EVOLUTION
BMS

Version 4.0. Handbook

Rev2. Updated: 14-06-2020

Copyright notice and disclaimer

Content

1. Preface

Thank you for choosing ComBridge Studio Evolution.

The EVOLUTION BMS is a multiprotocol SCADA / BMS system (BACnet / MODBUS / KNX / OPC) that monitors, visualizes and controls the mechanical and electrical equipment of the building, such as HVAC, lighting, blinds, technical alarms, hydraulic systems, security systems, power etc.

It has a graphical interface **RENOVATED IN HTML5** and fully customizable, accessible via the web and compatible with mobile devices (tablets, smart phones, etc.)

It is pre-installed on a Linux operating system with many advanced modules like SQL queries, database management, advanced logic, logs, etc. Including new responsive and optimized modules in HTML5, such as Smart Metering, time schedules, scenes, graphics, alarms, etc. All of them with very intuitive graphical user interfaces.

Its visualization is one of the most customizable, multi-user / project visualizations, with special user rights, multilingual and easy to use on the market. Browsing is based on menus, windows, pages and gadgets. This allows a high level of personalization, as well as the creation of the appropriate environment for each circumstance.

Available in different industrial versions of embedded PCs (also available as a virtual machine for a dedicated PC or server and a special version for cluster / private cloud servers) to meet the requirements of even the most complex installations.

Evolution is a professional BMS system and the "Evolution BMS-Unlimited" has no limits on data points. Thus, it can control huge and complex facilities such as industrial buildings, airports, hotels, etc.

But with the new pricing structure, the "Evolution BMS-1500" can now also fit into the budget of smaller projects. Apart from the data point limit, this version does not differ from the "Evolution Unlimited" version. In addition, the "Evolution BMS-1500" can also be upgraded to the unlimited data point version if required later, with the corresponding license extension.

Included by default on all servers:

HTML visualization interface and local editor.
5 x KNXnet / IP gateways

1 x DALI e64 IPAS Gateways

5 x ModBus Devices

1 x BACnet device

5 x Smart Metetering Devices

5 x Simultaneous users (Visu / Smartvisu)

1 x additional and independent multiproject (Application manager) *

1 x Database Manager (Automated Backup and Export of recorded Data)

1 x reporting tool for individual project cost calculation

1 x Template **: Design a page and reuse it many times with different data points.

* Allows the configuration of an additional and independent project in Evolution Server. Users and visualizations can be assigned individual categories, scenes, schedules, alarms, etc. Eg, a development with 100 houses acquires an Evolution license and 100 additional users from multiple projects, thus controlling 100 houses with a single evolution.

** Template page with virtual process points and multiple links, each with different data points. (Eg, Hotel with 100 equal rooms. Create just one room with virtual process points / template and create a plan with 100 links, one for each room. Data points are assigned to each room's links)

Additional available license extensions:

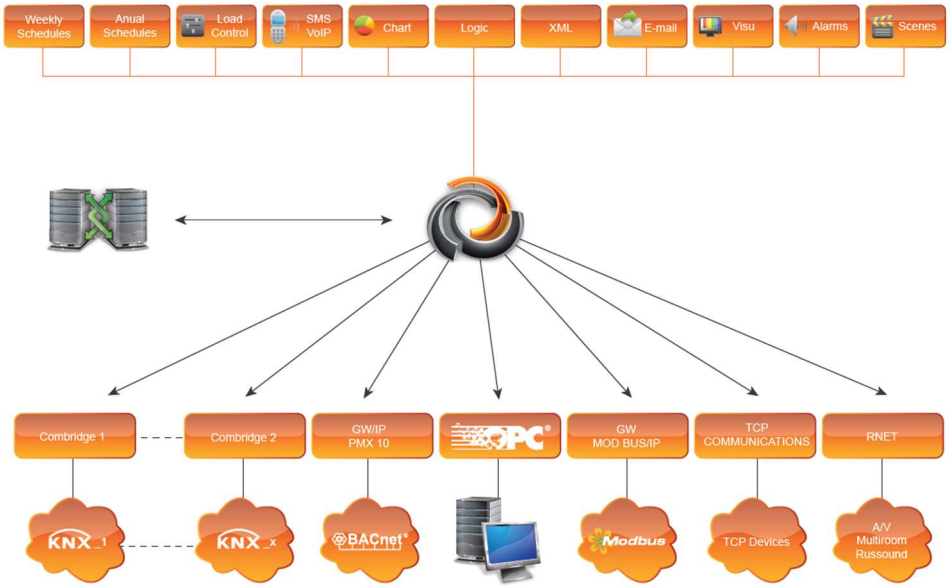
Web Code	Order No.	Name
27467	63102-32-38	Additional multiproject users *
10616	63102-32-50	Additional users (5 x users)
10382	63102-32-52	Smart Metering - license extension (5 x devices)
13770	63102-32-55	BACnet - license extension (5 x devices)

Web Code	Order No.	Name
10693	63102-32-51	KNXnet / IP gateway - license extension (5 x gateways)
15790	63102-32-54	Modbus - license extension (5 x devices)
15793	63102-32-53	Gestión DALI - license extension (5 x gateways)

EVOLUTION BMS is designed to record any KNX value for future reference and analysis.

Thanks to its possibilities in terms of user rights and permissions, different environments can be created for each user. Additionally, each user can be assigned different elements and advanced controls for monitoring and / or control.

Using the database module, EVOLUTION BMS and its KNX data can be integrated with external systems in a simple and flexible way.



EVOLUTION BMS is prepared to support integration with other systems, such as Modbus IP, Bacnet, etc., frequently used in building management systems.

2. System requirements

The EVOLUTION server works like a web server; It is part of the application network and can be accessed through its network address (IP address). The network address is simultaneously the URL that opens the display login screen in a standard system independent browser (Microsoft Edge, FireFox, Chrome, Safari ...). Evolution Editor is an Adobe Air application that can be installed on Windows 10 operating system

Fig. 1: EVOLUTION Server Basic

Figure 1 shows an example of EVOLUTION Server Basic. The EVOLUTION server can be operated remotely through its network interface via IP connection.

Depending on the performance requirements, it is offered on different HW platforms or as software in Virtual Machine format. Current information with all options can be found at https://www.futurasmus-knxgroup.com/evolution.php

Figure 2 shows a typical system structure: The EVOLUTION server is connected via the network to a KNXnet / IP interface, which establishes the connection to the KNX system. Access to the EVOLUTION web server requires the use of a standard browser, so that the user can log into the application with the corresponding authorizations.

To start and configure the application, a PC is required where the EVOLUTION Connection Manager has been installed locally. EVOLUTION Connection Manager starts the EVOLUTION Editor and establishes the connection to the server. With the Editor, the integrator creates websites that can be accessed using various navigation strategies:

- *Users with different user rights who can operate the visualization*
- *Time schedules*
- *Scenes*
- *Alarms*
- *Smart Metering*
- *Templates and much more.*

Thanks to the available licenses, we can expand the variety of applications, such as allowing KNX lines to be added to the project or expanding the number of users. By default, the basic license allows simultaneous access by 5 users.

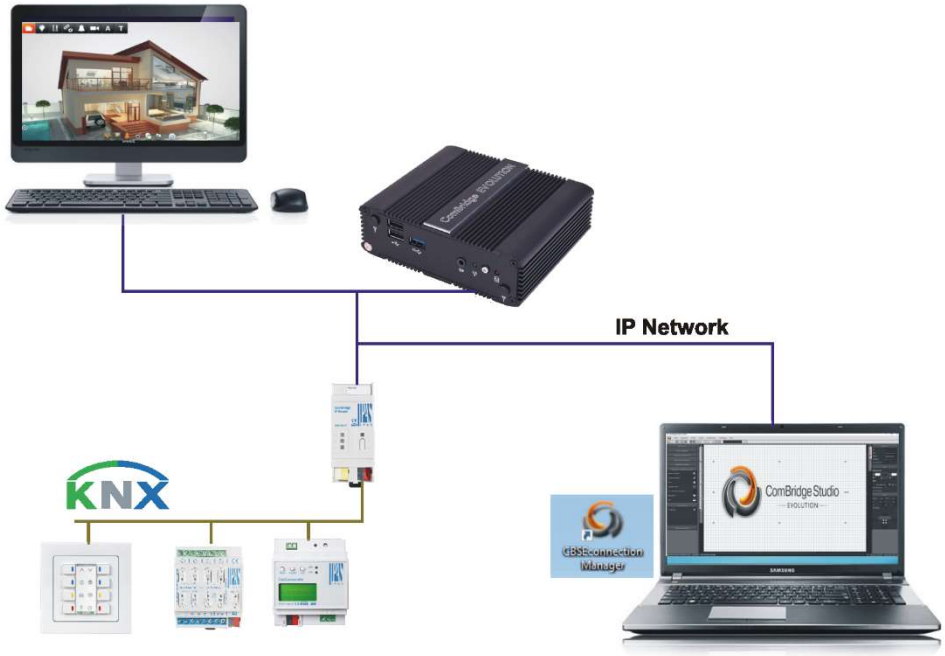


Fig. 2: EVOLUTION system structure

3. First commissioning

At the time of purchase, the Evolution server has the fixed IP address 192.168.1.131. In order for the Evolution server to be commissioned over the network, the client PC must be on the same network.

To start the configuration of the Evolution Server, you have to open a browser with the link http://192.168.1.131, where the Login screen opens:

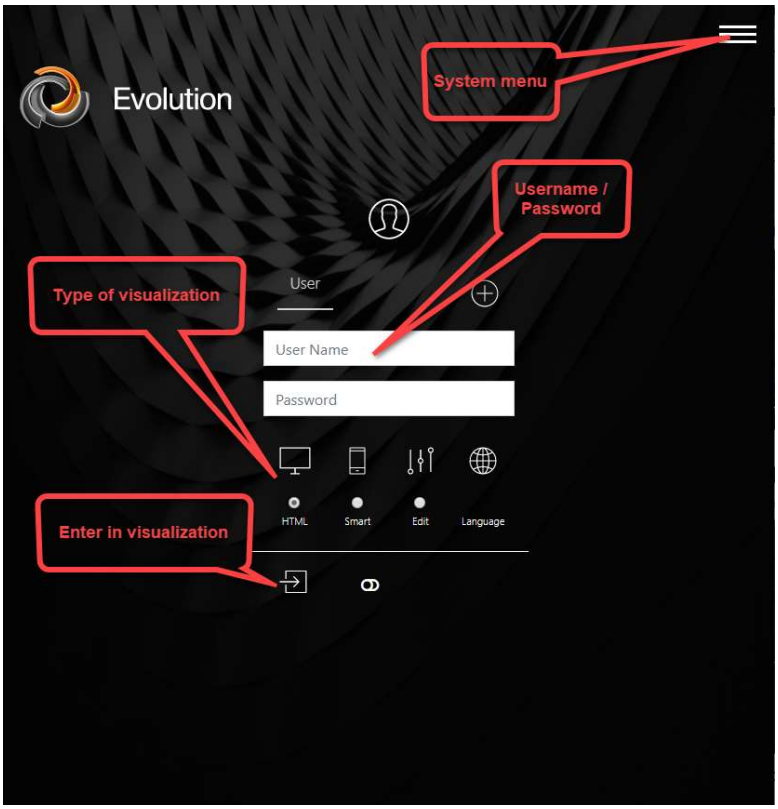


Fig. 3: Evolution login screen

The configured users are displayed in the upper area of the login screen. In Figure 3, the user "User" is active. Below the user input fields we can see several options:

If the user's selection is confirmed with this setting, the HTML visualization opens.

With this selection, the SmartVisu opens.

This option can be used to define a language for the selected visualization.

Clicking on the Main Menu opens the following selection:

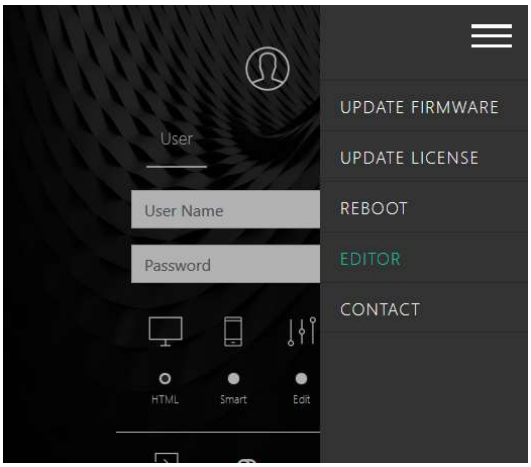


Fig. 4: Main Menu Options

UPDATE FIRMWARE Opens the download page to install software updates.

UPDATE LICENSE Opens the download page for the installation of the EVOLUTION license files.

REBOOT Performs a remote restart of the Evolution server.

EDITOR Starts the local installation of Evolution Connection Manager.

CONTACT Opens the Futurasmus KNX Test Lab contact page https://www.futurasmus-knxgroup.com/evolution.php.

4. Editor

The editor is started using the "Evolution Connection Manager" tool. This application is installed locally on the configuration PC. Installation may require special rights (eg for temporarily disabling an antivirus program).

4.1. Connection Manager Installation

By clicking on EDITOR in the service menu, the local installation of Evolution Connection Manager is performed.
Although it may vary by browser, the installation package for Connection Manager is generally copied to the download directory on your PC.

In some cases, the operating system will warn you that an unknown application is about to be installed. In Windows 10 the installation can be carried out if confirmed with "Run Anyway".

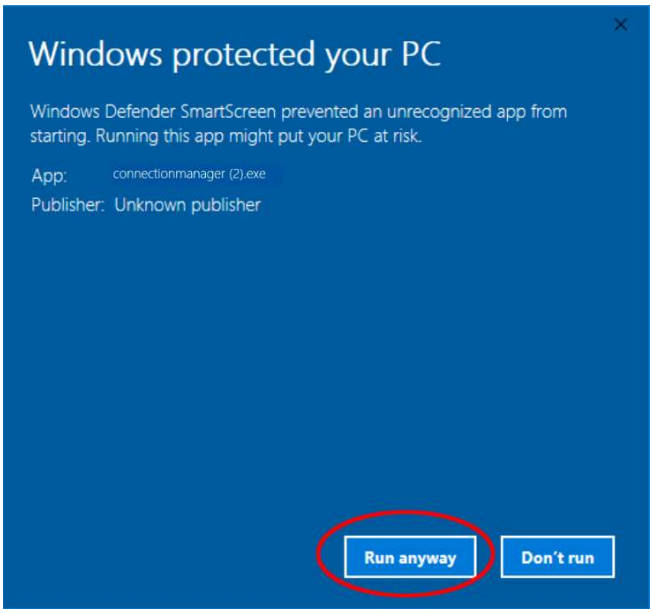


Fig. 5: Windows 10 security notice

After starting the installation, the following message appears:

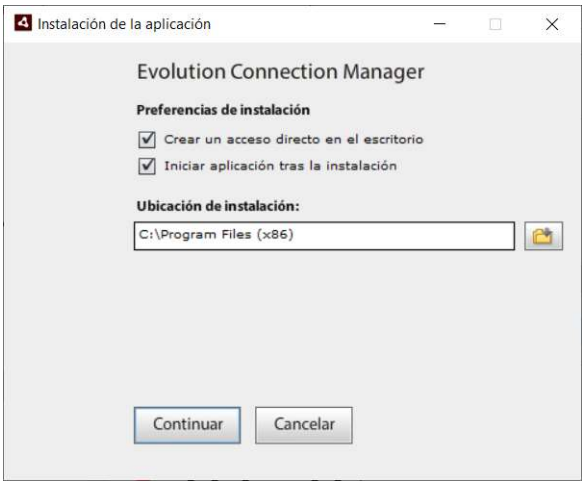


Fig. 6: Evolution Connection Manager installation settings

Important notice: Adobe AIR is required to use the Connection Manager and the editor. It can be downloaded free from www.adobe.com; if not, it is automatically downloaded and installed from the Internet during the Connection Manager installation process.

Connection Manager starts with an interface to establish the connection to an Evolution server:

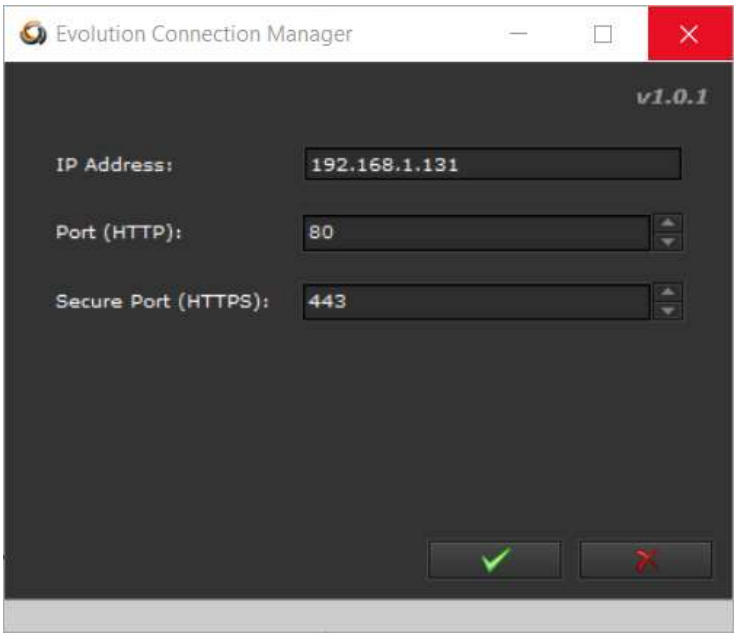


Fig. 7: Connection data for Evolution server in Connection Manager

For remote IP access the following data is required:

- *IP Address: Evolution server IP address*
- *Port (HTTP): Web port*
- *Port (HTTPS): Secure web port*

Next you will be asked for the password (default "00000") of the Evolution editor

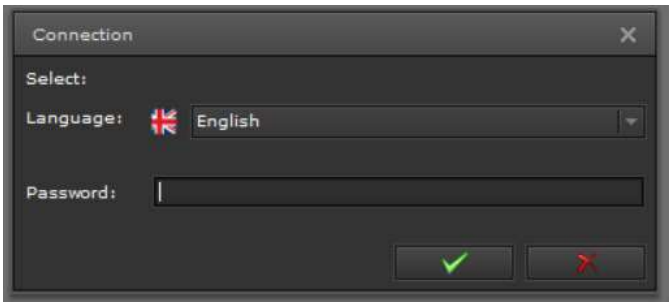


Fig. 8: Evolution editor security password

After confirming the correct access data, the Evolution Project Manager opens.

4.2. Project Manager

When the Evolution Connection Manager has connected to the Evolution server, the Project Manager opens, as shown in Figure 9.

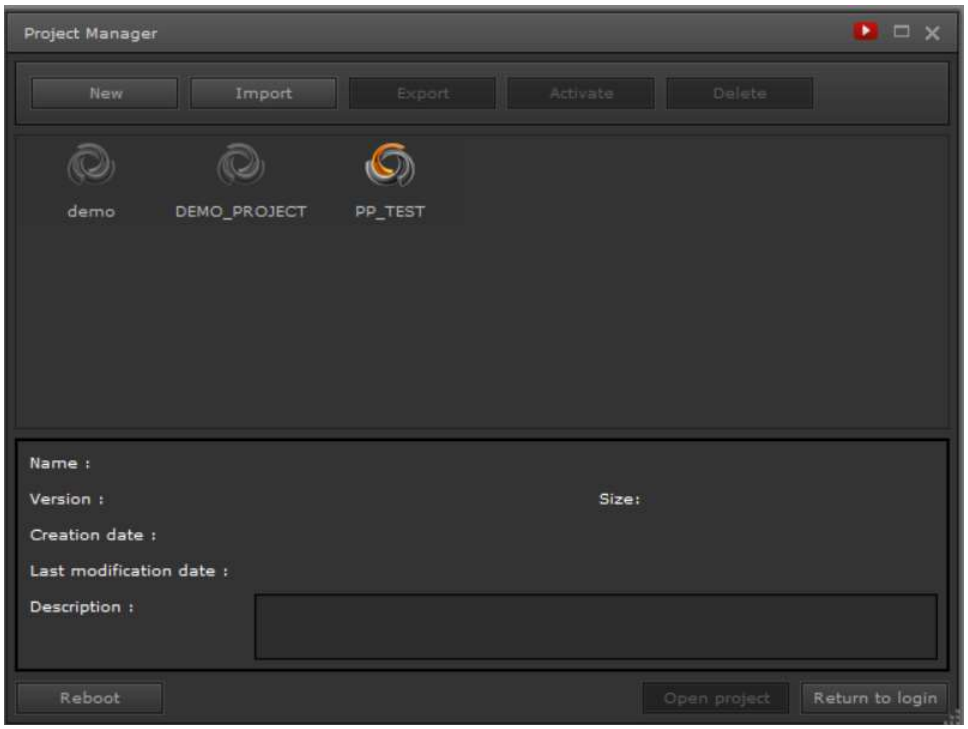


Fig. 9: Evolution Project Manager

The Project Manager manages all the projects created with the connected server. An Evolution project is the result of all the display configurations in an installation. Among other things, a project also defines the users who can use the visualization and their assigned rights. The Evolution server provides a web server to display the visualization, which shows the web pages of an "activated" project in a browser.

4.2.1. **Create a New Project**

Clicking the 

button opens the input mask to create a new project. The name of the new project is entered in the *Identifier* field of that mask. Optionally, a short description can also be entered in the *Description* field.

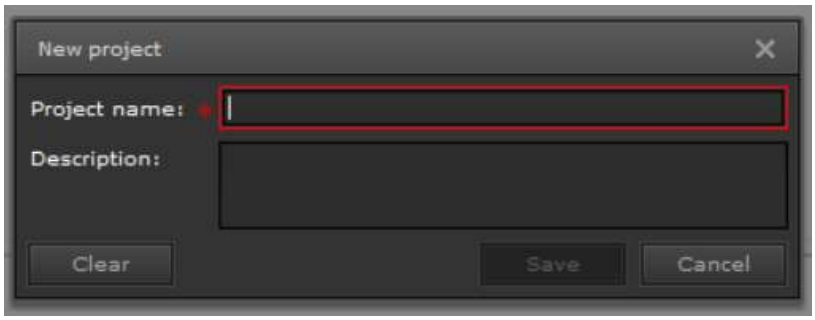


Fig. 10: Entry mask for a new project

The project name can only have letters, numbers, and underscores. Invalid

characters are filtered in the input mask and cannot be used.

4.2.2. **Export project**

The project to export is selected by clicking on the project management window. Clicking the button opens the project export dialog box. In the project export dialog box (via the export options), you can optionally save images for the visualization, logged data, and photo galleries.

All system configuration takes place in the Evolution Editor and is saved on the Evolution server. Neither the project data nor other configuration data is saved on the client PC.
Therefore, avoid possible data loss by regularly exporting project changes to external devices.

Clicking on starts the project export. When all the data for the export has been compiled, the browser file storage dialog asks you to specify the storage location and file name. The export is now complete.

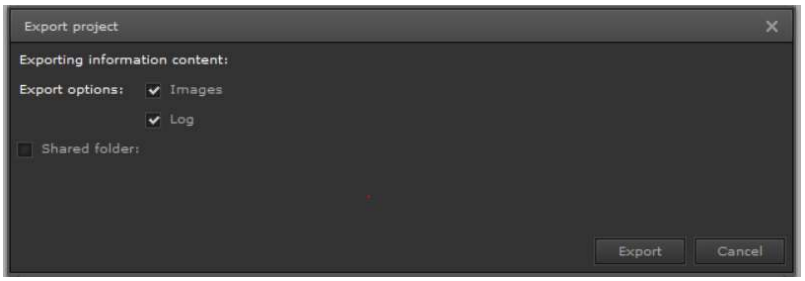


Fig. 11: Project export dialog

Through the external data directory check box, you have the possibility to save the project data to an external network drive. If this option is checked, the project export dialog expands, as shown in the following figure.

Fig. 12: Project export dialog for external data directory

Using the you can select the desired data directory. If the external data directory is not yet configured on the system, you can use the button to link a

new external data directory. To do this, the following dialog box opens when the button is pressed:

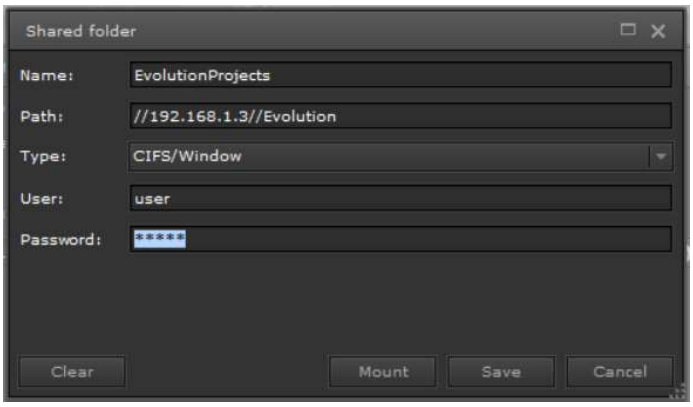


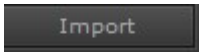
Fig. 13: Dialogue for the integration of an external data directory.

Enter the required data here:

Name: Name to identify the external data directory
Path: Destination path on the network drive
Type: CIFS / Windows is currently supported.
User: User for authentication (if necessary)
Password: Password for authentication (if necessary)

Figure 13 shows an example of the configuratopm of an external security directory.

4.2.3. **Import project**

Clicking the button opens the 

import dialog in Fig. 14: for a project that has already been saved. Enabling the security directory allows you to choose between the security location on the Evolution server (marked) or a security directory on the client PC (unmarked). Clicking the  button opens the file selection dialog with which you can select the project.

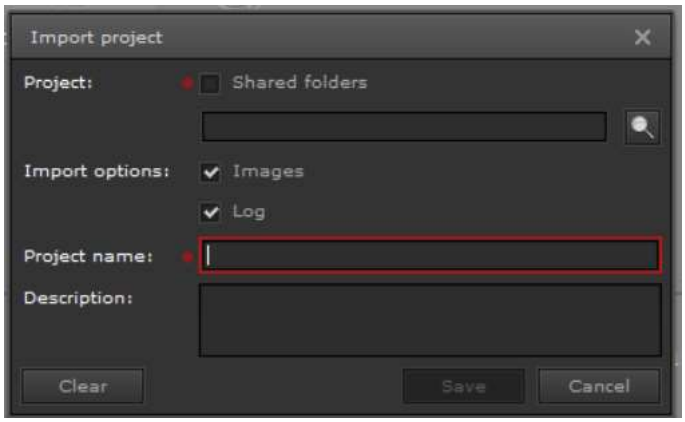


Fig. 14: Import dialog

Import options*:* They determine whether to get the visualization images, logged data, and photo galleries from the project backup.

Project name: Defines the new name of the project.

Description: Brief optional description of the project.

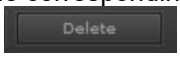
If the project backup file is on the client PC, the maximum possible transfer volume is limited to 100 MB. Larger backup files can only be uploaded through an external, linked data directory.

4.2.4. **Activate project**

The 

button can only be pressed if a project has been selected that is not activated in the project administration window. Activating a project means that the system adapts communication and data visualization to the newly activated project. Also, only users configured in the activated project can log in to the Evolution server.

4.2.5. **Delete project**

The project to be removed is selected by clicking on the corresponding symbol in the project management window If you then click the 

button, the project will be permanently removed.

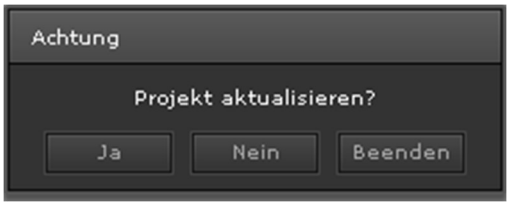
All project data is permanently deleted on the Evolution server. That is, restoration is only possible if you have a project export backup file.
Please note that an active project cannot be deleted.
If you want to delete the active project, you must first activate another project and then carry out the deletion process.

4.2.6. **Open an existing project**

An existing project is opened in the project administration window by clicking on the corresponding symbol and then pressing the 

button. Then the system checks if the project version matches the current Evolution version. If the versions match, the editor window opens.

If the versions do not match, you will be asked to update the project.



If you confirm with Yes, the project is automatically updated to the current version. If the update of the project cannot be carried out correctly, for example, because the project version does not support automatic updating, there is still the possibility to force the update. To do this, right-click on the project icon to select the entry from the Test / Restore Project pop-up menu.

5. EVOLUTION Editor

After pressing the 

button, the structure of the Evolution Editor is displayed. On the top of the screen you will find a bar with the main menu. Just below the bar, you will see several icons representing the most important edition functions, such as save, delete, copy, cut, etc.
In the centre of the screen we find the visualization workspace. On the left hand side, we find the functions menu.
Finally, on the right hand side of the work space, we find the property menus, which vary depending on the selected element.

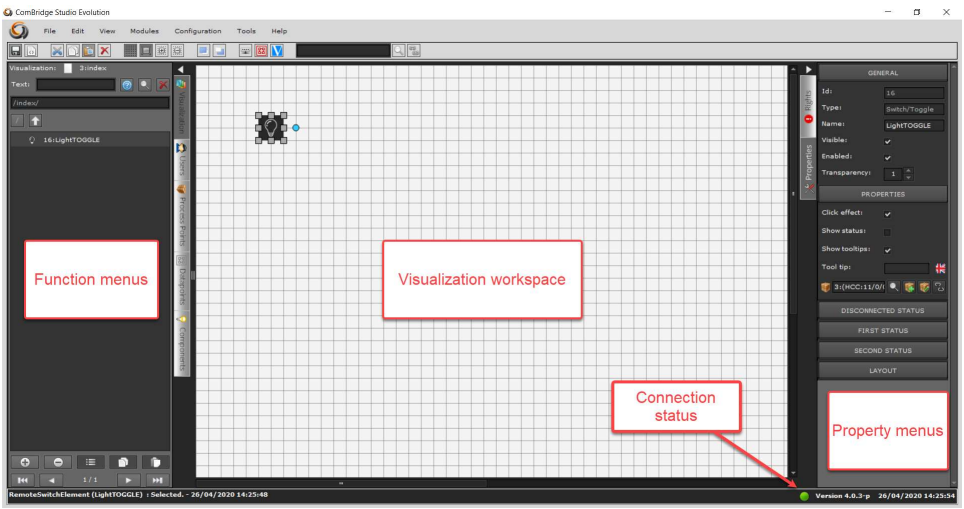


Fig. 15: EVOLUTION editor interface

At the bottom of the screen we can find the project info, on the left, and the current version number, on the right. To the left of the version identifier, the save icon shows whether the changes are saved or not. A green dot indicates that all changes have been saved. A red dot, on the other hand, indicates that there are changes that have not been saved.

5.1. Menu Summary

The following is a brief description of the editor menu. Please refer to the relevant chapters for detailed descriptions of each function.

5.1.1. File Menu

New: Clicking on this menu option opens a submenu with the following entries:

- **Project:** Project management opens and prompts you to enter a new project name.
- **Page** : Creates a new HTML page for the visualization.
- **Menu** : Creates a new menu on the HTML page.
- **Page** : Creates a new page and opens it in the editor for immediate editing.
- **Pages** : Multiple pages can be created at the same time. The page size is the same for all generated pages.
- **KNXnet/IP Interface** : Opens the corresponding dialog box to integrate a new KNXnet / IP interface in the EVOLUTION. See chapter 5.2.4 Associate KNXnet / IP interfaces.
- **Data point**: Opens a submenu that allows you to create a new KNX group address or a new "virtual data point".
- **Process point** : Open the dialog window to enter a new process point. For more details, see chapter 6.2 Evolution process points.
- **User** : Opens the dialog window to manage project users. For more details, see chapter 7.6 Create User.

Change project: Opens the project management window so that a new project can be selected and opened in the editor.

Activate project: Activates the currently open project.

 **Save:** Saves the project if changes have been made; otherwise, the menu item is disabled.

 **Import:** Clicking on this menu option opens a submenu with the following entries:

 **Export:** Clicking on this menu option opens a submenu with the following entries:

 **On login:** Closes the editor and switches to the login screen.

5.1.2. Edit Menu

 **Go to front:** In the tiered structure, the selected element is positioned in front.

 **Go to back:** In the tiered structure, the selected element is positioned at the back.

 **Select all:** All elements in the edit area are selected.

 **Drop selection**

 **Lock-Unlock**

-  **Lock selection:** The selected items are locked for editing. This means that no changes can be made to them.
-  **Unlock Selection:** selected items can be edited again.
-  **Lock everything:** All elements in the edit area are locked.
-  **Unlock everything:** All elements in the edit area are locked.

 **Cut:** Deletes the selected item from the edit area and copies it to the clipboard.

 **Copy:** Copies the selected item to the clipboard

 **Paste:** Pastes the clipboard contents at the mouse pointer position

 **Delete:** deletes the selected element

5.1.3. View Menu

 **Tools Bar:** Shows and hides the icon menu bar.

 **Properties:** Opens the properties tab.

 **Rights:** Opens the rights tab.

 **Pages:** Opens the pages tab.

 **Users:** Opens the users tab.

 **Process points:** Opens the process points tab.

 **Data points**: Opens the data points tab.

 **Components:** Opens the components tab.

5.1.4. **Modules Menu:**

Time schedules:

Weekly time schedules: Opens the configuration window to edit and configure weekly time schedules.

Annual time schedules: Opens the configuration window to edit and configure annual time schedules.

Alarms Module: Opens the alarm management module.

Smart Metering: Opens the Smart Metering module.

Logic Module: Opens the logic editor.

Scenes Control: Opens the scene management module.

Project Report: Opens the Project Report module.

Non EIS Types: Definition of Non EIS data types

Ping control: Checks the availability of IP components on the network

SmartVisu: opens the SmartVisu editor

SQL queries: Opens the SQL query manager

DALI: Opens the Dali Management Tool

5.1.5. **Configuration Menu:**

Network: Setting of network parameters

Editor: Editor User Settings

Emails service: Configuration of email messages

SMS service: Configuration of SMS messages

Security Directory: Definition of external directories

System time: System time configuration

User rights for online modules: Extended management of user rights

PP (process points) indicator: General indicator of PP in online modules.

Design components browser: selection of button styles

User groups: Definition of new user groups

HTML: Representation of HTML pages in the browser

Passwords: Assignment of new system passwords

GPS: Enter location

5.1.6. **Tools Menu**

Diagnosis: Launches the diagnostic application. See chapter 10.1.

Database manager: Opens the database manager. See chapter 10.2.

Delete memory: Clears the cache on the EVOLUTION server. See chapter 10.3.

CSV export manager: Opens the configuration mask for the CSV export manager. See chapter 10.4.

Storage manager: Opens the configuration mask for hard disk storage management. See chapter 10.5.

System restart: The EVOLUTION server restarts

Support by Team Viewer: Starts the Team Viewer remote control tool.

5.1.7. Menu Help

Help

Quick guide: Brief start up description

Handbook: This instruction manual

Smart Metering: Smart Metering module instruction manual (optional)

Videos: URL to the YouTube channel of Futurasmus KNX Test Lab

License agreement

About EVOLUTION

5.1.8. Shortcuts

Ctrl+S	Save
Ctrl+A	Select
Esc	Drop selection
Ctrl+X	Cut
Ctrl+C	Copy
Ctrl+V	Paste
Del	Delete

5.2. System configuration

System settings include project independent settings. In other words, these settings are kept regardless of the project that is currently open or activated.

5.2.1. Network configuration

Network settings are necessary to adjust the standard settings to the network conditions of the project. To do this, select, in the main menu, the option *Configuration/Network*.

Fig. 16: Open network settings

The following configuration window opens.

Depending on the version, the EVOLUTION server has up to two network connections (eth0 and eth1). Depending on the application, one network connection can be used for connection to the bus, for example, and the other for the visualization or the configuration.

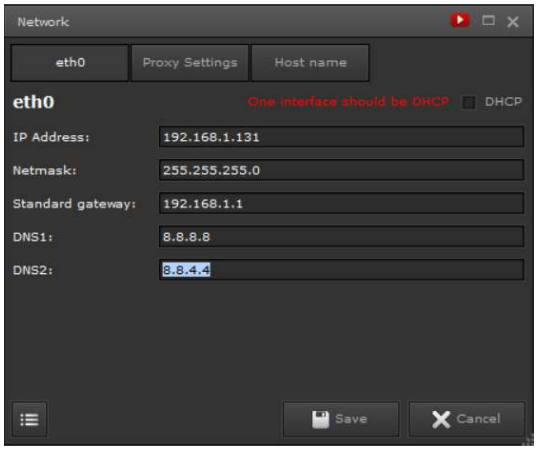


Fig. 17: Network configuration

Important note: If both network connections are used, we must make sure to configure a different network for each connection. In other words, IP addresses in connection with the netmask must not point to the same network.

When both network connections are used, only one of them can be configured to access the Internet. In other words, only one of the network connections can contain the default door specification.

DHCP: Activates / deactivates the DHCP client to automatically obtain its IP address. If not activated, you must assign an IP address manually

IP Address: Manually assigned system IP address

Netmask: Subnet mask
Standard Gateway: IP address of the internet access gateway
DNS 1 / DNS 2: Name domain servers for Internet address resolution

To access the Internet through a proxy server:

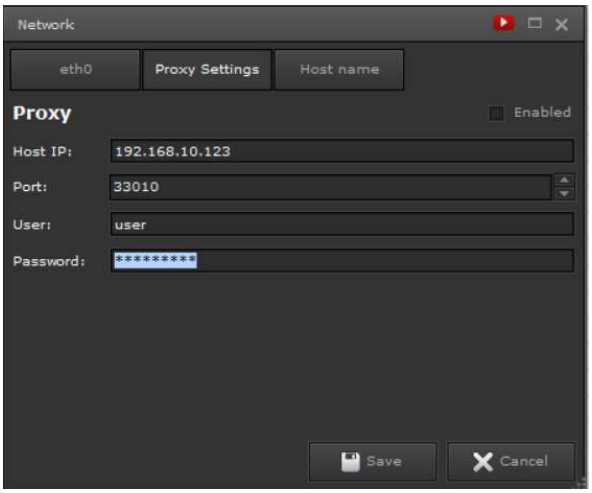


Fig. 18: Setting up a proxy server

Activate: Activates the connection to the Proxy Server.
Host IP: Proxy server IP address.
Port: Proxy server port number.
User and **Password**: Proxy server authorization.

The network administrator provides the data for the proxy configuration.

5.2.2. **System time/date configuration**

For the correct processing of the weekly or annual schedules, the date and time corresponding to the location must be configured through the *Configuration / Date time config* menu.

The parameters are: configure the current date, time, time zone, and optional use of an NTP time server. NTP time servers allow the automatic synchronization of system time. With the *Save* button, the changes are accepted.

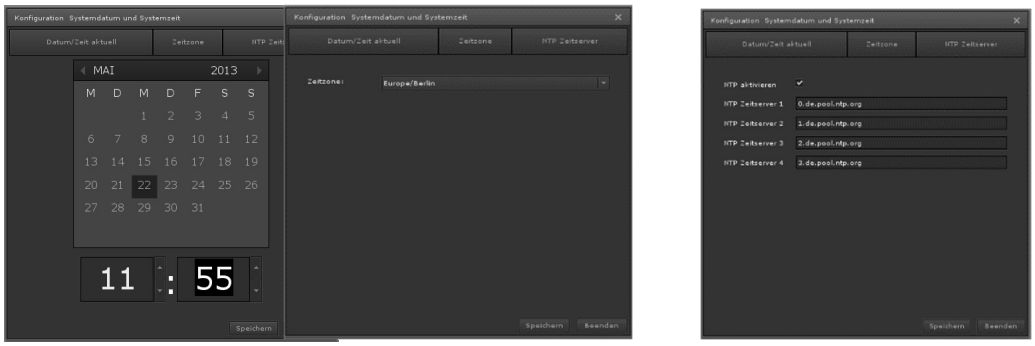


Fig. 19: Date, time, time zone and NTP time server settings.

For the NTP service, it is necessary that the network configuration has been carried out successfully. It must be disabled if the system environment does not allow an Internet connection.

Select the time servers that are available in your time zone at www.pool.ntp.org

5.2.3. **Editor credentials - Configuration**

Editor login data is project independent, and affects all projects installed on the server.

They are configured through the menu *Configuration/Editor* (as shown in Figure 20).

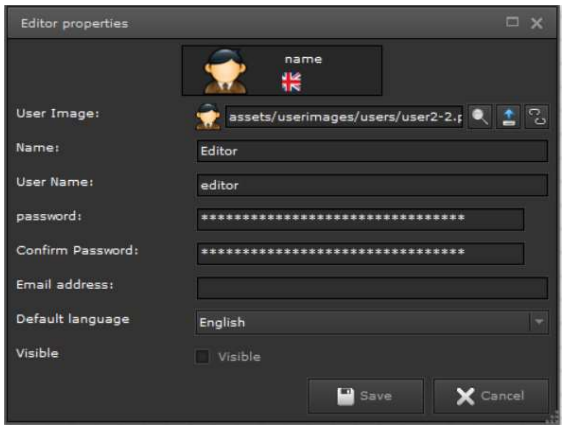


Fig. 20: Editor Settings

Password: Only numbers from 0 to 9 are allowed
Confirm password: Repeat password
Email address: Email address for email notifications with system information. The email service must be previously configured (Section 5.2.6)
Language: Editor language

5.2.4. **Associate KNXnet / IP interfaces**

Evolution creates a connection to KNX installations using KNXnet / IP interfaces. Multiple KNXnet / IP gateways are allowed on the same Evolution server, where the limit will be on the purchased license.

“KNXnetIP" gateways are added from *File / New / KNXnetIP Gateway* or via the menu icon  .

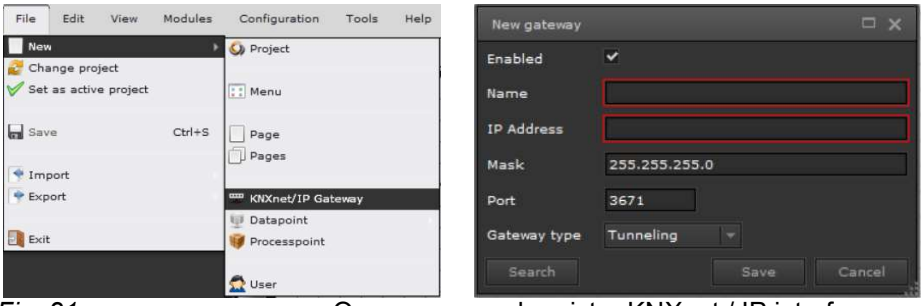


Fig. 21: Open menu and register KNXnet / IP interface

Active: The configured interface is activated

Name: KNX Gateway Name (it must be unique)

IP Address: KNXnet/IP interface IP address

Mask: Appropriate subnet mask

Port: KNX standard communication port

Connection type: Allows "ObjectServer" or "Tunneling".

- A Tunneling connection creates a point-to-point connection to a component. It is used, for example, for ETS programming.
- The ObjectServer connection transmits only group addresses. We recommend to use this one instead of Tunneling whenever it is available. If it is not, you can configure the Tunneling connection.

The search function 

is carried out using IP Multicast communication. For it to work, the multicast address 224.0.23.12 registered by the KNXA for KNXnet / IP traffic is required.

If automatic search does not detect these interfaces, they must be added manually. This is due to the fact that multicast traffic is usually filtered by the switches and routers on the networks.

Example of a list of KNXnet / IP interfaces after a search:

.

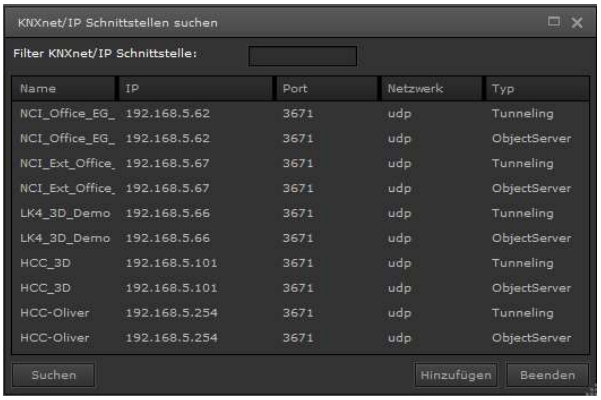
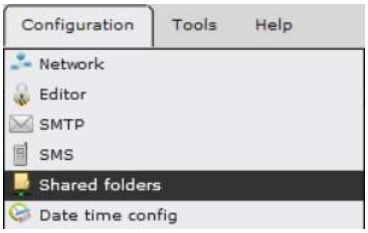


Fig. 22: Interface Search View

5.2.5. **Backup directory Configuration**

Menu *Configuration / Shared folders*.



Allows you to organize the data backup in a shared network directory. The *CSV export manager*: module allows automated data backup, including data logged by process points.

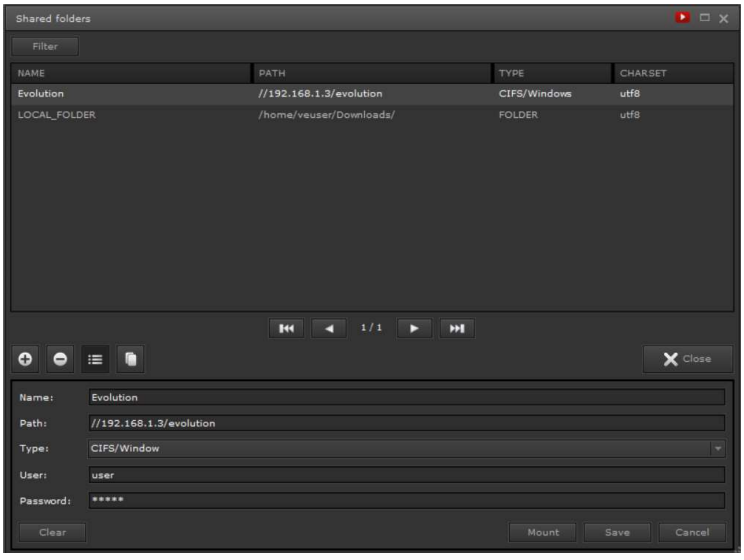


Fig. 23: Back up directory Configuration

Creates new backup directories.

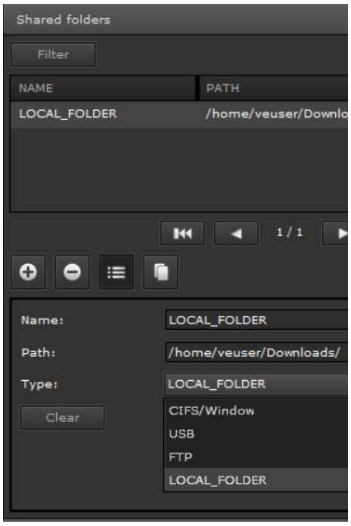
Deletes the configuration of the selected backup directory. No data is removed from that directory.

Allows editing the setting of the selected backup directory.

- The lower edit area opens with a copy of the selected security directory

settings.

The backup directory allows you to:



- Have different locations

- Create multiple backup directories, which can be used for different security tasks.

Name: Enter here the name of the backup directory, which is then selected in the corresponding applications.

Path: Enter the network or drive path for the backup directory.

Type: The type of security directory is displayed. We have the following choice:

CIFS/Window: Specifies a local network drive as the storage location for the backup directory. The prerequisite for this is a directory created for Evolution. A network path can be specified as follows: //<IP-Adresse>/Foldername.

USB: The backup directory is on a device connected to the Evolution USB port. Before that, the mass storage device must be connected to the Evolution USB port. In this case, the connection is recognized and automatically configured.

FTP: The data is transferred to the backup directory via FTP protocol. This type forces the required port for FTP to be free.

Local directory: The backup is done locally on the Evolution server. This local directory can be accessed through FTP.

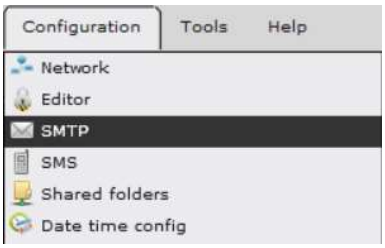
User: Username to access the corresponding network drive.

Password: Access password to the corresponding network.

After saving the settings, the connection can be checked by clicking on 

. If the test is positive, the directory can now be used for data backup.

5.2.6. E-mail Service Configuration



Menu *Configuration/SMTP*. The already configured email accounts are listed. New accounts are created in  . Account details are entered in the lower section

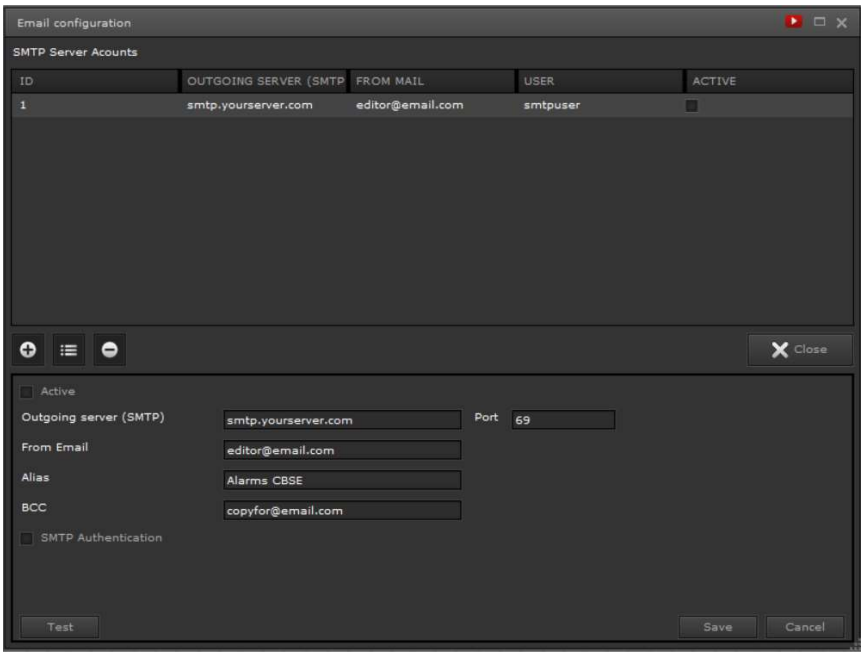


Fig. 24: Email configuration

An email account is required. Note the service provider settings for the SMTP (email sending) service.

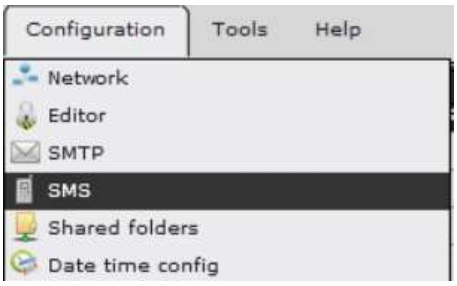
Property	Value	Description
Active	☐	The email account is inactive, that is, emails will not be sent.
	☑	The email account is active.
Outgoing mail server		Outgoing mail server (SMTP) host name.
Port		The port number of the outgoing mail server
Sender		Sender's Email
Description		Identifier for this email account
BCC		BCC (Blind Carbon Copy) is a list of additional recipients that are not displayed to the message recipients specified in the alarm settings.
SMTP authentication	☐	The service provider does not need authentication to send emails.
	☑	Service provider authentication is required. The required data is entered in the following fields. Take the data from your service provider's documentation.
User		Username as registered with the service

		provider.
Password:		Associated password
Authentication	none	Connection security is specified through these settings. The procedures provided by the service provider can be found in the provider's documentation.
	SSL	
	TTLS	
	SSL	

Configuration is completed by pressing the button Speichern.

See annex chapter 11.5 for configurations of some free Internet providers with which Evolution's e-mail service has been tested.

5.2.7. **SMS Service Configuration**



The configuration of the SMS service is carried out in the menu *Configuration/SMS*.

By clicking the button you can enter the required account information.

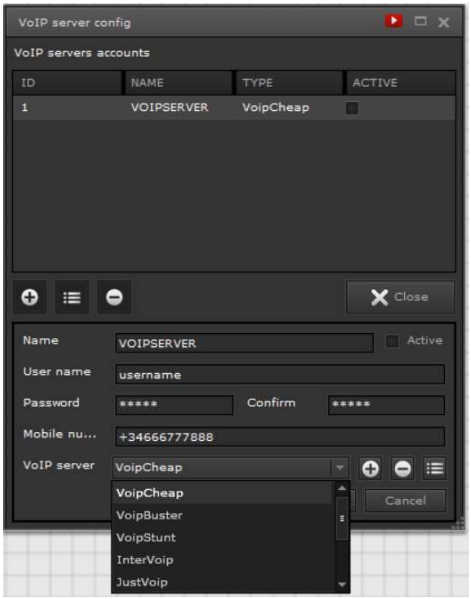


Fig. 25: SMS / VoIP Server Configuration

Property	**Value**	**Description**
Description		Freely selectable name to identify this account.
Active	☐	The account is inactive, that is, no SMS

		messages will be sent.
	☑	The SMS account is active.
User		Username as registered with the service provider.
Password:		Associated password
Confirm		Confirm password
Phone number:		VoIP account phone number.
VoIP server:	+	List of registered VoIP service providers. With "+" you can add more service providers. "-" removes an entry from the list and with "E" you can edit an entry.
	-	
	E	

The providers that we see in the drop-down menu have been tested for the SMS service.

5.3. User rights for online modules:

Evolution has advanced user control. You can create multiple users, who can also call different websites. Online modules, such as time schedules, scenes or alarms, can be organized in a way that each user has access to the assigned configuration and shows it on the visualization.

The functional scope of the online modules and the assignment of the categories can be defined through the user rights (established through the configurations created within the module).

A configuration can have a number of assigned users, each with their individual rights within the corresponding modules.

The project manager can establish the rights, as well as the number of users and the categories of the different HTML modules assigned to the defined users.
In the menu *Configuration -> Rights for Online Modules*.

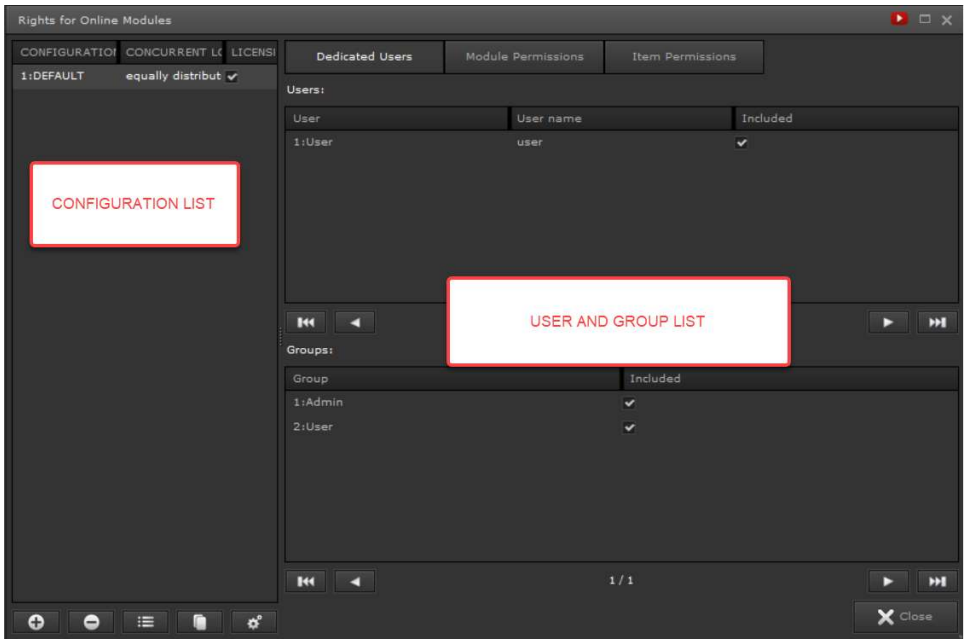
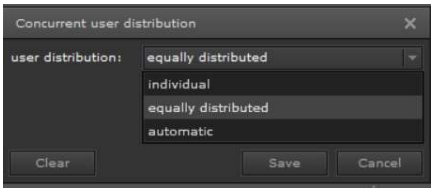


Fig. 26: User rights configuration interface for online modules.

The list of settings is on the left. In the DEFAULT standard configuration, there are no restrictions on access rights to HTML modules. Settings can be added, removed, or edited using the command buttons in the footer area. A number of simultaneously connected users can be assigned to each configuration. Clicking  in the footer area defines the distribution of users in the settings. The following options are available:



individual: The total number of users appears individually in the configuration.

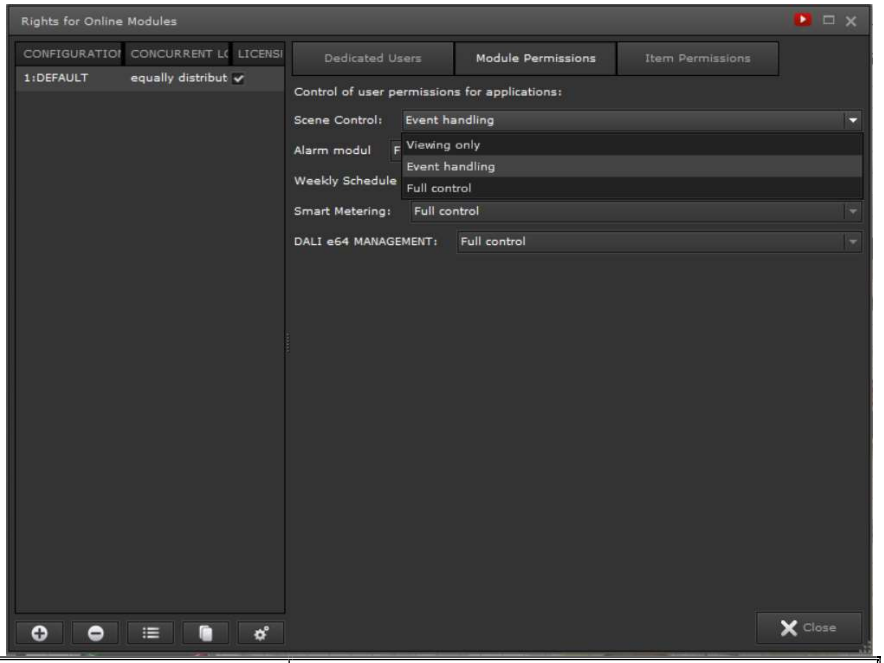
equally distributed: The number of users is divided equally by the number of configurations.

automatic: The number of available users is distributed according to the order of calls.

On the right hand side, the configuration settings are divided into the *Dedicated users*, *Module Permissions* and *Item Permissions* areas, which can be accessed through the respective tabs.

All users and groups are listed in *Dedicated users*. The *Included* checkbox determines the assignment of a user to the selected configuration. That is, when the user works online, after logging in, they will only have the access rights specified in the configuration.

Configurable Evolution applications are listed on the *Module Permissions* tab. The following options are available for each of the applications mentioned:



Option:	Description
Display only	The settings made in the Evolution editor can not be changed in the visualization.
Edit switching events	The preconfigured events in the Evolution editor can be changed in the visualization.
Unlimited	The operation of the module is not subject to any restrictions. All editing functions are available just like in the Evolution editor.

In the *Object Access Rights* tab you can assign application specific rights. Setting options for application specific objects are: *Not visible*, *Viewing only*, *Event handling* and *Full control*. See table above for explanation of the different options. After selecting the application to configure and its section, we find a list of all the objects defined in it.

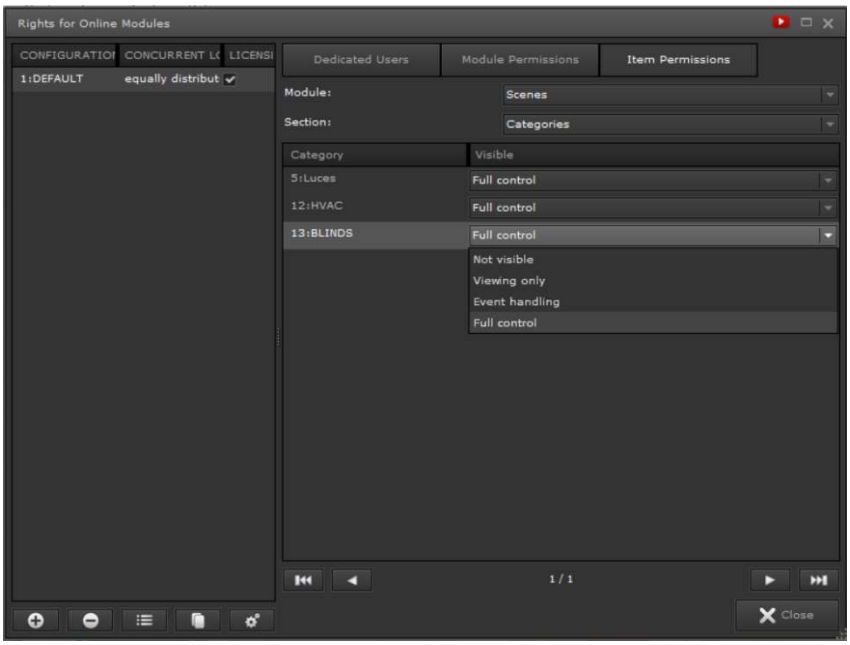


Fig. 27: View of user rights settings for the scenes module

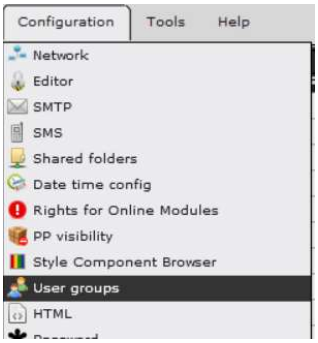
Now each object can be assigned the appropriate access option. In the screenshot above we see how the chosen access rights are assigned to the Scene- Category (13: Blinds). The following table lists the applications and their configurable sections.

Application:	**Object/Section**	**Description**
Alarm	*Contacts*	*Different access rights can be assigned to each alarm contact address.*
	Messages	*Different access rights can be assigned to each alarm message.*
	Categories	*Different access rights can be assigned to each alarm category.*
Scenes	*Scenes*	Different access rights can be assigned to each scene category.
Weekly time schedules	*Categories*	Different access rights can be assigned to each weekly time schedule category.
Annual time schedules	*Periods*	Different access rights can be assigned to each period.
	Categories	Different access rights can

		be assigned to each annual time schedule category.
Smart Metering	*Directory*	Different access rights can be assigned to each Smart-Metering directory.

If more settings have been defined for an imported project than the number of allowed licenses, due to lack of licenses, some users may no longer be able to log in because the maximum number of users connected at the same time has already been reached.

5.4. User groups:



Using the user group editor, new groups can be created in addition to the predefined *Admin* and *User* groups. A user group is only identified by its name. Using user groups allows you to specify access rights to components and modules in relation to those groups.

A user can belong to only one group. (7.6 see chapter «Create Users»).

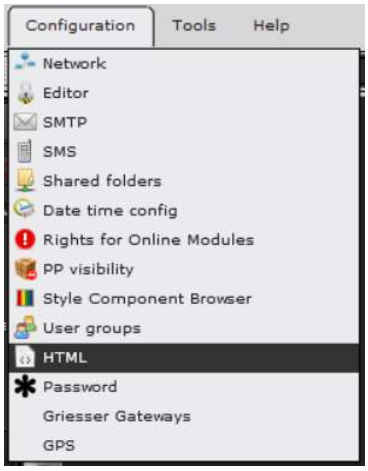
Predefined user groups have the following functions:

Group	Functions
Admin	Access to visualization pages, scene settings, time schedules, alarms and Smart metering, access to all priorities.
User	Access to access rights for visualization pages, control elements and modules, as established by the project manager.

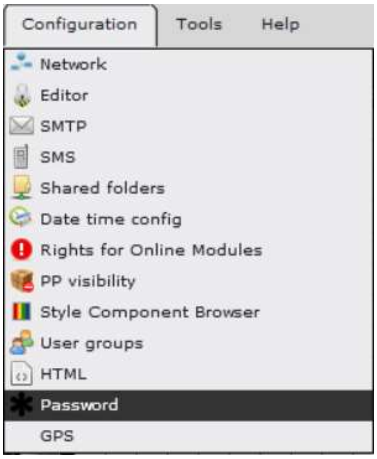
Newly created user groups can be treated as the predefined user group *User*.

5.5. HTML Configuration

HTML pages can be exported so that they are displayed in full screen on mobile devices.



5.6. Modify system accounts



The Evolution server has 2 preconfigured user system accounts. The *admin* user is responsible for the system update process. The update process is carried out by opening the page. The second user account, *veuser*, is the standard user, in whose access area all application-related files are stored (for example, user-specific image files, configuration files, exported HTML pages, etc.). The passwords of these users can be changed through this menu item.

6. Data and process points

Evolution supports various data communication protocols, such as KNXnet / IP, OPC, BACnet, Modbus, etc. All these communication protocols have their special way of communicating with the data and process points.

KNXnet/IP - Group addresses
OPC – OPC elements
BACnet – BACnet objects instances
Modbus – Register, Coils

At this level of communication, Evolution only differentiates between KNX data points and so-called "virtual data points". That is, OPC, BACnet and Modbus data points are considered "virtual data points" in EVOLUTION. The implementation in the required data communication protocol is carried out at the system level by means of the appropriate software modules.
EVOLUTION goes one step further and eliminates the concept of “data point”. In EVOLUTION, the communication data points mentioned above are encapsulated in so-called process points. The advantage is that multiple data points can be combined by functions and thus form a processing unit or a process point. Therefore, in Evolution a Process Point represents the union between the application and the data point.

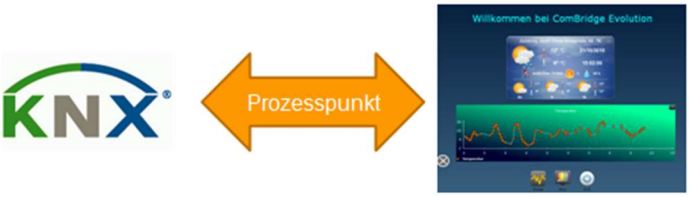


Fig. 28: Process point and data point in EVOLUTION

The process point as a virtual level between the application and the data point, as shown in Fig. 28:,, allows the manipulation of data points so that application specific functions, logical joins, conversions, calculations and much more can be easily implemented. Using the example of a KNX event, the sequence of functions in event processing is illustrated in Fig. 29:.

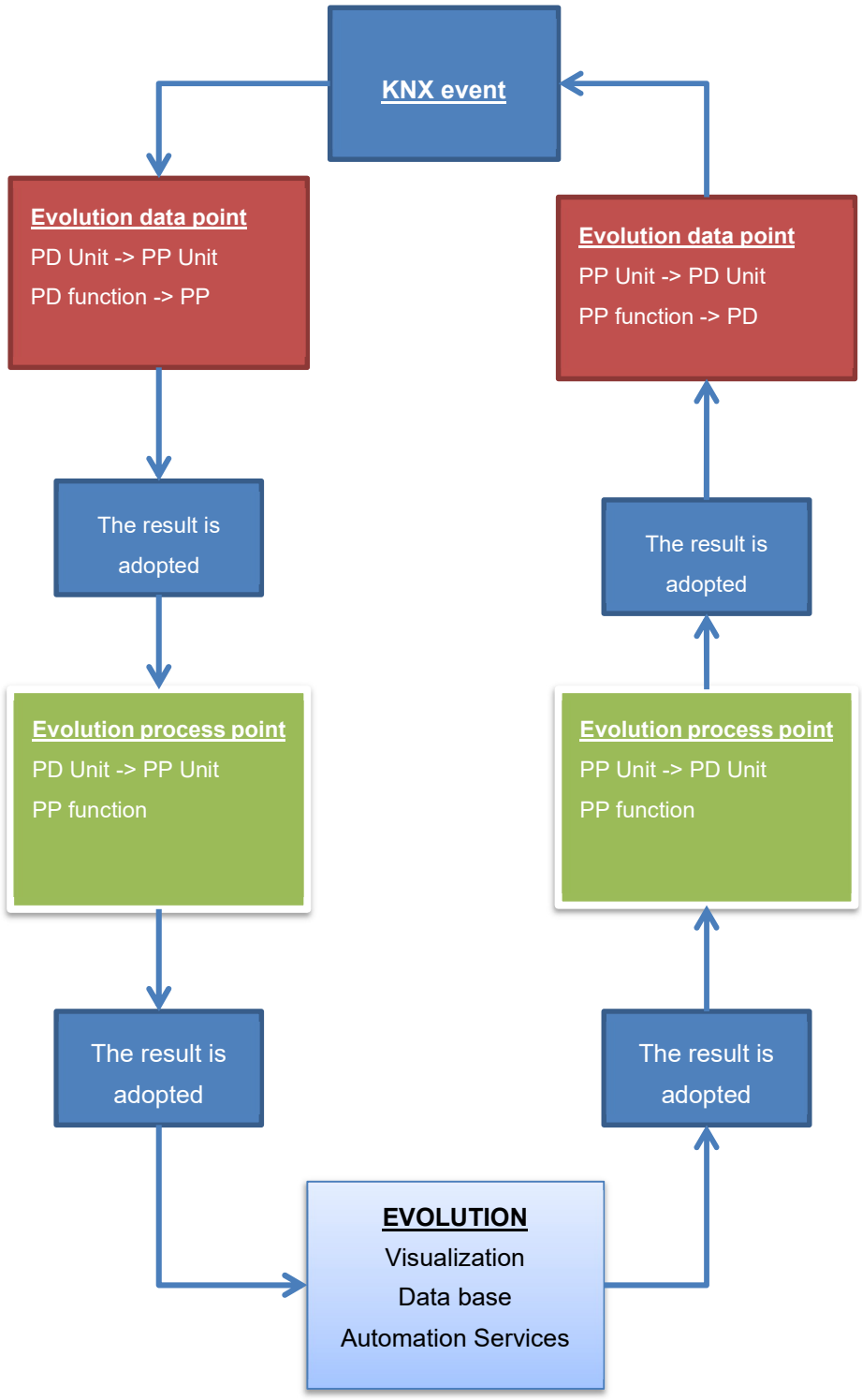
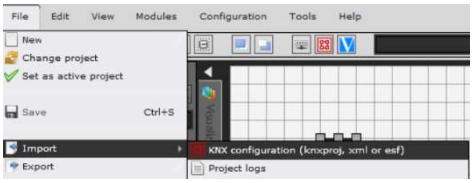


Fig. 29: Functional sequence in event processing

EVOLUTION receives a KNX event through the Client-Manager and registers it as a data point. EVOLUTION checks whether a reception function has been defined for the data point and executes it accordingly. The unit conversion is then performed for the function value or data point value (if configured). The result of the data point calculation is transferred to the process point. At the process point level, a reception function (if one has been defined) is also performed; and then

unit conversion takes place. The result of the process point calculation is finally forwarded to the application. The application can be a warning in the visualization, a modification in the logic and / or the storage in the database.

6.1. ETS group addresses as Data Points



Starting with ETS 5, group address information can also be imported from the ETS project file with the extension ".knxproj" and in XML format to EVOLUTION. Compared to OPC format, new formats have the advantage that full data point type information is now imported. As long as the main types and subtypes have been fully assigned in the ETS, EVOLUTION imports the data points and therefore also the process points with all the information from the data format. Therefore, there is no need to edit the data and process points later.

With *File/Import/KNX configuration* the import window opens. All *Project files* already loaded are listed in the lower area. New *KNX data sources* are loaded with the button  , which launches a file selection dialog box. After selecting the *Project* to import, click on *continue* and the import window will open (Fig. 31:)

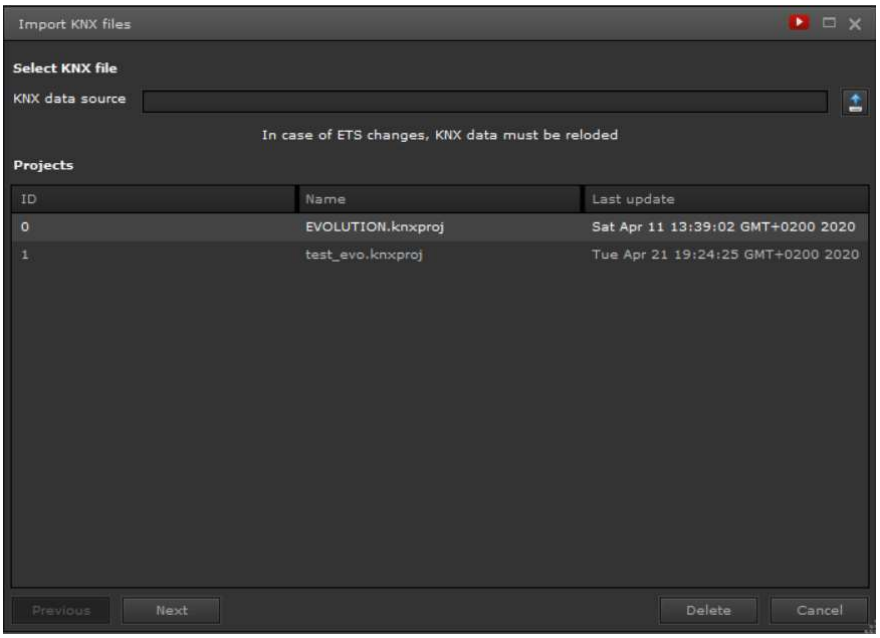


Fig. 30: KNX Data Source Selection

The 5 necessary import settings are made in the import dialog box (Figure 31).

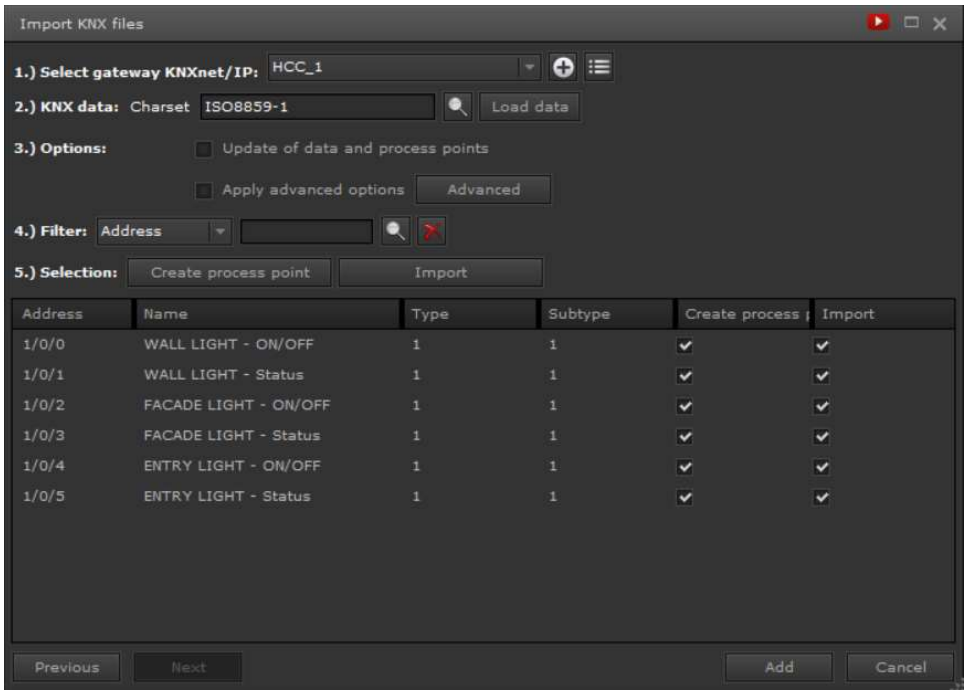


Fig. 31: Import of data points and KNX process points

1.) **Selection of KNXnet / IP interface:** Select here the communication interface to which the KNX data to import is assigned. Depending on the filter (4.), KNX data can be selected once filtered, and therefore different interfaces can be assigned.

2.) **KNX data character set:** Depending on the language and country, the required character set can be selected. With 

the KNX data is imported and listed in the lower area of the window.

3.) **Options:** This option is only important in case the KNX data needs to be updated. If *Update data points* field is selected, only changes in the data structure are taken into account during import. If the *Extended Options* are selected, the properties of the process points listed below can be configured.

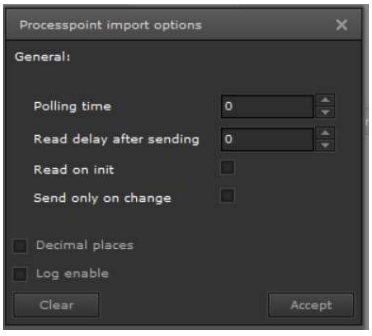
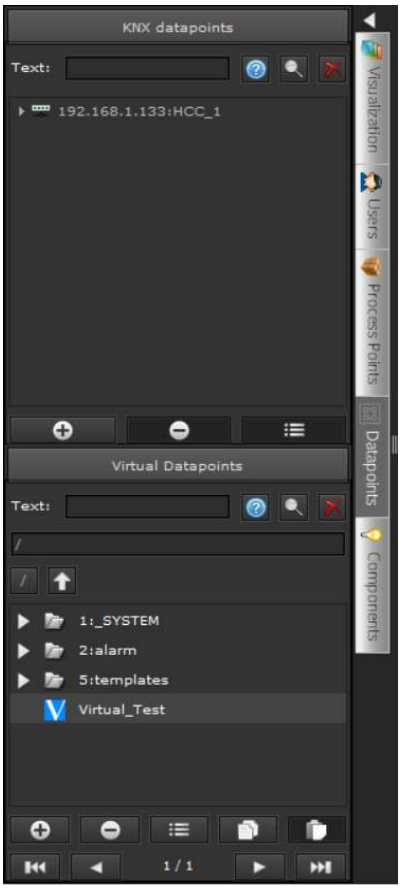


Fig. 32: Process point properties

EVOLUTION allows you to re-import updated KNX files at any time. When importing, EVOLUTION checks whether a data point or a process point already exists. If this is the case, the data point is not imported again, but

only the updated ESF data is taken if you have checked the *Update PP* option.

4.) ***Filter:*** *The following filters can be used to import data points and process points locally:*



a. **Address:** Filter by specific group addresses. The 2/1/ address specification filters all group addresses that contain 2/1/ in its address.

b. **Intermediate group:** KNX data is filtered based on its intermediate group

c. **Main group**: KNX data is filtered based on its main group

d. **Name:** Filters in full text mode according to the string specified in the data point element

e. **Type**: Filters depending on the type of data point entered

f. **Subtype**: Filter by specified subtypes of group addresses

5.) **Selection**: It is possible to create the process points by importing the data points and it's also possible to import them. This function is available on the first import to fully import KNX data.

In the window where KNX data is listed, you can also select the data and process points individually.

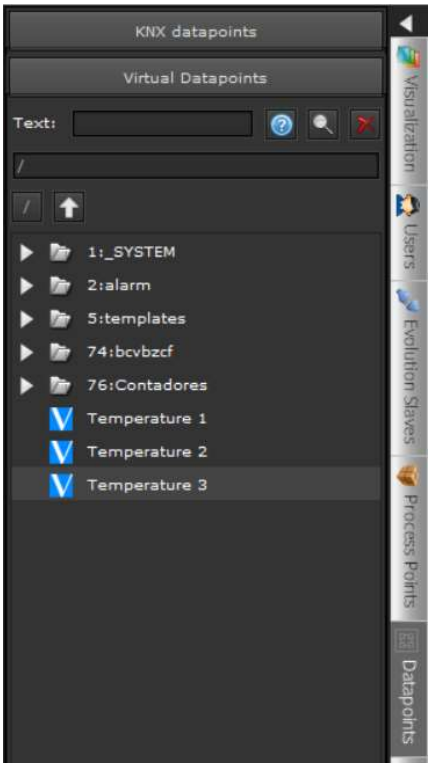
Selecting "Add" imports the data and process points.

In Evolution the linking between elements and functions can only be carried out through process points.

6.1.1. Virtual Data points

Virtual data points are first and foremost internal EVOLUTION communication objects that are not associated with any kind of special data point. They are used to "exchange" values or events between different EVOLUTION modules. If we

want to reproduce a scene only from the Evolution visualization, we will create a virtual object to trigger that scene. EVOLUTION also uses virtual data points to connect to other communication protocols, such as Modbus or BACnet.



In the editor, virtual data points are listed in the *Virtual Data Points* of the Data Points function menu. New virtual data points can be created through the general global menu pictogram  or by opening the context menu (right mouse click on the data menu functions menu) and selecting the - *New virtual object* menu item. In the window that opens up now, the project manager is invited to assign a name to the new data point. The created data point can be assigned to a process point.

Fig. 33: Data Points View

6.1.2. **Import BACnet data points**

The data points of the BACnet configuration can be read in EVOLUTION using an import filter to generate the necessary virtual data points and corresponding process points. Information about the syntax of the BACnet configuration file is included in the module description.

BACnet import is done through menu item *File / Import / BACnet Configuration*. If you select this menu item, a dialog box opens allowing you to select the file to import.

After successfully completing the import process, the imported data points and process points can be accessed through the *bacnet* folder in the Data Points or Process Points function menu.

Fig. 34: Imported BACnet data points

6.1.3. **Import Modbus data points**

The data points of the Modbus configuration can be read in EVOLUTION using an import filter to generate the necessary virtual data points and corresponding process points. Information about the syntax of the Modbus configuration file is included in the Modbus module description.

Modbus import is done through menu item *File / Import / Modbus Configuration*. If you select this menu item, a dialog box opens allowing you to select the file to import. If an existing XML file is to be imported, the file type "XMLFile" must be selected in the file selection dialog box. These files have the extension „*.xml*“.

In addition to EVOLUTION's own configuration file, the Modbus import tool can also read the WAGO-CoDeSys format and use it to generate the required configuration file. To do this, we select the file type "ModbusFile" in the file selection dialog (preselection). Files with the extension „*.sym*“ are displayed. After selecting the file,

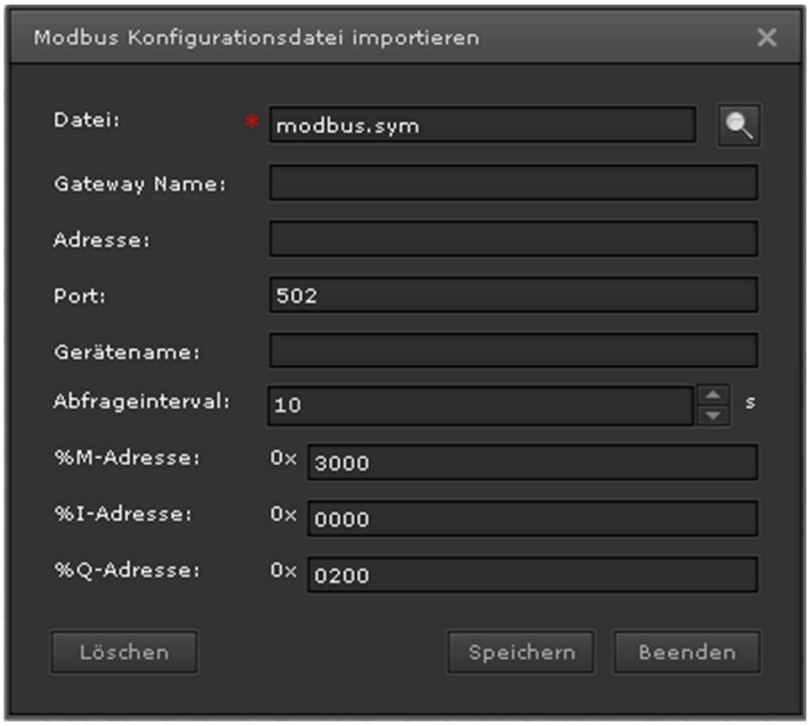


Fig. 35: the WAGO-CoDeSys import dialog appears

The fields to be fulfilled are the next:

Gateway name: Free choice name for WAGO controller
Address: WAGO Controller IP Address
Port: Communication port for Modbus (standard 502)
Device name: WAGO supports only one Modbus component per controller. For this reason, the fixed name is "device" with Modbus identifier 1.
Request interval: Query interval for readable states in seconds. Changes from

EVOLUTION to Modbus are reported immediately.

Address %M: Indicator memory area base address (0x3000 standard)

Address %I: Input register base address (standard 0x0000)

Address %Q: Output register base address (standard 0x0200)

When a *sym* file is imported again, the gateway name and IP address are used to decide whether existing process points / data points should be kept, updated or deleted. If the Modbus gateway name and associated IP address are not yet known, the corresponding process points or data points are created again. If the gateway name is already known, new variables from the sym file are adopted as process points / data points. Non-existent (removed) variables from the sym file are also removed as process points / data points.

If you remove process points that were already linked to components / functions, these components / functions must be linked to other process points. Otherwise, these components will not work.

After successfully completing the import process, the imported data points and process points are located in the *modbus* folder of the corresponding views.

6.2. Evolution process points

process points are used for the internal EVOLUTION communication. In the simplest case, the information when creating a data point is enough to automatically generate a process point from it. For special functions, a Process Point can be individually configured or a new one created.

Clicking on the menu on the left side of the *Process Points* the existing process points are displayed on the left side of the Editor.

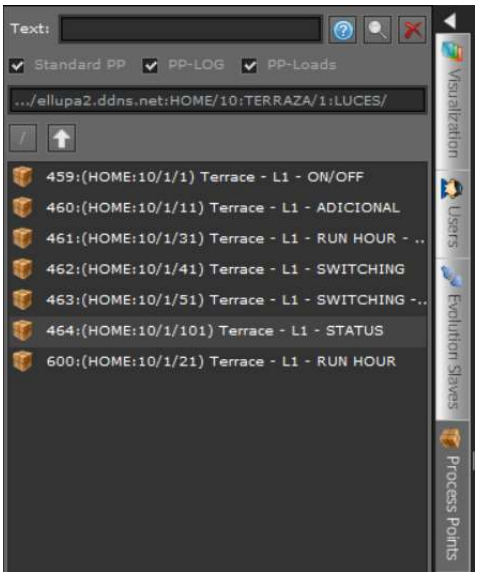


Fig. 36: List of Process Points

Process points are displayed in a hierarchical directory structure. Double-clicking on the main group displays the next level. In the header of the function menu we find the full text search filter. A selection in the search filters directly by Standard Process Points (PP Standard) or Process Points whose values are saved in the database (PP in DB) or are used for load management (PP Last).

Clicking on takes us back one level in the view. Clicking on we get directly to the root of the interface. In case of having a large number of data or process points, the filters and navigation elements simplify the search by process points.

Cannot create self-defined process points in automatically created directories _SYSTEM, alarm, dali, bacnet, modbus, ping, and noneis. It is also not possible to manually create directories with these reserved names.

Double-clicking on a Process Point opens the parameters window of said Process Point. The parameterization window is divided into the *Basic*, *Advanced*, *Processing*, *Recording* and *Visibility* (see Fig. 37:). The configuration options for the sections are shown with the tab keys of the same name.

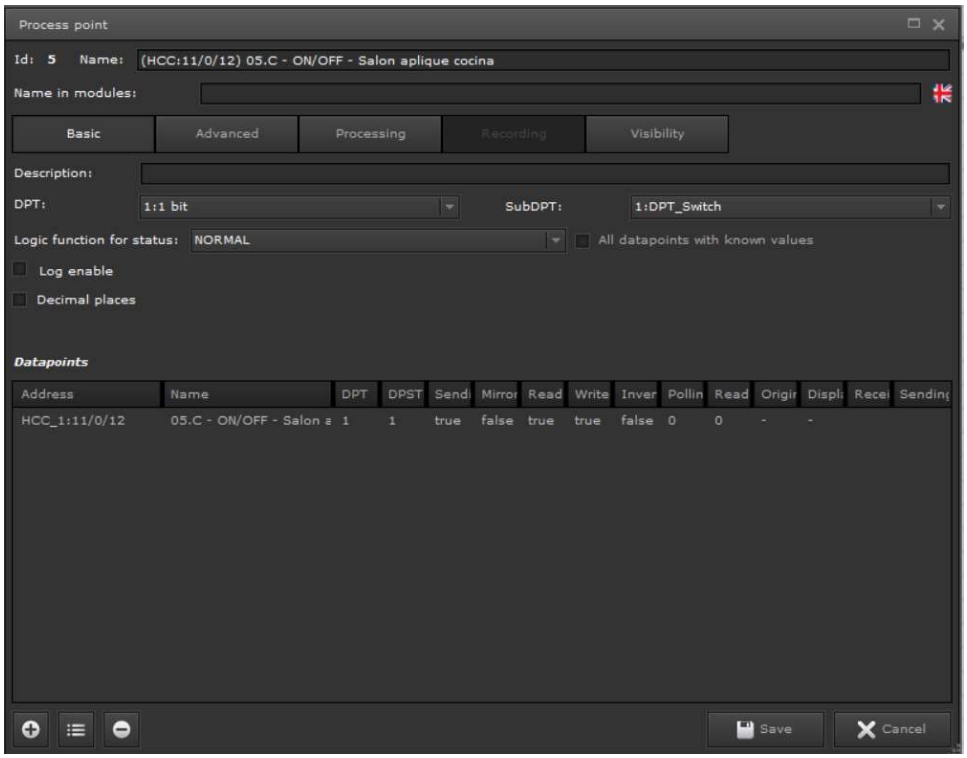


Fig. 37: Configuration mask for process points

Name: Name of the Process Point (free choice). If a Process Point is automatically created, its name is made up of the interface name and the group address. The name is also automatically assigned if a Data Point is linked and the Process Point has no name assigned.

Name in the module: The name specified in this field is displayed in the online views of the time schedules, scenes and alarms modules.

Description: Field for the description of the Process Point

DPT and SubDPT: KNX data point type and process point subtype

Logical union of the statuses: It's the condition that defines the status value of the Process Point. The options mean the following:

NORMAL: The status value is set by the status of the respective data point with the *write* flag enabled.

OR (SUM): The status value results from the OR operation (with 1: 1 bit DPT) or the sum of the status values of the assigned data points (whose *write* flag is enabled).

AND (MUL): The status value results from the AND operation (with 1: 1 bit DPT) or the multiplication of the status values of the assigned data points (whose *write* flag is enabled).

HIGHEST: The status value results from the maximum of the status values of the assigned data points (whose *write* flag is enabled).

LOWEST: The status value results from the minimum of the status values of the assigned data points (whose *write* flag is enabled).

AVERAGE: The status value results from the mean of the status values of the assigned data points (whose *write* flag is enabled).

Save PP values: If this field is checked, the configuration mask for data collection opens automatically (see chapter 6.2.1). Otherwise, the tab field that displays data collection remains disabled.

Decimals: Process points that provide analog values can be rational and therefore have a certain number of decimal places. If we wish to limit the number of decimals or give them a specific format, we must select the Fill with zeros box. The following additional parameters will then appear:

The parameter *Min. decimal places* indicates the minimum number of decimal places. If we set the value 1 here and the Process Point has the value 24.23, this value is rounded to 24.2 and this will be the one displayed. If we select, for example, the quantity 3 in *Max. decimal places*, the Process Point values will always be rounded to the third decimal place after the comma. Depending on the conditions that the Process Point values meet, 1 or 3 decimal places will be represented after the comma (as in the example). If the values entered in the *Min. and Max. decimals* parameter are equal, this value will represent the number of decimals that will be displayed in any case.

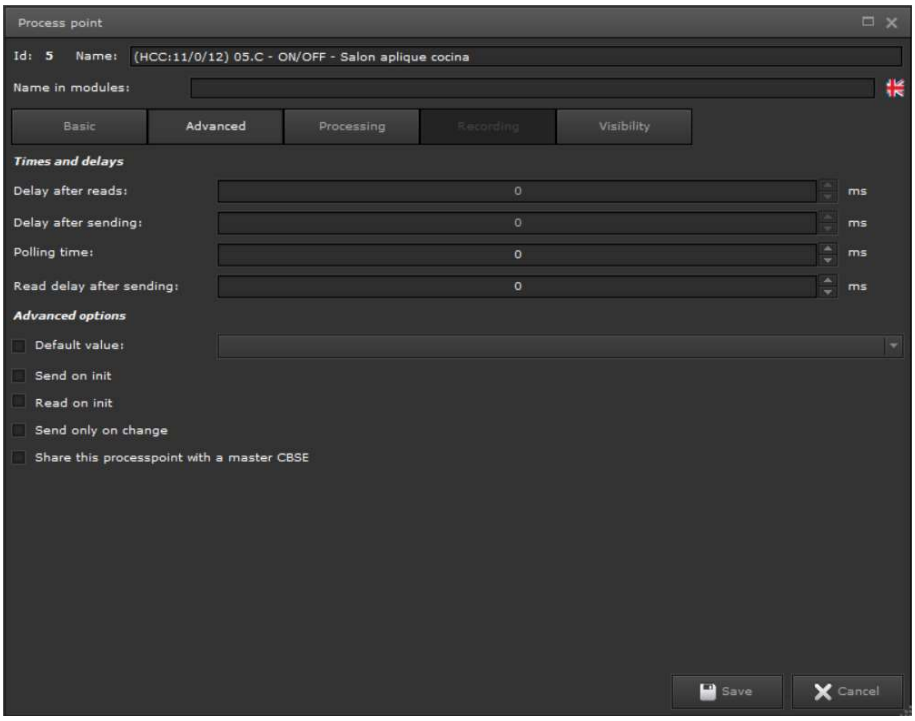


Fig. 38: PP parameterization fields for advanced configurations

Delay after reads: If multiple data points (with the read flag set) are assigned to a process point, the time in milliseconds after which the next data point is queried can be specified here.

Delay after sending: If multiple data points (with the send flag set) are assigned to a process point, the time in milliseconds after which the next data point is sent can be specified here.

Polling time: Cyclic “sampling interval”, in milliseconds, after which process points are recalculated.

Read delay after sending: Specifies the delay time (in milliseconds) that is used to query the status of all associated data points (whose read flag is enabled) after a value has been sent. This applies to devices that do not automatically submit their status changes.

Read on init: If this field is checked, the bus will initially read the current values of all those assigned data points whose read flag is activated.

Send only on change: If this field is checked, the process point value is only sent if the value varies.

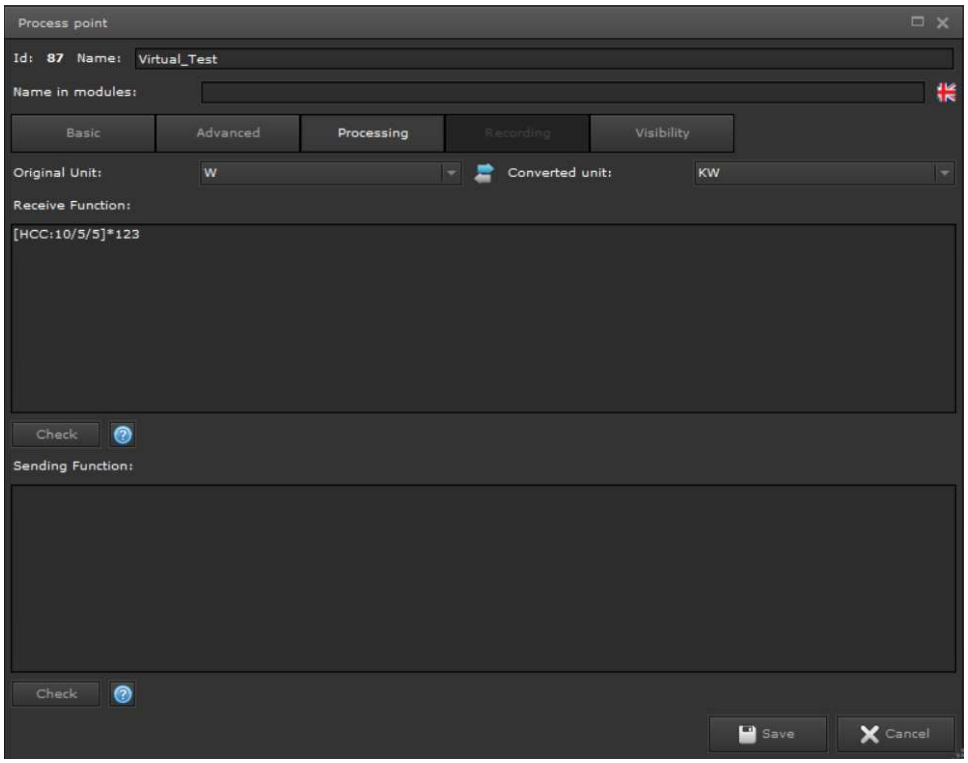


Fig. 39: PP configuration mask for specific user functions.

Unit: At a process point you can calculate the unit of a data point or a process point: If you want to convert the unit of

the data point to be displayed in a visualization element, for example, the unit of the data point will be shown on the left and the unit that you want to use in the process point on the right.

For instance: An energy meter delivers the active energy into the Ws unit. In the Evolution database, we wish to sotre the unit KWh. Since the the data point has sent the unit Ws, this is the unit that we must choose in the left section "Unit". The Ws unit must be transferred to the process point converted into KWh. So in the "Unit" field on the right, we choose the KWh unit.

Inversely, if the process point is sent to the data point, the KWh unit is converted back to Ws and sent to the data point on this unit.

PP -> PP Function Allows the introduction of a user specific reception function for the process point. In other words, this function is executed when you want to assign a value to the process point. By clicking with the right mouse button on this window, we can add the projected data points with this process point, as well as link them mathematically. The [PROCESSPOINT] variable, on the other hand, is used to edit the current value of the process point. The result of the calculation becomes then a valid value for the Process Point. **¡Important note! In certain circumstances, the data type of the Process Point may have to be adapted.**

PP -> PP Function Allows the introduction of a user specific sending function for the process point. In other words, this function is executed when the process point transmits its value to a data point. If we right-click in this window, the selectable variables [VALUETOSEND], [PROCESSPOINT] and the data points linked to the process point are displayed. The [PROCESSPOINT] variable is used to edit the current value of the process point. The [VALUETOSEND] variable is the value assigned to the process point using a control element. The result of the calculation becomes then a valid value for the data point.

As you can see in Fig. 40: the assigned data points are listed in the lower area of the process point mask.

Fig. 40: View of the Data Points in the Process Point mask

In the example, we see that HCC: 11/0/12 is a binary switch object and HCC: 11/0/14 the corresponding status object. The process point is informed by the *read* flag which data points point to status objects (*read* = *true*). The *send* flag, by contrast, identifies the switch objects to which values are sent. In this way, the process point uses two objects for event processing.

With *Add*, you can add more data points to the list and with *Delete*, you can remove data points from the list. If a data point has been selected, the Data Point Editor can be opened by clicking on *Edit*, as we can see in Figure 41:

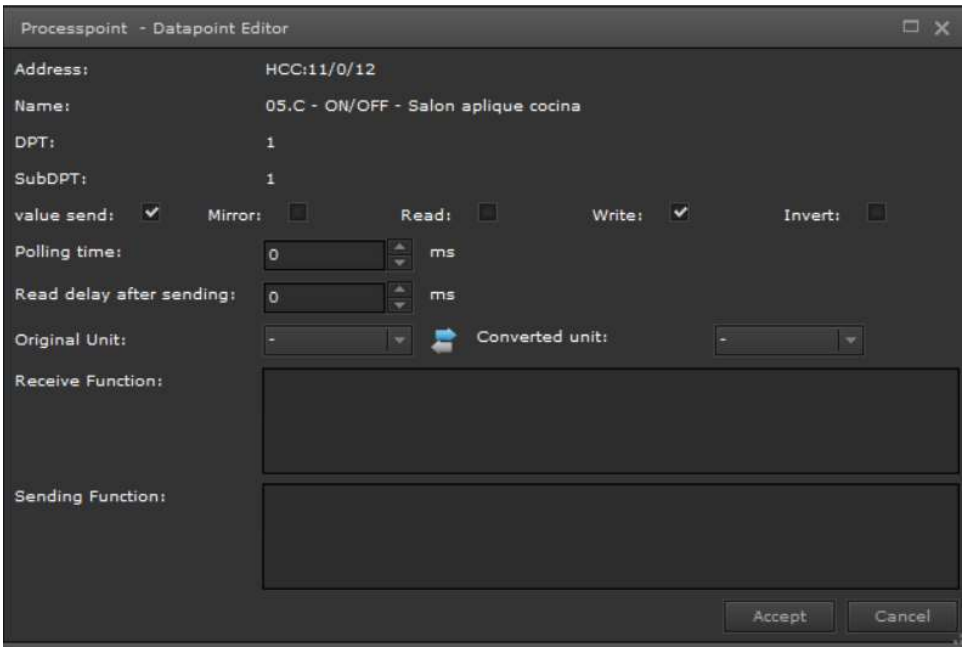


Fig. 41: KNX data point editor

The following properties of the data points can be parameterized:

Address: Data point address for KNX objects *Gatewayname:Group address*, for instance.

Name: Name of the Data Point

DPT and DPST Data Point Type and Data Point Subtype

Value send: If it is “true”: The data point sends values to the bus.

Mirror If it is “true”: The Data Point forwards its value directly to the Process Point without waiting for an acknowledgment from the Bus.

Read: If it is “true”: A query on the data point value is sent (is “read”) when necessary.

Write: If it is “true”: The data point updates the value of the

process point.

Invert: The value of the Data Point is inverted.

Polling time: "Sampling interval", in milliseconds, after which the value of the data point is calculated cyclically.

Read delay after sending: Specifies the delay time (in milliseconds) that is used to query the status of the associated data points after a value has been sent. This applies to devices that do not automatically submit their status changes.

Unit: See Process Point

DP -> PP Function See Process Point

6.2.1. **PP Log**

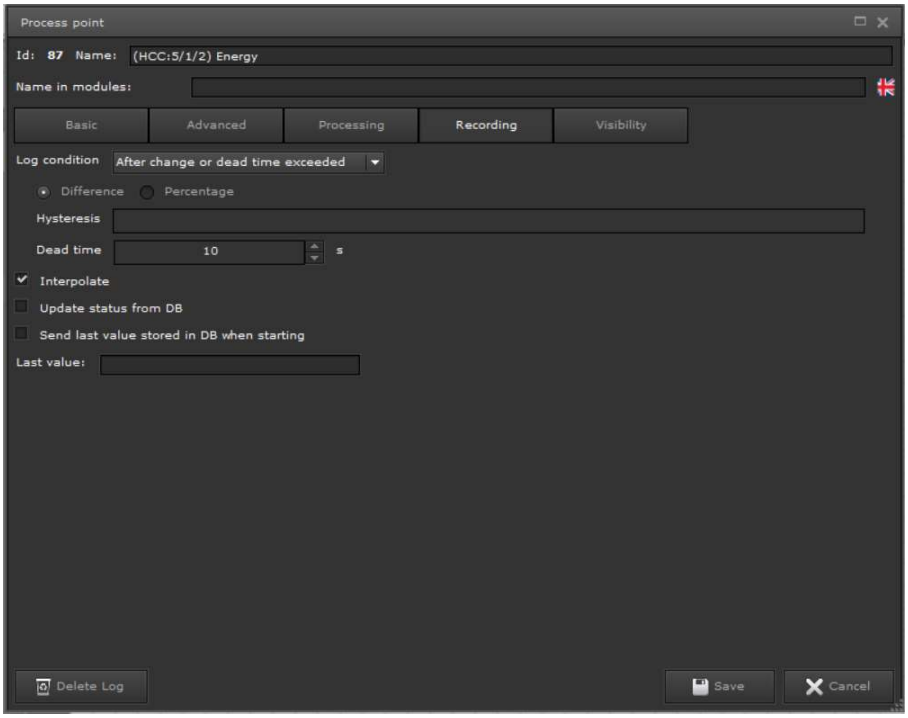


Fig. 42: PP configuration mask for data logging

Storage condition: This selection field allows you to define the circumstances under which the value of the process point is saved in the database. These are the available functions:

Always: Each transmitted value is saved.

On value change: Only values that differ from the previous value are saved.

Cyclic: The current process point values are

	entered into the database at fixed time intervals (entry in seconds). **On value change and cyclic:** For this condition, a percentage or a fixed value can be specified as hysteresis for the value change. That is, it is only saved in the database if the change in value exceeds or falls below the established value. During dead time the current value is also forced to be stored if no storage has been performed in the specified period.
Interpolate	Values are interpolated.
Update status from DB:	When the EVOLUTION server is restarted (for example, restart, project activation), the last value of a process point is read from the database and the status of the process point is initialized to allow calculation of subsequent values.
Read last DB value:	The last value of a process point is read from the database after restarting the EVOLUTION server, and therefore after restarting the system.

The "**Update status from DB**" and "**Read last DB valu**e" flags should always be enabled when the process points are virtual objects. Unlike KNX processing points, the values of a virtual object after restarting the Evolution server are either undefined or set to an initial value. However, certain records, such as the record of energy values, require a chronological log. If flags are set, recording continues from the last saved data.

6.2.2. **Process point visibility**

By default, for online configuration, all the process points of a certain module are shown to all those users who have access rights to said module. Using the configuration mask shown in Fig. 43:, certain process points can be shown only for selected users or groups of users and modules.

Supported modules include online modules Smart Metering Editor, Annual time schedules, Weekly time schedules, Scenes, Alarms, Charts, templates and the DALI Management Module. Configuration is done by clicking the icons on the right. Then, a selection field opens showing users or groups of users. This allows elementary security guidelines to be implemented to prevent unauthorized or incorrect configuration of core modules.

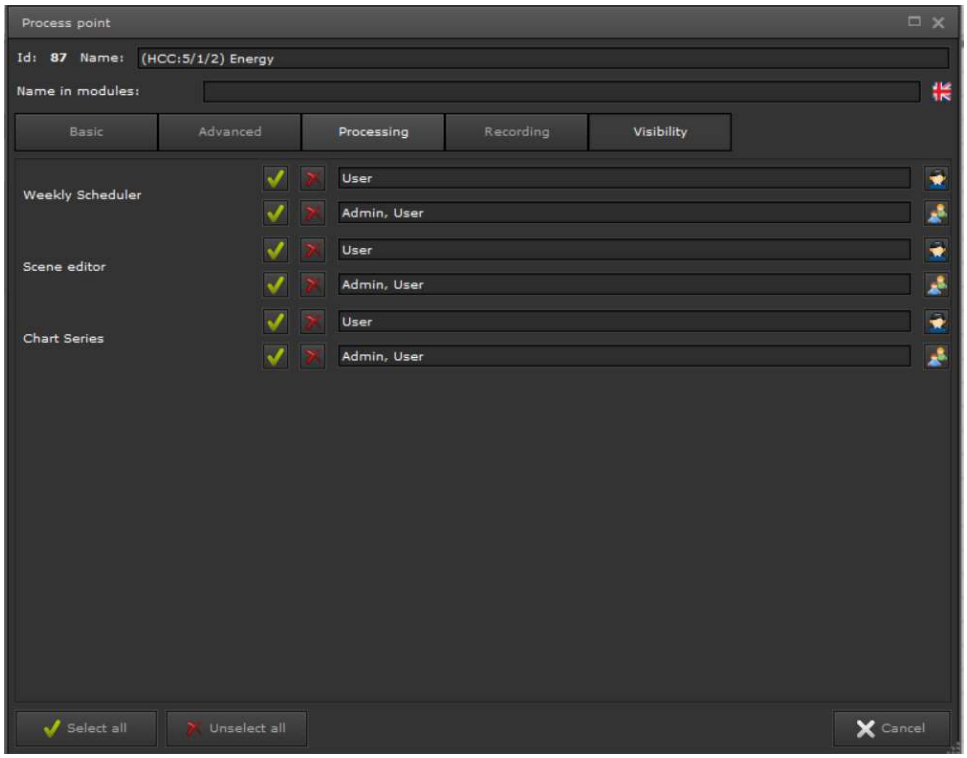


Fig. 43: Configuration to set visibility of process points

7. EVOLUTION visualization concept

Evolution uses HTML5 technology as the basis for the visualization. A web server provides websites that are displayed using navigation methods in a standard browser. An <URL> calls the home page, from which all available websites can be accessed according to the navigation rules. In the simplest case, an <URL> is an IP address.

The <URL> that starts the EVOLUTION visualization is the Evolution Server IP address. If this IP address is entered in the browser as <URL> in the browser, the EVOLUTION login screen opens as already described in Chapter 3. Essentially, the user's access data is activated on the login screen, which then allows access to a certain set of websites for this user. In most cases, a user has access to multiple different pages or websites. The integrator determines which user can access and which web pages they can act on. The tool to perform this configuration is the EVOLUTION Editor (Chapter 5.).

Figure 44 shows in simplified form how a visualization is structured in EVOLUTION: Multiple users are managed on the login screen. Each individual user is assigned a home page with navigation options. As a general rule, the visualization represents the statuses of the building and also offers the user the option to interact. HTML pages are available to display the many functions and

information of a building in an organized way. There is no limit on the number of pages. Each user can be assigned all or just a few HTML pages through their individual home page. In this way, the range of functions is scalable by the user. Each event is received and sent over the IP network.

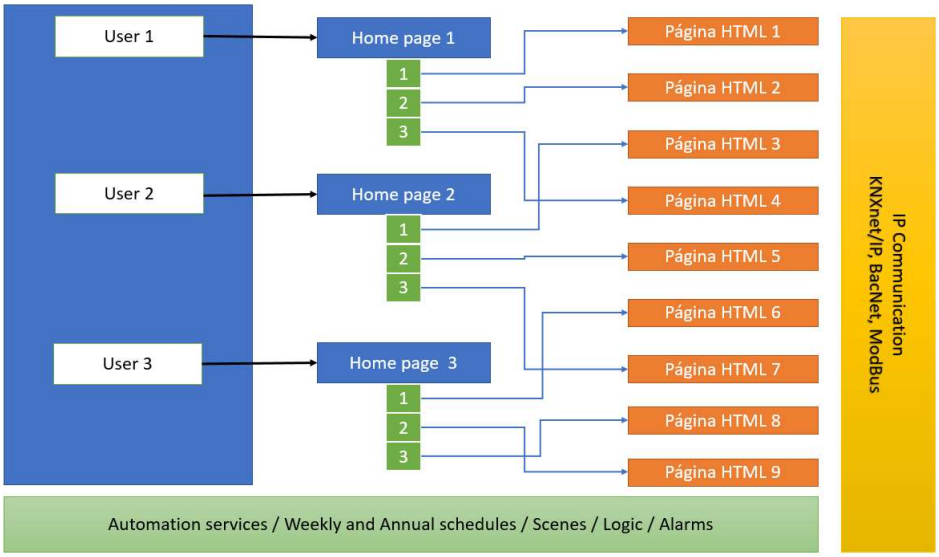


Fig. 44: Simplified representation of an Evolution visualization

If, for example, a status value is sent in the KNX installation, it is transferred to the IP network through a KNXnet / IP interface and therefore reaches the EVOLUTION server, which provides the information in the communication module for all services and applications.
The following describes how to use the EVOLUTION Editor to create HTML visualization pages, start pages, and users, as well as manage them in the corresponding visualization project.

There are numerous possible visualization concepts, from simple page navigation to window navigation, which are not the subject of this manual. Check with the manufacturer for custom training.

Figure 45 schematically shows a visualization as described above. In this example, user 1 must be logged in. In the example, the EVOLUTION visualization opens in the browser. The Windows taskbar is also displayed. The "blue" area in the browser represents the area not used by the visualization. Before the visualization setup begins, the available representation area must be defined. The starting point is the resolution of the screen in pixels. If a screen has a resolution of 1920x 1024 [px], the home page may also have this resolution. However, if the browser maintains the menu bar and even the Windows task bar, the visualization area is reduced accordingly and, as shown in the example, the usable resolution is 1200x800 [px]. This maximum visualization area matches the maximum resolution

of an HTML page in the building visualization. In the example, this HTML page should be the home page for user 1.

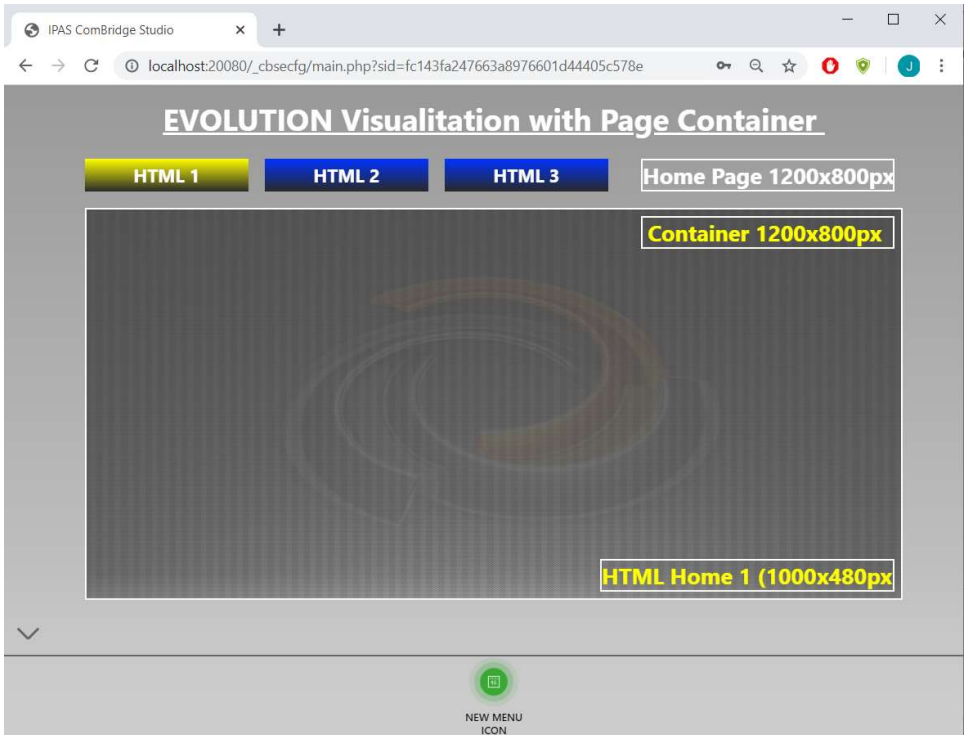


Fig. 45: Schematic representation of an EVOLUTION visualization

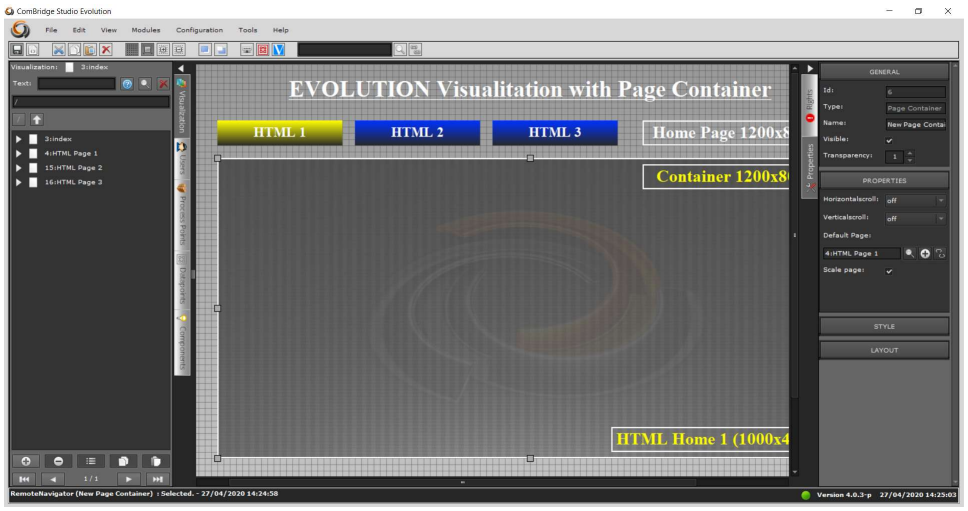


Figure 46 shows this home page in the editor.

Fig. 46: User home page in the editor

From the list of HTML pages, the home page for user 1 has been selected. On the right side of the editor, we find a list of all the properties that this home page can have.

The properties described below are typical for all EVOLUTION elements and will not be described again for other elements with the same properties.

The properties of the HTML page are divided into the areas described below:

ID: is an internally used number and can be used in the editor as a filter for quick search.

Type: The type of element is shown here.

Name: is the individual identifier of the item in the current project.

This identifier serves to improve orientation within the project. In order to quickly find and assign HTML pages, containers, navigation elements, etc., careful discipline is recommended to name these identifiers immediately after they have been created.

Title: is the title of the page header, which has a fixed place.

Size: is a selection of a preset standard resolution. If "user defined" is selected, any resolution can be defined in the **width** and **height** fields.

Send when loaded: Here you can enter a process point and a value in the Value field that is sent every time this HTML page is opened.

Evolution functions: EVOLUTION uses function modules, such as time schedules, scenes, alarms, etc., which can also be configured online in the HTML visualization. If an Evolution function is selected, the corresponding online module opens when the page is opened.

 is the configuration item for process points. All EVOLUTION elements that work with process points have this configuration.

 opens the list of process points from which you can select the process point for this item.

 opens the process point mask to create a new process point.

 opens the process point mask to edit the new selected process point.

 removes a process point from the element.

Style: Here you can define the outline properties of the desktop.

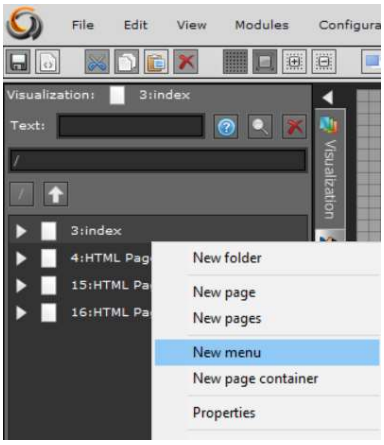
Font: you can select the font properties for the desktop, such as color, size, type, etc.

Background: the properties of the wallpaper are selected, such as color, color gradient and transparency.

Image: offers the possibility to set a background image for the desktop. With you can select an image that is already on the EVOLUTION server. With you can upload new images in the EVOLUTION server. Using removes the background image from the desktop environment. The corresponding file will still be available on the server. If the **Scale image** field is checked, the image is adapted to the resolution selected in the properties for the desktop size. If **X:Y constant** is also checked, scaling is performed taking into account the aspect ratio.

All changes in the editor are accepted when saving. To the right of the Save button in the main menu is the Export button. Clicking on the export symbol exports all updated HTML pages. After export, the HTML pages are available in the visualization.

7.1. Pages menu



Evolution offers the option to configure a fixed menu on each page. This menu can be easily hidden or displayed online with a single click. This menu is generally used to call EVOLUTION functions. Menu items have the function of a window navigation item and therefore can also open pop-up windows in the visualization. A page menu is configured through File / New / Menu on the HTML page currently open in the editor.

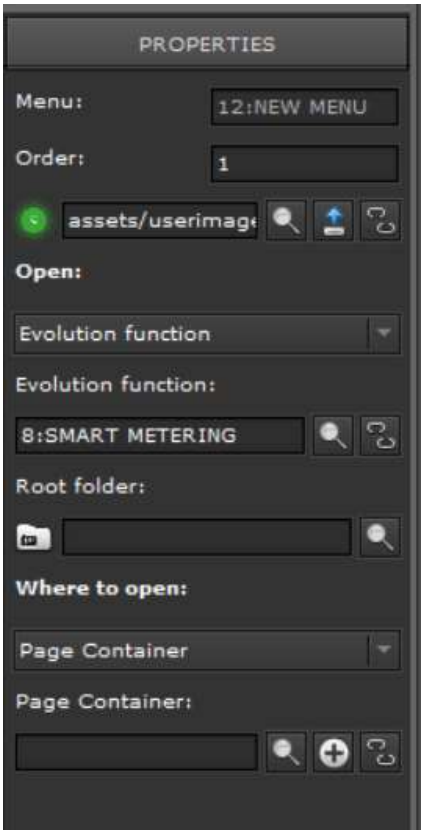
Alternatively, you can configure the page menu by selecting a HTML page with the right mouse button. Then we select *„New menu“* from the options. To create additional menu items, switch to the page level by double-clicking the page symbol. Then select the previously created page menu with the right mouse button and click *New Menu Item* in the displayed context menu. The inserted menu items are displayed centered in the lower area of the page (see Fig. 47:).

Fig. 47: Page menu example on an HTML page

The symbol marked in red is used to show and hide the menu. To edit a menu item, select it; configuration can be done in the properties menu on the right side of the editor. The following properties can be assigned to the menu item:

Name: is the text shown below the icon

Password: allows the optional entry of a password. This password is requested when the menu icon is pressed.



 Opens an image selection window to select a menu icon from a list.

 Opens a file selection window to transfer an image to the EVOLUTION server, which is also used as a menu icon.

 The current image allocation is deleted

Select function: In the drop-down menu you can select the function submenu, the HTML page, the external URL and the EVOLUTION function. Depending on the option chosen, different data must be entered at the next level.

Submenu: If the menu item is to open a submenu, it can be selected or added using the corresponding keys  or  . The icon  interrupts an existing link.

HTML page: opens the list of created HTML pages, from which a page is selected to be opened by clicking on the menu item.

External URL: here you can enter a link to the Internet, which opens the corresponding website in the EVOLUTION visualization

Evolution function: Here you can assign functions to the EVOLUTION menu item. The available EVOLUTION functions are:

1:Logout – switches to login screen

7:Alarm management – opens the alarm management module

8:Smart Metering – open the Smart Metering template
This module is an extension that requires a license.

9:Scenes – opens the online scene settings.

11:Weekly time schedules – opens the online configuration of weekly schedules

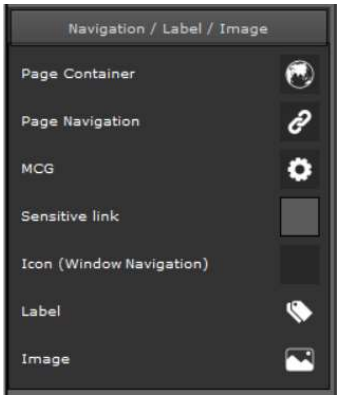
12:DALI e64 management – opens the DALI e64 Management template. This module is an extension that requires a license.

18: One page back: switches to the last opened page

Open in: Here you can define whether the previously selected function should be opened in a page container or in a popup window.

7.2. Page navigation:

Although any control element can be placed on an HTML page, note that navigating and viewing additional pages is an essential design tool for easy-to-use display. In addition to the page menu already presented, EVOLUTION has other navigation elements.



The EVOLUTION navigation elements are explained below using the example already shown in Figure 48. In the left function menu of the editor, the navigation elements are available in the Navigation/Label/Image menu.

HTML pages can be displayed directly in a browser and can also be displayed within another HTML page. In this case the **page container** should be used. Page containers work like an IFRAME in HTML. A page container can be inserted into an HTML page or into a window. A new page container is created through the context menu of the HTML page (right-click on the HTML page symbol) or by dragging and dropping from the Navigation/LabeleImage menu. Figure 48 shows the page container with a green border. For an HTML page to display in its original size, the page container and the HTML page must be the same size. In the example, the HTML page size and the page container size is 1000x480 pixels.

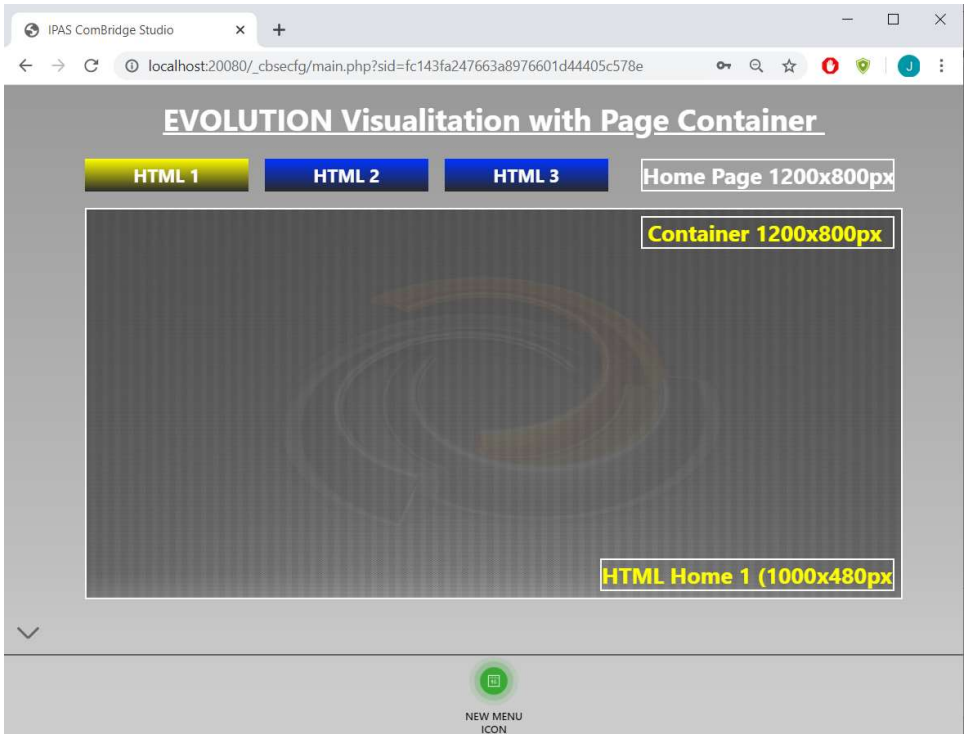
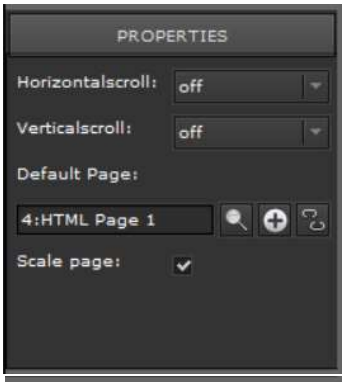


Fig. 48: EVOLUTION visualization with page container.

If the page container is selected, the element properties can be set on the right side of the editor.



In the properties, you can specify whether scroll bars should appear in the browser in case the browser window is smaller than the HTML page.

Page: Here you can select, from the list of available pages, the page that will be displayed in the page container when the main page is opened. The **scale** flag adapts the HTML page to the size of the page container.

As with most of the items that are available to configure the EVOLUTION visualization, the side container also has style properties. Among other things, you can colour the background and, where appropriate, the frame.

Entering the page container is the basis for individual navigation within another page in the browser. In combination with navigation elements, HTML pages can be opened in page containers. To do this, the navigation element requires two data: Which

HTML page should be displayed in which page container.

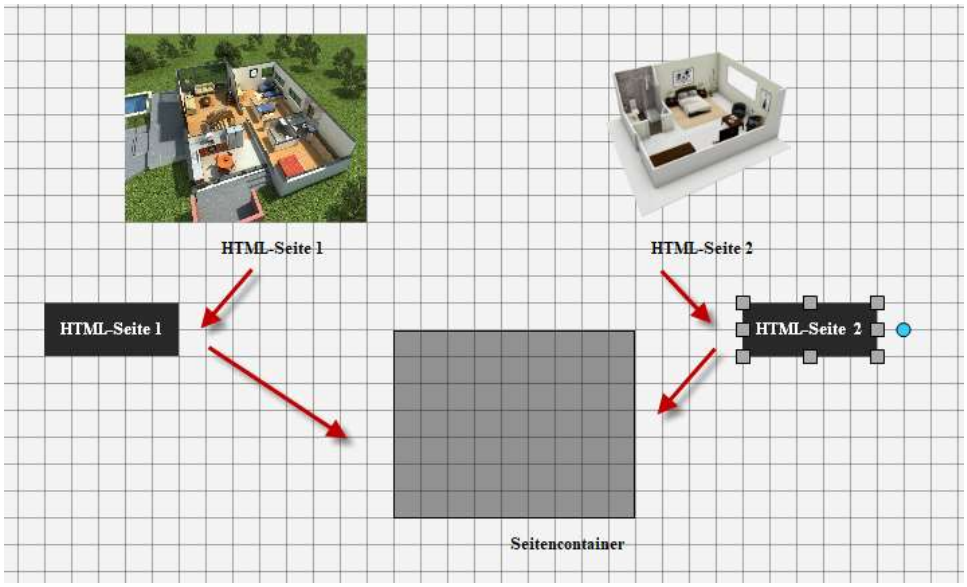


Fig. 49: Principle of page navigation

Figure 49 shows the navigation principle: The navigation element for page HTML-Seite 1 has been configured so that HTML page 1 is displayed by clicking the element in the page container.

The page navigation element is dragged and dropped from the function menu to the HTML page.

The following illustration shows the necessary settings:

Click effect: This is a design feature. Clicking on the item activates an effect that visually shows that the item has been pressed.

Show Tooltip and Tooltip: If the flag is enabled, the Tooltip text will appear in the browser when the mouse pointer moves over the element.

Linked to: specifies the type of connection to display in the page container. The selection is as follows:

HTML page: an HTML page is displayed in the page container.

External URL: The website displays an Internet address.

Evolution function: One of the EVOLUTION functions mentioned above is displayed in the page container.

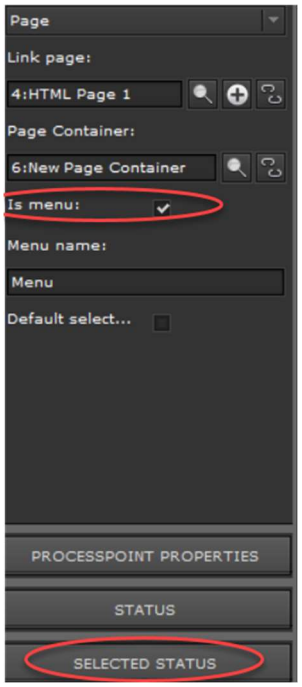
Depending on the selection, the entry for the appropriate type shows up. In the adjacent view, the HTML page was selected, and then the HTML 1 page was selected as the connection.

Page container: select here the container in which the previously selected type will be shown.

In Figure 48 we can see that the HTML 1 page is shown in the page container

because the navigation element has a YELLOW background and all the other navigation elements have a GRAY background. EVOLUTION offers a special property for navigation elements:

"Is Menu" identifies all the navigation elements that belong to a group, in the example "Menu". This "Menu" name must be identical in the links that point to the same container.



If the flag is enabled, the second design menu, "Selected Status", appears in the properties area to the right of the editor A layout is defined for each status, so that an activated navigation element differs from those that are not active.

For each status you can specify a customized text, with freely selectable colour and font, the background colour of the element, the colour and shape of a frame or an individual background image.

Typically, containers and pages fit the size of the surrounding window. Individual container sizes can be obtained by setting the right properties in the "Design" property menu. The following illustration shows this properties window. In the lower area, the size of the container is determined by the distance to the edge of the surrounding window.

Values "0" indicate that the distance from

The container to the edge is 0 pixels. If the value "0" is removed, the above parameters can be changed individually.

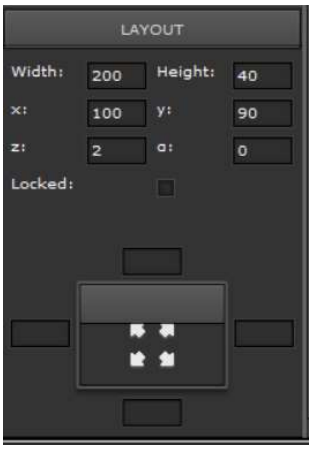
Width, **Height:** indicate the dimensions of the container in pixels.

X, **Y**: Distance from the left or from the top in pixels

Z: Nivel de representation

A: Rotation angle with respect to the upper left corner.

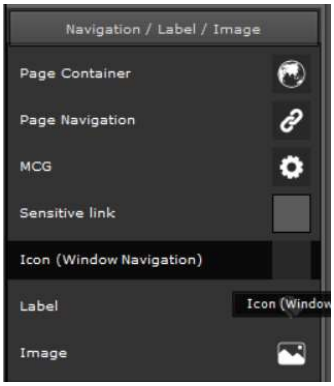
This element property can be used to place other navigation elements in a window, but outside the frame.



Navigation elements in a group generally display HTML pages in the same page container. By creating a navigation element with Layout for Status and Status, a menu group name, and the corresponding page container, the menu group can be quickly multiplied by copying and pasting. Only the respective HTML pages should be assigned. This concept of navigation is used in many cases, for example, to open the floors or areas of a building.

7.3. Navigation window (popup window)

Windows are containers with a frame and a title bar. They can be dragged to the desktop or resized. Windows work like a *WINDOW* in *HTML*.



In Evolution several windows can be opened simultaneously.

To create a new window, just select the menu item on the left side of the menu with the right mouse button and position it on the HTML page using drag & drop.

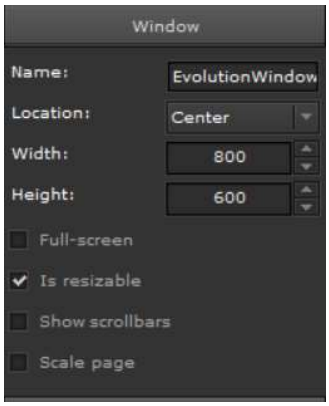
When the item is selected, the associated properties appear on the right side of the editor. The properties are comparable to the page navigation properties. If the HTML page is going to be displayed in a window, in the "Open in» option, you must select **Window**.

HTML page: Specifies the HTML page to be displayed in the window.

If background images, background colours, and frames are hidden, the window navigation element is transparent and can be placed in specific areas of a floor plan, for example. In the application, you can click this area to open the window.

After saving and exporting the settings, the function will be active.

Fig. 50: Open a window



The window can be defined using its properties.

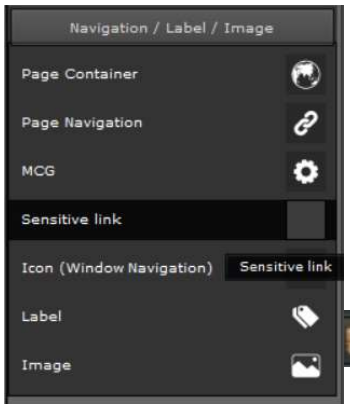
Name: It is the text of the window label.

Location: defines the location in the application when called.

Width and height: Determine the size of the window.

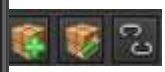
The flags establish the usual representations of the window.

7.4. Sensitive link



The "Sensitive Link" navigation element works similarly to the window element. What makes it different is that it is not a click on the element that opens the window, but the state of a process point.

The element properties therefore include the already explained entry for process points.



As already described, a process point can be selected through this option. For example, a condition is defined for the process point:
Process point = ON
- *If the condition is true or is met, the window opens with the selected HTML page.*

Alternatively, HTML pages can be opened in page containers or in EVOLUTION functions.

7.5. HTML Visualization Pages

In a HTML visualizationpage we can include images and control elements. The functionality of an HTML display page corresponds to an HTML document. Pages are created in the menu located on the left hand side of the editor. To do this, select the *Visualization* tab, which lists all the pages that are already available. **Error! Reference source not found.** Shows an example of a list of available pages. If the mouse is in the page listing area, you can open the context menu with the right mouse button. The *New Page* menu item creates a new page. If the new page is selected from the list, it can be edited in the central workspace . The properties of this page are now visible in the properties menu, located on the right hand side. Before we proceed with the layout, we must define its properties. Name, background and size. As for the page size, it should be noted that the page should always be embedded in a page container. If the page is scaled in the page container (this is an option for the page container), make sure the dimensions of the page container and the embedded page are the same.

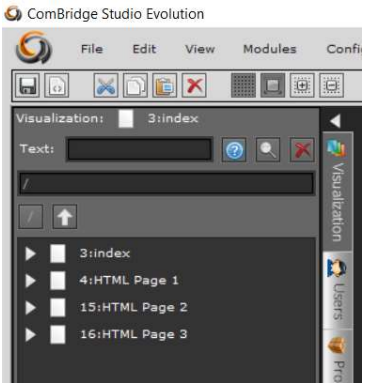
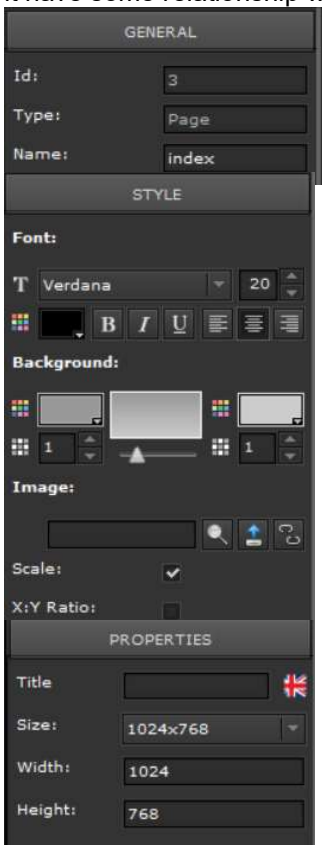


Fig. 51: List of pages in the left function menu

The following properties can be assigned to the page:
Name: name of the page. When assigning a name to a page, we recommend that

it have some relationship with the project so that they are more easily identifiable.



Font: you can select the font properties for the page title, such as color, size, type, alignment, etc.

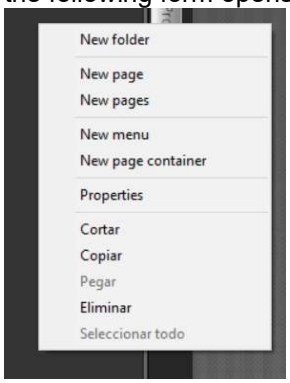
Background: Defines the background color, gradient, and transparency.

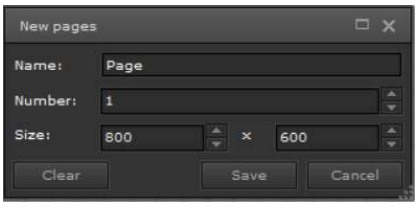
In **Image** you can load an image as background. With you can select an image already existing in the data base. With you can upload new images in the data base. removes images from wallpaper. If you have activated the field Escalate, the image will adjust to the resolution chosen in the properties. On the other hand, if you have activated the field Keep Aspect Ratio, the image will maintain the image's width to height.

In the menu **Size** you can define the size of the page. Width and Height show the size in pixels. In order to display the page in the visualization, a page container is required in which to display that page.

It is recommended that the page format, container format, and window format match each other. This means that the page size should correspond to the size of the page container. Given that the page always conforms to the format of the container, a page that is much larger than the container would shrink to its size. In this way, some control elements are made smaller and some may then be difficult to operate.

It is not uncommon to have multiple pages of the same size in one project. Right-clicking the page listing field opens the adjacent menu. If *New Pages* is selected, the following form opens:





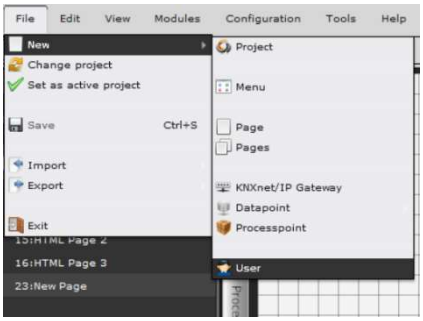
Name: Specification of the base name for the generated pages. A counter is automatically added to the name so that the first page, for example, is called Page1, the second Page2, etc.

Number: Specifies the number of pages to be generated.

Size: Determines the size of the page.

7.6. Create User

An individual HTML page and thus an individual visualization can be assigned to each user. The project manager defines which pages and functions that user can use. For example, you can define users whose visualization matches the screen resolution of their particular visualization device.

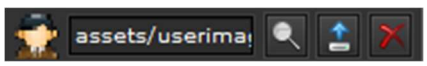


The new user configuration page is opened through the main menu *File / New / User*.

Fig. 52: Open user settings

Fig. 53: User settings

For each user a specific image can be selected.



Clicking  in the *User Image* row opens an image selection dialog box listing the images available on the EVOLUTION server. By clicking on the  icon, personalized images can be loaded for each user. Please note that the user's personalized images are provided in PNG format with a size of 43x43 pixels. The  icon is used to undo the assignment of images.

Name: This name is displayed next to the user's image

User name: Name given to the user

Password: User password (only digits 0 to 9 are allowed)

Language: User language (for each user a language can be defined, for example, to display the descriptive texts accordingly). Using the drop-down menu in the *Language* field, the desired language can be selected.

HTML page: Select the user's home page from the list of available pages.

Assign SmartVisu: Selecting a SmartVisu visualization from the list of visualizations created with the SmartEditor.

User group: One of the groups can be selected from the list of defined user groups. A user can only be assigned to one group. EVOLUTION has two predefined user groups. Depending on the user group, there are different functions available.

Group	Functions
Admin	Access to visualization pages, scene settings, time schedules, alarms and Smart metering, access to all priorities.
User	Access to the visualization pages

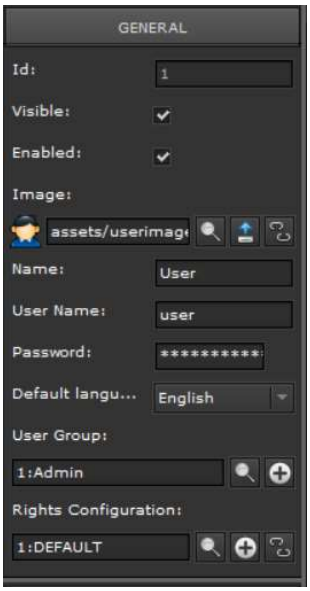
Additional user groups are treated as the User group.

Rights settings: Selecting the configuration (☛ User rights for online modules:).

Auto-logout time: Automatic logout after time in minutes. After logging out, the login screen is displayed. A value of "0" disables automatic logoff.

Configuration is completed by pressing the “Save” button. The "Cancel" button completes the configuration without applying the changes.

Changes to user settings can be made in the editor at any time. To do so, you need to select *User* in the functions menu on the left of the tab. In *LoginDesigner* a list of all users appears. When the user is selected, changes can be made in the properties menu on the right. In addition to the information on the user settings page, the following settings are possible in the properties menu:

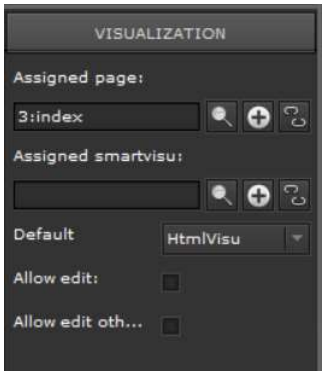


Visibility:

☑ the user is shown in the login window,
☐ the user is not shown.

Active:

☑ Login is activated,
☐ Login is disabled.



HTML start page: is the selection of the HTML start page

Assign SmartVisu: Assign a SmartVisu to the user

By default: Selection of the standard visualization interface HtmlVisu, SmartVisu.

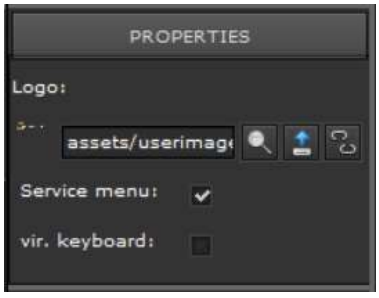
Process point for login control: It allows the selection of a process point (data type 1: bit) with which the user can be allowed to log in (value = 1) or not (value = 0).

Log out for users when they are online ☑ By changing the above process point (process point for login control), the user session will be closed, if they are currently online.

☐ The current login status remains unchanged.

The login control only has effect in the following login process.

EVOLUTION offers the possibility to individually redesign the login window. To do so, choose the entry *LoginDesigner.* The following properties can be modified in the menu:



Logo: here you can define the user's image.

Main Menu: displays the Main Menu in the upper right corner.

Virtual keyboard: displays an on-screen keyboard to enter login data.

8. EVOLUTION Components

EVOLUTION offers the user a range of control elements to configure the visualization control functions, warnings, information, graphics, etc. Control elements can be placed on pages, inside a page container, and in windows. Basically, a control element is selected from the palette in the components menu and dragged and dropped in the central work area. When an element is selected, we can edit its properties in the properties menu located on the right hand side. EVOLUTION offers various component styles to choose from. The component style is selected using *Settings / Component Style Navigator*. By selecting the component style, numerous preconfigured elements are made available which, based on the basic components, differ in some visual properties (eg color, image, etc.) The goal is to provide the project manager with a range of components that they can use simply by dragging and dropping, without the additional time-consuming design effort. Controls are divided into groups on the Components tab.

Lighting control: Elements for lighting control

Blind / Shutter control: Controls for blinds or roller shutters.

Heating / Ventilation / Air conditioning Elements for HVAC control

Common controls: General functions management

Advanced elements: Controls for specific tasks

Navigation / Label / Image Navigation elements

Info Elements: Elements for information management.

Chart elements: Elements for the representation of measurement data

Each control element has **General** Settings, **Properties**, “Specific properties of a function" and properties related to the design and form of representation. Also, user rights can be assigned to a control element. The properties of a control element which we will look at next are identical for all components. The specific attributes of the component will be explained with the respective components.

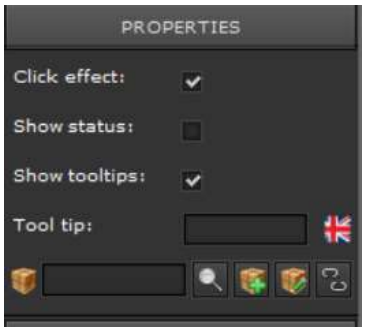
8.1. General

The figure shows the **General** properties area. The explanation of the attributes can be found in the following table:

Property name	Value	Description
Id:	No.	It is the internal reference number of the element. It is automatically assigned and cannot be modified. The reference number can be used to search for an item using the appropriate filter function.
Type:		The basic type of element is shown here. The basic type defines the essential functionality of the element and cannot be changed.
Name:	Text	Here you can can enter a name for the element. It is recommended to choose meaningful names related to the project. This makes searching easier, specially in large projects.
Visible:	☑	The element will be visible on the visualization.
	☐	The element will be hidden in the visualization. However, the function remains active, that is, calculations, events, etc. continue to be performed.
Activate:	☑	Operation is activated. The function associated with the element is carried out when it is actuated.
	☐	Operation is deactivated. Only the status of the process point is displayed.
Transparency:	0-1	The range of values for transparency is between 0 and 1 (0% - 100%). The value changes in steps of 0.01 (1%). With value 0 the object is translucent (invisible), with value 1 the object is not transparent.

8.2. Properties

In addition to assigning to a process point, there are also visual attributes in the Properties area:



.

Property name	Value	Description
Show zoom effect:	☑	A visual effect happens when the control element is actuated.
	☐	There is no visual effect.
Value status:	☑	The status value is displayed in the element as text
	☐	The status value is hidden
Show tooltip:	☑	The tooltip text is displayed when you hover the mouse over the element.
	☐	The tooltip text is not displayed.
Tooltip:		Free-choice text is displayed when the mouse pointer rests on an item. If necessary, text in other languages can be added using the country's flag (red mark).
Process point 		Opens the list of process points.
		Opens the process point editor to create a new process point.
		Opens the process point editor to edit the assigned process point.
		Unlinks the control element and the process point.

8.3. Layout properties

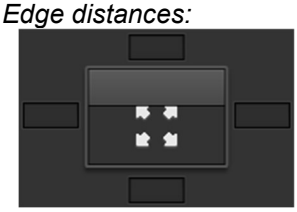
The control elements edit the status of the process points. The main feature of the control elements is that they show the process point status. In general, the process points can have different states, which should be respectively visible. EVOLUTION offers numerous configuration options for this purpose. The number of statuses to configure depends on the respective component and is presented in separate property areas (for example: **Disconnected status, First status, Second status, Connected status**). The visualization options and configuration parameters are identical for the different statuses, so the properties for the **Disconnected status**, described below, apply to all of them. The specific attributes of the component will be explained with the respective components.

Property name		Value	Description
General Setting:		☑	Configuration changes also affect other statuses. This attribute is only available if multiple statuses are available for components.
		☐	Configuration changes only apply to this status.
Text before status:			Freely selectable text is displayed in front of the value status text. The text can be specified in other languages through the country's flag. The text is also displayed without a visualization of the value status.
Text after status:			Freely selectable text is displayed behind the value status text. The text can be specified in other languages through the country's flag. The text is also displayed without a visualization of the value status.
Font:		Verdana 8	Font and size.
		Black	Colour. Clicking on the colour area opens a colour selection dialog box.
			Format: Bold, italic, underlined

			Alignment: left justified, centered, right justified
Colour:		White 0	Colour on the left and transparency.
		0	Colour gradient. A color gradient between left and right color is calculated. The slider adjusts the angle of rotation (0-359 °) of the color gradient.
		Black 0	Colour on the right and transparency.
Frame:		Black	Colour of the frame. Clicking on the area to the right opens a colour selection dialog box.
		0	Frame line thickness. If the value is 0, no frame is drawn.
		0	Corner radius. Draws rounded corners.
Image:			Opens the image selection dialog box.
			It offers the possibility to transfer an image to the EVOLUTION server and use it.
			The current image allocation is deleted However, the image file is not deleted.

8.4. Layout

In the design properties section you can set the size and position of a component. Configuration through this property mask is optional, since positioning and resizing can be done with the mouse on the work surface. When an item is selected, it is displayed in an edit frame. The size of the respective component can be changed using this frame. Changing the position on the work surface is done by pressing the right mouse button.

Property name	Value	Description
Width:	800	Component width in pixels. This setting can only be changed if distances have not been specified for the edge.
Hight:	600	Component hight in pixels. This setting can only be changed if distances have not been specified for the edge.
X:	0	Position of the left border in pixels.
Y:	0	Position of the top border in pixels.
Z:	1	Presentation level when multiple components are placed on top of each other.
A:	0	Rotation angle with respect to the upper left corner.
Locked:	☐	Component position can be changed
	☑	Component position is locked, i.e. cannot be changed
Edge distances: 		Fields to enter the edge distances from the surrounding container (page / page container / window). As soon as an edge distance is specified, the other size parameters lose their validity.

8.5. User rights

When we select an element in the work area, we can select the properties related to these rights in the menu on the right.

In the image we see the rights available for a switching component. All users of the visualization are in the list of user rights. In the example, only the user *User* has been configured. The rights system allows a user read and write rights. With read rights, a user can see a status notice (read). With the write ones, the activation, for example, of a push button sends the event to the Bus. If you want all users to have the same rights, the read and write flags must be enabled in the *Usuario* header. To assign rights individually, you can also check the boxes next to each of the user names. In addition, EVOLUTION allows the management of rights through user groups. By default the **Admin** and **User** groups are predefined. A user is assigned to a group when that user is created. The "Admin" group, for example, has special rights for online scene editing or time switching.

8.6. Standard Control Elements

8.6.1. Switch Off

	This component is based on the basic type "Send simple value" and is used to send an OFF value.	
Properties	**Value**	**Description**
		Selection of the process point. The process point generally has data type (DPT) 1: 1 bit
Status		
Value	OFF	Value that is sent to the process point when the button is pressed.

8.6.2. Switch On

	This component is based on the basic type "Send simple value" and is used to send an ON value.	
Properties	**Value**	**Description**
		Selection of the process point. The process point generally has data type (DPT) 1: 1 bit
Status		
Value	ON	Value that is sent to the process point when the button is pressed.

8.6.3. Toggle switch

	Alternately sends a binary value to turn on and off. The switches require a status the first time they are used so that, when they are triggered, they switch the inverse of the current status. The switch

	receives the current status directly from the Process Point that we use to configure it. The basic type of component is „Switch / Toggle“.	
Properties	**Value**	**Description**
		Selection of the process point. The process point generally has data type (DPT) 1: 1 bit
Disconnected status		The status of the process point is unknown
Image		Status visualization if the current status is unknown.
First status		
Value	OFF	Value that is sent to the process point to change to this status.
Image		Standard status visualization for this status
Second status		
Value	ON	Value that is sent to the process point to change to this status.
Image		Standard status visualization for this status

Next, we will see an example of the configuration of a process point for use with the Toggle Switch component. In Fig. 54: we see a Process Point to which 2 data points have been assigned. The data point “05.C - ON / OFF” “is the switching object (*Read = false, Send = true*) and“ 05.C - Status ”“ is the corresponding status object (*Read = true, Send = false*). If the process point is linked to the switch, it will read the status from 05.C - Status and perform a switch when 05.C - ON / OFF is actuated.

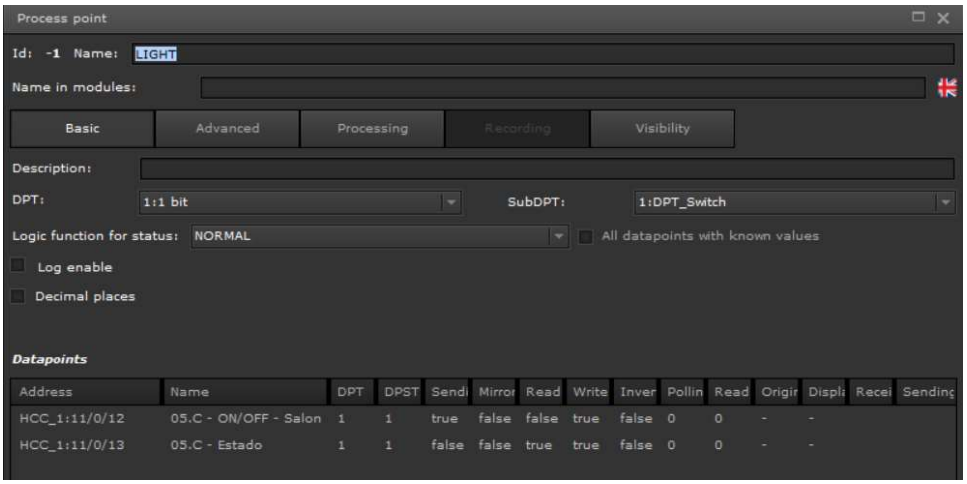


Fig. 54: Process point with status request to status object

8.6.4. **Dimmer**

	1 key dimmer. Multiple process points are required for configuration. The basic type of component is „Dimmer“.

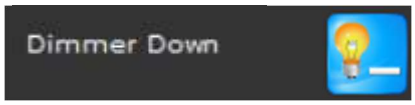
Properties	**Value**	**Description**
Address:	*change*	Dimming direction: up and down
	Up	Dimming direction: only up
	Down	Dimming direction: only down
Status: 		Selection of the process point. The status processing point processes the acknowledgment of the dimmer. The process point must have the unsigned 5: 8 bit data type (SubDPT: DPT_Scaling).
Short key press: 		Selection of the process point. The process point processes a short key press. Short press performs the ON / OFF function.
Long key press: 		Selection of the process point. The process point processes a long key press.

		Long press performs a dimming function. The assigned process point must have the data type (DPT) 3: 4 bits.
Long key press after:	600	Time in milliseconds after which a key press is interpreted as a long key press.
Disconnected status		The status of the process point is unknown
Image		Status visualization if the current status is unknown.
OFF Status		
Image		Show status for OFF status
ON Status		
Image		Show status for ON status

8.6.5. **Dim - brighter**

	1 key dimmer. This is also a component based on the "Dimmer" type, whose regulation direction is initially set "up". The configuration is identical to the dimmer configuration. See chapter 8.6.4.

8.6.6. **Dim - darker**

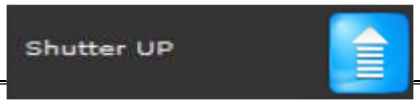
	1 key dimmer. This is also a component based on the "Dimmer" type, whose regulation direction is initially set "down". The configuration is identical to the dimmer configuration. See chapter 8.6.4.

8.6.7. **Shutter / roller shutter**

	1- Shutter / roller shutter controlled via key Multiple process points are required for configuration. The basic type of the component is “Blind / Shutter”

Properties	Value	Description
Address:	*change*	Movement direction: up and down
	Up	Movement direction: only up
	Down	Movement direction: only down
Status: 		Selection of the process point. The status processing point processes the acknowledgment of the shutter actuator. The process point must have the unsigned 5: 8 bit data type (SubDPT: DPT_Scaling).
Short key press: 		Selection of the process point for slat movement / start / stop. The assigned process point must have the data type (DPT) 1: 1 bits.
Long key press: 		Selection of the process point for the up/down command. The assigned process point must have the data type (DPT) 1: 1 bits.
Long key press after:	600	Time in milliseconds after which a key press is interpreted as a long key press.
Disconnected status		The status of the process point is unknown
Image		Status visualization if the current status is unknown.
Connected status		Status of the available process point.
Image		Show connected status

8.6.8. **Shutter / roller shutter UP**

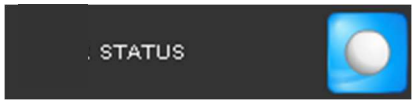
	1- Shutter / roller shutter controlled via key The movement direction of this component is initially set to "up". The

	configuration is identical to the configuration of the blind. See chapter 8.6.7.

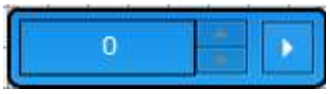
8.6.9. **Shutter / roller shutter DOWN**

	1- Shutter / roller shutter controlled via key The movement direction of this component is initially set to "down". The configuration is identical to the configuration of the blind. See chapter 8.6.7.

8.6.10. **Binary status**

		Shows current status. It is a component specially created for the visualization of the status based on the type "Switch / Toggle Switch", in which the activation flag is not enabled.
Properties	**Value**	**Description**
		Selection of the process point. The process point generally has data type (DPT) 1: 1 bit
Disconnected status		The status of the process point is unknown
Image		Status visualization if the current status is unknown.
First status		
Value	OFF	Standard value for this status
Image		Standard status visualization for this status
Second status		
Value	ON	Standard value for this status
Image		Standard status visualization for this status

8.6.11. Set value

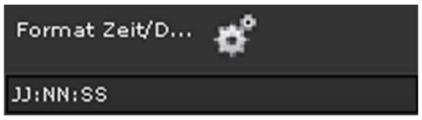
		Sends a value that can be configured. When the send button is pressed, the displayed value is sent. On the other hand, if we use the value change buttons next to the value field, then each change is sent. The component is of the type "Input value".
Properties	**Value**	**Description**
Send button	☑	The send button is displayed on the control element
	☐	The send button on the control element is hidden
Keypad:	☑	 The keyboard icon is displayed on the control element to allow entering a value on a touch screen using an on-screen keyboard. The visualization depends on the data type of the process point.
	☐	The keyboard icon is hidden
		Selection of the process point. If the process point also has a data point for the status, the current status will be displayed.
Status		
Image		Selecting a background image

8.6.12. Status value

		Status visualization in text format. The component is of the type "Label".
Properties	**Value**	**Description**
		Selection of the process point.

Status		
Image		Selecting a background image

8.6.13. **Time**

	Show the time. The component is of the type "Digital clock".	
Properties	**Value**	**Description**
	HH:MM:SS	Time or date format for the visualization. The  button provides a description of the possible formats.
		The following process points are available: KNX time: corresponds to the process point of a KNX process point. Evolution time: You must select the process point „_SYSTEM.TIME“ in the PP folder. The data type (DPT) must be 10:Time or 11:Date.
Text		Descriptive text that precedes the date / time.
Image		Selecting a background image

8.6.14. **Dates**

	Show the date. The component is of the type "Digital clock". This means that the configuration is identical to that of the time component. See chapter 8.6.13.

8.6.15. **Text box**

	Text field to display static text. The component is of the type "Basic label".

Properties	Value	Description
Text		Text to be displayed
Image		Selecting a background image

8.6.16. **Background image**

	Visualization field for images and charts. Both formats are supported: bitmap and vector graphics. The component is of the type "RemoteImageUI".

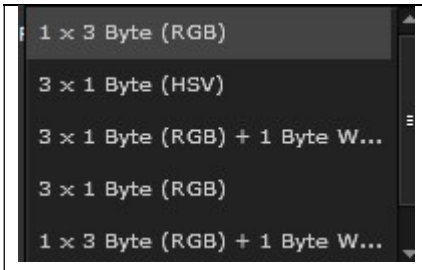
Style	Value	Description
Background		Background configuration
Image		Image selection
Scale image	☑	El tamaño de la imagen se ajusta al tamaño del elemento.
	☐	The image size adjusts to the size of the item.
X:Y constant		The aspect ratio of the image is maintained when scaling.

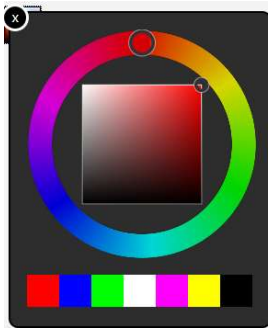
8.7. Advanced Control Elements

8.7.1. **RGB element**

	The RGB element allows the configuration of an accurate colour tone based on different color models.

Properties	Value	Description

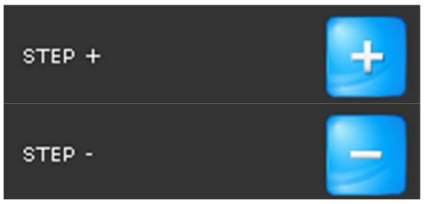
		We can select: 1x3Byte: RGB colours are encoded in an object (DPT251.600) HSV: 3 objects for the colour (DPT 5.3) RGB through 3 objects (red, green, blue) *4x1Byte*: RGBW (4xDPT5.1) 1y3+1Byte RGBW (DPT251.600)
		Selection of the process point to set the red value. The assigned process point must have the data type (DPT) 5: 8 bits unsigned. Depending on the selection, the possible PP types for the configuration are displayed.
Disconnected status		
Image		Status visualization if the current status is unknown.
Connected status		
Image		Show connected status. When connected, the selected color is displayed on the surface of the element.
		In "Predefined colors" you can define up to 7 colors, which can be selected directly in the online element.



The color tone is set exclusively in the visualization (not in the editor). If you press the RGB control in the visualization, the color picker next to it opens. A colour can be selected by clicking on the colour spectrum. Alternatively, up to 7 predefined colours can be directly selected.

If the RGB actuator dimming curve has been adjusted to the light source, then the selected color will correspond to the mix value. If, on the other hand, the adjustment curve has not been adjusted, colour differences may occur.

8.7.2. **Push button - Step:**



With this control element you can increase or decrease values in steps. Each key press, the current value increases or decreases according to the value of the step given in the configuration. The component is of the type "Send step value".

Properties	**Value**	**Description**
Address:	*change*	Movement direction: up and down. Long press changes direction.
	Up	Movement direction: only up
	Down	Movement direction: only down
Long key press after:	600	Time in milliseconds after which a key press is interpreted as a long key press.
Step:	1	Indicates the value (step) that is added to or subtracted from the current value with each press of the key. The value of the step depends on the type of data. Therefore, the first thing to do is assign the process point.
Sending time:	0	With a long press, the increment is added internally

		with the interval (in milliseconds) specified here. Only the key is released, the process point value is updated with the total increment.
Maximum		Maximum configurable value. The configuration depends on the type of data.
Minimum		Minimum configurable value. The configuration depends on the type of data.
		Selection of the process point.
Disconnected status		
Image		Status visualization if the current status is unknown.
Connected status		
Image		Show connected status

8.7.3. **Pulse sensor**

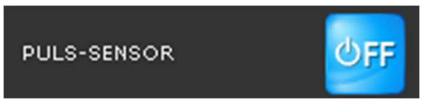
		The pulse sensor sends the value configured in *First status* when the control element is pressed and the value of the *Second status* when the control element is released. The component is of the type "Pressure switch".
Properties	**Value**	**Description**
		Selection of the process point.
Disconnected status		
Image		Status visualization if the current status is unknown.
First status		
Value	OFF	Value setting for this status, that is, at the press of a key. This entry depends on the type of data.

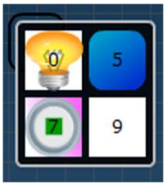
Image		Status visualization for this status
Second status		
Value	ON	Value setting for this status, that is, after releasing the key. This entry depends on the type of data.
Image		Status visualization for this status

8.7.4. **Push button - matrix**

	This element allows organizing multiple keys to send values within a matrix field. Each key is assigned an individual value. The matrix field is displayed when the control element is activated. The matrix field closes again either when a value send button is pressed, when the mouse leaves the matrix field, or the  icon located in the upper right corner of the matrix field is pressed. The component is of the type "Send value".

Properties	**Value**	**Description**
No status:	Unknown	Unknown status is displayed.
	Higher	If a non-parameterized value is received, the next highest parameterized status value is displayed.
	Lowest	If a non-parameterized value is received, the next lowest parameterized status value is displayed.
	Lower	Non-parameterized statuses are not displayed
Update		
		
		Selection of the process point.
Disconnected status		
Image		Status visualization if the current

		status is unknown.
Connected status		
Image		Status visualization for this status
Extended object properties		List of send buttons. If you add or select a value send button, the **ID-field general** and **ID-field value** configuration sections are displayed.
		Adds a new value send button
		Deletes a selected value send button
ID-field general		
ID-field general		Position number within the matrix field
ID-field valueID-field general		
Value	ON	Value setting for the value send button. This entry depends on the type of data.
Image		Design image for the value send button.



In the example, the matrix element has been configured for 4 values (0, 5, 7, 9). Each field has been assigned a different design. If the control element is pressed, the matrix field opens to activate the appropriate value send button.

8.7.5. **Slider**

	The slider allows you to set a value by moving the slider knob with the mouse. The component is of the type "Slider".

Properties	**Value**	**Description**
Value status:		The current status value is displayed in the element.
		No status is displayed on the item.
Minimum	0	Minimum selectable value. The configuration depends on the type of data.

Maximum	1	Maximum selectable value. The configuration depends on the type of data.
		Selection of the process point.
Style		
Text		Selecting the font and text color

8.7.6. **Analog indicator**

	This item displays a status value on an analog indicator. The current value is displayed below the hand in text format. The scale can be divided into colour sections using thresholds. The component is of the type "Measure instrument".

Properties	**Value**	**Description**
Min/max angle:	0°-360°	The start and end angles of the scale range can be specified using the sliders.
Text:	0.0-20.0	Sets the scaling division on the main scale
Ps-X Value	0.0.-10.0	Sets the scaling division on the lower scale
Text after status:		a unit, for example, can be entered here.
Min. value	0	Minimum selectable value. The configuration depends on the type of data.
Max. value	100	Maximum selectable value. The configuration depends on the type of data.
Thresholds:	0-3	Scale division by colour areas. Up to 3 colour areas can be defined.

Threshold 1:	0	Value at which colour area 1 begins. Colour area 1 ends with the value for threshold 2. The value depends on the type of data.
Threshold 2:	33	Value at which colour area 2 begins. Colour area 2 ends with the value for threshold 3. The value depends on the type of data.
Threshold 3:	66	Value at which colour area 3 begins. Colour area 3 ends with the value for threshold 4. The value depends on the type of data.
Threshold 4:	100	Final value for colour area 4. The value depends on the type of data.
		Selection of the process point.
Style		
Background color:	Black	Background colour and transparency settings.
Bezel colour:	Silver grey	Colour and transparency settings for the bezel.
Hand colour:	Red	Colour and transparency settings for the hand.
Colour of hand shaft:	Silver grey	Colour and transparency settings for the hand shaft.
Scaling	White	Colour and transparency settings for the scale.
Colour Threshold 1:	Green	Colour and transparency settings for colour area 1.
Colour Threshold 2:	Orange	Colour and transparency settings for colour area 2.
Colour Threshold 3:	Red	Colour and transparency settings for colour area 3.
Text:		Format for displayed text

8.7.7. **Fill level**

		The fill level indicator is a graphically animated object that is particularly suitable for displaying container fill quantities. The component is of the type "Deposit".
Properties	**Value**	**Description**
Indicate volume in:	1	Maximum container capacity. The configuration depends on the type of data.
		Selection of the process point.
Background		
Colour		Set the element's background colour
Status		
Text, font, colour		Configuration of the design elements for the status visualization.

8.7.8. **Operation mode of the room**

		This is a matrix element specially designed for operating mode switching of a 1-byte room (Send Value Type). KNX room controllers can change operating modes via a 1-byte object. The matrix element is preconfigured with appropriate values and acknowledgment pictograms, so the integrator only has to configure the corresponding process point. The process point can also contain the status of the operating mode in the data point list, so the operating mode element can also be used as a status indicator.
Properties	**Value**	**Description**
Status unknown:	Unknown	Unknown status is displayed.
	Higher	If a non-parameterized value is received, the next

		highest parameterized status value is displayed.
	Lowest	If a non-parameterized value is received, the next lowest parameterized status value is displayed.
	Lower	Non-parameterized statatuses are not displayed
		Selection of the process point.
ID-field valueID-field general		
1		Operation mode Comfort
2		Pre-Confort (Standby)
3		Economy (night)
4		Protected (frost protection)
Disconnected status		
Image		Status indicator when the status of the process point is unknown.
Status unknown		
Image		Status indicator in case *No status = unknown*

8.8. Navigation elements

EVOLUTION also offers the possibility to create elements for the customized navigation between pages, page containers and windows. The use of the navigation elements is described in Chapter 7.

8.8.1. Page Container

		See chapter 7.
Properties	**Value**	**Description**
X-Scroll:	Auto	The horizontal scroll bar is displayed if the width of the page is exceeding the width of the container.

		On	The horizontal scroll bar is always displayed
		Off	The horizontal scroll bar is hidden
Y-Scroll:		Auto	The vertical scroll bar is displayed if the hight of the page is exceeds the hight of the container.
		On	The vertical scroll bar is always displayed
		Off	The vertical scroll bar is hidden
HTML page:			And the page selection window opens up.
			A new page is created and aligned with the dimensions of the container. It is recommended to change the automatically generated page name "New page" immediately.
			Any existing page assignments are cancelled. However, the page is not deleted.
Scale the page:			The embedded page is scaled to the size of the container. This option is only available for the flash visualization. No scaling is performed for the HTML export version of the page.
			The embedded page is not scaled.

8.8.2. **Page navigation:**

			With this element you can load other containers or pages. If you embed this element in a window that has a smaller container embedded in it (that is, the container doesn't completely fill the window), you can use the page navigation element to open different pages in that container.
General		**Value**	**Description**
Password:			If a password is entered, the page can only be opened with knowledge of this password.
Properties			**See chapter 7.**
Process Point Properties			

Process point: 		Selection of the process point. If a process point is selected here, the configured *value* is assigned to the process point when the navigation key is pressed.
Send value:	☑	The value is sent to the bus
	☐	The value is not sent to the bus
Go to page:	☑	Activates the settings for *Go to PP page*
	☐	*Go to PP page* is deactivated.
Go to PP page: 		Selection of the process point. If a process point is selected here, the page will automatically open when the *Condition* is met. To activate this option, the *Go to page* box must be checked.
Condition:	=	The condition is met if the value of the process point is equal to the configured *value*.
	<>	The condition is met if the value of the process point differs from the configured *value*.
	<	The condition is met if the value of the process point is less than the configured *value*.
	>	The condition is met if the value of the process point is greater than the configured *value*.
	Any value	The condition is met with all the events of the process point.
Value:		Comparative value for the *Condition.* The configuration depends on the data type of the process point „*Go to PP page*“.
STATUS		Configuration of the visual properties font, color, frame and image of the element. These properties are active when the item is not selected.
Selected Status		Configuration of the visual properties font, color, frame and image of the element. These properties are active when the item is selected.

The menu item of the navigation element complements the multiple design options of the EVOLUTION editor and, if configured accordingly, and provides the user with visual indicators on the active navigation element.

Fig. 55: Example of a navigation menu

8.8.3. Icon

	With this element you can open a window or start an EVOLUTION function.

General	Value	Description
Password:		If a password is entered, the window can only be opened with knowledge of this password.
Properties		**See chapter 7.**

8.8.4. Sensitive link

	This component opens a window depending on the status of a configurable process point.	
Properties		**See chapter 7.**

8.9. Info Elements

8.9.1. IP Camera

	The IP Camera component allows the integration of IP cameras. The supported video formats are JPG and MJPG. The camera image is displayed within the area covered by the component.

CONNECTION	Value	Description
IP Host:		Camera IP address
Port:	80	Camera port address.
User:		Optional login name
Password:		Optional password

Format:	jpg	JPEG image format
	mjpg	MPEG video format
Path:		File path to camera images

The URL path of the camera images can be found in the respective camera description.

8.10. Chart elements

In EVOLUTION, the process point (events) data is written to the project database if configured to do so (see the Process Points chapter). Historical data is generated over time. We find views by days, weeks, months and years. Chart elements use this data to display a graphic presentation.
EVOLUTION has 3 chart elements. The "**Advanced Chart**" offers additional properties compared to the "**Chart**".
The "**Comparison Chart**" component also allows the display of two sets of data on the X-axis with different time periods for comparative purposes.

	The appropriate chart component is placed in the workspace using drag and drop. The drawing area of the chart component is determined by the size of the element.

Properties	Value	Description
Zoom Chart: *(Extended DD)*	☐	In the online module there is no extract selection
	☑	In the online module you can set a specific visualization window using a slider. With this selection, you can go over the entire area.
Tooltip:	☐	Tooltip deactivated
	☑	Hovering with the mouse over a data point on the chart displays the measured value as well as the date.
Legend:	☐	Legends are not shown
	☑	Displays the name of the measurement series as a legend in the chart.
Comp. bars: (only in bar charts) *(Extended DD)*	☐	If there are multiple data series, the data columns are displayed one inside the other
	☑	Columns of data are positioned side by side.
Style	**Value**	**Description**
Title:		Title in text format for graphics
Font:		Selecting the font and text color
Background and Frame (Extended DD)		Background element design.
Background image (Extended DD)		Selecting a background image for this element
Scale image: *(Extended DD)*	☐	The background image is not scaled to the size of the chart component.
	☑	The background image is scaled to the size of the chart component.
X:Y constant:	☐	The aspect ratio is not taken into account when scaling the background image.
	☑	The aspect ratio is taken into account when scaling the background image.
Representation		This section defines the types of

			visualization, depending on the different measurement series. Each series of measurements can be assigned to a different process point.
			The measurement series is displayed as a bar chart.
			The measurement series is displayed as a line chart.
			The measurement series is deleted again. The last available measurement series can no longer be deleted.
X-axis		**Value**	**Description**
Scaling:			Colour of separation lines
			Transparency of separation lines
			Thickness of separation lines
		inside	Separation lines are represented within charts
		outside	Separation lines are represented outside the charts
		cross	Separation lines cross the axis line
		none	No separation line is shown
	Scale Length	5	Separation line length
	Partial interval:		Distance value of the intermediate division
	Show line:		The axis line is not shown
			The axis line is shown
	Show scale:		The axis line is not shown
			The axis line is shown
Line:		White	Colour of axis line
		1	Transparency of axis line
		1	Thickness of axis line
Position:		Top	The X-axis is shown at the top
		Bottom	The X-axis is shown at the bottom
By default:	*Timeline*		Select X-axis time unit: Minutes, hours, days, weeks, years.
	Time from		Start time
	Time to		Final hour
Y-axis		**Value**	The configuration of the Y-axis is, in principle, the same as that of the X-axis. The parameters that differ are explained below.

Position:		Left	Left Y-axis position
		Right	Right Y-axis position
Prefix:			Text that appears before the Y value
Sufix:			Text that appears before the Y value (ie.: the unit)
Maximum:			Maximum Y value
Minimum:			Minimum Y value
Grid lines		**Value**	**Description**
Visibility:			The grid lines are not shown
			The grid lines are shown
Address:		both	Show vertical and horizontal grid lines
		Horizontal	Show only horizontal grid lines
		Vertical	Show only vertical grid lines
Horizontal line:		Black	Colour of the horizontal grid line
		1	Transparency of the horizontal grid line
		1	Thickness of the horizontal grid line
Y interval distance		1	The number specifies the scale division Y in which a horizontal grid line is drawn. That is, a 1 means "all lines", 2 means "every second line", etc.
Vertical line		Black	Colour of the vertical grid line
		1	Transparency of the vertical grid line
		1	Thickness of the vertical grid line
X interval distance		1	The number specifies the scale division Y in which a vertical grid line is drawn. That is, a 1 means "all lines", 2 means "every second line", etc.

Several Process Points can be represented within a chart. In this case, the type of chart desired must be specified for each point in the process.

Depending on the chart type, more configuration parameters are available.

	The bar chart configuration parameters contain, on the one hand, the link to a process point and, on the other hand, the visual properties of a column.	
General	**Value**	**Description**
Name:		Measurement series name
		Selection of the process point. The selected process point must have the *Save PP* property activated.
Representation properties	**Value**	**Description**
Value:	Average:	The average value for a period of observation of the data is calculated.
	Minimum	The minimum value of the data observation period is displayed.
	Maximum	The maximum value of the data observation period is displayed.
	Increment	Incremental values are displayed.
	Run hours	Visualization of the operating hours of a process point.
Column	**Value**	**Description**
Frame 	Black	Colour of column frame
	0.55	Transparency of frame
	1	Thickness of frame
Fill 	Green	Fill colour of column
	1	Transparency of column
Width of column	0.82	A value between 0-1 provides the percentage width for X-axis scaling.

	The lines chart configuration parameters contain, on the one hand, the link to a process point and, on the other hand, the visual properties of a column.	
General	**Value**	**Description**

Name:		Measurement series name
		Selection of the process point. The selected process point must have the *Save PP* property activated.
Properties	**Value**	**Description**
Value:	Average:	The average value for a period of observation of the data is calculated.
	Minimum	The minimum value of the data observation period is displayed.
	Maximum	The maximum value of the data observation period is displayed.
	Increment	Incremental values are displayed.
	Run hours	Visualization of the operating hours of a process point.
Line	**Value**	**Description**
	Grey	Colour of line:
	1	Transparency of line:
	2	Thickness of line:
Form of line:	segment	
	step	
	Vertical	
	Horizontal	
	reverseStep	
	curve	
Value point	**Value**	**Description**
Point form:	Box	Rectangle shaped dot
	Circle	Circle shaped dot
	Cross	Cross shaped point
	Diamond	Rhombus shaped point
	ShadowBox	Shaded rectangle shaped point
	Triangle	Triangle shaped point
	none	The value point is not displayed.

Frame		Grey	Colour of the frame
		1	Transparency of frame line
		1	Thickness of line:
Fill		Orange	Fill colour for the representation of the value point
		1	Transparency of the value point
Radio		5	

Important! In order for the events of a process point to be displayed in the chart component, the option Save PP of the process point must be selected.

Unlike the data chart component, the data comparison component has a special feature: a configurable second X-axis. The comparison period is shown on the second X-axis. Due to the special comparative functionality of this component, you can only configure 2 sets of data (either as a bar graph or a line graph).

8.10.1. **HTML online chart configuration**

The chart component also offers configuration options in the visualization. One possible application is to create a central visualization page with the chart component and allow the user to select the respective data to show as needed.

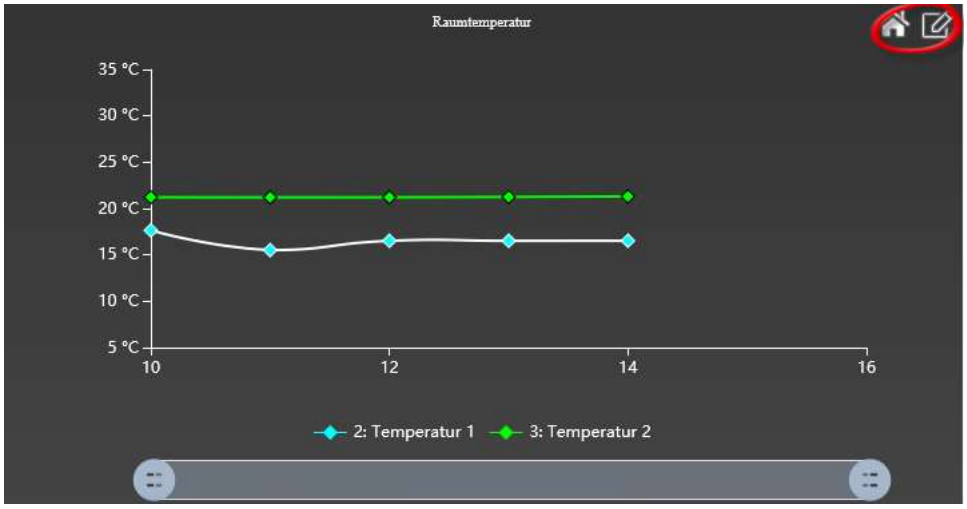


Fig. 56: Graphic component in the visualization.

Fig. 56: Shows a chart component in the visualization. Clicking on the red-bordered symbol enters the chart component edit mode. The corresponding controls are shown in the upper left area. Click to restore the original screen.

Exit edit mode by pressing the button.

: Generates an image of the representation in PNG format. The image can also be opened in the browser or saved as a file.

: Displays a calendar below the chart, from which you can select the observation period. The resolution of the timeline can be selected from: minutes, hourly, weekly and monthly. When automatic resolution of the time axis is selected, the settings are made based on the selected observation period. By clicking on the data will change according to the configuration. Click to reset settings. The calendar closes again with the icon .

: Open the online configuration window to show or hide additional diagrams.

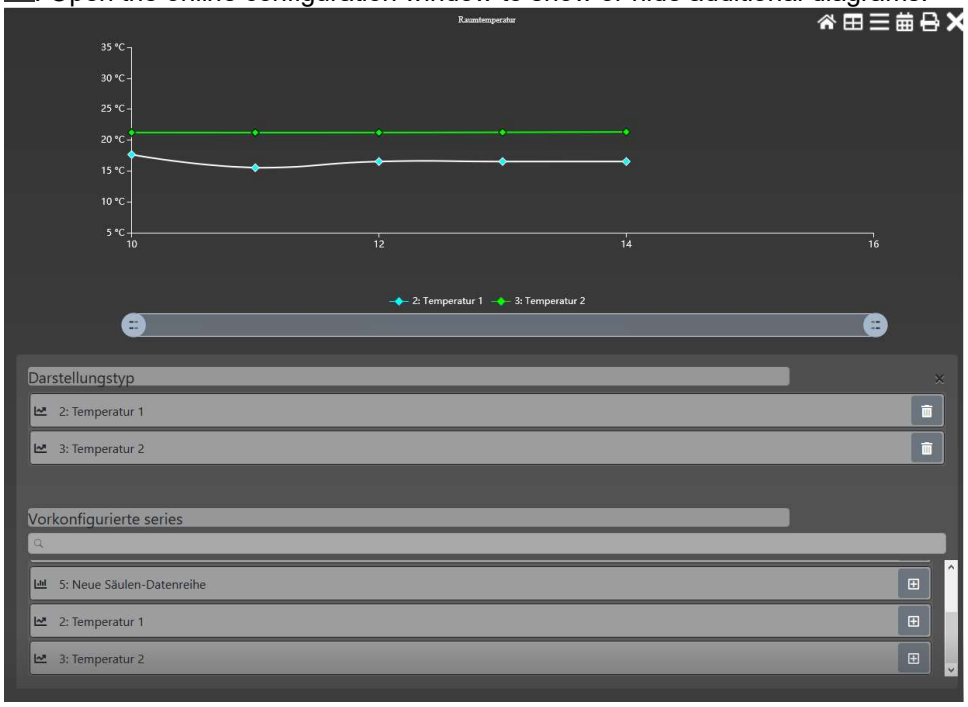


Fig. 57: Charts online configuration window

: Data in table form. Also, tabular data can be exported in CSV format through this view. This allows for subsequent editing in a spreadsheet application (for example, Excel). CSV export is done through the button Export. The tabular view is exited with the button .

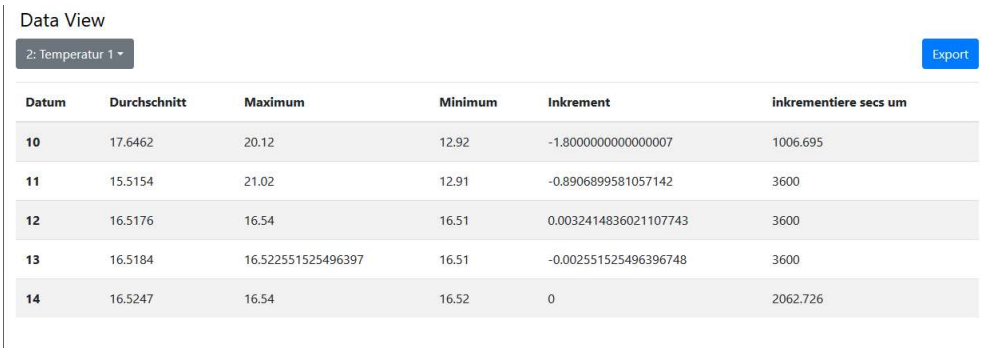


Fig. 58: Data table view.

9. Modules

EVOLUTION provides the user with numerous functions to conveniently automate and monitor a system. The function modules have a modular structure and can be configured through the *Modules* main menu. In addition to the basic configuration of the function modules, you can also modify the configuration in the visualization.

9.1. Scheduler

EVOLUTION allows the configuration of weekly and annual time schedules. The corresponding modules are in the *Modules / Scheduler*. For the correct execution of the schedules, it is essential that the EVOLUTION server system time is configured correctly.

9.1.1. Weekly time schedules

You can open the editing interface for weekly schedules through the menu option *Modules / Scheduler / Weekly schedules*. In weekly schedules the instructions that you define are repeated weekly on specific days and times of the week. EVOLUTION also offers the possibility to define the time of the switching order depending on sunrise or sunset (astronomical time). Individual time schedules can be sorted into categories. For example, you can create categories like lighting, blinds, or HVAC. In addition to improving organization, categorizing also improves system security by offering each user only those access options that are appropriate to their application profile.

The category is determined using the controls in the upper left area of the edit window. The standard category visualization is linked to the name ALL (that is, a specific category is not selected, but shows all the schedules regardless of their category).

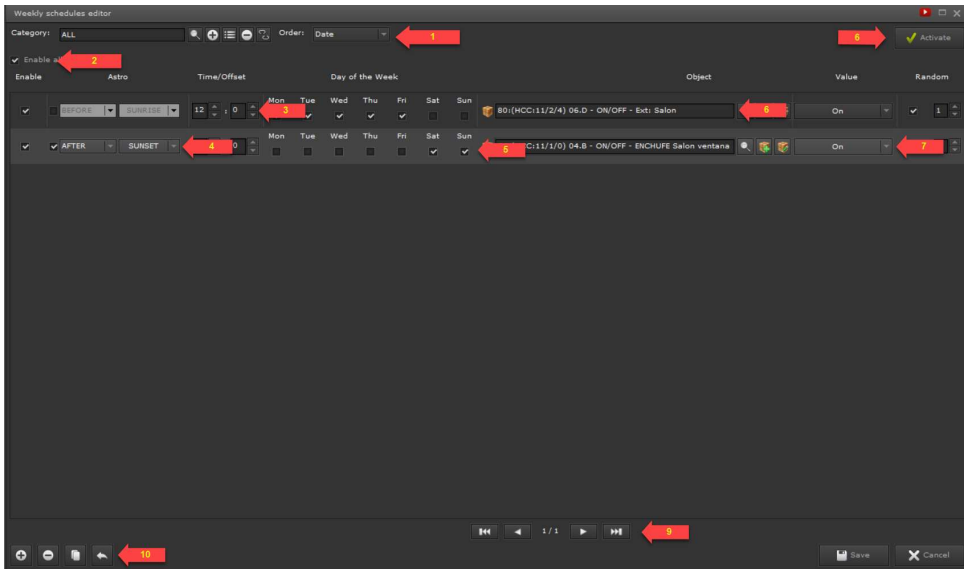


Fig. 59: Configuration of the weekly time schedules

1		The category selection window opens up.
		Creates a new category
		Opens a text box to rename the category.
		Deletes the displayed category. Time schedules in this category are listed in ALL.
2		The scheduling is inactive and does not run.
		The time schedule is executed by activating the weekly schedules.
3	*Time*	Indicates the time of the schedule in hours and minutes.
4	*Astro*	If the astro time is activated, you have to choose between before or after sunrise or sunset. If the location has been specified in "Settings / GPS", EVOLUTION can calculate sunrise and sunset from location data, date and time. Time switching is carried out according to the selection. This way, you enter a configurable time that serves as an offset for time switching.
5	*Week days*	Selection fields for the week days on which the time schedule will be executed.
6		Selection of the process point.
7	*Value*	The value to be assigned to the process point is entered here. The value depends on the type of data.
8	*Activate*	Activation of the weekly schedule. That is, the information is transmitted to the system unit responsible for execution. If activation does not take place, the configuration will only be activated the next time the system is restarted.
9		Time switch navigation. The visualization list is structured by pages. The navigation keys can be used to navigate to

		the beginning, one page back, one page forward, and to the end.
		Adds a new time switch at the bottom of the list or further processing.
		Deletes the selected time switch.
		Adds a copy of the selected time switch to the bottom of the list.
		Opens the category selection window to assign the selected time switch to another category.
		Saves the settings.
		Closes the edit window.

9.1.2. **HTML online time schedules**

To insert a weekly schedule into the visualization we need a window navigation item or a page menu item. This is configured with the EVOLUTION weekly schedule function in combination with the appropriate category.

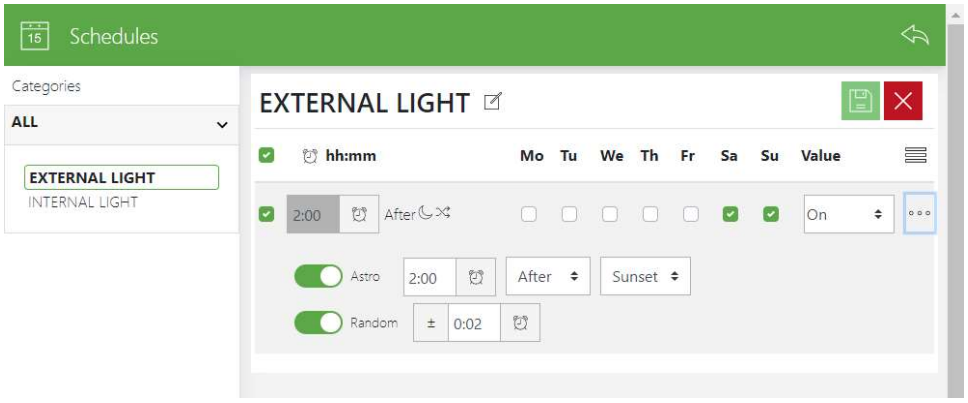


Fig. 60: HTML online time schedules

The online HTML edition creates a list of the time schedules of the assigned categories and allows modifying the time and value of an entry. The user interface design, size, and layout of the controls are designed for touch operation.
In the first "External light» time schedule (see Fig. 60:), we see the name which was specified through the configuration of the process point *PP General->Name in the modules* (Fig. 61:).

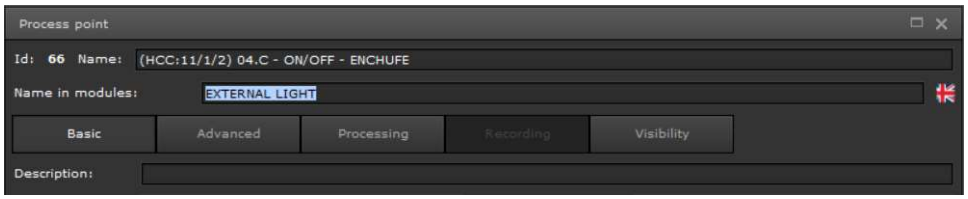


Fig. 61: Name in the modules

9.1.3. **Annual time schedules:**

EVOLUTION's annual time schedules meet all expectations for flexibility in describing time processes.

Annual time schedules are comprised of "**action sequences**" that are run from "**time scheduled events**" (switching event). A sequence of actions can consist of a large number of individual switching actions (switching action = setting a value of a process point) with a chronological sequence.

The main task when creating an annual switching program is to map the time orders into "subtasks" = "**action sequences**" and then trigger them as a "switching event" at the required time point.

This module is opened through the menu option *Modules / Scheduler / Annual Scheduler*. Annual schedules can be used in parallel with weekly schedules. The editing interface for annual switching programs is shown below:Fig. 62:.

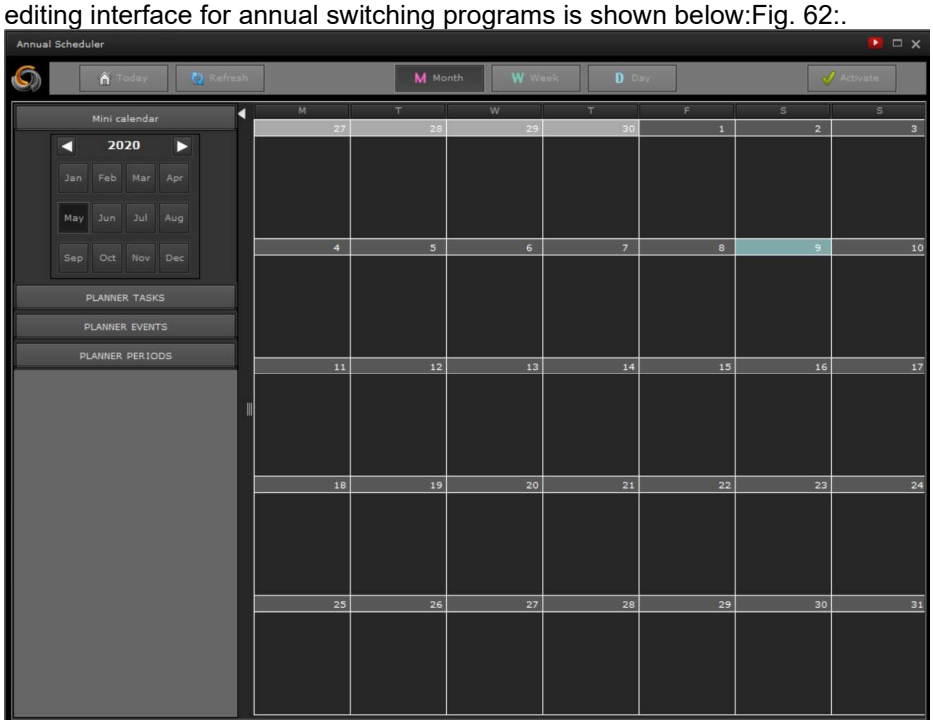


Fig. 62: Editing interface for annual schedules.

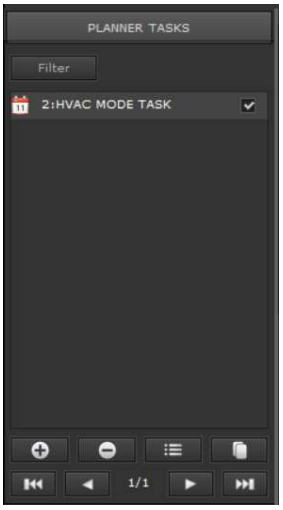
The editing window is divided into three areas. The header, the left "navigation

bar" and the calendar view showing the defined switching events.
The buttons in the header have the following functions:

	Changes the calendar view to today.
	Refreshes the view, that is, the data currently stored in the database is displayed.
	Changes calendar view to monthly view (default visualization)
	Changes the calendar view to weekly view.
	Changes the calendar view to daily view.
	Activates the annual time schedules. That is, the information is transmitted to the system unit responsible for execution. Activation must take place after setup is complete. If activation does not take place, the configuration will only be activated the next time the system is restarted.

The configuration of a switching sequence is described below. Later on, the assignment of this switching sequence to a switching event will be described.

9.1.3.1. Creating a sequence of actions



The "**sequence of actions**" defines a sequence of switching actions. The sequences of actions are listed in the "Planner Tasks". If you open this tab, the command buttons to manage these sequences of actions are also shown.
The arrows on the bottom line can be used to navigate within the list of action sequences. The check box next to a list entry indicates whether or not this switching sequence is activated.

Filter	Displays a filter mask to narrow the list of action sequences that are displayed.
	Open the action sequence editing window (see Fig. 63:), to create a new sequence.
	Deletes the selected sequence of actions
	Opens the action sequence edit window to edit the selected sequence.
	Creates a copy of the selected action sequence and opens the editing window for editing.

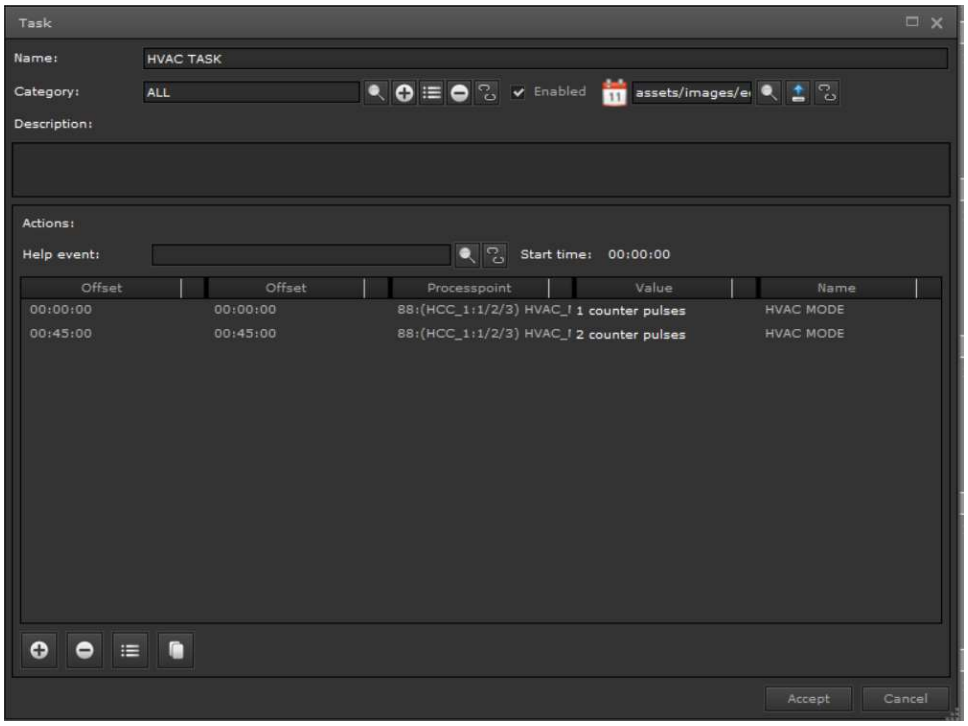


Fig. 63: Action sequence editor

Property	Value	Description
Description		Name of the sequence of actions
Category		The category selection window opens up. Access rights to entries in the annual time schedule can be organized by category.
		Adds a new category
		Opens a window to rename the selected category.
		Deletes the displayed category.
		Eliminates the link between the switching sequence and the displayed category.
Activate		The switching sequence is not activated
		The switching sequence is activated
Image		Descriptive image of the sequence. The command buttons can be used to select a new image, load it, or delete an existing image assignment.
Description		Optional descriptive text

Actions:			Opens the switching actions window (see Fig. 64:), to create a new action.
			Deletes the selected switching action
			Opens the switching action window for editing.
			Copies the selected switching action and opens the window to edit the new switching action.
	Used in		Call to the edition of switching events to create a link to a switching event.

In the example, the sequence of actions was named "HVAC Tasks" and assigned to the category "Heating". The optional description text can be used for documentation purposes. The actions "Presence" and "Standby" have been defined with the help of the actions window.

Fig. 64: Create a switching action

In the switching actions window, the appropriate process point is selected from the list of process points and then the value is defined. Then you can give the action the name you wish. The offset time specification to apply to the switching event, that is, the additional time at the start time of the switching event.

In an example of "Heating mode" action sequence, the first switching action is performed directly with the execution of the switching event; the second switching action, however, occurs an hour later. When this switching sequence is executed, it is determined by the execution period and the start time of the assigned switching events.

9.1.3.2. Define switching events

The switching event is a point in time that triggers a sequence of actions. Note that a sequence of actions can be carried out through various switching events, that is, at different times. Switching events are created through the *EVENTS* navigation tab and the action sequence editing window.

Using the  buttons in the list of switch events, you can create, delete, edit and copy switch events. The following image shows the editing window for change events:

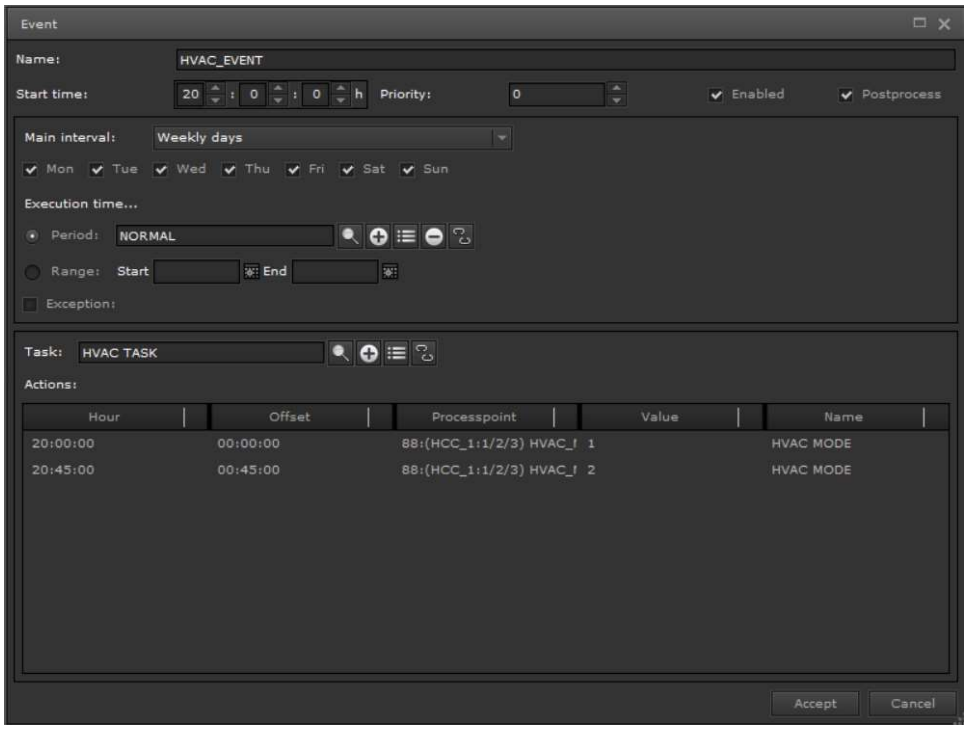


Fig. 65: Creating switch events

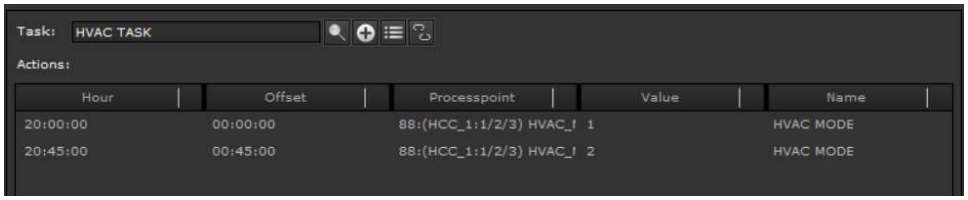
Property	Value	Description
Name		Name of the switch event
Start time	hh:mm:ss	Time at which the event is triggered.
Priority	0-99	If events with identical start times are defined, the priority determines the start order.
Enabled	☐	The switch event is not activated
	☑	The switch event is activated
Post process	☐	If a switching action cannot be carried out due to a bus connection failure, it will not be executed later, even if the bus connection is re-established.
	☑	If a switching action cannot be performed due to a bus connection failure, it will be executed later, when the bus connection has been re-established.
Interval:	None	The sequence of actions is only carried out once, on the specified start date / time.
	Daily	The sequence of actions runs daily *at the start time* specified in the

		execution period.
	Workdays	The sequence of actions runs from Monday to Friday, *at the start time* specified in the *execution period*.
	Weekend	The sequence of actions runs only Saturday and Sunday, *at the start time* specified in the *execution period*.
	Weekly	The switch sequence runs, only on the weekday of the start date, *at the start time* specified in *the run period*. So if October 19 is a Saturday, the switching sequence only takes place on Saturdays.
	Monthly one day (day of the start date)	The action sequence runs every month, only on the day of the start date, *at the start time* specified in *the run period*. Therefore, if October 21 is a Monday, the sequence of actions will take place on Monday of the corresponding week of the month. This option is not available if the *execution period* is defined as a period.
	Monthly on a date (start date)	The sequence of actions runs, only on the weekday of the start date, *at the start time* specified in *the run period*. If the start date is October 19, the sequence of actions is always carried out on the 19th of a month.
	Annually one day (day of the start date)	The sequence of actions is carried out annually on the day of the start date. This option is not available if the *execution period* is defined as a period.
	Annually on a date (start date)	The sequence of actions is carried out annually on the start date.
	Repeat by minutes	The time for the *Repeat* option is entered in minutes, after which the sequence of actions will be repeated during the *execution period*.
	Hours interval	The time for the *Repeat* option is entered in hours, after which the sequence of actions will be repeated

			during the *execution period*.
	Days interval		The time for the *Repeat* option is entered in a number of days, after which the switch sequence will be repeated during the *execution period*.
	Week interval		Here you enter the days of the week on which the sequence of actions will be repeated during the *execution period*.
	Year interval		This option displays a calendar in which you can mark the days in which the sequence of actions will be performed.
Repetition		1	This field is optionally displayed if the main interval is set to repeating by minutes, hours, or days.
Execution period	*Period*		The run period specifies a time interval that repeats annually. Within this interval, the switching events are triggered according to their specified primary interval. The periods can be, for example, vacation periods or summer and winter periods. You can assign a colour to a period to visually distinguish the time bands.
	Area		This form of execution period is identified by the start date and the end date. The end date is limited to 2100. Within this interval, the switching events are triggered according to their specified primary interval.
Exception	*Start*		It is the start date from which the exception applies.
	End		It is the end date until which the exception applies.
	New start date		Here you can change the start time of the switching event for the duration of the exception.
	Activate	☐	The switching event is disabled for the duration of the exception.
		☑	The switching event is triggered for the duration of the exception at the

			time of the *New start*.
Sequence of actions			Assignment of the sequence of actions. The associated switching actions are listed in a table.

Once all the adjustments have been made, the execution details for a switch event are displayed at the bottom of the editor window.



In the example, the scheduled event "HVAC Event" executes the sequence of actions defined in "HVAC Task" on weekdays at 8:45 a.m. with the action "Presence". 45 minutes later, the "Standby" action is carried out.

Clicking the *OK* button applies the settings and displays them in the calendar view.

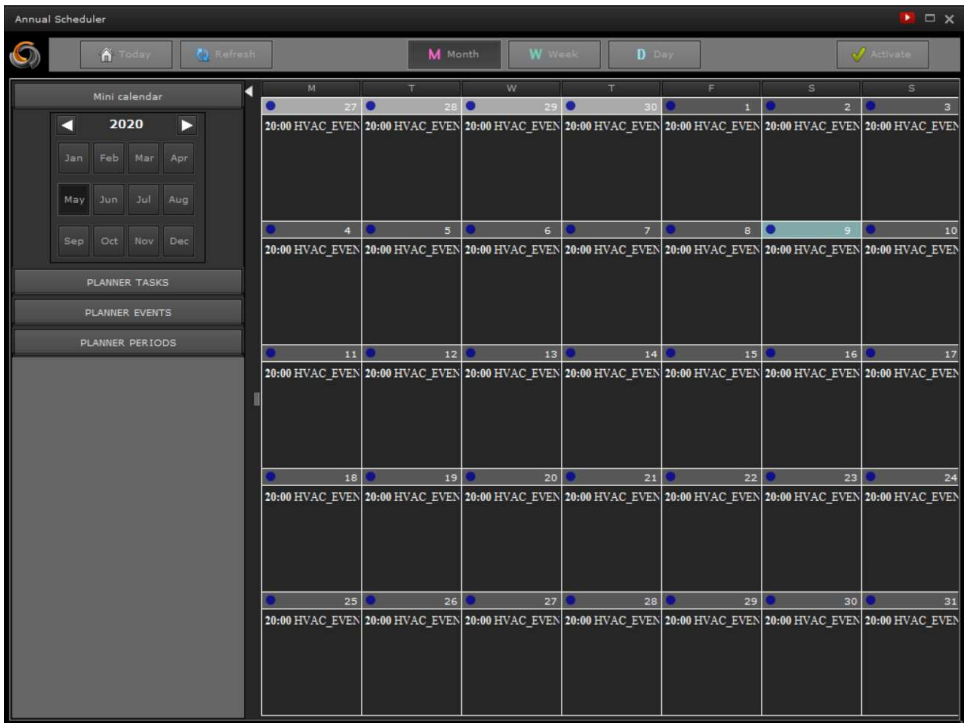


Fig. 66: Scheduled switching events

Switching events are displayed on the calendar with the start time and name. Calendar view also has a context menu that can be opened with the right mouse button. This allows for a convenient use of switch events (for example, the definition of exceptions). To do so, select the appropriate switching event from the

calendar with the right mouse button. In the menu item that opens, select the menu item and the corresponding edit window is displayed.

The configuration is operational with the activation of the annual time schedule of the unit to be executed (with the "Activate" button).

9.2. Alarm HTML online configuration

In systems with special security requirements, the EVOLUTION alarm service offers the possibility to inform the user about possible critical states of the installation system. In the alarm configuration, you can define actions that forward information when an alarm is activated (that is, when a freely definable system status occurs). One way of forwarding is to display a message on the screen. Notifications can also be sent via email and / or SMS. Email and SMS notification requires internet access and a suitable service provider. The necessary access data is configured in *Configuration / E-mail Service* or *Configuration / SMS Service*.

With *Modules / Alarm configuration* the configuration window opens. It is advisable to edit the contact details first (if alarm forwarding is required by email or SMS), then compose the messages and finally define the alarm statuses.

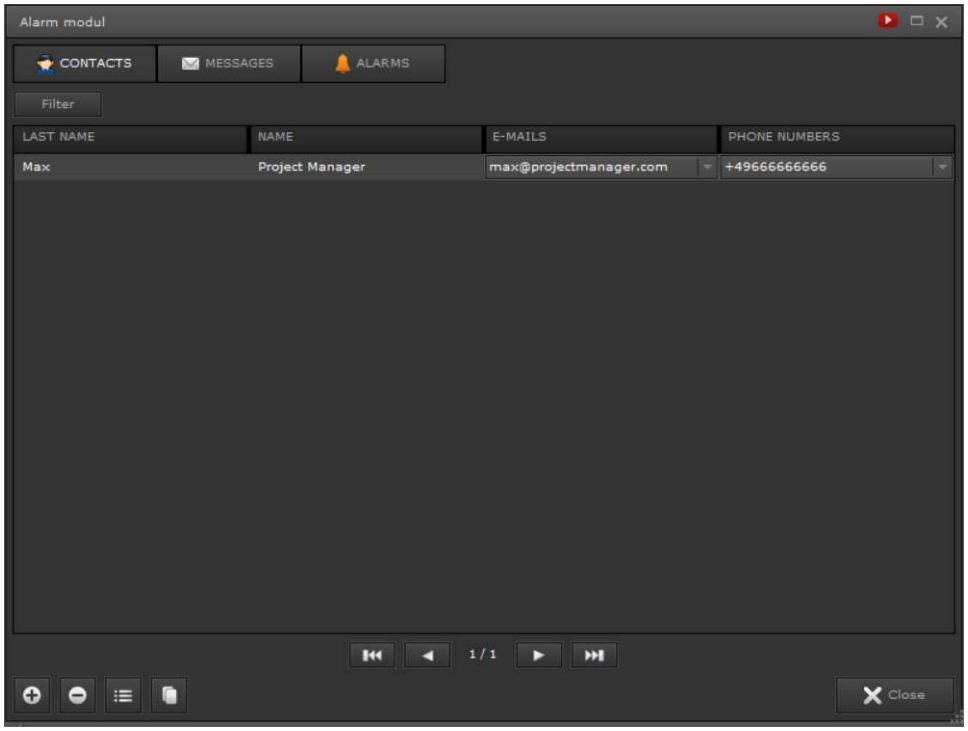


Fig. 67: Alarm configuration

Fig. 67: displays the main alarm setup window. Using the *CONTACTS*, *MESSAGES* and *ALARM* tabs in the header, the different editing areas are shown. Entries can be preselected using the *Filter* function. The function keys in the footer are used to add, delete, edit, and copy entries.

9.2.1. **Contacts**

Contact details are only required if alarm forwarding by email or SMS is required. The edit fields for the contacts are displayed in Fig. 68:.

Fig. 68: Contacts settings

Contact details include last name, first name, email address and phone number to send SMS. Configuration is completed by pressing the *Save* button. Multiple email addresses or phone numbers can be assigned to a contact. The corresponding input masks are opened using the button  .

9.2.2. **Messages**

In the Messages section, you can compose text messages that are displayed or sent when an alarm occurs. All texts can contain placeholders that are replaced by the current values when the alarm is triggered. Placeholders can also be inserted via the context menu of the text field (right-click).

Position marker	**Description**
[PROCESSPOINT]	Name of the process point that triggered the alarm.
[VALUE]	Value of the process point.
[CONDITION]	Comparison condition
[THRESHOLD]	Limit value or comparison value
[UNITS]	Unit

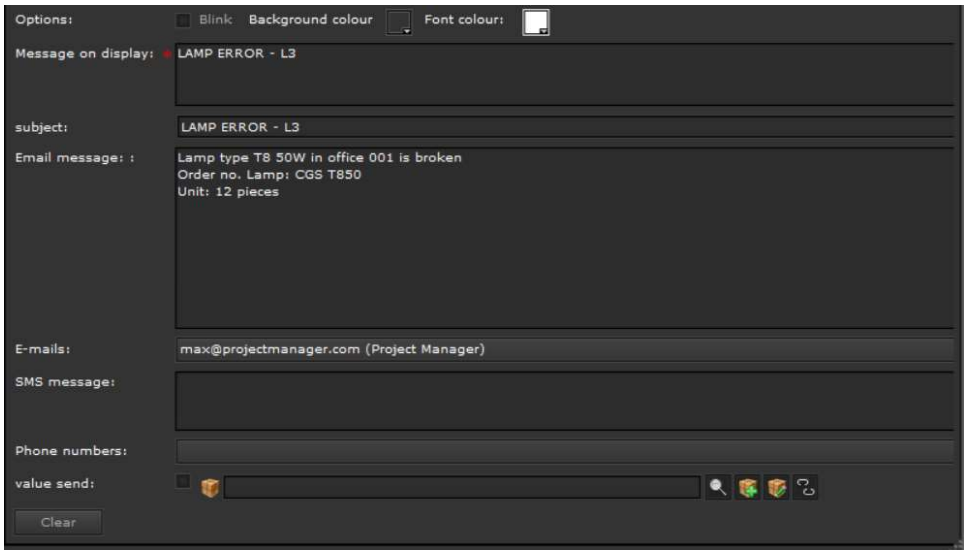


Fig. 69: Alarm messages

Property	Value	Description
Flashing	☐	Show without flashing
	☑	The message is displayed by flashing
Background colour	Black	Text message background colour
Text colour	White	Text colour
Show on screen		Text message displayed on the screen.
Subject		Subject line for sending the email
Email message		Text of the email message
E-Mails		List of email recipients. The address list is created using the button.
SMS Message		Text of the SMS message
Telephone numbers		List of SMS recipients. The list of phone numbers is created using the button.
Send value	☐	The option "Set a process point value in case of alarm" is not used.
	☑	The option "Set a process point value in case of alarm" is used. The process point can be configured in the adjacent entry field. A possible application would be, for example, to open a window in the visualization through this process point and to instruct the user to continue.

9.2.3. **Alarm**

The alarm statuses can be configured through the tab *Alarm*. A list of the alarms already defined appears in the upper area. Using the edit buttons you can add, delete, edit alarms or create a copy of an already defined alarm

status. The configuration mask is displayed to create / process an alarm. It is divided into the Alarm, Properties, Status and Error message sections.

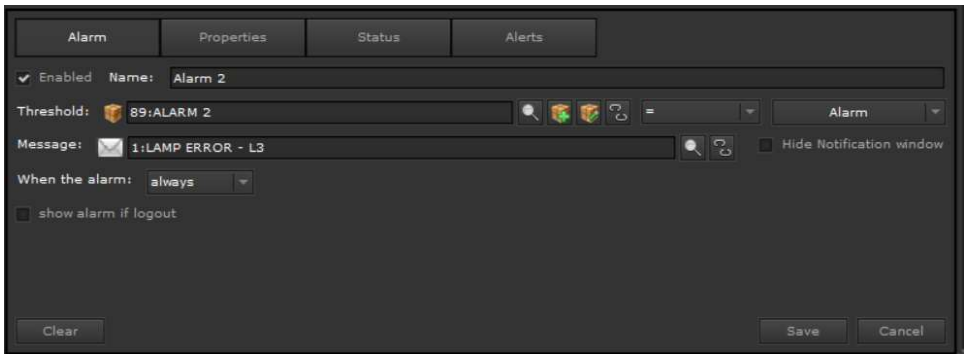


Fig. 70: Defining the alarm status

Alarm	Value	Description
Active	☐	The alarm status is not active
	☑	The alarm status is active
Description		Freely choose a name for the alarm status
Threshold = alarm condition		The alarm condition consists of the process point, the comparison operator, and the comparison value. The process point value is compared to the comparison value using the comparison operator. If the condition is met, the alarm is triggered. The comparison value depends on the data type (from the selected process point).
Message		Assignment of the message to be sent.
Hide message	☐	The message does not appear on the screen.
	☑	The message does appear on the screen.
Alarm	The first time	The alarm is generated once, the first time the alarm condition occurs.
	Always	The alarm is generated with each process point event that meets the alarm condition.
Alarm information on the login screen	☐	Even if the alarm goes off, it is not displayed on the login screen.
	☑	If the alarm goes off, it does show up on the login screen.

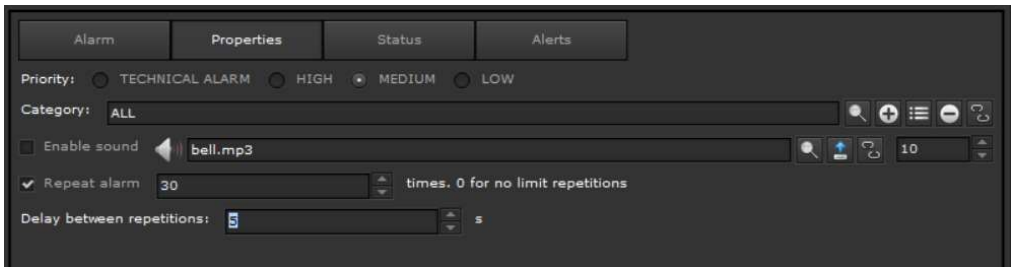


Fig. 71: Properties of the alarm status

Properties	Value	Description
Priority	ADMIN ALARM	These alarms can only be viewed and edited on the administrator's desktop.
	MAXIMUM	Alarms with this priority can be viewed on any desktop.
	MEDIUM	
	LOW	
Category	ALL	Allows the alarm to be assigned to a category. The category is edited or created with the following buttons. Depending on the category, you can sort out the access rights of users of the online alarm module.
Acoustic acknowledgment	☐	No acoustic acknowledgment
	☑	Acoustic acknowledgment is enabled in case an alarm is triggered
Repeat alarm	0	Number of times an unconfirmed alarm is sent by email and / or SMS. 0 means unrestricted, that is, the alarm repeats until it is acknowledged.
Wait time between repetitions		The wait time in seconds before the alarm message is sent again. In the example, the alarm is sent 3 times to the email or SMS service if there is no confirmation, each with a 30 second timeout. After that, the alarm is not resent.

The alarm management in EVOLUTION covers numerous applications. Supports both automatic and manual alarm handling. Figure Fig. 72: shows the state machine for using the alarm. Status changes due to acknowledgment of an alarm or change to / from maintenance mode can be triggered by process point events (automatic alarm handling) or by manual actions on the visualization. A distinction is made between the following statuses in alarm management:

0 – Unknown. That is, the status of the alarm process point is unknown.

1 – Normal Acked. There is no alarm condition.

2 – Alarm, UnAcked. The alarm condition is met. The alarm has not yet been confirmed.

3 – Alarm, Acked. The alarm condition still exists and has been confirmed.

4 – Normal, UnAcked. The alarm condition is no longer present. However, the status of the previous alarm was not confirmed.

5 – Maintenance/Disabled. The alarm is in maintenance mode or is disabled. If a maintenance period (MT) is specified for the alarm, the maintenance mode automatically ends after this period.

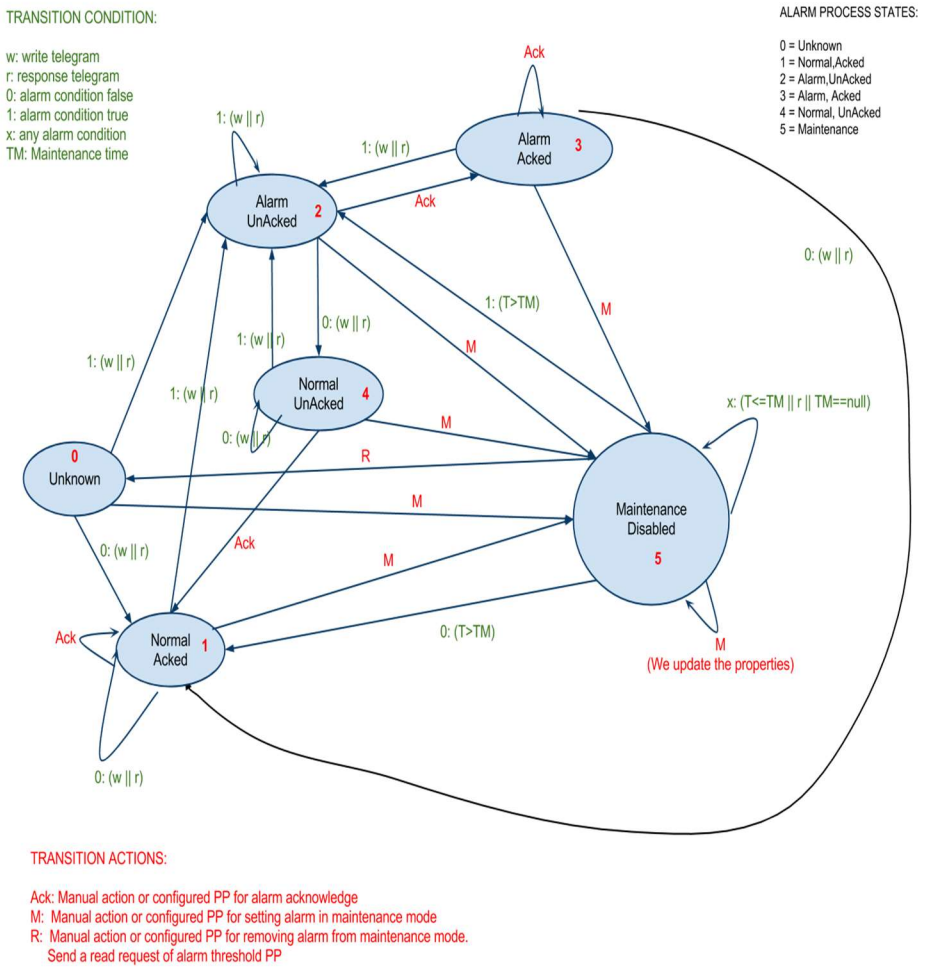


Fig. 72: State machine for alarm management

The alarm management statuses are available for each alarm definition through automatically generated process points for further individual processing. The following process points can be used:

Alarm.<Alarm-Name>.Status - it is sent every time the status of the alarm process changes (see Fig. 72:). The status can have values

0-5, according to the current status of the alarm process.

Alarm.<Alarm-Name>.Enabled - indicates if the alarm is activated (1) or deactivated (0). That is, the process point is sent when the status of the alarm process enters or exits maintenance mode (5).

Alarm.<Alarm-Name>.Acknowledged - indicates if the alarm is acknowledged (1) or not acknowledged (0).

These automatically created process points are listed in the process point selection in the *Alarm.<Alarm-Name>* subdirectory.
In the *Status* configuration area you can enter process points for automatic alarm handling.

Fig. 73: Status process points for the alarm status

Status	Value	Description
For acknowledgement		Process point for automatic confirmation of the alarm. That is, if the alarm process is in the "Alarm, not acknowledged" status (2), when the configured value is sent, it changes to the "Alarm, acknowledged" status (3).
For activation		Process point for automatic alarm activation (from deactivation or maintenance mode). If the process point is sent while the alarm status is in maintenance or inactive state, the alarm process status changes to state 0 and sends a read request to recheck the alarm condition.
For deactivation		Process point for automatic alarm deactivation (to maintenance mode). If the set value is sent, the status of the alarm process changes to maintenance mode (5).

If the handling of the alarm is not carried out correctly, for example, because the alarm is not acknowledged or an error occurs when sending the notification (email / SMS), this can be recorded in the error message settings.

Fig. 74: Alarm processing error message

Error message	Value	Description
Send if no confirmation has been received		If the alarm is not acknowledged even after the repeats have been exhausted, the process point configured here is sent.
Send if sending emails or SMS is not possible		If the alarm message cannot be sent because, for example, the connection to the service provider cannot be established, the process point configured here is enabled.

9.2.4. HTML Online alarm management

Users authorized to edit alarms are informed in the display by the Alarm Info bar about the alarm statuses. In the event of an alarm, the information bar is displayed at the top of the screen. Alternatively, a menu item that calls the EVOLUTION *Alarma* function can also be configured to allow editing and visualization of the alarm history regardless of the current alarm status.

Fig. 75: Alarm Info Window

The time stamp of the last alarm and the alarm message are displayed in the info bar. The alarm can be edited by pressing one of the symbols:

 Opens a text input field as we see in Fig. 76:in combination with the alarm management window.

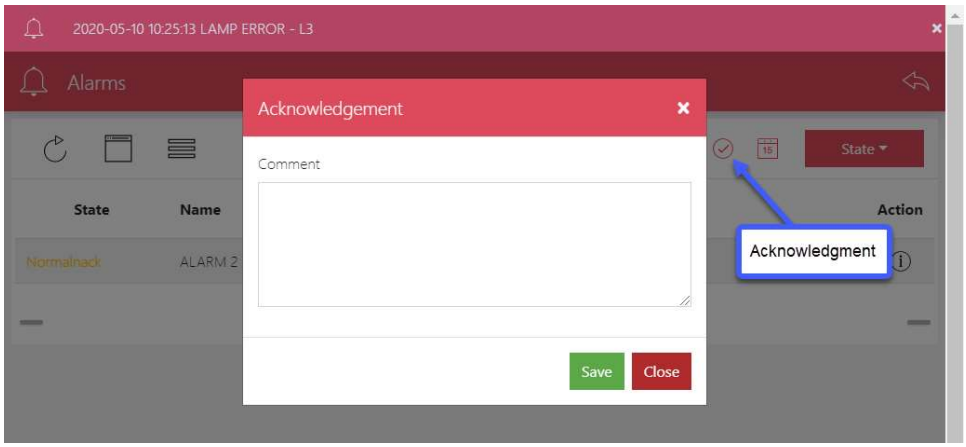


Fig. 76: Alarm confirmation

In the Confirmation / Deactivation text box you can enter a comment and save it with the confirmation.

Placing an alarm in maintenance mode serves to temporarily disable alarms, for example allowing modifications or maintenance work that would otherwise lead to permanent alarm messages. To avoid this, the authorized user can set the alarms in maintenance mode for a specific period of time. There are two alarm management modules available online that can be opened as an EVOLUTION function through a navigation element:

The alarm module serves as a user interface for editing alarms.

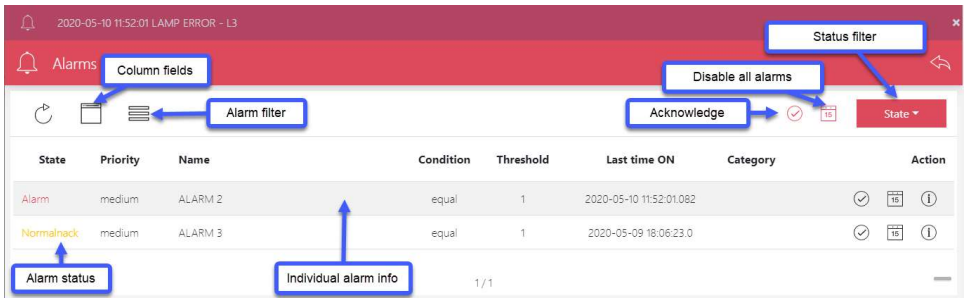


Fig. 77: Alarm Management Window

The table shows the alarm status, priority, name, name of the assigned process point, activation condition, activation date and category. For each entry in the list, the associated information can also be displayed in plain text with the Alarminfo button.

Fig. 78: Show alarm information

The *Verify* and *Maintenance* buttons open the dialogue boxes already commented to confirm or deactivate the selected alarm.

The alarm recording module shows a table with all the alarms stored in the database.

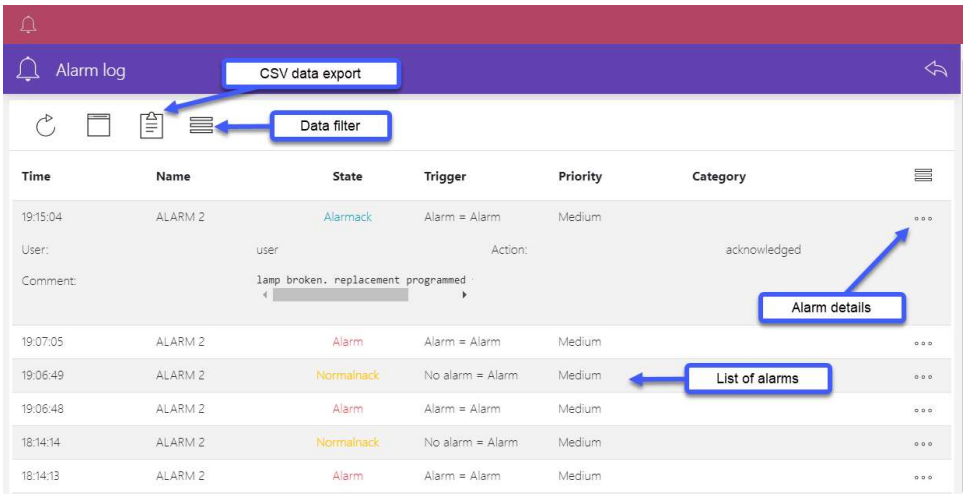


Fig. 79: Alarm log

9.3. HTML Online Scenes

The EVOLUTION Scene Module allows defining as many scenes as you wish. A scene consists of a list of actions, which is executed depending on a trigger event. An action includes one or more process points and optionally the execution of the wait (delay) function. Scenes can be opened from the main menu of the editor by clicking on *Modules/Scenes*.

Below is the scene setup window. Use the *Scenes* or *Events* buttons in the header to switch between the action edit and trigger view. In editing actions, already defined scenes are listed in a table in the middle area of the window. The input fields for creating a list of actions are displayed in the lower area. Next, the creation of an action list is shown. Finally, the associated trigger event is defined:

Allows you to create a new scene (action list). For this purpose, the input fields are displayed in the lower area of the configuration window.

Deletes the selected scene after the user confirms the deletion.

Opens or updates the lower edit area to modify the selected scene.

Opens or updates the lower edit area with a copy of the selected scene.

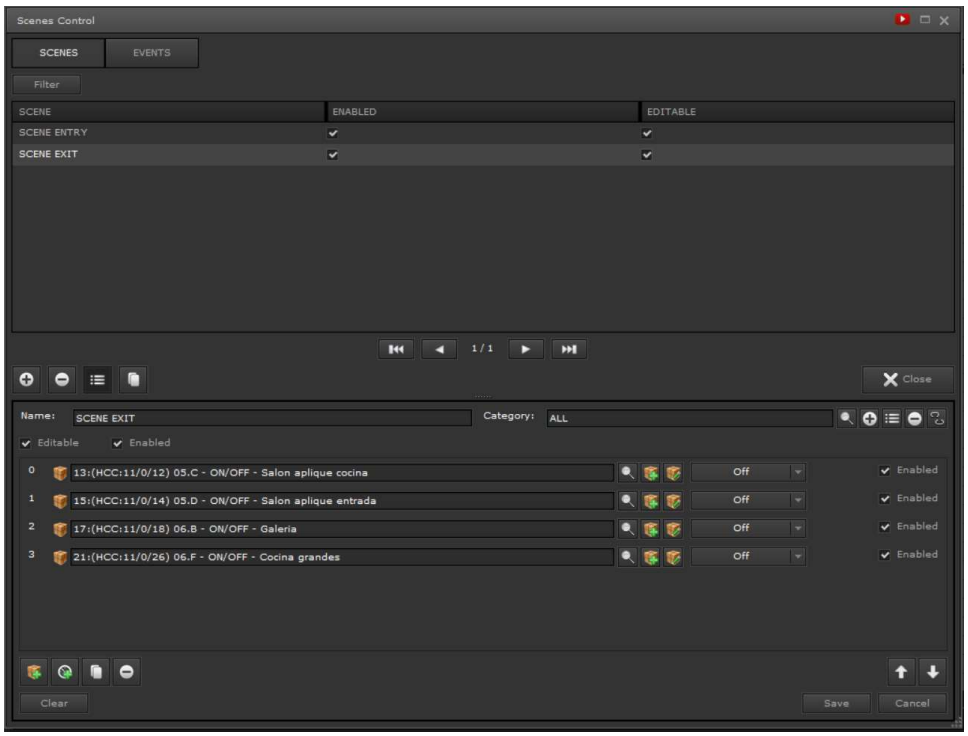


Fig. 80: Scene Settings - Action List

Property	Value	Description
Description		Freely selectable name for the scene
Editable	☐	The scene cannot be changed in the visualization.
	☑	The user can change the scene in the visualization.
Activated	☐	The scene does not run.
	☑	The scene is active and runs when the triggering event occurs.
Process point		Inserts a process point edit field in the action list.
		Adds a copy of the selected process point to the action list.
		Deletes the selected process point from the action list.
Function	Delay	Introduces a pause in the action list. The duration is calculated in ms.

The scene is saved using the *Save* button.

The order of the lines (and therefore the order of execution) in the action list can be changed by dragging and dropping.

To create the triggering event, use the *Events* button to switch to the associated edit view. The division of the editing window is similar to the action list editing. The filter function is located on the top bar to limit the tabular visualization of trigger events.

 Allows you to create a new trigger event. For this purpose, the input fields are displayed in the lower area of the configuration window.

 Deletes the selected trigger event after the user confirms the deletion.

 Opens or updates the lower edit area with a copy of the selected event.

Fig. 81: Event settings

Property	Value	Description
Process point 		Opens the list of process points.
		Opens the process point editor to create a new process point.
		Opens the process point editor to edit the assigned process point.
		Unlinks the scene trigger and the process point.
Execution condition	=	Checks if the value of the process point is equal to the *Value for execution*.
	<>	Checks if the value of the process point differs from the *Value for execution*.
	<	Checks if the value of the process point is less than the *Value for execution*.
	>	Checks if the value of the process point is greater than the *Value for execution*.
	Any value	The scene is executed with any process point event.
Value for execution		Comparative value for the Execution Condition
Execution Condition		Recording mode is not activated
	=	Checks if the value of the process point is equal to the *Recording value*.
	<>	Checks if the value of the process point differs from the *Recording value*.
	<	Checks if the value of the process point is less than the *Recording value*.
	>	Checks if the value of the process point is greater than the *Recording value*.
	Any value	The scene is executed with any process point event.
Recording value		Comparative value for the Recording Condition
Scene		Opens the list of available scenes to

		select the scene that we want to assign to the scene trigger.
		Deletes the link to the selected scene.

To be able to read KNX Bus values, the reading flags of the appropriate process points must be activated. If we want to use this function, both the data point to establish the value and the appropriate data point for the status value can be assigned to the process point (both data points in the same process point) In this case, do not forget the following: Make sure to activate the write flag at the data point to set value, and the read flag at the status data point. When scenes are started, the scene values are sent to the bus via the write data point. On the other hand, if we want to know the new scene values, these are read by the status data points.

9.3.1. **Online Scene Editing**

EVOLUTION offers the possibility, at any time in the future, to edit in the visualization all the scenes for which the "configurable» property has been enabled. The online scenes module is activated by a navigation element with the SCENES function. Fig. 82: Shows the online scene control window. A list of all the scenes appears in the main window. The list can be filtered using the text field in the header. If a scene is selected, it can be edited, provided the "configurable" property has been enabled.

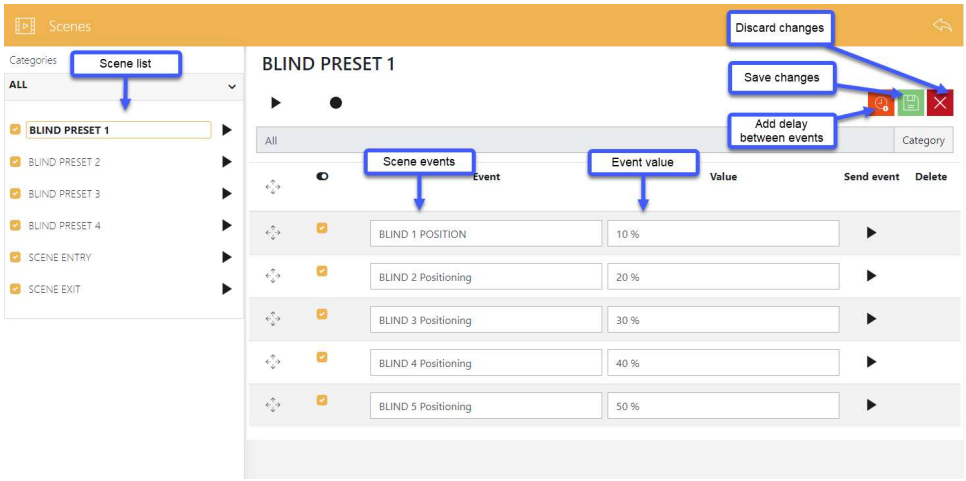


Fig. 82: Online Scene control

9.4. Logic Module

EVOLUTION provides the user with a very powerful and graphic logic module. In

addition to the standard AND, OR, INVERTER, etc. gates, you can also use comparators, mathematical operators, converters, and much more in complex logic circuit diagrams. The logic editor used to create the logic circuit diagrams is opened via the *Modules/Logic module* menu item. The editing interface for the logical editor is shown below:

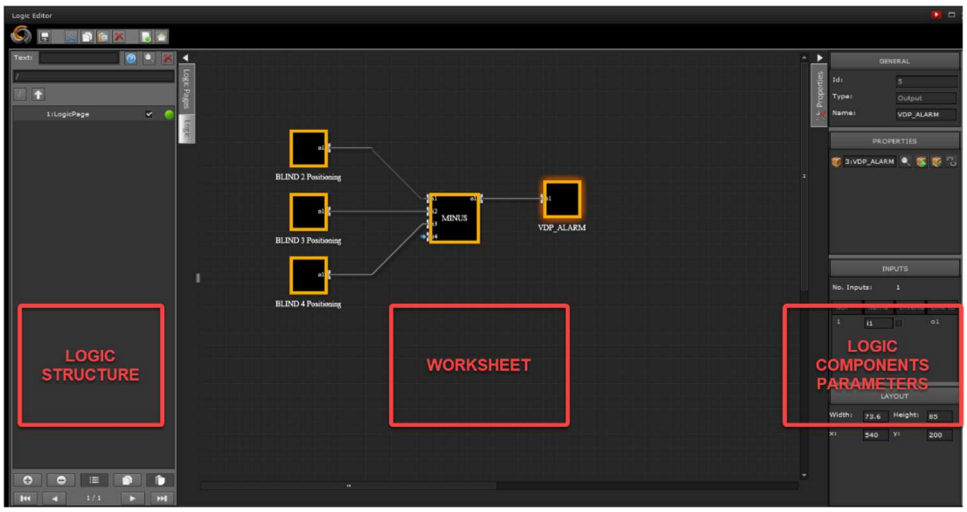


Fig. 83: Logical editor structure

Logic circuit diagrams are created on worksheets, the so-called logic pages. Logic pages can be created in folders for better structure of more complex function blocks. Folders are created or edited through the context menu (right mouse click) in the organization area of the logical pages. The context menu functions are:

New folder: Creates a new folder for logical pages at the currently selected level (folder).

New Logic page: creates a new Logic page in the currently selected folder.

Properties: defines the number of pages that are displayed in the page navigation window.

Cut: copies the selected page to the clipboard and removes it from the current position.

Copy: copies the selected page to the clipboard.

Paste: pastes the page into the clipboard in the currently open folder.

Delete: deletes the selected page.

Edit folders: this menu item appears when a folder is selected; it is used to change the folder name and folder icon.

The buttons in the header are used for the editing functions of the logical page:


saves the logical page in the editor.


cuts the selected item and pastes it on the clipboard.

copies the selected item to the clipboard

pastes the item into the clipboard on the Logic page currently displayed

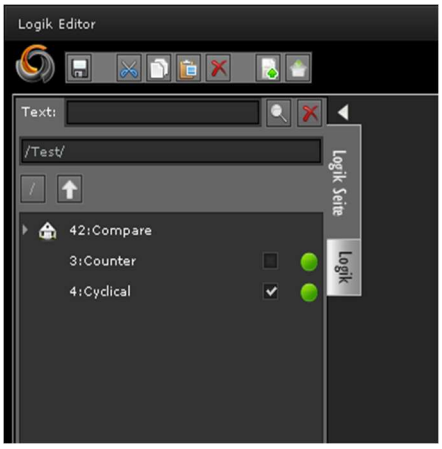
deletes the selected element

activates the Logic page currently displayed in EVOLUTION

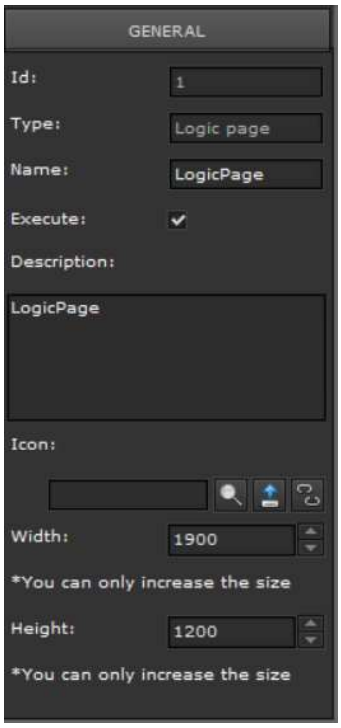
activates all logical pages in EVOLUTION

If the Logic pages are not activated, the functions configured on the page in EVOLUTION are not executed immediately, but only when the system is restarted. Save only saves the configuration in the logical editor.

A list of the pages with their current status appears in the Logic page navigation window (see image). The check box next to the page name shows the execution status. That is, the execution unit ignores pages that are not marked as executable. Next to the run check box is the activation status indicator. Green means that the page is activated; gray, however, is not activated.



If a new Logic page is created or an existing logical page is selected, the associated properties can be edited in the properties menu.



Name: Freely selectable page name

Execute: Logic runs when page is activated

Description: Descriptive text for the page

Image: Page icon to display in the Logic pages navigation window.

Width / Height: The standard size of a logical page is 1900x1200 pixels. The size can be increased for complex logical plans, but it cannot be reduced.

The creation of a logic circuit diagram is essentially based on drag and drop actions. The appropriate item (from the list of available logical items) is placed on the worksheet using drag and drop. The function inputs are on the left side of the element and the function outputs on the right side. The following figure shows an example of the structure

of a simple logic circuit. A logic circuit basically consists of inputs, outputs, and functional elements. The inputs and outputs are the interface with the process points.

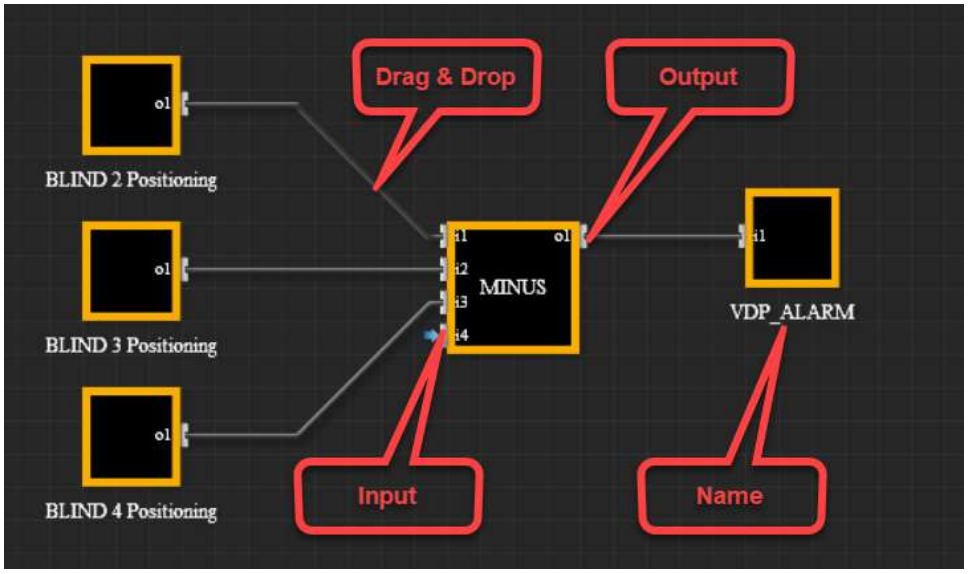


Fig. 84: Structure of logical elements.

To create a connection between elements, select the connection point of one element with the mouse and drag the connection line with the left mouse button pressed to the connection point of the other element. Connections can only be established between element inputs and outputs. To graphically illustrate this "wiring", the connection line turns green as soon as the logical editor has "recognized" a connection. The mouse button can then be released and the logical editor makes the connection independently. If a connected item is moved, the logical editor automatically tracks the connections.

Existing connections can be undone again by clicking on one of the connection endpoints

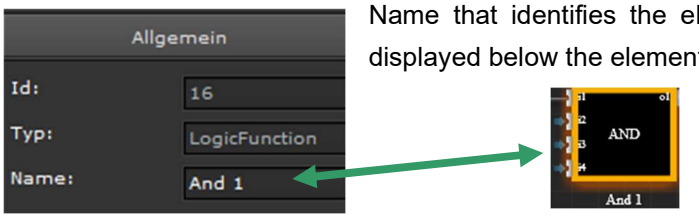
All available logical elements are listed on the *Logic* tab (in the navigation field to the left of the logical editor). The functionality of the elements is divided into *Inputs*, *Logic gates*, *Advanced and Outputs*. EVOLUTION logic circuit diagrams can contain binary and mathematical functions with corresponding value ranges. If numbers are used in a binary signal path, the following rule applies:

If necessary, the numbers are automatically converted to binary values (0 | 1). The following operation is used: [Bin] = ([Num] != 0). That is, the binary value is 1 if the numerical value is not 0. Therefore, the binary value is 0, even if the numerical value is 0.

The properties of a logical element are displayed in the properties menu on the

right and can be edited there if the element is selected in the worksheet. All logical elements have the following properties:

General



Name that identifies the element. This name is displayed below the element.

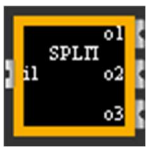
Element-specific properties are described with the element function

9.4.1. "Inputs" group elements

9.4.1.1. Inputs

			The input component is an interface to the process point system and is used to forward process point events to the connected logical element.
Properties		**Value**	**Description**
			Selection of the process point.
Standard value			Initialization value in case the process point value is unknown.
Outputs			
O1	*Invert*	☐	The process point value is forwarded unchanged.
		☑	Forwards the value of the inverted process point. In the diagram, the inverting connections are indicated by a red dot. 

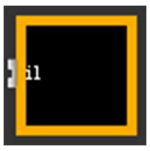
9.4.1.2. Connection element - Split

	The splitter is used to divide one input signal into up to three output signals. Since the circuit diagram editor only connects element connections once, this is the only way to connect an element's output to multiple inputs.

Inputs		Value	Description
I1	*Invert*	☐	The input is not inverted
		☑	The input is inverted
Outputs			
O1,O2,O3	*Invert*	☐	The input value is forwarded unchanged.
		☑	The input value is forwarded inverted.

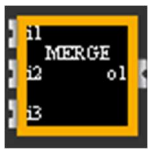
9.4.2. "Outputs" group elements

9.4.2.1. Outputs

	The output component, meanwhile, is an interface to the process point system and serves to forward events from the logical switch to a process point.

Properties		Value	Description
			Selection of the process point.
Inputs			
I1	*Invert*	☐	The input value is forwarded unchanged.
		☑	The input value is forwarded inverted to the process point.

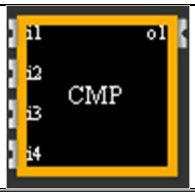
9.4.2.2. Connection element - Merge

	With the Merge element, up to three input signals can be switched to one output (OR link). As with all element connections, the connections of this

		element can also be inverted.	
Inputs		**Value**	**Description**
I1,I2,I3	*Invert*	☐	The input is not inverted
		☑	The input is inverted
Outputs			
O1	*Invert*	☐	The input value is forwarded unchanged.
		☑	The input value is forwarded inverted.

9.4.3. "Logic gates" group elements

9.4.3.1. Comparison function - CMP

	This item compares the connected inputs according to the established condition. Entries that are not connected are ignored. If the condition is met, the output is enabled as true (1).

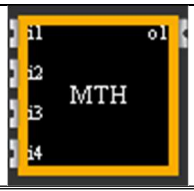
Properties	**Value**	**Description**
Function	CUSTOM	A user-specific comparison function can be specified in the function input field. Predefined syntax and functions are described in Section 7.4.5.
	EQUAL	Checks if it is the same according to the following instruction: (([i1]==[i2])&&([i2]==[i3])&&([i3]==[i4])) That is, the output becomes true (1) if all the inputs have the same value.
	MINOR	Checks if it is "less than" according to the following instruction: (([i1]<[i2])&&([i2]<[i3])&&([i3]<[i4])) That is, the output becomes true (1) if i1 <i2 <i3 <i4.
	MAJOR	Checks if it is "greater than" according to the following instruction: (([i1]>[i2])&&([i2]>[i3])&&([i3]>[i4])) That is, the output becomes true (1) if i1 > i2 > i3 > i4.
	DISTINCT	Checks if it is "different" according to the following instruction: (([i1]!=[i2])&&([i2]!=[i3])&&([i3]!=[i4]))

		That is, the output becomes true (1) if all the inputs have different values.
	<=	Checks if it is "less than or equal" according to the following instruction: (([i1]<=[i2])&&([i2]<=[i3])&&([i3]<=[i4])) That is, the output becomes true (1) if i1 <= i2 <= i3 <= i4.
	>=	Checks if it is "greater than or equal" according to the following instruction: (([i1]>=[i2])&&([i2]>=[i3])&&([i3]>=[i4])) That is, the output becomes true (1) if i1 >= i2 >= i3 >= i4.
Send always	☐	The output value is only sent if there is a change in the value.
	☑	The output value is forwarded with each recalculation of the function.

Inputs		**Value**	**Description**
I1,I2,I3,I4	*Invert*	☐	The input is not inverted
		☑	The input is inverted
	Invert	☐	An event or a change in value in this input does not automatically result in recalculation of the function.
		☑	An event in this input leads to the function being recalculated.
Outputs			
O1	*Invert*	☐	The input value is forwarded unchanged.
		☑	The input value is forwarded inverted.

Make sure the Shipping flag is set for at least one entry; otherwise, the comparison function will not run.

9.4.3.2. Mathematical function - MTH

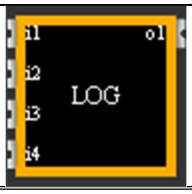


The MTH element calculates a mathematical function depending on the input values. Entries are operator linked and calculated. The result is sent on the output. Only those inputs that have a connection are considered.

Properties	**Value**	**Description**
Function	CUSTOM	A user-specific calculation function can be specified in the function input field. La

			sintaxis y las funciones predefinidas se describen en la Sección 7.4.5.
		PLUS	Runs the following calculation rule: ([i1] + [i2] + [i3] + [i4]) That is, the value of the output is the sum of all the input values.
		MINUS	Runs the following calculation rule: ([i1] - [i2] - [i3] - [i4])
		MULTIPLIED	Runs the following calculation rule: ([i1] * [i2] * [i3] * [i4]) That is, the output value is the product of all the input values.
		DIVIDED	Runs the following calculation rule: ([i1] / [i2] / [i3] / [i4])
		MODULE	Runs the following calculation rule: ([i1] % [i2] % [i3] % [i4]). It makes sense to connect only this function with 2 inputs. In this case, the calculation provides the integer remainder of the division ([i1] / [i2]).
		EXPONENT	Runs the following calculation rule: ([i1] ^ [i2] ^ [i3] ^ [i4]). It makes sense to connect only this function with 2 inputs. So the calculation gives us the power [i1][i2].
Send always		☐	The output value is only sent if there is a change in the value.
		☑	The output value is forwarded with each recalculation of the function.
Inputs		**Value**	**Description**
I1,I2,I3,I4	*Invert*	☐	The input is not inverted
		☑	The input is inverted
	Sending	☐	An event or a change in value in this input does not automatically result in recalculation of the function.
		☑	An event in this input leads to the function being recalculated.
Outputs			
O1	*Invert*	☐	The input value is forwarded unchanged.
		☑	The input value is forwarded inverted.

9.4.3.3. Logic function - LOG

			This element performs logical functions. The predefined functions are AND and OR. However, user-specific functions can also be defined. The output adopts binary states false (0) or true (1).
Properties		**Value**	**Description**
Function		CUSTOM	A user-specific function can be specified in the function input field. Predefined syntax and functions are described in Section 7.4.5.
		AND	The AND link is executed: ([i1] && [i2] && [i3] && [i4]) That is, the output becomes true (1) if all the connected inputs have the value 1.
		OR	The OR link is executed: ([i1] || [i2] || [i3] || [i4]) That is, the output becomes true (1) if one of the connected inputs have the value 1.
Send always		☐	The output value is only sent if there is a change in the value.
		☑	The output value is forwarded with each recalculation of the function.
Inputs		**Value**	**Description**
I1,I2,I3,I4	*Invert*	☐	The input is not inverted
		☑	The input is inverted
	Value send	☐	An event or a change in value in this input does not automatically result in recalculation of the function.
		☑	An event in this input leads to the function being recalculated.
Outputs			
O1	*Invert*	☐	The input value is forwarded unchanged.
		☑	The input value is forwarded inverted.

9.4.4. “Extended Gates” group elements

9.4.4.1. Signal delay - DELAY

			The DELAY element is used to delay signal forwarding. The delay time can be reset using the *set* input. *The delay is reset via the reset input.*
Properties		**Value**	**Description**
Delay		1000	Delay time in ms. If necessary, this value can be overwritten through the *set* input.
Accumulated		☐	If a new input event occurs within the delay time, the delay for this event is reset and the event in wait state is discarded.
		☑	Each input event is forwarded to the output with the set delay.
Inputs		**Value**	**Description**
in			The events on this input are sent to the output with the set delay.
set			The initial delay can be overwritten through this input.
reset			When the reset input is enabled, all pending events for the output are cleared. That is, the delay restarts with the next event on the *in* input.
Outputs			
out	*Invert*	☐	The output value is forwarded unchanged.
		☑	The output value is forwarded inverted.

9.4.4.2. Signal forwarding - GATE

	The GATE element is used to forward to the output or block events on the in input depending on the status of the enable input.

Properties	Value	Description
Value send	☐	If the *in* input is enabled again through *enable*, the *out* output does not automatically take the current status of the *in* input. The next thing that is sent to the *out* output is the next event.
	☑	As soon as the *in* input is enabled again via *enable*, the current status of *in* input is also sent to the *out* output.
Inputs	**Value**	**Description**
in		Input whose events are forwarded to the *out* output.
enable	0	Value 0 at the *enable* input implies that the events at the *in* input are blocked.
	!= 0	Values not equal to 0 at the *enable* input unlock the *in* input again, and the *out* output takes the same status as the *in* input.
Outputs		
out *Inverted*	☐	The output value is forwarded unchanged.
	☑	The output value is forwarded inverted.

9.4.4.3. Staircase function - STAIR

	The STAIR element sends a "1" for an adjustable period of time and a "0" after the period has elapsed. The duration of status "1" can be changed via the *set* input.

Properties	Value	Description
Interval	1000	Duration of status "1" in ms. If necessary, this value can be overwritten through the *set* input.
Reset with 1:	☐	The duration of status "1" at the output CAN be extended by sending a status "1" again.
	☑	The duration of status "1" at the output CAN NOT be extended

		by sending a status "1" again.
Turn off with 0:	☐	Sending a "0" to the *in* input does not propagate to *out* output.
	☑	A status change from "1" to "0" immediately changes the output to "0".
Inputs	**Value**	**Description**
in		An event "1" sets the output to "1" during the defined time period. After the time period has expired, the entry returns to "0".
set		The initial delay can be overwritten through this input.
Outputs		
out *Inverted*	☐	The output value is forwarded unchanged.
	☑	The output value is forwarded inverted.

9.4.4.4. Counter

		COUNTER is an ascending and descending counter that counts the events in the corresponding (+) and (-) inputs. A counter value can be specified through the *set* input.
Properties	**Value**	**Description**
Save value:	☐	The current value is not saved. In other words, the counter is initialized with the initial value after restarting the system.
	☑	The current value is saved in the database. In other words, the counter is initialized with the saved value after restarting the system.
Step	1	Specifies the size of the step when counting.
MAX value		Maximum possible value. After reaching the maximum counter reading, it starts again with the MIN value if the reset parameter is activated.

MIN value	0	Minimum possible value. After reaching the minimum counter reading, it starts again with the MAX value if the reset parameter is activated.
Initial value	0	Initial value in case there is no counter value yet. The initial value is also set when restarting through the *reset* input.
Current value		Shows the currently saved value. The value cannot be changed through the editor.
Reset	☐	After reaching the maximum or minimum meter reading, the meter reading does not reset.
	☑	When the maximum or minimum counter reading is reached, the counter reading is set to the MAX or MIN value with the next count pulse.
Inputs	**Value**	**Description**
+		Each event in this input leads to a step increment on the counter.
-		Each event in this input leads to a step decrement on the counter.
set		Allows the meter reading to be adjusted to the desired level. If the value is outside the valid range [MIN, MAX], the counter value is limited to valid MIN or MAX values.
reset		An event "1" on this input resets the counter to the initial value.
Outputs		
out *Inverted*	☐	The output value is forwarded unchanged.
	☑	The output value is forwarded inverted.

9.4.4.5. Cyclical sending - CYCLICAL

			The CYCLICAL component sends the input value with a configurable number of repetitions (input cycles) and an adjustable time interval (input time) at the output. The repeat sequence is started (1) or . gestoppt (0) through the ON / OFF input.
Properties		**Value**	**Description**
Interval		1000	Time interval between exit events in milliseconds.
Start the cycle again		☐	An event at the input is immediately sent to the output, and then the cycle continues.
		☑	An event at the input starts the entire cycle from scratch with the input value.
Cycles		0	Number of repetition cycles. The value 0 means an unlimited number of repetitions.
Inputs		**Value**	**Description**
in			Input value.
Time			The value set through this input overwrites the interval of the configuration parameter.
Cycles			The value set through this input overwrites the cycles of the configuration parameter.
ON/OFF		0	Stops the sending cycle. Changes to the value at the input are sent immediately to the output (no repetition).
		1	Starts the sending cycle
Outputs			
Out	*Inverted*	☐	The output value is forwarded unchanged.
		☑	The output value is forwarded inverted.

9.4.5. **Advanced operations - CUSTOM**

The elements of the LOG, CMP and MTH logical gates group can perform user-specific functions if the option CUSTOM is selected. In the appropriate table you can use the standard functions listed in the table below. Logic element inputs i1, i2, i3, and i4 are special variables that must be enclosed in square brackets in function statements (for example, [i1]). The instructions must be separated by a semicolon. Calculation variables do not have to be explicitly declared. However, they must be assigned a value before use. See an example with the following simple instruction sequences:

Correct:	**Incorrect (b is unknown):**
a=50*[i1]; if(a>=100, 1, 2);	a=b*[i2]; if(a>=100, 1, 2);

The result of the function, that is, the value assigned to the output o1 of the element results from the last instruction

a=2*[i1]; b=[i2] / 2; a+b;

In this example, the value of the a + b instruction is assigned to the output. For the function notation the well-known laws of mathematical algebra are applicable, as well as the commutative, associative and distributive laws, etc.

9.4.5.1. Operators

	Operator	Number	String	Example:
Sign	+x, -x	*		(-[i1])
Exponent	^	*		([i1]^[i2])
Point product, cross product	.,	*		([i1].[i2])
Module	%	*		([i1]%[i2])
Division	/	*		([i1]/[i2])
Multiplication	*	*		([i1]*[i2])
Addition, subtraction	+, -	*	* (+)	([i1]+[i2])
Less than or equal to, greater than or equal to	<=, >=	*	*	([i1]<=[i2])
Not equal, equal	!=, ==	*	*	([i1]>=[i2])
NOT boolean	!	*		(![i1)
AND boolean	&&	*		([i1]&&[i2])
OR boolean	||	*		([i1]||[i2])
Assignment	=	*	*	a=[i1]*5

9.4.5.2. Bit operators

	Operator	Example:
Bit and	&	([i1] & [i2])
Bit or	|	([i1] | [i2])
Bit xor	^*	([i1] ^* [i2])
Bit complement	~	(~[i1])
Shift left	<<	([i1] << 4)
Shift right, with sign	>>	([i1] >> 4)
Shift right, without sign	>>>	([i1] >>> 16)

9.4.5.3. Trigonometric functions

Description	Function name
Sine	sin(x)
Cosine	cos(x)
Tangent	tan(x)
Sine arc	asin(x)
Cosine arc	acos(x)
Tangent arc	atan(x)
Tangent arc with 2 parameters	atan2(y, x)
Secans	sec(x)
Cosecans	cosec(x)
Co-tangent	cot(x)
Hyperbolic sinus	sinh(x)
Hyperbolic cosine	cosh(x)
Hyperbolic tangent	tanh(x)
Hyperbolic sinus area	asinh(x)
Hyperbolic cosinus area	acosh(x)
Hyperbolic tangent area	atanh(x)

9.4.5.4. Logarithmic and exponential functions

Description	Function name
Natural logarithm	ln(x)
Base 10 logarithm	log(x)
Base 2 logarithm	lg(x)
Exponential function (e^x)	exp(x)
Power function	pow(x)

9.4.5.5. Statistical functions

Description	Function name
Average value	avg(x1, x2, x3,…)
Minimum	min(x1, x2, x3,…)
Maximum	max(x1, x2, x3,…)

Vector sum	vsum(x1, x2, x3,…)

9.4.5.6. Rounding functions

Description	Function name
Round	round(x)
Round to integer	rint(x)
Round down	floor(x)
Round up	ceil(x)

9.4.5.7. Various functions

Description	Function name
Condition. If the condition (first parameter) is true, the value of the second parameter is returned; otherwise, the value of the third parameter.	if(cond, trueval, falseval)
Converts a number to a string.	str(x)
Quantity function (absolute value)	abs(x)
Random number [0..1]	rand()
Module Function	mod(x,y) = x % y
Root function	sqrt(x)
Sum	sum(x,y,…)
Binomial coefficients	binom(n, i)
Sign (-1,0,1)	signum(x)

9.4.5.8. String functions

Description	Function name
len length left string	left(str, len)
len length right string	right(str, len)
Length string len starting with the character in the starting position	mid(str, start, len)
String that begins with the character in the start position and ends with the end position (optional), or to the end of the string	substr(str, start [, end])
Lowercase. Converts all characters in the string to lowercase.	lower(str)
Capital letters. Converts all characters in the string to uppercase.	upper(str)
String length	len(str)
Removes nonprinting characters at the beginning and end of the string.	trim(str)

9.4.5.9. Other functions

Description	Function name
Converts a number to a string based on the given base.	ToBase(*base,* x)
Base 10 string same as ToBase (10, x)	ToDec(x)
Base 16 string same as ToBase (16, x)	ToHex(x)
Converts a string from the given base to a number.	FromBase(x, *base*)
Converts a decimal string to a number, for example: fromDec ("123.45")	fromDec(x)
Converts a hexadecimal string to a number, for example: fromHex("0xff")	fromHex(x)
Checks if the argument is null.	isNull(x)
Selection condition. The first argument is the condition to verify, followed by pairs of arguments with comparison condition and return value. Example: The first argument is evaluated and then compared to the second, fourth, sixth argument, etc. The return value of the first matching comparison is returned. The result of the case ("c", "a", 5, "b", 6, "c", 7,8) is 7.	Case(c,v1,r1[,v2,r2…][,default])
Logarithmic function with the second argument as the basis.	LogTwoArg(x, base)
Selection condition. Returns the value of the nth argument. Example: switch(2, 5, 6, 7, 8) returns the value 6.	switch(n,a,b,c….)
Selection condition with standard return value as last argument. If the first argument is greater than the number of arguments -2, the last argument is returned. Example: switchDefault (1,5,6,7,8) returns 5 and switchDefault (9,5,6,7,8) returns 8	switchDefault(n,a,b…,default)
Checks if the specified floating point number corresponds to Not-a-Number.	IsNaN(x)
Checks if the specified floating point number corresponds to infinity.	IsInfinite(x)
Check if a character string represents a number.	IsNumber(x)

9.5. Project information tool

EVOLUTION offers the integrator a very powerful tool for project calculation. The Project Reporter Tool supports the integrator in calculating the complexity of project planning. It is opened through the menu item *Modules / Project Information*. The following image shows the interface of the PRTs.

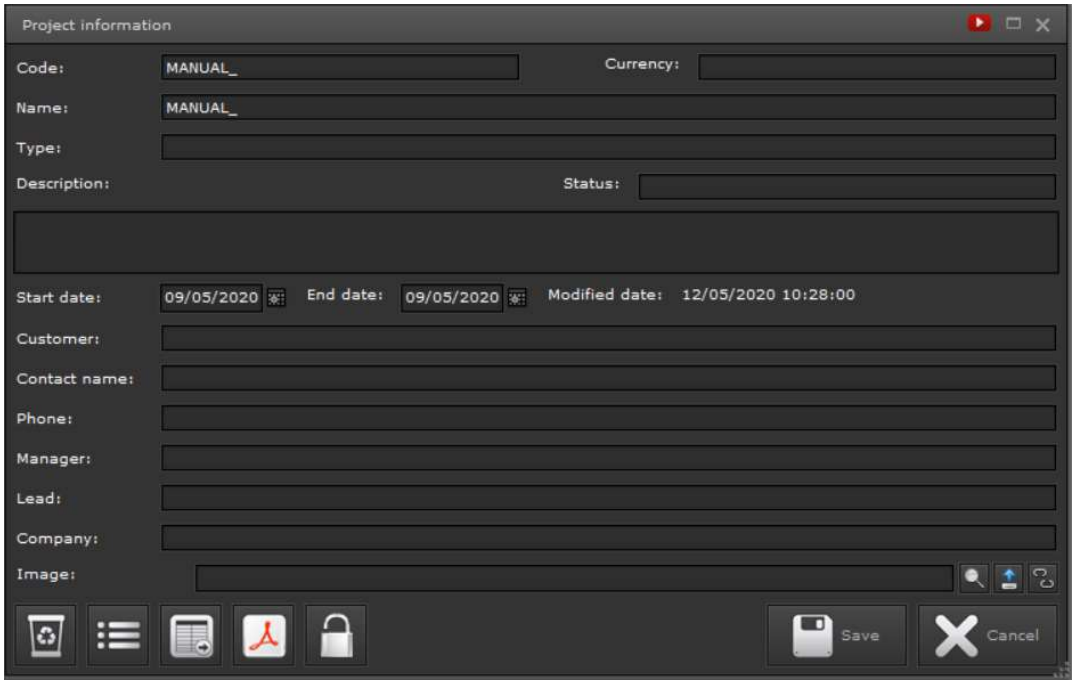


Fig. 85: PRT Interface

The integrator can enter the project data in the overview.

Clicking on  opens the PRT price list. The integrator saves his/her custom prices for individual properties and services. The following image shows examples of a price list. An individual price can be specified for each project configuration service. By clicking on *Export*, this price list can be exported and with *Import* it can be imported, for example, on another EVOLUTION server. After entering all prices, changes are accepted with *Save*.

Clicking  in the main view opens the calculation as a PDF preview. The PDF document can be printed through this preview. The  button exports the

calculation to a CSV file.

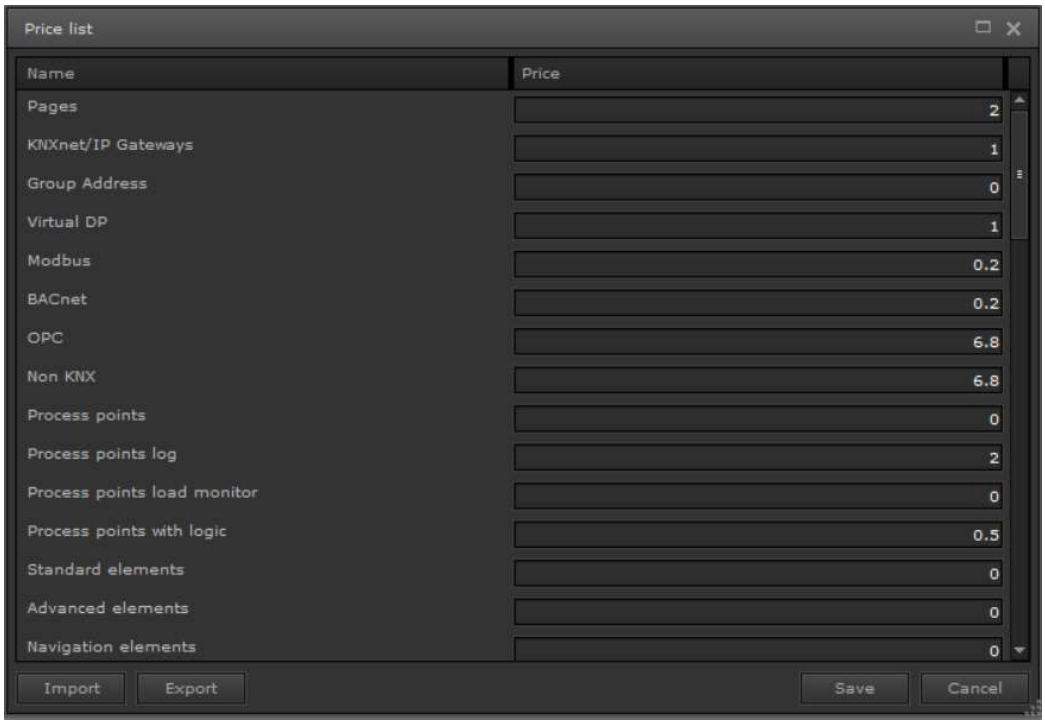


Fig. 86: Extract from a price list

The  button allows adding a password to protect the project. This means that project changes and export are only possible if the password is specified.

9.6. Non EIS Types

The module of type Non_EIS opens through the menu item *Modules / Non EIS Types*. The Non-EIS Type module can be used to define data types that do not correspond to a standard data type. These are typically composite standard data types. With the help of this module, parts of the data sent by the data point are extracted and copied to standard data types. A common application is, for example, weather stations that send their weather data along with a date and time stamp. The extracted data is available for further editing through virtual data points and corresponding process points. The extracted data is represented by extraction rules and the input of the appropriate standard data type. The following screenshot shows the Non-EIS Type selection window. Non-EIS types already defined are listed in this window.

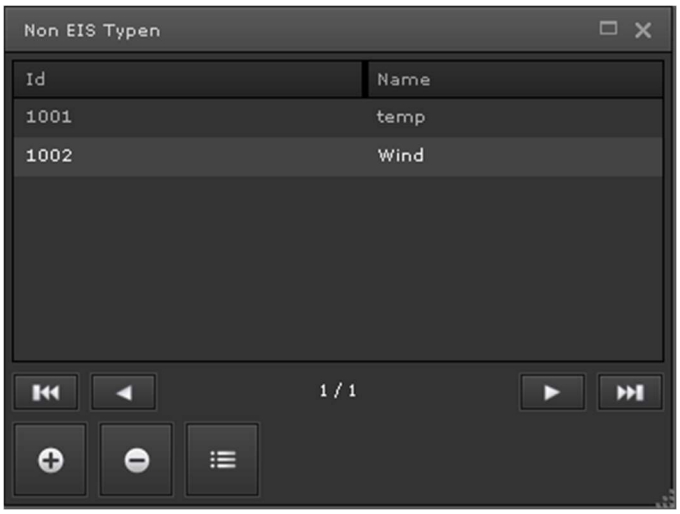


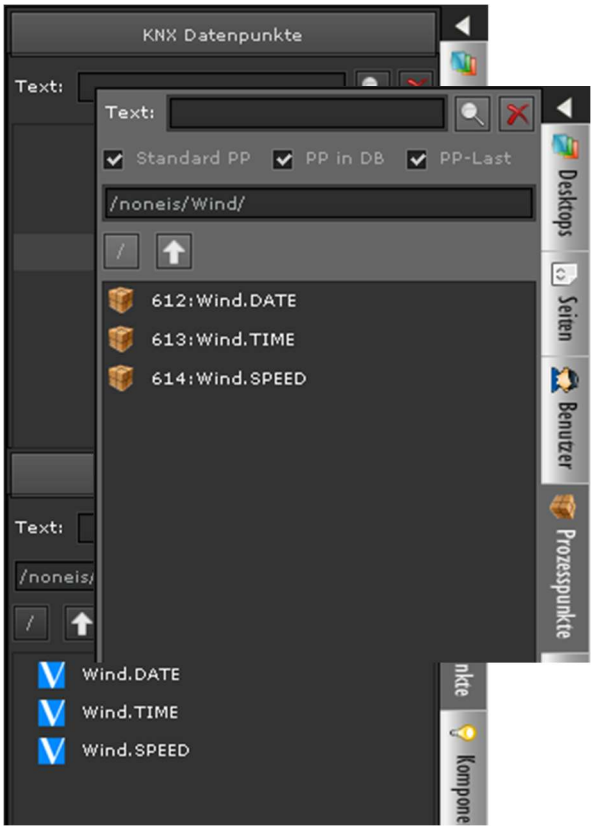
Fig. 87: Non EIS Type Selection Window

The buttons on the bottom line can be used to define new non-EIS Types, delete existing ones, or edit them. Pressing the + key or the Edit key opens the editing window as shown in Fig. 88:the following image. This is where the data to extract is defined. The definition includes **the name, the Bit-Offset** at which the data begins, the **data types** and a series of repetitions if several data of the same type are contained sequentially in a raw data (No EIS).

This allows the corresponding data points to be assigned to the No EIS type.

Fig. 88: Definition of Non EIS type

As soon as a Non-EIS Type is assigned to a data point, the process points and corresponding virtual data points are automatically generated for the data you want to extract. Process points and data points are listed in subfolders of the respective noneis folder (as shown in the following figures).



9.7. Ping control

The ping control module allows the accessibility of devices on the network to be verified. The ping protocol is used for this purpose. The module is opened via the *Modules / Ping Control* menu item. The configuration window lists the device IP addresses that have already been configured. Using the command buttons in the lower area of the window, you can add, remove or edit IP addresses. The verification interval is specified centrally for all devices in the *Update* box.

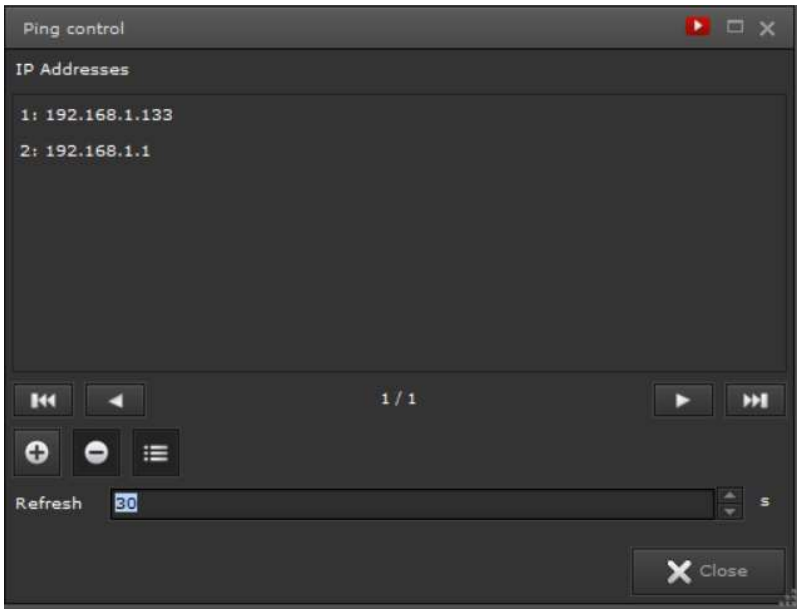
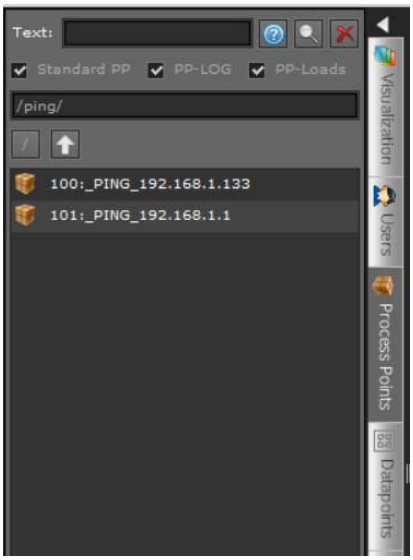


Fig. 89: Ping control settings



A process point is automatically created for each device you want to check, so that the status of the device can be easily linked in the visualization or with the alarm management.

The process points are listed in the process selection list in the ping folder. The name of the process point is automatically created according to the _PING_ <ip> schema. The data type is DPT1, that is, a 0 is sent if the device is not available and a 1 if it is available.

10. Tools

Additional applications can be opened in the main menu of the *Tools* Editor, which are used for diagnostic and management purposes.

10.1. Diagnosis

The diagnostic tool provides support for troubleshooting if the system does not perform as expected. In the central area of this diagnostic window we can see the currently used licenses, the clients connected to the client manager, the display clients connected to the EVOLUTION service and the connection status of the KNX interfaces in a tree view. The connection status of the Configuration Manager, a service to manage KNX interfaces, is recorded in the last line of this view.

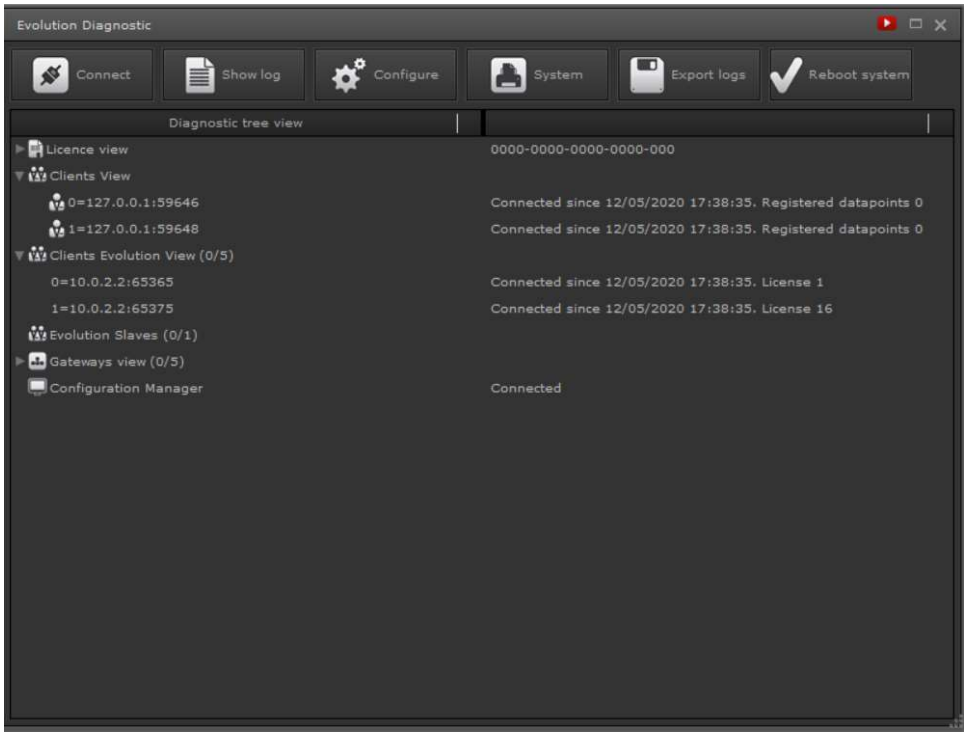
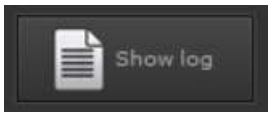


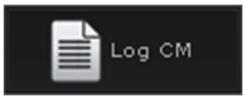
Fig. 90: Diagnostic Tool

The function of the buttons, one by one:

shows the current status of the connection to the Client-Manager. Clicking this button changes the connection status (online -> offline or offline -> online).



Toggle button to show or hide the recording view in the lower area of the window. The level of detail of the recording data depends on the degree of recording. This cannot be freely selected, as it can only be modified by authorized personnel to validate the functionality of the device. The *Filter* button allows the display to be limited to certain data or process points. The *Copy* button copies the recording data from the output window to the clipboard so that it can be easily analysed with an external text editing program.



shows the recording data of the Client-Manager. The Client-Manager communicates exclusively through data points. That is, the process points are not shown in this view.

shows the recording data of the EVOLUTION services.

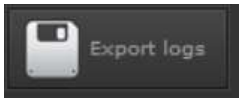

Starts recording in the output window.


Stops the current recording in the output window.


Deletes the visualization of the output window.


offers the possibility to save the recording data to a file.

Shows the general state of the system, such as the use of the processor and memory.



allows export of recording data.

10.2. Database manager

The database manager is used for tabular viewing of recorded events and alarms. Additionally, the data can be exported for archiving or for processing with external applications (e.g. Excel) in CSV format (comma separated values). When starting the database administrator through the menu item *Tools / Database manager*, the application window opens, as shown in the following figure.

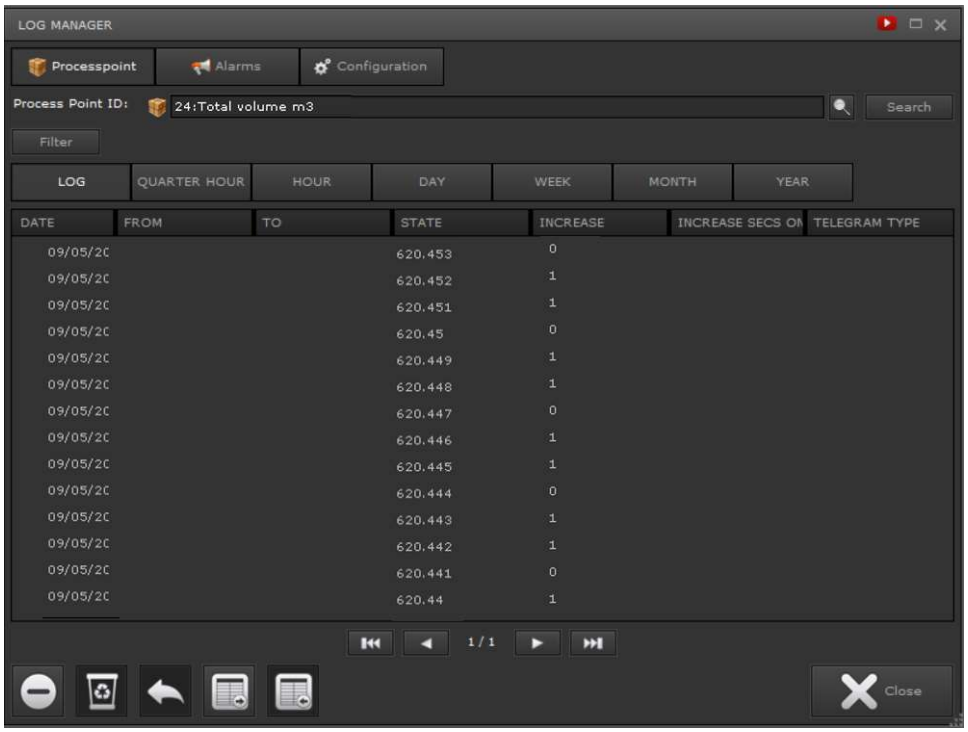


Fig. 91: View of process points in the Database Manager

The view of the corresponding data is toggled using the Process Point or Alarms buttons. The process points are only recorded if the appropriate flag (Save PP values) has been activated during parametrization. The process point to be displayed can be selected by entering the ID of the associated process point or using the selection function  . A subsequent click on *Search* populates the table with the recorded data. The *Filter* function allows you to filter by time with the start date and the end date. Also, the TIME / DAY / WEEK / MONTH / YEAR buttons can be used to display an interpolated representation of the data.
The following functions can be carried out using the icons in the lower area:


Deletes a selection of records. Selection is made with <Shift> or <Ctrl> + mouse click on the line.


Deletes all listed records.


Allows you to change the process point ID.


Exports the records listed in CSV format.


Allows reimportation of already exported CSV data sets.


Compresses the database. This is a database specific administration

function (it is recommended to perform it after deleting records).

The database manager alarm view lists the status of the selected alarm process points. Selection criteria are displayed with the *Filter* button. The selection criteria take effect when you click the *Search* button.

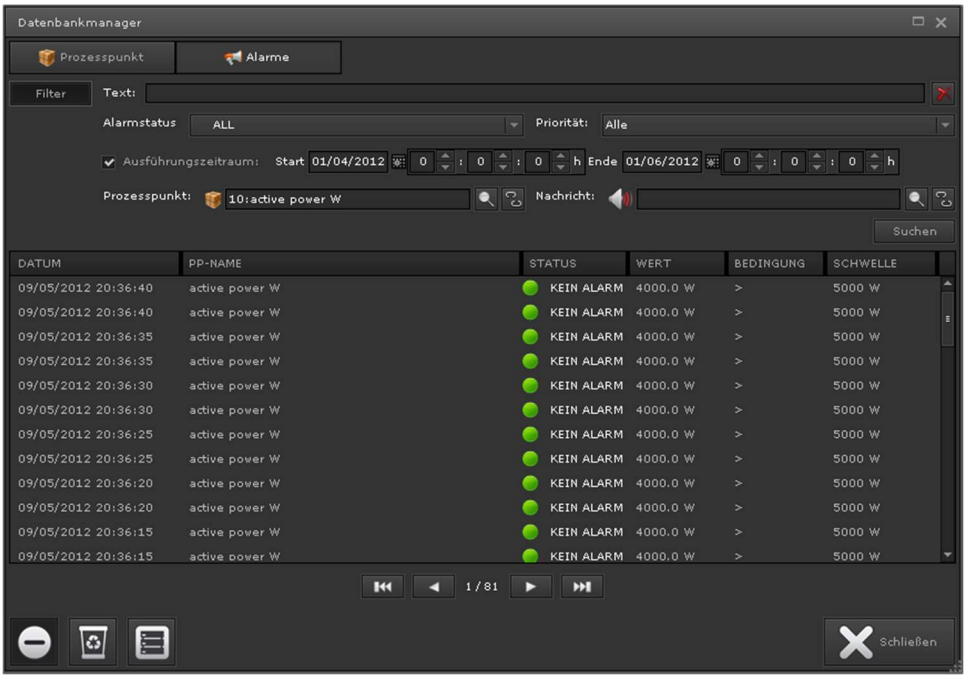


Fig. 92: Database administrator alarm view.

10.3. Clear cache:

The "Clear Cache" management function is activated via the *Tools / Clear Cache* menu item. Clears the internal cache that is used for the visualization elements. If process points are deleted when importing new configuration files (eg KNX-ESF, BACnet, Modbus), this function prevents old assignments from remaining in the visualization.

10.4. CSV export manager:

The CSV Export Manager allows automatic export of recording data at definable intervals. The configuration is done through the menu item *Tools / CSV Export Manager*. We can see an example of the configuration interface in the following image:

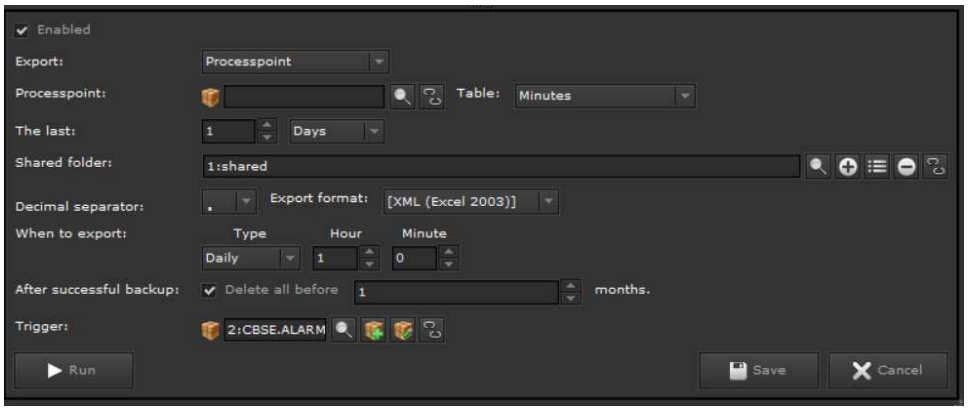


Fig. 93: CSV export manager

The function is activated through the box *Enable.* The export is done to an external data directory and / or to a Microsoft SQL database. To export to an external data directory (network drive or PC with permission), this must be created with the button, if none has yet been configured. The information required for this task is entered in the "Backup External Data" dialogue box. Exiting to an external database requires the login data for the database connection. The input fields for the database connection are displayed if the *Remote connection* selection field is configured as „Microsoft SQL Server“. Connection data (*server IP, port, and database name*) can be specified using the corresponding input fields or as a sequence of connection characters.

For exporting the database to a Microsoft SQL database, the table structure is required to have been created by the database administrator The SQL statements required for this can be displayed using the , and therefore can be easily copied and pasted. Two tables are required. One for storing process point events and one for the alarms. To be more exact, the SQL statements are listed below (the structure of the CSV file export also corresponds to this table structure).

SQL queries for logpp table	**Explanation of data fields**

CREATE TABLE [schema.]logpp (	
id integer NOT NULL PRIMARY KEY,	Primary key of the table entry
datetime datetime,	Date and time of the event
date date,	Date component (day / month / year)
time time(3),	Time component (hour / minute / second)
pp_id integer,	PP reference code
pp_name text NOT NULL,	Process point name
value text NOT NULL,	Event value
knxhex text NOT NULL,	Hexadecimal representation of the event value
source text NOT NULL,	Component physical address
datapoint character varying(100) NOT NULL,	Data point name
telegramtype character varying(10) NOT NULL	„r“ (read), „w“ (write)
);	

SQL queries for alarm log **Explanation of data fields**

CREATE TABLE [schema.]logalarms (	
id integer NOT NULL PRIMARY KEY,	Primary key of the table entry
datetime datetime,	Date and time of the event
date date,	Date component (day / month / year)
time time(3),	Time component (hour / minute / second)
pp_id integer,	PP reference code
pp_name text,	Process point name
condition character varying(10),	Alarm comparison condition
threshold character varying(14),	Comparison value of the alarm definition
msgvisu character varying(200),	Warning text
priority integer,	Alarm priority
emails character varying(200),	Configured email addresses
phones character varying(200),	Telephone numbers configured for SMS
status integer NOT NULL,	Alarm status (see 0-5 Fig. 72:)
value text,	Event value
"user" character varying(30),	Name given to the user
maintenancedatetime datetime,	End of maintenance state
maintenancedate date,	Date component maintenancedatetime
maintenancetime time(3),	Time component maintenancedatetime
commentary character varying(500)	Observation
);	

The safety interval can be configured daily / weekly / monthly or annually using the

Repetitions selection fields.
So as to not exceed the storage capacity of the EVOLUTION server, it is possible to delete old data records after successfully backing up data. To do this, you must select the **Delete all previous to** field and you must select a sufficient period of time (in months). All data records that are older than x months are deleted.

The storage interval and time span of the data records that remain in the database must be adapted to the volume of data records in the system. Too long a storage interval or data records that remain for months may exceed the storage capacity of the local hard disk.

The automatic backup starts by pressing the *Start* button.

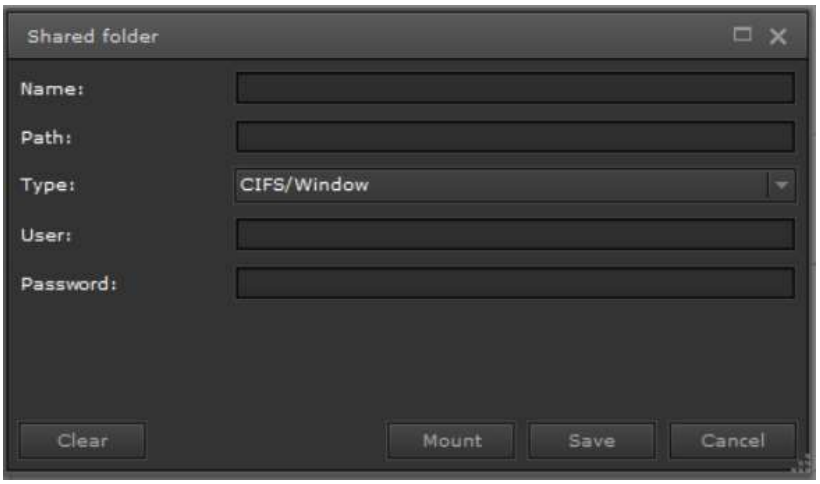


Fig. 94: Dialogue for configuring an external data directory.

Name: Name for the external security directory

(this name is freely chosen)

Path: The path to the external security directory *//<ip-address>/path (eg., //192.168.0.100/MSSHARE)*

Type: The only supported protocol is CIFS / Windows.

Character set:: The default character set is UTF-8

User: optional entry of a user name to log in to the external security directory.

Password: optional entry of a password to login

When the *Connect* button is pressed, the EVOLUTION server connects to the external security directory. *Save* takes over the settings and saves them permanently in the database.

10.5. Storage manager:

Storage management includes controlling the space available on the hard drive. The configuration guarantees the functionality of the system in case the storage capacity of the hard disk threatens to run out.
There are 3 levels of action. At the first level you can freely select in the range of 10% - 50% of the HDD's remaining storage capacity. The default value is 15% of the remaining storage capacity. If it falls below this range, there is the option of notification either as an alarm screen on the login screen and / or by email to the system administrator. The title and text of the message are freely selectable. The appropriate checkboxes must be selected.

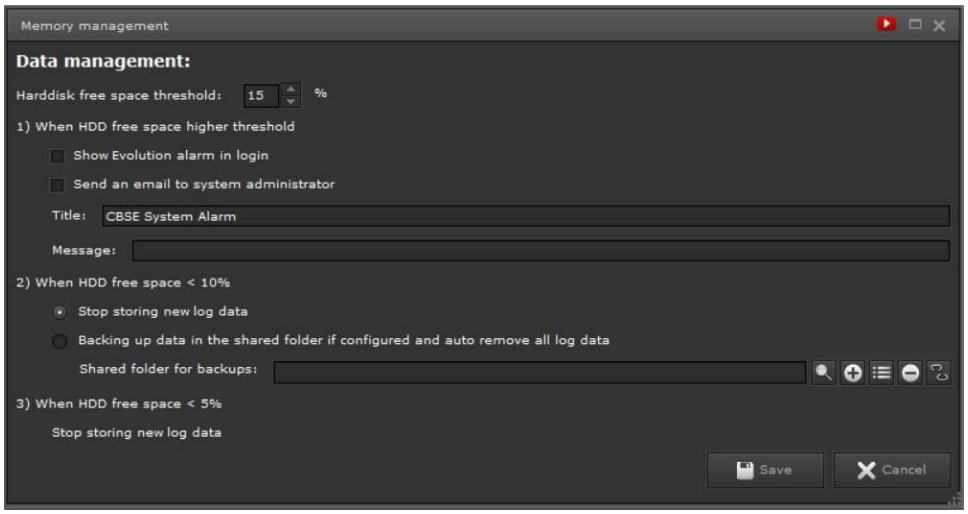


Fig. 95: Storage Management Configuration

If the remaining storage capacity is less than 10%, action level 2 automatically comes into operation. In this case, the new recording data can be saved in an external backup directory (network drive / PC share). The configuration of an external security directory is described in chapter 5.2.5. By default, storage of recording data ends with a residual storage capacity of less than 10%.
If the remaining storage capacity is less than 5%, the storage is moved to a backup external directory; it also stops, if selected at action level 2.

10.6. System restart

The EVOLUTION server is restarted through the *Tools / System Restart* menu item. Through some security questions you will be asked for confirmation to restart.

10.7. EVOLUTION license terms

The Evolution Server is sold under license. In this way, the user has access to both the editor and the demo project. The user can consult the license conditions

in the menu Help -> License agreement.

11. Annex:

11.1. Evolution Server Technical Data

System	
· **Processor**	Intel N2930 4 x 1,83 GHz (max. 2,16 GHz)
· **Memory**	4096 MB SODDR3 LP
I/O Interfaces	
· **Display Port**	1 x VGA, 1 x HDMII
· **Super I/O**	2 x USB 2.0, 1 x USB 3.0, 1 x COM via RJ45, 1 x RJ45, 1 x MicroSD Card Reader, 1 x Audio, DC Jack
· **USB**	
1	1 x Gigabit LAN
· **Storage**	256 GB Solid State Disk SATA MLC Samsung 860 Pro
▪ **Application**	Automation, POS, Digital Signage, Car PC
· **Power Source**	DC 12V
Mechanical and Environmental	
· **Dimension**	220 mm x 135 mm x 43 mm (L x W x H)
· **Operating Temperature**	0°C~40 °C
· **Storage Temperature**	-20°C~80 °C
· **Regulatory Compliance**	CE, FCC, BSMI, VCCI, C-tick RoHS Compliant

11.2. License extensions

Evolution is delivered with a minimum system of licenses, which includes the following:

HTML visualization interface and local editor.
5 x KNXnet / IP gateways

1 x DALI e64 IPAS Gateways

5 x ModBus Devices

1 x BACnet device

5 x Smart Metetering Devices

5 x Simultaneous users (Visu / Smartvisu)

1 x additional and independent multiproject (Application manager) *

1 x Database Manager (Automated Backup and Export of recorded Data)

1 x reporting tool for individual project cost calculation

1 x Template **: Design a page and reuse it many times with different data points.

* Allows the configuration of an additional and independent project in Evolution Server. Users and visualizations can be assigned individual categories, scenes, schedules, alarms, etc. Eg, a development with 100 houses acquires an Evolution license and 100 additional users from multiple projects, thus controlling 100 houses with a single Evolution device.
** Template page with virtual process points and multiple links, each with different data points. (Eg, Hotel with 100 equal rooms. Create just one room with virtual process points / template and create a plan with 100 links, one for each room. Data points are automatically assigned to each room's links)

You can find information about our expansion licenses at www.futurasmus-knxgroup.com. For a license extension, Futurasmus KNX Test Lab requires a ZIP file downloaded from the following URL "http: // IP: 8181 / sysinfo.php". Once the file has been sent to Futurasmus, the client receives an identical license file that must be installed on the Evolution servers. For this installation, EVOLUTION provides a download page on the server. To carry out the installation of the license extension, a browser window with the following URL must be opened:

http://IP-EVOLUTION-Server:8181/license.php

Next, the security data will be requested. The username is "admin" and the password is "evolution4u". The download page will immediately open.

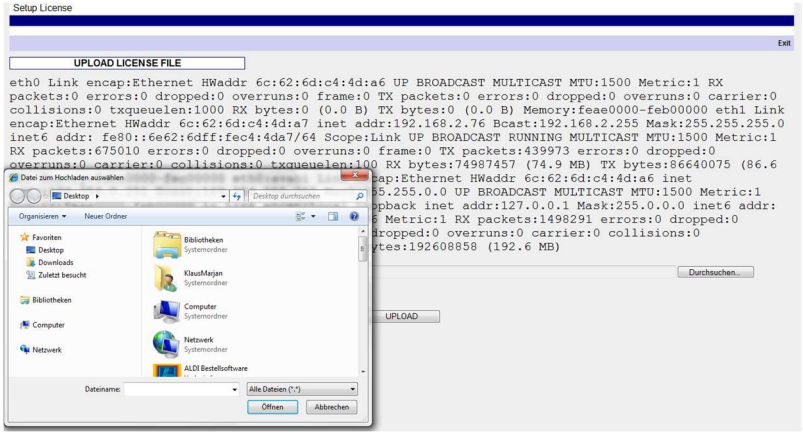


Fig. 96: EVOLUTION license update

The path to the license extension can be specified by clicking Durchsuchen... . Clicking UPLOAD starts the installation of the license extension.

Before beginning the installation, you must ensure that the license belongs to the MAC address.

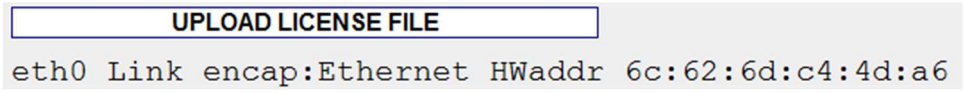
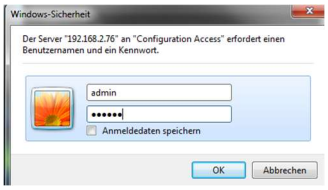


Fig. 97: MAC address information

11.3. Software update

Futurasmus KNX Test Lab is committed to constantly improving the EVOLUTION Software. The EVOLUTION software can be updated at any time. To this end, Futurasmus KNX Test Lab offers software updates that can be downloaded through the EVOLUTION update page. EVOLUTION update page opens with URL http://IP-CBSE-Server:8181/upload.php .



Next, the security data will be requested. The username is "admin" and the password is "evolution4u". The update page will immediately open.

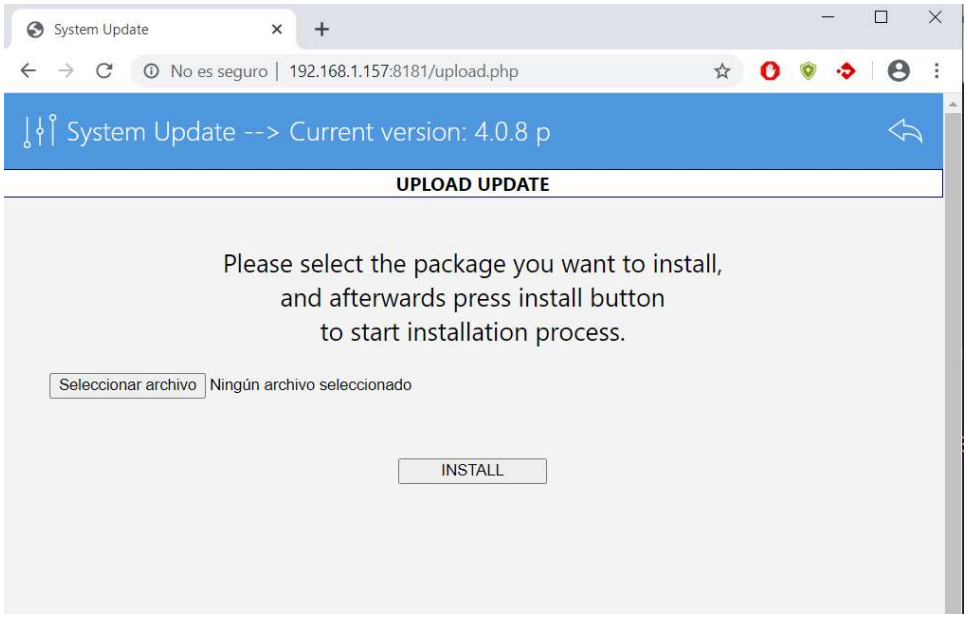


Fig. 98: EVOLUTION update page

The currently installed version of EVOLUTION is displayed in the upper left corner.

Updates are incremental. That is, you can only install the update released immediately after the one you have. This means that if the installed version is, for example, 1.1.1 and the most recent update is 1.1.3, you will have to install 1.1.2 first.

By clicking on “Select file” you can select the current update. Clicking INSTALL starts the installation. The information window below INSTALL reports the completion of the installation. Once the installation is successful, the EVOLUTION

server must be restarted.

11.4. FTP access

Using FTP, custom user data such as images or wallpapers for EVOLUTION server control elements can be uploaded.

For FTP access, the following URL must be entered:
ftp://IP-Adress.
Next, the security data will be requested.
The username is "veuser" and the matching password is "veadmin".
If the access data is correct, we will see the following Fig. 99: file structure. Then we can copy the images for the Slide Show, for example, in the *gallery* folder.

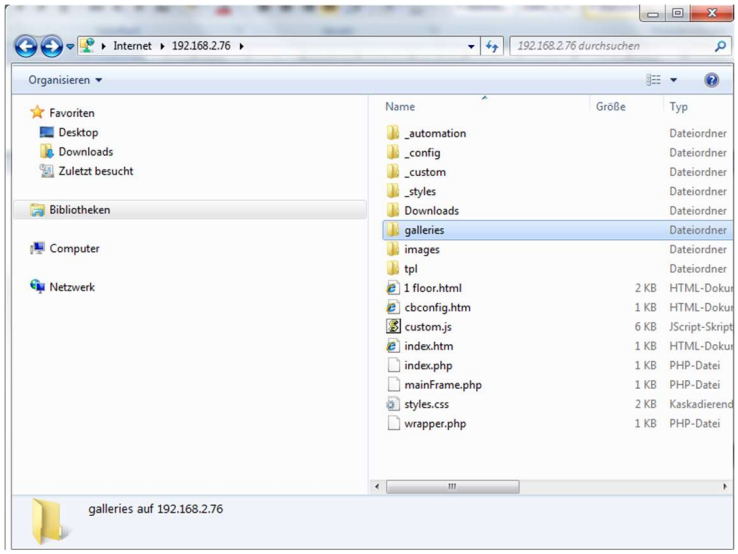


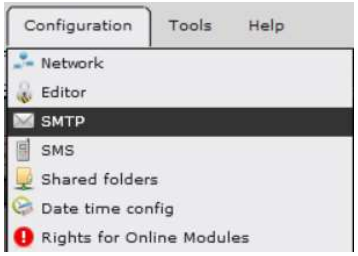
Fig. 99: Structure of FTP files on the EVOLUTION server

Project images can also be copied or deleted via FTP in the ftp://IP_EVOLUTION/images/custom/Projectname folder.

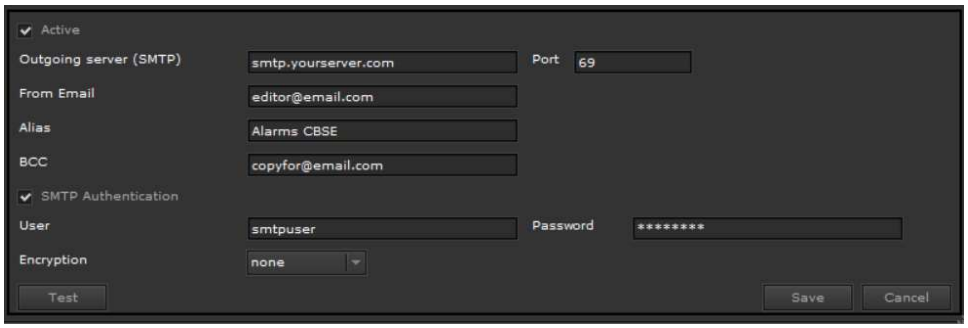
11.5. Email configuration

11.5.1. GoogleMail

In order for the Google provider to be used in the EVOLUTION email service, an email account must first be created at www.googlemail.com. Registration essentially consists of a freely chosen email address and password. Once the account has been created, the POP download server must be set. To do this, the email settings are opened.



Then the following email service must be configured in EVOLUTION:



Note: If your client does not support SMTP authentication, you will not be able to access your Gmail messages

11.6. Online support

Futurasmus KNX Test Lab committed to offer its clients the best possible support. Online support is available for quick response. In matters related to project planning, Futurasmus KNX Test Lab can provide the required support directly online with the TeamViewer remote control software (the required software can be downloaded free of charge at www.teamviewer.com). For system-related technical support, Futurasmus KNX Test Lab requires direct access to the EVOLUTION server. To do this, the client must configure port forwarding on their Internet router so that the server can be accessed.

The following ports, which may need to be activated on the network, are necessary for proper operation and support:

Port 80:	->	HTTP
Port 443:	->	HTTPS
Port 3671:	->	KNX communication
Port 7680:	->	Configuration Manager
Port 22:	->	SSH connection for support
Port 8181:	->	Import and license update
Port 21:	->	FTP (for data exchange if necessary)

11.7. Figures Index

EVOLUTION
BMS

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