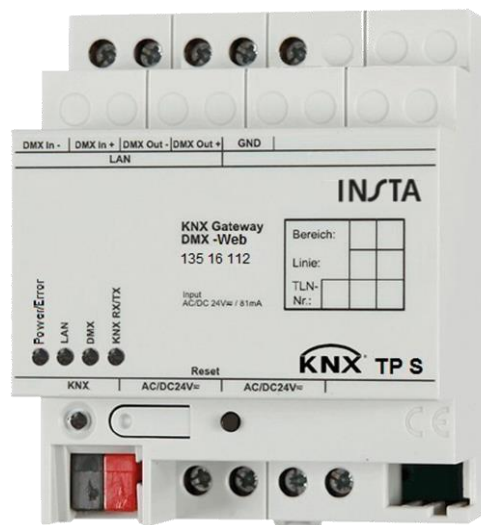


## KNX Gateway DMX-Web, DMX-Gate4 Tool software



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## 1 Description of functions

The *KNX gateway DMX-Web* is an intelligent DIN-rail mounted system device for coupling of DMX512 systems to the KNX/EIB. To this effect, the KNX gateway DMX-Web is connected with the KNX and the DMX512 bus. The gateway requires 24 V AC/DC supply voltage.



For connection of the KNX gateway DMX-Web the mounting and operating instructions must be observed.

The functionality of the KNX gateway DMX-Web is set by programming.

## 2 Hardware description

### 2.1 Device configuration

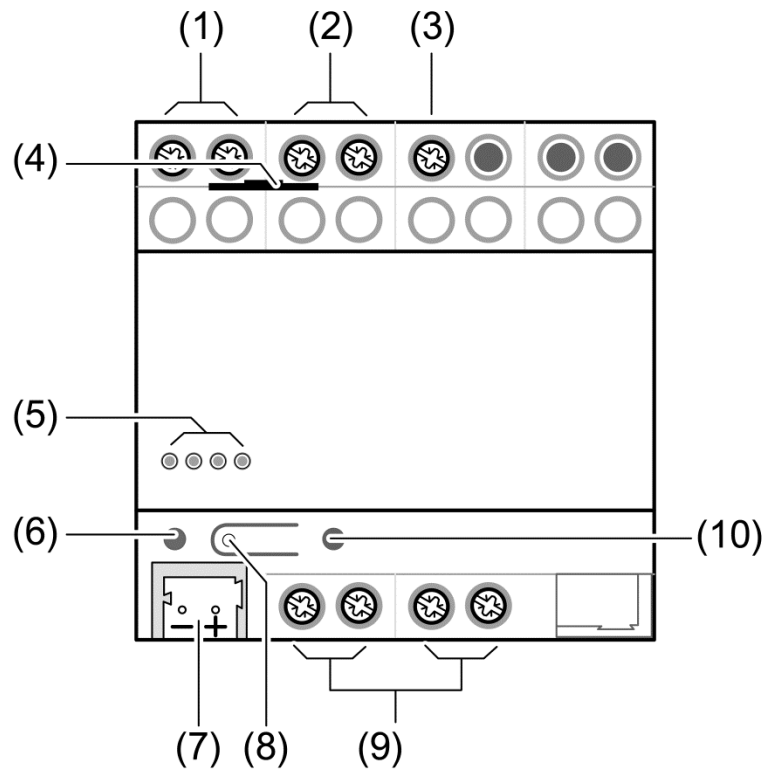


Fig. 2-1: Device configuration

- |      |                                    |
|------|------------------------------------|
| (1)  | DMX input (DMX IN - / DMX-IN +     |
| (2)  | DMX output (DMX OUT - / DMX-OUT +) |
| (3)  | DMX ground (GND)                   |
| (4)  | Ethernet/IP port                   |
| (5)  | Status LEDs                        |
| (6)  | Programming LED                    |
| (7)  | KNX port                           |
| (8)  | Programming key                    |
| (9)  | External supply port               |
| (10) | Reset key                          |

## 2.2 Status displays

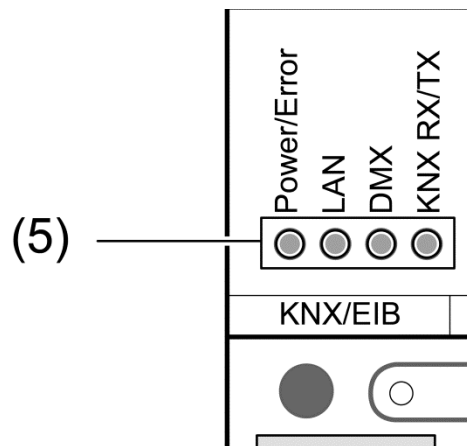


Fig. 2-2: Status LED

Power/Error	Shining green: normal operation Flashing orange: invalid or no project Flashing red: invalid firmware
LAN	Shining yellow: Receiving via Ethernet/IP interface
DMX	Flashing green: Receiving/transmitting via DMX interface Flashing red: For one second no receiving/transmitting of valid DMX messages
KNX RX/TX	Flashing green: Receiving from KNX bus. Flashing red: Transmitting to KNX bus. Flashing red-green: No KNX bus detected

## 2.3 Technical data

### External supply

Rated voltage AC/DC	AC/DC 24 V SELV ( $\pm 10\%$ )
Mains frequency	50 / 60 Hz
Power consumption	max. 2 VA

### Ambient conditions

Ambient temperature	- 5 °C to + 45 °C
Storage and transport temp.	- 25 °C to + 70 °C

Humidity

(ambient / transport / storage)

Protection class

III

Installation width

72 mm / 4 modules

Weight

approx. 175 g

### Network communication

Bit rate IP	10 / 100 Mbit/s
Ethernet/IP port	RJ45 socket

### KNX

KNX medium	TP 1
Commissioning mode	S-Mode
Rated voltage KNX	DC 21 V ... 32 V SELV

KNX port

Standard KNX / EIB bus  
connection terminals

Power consumption KNX

typ. 150 mW

### DMX

Input interface	USITT DMX512-A
Output interface	USITT DMX512-A

### Supply and DMX port

Port type	screw terminals
Single-wire	0.5 ... 4 mm <sup>2</sup>
Finely stranded without wire-end sleeve	0.34 ... 4 mm <sup>2</sup>
Finely stranded with wire-end sleeve	0.14 ... 2.5 mm <sup>2</sup>

## 3 KNX Gateway DMX-Web

### 3.1 Operation modes

The *KNX Gateway DMX-Web* is used for unidirectional data exchange between KNX and a DMX system. It supports the two operation modes *DMX-Master* and *DMX-Slave*.

In operation mode *DMX-Master*, the gateway receives new values of its communication objects via the KNX group addresses. The gateway decodes these values into DMX data bytes and sends them via the connections *DMX Out +* and *DMX Out-*.

In operation mode *DMX-Slave* the gateway receives data bytes from the DMX via the connections *DMX In +* and *DMX In -*. The gateway encodes the DMX values into values of its communication objects and sends them via KNX group addresses.

The operation mode is set with starting the projecting software *DMX-Gate2* or with creation of a new project. It cannot be changed within an existing project.

### 3.2 Interfaces

The gateway has four different interfaces which are used depending on the active operation mode.

#### 3.2.1 KNX

KNX connection is effected via a standard KNX bus connection terminal (8).



### 3.2.2 DMX IN

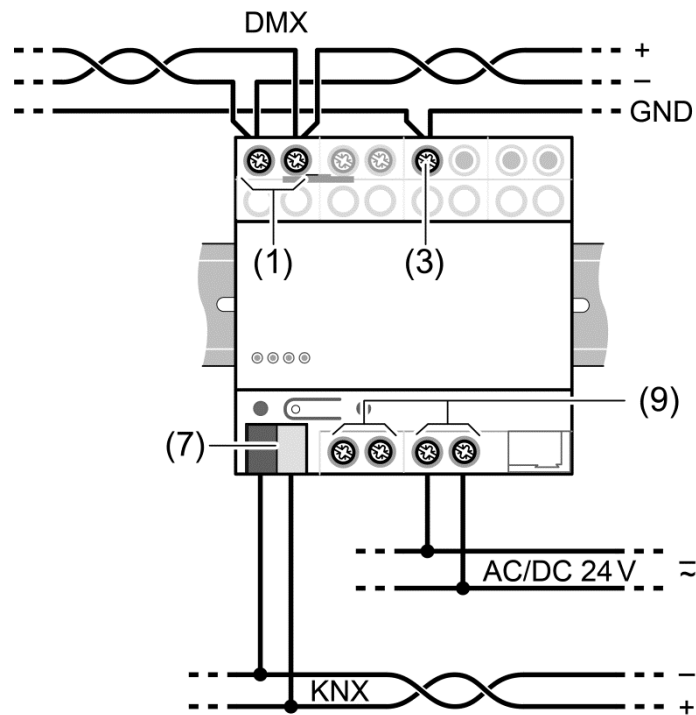


Fig. 3-1: Connection - operation mode Slave

Using the gateway in operation mode *DMX-Slave*, connection is made via the two screw terminals *DMX IN* (1) in combination with the *GND* port (3). The ports *DMX OUT* are not used in this operation mode.

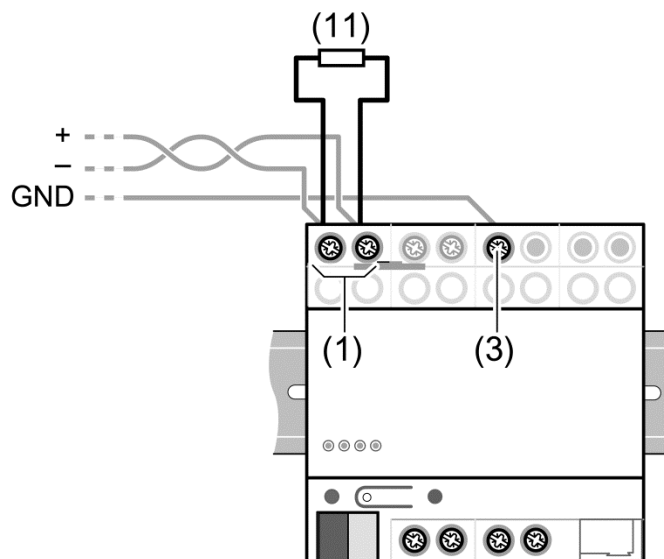
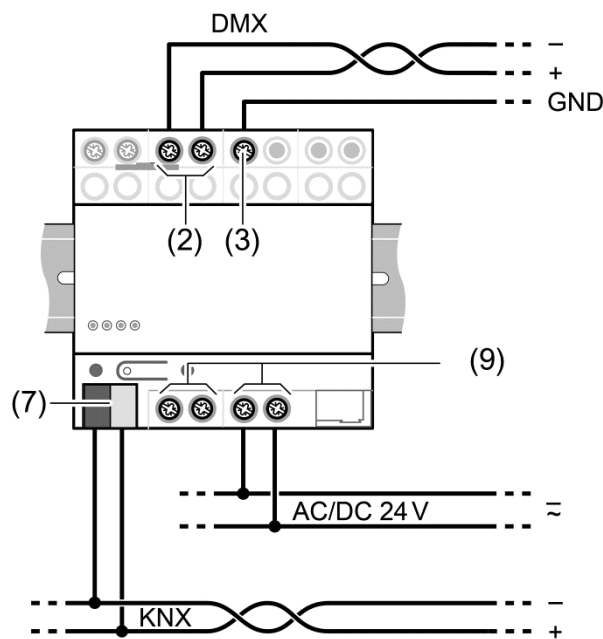


Fig. 3-2: Terminating resistor

At the last device within the DMX installation, the DMX bus should be terminated by means of the terminating resistor supplied (11).

### 3.2.3 DMX OUT



**Fig. 3-3: Connection - operation mode Master**

Using the gateway in operation mode *DMX-Master*, connection is made via the two screw terminals *DMX OUT* (2) in combination with port *GND* (3). The ports *DMX IN* are not used in this operation mode.

In a DMX system only one single data generator is admissible. If the gateway is to be used with another DMX data generator, (e.g. DMX-lighting control desk), a so-called DMX merger is needed.

At the last device within the DMX installation, the DMX bus should be terminated by means of the terminating resistance supplied (13)

### 3.2.4 LAN

The gateway is taken into operation via the Ethernet/IP-interface. Mains or PC connection is made via the RJ45 LAN socket.

For direct connection of a PC, a crosslink network cable might be needed.

## 3.3 DMX function groups

### 3.3.1 Distinction KNX - DMX

In the two systems DMX and KNX, dimmers are controlled differently.

In the KNX system each dimmer can be controlled via three different communication objects, the last command received determining the resulting brightness value.

- With a 1-bit-object, the dimmer can be switched on or off. Mostly, the brightness value used for switch-on can be defined in the parameters of the dimmer.
- With a 4-bit-object, the brightness value of the dimmer, based on the current value, can be changed with the commands „brighter“, „darker“ and „stop“. The resulting brightness value is not determined exactly. The dimming speed can also be defined in the dimmer parameters. During dimming no further telegrams are needed until the stop command.
- With a 1-byte-object defined brightness values between 0% and 100% can be set.

In the DMX system the master sends a continuous data stream. One byte of this data stream is used for the brightness value of each channel.

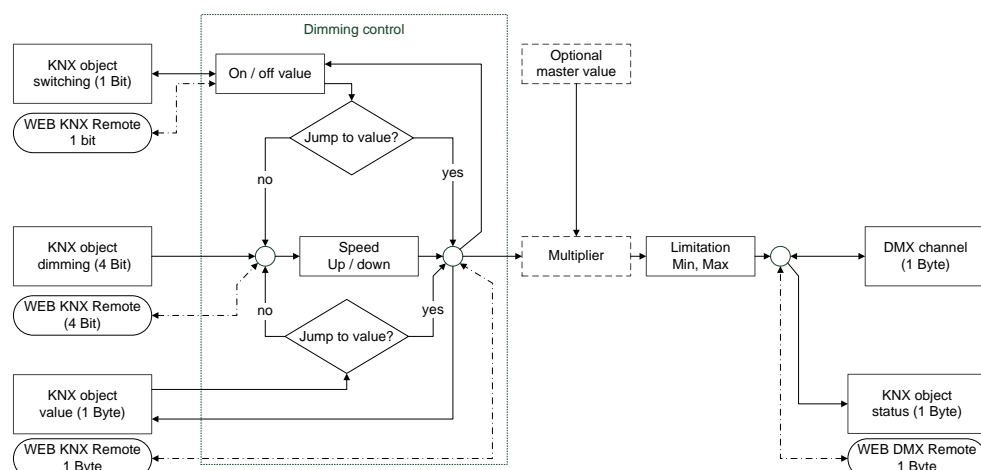
- Value 0 corresponds to OFF-state. (0%). Values 1 to 254 correspond to 0.4% to 99.6%. Value 255 corresponds to ON-state (100%)
- In dimming processes, the value of a channel is changed gradually.

The gateway has different function groups to adapt the two bus systems.

### 3.3.2 Switch, dimmer, value

#### 3.3.2.1 Dimming function - Master

In operation mode *Master* the gateway corresponds to a dimmer of the KNX system.



**Fig. 3-4: Dimming function Master**

Having received a new value from the KNX bus, the gateway calculates the new value of the DMX channel which is then sent.

When switching via the 1-bit-object, the values the gateway takes on for switch-on and switch-off can be set separately. These values are

set either directly or under consideration of the speed of the dimming function.

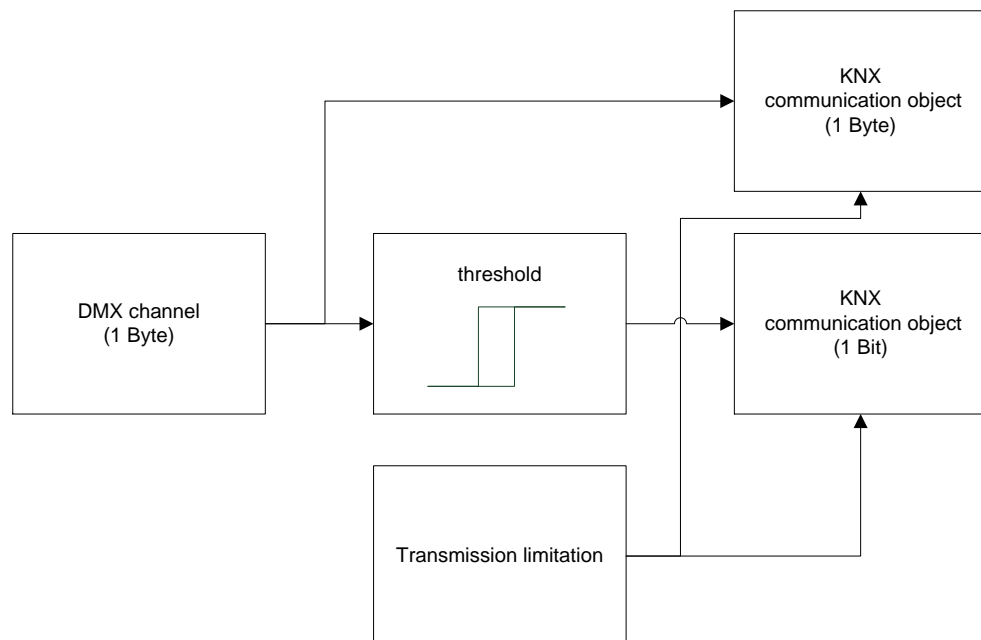
The value for switch-off is also used as threshold for the response of the switching state. If the value calculated by the dimming control rises above the switch-off value, the 1-bit-object sends the value 1. If the value calculated by the dimming control is smaller than or equals the switch-off value, the 1-bit-object sends the value 0. For the response function the transmitting-flag of the object must be set.

Depending on the transmission limitation of the gateway, the response can be delayed (see also *KNX setups*).

In case of DMX groups with DMX master channel all channels of the DMX group can be dimmed at a time. To this effect, the value calculated by the dimming control is multiplied by the value of the DMX master channel.

In addition, there is the possibility to limit the value range used by the DMX channel. To this effect, the value range of the dimming control is scaled to the value range of the DMX channel under consideration of the DMX master channel. Within a DMX RGB or a DMX RGBW group all channels should use the same value range. Otherwise there might be shiftings in the light colour.

### 3.3.2.2 Dimming function Slave



**Fig. 3-5: Dimming function – Slave**

In a DMX system, the values of all DMX channels are sent continuously. In operation mode Slave the gateway receives the values of all DMX channels.

When using a 1-bit-object, the gateway considers separate switching thresholds for the value "0" and the value "1". If the DMX value is smaller than or equals the lower switching threshold, the 1-bit-object receives the value „0“. If the DMX value is greater than or equals the upper switching threshold, the 1-bit-object receives the value „1“. In case of DMX values between the switching thresholds, the value of the 1-bit-object is not changed. For an unambiguous determination of the object value, the two switching thresholds must not be identical.

When a 1-byte-object is used, the DMX value is passed on to the KNX communication object with any modification.

Due to the different transmission speeds, the gateway must run a filtering before sending via KNX communication objects.

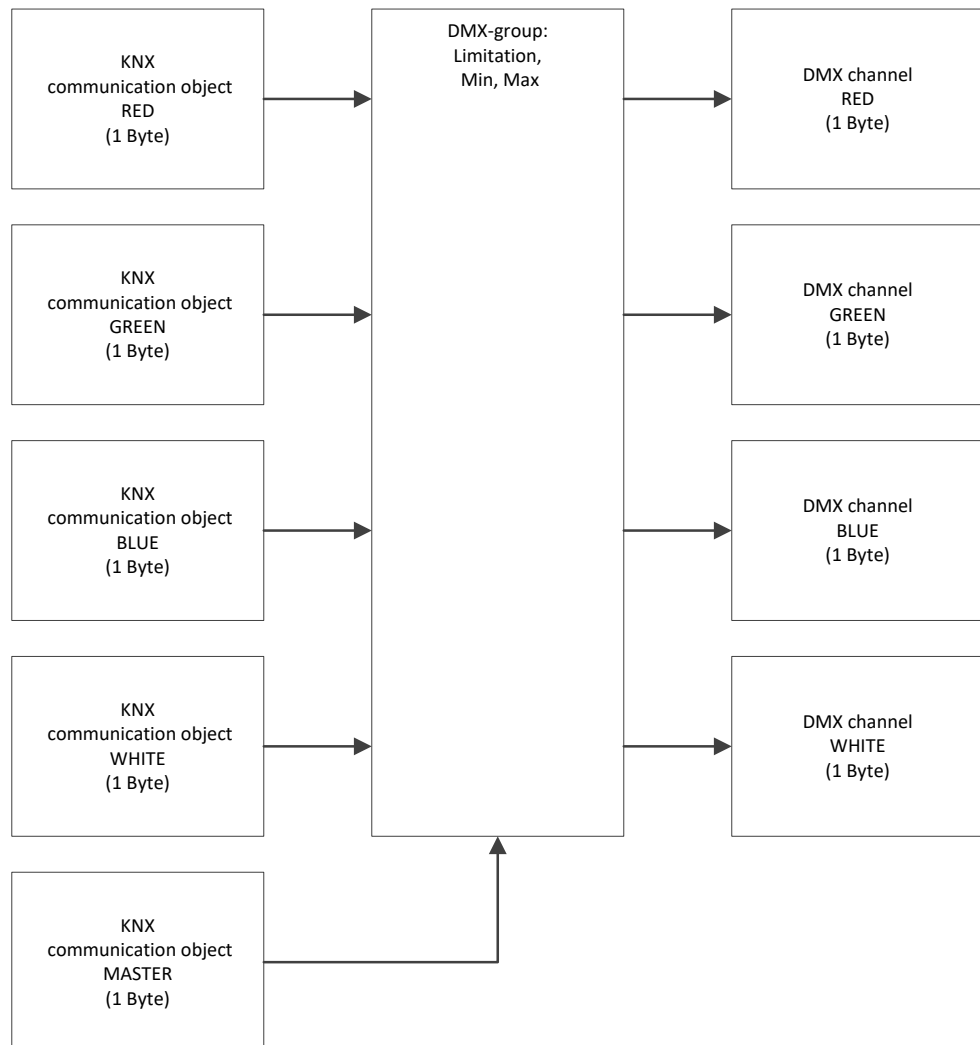
This is realized by the transmission limitation which is set in the KNX parameters of the gateway.

In case the values of a larger number of DMX channels are modified continuously, this might lead to a delay in the responses.

### **3.3.3 RGB, RGBW**

The function groups RGB and RGBW are used especially for controlling luminaires with adjustable light colour. These function groups have got three or four DMX channels for the individual colour

components and a common master input with which all colour components can be dimmed at a time.



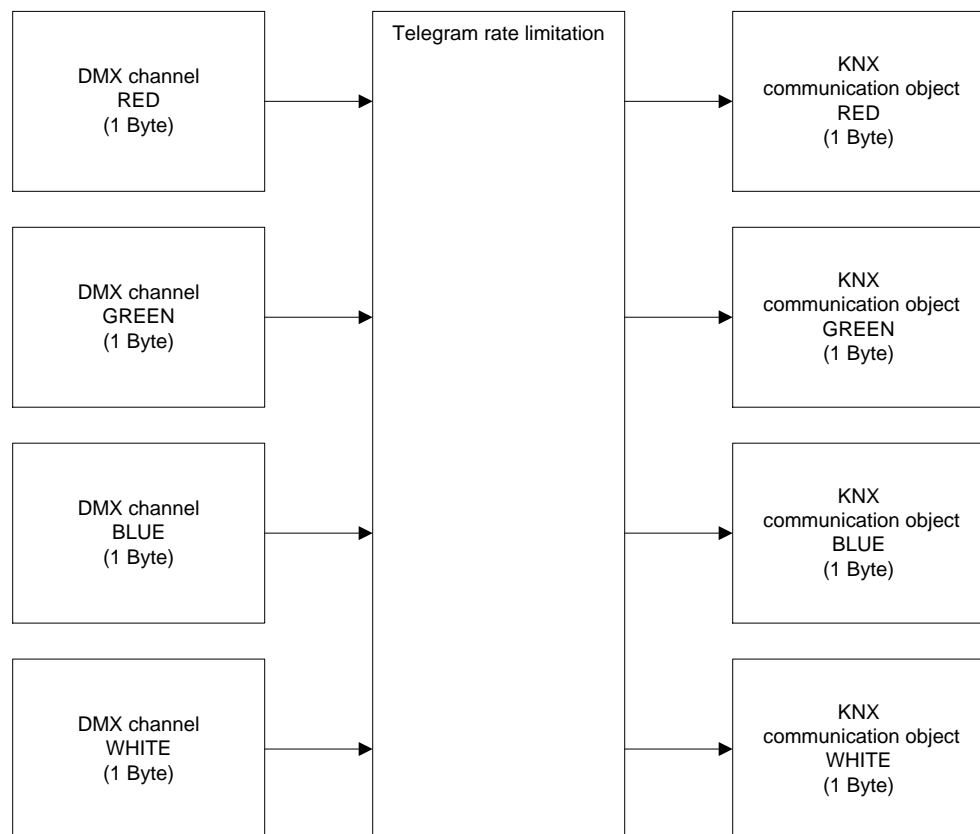
**Fig. 3-6: RGBW – Master**

After a restart of the gateway, the master input has the value 100%. So the input values of the colour components and the values of the simple function groups are converted to the relevant DMX channels.

If the desired light colour is set via the individual colour components, on receipt of a new value of the master communication object all colour channels are dimmed uniformly under consideration of the maximum and minimum value.

The new value of the DMX channels is calculated as follows

$$\text{DMX-channel} = \text{KNX-channel} * \text{KNX-master} * (\text{Max} - \text{Min}) + \text{Min}$$



**Fig. 3-7: RGBW – Slave**

In operation mode *Slave* the working principle of the DMX function groups RGB and RGBW corresponds to the working principle of the individual function groups Switch or Value. Here also, after changing a DMX channel, the gateway considers the set telegram rate limitation.

### 3.3.4 Freely defined groups

The DMX groups can be extended by new DMX channels. This makes it possible, for instance, to control several RGW/RGBW luminaires via one master object.

### 3.3.5 Limit values

In case of gateways which are used as *Slave*, up to four DMX channels can be monitored via a limit value function. Here the pertaining limit value can either be set firmly or it can be adapted during operation by means of a default value or a teach-in function.

➡ See also 4.3.6 *Edit limit value - Slave*

## 4 DMX-Gate4

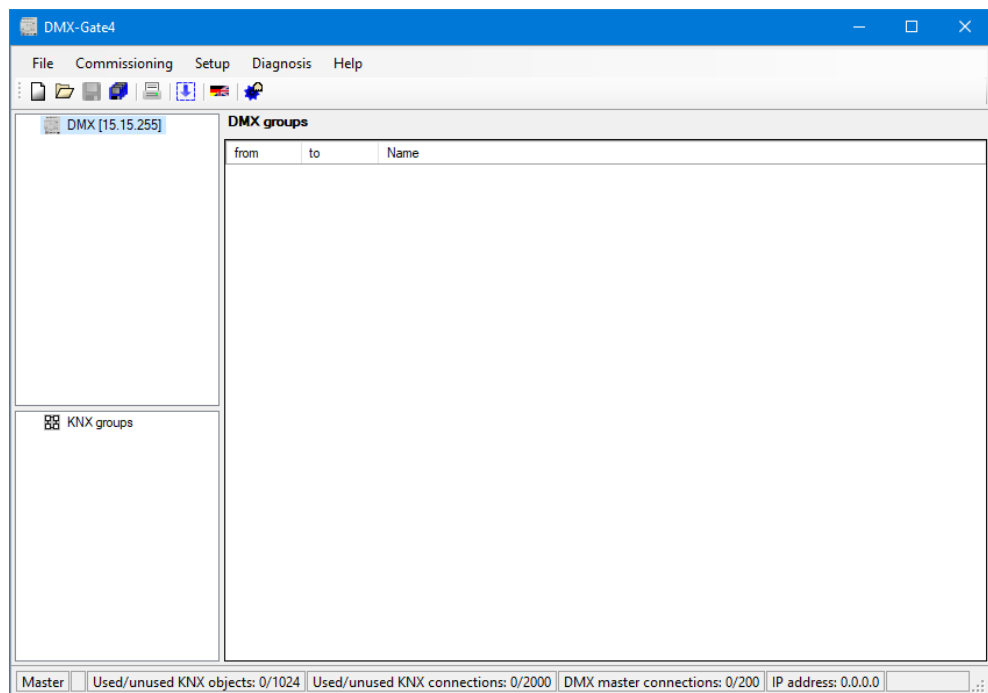
### 4.1 Starting the program

With the first program start, the DMX-Gate4 shows an empty project for a gateway in operation mode Master. Afterwards the project that was last worked on is opened.

### 4.2 Main window

The main window is splitted into six areas

- Menu
- Tool bar
- DMX tree topology
- KNX tree topology
- List view
- Status bar



**Fig. 4-1: Main window DMX-Gate4**

In the DMX tree topology you can navigate on the DMX groups/channels of the gateway. By clicking one entry, the pertaining information is listed in the list view. By means of the right mouse key, new DMX groups and new DMX channels can be generated in the DMX tree topology.

In the KNX tree topology you can navigate on the KNX group addresses. By clicking one element, the pertaining information is listed in the list view. By means of the right mouse key, e.g. new DMX group



addresses can be generated in the DMX tree topology. By means of drag-and-drop from KNX to DMX tree topology, KNX group addresses can be linked with DMX channels.

In the list view further information on the currently marked element of the DMX or KNX tree topology is shown.

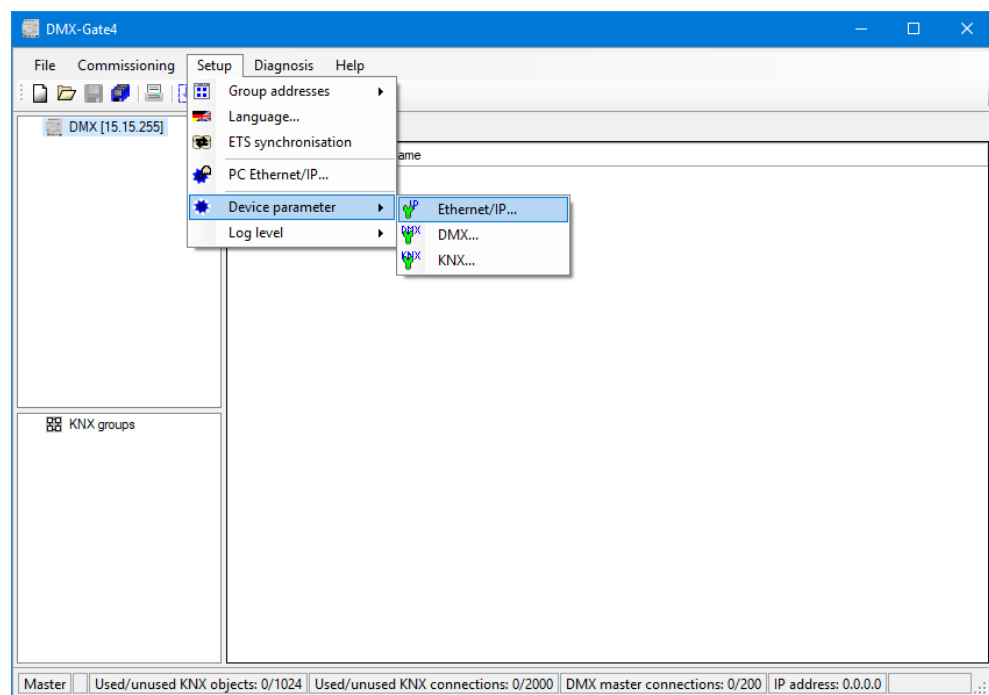
In the status bar at the lower edge of the main window status information on the current project and on the device are shown.

Possible states:

- The gateway is projected as master or as slave.
- The current project has been modified but has not yet been stored.
- How many KNX objects being used / are available.
- How many KNX connections are being used / are available.
- How many DMX Master connections are being used / available.
- Which IP-address is set for commissioning of the gateway.

## 4.3 Project planning

### 4.3.1 Device parameters



**Fig. 4-2: Set device parameters**

Via the menu item *Setup/Device parameters* the communication settings of the gateway are made. Separate dialogues are available for the KNX, DMX and Ethernet/IP ports.

#### 4.3.1.1 KNX setup

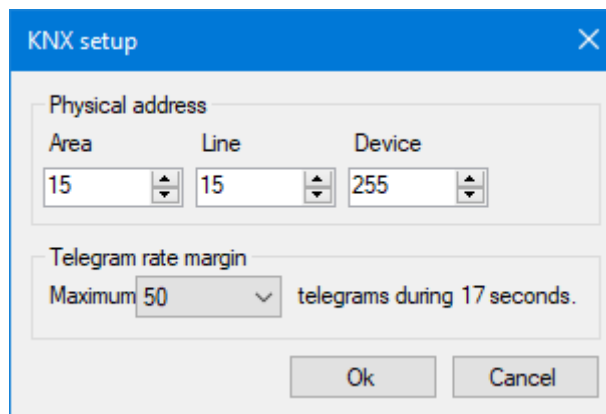


Fig. 4-3: Set KNX parameters

In the dialogue *KNX setup* the physical address the gateway uses on the KNX bus is set. With loading of the project with DMX-Gate4, this address is written into the gateway automatically.

#### 4.3.1.2 DMX Settings

In the operation mode *Master*, in the dialogue *DMX settings* different parameters can be set.

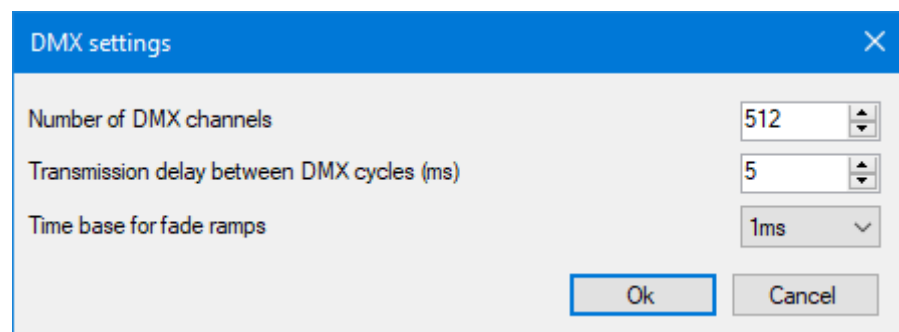


Fig. 4-4: DMX settings

The number of transmission channels used indirectly determines the maximum updating speed of the DMX channels.

The *Transmission delay between DMX cycles* allows an adaptation to luminaires which have difficulties in detecting packages in rapid succession.

The time basis for dimming ramps is valid for all DMX channels of the device. To this effect, for each individual channel the resulting dimming speed can be determined by means of a factor.

#### 4.3.1.3 IP parameters

Setup gateway Ethernet/IP

☒ Transfer settings on project download

Automatic

☒ DHCP ☒ AutoIP ☐ BootP

Settings

Name DMXGATE

IP address

Address 192.168.0.100

Mask 255.255.255.0

Gateway 192.168.0.1

Search gateway for setup data...

Ok Cancel

**Fig. 4-5: Setup Gateway Ethernet/IP**

In the dialogue *Setup Gateway Ethernet/IP* the basic communication parameters for the network connection of the gateway are set. The gateway will normally receive an automatic IP address. Here, the processes DHCP, AutoIP and BootP are available. In most network installations, BootP is not used and must be disabled. If DHCP or BootP is enabled, and the appropriate server cannot be connected, the gateway falls back to AutoIP.

Alternatively, the IP settings can also be made manually. In order to assign the IP address manually, both DHCP and BootP must be disabled. Modifications in this dialogue are loaded into the gateway during commissioning and are taken over after restart.

The following characters can be used in the input field *Name*: capital letters "A" ... "Z", lower case letters "a" ... "z", numeric "0" ... "9" and dash "-". In case of invalid characters, the input field is marked in red and the button *OK* is disabled.

➞ See also *4.4 Commissioning*

### 4.3.2 Add DMX groups

Up to 32 devices with up to 512 DMX channels can be connected to one DMX bus.

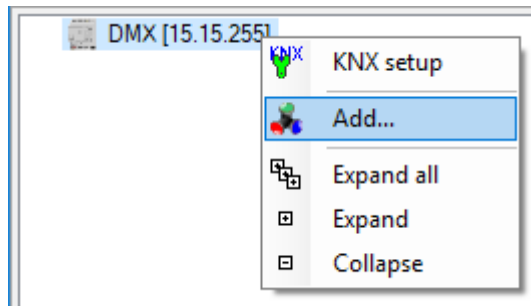


Fig. 4-6: Add DMX group

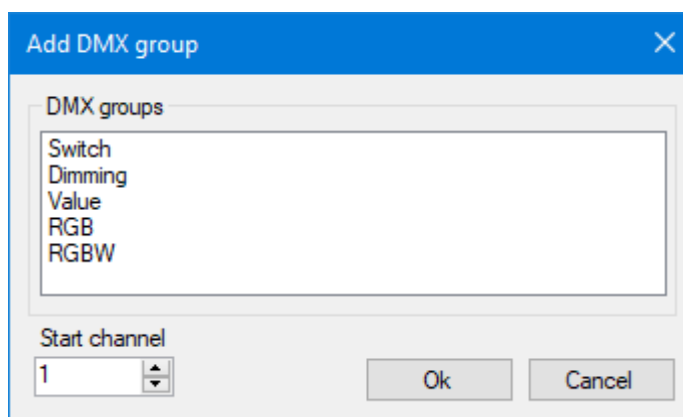


Fig. 4-7: Selection of the function group

To display the devices existing in the DMX installation and the desired functions in the KNX installation, different DMX function groups can be added.

#### 4.3.2.1 Switch, dimmer, value

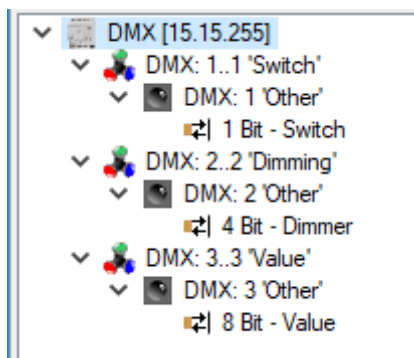
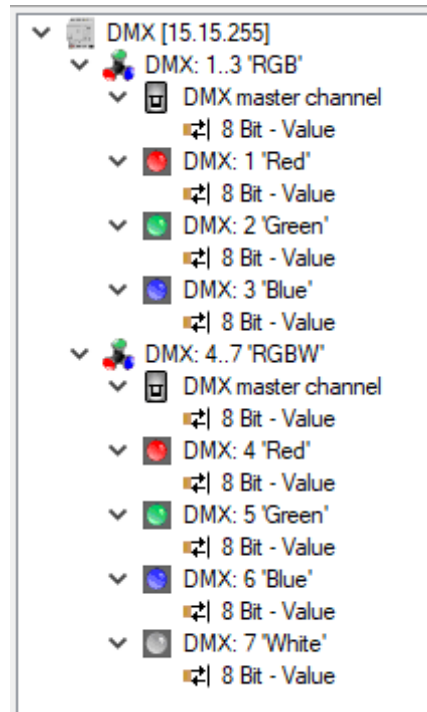


Fig. 4-8: DMX groups Switch, dimmer, value

The DMX function groups switch, dimmer, value have one channel when they are inserted. To each of these channels belongs one KNX object each in the corresponding format. Further communication objects can be activated in the characteristics of the DMX channel.

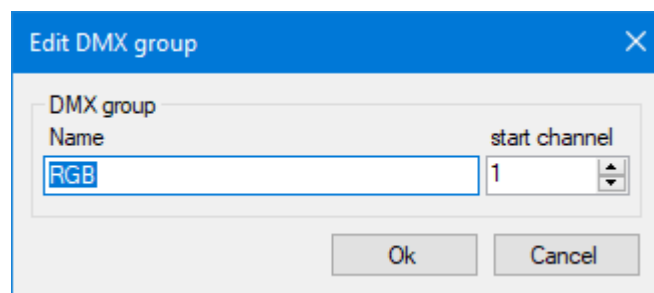
### 4.3.2.2 RGB, RGBW



**Fig. 4-9: DMX groups RGB, RGBW - Master**

When inserted, the DMX function groups RGB and RGBW have one channel for each colour component. To each of these channels belongs one 1-byte-KNX-object. In operation mode Master the two DMX groups have an additional Master channel by which all colour channels can be dimmed at a time.

### 4.3.3 Edit DMX group



**Fig. 4-10: Edit DMX group**

For each DMX group the name and the assigned starting channel can be edited.

The name should be a meaningful description of the DMX group. It is, for instance, also used when the Web surface is used.

After inserting, the DMX groups switch, dimmer, value occupy one channel each. The DMX groups RGB or RGBW occupy three or four DMX channels.

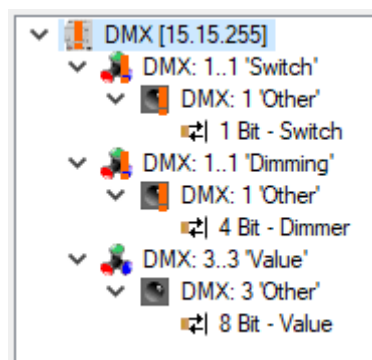


Fig. 4-11: Marking of overlapping DMX channels

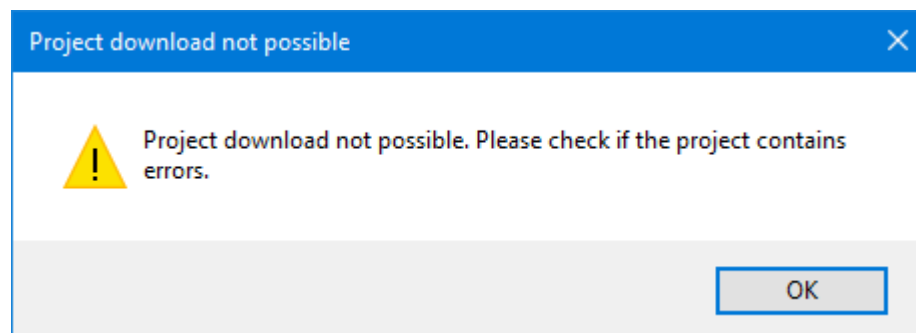


Fig. 4-12: Error message during commissioning

If existing DMX groups are modified, different DMX groups might use the same DMX channels. Such overlapping is not admissible. Before commissioning, this overlapping must be corrected.

#### 4.3.4 Edit DMX channels - Master

Depending on the type of DMX group, the channels of the group have different pre-settings. These can be adapted manually in the dialogue *Change DMX channel*.

**Edit DMX channel**

DMX channel

Name: Red Channel No.: 1 Type: Red

Value after restart: 0

Dimming speed

Time between 2 of 255 dimming steps (up): 1ms 20

Dimming time (up): d : h : min : s : ms 0:0:0:5:100

Time between 2 of 255 dimming steps (down): 1ms 20

Dimming time (down): d : h : min : s : ms 0:0:0:5:100

Conversion: Switch to value

KNX value 0 -> DMX value: 0

KNX value 1 -> DMX value: 255

DMX limitation

Minimum: 0

Maximum: 255

DMX value jump / dim

Dim behaviour on switch value receive: jump

Dim behaviour on brightness value receive: jump

KNX objects

☐ Switch ☐ Dimming ☒ Value ☐ Feedback value

Ok Cancel

**Fig. 4-13: Edit DMX channel - Master**

The *Name* serves for identification of the luminaires and is also used in the Web surface. For a clear display on mobile devices short names should be preferred, because the display of the Web surface also depends on the size and resolution of the screen and on the Web-browser used.

The *Channel-No.* is the number which is also set in the luminaires. It has to be adapted to the planning documents of the lighting system. A Master channel within an RGB or RGBW group does not have an own channel number, because it can uniformly influence all sub-ordinated DMX channels at a time.

The *Type* is entered automatically when a DMX group is created and can then be changed manually. It is used in the Web surface for mixing the colour components of RGB and RGBW luminaires. The *Type Miscellaneous* is used for DMX channels which do not represent a light colour, like positioning of pivotable luminaires.

The *Value at restart* allows, i.e. with orientation luminaires, a defined state after power failure.

In case of DMX luminaires, dimming processes are generally controlled centrally by the DMX Master by step-by-step approach of the brightness values. Common KNX dimming actuators, in contrast, receive one command to start of the dimming process and one command to stop the dimming process. In this case, the speed of the dimming process is determined during commissioning of the KNX dimming actuator. In operation mode DMX Master the gateway can receive the usual KNX commands and thus calculate the steps of the dimming levels for the DMX luminaires.

The calculation of the dimming ramp is effected separately for up-dimming and down-dimming over the time *between 2 of 255 dimming steps*. Here all DMX channels operate with a common time basis which is stipulated in the DMX settings of the gateway. For information purposes, the *dimming time* is additionally displayed over all 255 dimming levels.

### 4.3.5 Edit DMX channel - Slave

**Fig. 4-14: Edit DMX channel - Slave**

Also in Slave operation the name, the channel number and the channel type can be edited.



In basic setting each channel has a 1-byte-value communication object which directly receives the DMX value.

Additionally, a 1-bit-switching communication object can be activated. The conversion of the DMX value into the value of the 1-bit-object can be controlled by two parameters. If the DMX value is smaller than or equals the parameter *DMX-value -> KNX-value 0*, the objects sends the value 0. If the DMX value is greater than or equals parameter *DMX-value -> KNX-value 1*, the object sends the value 1.

The switching object as well as the value object send their value at each modification, considering the telegram limitation of the device.

### 4.3.6 Edit limit value - Slave

Fig. 4-15: Edit limit value - Slave

Compared to the switching objects of the DMX channels, the limit value function offers advanced criteria by which the reaction to defined DMX values can be adapted.

For each limit value a limit value function can be set which determines the value of the limit value object when an event starts. The following combinations are possible:

- 0: No action
- 1: Exceed. LV=ON, Deceed. LV-Hyst.= OFF
- 2: Exceed. LV=OFF, Deceed. LV-Hyst.= ON
- 3: Deceed. LV=ON, Exceed. LV+Hyst.= OFF
- 4: Deceed. LV=OFF, Exceed. LV+Hyst.= ON
- 5: Exceed. LV=ON, Deceed. LV-Hyst.= no telegram
- 6: Exceed. LV=OFF, Deceed. LV-Hyst.= no telegram
- 7: Deceed. LV=ON, Exceed. LV+Hyst.= no telegram
- 8: Deceed. LV=OFF, Exceed. LV+Hyst.= no telegram
- 9: Exceed. LV= no telegram, Deceed. LV-Hyst.= OFF
- 10: Exceed. LV= no telegram, Deceed. LV-Hyst.= ON
- 11: Deceed. LV= no telegram, Exceed. LV+Hyst.= OFF
- 12: Deceed. LV= no telegram, Exceed. LV+Hyst.= ON

The limit value can either be set firmly or be changed during operation. The external default can be made directly as *Absolute default value* via a 1-byte-communication object or as *Teach-in-function*. In this case a 1-bit-object is available. When this *Teach-in-object* receives the value 1, the current value of the DMX channel which is assigned to this limit value is used as new limit value.

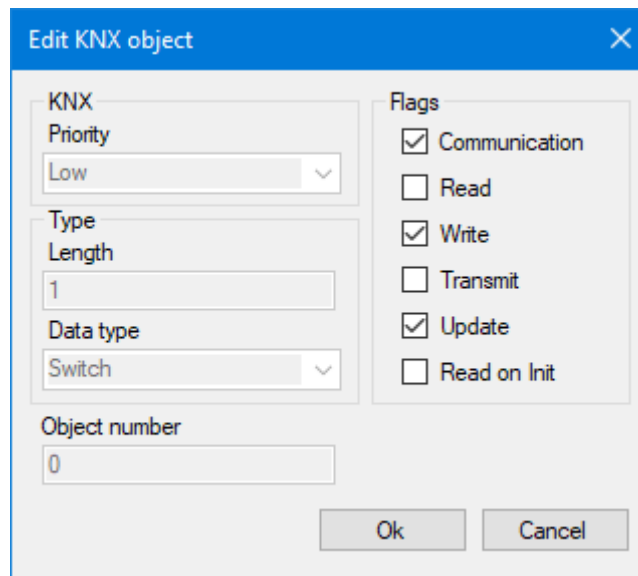
The limit values adapted via the external limit default value during operation time are overwritten in case of a download.

To each limit value belongs a parameterizable hysteresis which is used in case of a firm limit value but also in case of an external limit default value.

The limit value objects can send in case of a modification and/or cyclically.

In addition, for each limit value object a switch-on and a switch-off delay can be parameterized. If during switch-on delay the object value falls back to 0 or if during switch-off delay the object value falls back to 1, no telegram is sent.

### 4.3.7 Edit KNX object



The screenshot shows a dialog box titled "Edit KNX object". It contains the following fields and options:

- KNX**
  - Priority: Low (dropdown)
- Type**
  - Length: 1 (text box)
  - Data type: Switch (dropdown)
- Object number**: 0 (text box)
- Flags**
  - ☒ Communication
  - ☐ Read
  - ☒ Write
  - ☐ Transmit
  - ☒ Update
  - ☐ Read on Init
- Buttons: Ok, Cancel

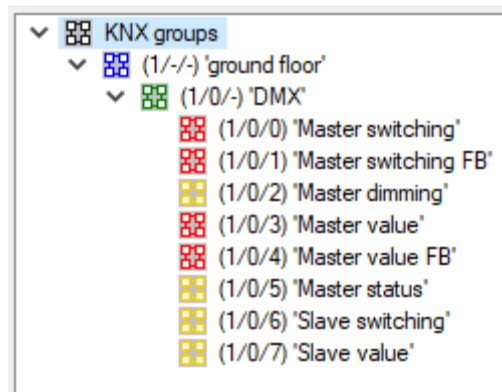
**Fig. 4-16: Edit KNX-Object characteristics**

With a right mouse click on a communication object and the command *Edit* the characteristics of the object can be displayed and the object flags can be edited.

If the flag *Read on Init* is set, after reset the gateway sends a read request with the assigned transmitting group address. In this case the gateway takes on the value of the response telegram and transmits the new value to the DMX channel.

### 4.3.8 Group addresses

After creating the DMX channels they must be linked with the group addresses used in the KNX installation.



**Fig. 4-17: Tree topology KNX group addresses**

If a data point type has been assigned to a sub-group, the symbol in the tree topology is marked red. If no data point type has been assigned, the symbol is marked yellow.

The KNX group addresses can either be taken over from an existing ETS project or generated manually.

In connection with ETS as from version 4.2 the group addresses can either be taken over or the assignments of the group addresses can be synchronized with the communication objects by Plug-in.

➞ See also 4.3.11 Synchronisation with ETS

#### 4.3.8.1 Import out of ETS3

To take over the group addresses from an ETS3 project, the group addresses in ETS can be exported into a CSV file. The dialogue *Export group addresses* is opened in the ETS window *Group addresses* via the context menu of the node *Main groups*. In this dialogue the format *3/1 – three columns, main/middle/subgroup separate* must be set.

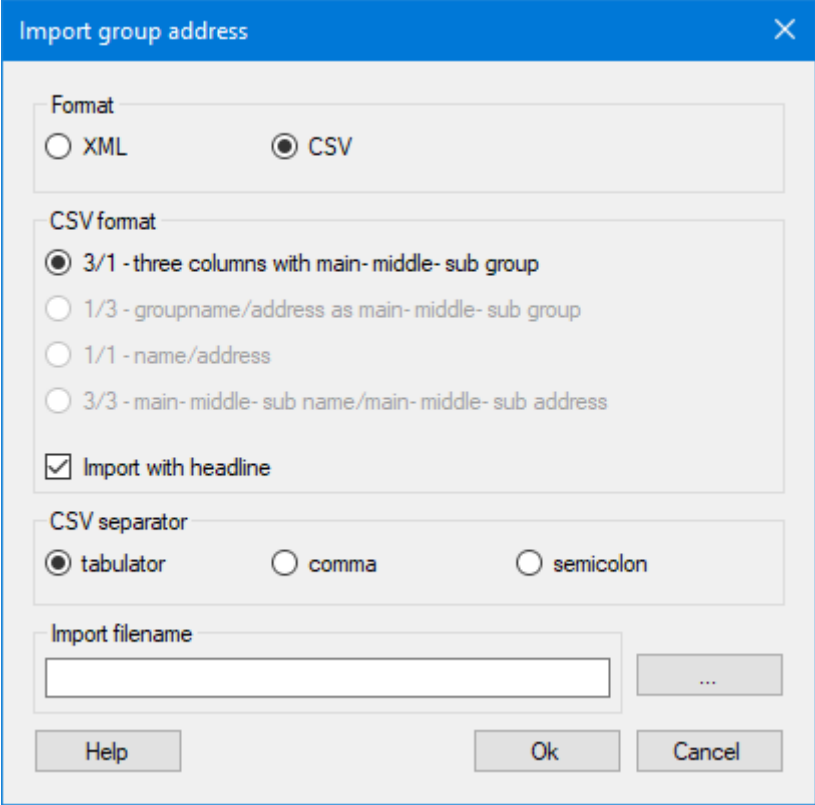


Fig. 4-18: Import of group addresses out of the ETS3

Afterwards, the group addresses in the *DMX-Gate4* can be taken over via the menu item *File -> Import -> ETS3 group addresses (CSV)*.

#### 4.3.8.2 Import from ETS4 and ETS5

For an import from an ETS4-project or ETS5-project the group addresses in the ETS can be exported into a CSV- or an XML-file. The dialogue *Export group addresses* is opened in the ETS-window *Group addresses* via the context menu of the node *Group addresses*. For export into a CSV-file, the format *3/1 – three columns, main/middle/subgroup divided* must be set. For export into an XML-file, the file name is sufficient.

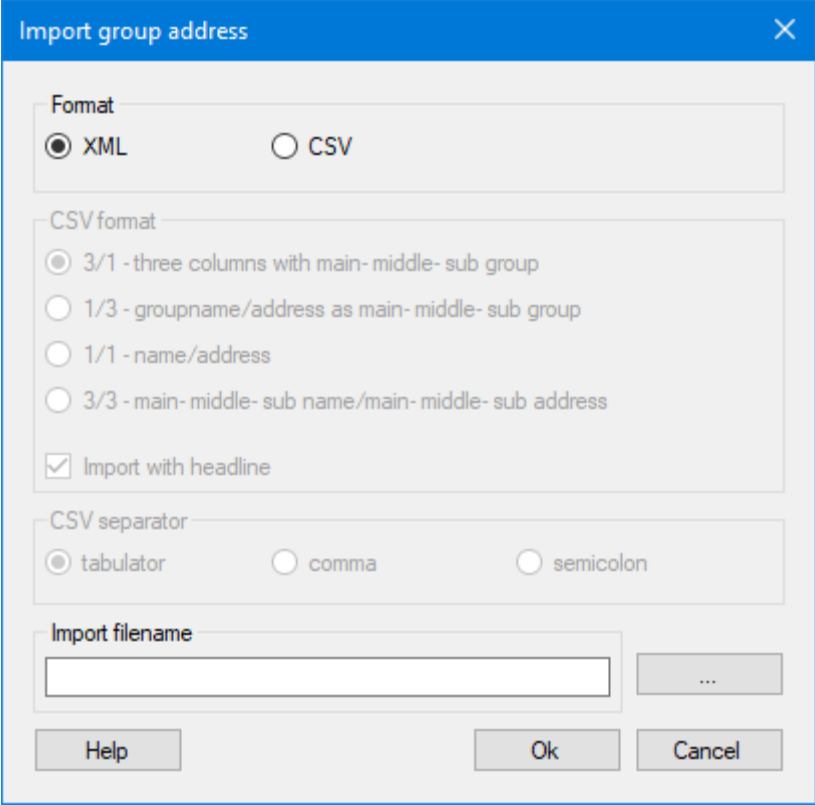
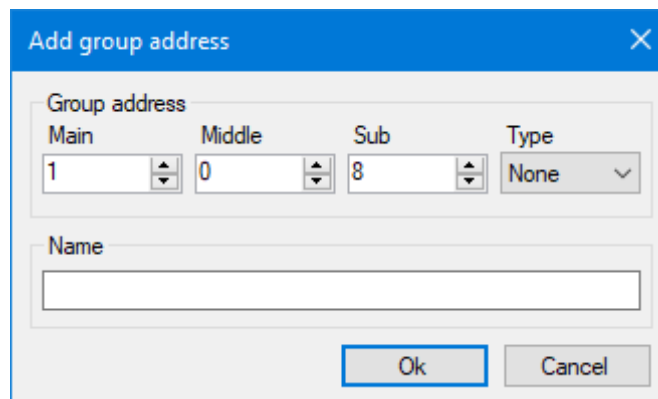


Fig. 4-19: Import of group addresses from ETS4

Afterwards, the group addresses in the *DMX-Gate4* can be taken over via the menu item *File -> Import -> ETS4 group addresses (XML)*.

### 4.3.8.3 Manual editing of group addresses



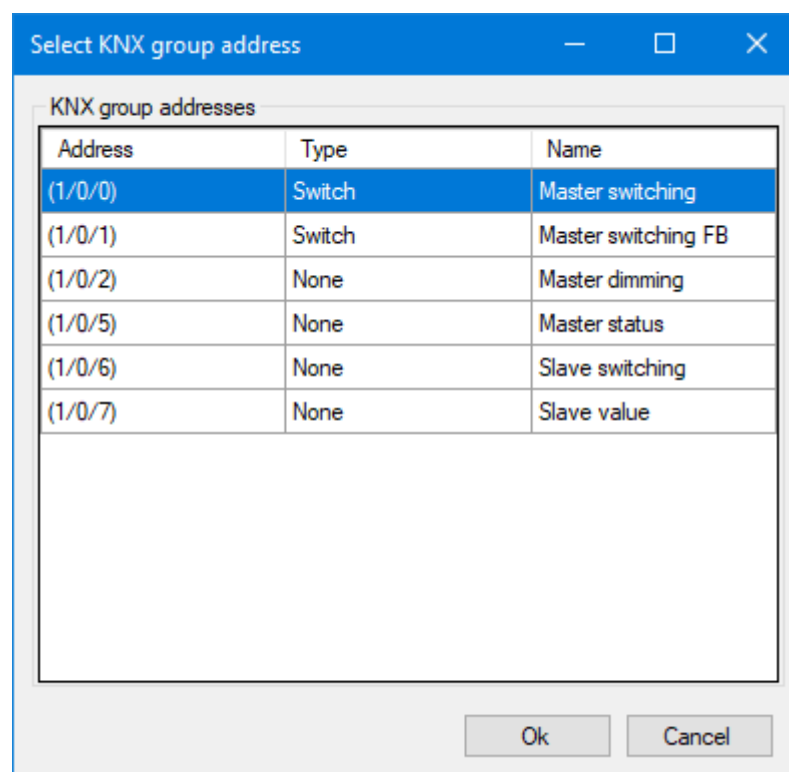
The 'Add group address' dialog box has a blue title bar with a close button. It contains a 'Group address' section with four input fields: 'Main' (value 1), 'Middle' (value 0), 'Sub' (value 8), and 'Type' (dropdown menu showing 'None'). Below this is a 'Name' text input field. At the bottom right are 'Ok' and 'Cancel' buttons.

**Fig. 4-20: Add and edit group addresses**

To create new group addresses, in the tree topology press the right mouse key to open the dialogue *Add Group address* by means of the commands *Add main group*, *Add middle group*, *Add sub group*. Open the same dialogue to edit existing group addresses. Depending on the context in which the dialogue is opened, there might be some elements which cannot be edited.

### 4.3.9 Link DMX groups with KNX groups

There are two ways to assign group addresses to KNX communication objects.



The 'Select KNX group address' dialog box has a blue title bar with standard window controls. It contains a table titled 'KNX group addresses' with three columns: 'Address', 'Type', and 'Name'. The table lists several group addresses with their types and names. Below the table is a large empty rectangular area. At the bottom right are 'Ok' and 'Cancel' buttons.

Address	Type	Name
(1/0/0)	Switch	Master switching
(1/0/1)	Switch	Master switching FB
(1/0/2)	None	Master dimming
(1/0/5)	None	Master status
(1/0/6)	None	Slave switching
(1/0/7)	None	Slave value

**Fig. 4-21: Add group addresses to DMX channel**

Clicking the right mouse key on a KNX communication object in the DMX tree topology you can choose the command *Add KNX group address ...* to open the dialogue *Select KNX Group address*. In this dialogue all group addresses of the suitable type are listed or those whose type has not yet been determined.

If a sub-group out of the tree topology *KNX Group addresses* is pulled onto a DMX channel or a KNX communication object, the shape of the mouse pointer indicates whether an assignment is possible or not.

If two or more group addresses are assigned to a communication object, one of these group addresses can be defined as sending group address.

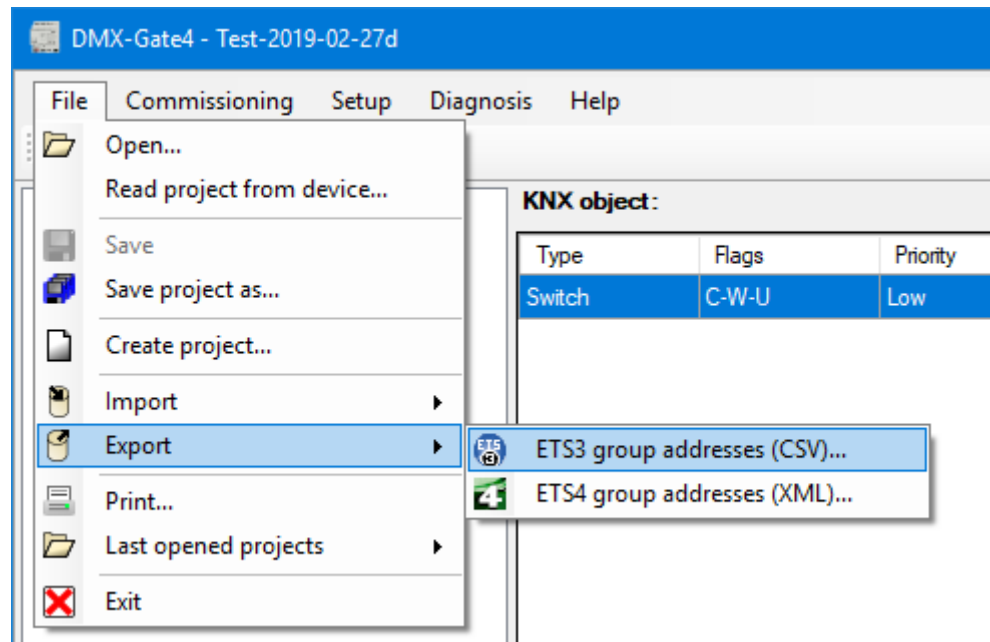


All DMX-channels, which are inserted in the tree structure, must have at least one KNX group address.



### 4.3.10 Export group addresses

If new group addresses have been created in *DMX-Gate4*, they can be exported into a file to be able to use them afterwards in the ETS.



**Fig. 4-22: Export group addresses for ETS**

Depending on the ETS version two variants are available. If the group addresses are to be imported into ETS3, they must be exported as CSV-file. If they are to be imported into ETS4, they can also be exported as XML-files.

In connection with ETS as from version 4.2 it is possible, in addition to the pure takeover of the group addresses, to synchronize the allocations of the group addresses to the communication objects via Plug-in.

➤ See also 4.3.11 Synchronisation with ETS

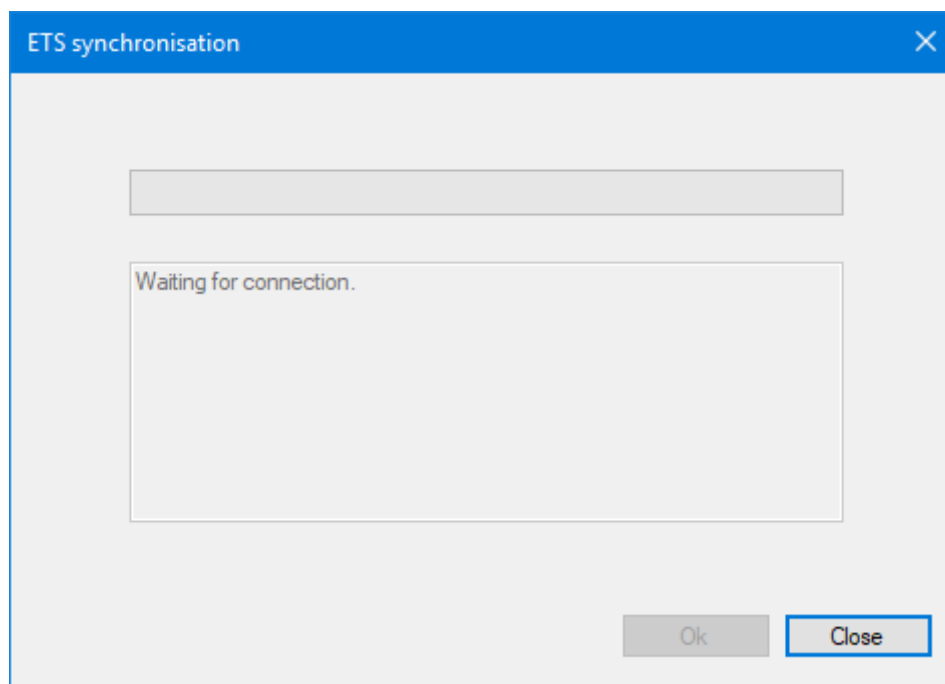
### 4.3.11 Synchronisation with ETS

The ETS product data for the KNX Gateway DMX-Web allow, via a Plug-in in combination with the ETS (as from version 4.2) a synchronisation of the group addresses and the communication objects with the DMX-Gate4.

For a complete synchronisation between DMX-Gate4 and ETS several steps are necessary / recommended:

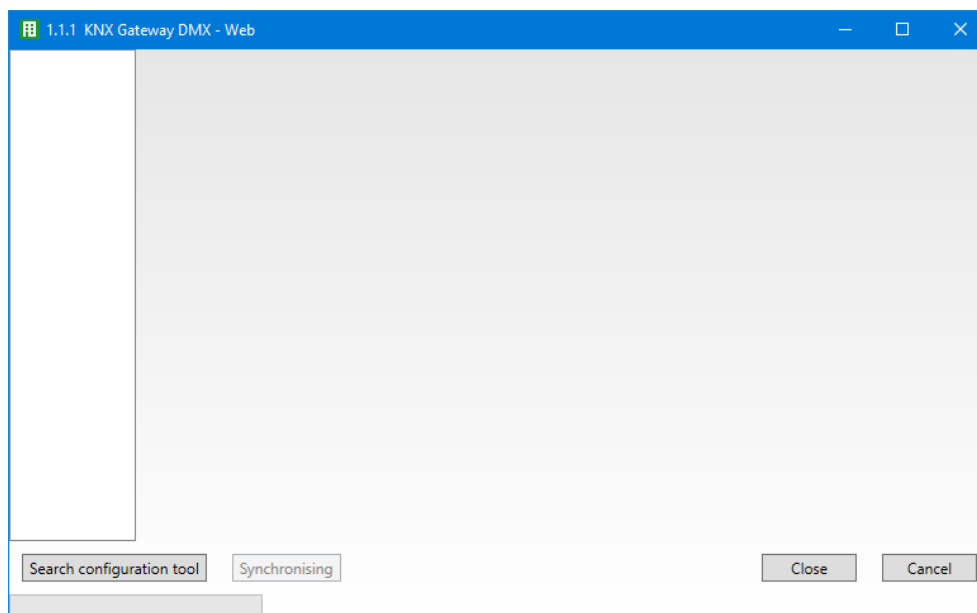
- Installation of the current DMX-Gate4.
- Installation of the current ETS (as from version 4.2).
- Import of the ETS product data for the KNX Gateway DMX-Web and installation of the Plug-in.
- Start of DMX-Gate4 and opening of the project planning of the Gateways.
- Start of ETS.
- Adding a gateway to the current ETS-project.
- Creating the group address structure in ETS.
- Synchronisation to take over the group addresses into DMX-Gate4.
- Creating the DMX groups, the DMX channels and the communication objects in DMX-Gate4.
- Allocating the group addresses to the communication objects in DMX-Gate4.
- Synchronisation to take over the communication objects and the allocations into ETS.

With the command *Settings -> ETS Synchronisation* the DMX-Gate4 starts the synchronisation service and waits for a connection to ETS.



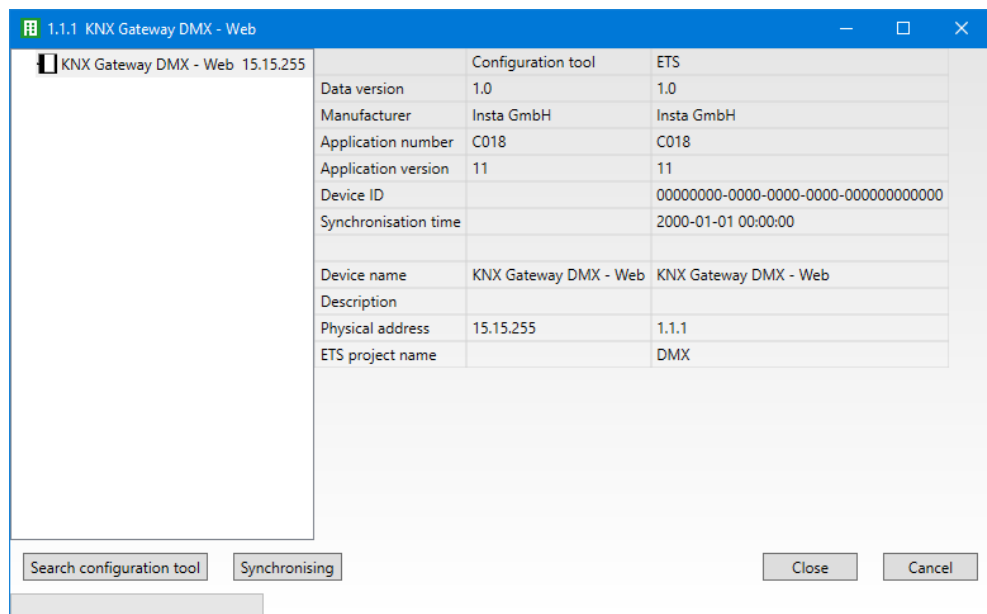
**Fig. 4-23: DMX-Gate4 - connection to ETS**

In ETS the Plug-in is started via the function for editing the parameters of the gateway.



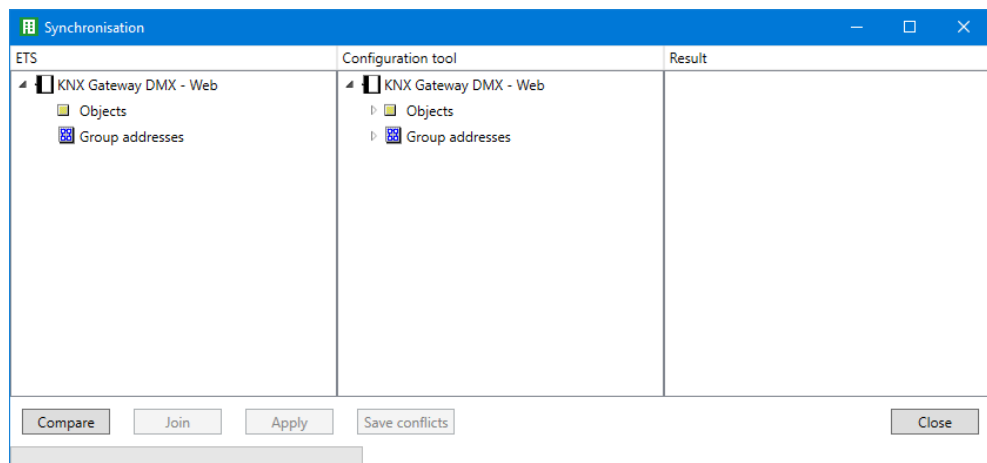
**Fig. 4-24: ETS Plug-in**

After clicking *Search project planning tool* the Plug-in tries to get a connection to the synchronisation service of DMX-Gate4.



**Fig. 4-25: Connection to DMX-Gate started**

When the connection to DMX-Gate4 has been established, the Plug-in shows some essential data of DMX-Gate4 and ETS. After clicking *Synchronising* the window *Synchronisation* is opened.



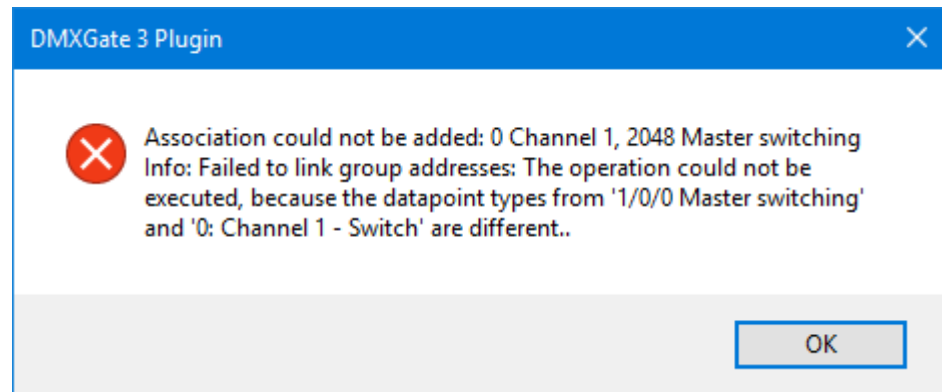
**Fig. 4-26: Start of Synchronisation**

In the first two columns of this window, the Plug-in shows the data available in ETS and in DMX-Gate. With the button *Compare* the Plug-in checks which data are available in ETS only, in DMX-Gate only or which data are available in both programs and whether there are any contradictions. With the button *Join* the Plug-in shows the sum of the relevant data in the column *Result*.

Here the data can also be checked again manually.

With the button *Apply* the joined data are transferred into ETS as well as into DMX-Gate4. Afterwards, the Plug-in can be closed.

The Plug-in is not able to eliminate conflicts, i.e. if a group address in ETS and in DMX-Gate4 has been connected with objects of different type or if in using the free group address structure contradicting address areas have been created.



**Fig. 4-27: Error due to contradicting data**

In this case a corresponding message is shown. To be able to remedy these conflicts, by means of the button *Safe conflicts* a list of conflicts can be displayed. After correction of the contradicting data in ETS or DMX-Gate4, the synchronisation can be re-started.

### 4.3.12 Documentation

To finalise the project planning, with *File -> Print...* the current state can be printed.

## 4.4 Commissioning

Commissioning of the gateway is effected via the Ethernet/IP interface.

### 4.4.1 IP settings

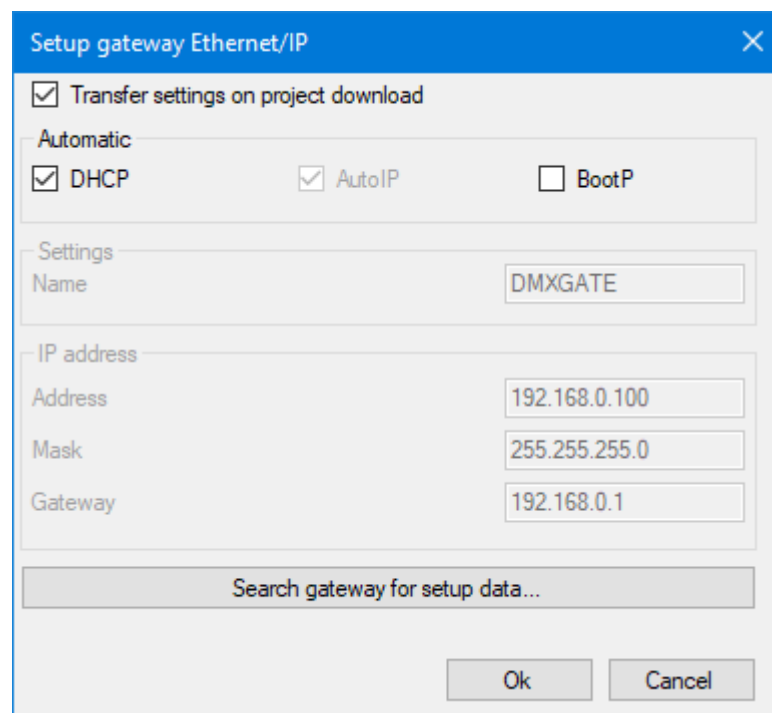


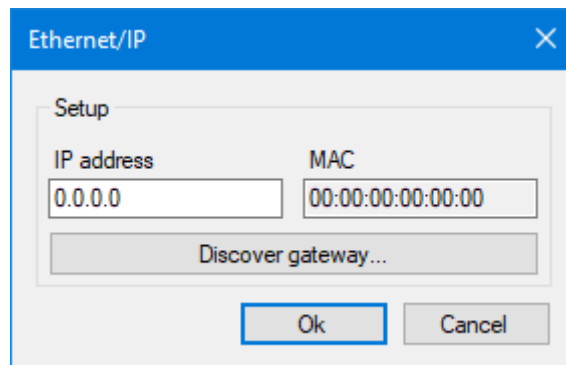
Fig. 4-28: Settings Gateway Ethernet/IP

The gateway can either be connected as part of the complete network or connected to the PC via crosslink line. For successful commissioning, the network settings of the gateway and of the PC must be tuned to one another.

Unless there are any restrictions made by the network administrator, in most cases the gateway can automatically obtain the IP address. The IP address is assigned automatically after the supply voltage of the gateway has been switched on. If possible, the gateway tries to get its IP-address from a DHCP-Server or a BootP-Server. In most network installations, BootP is not used and must be disabled. If DHCP or BootP is enabled, and the appropriate server cannot be connected, the gateway falls back to AutoIP.

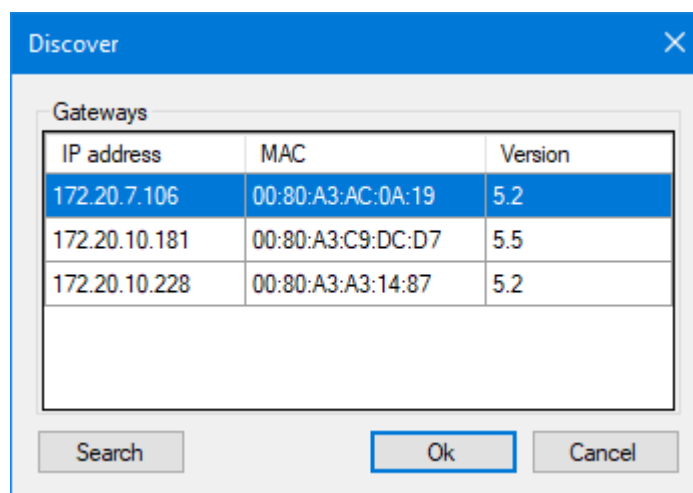
Here it gets an IP-address between 169.254.1.0 and 169.254.254.255 by means of a random number generator. If necessary, the network interface of the PC must be configured accordingly.

For commissioning itself, the gateway can be identified unambiguously by its MAC address. You can find the MAC address on the label on the side of the device.



**Fig. 4-29: Settings PC Ethernet/IP**

In the dialogue *IP setting* the PC can look for suitable gateways.



**Fig. 4-30: Search DMX Gateway**

All IP addresses found are then listed together with the MAC addresses in the dialogue *Search*.

If the gateway is not listed in this dialogue, the network line of the gateway might not have been connected when the supply voltage of the gateway was switched on and the gateway might have set an IP address which does not match the IP settings of the PC. In this case it is advisable to switch off the supply voltage and to switch it on again after connecting the network line.

#### 4.4.2 Download

Commissioning of the gateway is effected via the menu *Commissioning -> Download Project*. Then the dialogue for download is opened in which the loading process is triggered with the button *Start*.

### 4.5 Functions of the web server

The gateway has got an integrated web server which, for instance for test purposes, offers direct access to the DMX channels during commissioning and allows the setting of light scenes and light colours during normal operation.

The web server can be called up by means of a smart phone or a PC by entering the IP-address (e.g. <http://192.168.0.212>).

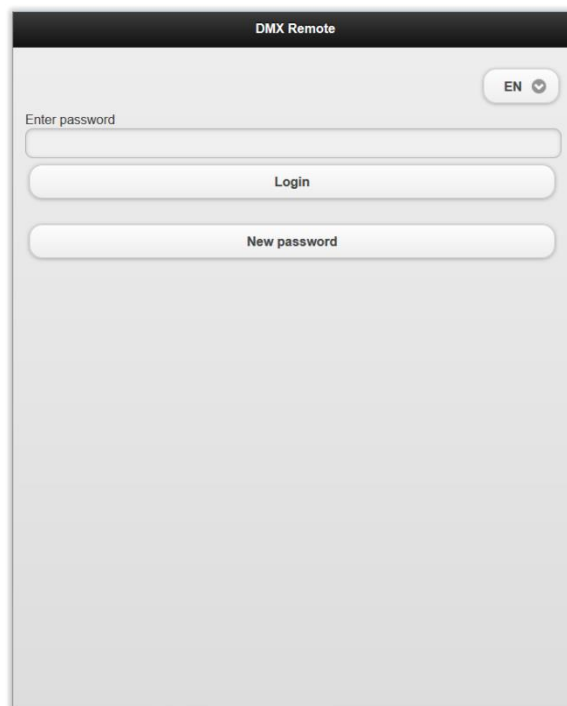


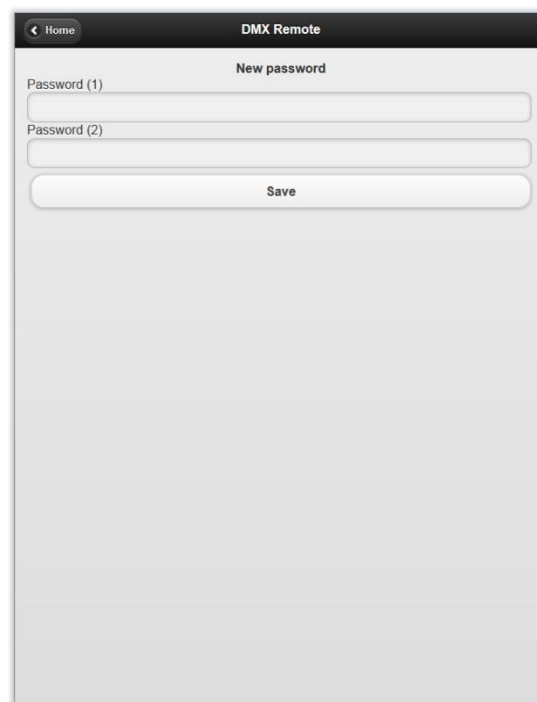
Fig. 4-31: Start page of the Web-Servers

On the start page of the web server the language of the web surface can be changed.

#### 4.5.1 Password protection

In order to block unauthorized access to the web server, a password can be saved. In works setting no password is needed.



The screenshot shows a mobile web interface titled 'DMX Remote'. At the top left is a back arrow and the word 'Home'. The main heading is 'New password'. Below this, there are two input fields: the first is labeled 'Password (1)' and the second is labeled 'Password (2)'. Below these fields is a 'Save' button. The background is a light gray gradient.

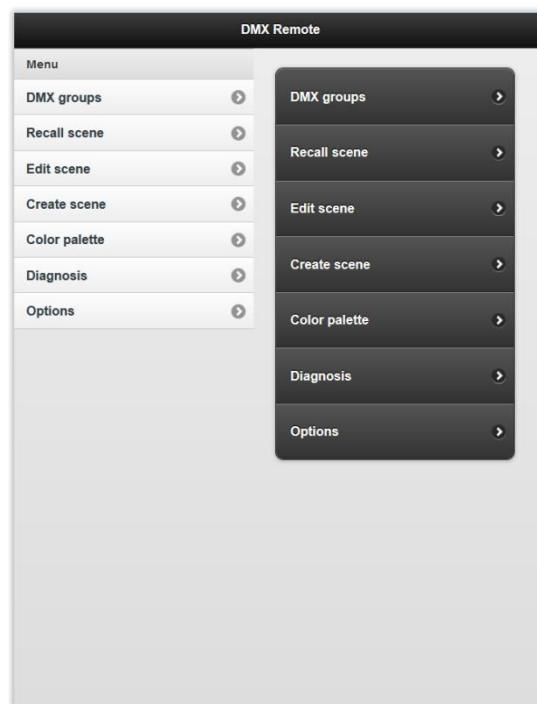
**Fig. 4-32: Change password**

After clicking the button *New password*, on the next page a password can be entered which has to be repeated (confirmed) for safety reasons.

Should you have forgotten the password, you have the possibility to access the web server by entering the MAC address of the gateway as master password.

#### **4.5.2 Remote control**

The button *Login* calls up the menu to select the control functions of the web server.



**Fig. 4-33: Functions of the remote control**

The main menu of the remote control offers the following functions:

- **DMX groups:** Here the channels of the DMX groups created in the project planning of the gateway can be controlled. The functions available depend on the project planning.
- **Recall scene:** By calling up saved scenes, the channels of selected DMX groups can be controlled at a time.
- **Edit scene:** Here saved scenes can be edited.
- **Create scene:** With creating a new scene, the DMX group in this scene can be selected.
- **Colour palette:** The colour mixtures saved in the palette can be used for the control of RGB and RGBW groups and the creating of scenes.
- **Diagnosis:** Here specific DMX channels can be controlled, independent of the projected DMX groups. This facilitates the correct assignment of the luminaires to the DMX channels.
- **Options:** Here parameters of the Web server can be set and information on the software of the gateway can be checked.

A gateway which is used as Slave does not provide the functions for scene control and the colour palette.

### 4.5.2.1 DMX groups

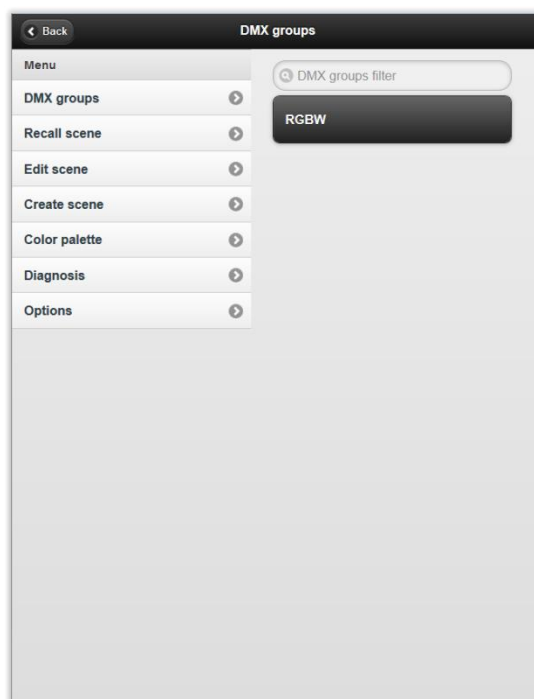


Fig. 4-34: Selection of the DMX groups

After clicking *DMX groups* the Web server shows a list of groups contained in project planning. The box *Group filter* helps with a large number of DMX groups to limit the choice.



Fig. 4-35: Control of an RGBW group

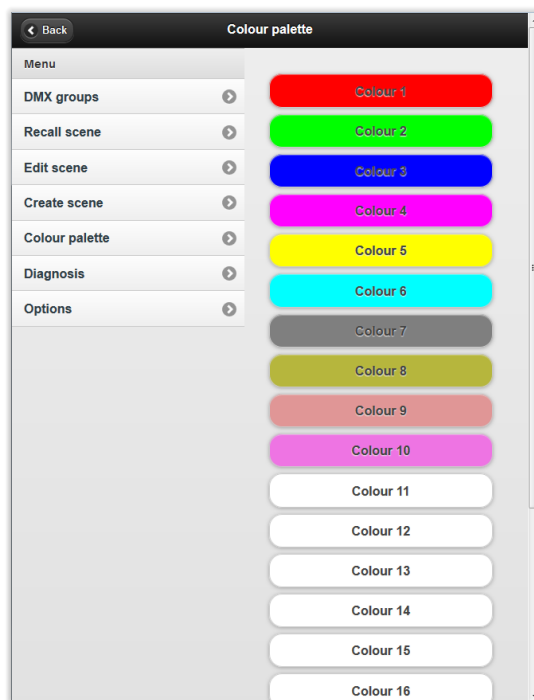
Depending on the type of DMX group, the contained DMX channels and the activated communication objects, on the next page the Web server shows different operation elements by which the channels can be controlled.

In the RGB and RGBW you can select a mixed colour out of the light colour of the colour palette or to create a new light colour.

With a gateway which is used as Master, the browser inquires the current values after clicking *Update*.

With a gateway which is used as Slave, the Web server regularly inquires the current values of the channels of the current DMX group.

#### 4.5.2.2 Creating and recalling light colours



**Fig. 4-36: Colour palette**

If a colour palette is called up from a DMX group, a defined light colour for this group can be chosen.

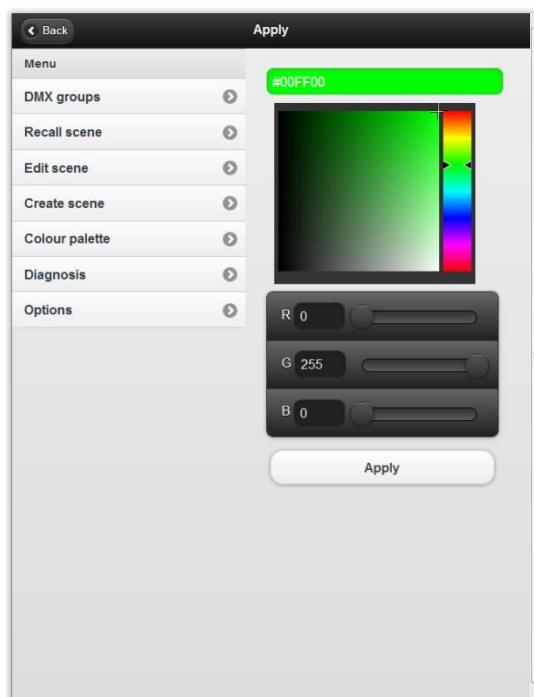
If the colour palette is called up from the main menu of the Web server, the light colours of the palette can be re-defined.



**Fig. 4-37: Create and apply light colour**

If in an RGB or RGBW group the button *Colour selection* is clicked, with the slide controllers for the colour proportions on the next page a new light colour can be created, independent of the colour palette.

Here the upper box shows the selected colour. A click on this box opens the colour selection tool.



**Fig. 4-38: Colour selection tool**

This colour selection tool consists of two elements. The bar on the right hand side determines the colour shade. The position of the cross in the square on the left hand side determines the brightness (left darker – right brighter) and the saturation (above saturated – below unsaturated). Via the button *Apply* the light colour is passed on to the channels of the DMX groups.

#### 4.5.2.3 Creating and recalling scenes

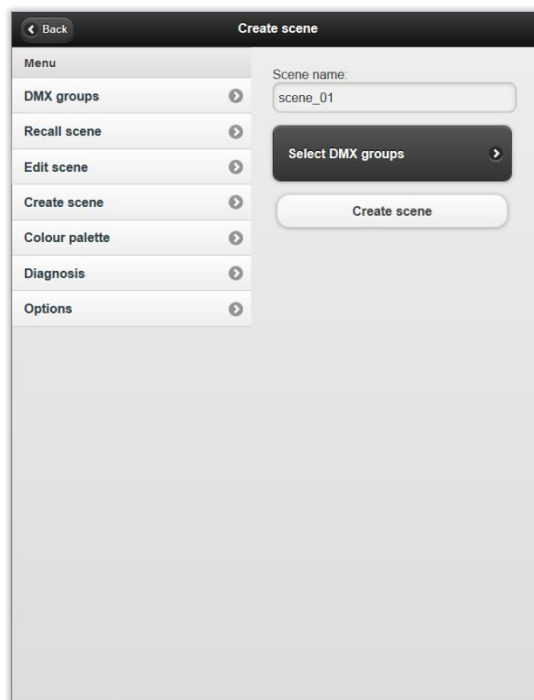
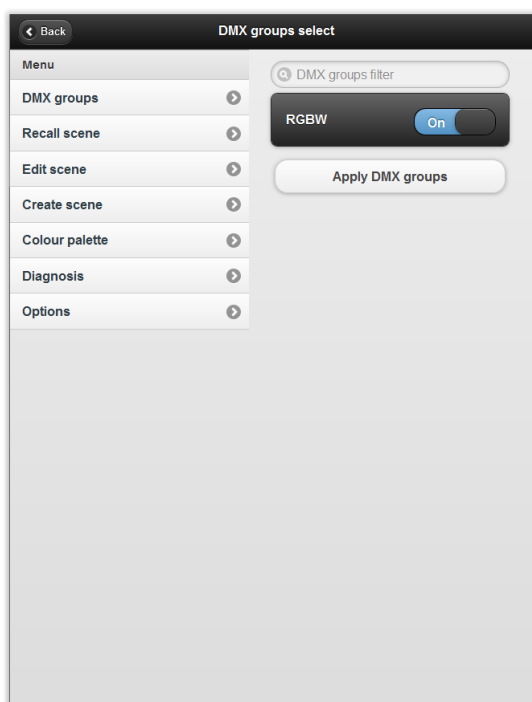


Fig. 4-39: Create new scene

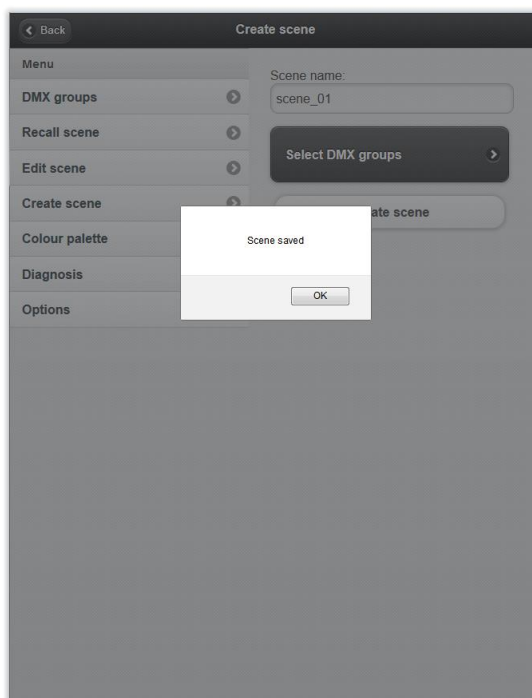
The scene control of the Web server allows to control the channels of several DMX groups at a time. To this effect, first of all a new scene is created from the main menu of the Web server.

For unambiguous identification a meaningful name must be entered. The name must not contain any spaces. You can use an underscore character instead (e.g. „Scene\_01“)



**Fig. 4-40: Select DMX groups for scene**

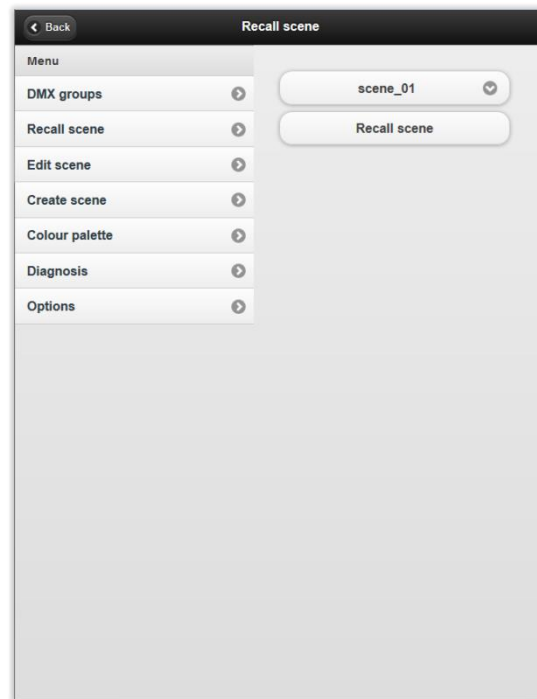
With one scene, one or several DMX groups can be controlled at a time. The box *Select DMX groups* opens the page on which the desired groups can be activated.



**Fig. 4-41: .Save scene**

With the button *Create scene* the assigned groups and the current values of the DMX channels are stored.

From the main menu, via the command *Edit scene* the created scenes can subsequently be modified.



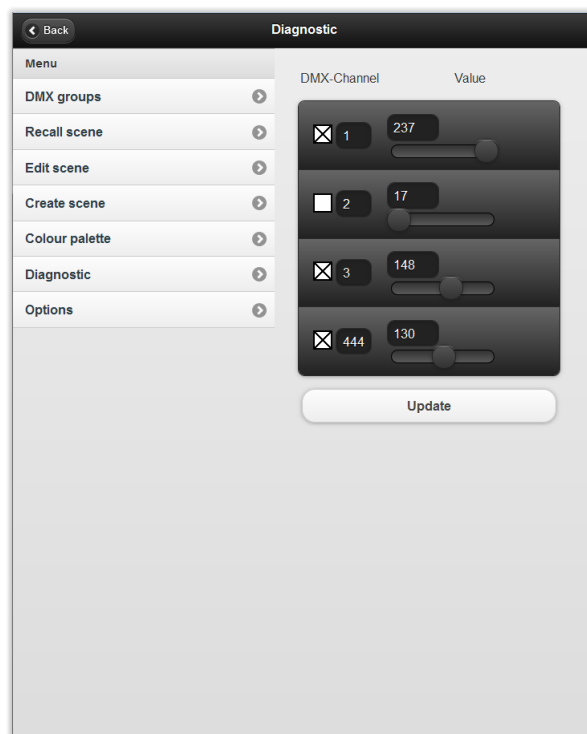
**Fig. 4-42: Recall saved scenes**

From the main menu, the desired scenes can be selected any time from the list of scenes saved. In doing so, all channels of the active DMX groups are in a sense controlled at a time.

### 4.5.3 Diagnosis functions of the Web server

During commissioning of a DMX control, the correct assignment of the luminaires to the DMX channels is important.





**Fig. 4-43: Direct control of DMX channels**

With a gateway which is used as Master, the page *Diagnosis* allows to control individual DMX channels without having to project the DMX groups and the KNX group addresses beforehand.

To this effect, the channel number and the value of the channel are entered for up to four channels. Clicking the button *Update* sends the values of these channels.

With a gateway which is used as Slave, the page *Diagnosis* allows to inquire the values of individual DMX channels without having to project the DMX groups and the KNX group addresses beforehand.

#### 4.5.4 Options of the Web server

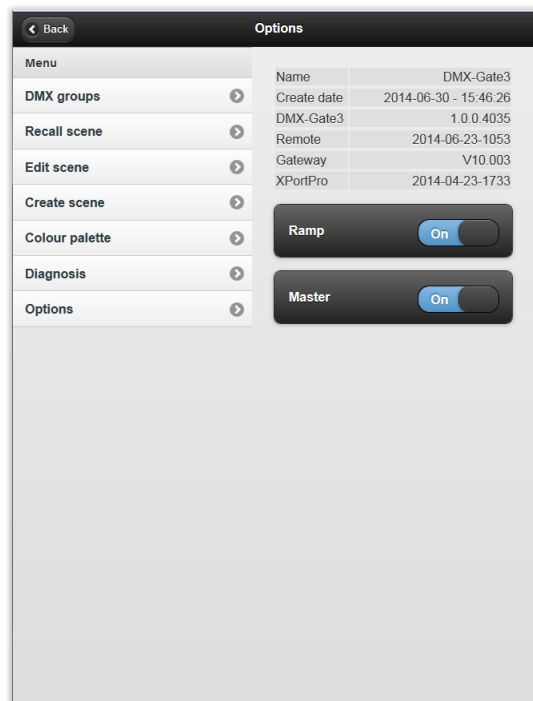


Fig. 4-44: Options of the Web server

In the upper part of the page *Options* the Web server shows some details.

The two upper entries *Name* and *Create date* were generated in project planning. The following four entries *DMX-Gate4*, *Remote*, *Gateway* and *XPortPro* indicate the versions of the individual software parts.

With a gateway which is used as Master, in the lower part two parameters can be set. The button *Ramp* corresponds to the parameter *Dim to / jump to DMX-value* for reception of the 1-bit and the 1-byte objects. If the switch *Master* is enabled, the remote operation of the RGBW channels is affected by the current values of the master channels

## 4.6 Read project out of the device

During commissioning, the project planning data are completely saved in the device. Via the command *File-> Read project out of device...* the project planning data can be read out and saved on the PC as file.

## 4.7 Diagnosis

In case of a malfunction of the gateway, first of all the status information of the LED at the front of the device (see also Status information) should be checked.

Afterwards, via the menu *Diagnosis* -> *Gateway information* the dialogue *Diagnosis* can be opened.

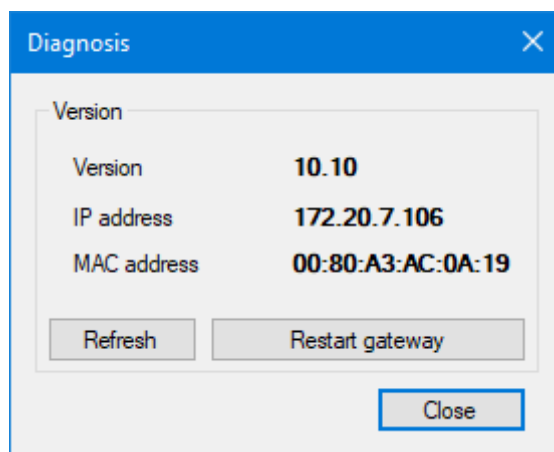


Fig. 4-45: Reading out of diagnosis information

After clicking the buttons *Refresh*, the software tries to make a connection to the gateway and to read out data of the gateway. *Version* describes the firmware loaded in the device. On request, the current firmware can be loaded into the gateway via the menu *Commissioning*. If in case of a restart the gateway has detected that the memory contents is erroneous, this is indicated via the status LED *Power/Error*.

## 4.8 Logging

The Project planning software offers the possibility to log events occurring during project planning. Several levels of logging can be set by means of the commands *Settings* -> *Log-level*. If you suspect a malfunction of the project planning software, it can be modified in agreement with the manufacturer.

## 5 Appendix

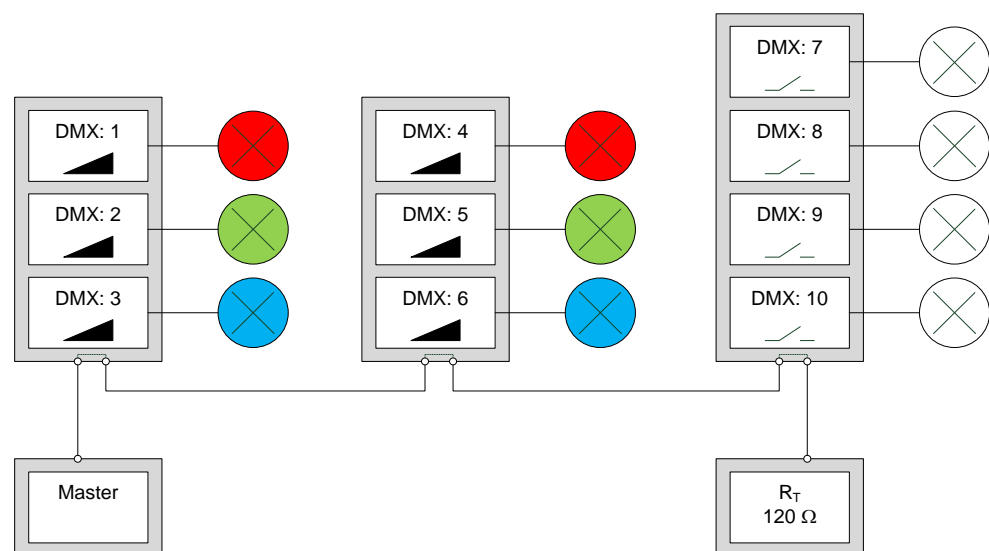
### 5.1 DMX

DMX or DMX-512 describes a light control system having its roots in stage technology.

The original definition is derived from USITT (United States Institute for Theatre Technology)

#### 5.1.1 Physical structure

Within the bus segment, the bus line runs from the transmitting device (Master) to maximum 32 receiving devices (Slaves). Its physical structure is a line terminated by a resistance (nominal 120  $\Omega$ ).



**Fig. 5-1: Structure of a small DMX installation**

In cases with more than one transmitter, a DMX merger must be used. In cases with more than 32 Slaves, splitters/boosters are used to split up the slaves into different bus segments.

#### 5.1.2 DMX devices

Each of the maximum 32 Slaves at one line can possess several logic channels for different functions. Maximum number of channels is 512. The relevant channel numbers used can be set in the devices.

#### 5.1.3 Installation

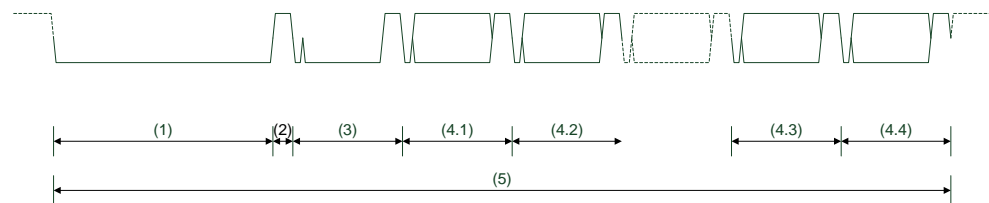
In stage technology installation is made with shielded flexible cables equipped with five-pole plugs and sockets.

In building installation shielded network cables (CAT5 or CAT6) are recommended.

Maximum cable length is 1200 m. It depends on the quality of the cables used.

### 5.1.4 Data transfer

The electrical signal transmission corresponds to RS485 with a transmission speed of 250 kbit/s.



**Fig. 5-2: DMX telegram frame**

(1)	RESET	typ. 88 ... 125 $\mu$ s
(2)	MARK between Reset and Start byte	8 $\mu$ s
(3)	Start byte (logical 0)	44 $\mu$ s
(4)	DMX data	
(4.1)	Channel 1	44 $\mu$ s
(4.2)	Channel 2	44 $\mu$ s
(4.3)	Channel 511	44 $\mu$ s
(4.4)	Channel 512	44 $\mu$ s
(5)	Telegram frame with 512 channels	approx. 23 ms

The telegram frame starts with a RESET pulse with following MARK, at which the connected devices detect the start of a new telegram frame.

The start byte has the logical value 0 as indication that the data bytes of the DMX channels will follow. DMX-RDM, the functional extension of the DMX standard, uses a start byte with a different value so that the luminaires can detect the difference to the normal telegrams with current values.

After the start byte the DMX data for all DMX channels used follow. The length of the telegram frame is directly related to the number of channels used. In case of 512 channels, about 44 telegram frames per second can be transmitted.

## 5.2 KNX

KNX is a distributed bus system for building automation.

To guarantee trouble-free interlinking of devices from different manufacturers, for different basic functions the sizes of the communication objects and their functions are standardised by the KNX association.

Projecting of all functions in a building and commissioning of the devices is effected by PC.

### **5.2.1 Physical structure**

In one bus segment, up to 64 devices can be installed which all can send and receive. Each bus segment has its own power supply.

In case of larger installations, several electrically separated bus segments are connected logically via line or area couplers. The line and area couplers filter the telegrams and only pass on those telegrams which are needed in the relevant bus segment.

### **5.2.2 Installation**

For installation two wires of a four-wire cable of type JY(St)Y 2x2x0.8 are used. The cable is laid in a tree-like structure. Regarding the cable length in a bus segment several criteria have to be observed: The overall length with all junctions must not exceed 1000 m. The distance between the power supply and a device must not exceed 350 m. The distance between two members must not exceed 700 m.

### **5.2.3 KNX devices**

Within an installation, each device has got an unambiguous physical address which is also used for commissioning.

For determination of the function, each device has got logical communication objects. Number and size of these communication objects directly depend on the function of each device. The communication objects are linked with one another via group addresses. All devices with the same group addresses work together.

### **5.2.4 Data transfer**

Date transfer is effected with 9600 bit/s. The length of each individual telegram depends on the size of the communication objects.

In most cases a KNX device sends a telegram with the new value of the communication object when a new event starts, i.e. change of a temperature value or pressing of a key. In individual cases devices can be programmed in a way that they send out new telegrams regularly without modification of a value.