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DIVUS

VISION

DIVUS VISION - Manual

Version 1.0

REV02-20201021

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## GENERAL INFORMATION

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User instructions: Please read this manual before using it for the first time and keep it in a safe place for future reference.

Target group: The manual is written for users with previous knowledge of PC and automation technology.

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## PRESENTATION CONVENTIONS

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[KEY]	Keystrokes of the user are shown in square brackets, e.g. [CTRL] or [DEL].
COURIER	Screen output is described in the Courier font, e.g. c:\>
COURIER FAT	Keyboard input by the user is described in Courier font bold, e.g. <b>c:\&gt; DIR</b>
"..."	Names of buttons, menus or other screen elements to be selected are displayed in "inverted commas".
PICTOGRAMS	The following pictograms are used in the manual to identify certain sections of text:
	<i>Watch your step!</i> Possibly dangerous situation. Damage to property can be the result.
	<i>Notes</i> <i>Tips</i> and supplementary information
	New Marks changes and new features

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# 1 Introductory Remarks

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## 1.1 INTRODUCTION

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This manual describes the DIVUS VISION application, a new KNX visualisation software for DIVUS KNX IQ panels. DIVUS VISION is pre-installed on KNX IQ touch panels. There is also a version of DIVUS VISION that can be run from a PC with a Windows operating system, as well as on Android and iOS mobile devices.

The DIVUS KNX IQ is a stand-alone system for KNX visualisation. So it plays the client and server roles at the same time. The client role consists of controlling the KNX system via graphical elements. The server role is to manage the communication between KNX (or other technologies) and the graphical user interface in both directions.

### 1.1.1 PREREQUISITES

Prerequisites for DIVUS VISION are:

- **1 DIVUS KNX IQ touch panel**
- 1 Windows PC with corresponding DIVUS VISION software [optional or alternative to KNX IQ]
- 1 mobile device with iOS or Android operating system and corresponding DIVUS VISION application [optional]
- OPC export file of an ETS project (KNX) [optional]
- Network with active Internet connection [optional]

Strictly speaking, therefore, only a KNX IQ is needed to get started with DIVUS VISION, since you can implement or edit a visualisation from the panel itself, as well as display and control a KNX system via an existing visualisation. In addition, a project can also be implemented in offline mode (see 1.1.2) by the PC application (and transferred to a paired device in a second moment).

### 1.1.2 WORKING MODES

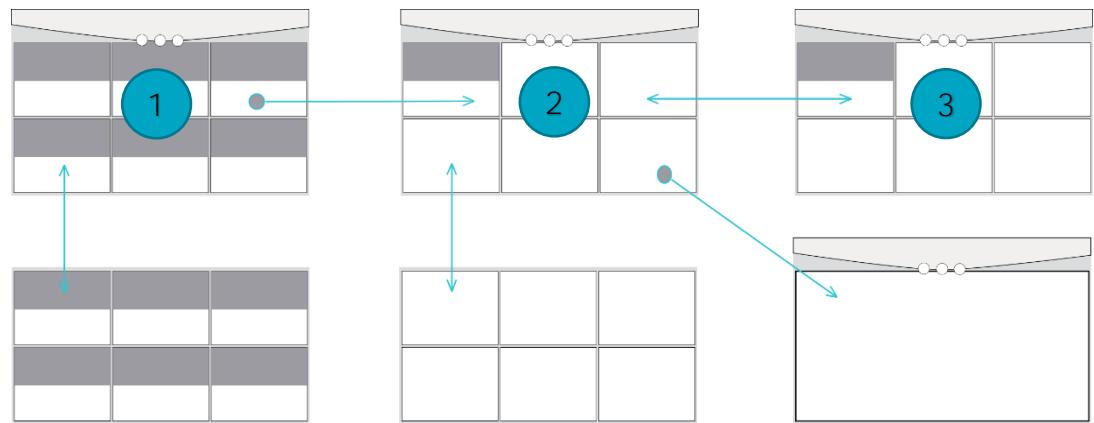
In general, there are several different editing modes:

- **Local connection**  
This is only possible from the local area network (LAN).
- **Cloud connectivity**  
This is available to the end user in order to connect mobile devices to the KNX IQ and thus operate the visualisation. It is also available for the Windows version of VISION. It allows you to connect from anywhere there is an internet connection for the device you are using as a client (mobile or PC that is).
- **Offline programming mode**  
This mode allows you to work on the visualisation on the PC independently of the available network and to transfer the project to the KNX IQ at a second moment.

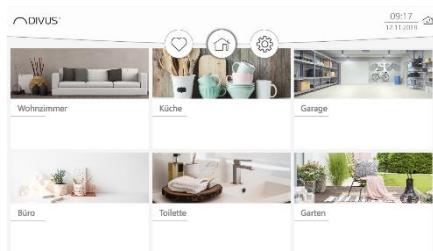
## 1.2 INSTALLATION

The desktop version of DIVUS VISION can be found in the download area of our website [www.divus.eu](http://www.divus.eu). You can also find the mobile versions on our homepage or in the respective app stores for Android or iOS.

## 1.3 VISUALIZATION - NAVIGATION



### 1 Homepage / Rooms' Overview



Up to a maximum of 6 rooms are displayed here in a grid.

Vertical scrolling allows you to reach other rooms, if available.

Horizontal scrolling allows you to reach the first (to the right) or last (to the left) room.

Clicking on one of the rooms allows you to reach it directly.

Clicking on an icon in the lower left area of a room box allows you to directly access these central functions. More detailed information can be found in chapter 1.4.5.1.

### 2 Room

The room representation shows up to 5 of the first elements of its content. The first element shows the room itself with name and central functions.

The vertical scrolling allows to reach further elements of the room.



Horizontal scrolling allows you to reach the next (to the right) or previous (to the left) room. The order is the one you see on the homepage.

Clicking on one of the elements allows you to reach this room directly.

### 3 Element

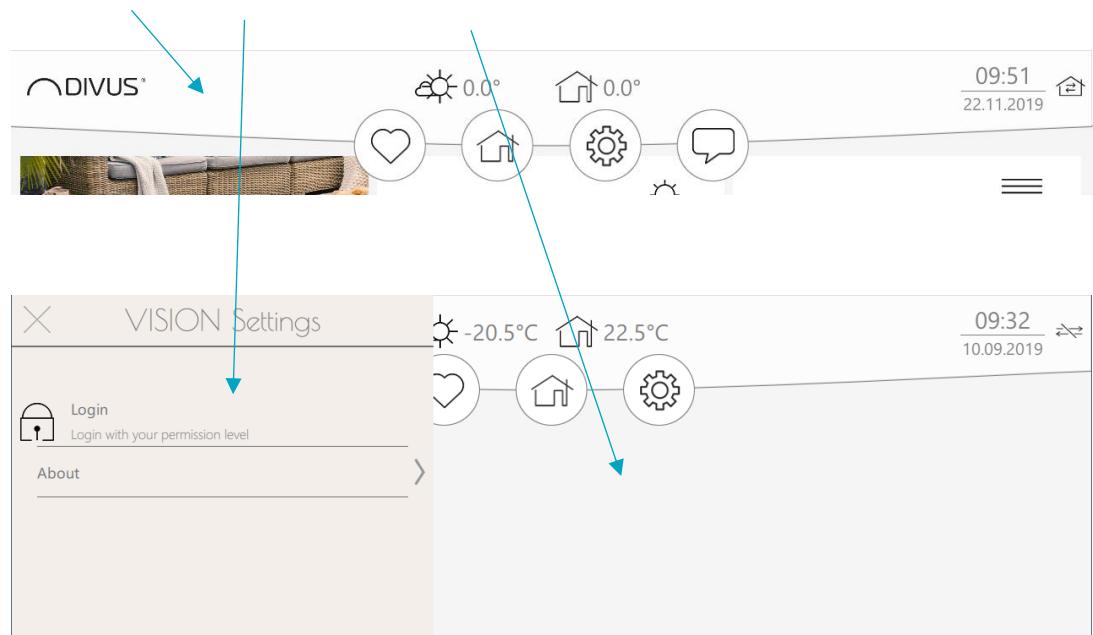
The detail view of an element is the deepest navigation point in the hierarchy. So here you operate the element or read its status and then you have to close it to get back to the next higher level (room).



## 1.4 GRAPHICAL USER INTERFACE - GENERAL

The user interface is divided into 3 main areas:

The upper bar, the menu and the visualization area.



### 1.4.1 UPPER BAR

In the upper bar there are 4 or 5 centrally located icons for favorites and plugins (as soon as available), homepage, settings and notifications (if activated) as well as temperature values (above) and current date and time (right). This area always remains visible.

### 1.4.2 CONNECTION ICON

In the right corner of the upper bar is the connection icon, which shows the current status of the connection. Here is the overview of the possible states:

Icon	Meaning
	Connecting
	Locally connected
	Connected via cloud (client only)
	Connected to cloud (KNX IQ only)
	Unknown status
	No connection (also displayed in offline mode and demo mode)
	Connection error occurred
	Waiting for connection to server

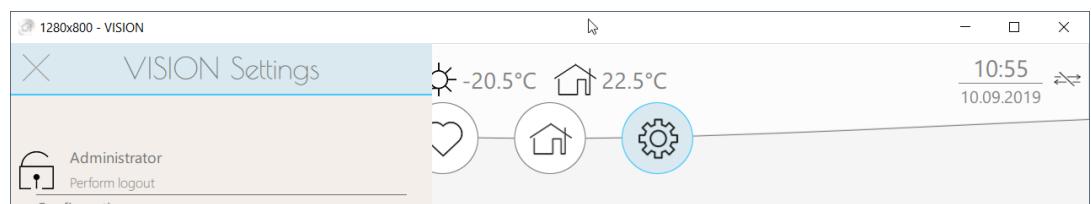
### 1.4.3 VISUALIZATION AREA

The larger part of the window is, of course, for the visualization itself: here you can see the rooms created or the elements of a room or special setting pages, such as when editing a schedule or scenario. A plus icon appears in the lower right corner (if you are logged on as administrator), which, depending on the context, allows you to create new objects: initially rooms, then elements within a room, and so on).

### 1.4.4 MENU

The menu is initially hidden and appears when you click/press the gear icon. The actual processing does not begin until you log in using the PIN code. If you log in correctly, the gear icon will be colored (depending on the user) and several menu items and functions will only become visible then.

There are two ways to close the menu:

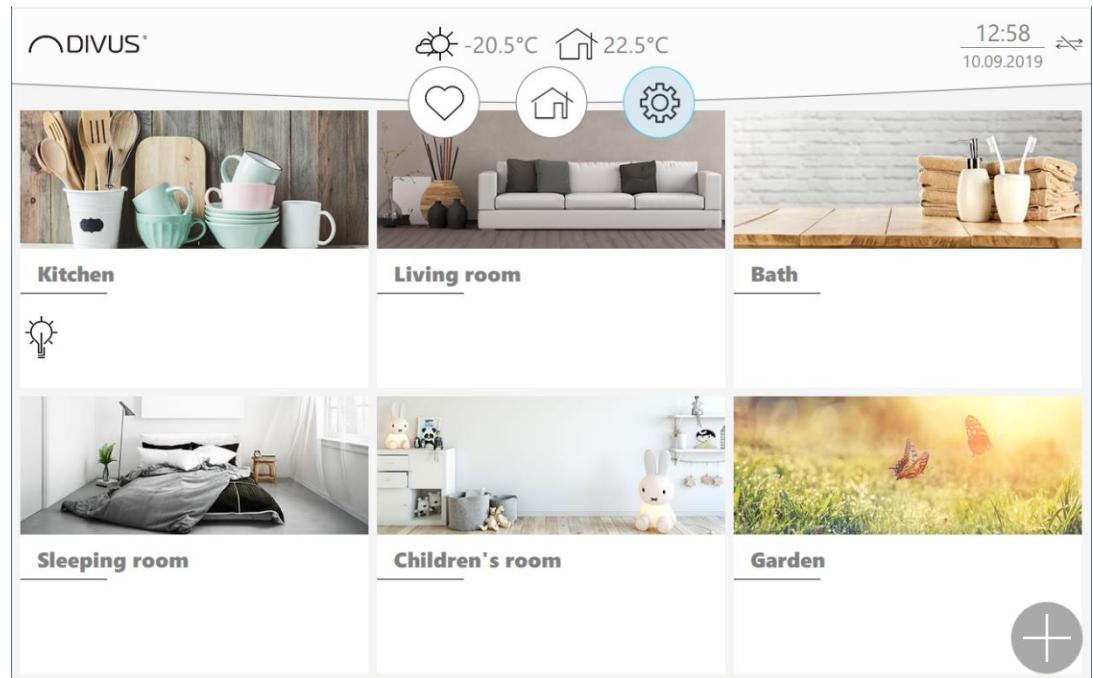


You can close the menu either with the X symbol on the far left or with the gear icon.

### 1.4.5 ROOMS' OVERVIEW

This view is defined as the homepage of the visualization. The first 6 rooms are displayed in corresponding tiles by name, background image and central functions.

Scrolling up/down allows you to reach any other rooms. By a click on one of the rooms you reach its detail view.



#### 1.4.5.1 Central Functions



Depending on the content, some central functions are automatically added to a room, which can also be operated from this view. There is a central switch for lights, blinds, and music as well as the display of the room's temperature. These functions become available as soon as at least one element is added to the room that matches the corresponding device type (i.e. a light, a shutter switch, a room controller or a music element to control an audio system). The central functions switch as follows:

- Lights: all on/all off (toggle)
- Blinds down: all down
- Blinds up: all up
- Room temperature displays the room's temperature (average if several sensors are present)
- Music play/pause (toggle)

#### 1.4.6 DETAIL VIEW OF THE ROOM

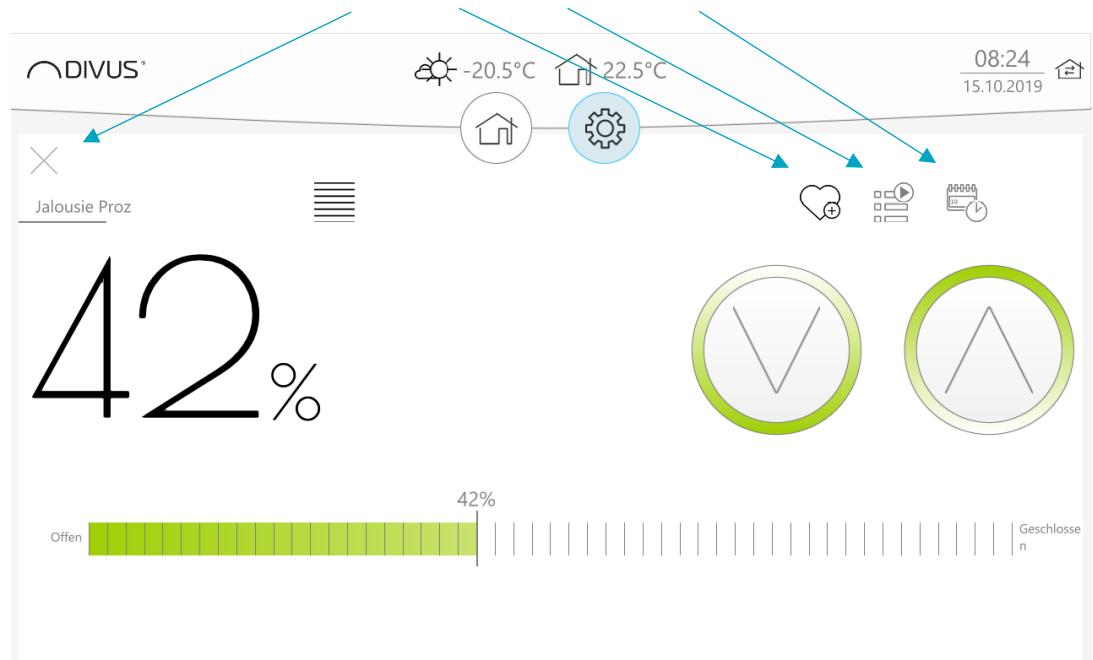
In the room's detail view, the content of the room is displayed by default according to the same schema as for rooms in a 6-grid. The first position always shows the tile of the room itself. This serves both for better orientation and to be able to operate the central functions. Further elements can also on this level be reached by scrolling down or up.

By scrolling sideways, on the other hand, you reach the other rooms on the same level, i.e. their detail views.

#### 1.4.7 DETAIL VIEW OF ELEMENTS

Here each element with all its functions is offered for operation:

All elements have some icons in common, i.e. the elements for  
closing, favorites, sequences and schedules



# 2 Vision - Settings

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## 2.1 LOGIN

---

By logging in with a PIN code, certain functions and menu items become accessible. Without login you have access to the visualization, but you can't change anything and for certain functions the PIN code window will appear.

To login, open the menu and select the first item *LOGIN*.

The administrator PIN code is 74269.

To configure the authentication of the different users, go to Configuration - Authentication in the menu after the first login. More detailed information can be found in chapter **Fehler! Verweisquelle konnte nicht gefunden werden..**

### 2.1.1 LOG OUT

As soon as you have logged on, you will find the function for logging out at the same place as for logging on. After editing, a user should always log out. Whether a user is currently logged in can be seen at first glance through the gearwheel icon: if it has a colored background, then a user is logged in; if the background is white, then no user is currently logged in.

After 15 minutes of inactivity, the logged-in user is automatically logged out.

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## 2.2 CONFIGURATION

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The third menu item gives access to various sub-items for configuring DIVUS VISION:

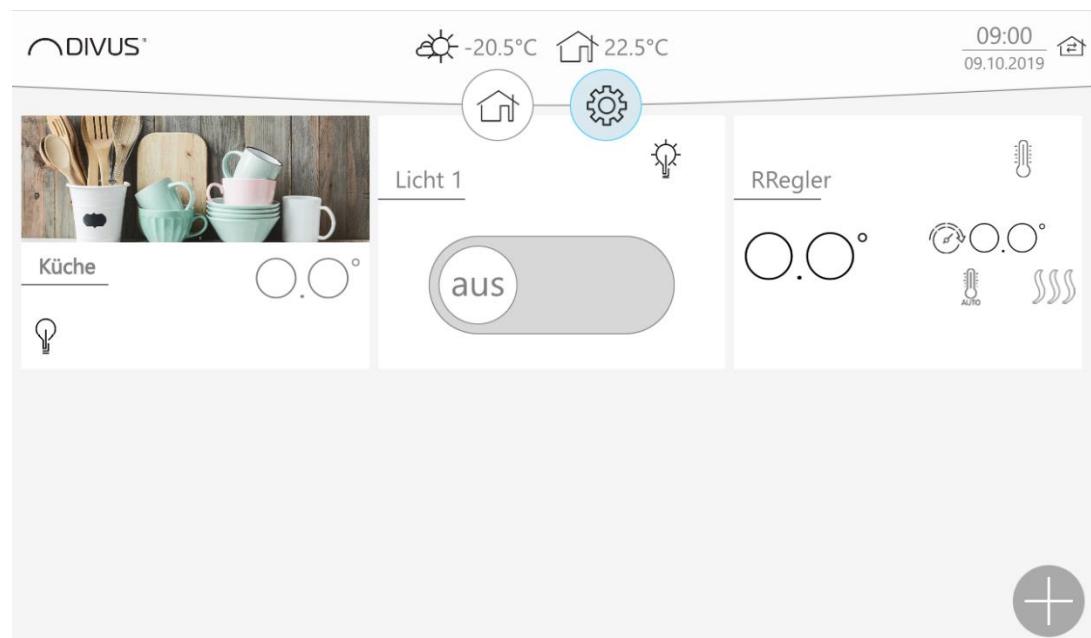
- Visualisation
- Drivers
- Datapoints
- Rules
- Notifications
- Authentication

- Plugins
- Cloud
- Import/Export

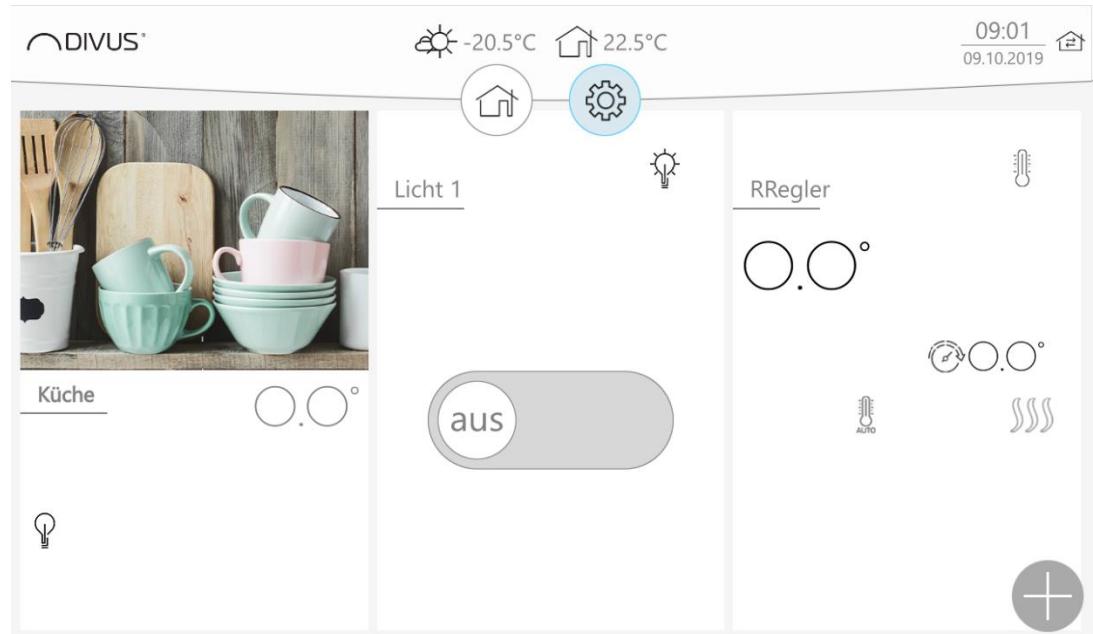
### 2.2.1 VISUALISATION

Here the visualisation can be customized. The raster mode can be *fixed* or *dynamic*. *Fixed* means that the grid has a fixed division into 6 tiles - unoccupied tiles remain free. *Dynamic* means that the tiles, depending on the number, fill as much of the surface as possible.

**Example** of fixed raster mode with 3 elements:



**Example** of dynamic grid mode with 3 elements:



The time with date displayed by default in the upper bar can be hidden as desired.

The temperature values for inside and outside, which are deactivated by default, can also be activated here and linked to a datapoint. They then appear in the middle of the upper bar.

## 2.2.2 DRIVERS

This is where you configure the drivers that are used to support different technologies.

### 2.2.2.1 KNX

Depending on the KNX IQ model, select the desired setting here:

- Direct KNX bus cable connection (TP model)
- IP tunneling via network interface (TP and IP model)

Also see chapter 3.1.1

## 2.2.3 DATAPoints

The datapoints of a project are managed here. There is a search function, an area for the list of available datapoints and the plus icon to create new datapoints.

In the case of KNX, a *datapoint* corresponds to a single group address or a pair of group addresses consisting of the command address and the corresponding status address.

Apart from the name, the DPT (datapoint type) is a necessary information.

### 2.2.3.1 DTP (datapoint type) - table with examples

This table shows all datapoint types supported by VISION:

DPT 1	1 BIT	Switches (on/off or up/down etc.)
DPT 2	1 BIT controlled	(0...0 to 1...1)
DPT 3	1/4/8 BIT controlled	Dimmers/shutters (0...0 to 1...7)
DPT 4	1 byte (CHAR)	Single letter or symbol
DPT 5	1 byte (%)	(0...100, 0...255 or 0...360°)
DPT 6	1 byte (%)	(-128...127)
DPT 7	2 bytes	(lux, mm, ms etc. 0...65535)
DPT 8	2 bytes	(time difference, rotation etc. -32768...32767)
DPT 9	2 Byte (float)	Floating point values (-671088.64...670760.96)
DPT 10	3 bytes	time
DPT 11 KNX	3 bytes	date
DPT 11 yyyy	4 bytes	0...4294967295
DPT 12	4 bytes	0...4294967295
DPT 13	4 bytes	-2147483648...2147483647
DPT 14	4 bytes	4-octet float value IEEE 754
DPT 15	4 bytes	Access control (status/feedback)
DPT 16	14 bytes	Character string (max. 14 letters/symbols)
DPT 18	1 Byte	Scene control
DPT 19	8 Byte	Time and date
DPT 20	1 Byte	8-Bit Enumeration
DPT 232	3 bytes	RGB

### 2.2.3.2 Create a new datapoint

As an administrator, go to *Configuration - Datapoints - Datapoint List* in the menu. First press the *plus* icon at the bottom right of the menu area.



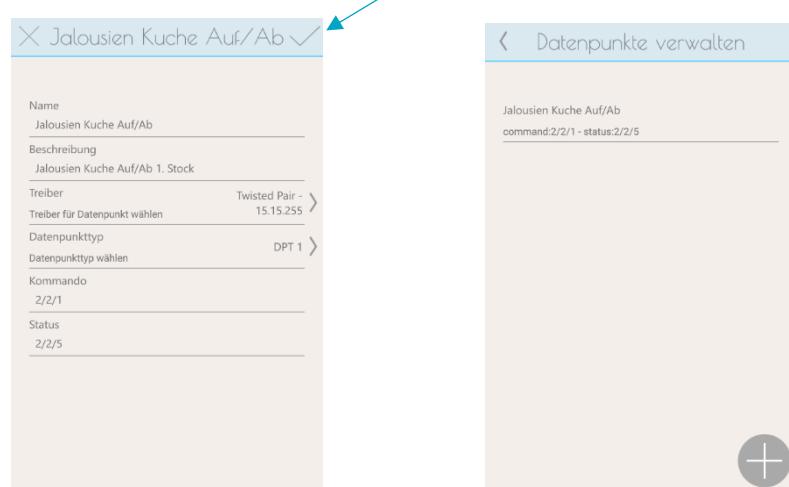
Attention: A datapoint needs an appropriate driver. If you have not yet defined the desired driver, do so before you create the associated datapoints. It is not possible to save a datapoint without a driver.

The "Add datapoint" window for entering the properties of the new datapoint then appears in the menu area. So enter the following: name, description, driver, datapoint type, command, status.

For a new KNX datapoint this would be e.g.

- Name: Kitchen blinds up/down
- Description: Kitchen blinds up/down 1st floor
- Drivers: KNX (...)
- Datapoint type: DPT 1 (1 BIT)
- Command: 2/2/1
- Status: 2/4/1

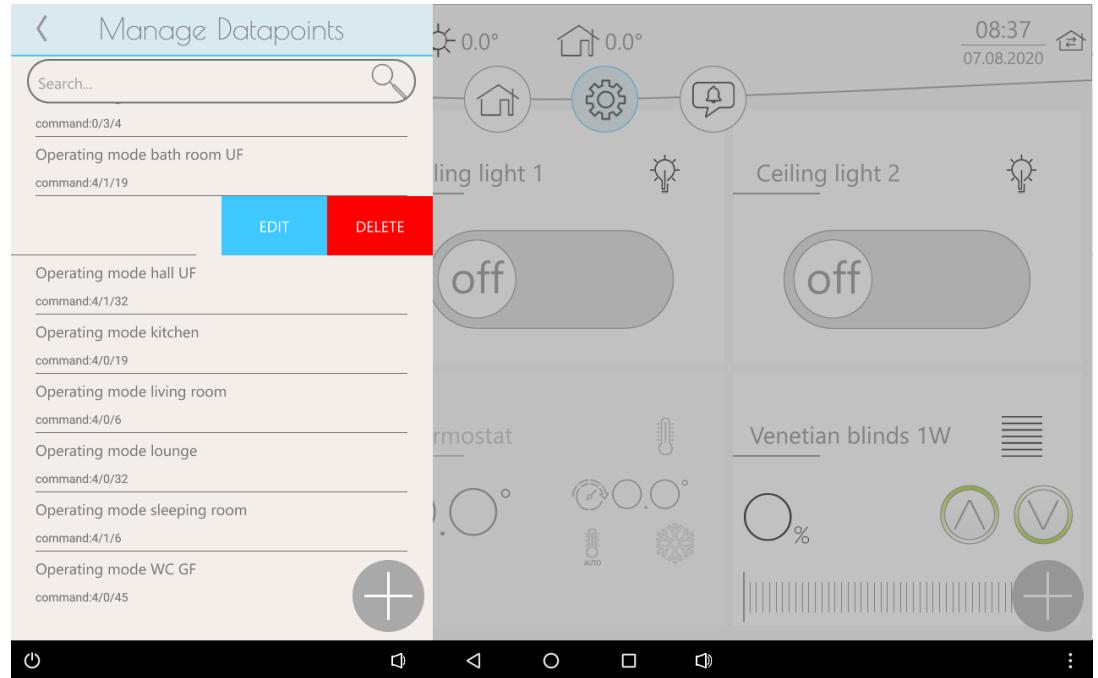
Last confirm the entry with the checkmark icon in the upper right corner. The new datapoint is saved.



Datapoints can also be created directly using the "Link" function of an element. The only difference is that in this case certain settings are predefined and cannot be changed. More detailed information can be found in chapter 3.6.2.

### 2.2.3.3 Edit / delete a datapoint

To edit or delete an existing datapoint, open and hold it pressed in the list of datapoints:



Then the two buttons for editing and deleting the datapoint appear. Choose Edit to open the same form you used to create the datapoint. For already linked datapoints you cannot edit the values for driver and DPT. Press the red button to delete. The datapoint is then deleted directly.

### 2.2.3.4 Search Function

If the number of datapoints increases and they can no longer all be seen directly in the window, the search function appears at the top of the list. When you enter a search word, the datapoints that do not correspond are automatically filtered out. As soon as the desired datapoint becomes visible, you can interrupt the entry and select it (also see 2.2.3.3).

The search is possible by name as well as by group address.

## 2.2.4 RULES

Rules are logics following the simple "if - then" principle. This function initially only shows the search function and the plus button at the bottom right.

### 2.2.4.1 Create a new rule

After pressing the *plus* button, the form for the new rule appears. First enter a name and select the type: there are 3 types available, which are described in the following table:

Rule type	Description
-----------	-------------

<b>On demand</b>	Is controlled, for example, by a time schedule.
<b>Trigger</b>	With each new telegram that refers to one of the datapoints inserted below (even if the value remains the same), the rule's logic is evaluated.
<b>On value change</b>	Is only evaluated if one of the datapoints in use has an effective change in value.

Then enter when the logic should be triggered in the "If" area of the form:

1. The element (e.g. a thermostat)
2. The function of the element (e.g. the measured temperature)
3. The comparison operator (smaller, larger, equal, etc.)
4. The value of the function of the element (e.g. 5 for 5°)

Then repeat the same procedure for any additional triggers (by adding the small (+)) or for the function(s) to be commanded.



**Note:** To execute multiple commands when certain conditions occur, you can use a sequence containing the desired commands and then insert it into the IF or THEN section.

## 2.2.5 NOTIFICATIONS

Here you will be offered an option to enable or disable notifications, as well as access to the list of existing notifications. Initially the list only shows the search function and the "+" button in the lower right corner.

The notifications panel can be called up via the icon in the top bar if the notifications are activated.

In general there are 2 types of notifications:

- *System-wide notifications*, with which the system provides warnings or suggestions. These notifications are generated independently by the system and are also generated when the notifications in the menu are disabled.
- *User-level notifications* that appear for user-defined events. This type of notification can be enabled or disabled from the menu. As a result, the icon in the top bar is also displayed or hidden.

A user level notification can be combined with a beep and you can choose to have the automatic popup or just print in the notification panel.

### 2.2.5.1 Create a new notification

After pressing the plus button, the form for the new notification appears. First you enter a name and select the type: *Info*, *Warning* and *Alarm* stand for corresponding importance levels in increasing order.

In order to display a message for a certain event, you need a rule where the relationship between trigger and notification can be defined in detail (see chapter 2.2.4).

### 2.2.5.2 Delete a notification

Press and hold the notification in the list until the delete button appears, then press it.

NEW

## 2.2.6 USER MANAGEMENT (PREVIOUSLY AUTHENTICATION)

### 2.2.6.1 Introduction

Starting from version 4.15 the authentication and user rights concept of VISION has been revised. The previous menu entry under Configuration called *Authentication* has been replaced by *User management*.

#### What remains the same

For most projects, nothing will change: there are still two default access levels, namely the *administrator* level which comes with the default PIN code 74269 and the *user* level which operates the visualization without the need for authentication.

Any authenticated access still has a default timeout followed by an automated log off. After 15 minutes of inactivity (i.e. without user interaction), the authenticated session will run out, the gear icon's background will return transparent and VISION will apply the user level access rights.

Also temporary access rights behave like before: a user may gain higher permissions inserting a correct PIN code e.g. to view a protected room's content or to operate a protected element. These rights will be lost after 10 seconds of inactivity.

Also the role and the permissions of the administrator remain the same: they can't be changed or deleted. Only the PIN code can – and should – be customized.

#### What is new

The other, previously predefined access levels are now replaced by a more flexible structure. The administrator can now choose to manage additional users defining their name, PIN code and access rights. Access rights are set through a permission matrix where a set of basic permissions is offered for configuration. These are:

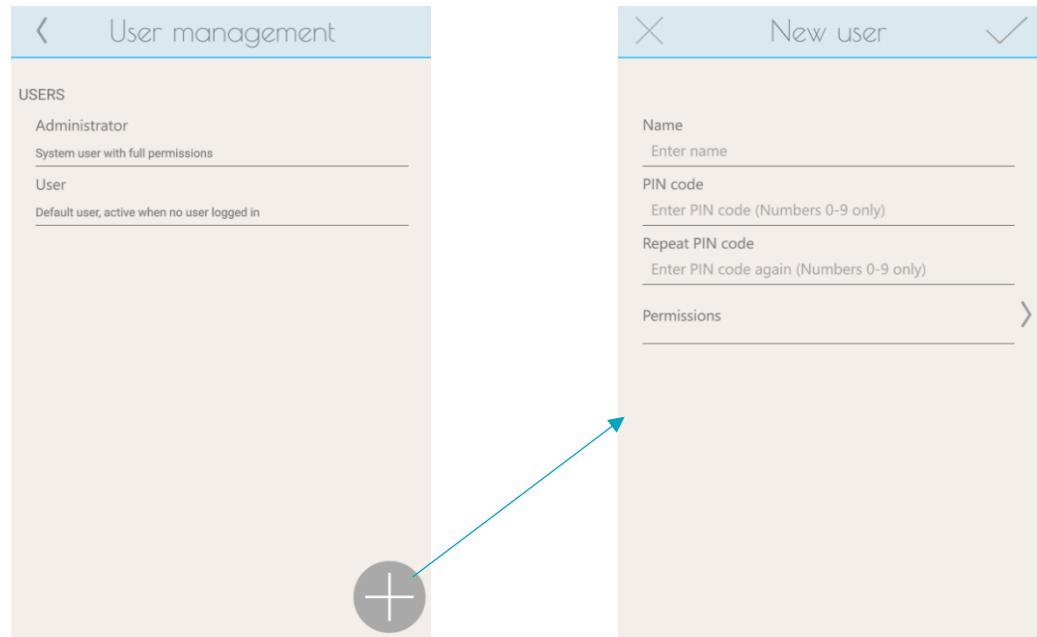
VIEW	Permission to see rooms and elements with their current values
CONTROL	Permission to operate elements (i.e. change values)
SCHEDULES	Permission to manage (add, edit, delete) schedules for elements
SEQUENCES	Permission to manage (add, edit, delete) sequences with the available elements
PRESENCE SIM.	Permission to control the presence simulation functions PLAY and RECORD.
USER PREFS.	Permission to change the order of tiles (on the homepage and inside rooms) and to access some device dependent settings. These are: <ul style="list-style-type: none"> <li>▪ Access to submenu <i>App</i></li> <li>▪ Access to submenu <i>Devices</i> (on client devices only)</li> <li>▪ Access to submenu <i>Pairing</i> (on KNX IQ only)</li> </ul>

Single rooms or elements may get a custom set of rights which will override the default ones. This means that authentication settings done on a room or an element will prevail over the default settings configured in the *User management* menu.

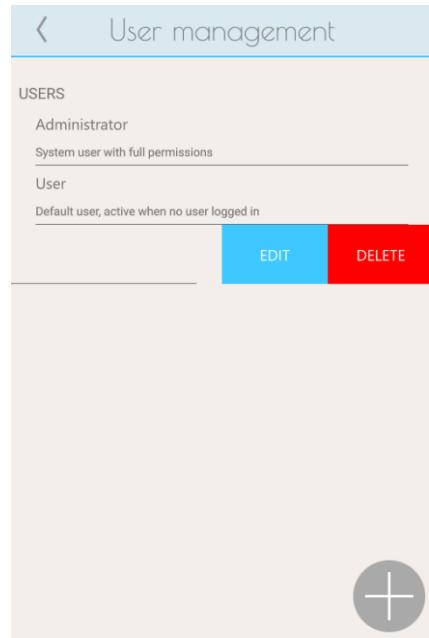
There is no fixed hierarchy of users in this new structure: each user can be managed independently from all others.

#### 2.2.6.2 ADDING NEW USERS

- Go to *Configuration - User management - Users* as administrator and hit the plus icon in the lower right corner of the menu.
- Insert the name and the PIN code of the new user. The PIN code must be a numeric code of min. 4 and max. 8 digits. The permissions can be set from here also, but you may prefer to set (or change) them later going to *Configuration - User management - Permission matrix*.



### 2.2.6.3 EDITING OR DELETING A USER

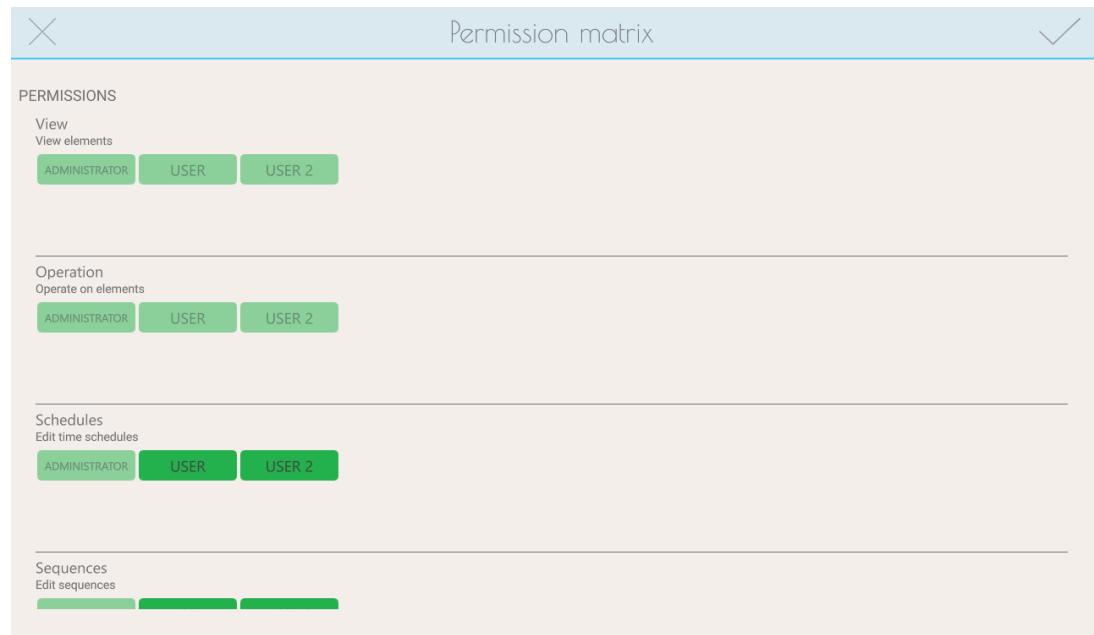


Go to *Configuration - User management - Users* as administrator and long click (or swipe left) the desired user. Choose the appearing button *EDIT* (to recall the same form shown to add a new user and edit its values) or *DELETE* to delete the user and remove any references to his rights throughout the project.

### 2.2.6.4 Configuring the default access rights

Go to *Configuration - User management - Permission matrix* as administrator.

A double click / tap on the title "Permission matrix" will expand the view to fullscreen.



For each of the permissions, choose the desired right: granted rights will be green, denied rights will be red. Semi-transparent rights mean that they can not be changed currently.

Whether a right may be changed or not, results from a set of dependencies. Some of the base permissions have obvious dependencies e.g. to operate something (*control right*) you need to see it (*view right*). Therefore, in this example, the *view right* will be semi-transparent and you will not be able to disable it without first disabling the *control right*.

Check out this dependencies overview scheme:

1	VIEW		USER PREFERENCES
2	CONTROL		PRESENCE SIMULATION
3	SCHEDULES	SEQUENCES	

As you can see:

- *View* and *User preferences* permissions have no dependencies
- *Control* and *Presence simulation* depend on the *View* permission. This means they can only be enabled if the *View* right is enabled first.
- *Schedules* and *Sequences* permissions both depend on the *control* permission. This means they can only be enabled if *Control* and *View* rights are enabled already. At the same time, it means that a user with schedules or sequences (or both) enabled can't be denied the *Control* or the *View* right.

## 2.2.7 PLUGINS

Some special, modular functions also using or related to the KNX bus can be found here.

### 2.2.7.1 The Astronomical clock

This optional function allows to use geographical data combined with date and time data to calculate sun position and angle, sunset and sunrise. Then you can create logics which are triggered at the chosen time of the day e.g. "turn on the external lights 30 minutes after sunset".

Set up the astronomical clock:

5. Go to Configuration – Plugins – Astronomical clock – Settings
6. Enable the astronomical clock
7. Input the desired coordinates using decimal degrees.
8. during programming, you can use sunrise and sunset in place or as alternative to a fixed time.

### 2.2.7.2 Date/time synchronization

This function is useful if you need a reliable date and time data source on KNX and have it on your LAN, or the opposite.

Set up the astronomical clock:

9. Go to Configuration – Plugins – Date/time synchronization
10. Enable the date/time synchronization
11. Choose the desired direction (KNX IO => bus or Bus => KNX IO)
12. Choose the desired datapoints to involve in the synchronization
13. Choose the desired time interval. 0 means do not send.

### 2.2.7.3 Presence simulation

The presence simulation is based on a simple principle: record the commands sent over the KNX bus along with a time stamp. Then, when required, switch to playback mode and the last week will be replayed to simulate your presence (while nobody is there).

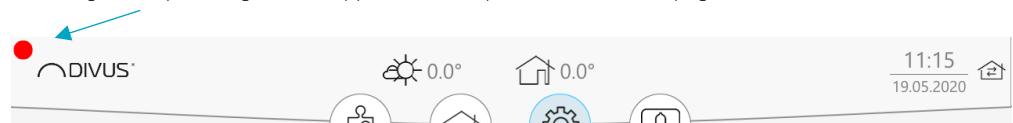
- On/Off elements
- Dimmers
- Shutters
- RGB
- Custom sliders

To set up the presence simulation:

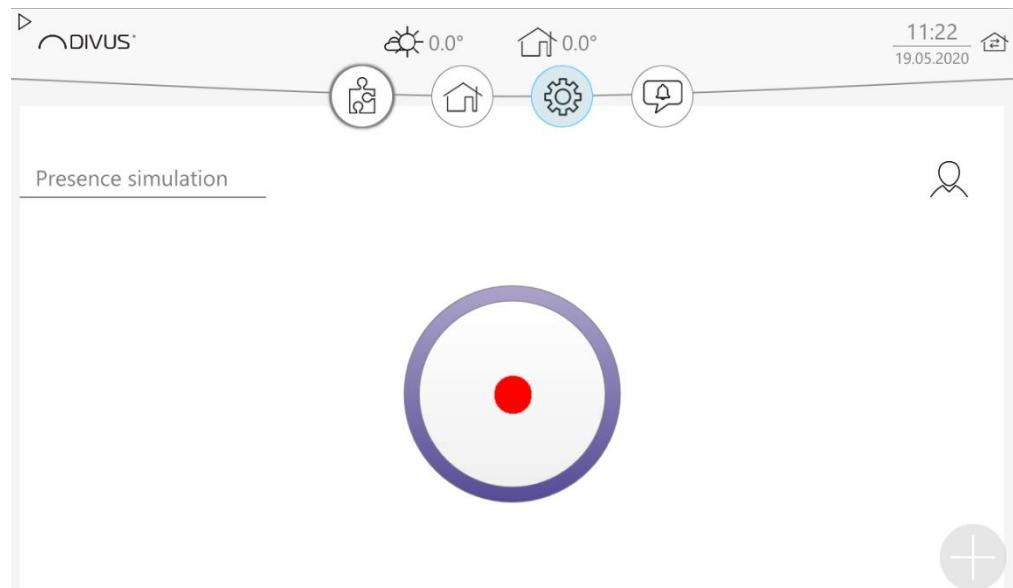
14. Go to Configuration – Plugins – Presence simulation
15. Enable the presence simulation
16. The plugin icon will appear (if it was previously hidden) on the upper bar



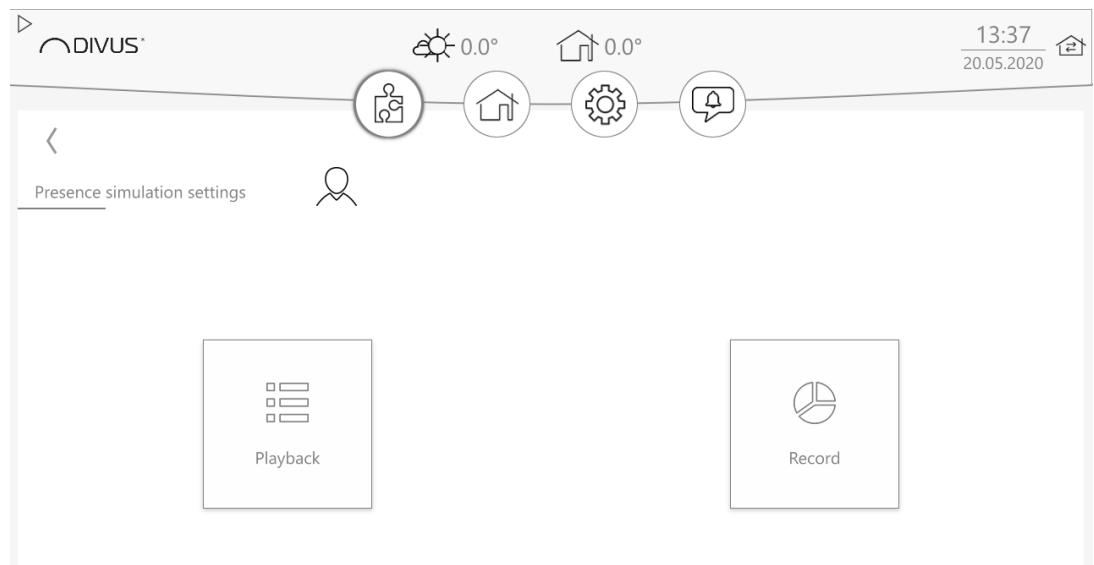
17. On the plugins page you will find the presence simulation function. It shows one simple button. When recording, a red pulsating dot will appear in the top left corner of the page.



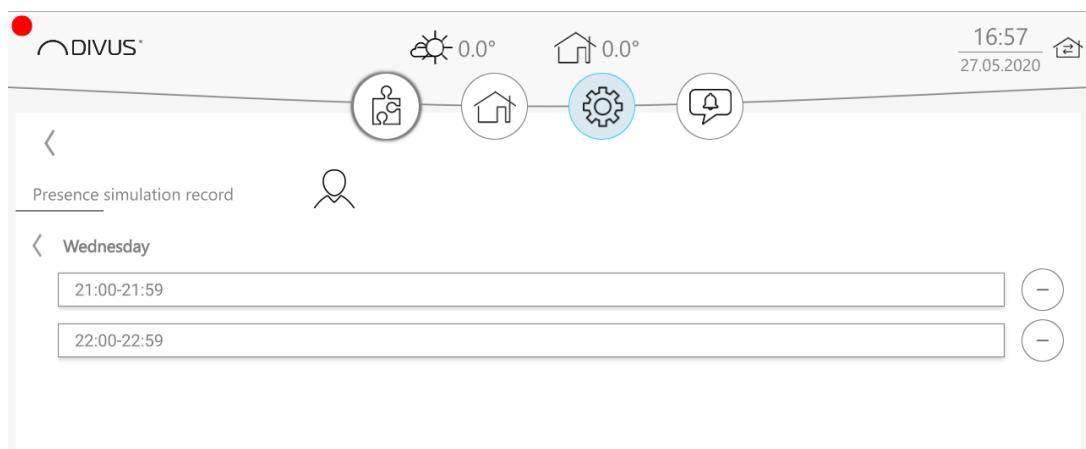
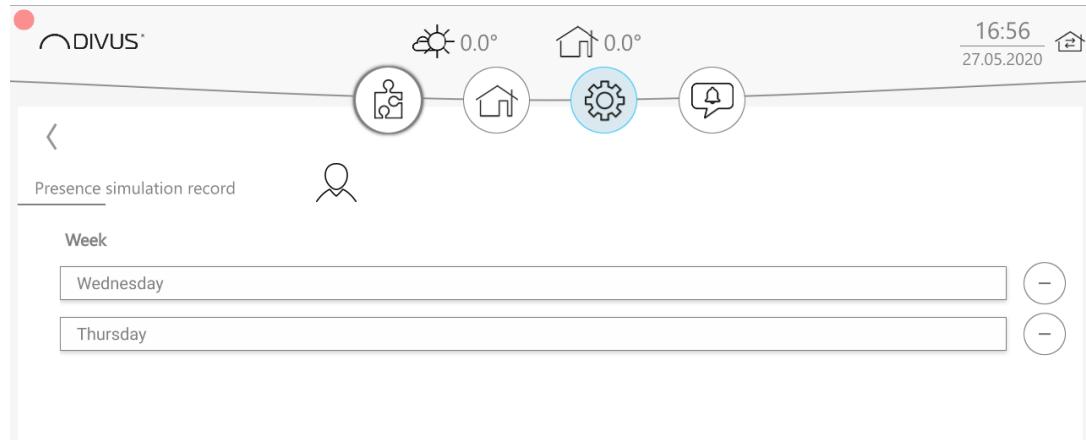
18. If you push the button again, it will switch to playback mode. The icon in the corner will show a play symbol and the presence simulation button will also change:



There are of course also tools to configure what to record and what to play back. To reach them go to the detail view of the Presence simulation where you will see a gear wheel icon on the right. There you reach the presence simulation settings page.



Under *Playback* you can define which items should be excluded/included during recording. In *Recording* you can view recordings and add, edit or remove individual commands or e.g. particular hours or days that you do not want to be played back.

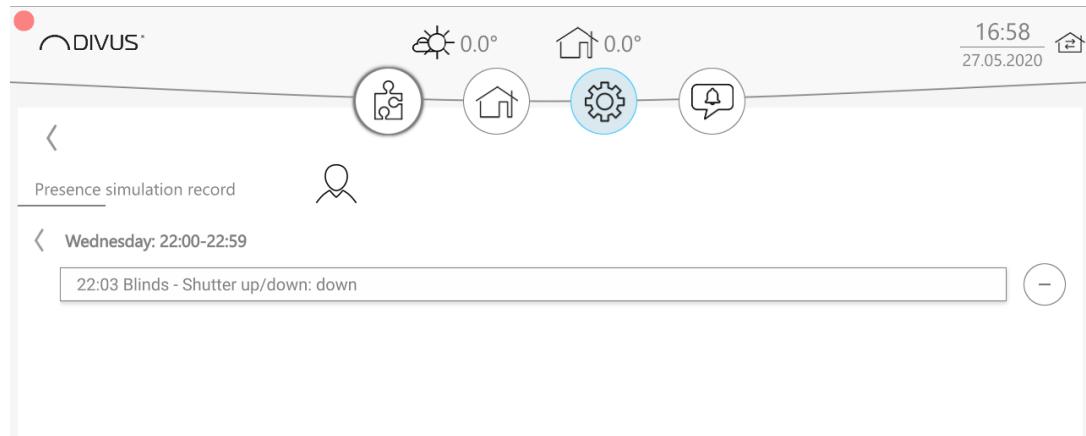


During *Playback*, if available, the last week of recorded commands is played back. If a day is not found, the system jumps to the previous day until it finds one actually containing commands. This means you could also use the recording of one single day and let it would be played back every day.

A function can be connected to the presence simulation (see chapter 3.6.2 *connection*). The function is called "Status synchronization" and, as the name suggests, allows you to have e.g. a light signal corresponding to the simulator status, or to control its status via an actuator, switching from recording to playback or vice versa.



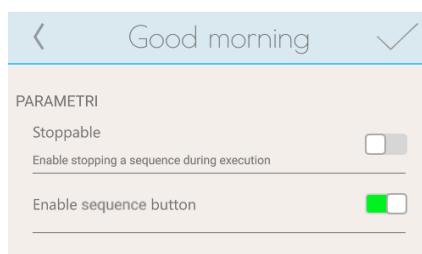
Attention: After each change on the datapoint level (changes in ETS, new import or individual additions) it is **the responsibility of the system Integrator** to delete the current recording, if the presence simulator is active and recording, in order to prevent any playback from sending commands that have e.g. changed their effect in the meantime because they have been assigned to another KNX device.



#### 2.2.7.4 Sequence button

This function creates a connection between physical buttons on the KNX bus and sequences created in VISION in such a way that by pressing a button, the sequence matched to that button will be executed. This function requires:

- A 1 Byte (0-255) group address of the so-called *listener*, similar to the one for KNX scenes
- One or more KNX buttons that, when pressed, send a numerical value to the above address
- Enabling the function in the sequence parameters.



- Optionally, for keys equipped with RGB LEDs, a group address (which can also group several LEDs at ETS level) of type DPT 232 (3 bytes).

These are the settings available under *Configuration – Plugins – Sequence button*:

Setting	Description
<b>Enable sequence button</b>	To enable or disable the function (in general). Once this is enabled, every single sequence will show the option in its own settings.

**Timeout** Time available to complete the pairing with a KNX button (default 120 s)

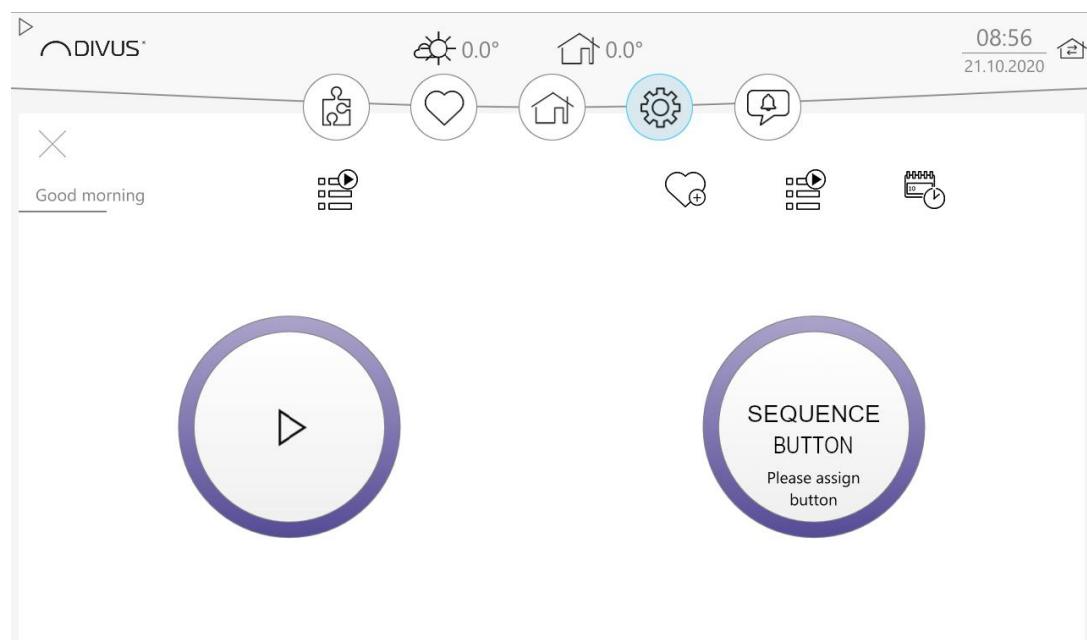
**Datapoint "listener"** To be connected to the 1 Byte address, subtype 0-255

**Datapoint "LED RGB"** To be connected optionally for keys equipped with RGB LEDs (DPT 232).

**LED RGB colour** Hexadecimal value of the color (default white #FFFFFF) in the web format i.e. the symbol "#" followed by 3 values between 00 and FF for the colors red, green and blue respectively. See e.g. [this website](#).

Once these general settings are in place and the feature is enabled, the procedure for matching a button to a VISION sequence is as follows:

1. Open the detail view of the sequence



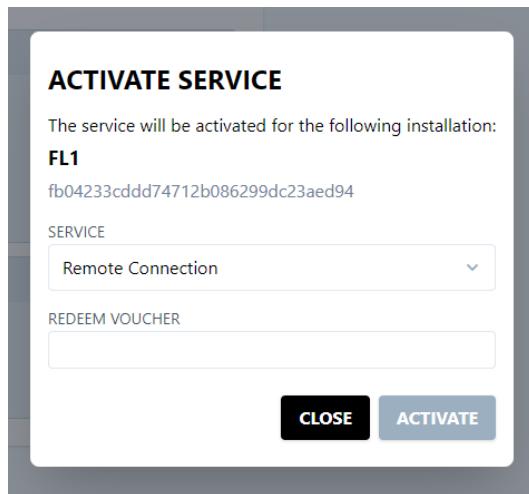
2. Press the *sequence button* on the right
3. (timer starts)
4. If the function is available, one or more LEDs of the buttons that can be matched light up in the configured colour. The LEDs have only an orientation function for the user and do not distinguish between already assigned keys and "free" keys.
5. Within the time set with the timeout parameter (default 120 seconds), press one of the preconfigured keys for this function. At ETS level a separate value will have been programmed to be sent to the "listener" address when each key is pressed.
6. The "listener" that now receives a value by pressing the key, records the combination between the *received value* and the *currently open sequence* and saves it.

7. From now on, each press of the button will execute the matched sequence.

### 2.2.8 CLOUD

The cloud is, simply put, a way to access your KNX IQ's visualisation from wherever you are, using a client device. To use this access type, there is a procedure involving several steps:

1. Your KNX IQ package contains a voucher for the DIVUS Cloud. Get it and read it if you didn't already.
2. Go to [cloud.divus.eu](http://cloud.divus.eu) and create a new account.
3. Check the confirmation email you'll receive and click the confirmation link to activate your account.
4. Then go to your DIVUS KNX IQ and on Configuration - Cloud, insert your cloud user name and password.



5. Go back to [cloud.divus.eu](http://cloud.divus.eu): you will find the KNX IQ shown in a new box: click *Activate service* and choose *remote connection*. Use your voucher code in the *Redeem voucher* field and finally click *Activate*.

6. Now, when you set up a connection between a mobile device (or your PC) and the KNX IQ, you can choose cloud as connection mode, but remember that the first pairing must be done in the LAN. See chapter 2.3 for further details about pairing.

### 2.2.9 IMPORT/EXPORT

This is where the project itself is managed. Exporting corresponds to saving the project in a file. Importing corresponds to reading a saved project, whereby the current project is replaced. Resetting returns the project configuration to its initial status, i.e. all changes are deleted and a new project can be created.

#### 2.2.9.1 Export

This function enables you to select the storage location for the project using a file browser and then execute the saving.

#### 2.2.9.2 Import

This function allows to select and read an existing project backup in form of a file with .kiq extension. This replaces/overwrites the current project.

### 2.2.9.3 Reset

If you want to start with a new project, use this function to reset the current project to the factory settings or delete it completely.

## 2.3 Pairing (ONLY ON KNX IQ ITSELF)

Here you can manage client devices and configure the corresponding settings. On external devices (other than the KNX IQ) you will find Devices in this position. For details see chapter 2.5

Before being able to access the display from a device other than the KNX IQ itself - either to program it or to control it - it is necessary to proceed with the pairing, during which the external device is authorised to access the KNX IQ. This procedure must be done from inside the local network; pairing over the cloud is not allowed. From a mobile device or from a PC I can configure access to one or more KNX IQ by performing the pairing for each of them. I can then choose which device (and its project) to connect with from the menu. See chap. 2.5 for more on that.

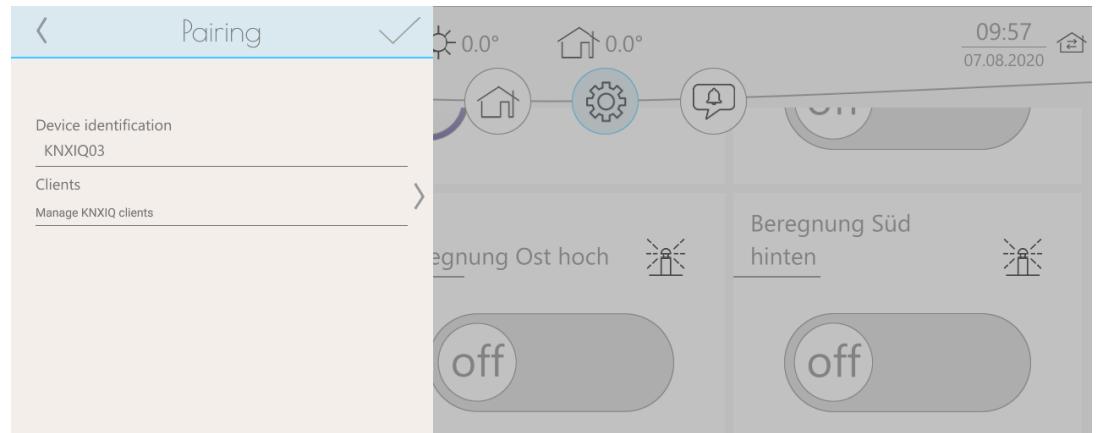


Up to a maximum of 10 client devices may be paired with one single DIVUS KNX IQ.

### 2.3.1 PAIRING - DEVICE SIDE

The clients are managed on the device that plays the server from this point of view. The order is this:

1. As an administrator, press PAIRING in the menu.
2. Enter an identification name for the device (for the clients to identify it).



3. Open the list of client devices. It'll be empty at first.
4. Create a new device by pressing the lower plus button.
5. Type in a name and then generate a pairing code.

6. Make a note of the generated code or leave the window open: you will need this code for the client-side configuration.

## 2.4 PAIRING - CLIENT SIDE

You can configure access to one or more devices from a client. Clients include PCs through the VISION application for Windows as well as mobile devices through their respective DIVUS VISION application for iOS or Android.

How to connect a client device to the DIVUS KNX IQ:

1. As administrator, click/press on Devices in the menu
2. Choose the device you want to pair to by keeping it clicked/push, then click/push the EDIT button which appears. If the desired device must be created yet, go to chapter 2.5
3. Finally, click on "**Start pairing**" and enter the code that you first generated on the device (see 2.3.1, item 6). Wait for the confirmation of the successful pairing.
4. Once at least one device is created, you can select it for work or operation from the client application.

## 2.5 DEVICES (CLIENT SIDE ONLY)

In place of *Pairing* you will find *Devices* in the menu on client devices. Here you create, configure and select the KNX IQs to which you can then connect.

### 2.5.1 ADDING A NEW DEVICE TO A CLIENT SYSTEM

1. as *administrator* click/press on Devices in the menu
2. click/press the "+" button at the bottom right of the menu
3. enter the **address** of the device via the search function or manually
4. if configured manually, also give the device a **name** - otherwise the name will be transmitted automatically via the search function.
5. the **serial number** is transmitted by the search function and cannot be entered manually.
6. **offline mode**: Activate this field if you intend to work on the project without connection to the device at the beginning. This field can be switched over later. See also chapter 1.1.2.
7. **default device**: Activate this field if you want your client application to start directly with this device / configuration.
8. **connection type**: Choose between "Direct" and "Cloud" here. See also chapter 1.1.2.

9. finally click on "Start pairing" and enter the code generated on the device (see 2.4.1, point 6). Wait for the confirmation of successful pairing.

10. When at least one device has been created, you can select it in the client application to work on it or control the automation system.

## 2.5.2 LEGEND OF DEVICE LABELS

Device label	Meaning
	Coupled: Changes are transferred directly to the device, operation of the visualization is also possible.
	Device selected automatically at startup.
	Direct network connection (LAN)
	Connected over cloud
	Offline mode: not connected. Changes remain stored on the client device and can be transferred afterwards. Commands are not routed via the device to the terminal devices in this mode.

## 2.6 APP

Application settings such as language, logging and demo mode can be configured here.

### 2.6.1 LANGUAGE

The languages available are English, German and Italian. "Auto" tries to select the language used by the client's operating system. If that is not available, English will be used.

Starting with version 4.15 of KNX IO this option is removed: the language is automatically the one set in the operating system via the general settings of the DIVUS Launcher.

### 2.6.2 DESIGN

Here you can choose between the dark and the light color scheme.

### 2.6.3 LOG

Application-specific logging can be activated here. The log file can then be deleted if necessary or sent to DIVUS support.

Attention: The log function should only be activated if necessary and preferably in consultation with our support department and should be deactivated after a problem has been solved, as otherwise it loads the storage medium of the KNX IO with write operations which may impair its functionality in the long term.

#### 2.6.4 DEMO MODE

For demo purposes you can activate the corresponding mode, which shows some prefabricated rooms with elements. Your current project will be preserved, i.e. as soon as you leave the demo mode you will return to the current project.

#### 2.6.5 SOFTWARE UPDATE HINT

This setting enables or disables the notification about updating the device. If enabled, it will appear on every application start.

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### 2.7 ABOUT VISION

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The current version number of the DIVUS VISION application can be read out here. Moreover you will also find the contact details to get in touch with us.



# 3 Creating a new visualization

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## 3.1 PREPARING THE PROJECT

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There are some mandatory preliminary tasks to complete before we can concentrate on the graphical part. These are:

1. Create and configure a default KNX driver
2. Export the esf file from the ETS software
3. Do the ETS import to build the project's set of data points

You need to complete them in the above order. Let's have a look at the single steps in detail now.

### 3.1.1 CREATE AND CONFIGURE A DEFAULT KNX DRIVER

1. Go to *Settings – Configuration – Drivers – KNX* as administrator.
  - The list will be empty the first time, so push the round plus button at the bottom to create a new driver.
  - If there is one which you want to edit instead, keep it pushed until the edit button appears.
  - **Never delete a driver which has datapoints associated to it** or you'll have to change each datapoint singularly. Also see chapter 4.2.
2. Enable driver: If you have multiple KNX drivers, you need to enable one of them. Only one driver at a time can be enabled, so you'll need to disable the currently enabled one before you can enable another one.
3. Interface type: Choose according to your KNX connection and your KNX IQ model.
4. **Scan for TP/IP Interface**: choose the physical address of the device or the IP address of the KNX/IP router to connect to.
5. Enable startup read: reads the values of all the involved datapoints of the project on start up.
6. Read status interval: defines the time between subsequent reads during startup
7. Save and make sure the desired driver shows as *enabled* in the list now.

### 3.1.2 EXPORT THE ESF FILE FROM THE ETS SOFTWARE

Depending on your ETS version, the option called OPC export may be in the menu or in the export options where you also export the knxproj-file (change the exported file type there).

If you are working on the KNX IQ device through the DIVUS Synchronizer app or directly, you need to upload the esf file to the device: go to the UPLOAD page and push the VISION icon there. For more details please refer to the DIVUS Synchronizer manual.

### 3.1.3 ETS IMPORT

Go to Configuration – Datapoints – ETS Import. You'll be presented with 4 submenu points:

- Select ETS OPC Export file

Choose the file previously exported from the ETS. If you used the Synchronizer to load it onto the device's storage, you will find it in the folder called VISION. The choice will then be kept until you explicitly change it – also after the import procedure is completed.

- KNX driver (Choose driver)

Choose the previously configured KNX driver. All the imported datapoints will be managed by this driver.

- Options

Go here to set some flags depending on whether you're importing into an empty project or not and some other general options.

- Import rules

Here you manage the import rules. Using naming logics (using specific keywords in the names assigned in ETS) you can automate the matching of group addresses and merge them into a single data point during the import process. Usually at least one rule will be defined. Adding more rules means that all rules will be applied.

**Example:**

In ETS writing 1 BIT group addresses have the keyword **On/Off** in the name. The corresponding status group addresses have the keyword **Status** instead of *On/Off* - the rest of the name is the same.

Kitchen Light On/Off	1/2/3
Kitchen Light Status	1/3/3

The logic will look for group addresses that have a part of the name **in common** and differ only for the keywords indicated in the rule: **On/Off** marks the command/write address while the status/reading address contains the word **Status**. As a result, VISION will create a data point consisting of the two group addresses identified by the rule. In this mode the current status of the light in the kitchen will always be shown correctly - whether you use VISION or a physical switch will make no difference.

Note that a keyword can also consist of several words.

**Example 2:**

You can also use only one of the two keywords. If, for example, the way to assign names and functions was not the one in the first example but this one:

Kitchen Light On/Off	1/2/3
Kitchen Light On/Off Status	1/3/3

As the colouring already indicates, you can see that the part of the name **in common** in this case also includes *On/Off* and what differentiates the two addresses is only the keyword **Status**. In the rule that makes this type of pairings, you will leave the keyword field for the command address empty and only value the second field with the keyword *Status*.

#### 3.1.3.1 Define a new import rule

4. Go to Settings – Configuration – Datapoints – ETS Import – Import rules
5. Push the round plus button
6. Choose a name for the rule (e.g. "R1")
7. As command keyword, choose the keyword you use in the ETS to identify commanding/switching addresses (e.g. "Kitchen light on/off" → "on/off")
8. As feedback keyword, choose the keyword you use in the ETS to identify feedback/status addresses (e.g. "Kitchen light status" → "status")
9. Save pushing the check symbol on the top right of the menu.
10. Make sure "Apply import rules" is enabled under *Options*.
11. (The import will then merge "Kitchen light **on/off**" and "Kitchen light **status**" into a single datapoint, as well as all other pairs using that same naming convention)

#### 3.1.3.2 Execute the import

When all the four points of the menu are set as desired, hit the NEXT above to start the import. After a few steps the procedure will be complete and you can go back to the datapoint list to find all the newly imported datapoints.

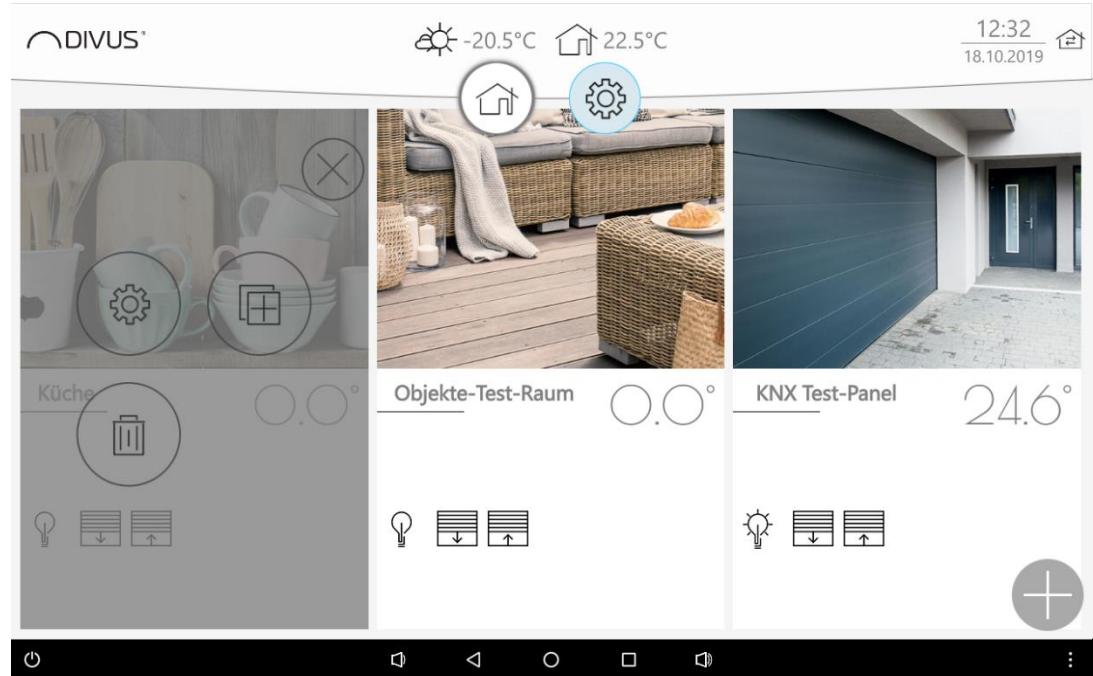
## 3.2 CREATING A NEW ROOM

How to create a new room:

1. Log on as an administrator (see chapter 2.1) if you haven't already.
2. Go to the rooms' overview - the quickest way is to press the Home button.
3. Press the plus button in the lower right corner.
4. Enter the required data for the new room (name, description, background).
5. The new room is shown as the last room after the existing rooms.

### 3.3 EDITING A ROOM

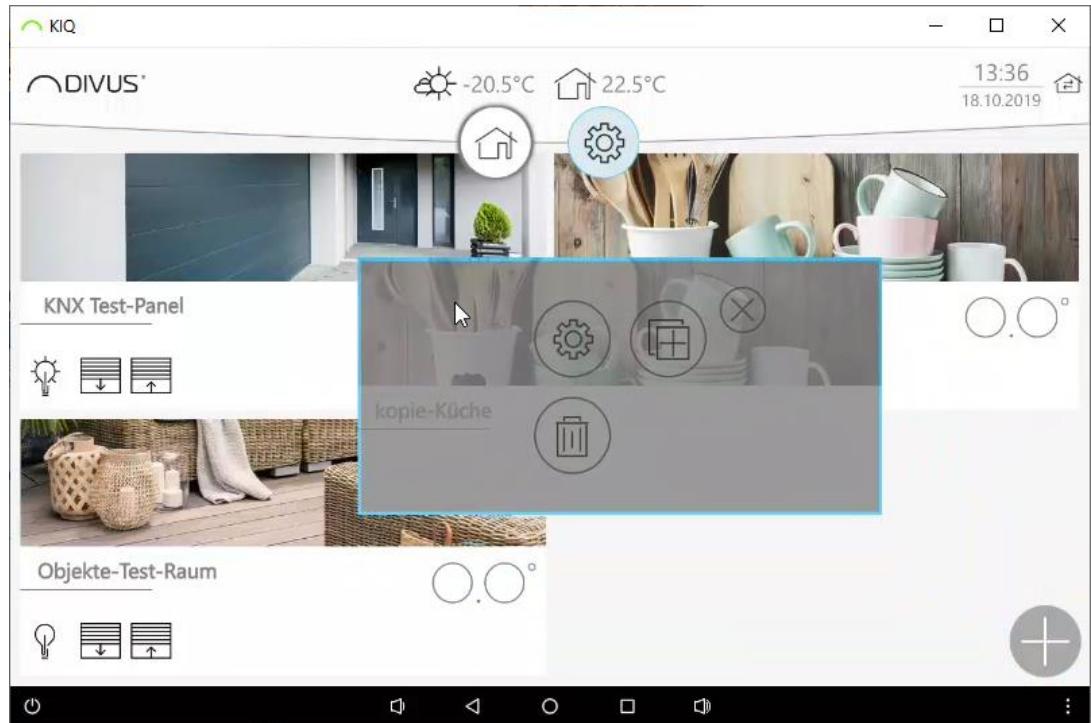
To edit a room, press and hold the finger or mouse pointer on its tile. Several icons appear on the tile:



- The *gear icon* leads (back) to the input form, where name, description and image can be changed.
- The *copy icon* allows you to copy the room (with its content). The copied room, like a new room, is added last to the existing rooms.
- The *trash can icon* is used to delete the room. Its content will also be completely deleted.
- The *X* closes this editing menu and the tile is displayed normally again.

### 3.4 MOVING A ROOM (OR CHANGING THE ORDER OF ROOMS)

1. Press and hold your finger or mouse pointer on a room tile until the Edit menu appears.
2. Then drag it to the desired position.
3. Then close the editing menu with the X symbol. The tiles are rearranged.



### 3.5 ADD A NEW ELEMENT TO A ROOM

1. As administrator, go to the desired room.
2. Then press the plus symbol at the bottom right.
3. Enter the element's name, description and type in the form that appears.
4. After the type selection a further menu item named *Parameters* appears, where the details of the element can be further configured. The available types are described below.

#### 3.5.1 ELEMENT TYPES

##### 3.5.1.1 On/Off

This type is used for all devices that have two possible states: on/off, up/down, play/pause, etc.

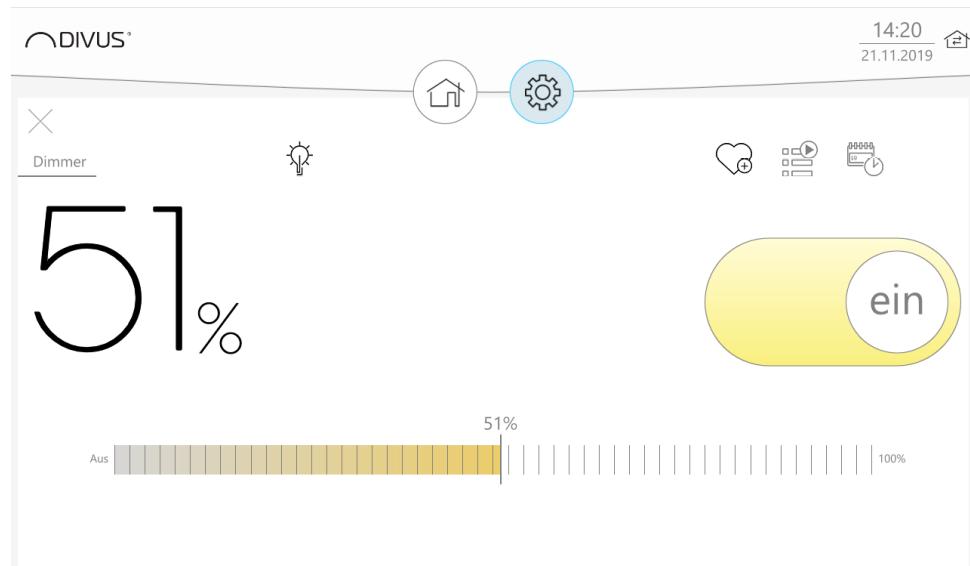
After selecting this type, the selection of a suitable icon and corresponding labelling of the two states appears as parameter. There is a choice to be made:

	General On/Off
	Light On/Off
	Presence Absent/Absent

	Door Closed/Open
	Lock Locked/Unlocked
	Alarm Alarm/Normal
	Windows Closed/Open
	Door lock Closed/Open
	Garage Open/Closed
	Ventilation On/Off
	Load On/Off
	Heating On/Off
	Climate On/Off
	Socket On/Off
	Sprinkler On/Off
	Skylight Closed/Open
	Day/Night

An on/off element has a single datapoint to link. More detailed information can be found in chapter 3.6.2.

### 3.5.1.2 Dimmers

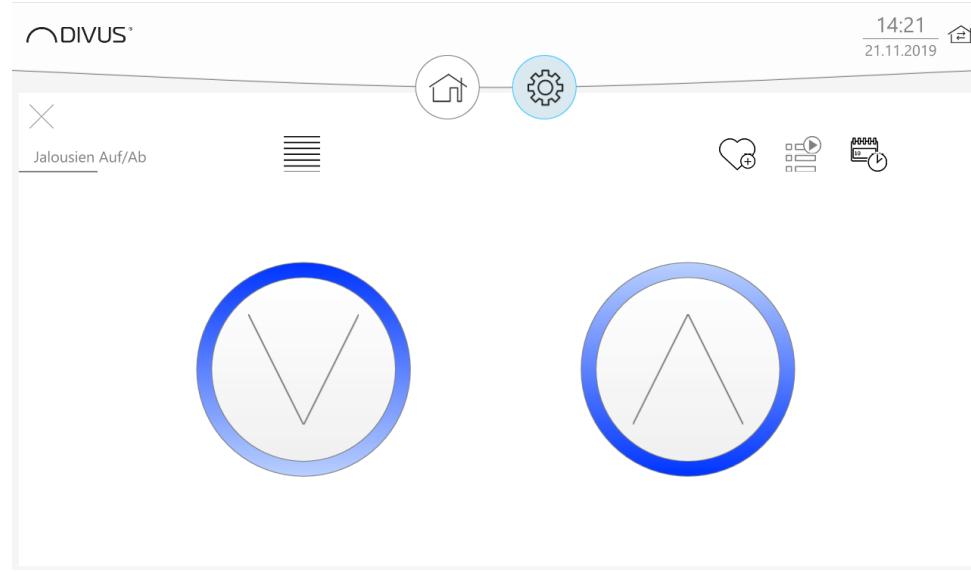


This element type has no parameters. It is then linked with 2 datapoints:

- On/Off (DPT 1)
- Dimming (DPT 5)

More detailed information on linking datapoints can be found in Chapter 3.6.2.

### 3.5.1.3 Shutter up/down

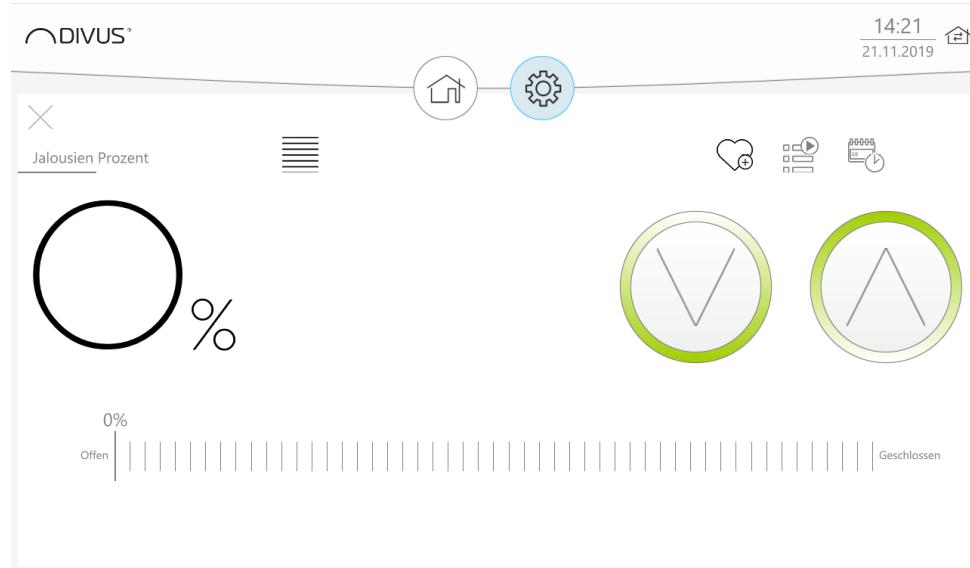


This element type has no parameters. It is then linked with 2 datapoints:

- Shutter up/down (move) (DPT 1)
- Shutter up/down step (stop) (DPT 1)

More detailed information on linking datapoints can be found in chapter 3.6.2.

## 3.5.1.4 Shutter percent

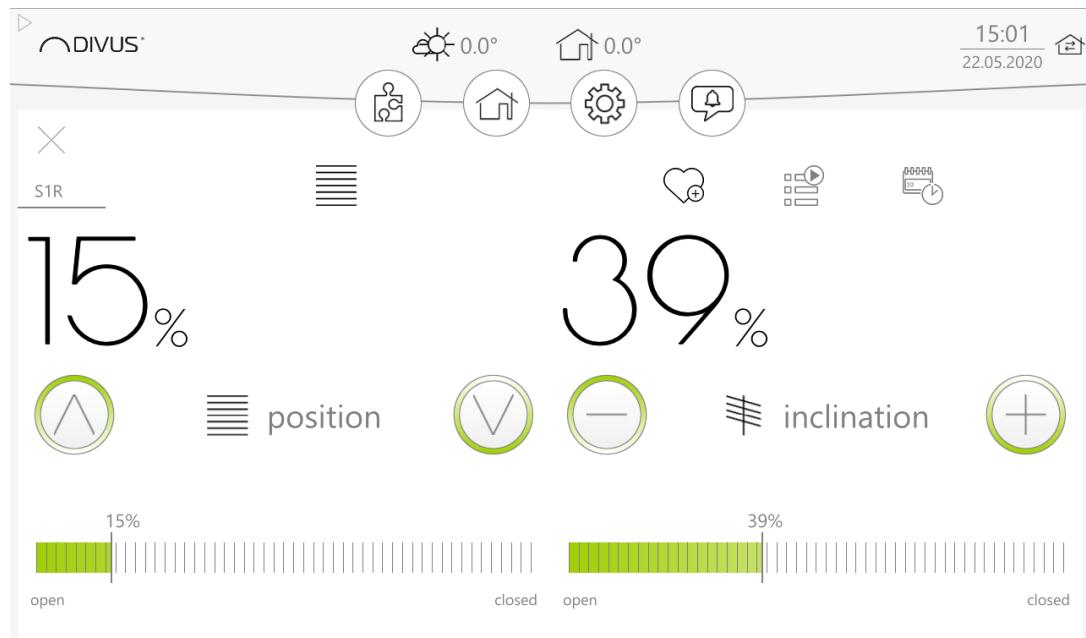


This element type has no parameters. It is then linked to 3 datapoints; the first two are the same as for element type Shutter up/down. In addition there is a 3rd datapoint for

- Shutter position (DPT 5)

More detailed information on linking datapoints can be found in Chapter 3.6.2.

### 3.5.1.5 Venetian blinds



This element type has two parameters:

- Venetian blinds slider control (enable/disable)
- Lamellae slider control (enable/disable)

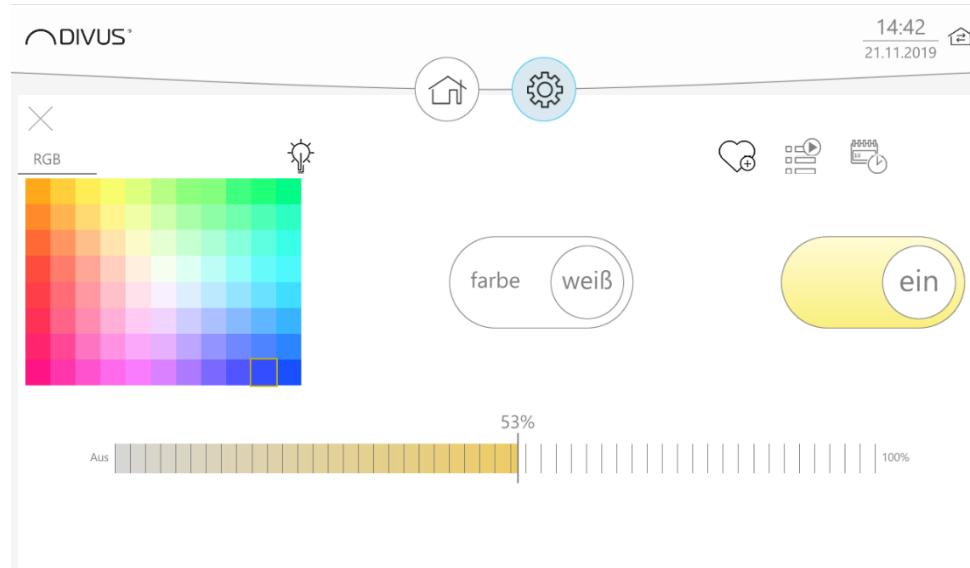
It offers up to 6 functions which need to be linked to a matching datapoint:

- Shutter up/down (DPT 1)
- Shutter up/down step (DPT 1)
- Shutter position (DPT 5)
- Slats up/down (DPT 1)
- Slats up/down step (DPT 1)
- Slats position (DPT 5)

This is the most complete type of element for blinds actuators.

More detailed information on linking datapoints can be found in chapter 3.6.2.

### 3.5.1.6 RGB



This element type has 2 parameters: The colour white (for RGBW devices) and the dimmer can be activated or deactivated. The datapoints for red, green and blue as well as for switching on and off are fixed. All in all:

- On/Off (DPT 1)
- RGB Color Red (DPT 5)
- RGB Color Green (DPT 5)
- RGB Color Blue (DPT 5)
- RGB Color White (DPT 5)
- Dimming (DPT 5)

The following applies to the operation of RGBW:

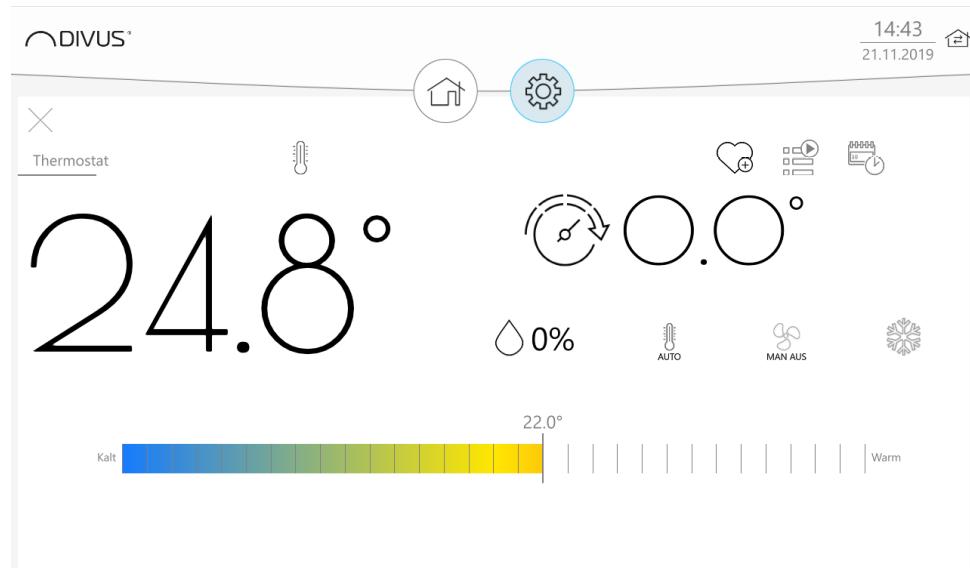
- If the *color/white* switch is set to **white**, use the slider at the bottom to switch the value of the white color (%).
- If the *colour/white* switch is set to **colour**, use the slider at the bottom to switch the brightness value of the light.



Attention: RGB group addresses of the type DPT 232 (3 bytes) are not supported. Instead, configure the colors in the ETS as separate (1 byte) values.

More detailed information on linking datapoints can be found in Chapter 3.6.2.

### 3.5.1.7 Thermostat

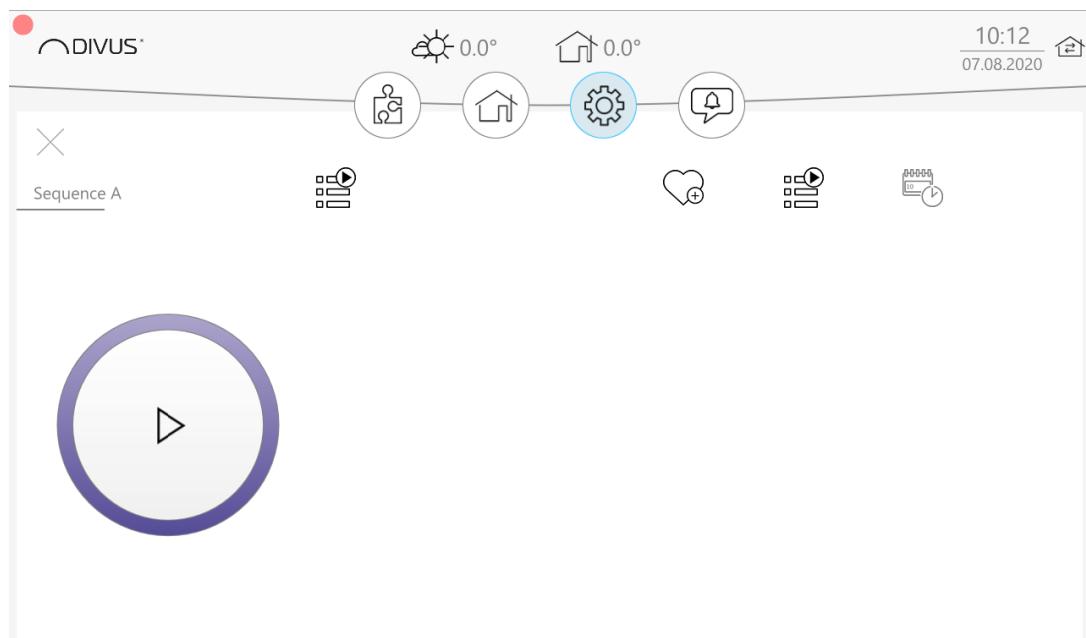


This element type has the widest range of functions, as does the physical device. Its parameters include:

- Mode
  - a. None
  - b. AUTO-COM-PRE-ECO-OFF
  - c. COM-PRE-ECO-OFF
  - d. COM-STBY-NIGHT-FROST
- Fan type
  - a. None
  - b. On/Off (status only) (DPT 1)
  - c. Off/Speed 1-3 (Status only) (DPT 1 + DPT 5)
  - d. Auto/[Man Off/On] (DPT 1)
  - e. Auto/[Man Off/Speed 1-3] (DPT 1 + DPT 5)
  - f. Auto/Man (DPT 1)
- Invert fan Auto/Man (0/1 or 1/0)
- Invert Winter/Summer (0/1 or 1/0)
- Enable operating mode

- Enable humidity
- Enable effective setpoint
- Enable setpoint
- Enable status icon
- Enable Winter/Summer
- Enable setpoint offset
  - a. Step width Offset
  - b. Min. value Offset
  - c. Max. Value Offset

#### 3.5.1.8 Sequence



This type of element is similar to KNX scenes but is managed by VISION directly. It allows to create a set of commands to be executed in sequence in order to reach a defined configuration of the environment. Once the functions to be set with the respective value have been set, the same result can be achieved at any time by reproducing the sequence.

**NEW** The smart buttons, starting from version 4.15, also offer the possibility to match a certain sequence with a certain numerical value sent to a specific 1 byte group address. Then by pressing a physical button, you can execute the desired sequence. For more details see chapter 2.2.7.4.

The parameters of the sequence are:

- *Stoppable* (you can interrupt the sequence during execution or not)

- *Enable smart button* (enables the sequence for pairing with a KNX button. See chapter 2.2.7.4)

#### 3.5.1.9 KNX Scene

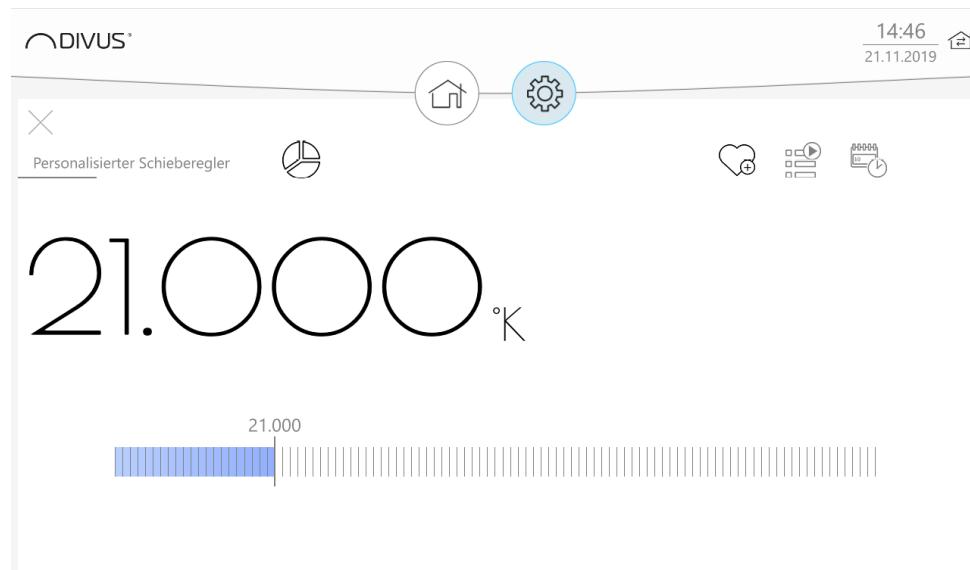
The KNX scene is similar in functionality to the sequence, but more limited. The configuration of the KNX scene must be done in ETS. Through this element it is possible to recall a certain scene, corresponding to a number (from 1 to 64) also defined in ETS programming level.

The parameters are:

- *Enable learning* (saves the current values of the involved group addresses and from then on sets using the new values)
- *Scene number* (scene number to be recalled from 1 to 64)

As a connectable function, there is a single datapoint that will match that of the *KNX scene* (DPT 5, 0-255).

#### 3.5.1.10 Custom slider



The custom slider can be used for many purposes. These icons are available:

None (element remains without icon)

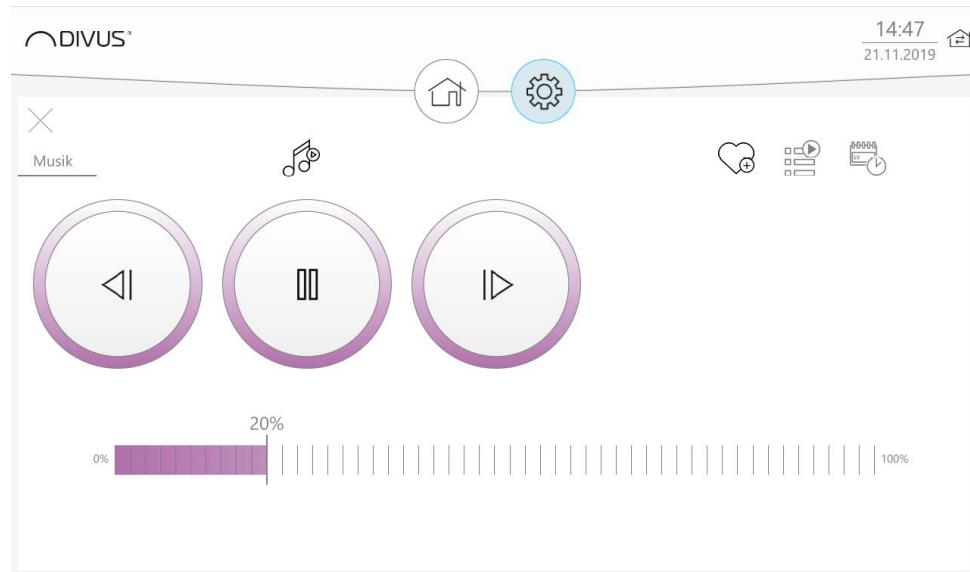
	General information
	counters
	data
	moisture

	heating
	light
	cooling
	temperature
	Weather
	ventilation
	Energy
	General measured value
	CO <sub>2</sub>
	Wind speed
	Brightness

Apart from the icon, you will find the following options under PARAMETERS:

Controls	All, only slider, only value can be selected
Unit	Shown after the value (e.g. °K)
Decimals	Number of decimal places
Label min.	Displayed to the left of the slider.
Label max.	Displayed to the right of the slider
Value min.	Minimum value (smallest value of the possible value range)
Max. value	Maximum value (largest value of the possible value range)
Tick step	Value between 2 ticks
Value step	Smallest possible value shift of the slider

### 3.5.1.11 Music



The parameters for the music element are:

Invert Play/Pause      Disabled: 0 Pause, 1 Play - Enabled: 1 Pause, 0 Play

---

Enable volume control      Enables/disables the *volume control*.

---

Enable previous/next      Activate/deactivate *Next/previous title*

---

Value for Previous      Enabled: transmits 1, Disabled: transmits 0

---

Value for Next      Enabled: transmits 1, Disabled: transmits 0

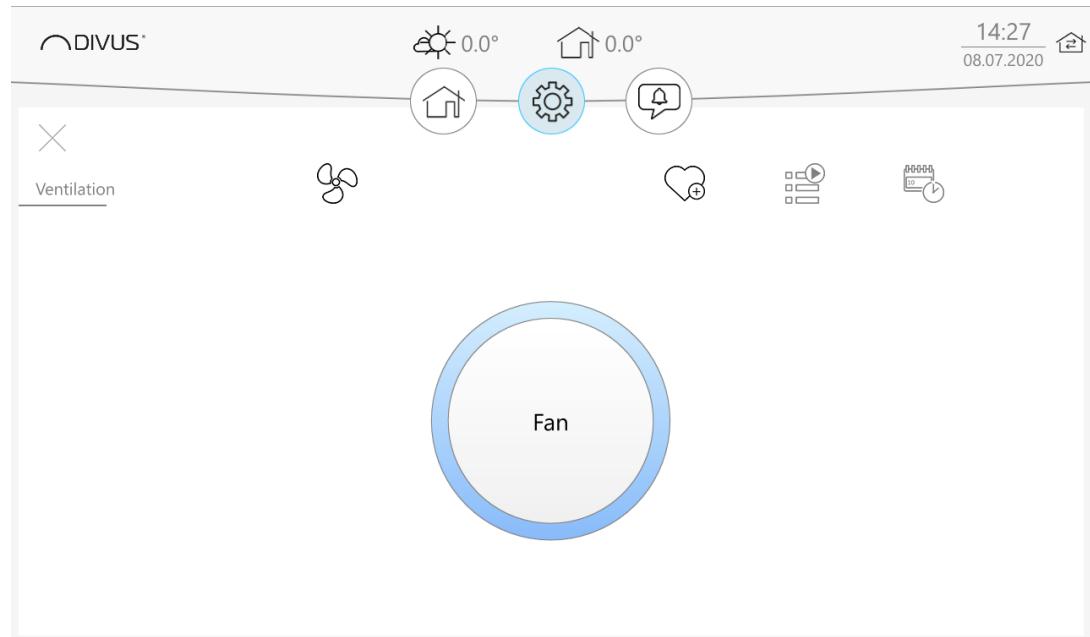
---

Enable track information      Activates/deactivates track title and artist

The functions that can be linked are, of course, those that were activated under PARAMETERS.

### 3.5.1.12 Command button

This element acts like a physical button: you can associate a command both to the pushing and the releasing action.



The parameters are

Icon	Choose one of the available icons (or none).
Value when pressed	Set the value to be sent when the button is pressed
Value when released	Set the value to be sent when the button is released
Label	The name to show inside the button

The command button element connects one single function: that of the value (which may be of any DTP)

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## 3.6 EDIT ELEMENT

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Similar to rooms (see chapter 3.3), you bring an element into edit mode by holding down its tile until the edit icons appear.



### 3.6.1 OPEN ELEMENT FORM

If you want to edit the name or other essential properties of the element, press the gear icon. In addition to the fields Name and Description, you have access to the submenus *Type* (see Chapter 3.5.1), *Parameters* and *General*.

#### 3.6.1.1 Submenu Parameter

Depending on the element type, you will find different configuration options that allow you to define the properties of the element in detail.

#### 3.6.1.2 Generic submenu

Here you can define general settings that influence the functionality of the control element:

- *Authorization level* By the explicit assignment of an element to a certain user level, this level is determined for the access (possession) of the element. At the same time, this means that lower access levels no longer have access to the functionality of the element. Locked elements remain visible, but when you click/press a button, the PIN entry window appears. The correct entry of an authorized PIN code remains active for 10 seconds. During this time you can switch several elements that are assigned to the corresponding level. After the 10 seconds you jump back to the previous authorization level.
- *Visible* Makes the element visible/hidden
- *Enable scheduling* The element can be controlled in schedules
- *Enable scenarios* The element can be integrated into scenarios
- *Status only mode* The element is used for operation (deactivated, default) or only to display its value (activated).

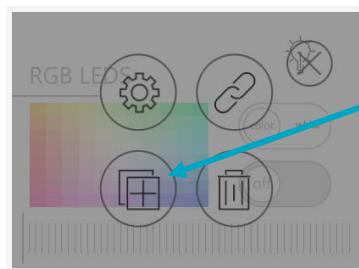
### 3.6.2 LINKING DATAPoints OF AN ELEMENT

This function links the visual element with the desired function in the background. Depending on the element type, there can be a single function or a variety of functions that you can link here. There are two possibilities:

- You can select an existing datapoint for the link (only the elements of the matching datapoint type are automatically displayed).
- You can create a new datapoint. In this case, the appropriate datapoint type is automatically preselected - you only need to enter a name and the group address(es).

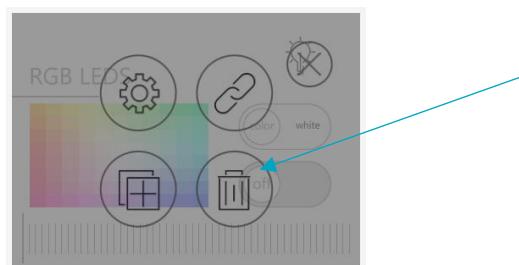
### 3.6.3 CREATE A COPY OF AN ELEMENT

Press and hold the mouse pointer or finger on the item until the Edit menu appears. Then press the copy icon.



### 3.6.4 DELETE ELEMENT

Press and hold the mouse pointer or finger on the item until the Edit menu appears. Then press the delete icon (Trash).




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## 3.7 SEQUENCES

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In general, only elements that have been activated for this purpose can be included in sequences. You can find this setting under the generic settings of the element:



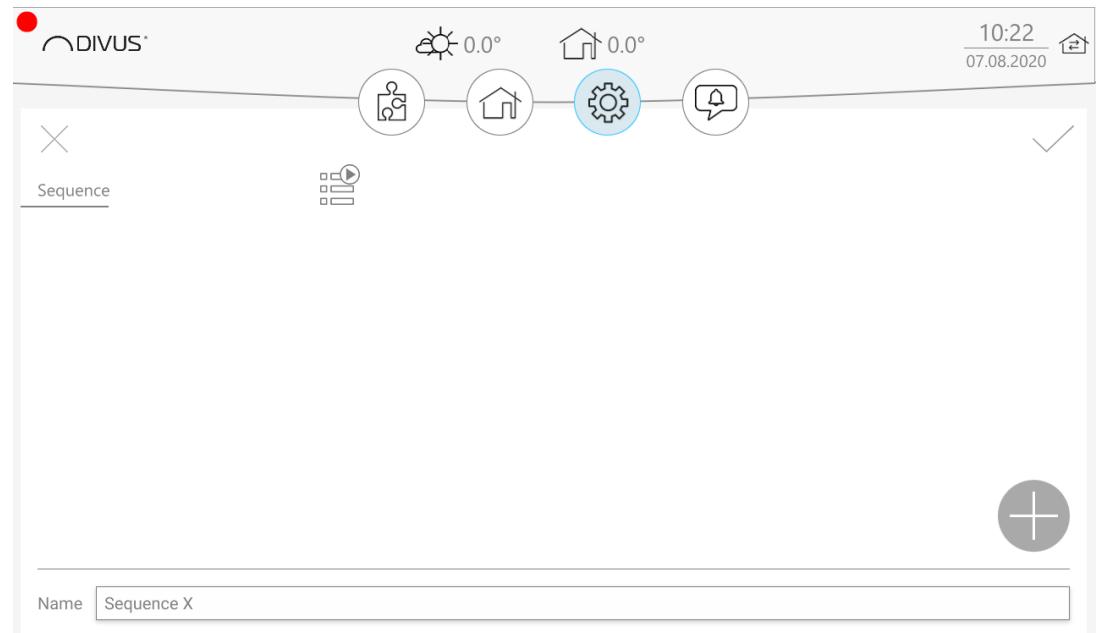
Moreover, scenarios can be generated in different ways: directly as element or indirectly when you create one starting from the scenario icon inside another element's detail view. In the latter case a scenario element will automatically be added to the same room as the generating element.

### 3.7.1 CREATE A SCENARIO AS ELEMENT

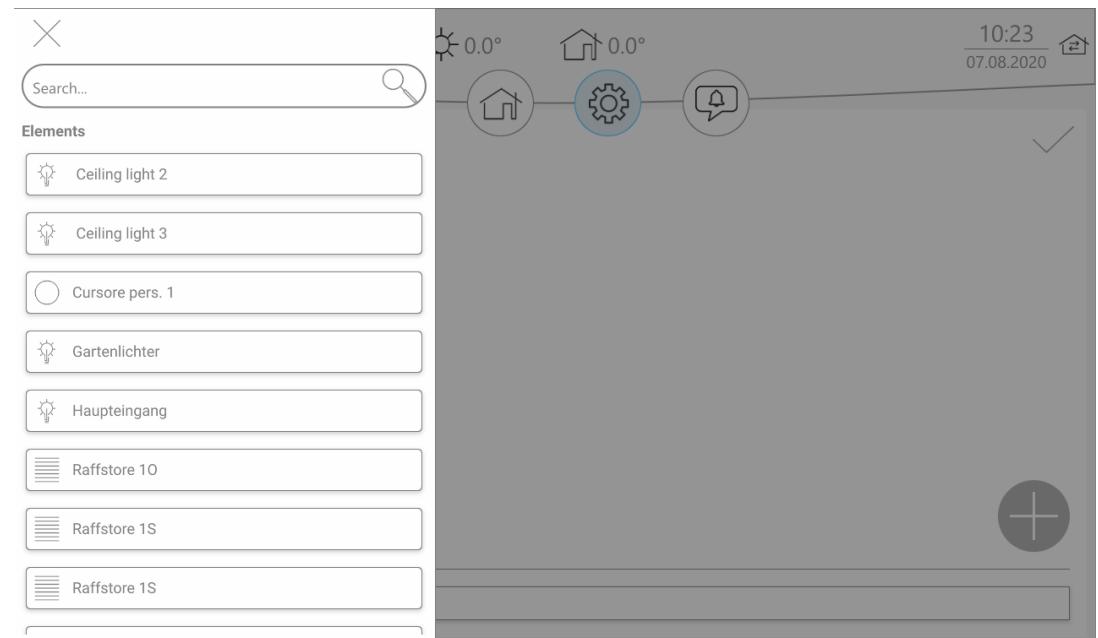
1. Go to the desired room as administrator
2. Use the plus button to add a new element of type *scenario*
3. This creates a new, empty scenario and displays it in the room.

### 3.7.2 CREATE A SCENARIO FROM ANOTHER ELEMENT

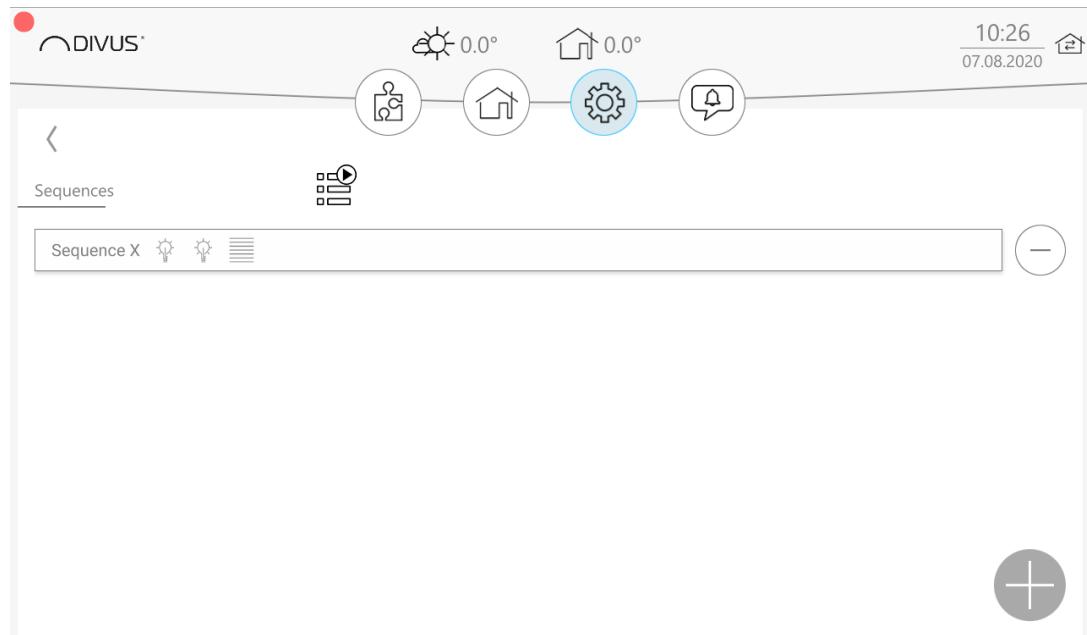
1. Go to an element enabled for scenarios
2. Press the scenario icon 
3. The configuration window for scenarios opens: choose an existing scenario or create a new one.



4. Enter a name (for a new one) and then add the desired elements and set their values.



- Finally save by clicking the ✓ icon. The list now shows the new scenario:



### 3.7.3 EDIT A SEQUENCE

To access the list of available sequences, proceed as for creating and click on the sequence that you want to edit. Save your changes with the ✓ icon at the end.

### 3.7.4 DELETE A SEQUENCE

To access the list of available sequences, proceed as for creating. Then click the minus symbol at the right end of the line of the sequence to be deleted. Confirm the deletion in the message that appears.

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## 3.8 TIME SCHEDULES

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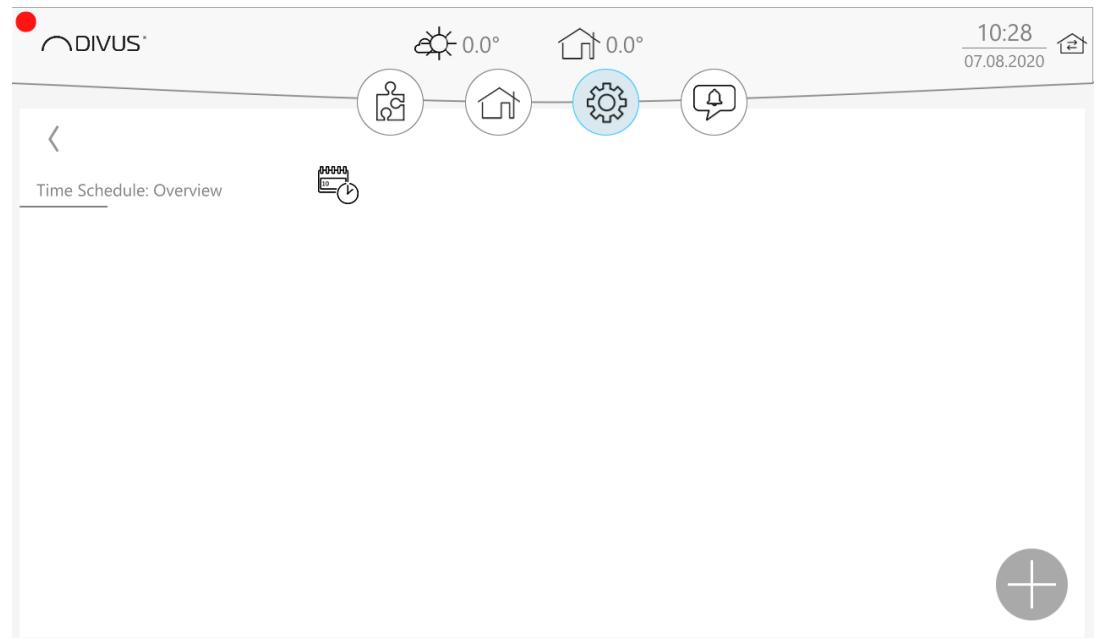
### 3.8.1 CREATE A NEW SCHEDULE

- Go to the detail view of the item for which you want to create a schedule.

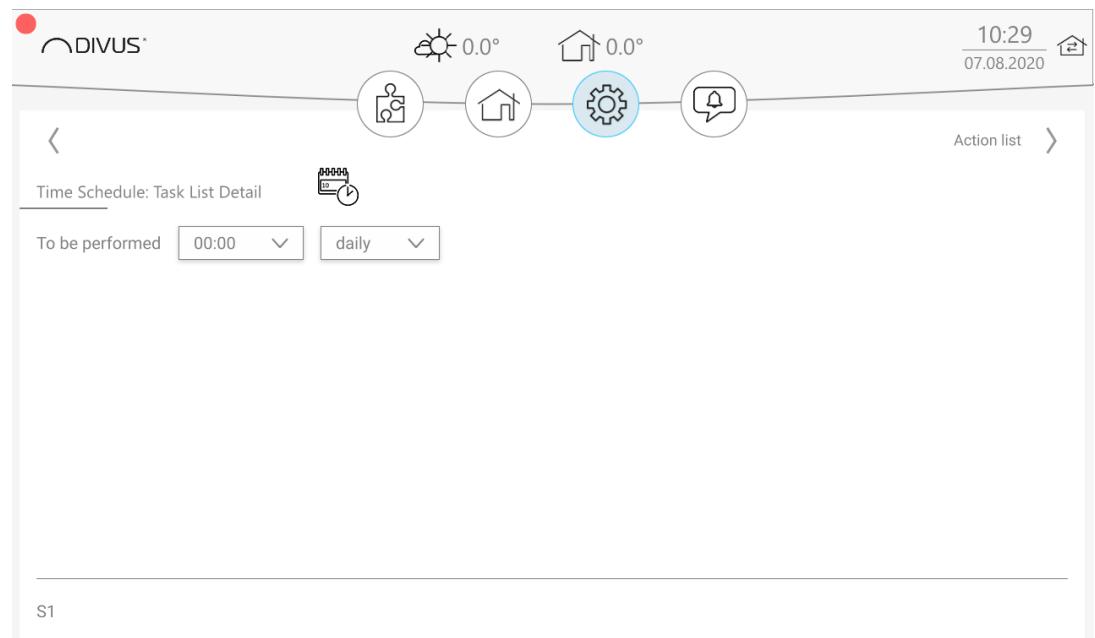
- Press the schedule icon.



- The scheduling configuration window opens. Press the plus symbol.



4. Enter the time and frequency of the first command. Then press the right arrow in the top right.



- Select the function of the element to be scheduled and its value.



- Go back to the task list and possibly repeat steps 4 and 5 for more scheduled commands. Save at the end by clicking the ✓ icon.

### 3.8.2 EDIT A SCHEDULE

- Go to the detail view of the desired element.
- Click/press the schedule icon.
- Select the desired schedule and then edit its desired tasks.

### 3.8.3 DISABLE/ENABLE SCHEDULE

- Go to the detail view of the desired element.
- Click/press the Schedule icon.
- You can disable (switch to the left) or enable (switch to the right) the time schedule using the switch on the right (before the minus symbol). Newly created schedules are initially enabled automatically.



### 3.8.4 DELETE SCHEDULE

1. Go to the detail view of the desired element.
2. Click/press the *schedule icon*.
3. You can delete the schedule by clicking the minus symbol.



# 4 Troubleshooting

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## 4.1 Changing the physical address of a TP-KNX driver

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To change the predefined physical address of a KNX driver, proceed as follows:

1. Logged on as administrator, go to *Configuration - Driver - KNX* to reach the driver list.
2. Select the desired driver and keep it pushed
3. Push EDIT
4. Repeat the address scan
5. Edit the address which results from the scan by keeping it pressed and then pushing *EDIT*.
6. Enter the desired physical address
7. Save with the "✓" icon

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## 4.2 CHANGE KNX DRIVER (CHANGE FROM TP TO IP OR VICE VERSA)

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If you transfer a project from a KNX IQ TP to a KNX IQ IP (or vice versa), you must change the driver configuration. It is important **not to delete the current driver and create a new one, but to edit the existing one!** This updates all datapoints that were previously configured for the other, no longer existing driver and you do not have to change them individually.

---

## 4.3 TRANSFER EDITED PROJECT BETWEEN CLIENT DEVICE AND KNX IQ

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If you have finished editing in offline mode and want to transfer the project to KNX IQ, proceed as follows:

1. Log on to the client device as administrator.
2. To be safe, export the current project to a file.
3. Go to *Devices* in the menu and select the device for which you want to transfer the project.
4. Press and hold the row of the device, then press EDIT.
5. Deactivate the offline mode in the device form and check that the other entries are (still) correct.

6. Save.
7. Now the 2 devices will try to connect.
8. If the connection is successful, an automatic control of the respective projects follows. The possible cases are these:
  - A. Client device has local project data. In this case, a message appears indicating the direction in which synchronization is to be performed. In our case we choose to transfer the project from the client device to the KNX IQ device. It would still be possible to overwrite the local project with that of the KNX IQ.
  - B. Client device has no project data. In this case, the project is transferred from KNX IQ to the client device.



**Warning:** Currently it may happen that you work on your PC and have it connected to the KNX IQ and therefore work directly on the device's project. If later you are disconnected but not in offline mode and continue to work on the project on your PC, you may lose all those changes once you reconnect to the KNX IQ which will overwrite the PC project with its "old" one. To avoid this, you may either save the project and import it once you are connected again to the KNX IQ, or you may switch to offline mode and then back to online once you are connected again.

## 4.4 NOTES

