

KNX/DALI GATEWAY TUNABLE WHITE

IC00P02DAL



Prodotto: IC00P02DAL
Descrizione: KNX/DALI GATEWAY TUNABLE WHITE
Data: 25/02/2019

Any information inside this manual can be changed without advice.

This handbook can be download freely from the website: www.eelectron.com

Exclusion of liability:

Despite checking that the contents of this document match the hardware and software, deviations cannot be completely excluded. We therefore cannot accept any liability for this.

Any necessary corrections will be incorporated into newer versions of this manual.

Symbol for relevant information



Symbol for warning



Controlling the colour temperature	4
Settable colour temperature range	4
Setting minimum colour temperature	4
Setting the switch-on colour temperature.....	5
Dimming characteristic and dimming speeds.....	6
Setting dimming time for relative dimming	8
Setting dimming behaviour for absolute dimming	8
Setting dimming behaviour in OFF state for relative dimming	9
Setting dimming behaviour in OFF state for absolute dimming	10
Setting the behaviour of the colour temperature during dimming of the brightness	10

Controlling the colour temperature

Settable colour temperature range

When activating DALI operating devices that support the device type furthermore, the colour temperature value, which is set whenever switching on via the "Switching" or the "Central function switching" object on the DALI operating devices, can be predefined. The parameter "Colour temperature after switching on" defines this colour temperature value separately for each group and each single device. The settable value is anywhere between the minimum and maximum colour.



Example of a configured colour temperature range with switch-on colour temperature

DALI lights that can change the colour temperature are generally fitted with two different luminaires for warm white and cold white light. The luminous flux of both luminaires can be varied independently and thus the colour temperature can be changed in the specified range by different activation via the upstream DALI operating device essentially changes the proportional luminous flux of the luminaire while maintaining the total luminous flux. During a dimming operation of the colour temperature, it can happen that the operating devices switch the luminaire on or off if required. This can lead to switching operations in the transition ranges, which cause the dimming operations to briefly appear unsteady.

Setting minimum colour temperature

The minimum colour temperature can be set separately for each DALI group and each single device.

- Set the parameter "Minimum colour temperature" in the parameter node "Addressing -> Groups -> [x] Group name -> Tunable white function" or "Addressing -> Single devices -> [x] Device name -> Tunable white function" to the required colour temperature. The set colour temperature is not undershot in any operating state.
- The upper limit of the selection of the value settable here is limited by the configured maximum colour temperature (minimum colour temperature < maximum colour temperature).
- During editing of the minimum colour temperature, the ETS plug-in checks all configured colour temperature values of the group or the single device (e.g. switch-on colour temperature, scene values) to determine whether the values undershoot the minimum colour temperature. If this is the case, the plug-in will signal a value conflict and offer the following selection...
 - the colour temperature values can be adjusted to the minimum colour temperature, or
 - the minimum colour temperature setting is reset to its original value.
- If values are received by the "Absolute colour temperature" object and are less than the configured minimum colour temperature, then the Gateway will set the minimum colour temperature as the new colour temperature value for the group or single device concerned. In this case, the 1-bit "Invalid colour temperature" feedback can be generated as an option.

Setting the switch-on colour temperature

The switch-on colour temperature can be set separately for each DALI group and each single device.

- Set the parameter "Colour temperature after switching on" in the parameter node "Addressing -> Groups -> [x] Group name -> Tunable white function" or "Addressing -> Single devices -> [x] Device name -> Tunable white function" to "Set colour temperature value". In the selection box, configure the necessary colour temperature value.
The set colour temperature is set after receipt of an ON telegram via the "Switching" communication object or after receipt of a central telegram with the polarity "activated".
- Set the parameter "Colour temperature after switching on" to "Memory value (colour temperature before switching off last time)".
On switching on, the active and internally saved colour temperature value prior to switching off last time is set (via the "Switching" or "Central function switching" object). This memory value is saved in the volatile memory, which means that after a device reset (mains voltage return or an ETS programming operation), the value is predefined to maximum colour temperature.
- Set the parameter "Colour temperature after switching on" to "tracked colour temperature value".
On switching on, the internally tracked colour temperature most recently specified and in the "OFF" state is preset. The tracked colour temperature value is not influenced by an ETS programming operation or by a bus voltage failure ("no change"). When the bus/mains voltage returns, the colour temperature active most recently before the bus/mains voltage failure is restored. Hence, this colour temperature is taken into account as a colour temperature value to be tracked when switching on.
- In the "Set colour temperature value" setting: The lower limit of the selection of the value that can be set here is limited by the configured minimum colour temperature and the upper limit by the configured maximum colour temperature.
- A memory value is also then saved internally by a switch-off telegram if the bus-controlled switch-off is overridden, for example, by a disable or forced position function or by a manual operation. In this case, the internally tracked colour temperature value is saved as memory value.
- The colour temperature to be set by switching on is either dimmed in the configured dimming time or is jumped to directly depending on the configured dimming behaviour (absolute dimming). The dimming characteristic for colour temperature changes is always linear.
- A switched-off DALI group or single device can also be switched on by the receipt of an absolute colour temperature value or by relative dimming (configurable functions) if necessary. In this case, the switch-on colour temperature is not evaluated. The Gateway then activates on switching on the colour temperature, which was set directly by the absolute colour temperature value or by the relative dimming operation.

Dimming characteristic and dimming speeds

When activating DALI operating devices that support the device type "Tunable White" (DT8 - TW), the colour temperature can be changed by a relative or absolute dimming operation. The limits of the colour temperature range adjustable by a dimming operation is defined by the minimum and maximum colour temperature predefined in the ETS.



Example of a dimmable colour temperature range

A DALI group or single device can be dimmed by...

- **Relative dimming:**
Relative dimming of the colour temperature can be triggered by the 4-bit "Relative colour temperature" communication object available for each group or single device. The data format of the "dimming" object - as well as with relative dimming of the brightness - complies with the KNX standard DPT 3.007, which means that the dimming direction and relative dimming increments can be predefined in the dimming telegram or dimming procedures can also be stopped. A relative dimming operation allows a colour temperature value to be changed constantly and always starts from the colour temperature that is set at the time of the dimming command.
In the plug-in of the DALI Gateway, the dimming speed for relative dimming of the colour temperature can be configured separately for each group and each single device and independent of the dimming speed for a brightness change.
A relative dimming telegram for controlling the colour temperature can also switch on a group or single device in the "OFF" state. In some applications, it may be necessary, however, for a switched off group or switched off device to still remain off until a relative dimming telegram of the colour temperature is received. This is interesting when using light scenes, for instance: Several DALI groups are set to a defined colour temperature via a light scene. Other groups are switched off by the scene. Only the colour temperature of channels not switched off by the scene recall should be changed by dimming up afterwards. Here, it is necessary for groups or single devices not to respond to a relative dimming operation of the colour temperature and thus not to switch on. The parameter "Behaviour when OFF by relative dimming of the colour temperature" defines whether or not a DALI group or single device in the "OFF" state switches on via a relative dimming telegram of the colour temperature or remains switched off and only tracks the dimming operation internally.
- **Absolute dimming:**
Absolute dimming is triggered by specifying a colour temperature value. This value can be predefined by the 2-byte "Absolute colour temperature (K)" communication object according to
When predefined a colour temperature value via the object, by a scene recall or by an effect step, it is possible to configure (separately for each) in the ETS plug-in whether the value is jumped to directly or alternatively whether it is dimmed to using a dimming time (Fading Time).
Just as with relative dimming, an absolute dimming telegram for controlling the colour temperature can also switch on a group or single device in the "OFF" state. Here too, it may be necessary in some applications for a switched off group or switched off device to still remain off if a new colour temperature value is specified absolutely. The parameter "Behaviour when OFF by absolute dimming of the colour temperature" defines whether or not a DALI group or single device in the "OFF" state switches on via a new absolute 2-byte dimming telegram of the colour temperature or remains switched off and only tracks the colour value internally.

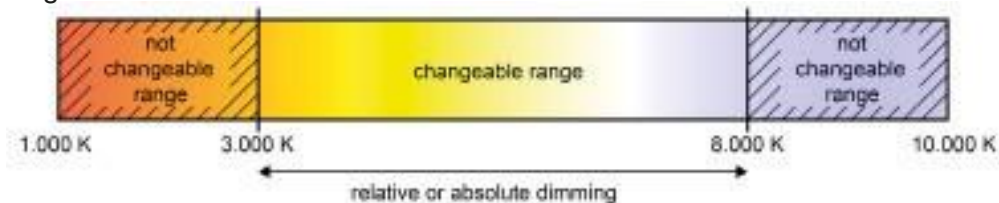
On the DALI Gateway, it is possible that the setting of a dimming time for relative dimming or absolute dimming (with dimming of the colour temperature values) can take place for the DALI Gateway in the range minimum colour temperature to maximum colour temperature. The dimming step times can be derived from the configured times.

- The dimming characteristic for colour temperature changes is always linear.
- It is possible via the 1-bit "Absolute colour temperature (K)" feedback object to optionally display whether a colour temperature specified externally via the "Absolute colour temperature (K)" is valid. This is the case, if the specified colour temperature violates the set limits of the minimum and maximum colour temperature.
- Relative dimming of the colour temperature cannot be triggered by manual operation directly on the device.
- Even if colour temperature values are instantly jumped to, the dimming procedure on DALI operating devices always takes a very short time. This dimming procedure is dependent on the system. The colour temperature value jumped to will be dimmed to within 0.7 seconds (short fading). This time cannot be altered.

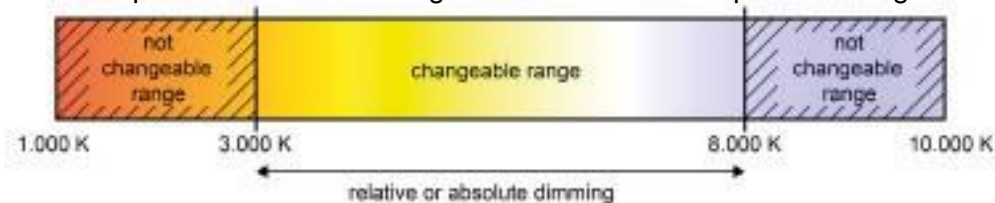
It is optionally possible to automatically change the colour temperature proportionally when dimming the brightness. This makes it possible with little project planning to simulate a thermal radiator using almost any colour temperature controllable luminaire (perception of the light source such as an incandescent or halogen lamp). Example:

A DALI luminaire is fitted with colour temperature controllable LED lights. The lamp is switched via KNX telegrams and dimmed in brightness. When dimming, the colour temperature should adjust automatically to the brightness of the dimming setting without the colour temperature being set separately via the KNX. At low brightness, the luminaire should glow warm white, and at high brightness it should glow cold white. Thus, the colour temperature should change constantly in the same way as the brightness in the ranges of the dimmable brightness range.

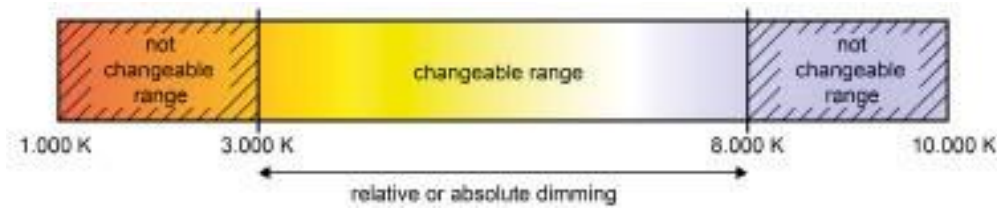
The maximum possible KNX brightness range (0 %...100 %) is mapped proportionally to the configured colour temperature range during the automatic adjustment of the colour temperature (minimum colour temperature [0 %]...maximum colour temperature [100 %]). A configured minimum and maximum brightness limits the automatically adjustable colour temperature range. In the same way, a configured minimum colour temperature can never be undershot and a maximum colour temperature can never be exceeded even if the brightness range allows a greater adjustment range.



Automatic adjustment of the colour temperature to the set brightness
Example in the maximum brightness and colour temperature range



Automatic adjustment of the colour temperature to the set brightness
Example with limited brightness and colour temperature range



Automatic adjustment of the colour temperature to the set brightness
Example with limited colour temperature range

The automatic adjustment of the colour temperature to the brightness dimming setting if a DALI group or single device can take place during relative dimming and absolute dimming. The parameters "Behaviour of the colour temperature during relative dimming of the brightness" and "Behaviour of the colour temperature during absolute dimming of the brightness" allow the described function for the relative or absolute dimming to be activated separately.

- The brightness of the connected luminaire activated on the physical output of the DALI operating device is dimmed via the configured DALI characteristic (linearly or logarithmically) in the ETS for each DALI group or single device. The colour temperature is constantly dimmed linearly.

Setting dimming time for relative dimming

In the plug-in of the DALI Gateway, the dimming time for relative dimming of the colour temperature can be set separately for each group and each single device.

- Set the parameter "Time for relative dimming for colour temperature adjustment" in the parameter node "Addressing -> Groups ... - [x] Group -> TW function colour temperature 1" or "Addressing -> Single devices ... - [x] Electronic ballast -> Set TW function colour temperature 1" to the required dimming time.

Setting dimming behaviour for absolute dimming

In the plug-in of the DALI Gateway, the dimming behaviour for absolute dimming can be set separately for each group and each single device using the "Absolute colour temperature (K)" object.

- Set the parameter "Dimming behaviour on receipt of a colour temperature" in the parameter node "Addressing -> Groups ... - [x] Group -> TW function colour temperature 1" or "Addressing -> Single devices ... - [x] Electronic ballast -> Set TW function colour temperature 1" to "dim".
Once a new colour temperature value is received, it is set by means of the calculated dimming increment time for absolute dimming.
- Set the parameter "Dimming behaviour after receipt of a colour temperature" to "jump to". As soon as a new colour temperature value is received it will be instantly jumped to.
- During a scene or effect recall, the dimming behaviour can be configured separately.

Setting dimming time for absolute dimming

In the plug-in of the DALI Gateway, the dimming time for absolute dimming can be set separately for each group and each single device using the "Absolute colour temperature (K)" object.

The dimming behaviour must be configured as "Dim to".

- Set the parameter "Time for absolute dimming for colour temperature adjustment" in the parameter node "Addressing -> Groups ... - [x] Group -> TW function colour temperature 1" or "Addressing -> Single devices ... - [x] Electronic ballast -> Set TW function colour temperature 1" to the required dimming time.
- On the DALI Gateway, it is possible that the setting of a dimming time for relative dimming or absolute dimming (with dimming of the colour temperature values) can take place for the DALI Gateway in the range minimum colour temperature to maximum colour temperature. The dimming step times can be derived from the configured times.

Setting dimming behaviour in OFF state for relative dimming

A relative dimming telegram for controlling the colour temperature can also switch on a group or single device in the "OFF" state. In the plug-in of the DALI Gateway, the behaviour in the "OFF" state when receiving a relative dimming telegram can be set separately for each group and each single device by the parameter "Behaviour when OFF by relative dimming of the colour temperature".

- Set the parameter to "Colour temp. value change switches ON (standard)".
The DALI group or the single device in the "OFF" state is switched to the switch-on brightness by a relative dimming telegram of the colour temperature telegram. The dimming operation for the colour temperature starts at the colour temperature value most recently set by the Gateway or which was tracked in the "OFF" state. The relative dimming telegram that leads to switching on, specifies the dimming direction and dimming increment. The dimming operation stops after reaching the specified colour temperature.
- After an ETS programming operation, the colour temperature value, at which the dimming operation is started for relative dimming after the "OFF" state, is permanently set to the mean value of the configured colour temperature range: $\text{colour temperature start dim} = ((\text{colour temperature max} - \text{colour temperature min}) : 2) + \text{colour temperature min}$.
- Set the parameter to "Colour temp. value change is ignored".
- The DALI group or the single device in the "OFF" state is not switched on by the relative dimming telegram. The group or single device remains switched off and only tracks the dimming operation internally based on the last valid colour temperature currently set.

Setting dimming behaviour in OFF state for absolute dimming

An absolute 2-byte colour temperature telegram can also switch on a group or single device in the "OFF" state. In the plug-in of the DALI Gateway, the behaviour in the "OFF" state when receiving an absolute colour temperature telegram can be set separately for each group and each single device by the parameter "Behaviour when OFF by absolute dimming of the colour temperature".

- Set the parameter to "Colour temp. value change switches ON (standard)".
The DALI group or the single device in the "OFF" state is switched to switch-on brightness by an absolute colour temperature telegram. If the dimming behaviour of the absolute colour temperature is configured to "jump to", the intended colour temperature value is preset. If the dimming behaviour is configured to "dim to", the dimming operation starts at the colour temperature value most recently set by the Gateway or which was tracked in the "OFF" state. The dimming operation is executed according to the set dimming time. The dimming operation stops after reaching the specified colour temperature.
- Set the parameter to "Colour temp. value change is ignored".
The DALI group or the single device in the "OFF" state is not switched by the absolute colour temperature telegram. The group or the single device remains switched off and only tracks the colour temperature value internally.

Setting the behaviour of the colour temperature during dimming of the brightness

It is optionally possible to automatically change the colour temperature proportionally when dimming the brightness. This makes it possible with little project planning to simulate a thermal radiator using almost any colour temperature controllable luminaire (perception of the light source such as an incandescent or halogen lamp). In the plug-in of the DALI Gateway, the behaviour of the colour temperature can be set separately by means of parameters for each group and each single device for this application during dimming of the brightness separately for the relative or absolute dimming.

- Set the "Behaviour of the colour temperature during relative dimming of the brightness" to "no change of colour temperature".
The relative dimming of the brightness via a 4-bit dimming telegram has no effect on the colour temperature of the group or single device. The colour temperature can only be controlled separately.
- Set the "Behaviour of the colour temperature during relative dimming of the brightness" to "Colour temperature proportional to brightness".
During relative dimming of the brightness via a 4-bit dimming telegram, the colour temperature of the group or single device is also changed proportionally. The colour temperature becomes warmer when dimming down. The colour temperature becomes colder when dimming up.
The colour temperature can also be controlled separately.
- Set the parameter "Behaviour of the colour temperature during absolute dimming of the brightness" to "no change of colour temperature".
The absolute dimming of the brightness via a 1-byte brightness value has no effect on the colour temperature of the group or single device. The colour temperature can only be controlled separately.
- Set the parameter "Behaviour of the colour temperature during absolute dimming of the brightness" to "Colour temperature proportional to brightness".
During absolute dimming of the brightness via a 1-byte brightness value, the colour temperature of the group or single device is also changed proportionally. The colour temperature becomes warmer when dimming down. The colour temperature becomes colder when dimming up.
The colour temperature can also be controlled separately.

Indice revisioni

Date	Document ref	Comments
27/02/2019		First issue

Copyright 2019 Eelectron SpA
All rights reserved
<http://www.eelectron.com>