and can be folded. All helpers can be print in print view.





30.2 FB Editor Basic Control

Undo – undo last change **Redo** – redo last change **Clear and New** – delete all function blocks in diagram **Print** – print current diagram **Zoom in** – enlarge view **Zoom out** – reduce view **Live monitoring** – live monitoring of values changes by sending values from block to contained group objects which will trigger block functions on outputs. **Save as file** – save current diagram as a file **Load from file** – reload diagram from file **Preview code** – preview of LUA code **Show and generate** – show and generate LUA code	 
Search box - will find function block containing typed letter.	

30.3 Adding new diagram

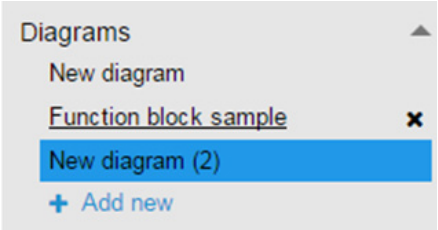
New diagram can be added by clicking **+ Add new** in diagram tab.

Diagram can be renamed by double click on diagram name.

Name of each Diagram must be unique.

Diagram can be deleted by clicking on **x** on beside diagram name.

All unsaved changes will be lost when creating new diagram.



30.4 Adding new function block to the diagram

Left click on selected function block to be added to the working space.

When added, element need to be assigned /set.

Clicking on element will open Properties dialog window on the right side.

Sample: Description of **Address** Function block changed from “Address” to selected object “0/1/0”.

- to delete FB.

- to duplicate FB.

Complex function blocks properties window contains multiple parameters

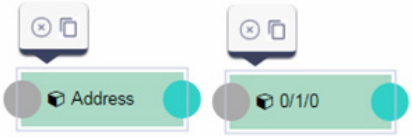
Example: Staircase lighting function without any assigned objects

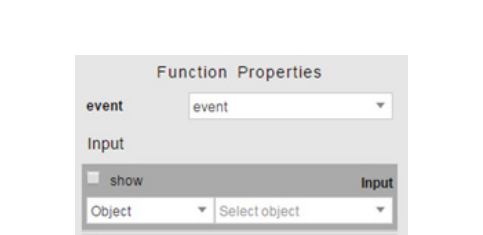
Objects connected to the function block must be created first.

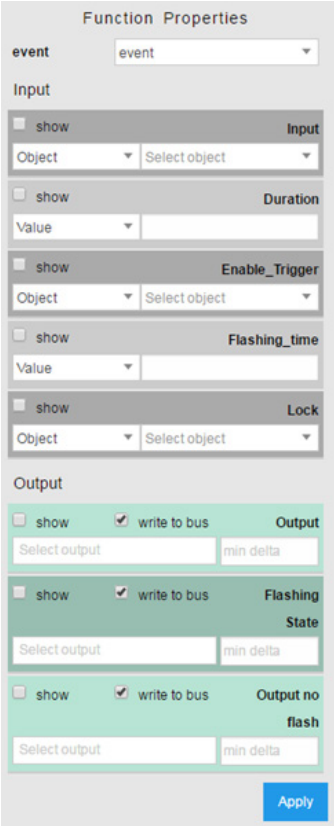
Event – object triggered by event / timer.

Input

- Show – Show / hide input value/connection point in function block
- Object – selecting object / value / storage / string
- **Select object** – select concerned object







Output

- Show – Show / hide output value / connection point in function block.
- **Write to bus** – value will be written to bus when checked.
- Select output – selecting output.
- **Min delta** – minimal difference in value change.

Example: Staircase lighting function.

Input – staircase timer control.

Duration – duration of staircase time in sec.

Enable trigger – enable re-triggering of staircase timer.

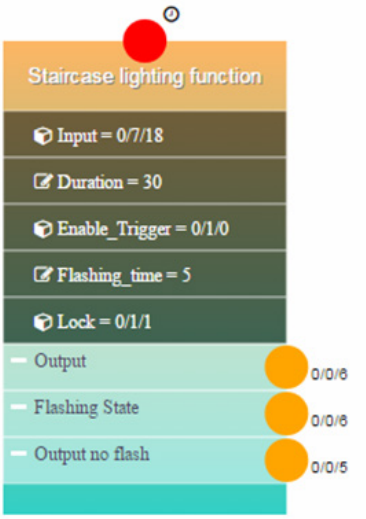
Flashing time – warning flashing time of staircase timer before end (inactive when empty).

Lock – enabling / disabling staircase timer.

Output – output of staircase timer.

Flashing state – warning flashing state object.

Output no flash – output of staircase timer without warning function.



Connecting function blocks together

Connection points colours explanation:

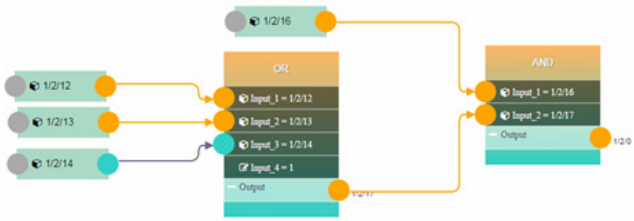
Red circle - to be connected with timer or event. When event is selected at least one event element must be linked. Block logic will run each time event element will receive telegram. To link event element select 'Show' for all inputs triggering logic and link event element to them with corresponding group addresses.

Grey circle – not connected

Yellow circle/line – represent events

Blue circle/line – for non-event connection

After each change on diagram Show and Generate buttons must be pressed for changes to take an effect.



Preview of generated LUA code

31 Application Note Documents

Detailed description of selected topics with focus on easy implementation can be found in application notes documents.

Actual list of Application notes:

- AN001_Wiser for KNX integration using BACnet
- AN003_Modbus power meters and Wiser for KNX
- AN005_PIR trend and logs with Wiser for KNX
- AN006_Advance techniques in visualization (Wiser for KNX)
- AN010_RS232 control with Wiser for KNX
- AN011_Email, SMS and FTP in Wiser for KNX
- AN015_Wiser for KNX visualization shortcut on the desktop
- AN016_Wiser for KNX as a Modbus slave
- AN017_Addressable limits of the Wiser for KNX controller
- AN018_Advanced project tutorial
- AN019_Exiway Power Control connected to SBO via Wiser for KNX
- AN023_Redundant operation mode of two Wiser for KNX
- AN025_Advanced graphic’s tutorial
- AN027_Creation of Modbus profile
- AN028_Wiser for KNX upgrade procedure
- AN029_Umotion client touch panels 10 and 15
- AN032_Lighting solution for comfortable environment using Wiser for KNX
- AN033_DMX control with Wiser for KNX
- AN034_Lighting solution for comfortable environment using Wiser4KNX II
- AN037_Modbus integration of room controllers SE8000 series
- AN041_CoolMasterNet
- AN042_Optimalization of visualization in complex projects
- AN044_Power_dissipation of DIN rail KNX
- AN046_Programming in Lua with Wiser for KNX
- AN047_ Corridor Linking using LUA scripts with Wiser for KNX
- AN048_ Monthly Email Backup File of Wiser for KNX
- AN049_ Exiway Smart Control and Wiser for KNX
- AN2_001_ How to flash microSD card in Wiser for KNX
- AN2_003_ Connectivity Ecosystem
- AN2_005_ Power Dissipation of KNX devices
- AN2_100_ RGBW-Dimming with KNX Multitouch Pro
- AN2_101_ Authorize actions on KNX with RFID-Tags
- AN2_102_ Revox Integration
- AN2_103_ How to fix issue with Bootloader in spaceLYnk / Wiser for KNX

- AN2_104_Alexa Voice control integration
- AN2_105_Touch 3

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33 Appendix

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