KNX
Product documentation

GIRA

Issue:
22.01.2025

DALI actuator Colour, 4-gang

Order no. 2113 00

Product image non-binding

Table of contents

1 Information on the product

1.1 Product catalogue

Product:	DALI actuator Colour, 4-gang (2113 00)
Use:	Actuator
Design:	RMD (rail-mounted device)

1.1.1 Function

DALI

The DALI actuator is the interface between a KNX installation and a digital DALI (**D**igital **A**ddressable **L**ighting **I**nterface) lighting installation. The device controls up to 4 DALI systems in broadcast mode, so that a total of up to 128 DALI operating devices can be switched and dimmed.

Master control (broadcast) of all connected DALI operating devices for each DALI system eliminates the need for DALI commissioning. This means that the system can be put into operation quickly and easily.

The DALI actuator is certified as a DALI-2 control device in accordance with IEC 62386 Ed. 2.

The complete functionality of the DALI system can only be ensured if DALI-2 operating device is used exclusively. It is recommended to use DALI-2 operating devices. A complete list of DALI-2 operating and control devices is available via the following link: https://www.dali-alliance.org/products

DALI-2 sensors

The DALI actuator is a DALI-2 multi-master device that allows the use of additional DALI control components in multi-master operation. The DALI actuator reads the telegrams from a connected DALI-2 sensor and tracks the status of the individual systems so that a KNX visualisation displays the correct status of the DALI systems

Colour temperature control (DALI Device Type 8 - TW)

The DALI actuator supports the control of DALI operating devices of device type "Tunable White." This makes it possible to control the colour temperature of a luminaire by means of suitable DALI operating devices and lamps. The actuator allows the colour temperature to be controlled by relative or absolute dimming and additionally by scenes.

The colour temperature is controlled for each DALI system independently of the brightness control by means of separate communication objects and can be used for each channel as an alternative to the colour control.

Colour control (DALI Device Type 8 - RGBW Colour Control)

The DALI actuator can be used to implement the control the light colour using DALI operating devices of device type "Colour Control". The device enables flexible colour control in the colour spaces "RGB", "RGBW", "HSV" or "HSVW". In the RGB colour spaces, the colour can be controlled by relative or absolute dimming by means of either combined or separate communication objects according to the KNX specification. In the "HSV" colour space, separate objects are always available for the absolute control of the light colour by the hue (H), saturation (S) and brightness value (V). It is also possible to integrate colour control in scenes.

It is also possible to execute automatic colour wheel and brightness sweeps. The colour wheel sequence is used for the automatic overall colour control of DALI lights. This function uses the cyclical adjustment of the hue in the colour wheel. This results in continuous colour gradients that can be started and stopped at will during the running time of the DALI actuator.
The automatic brightness sequence works in the same way. This function cyclically adjusts the brightness within the entire brightness range and thus creates individual brightness scenarios.

DALI feedback telegrams and activatable functions

The general DALI state of operation can be signalled to the KNX (error status, short-circuit). Time delays, soft dimming functions, a staircase function with additional functions and an operating hours counter can also be configured. Moreover, the brightness values of the DALI systems in case of bus voltage failure or bus voltage return and after ETS programming, can be preset separately. Central switching is possible, too.
For DALI DT8-compatible operating devices, the following functions can be additionally configured: definition of the controllable colour or colour temperature range by minimum and maximum limit values, switch-on colour or colour temperature, relative and absolute dimming. Furthermore, it is also 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 lamp (perception of the light source such as an incandescent or halogen lamp).

Scenes

The four DALI systems can each be optionally integrated in up to 16 scenes, which means that pre-programmed static light scenes can be recalled by influencing the brightness, colour temperature or colour. If necessary, the scene values can be switched over and individually adapted and saved during operation of the device, allowing the user to replace the presettings of the ETS as desired. The extended scene recall allows scenes to be switched over by switching commands.

Manual operation and mounting

The operating elements (4 pushbuttons) on the front panel of the device allow the DALI systems to be switched on or dimmed in brightness by manual operation in parallel with the KNX even without bus voltage or in a non-programmed state. This feature permits fast checking of connected loads for proper functioning.

The DALI actuator is supplied completely via the mains voltage connection and provides the DALI system voltage. The mains voltage must be switched on to control the DALI interface or for programming by the ETS! The device is designed for mounting on DIN rails in closed compact boxes or in distributors in fixed installations.

1.2 Device components

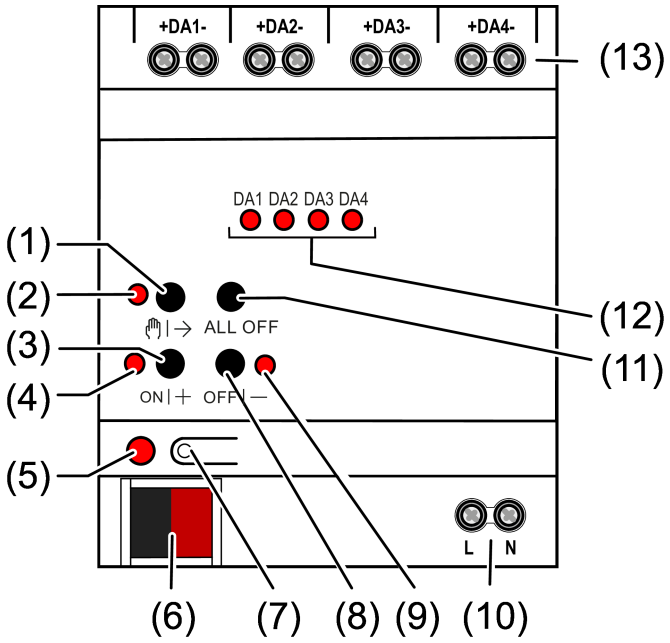


Figure 1: Device components

(1) Button ✋|→
Manual operation

(2) LED ✋|→
On: continuous manual mode active
Flashing: temporary manual mode active

(3) Button **ON|+**
Short press (< 1 s): ON / long press (1...5 s): dims brighter.

(4) LED **ON|+**
LED ON in manual operation indicates a switched-on DALI system (brightness: 1...100 %).

(5) Programming LED

(6) KNX connection

(7) Programming button

(8) Button **OFF|–**
Short press (< 1 s): OFF / long press (1...5 s): dims darker.

(9) LED **OFF|–**
LED ON in manual operation indicates a switched-off DALI system (brightness: 0 %).

(10) Terminals for mains supply

(11) Button **ALL OFF**
All DALI subscribers OFF (only in permanent manual operation).

(12) Status LED of the DALI systems DA1 ... DA4
On: DALI system switched on
Flashes slowly: manual operation mode active
Flashes quickly: DALI system locked by manual operation
OR: Indication of an unauthorised external voltage on the corresponding

DALI system (e.g. mains voltage connected). DALI actuator without function. The actuator is not ready for operation again until the error has been eliminated and initialisation has been performed again (mains voltage return).

(13) Terminals for DALI systems DA1 ... DA4

1.3 As-delivered state

In the as-delivered state, the DALI actuator is passive, i.e. no telegrams are transmitted to the KNX. Joint operation of the connected DALI operating devices by broadcast manual operation on the device, if the mains voltage is on. With manual operation, no feedback telegrams are sent to the KNX. Other functions of the DALI actuator are deactivated. The device can be programmed and put into operation via the ETS (if the bus and mains voltage supply are connected and switched on). The physical address is preset to 15.15.255.

Furthermore, the device has been configured at the factory with the following characteristics...

- Manual operation: broadcast
- Dimming speed, manual operation (0...100%): 3.5 seconds
- Minimum brightness: 1%
- Maximum brightness: 100%
- Response to bus voltage failure: No reaction.
- Response to bus voltage return: No reaction.
- Response after return of the mains voltage supply on the DALI actuator: No reaction from the DALI actuator. When the mains voltage returns, the DALI operating devices usually initialise themselves to the "power-on level" most recently programmed or specified by the manufacturer.
- Operating hours counter reading: 0

The delivery state (broadcast manual operation) can be restored at any time by unloading the application program using the ETS.

In the delivery state, no colour temperature control or colour control is possible.

1.4 Technical data

KNX

KNX medium	TP 256
KNX commissioning mode	S mode
Rated voltage KNX	DC 21 ... 32 V SELV
Current consumption KNX	3 ... 4 mA
Connection type for bus	Device connection terminal

Supply

Rated voltage	AC 110 ... 240 V ~
Mains frequency	50 / 60 Hz
Rated voltage	DC 110 ... 240 V
Power loss	max. 3 W
Power consumption	< 5.0 W

DALI

The four DALI systems are supplied with power exclusively via the DALI actuator. The connection of an additional power supply to one of the DALI systems is not permitted.

Rated voltage DALI	DC 15.2 V (typ.)
Output current per DALI system	Typ. 64 mA, max. 250 mA for short periods
Guaranteed bus current per DALI system	80 mA
Number DALI operating devices	Max. of 40 per DALI system ∑ DA1 .. DA4 max. 128

If additional DALI sensors are connected, it must be ensured that the total current consumption of 80 mA per DALI system is not exceeded.

DALI transmission rate	1.2 kBit/s
DALI protocol	EN 62386
Duration of the starting operation	max. 5 s
Cable type	Sheathed cable 230 V, e. g. NYM

DALI cable length (see figure 2)

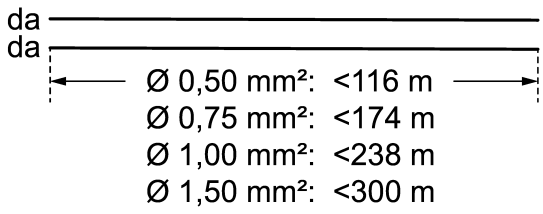


Figure 2: DALI cable length

Ambient conditions

Ambient temperature	-5 ... +45 °C

Storage temperature	-5 ... +45 °C
Transport temperature	-25 ... +70 °C
Clampable cable cross-sections (see figure 3)	

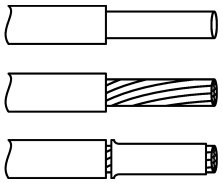


Figure 3: Clampable cable cross-sections

Installation width	72 mm / 4 HP

Terminals

Connection mode	Screw terminal
Stripping length	8 mm
Suitable tool	
Phillips screwdriver (recommended)	PZ1 Plusminus (Pozidriv/slotted)
Phillips screwdriver	PZ1
Slotted screwdriver	4 mm
Connection torque	max. 0.8 Nm

2 Safety instructions

Electrical devices may be mounted and connected only by electrically skilled persons.

Serious injuries, fire or property damage are possible. Please read and follow the manual fully.

Danger of electric shock. Always disconnect before carrying out work on the device or load. In so doing, take all the circuit breakers into account, which support dangerous voltages to the device and or load.

DALI is an FELV (functional extra-low voltage). On installing, ensure safe isolation between KNX and DALI and mains voltage. A minimum distance of at least 4 mm must be maintained between bus conductors and DALI mains voltage cores.

3 Mounting and electrical connection

DANGER!

Electric shock when live parts are touched.

Electric shocks can be fatal.

Always disconnect device before carrying out work on it. To do so, switch off all corresponding circuit breakers, secure them against being switched on again and check that there is no voltage. Cover up any adjacent live parts.

Mount device

- Mount device on DIN rail.

Connect device

Control cable: appropriate type, cross-section and routing for the specifications for 230 V cables. DALI and mains voltage wires can be run together in a cable, e.g. NYM 5x1.5 mm². The connected DALI subscribers may be operated on different phases.

- The DALI control voltage is a functional extra-low voltage (FELV). When installing, perform the installation in such a way that when an area is disconnected, the lines carrying both the DALI and also the mains voltage are disconnected.
- If multiple circuit breakers supply dangerous voltages to the device or load, couple the circuit breakers or label them with a warning to ensure tripping.
- DALI participants from some manufacturers have expanded functions and can e.g. be controlled via mains voltage on the DALI connection. When existing DALI installations are refitted, remove all corresponding operator controls.
- Attach the cover cap to the bus cable connection as protection against hazardous voltages.

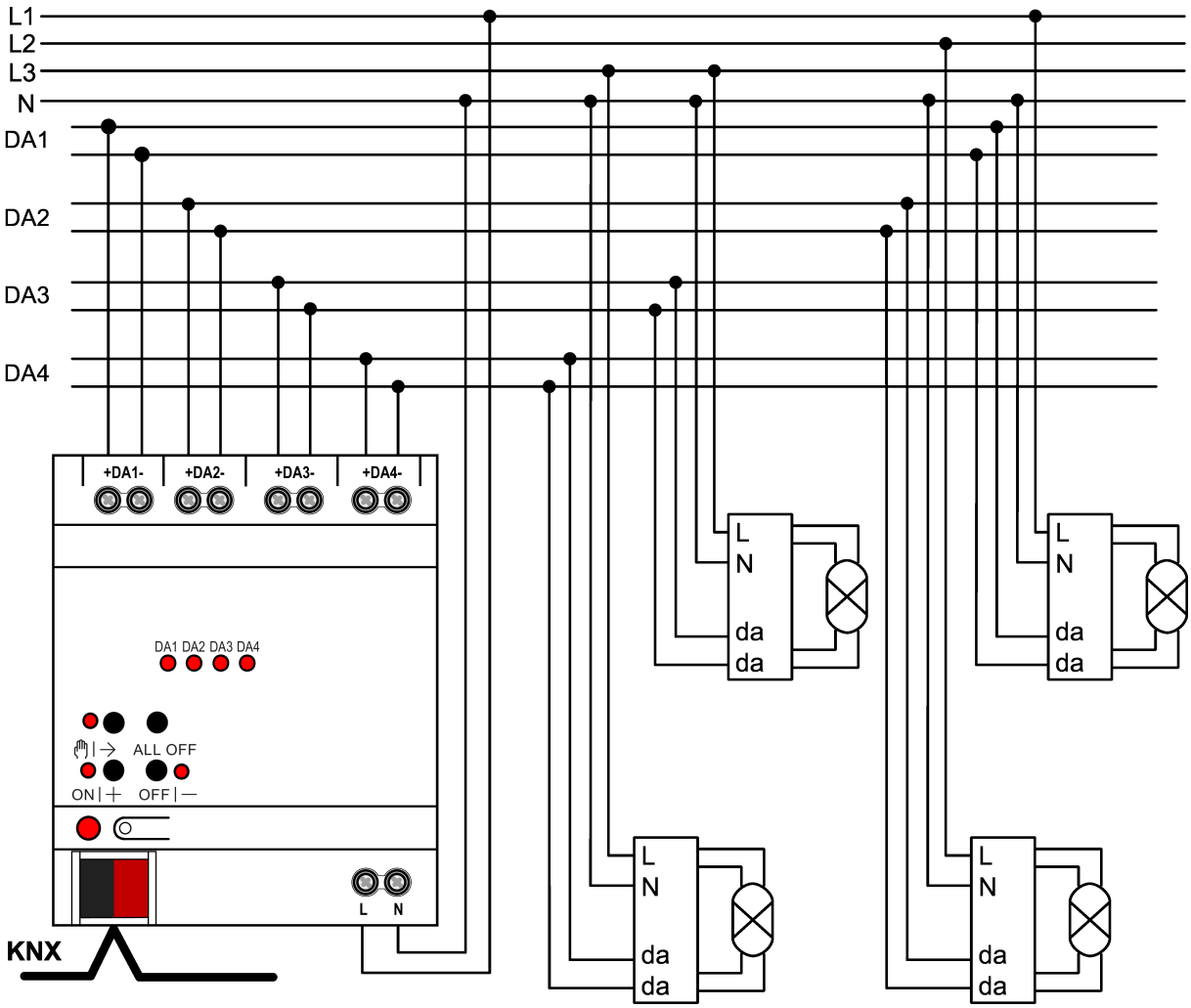


Figure 4: Connection example

- Connect device as shown in the connection example (see figure 4).

The mains voltage supply can also be provided by the DC voltage of an emergency lighting system.

The four DALI systems are supplied with power exclusively via the DALI actuator. The connection of an additional power supply to one of the DALI systems is not permitted.

The DALI power supply integrated in the DALI actuator is short-circuit-proof. The actuator detects short-circuits on the DALI cable, as may occur in the case of an installation error. As soon as a short circuit is identified with the mains the actuator switches off the DALI system voltage. In these cases, a short-circuit status can optionally be sent out on the KNX. The actuator checks at intervals of approx. 10 s whether an identified short circuit is still present. If the short circuit has been eliminated, the actuator automatically switches the DALI system voltage back on and continues to operate in normal mode.

4 Commissioning

The device can be put into operation, after mounting of the device and connection of the bus line, the mains supply and the DALI cables. The following procedure is generally recommended...

Commissioning the device

- Switch on the mains supply to the device.
- Switch on the bus voltage.

  Voltage check: When the programming button is pressed, the red programming LED must light up.

- Configure and program the physical address with the help of the ETS.
- Download the application program using the ETS.

  The DALI actuator initialises all connected DALI operating devices and sets the DALI parameters (power ON level, system failure level ...) according to the ETS programming.

  The DALI actuator is ready for operation.

No ETS programming is possible if no mains voltage supply is connected.

After each mains voltage return, the DALI actuator sends the DALI parameters (power ON level, system failure level ...) to all connected DALI devices. This means that when DALI operating devices are replaced, the DALI parameters within a DALI system are always configured the same.

Master reset

The master reset restores the basic device settings (physical address 15.15.255, firmware remains in place). The device must then be recommissioned with the ETS. Manual operation is possible.

In secure operation: A master reset deactivates device security. The device can then be recommissioned with the device certificate.

Performing a master reset

Prerequisite: The safe-state mode is activated.

- Press and hold down the programming button for > 5 s.

  The programming LED flashes quickly.

  The device performs a master reset, restarts and is ready for operation again after approx. 5 s.

Restoring the device to factory settings

The device can be reset to factory settings with the Gira ETS Service App. This function uses the firmware contained in the device that was active at the time of delivery (delivered state). Restoring the factory settings causes the device to lose its physical address and configuration.

Safe-state mode

If the device does not work properly - for instance as a result of errors in the project design or during commissioning - the execution of the loaded application program can be halted by activating the safe-state mode. In safe-state mode it is not possible to control the DALI operating devices via the KNX or by manual operation. The DALI actuator remains passive in safe-state mode, since the application program is not being executed. Only the system software is still functional so that the ETS diagnosis functions and also programming of the device continue to be possible.

Activating safe-state mode

There are two options for activating the safe state mode.

Option 1:

- Switch off the mains voltage supply.
- Wait approx. 10 seconds.
- Press and hold down the programming button.
- Switch on the mains supply. Release the programming button only after the programming LED starts flashing slowly.

  Safe-state mode is activated.

Option 2:

Prerequisite: The mains voltage supply must be switched on without interruption.

- Switch off the bus voltage or disconnect the bus terminal.
- Press and hold down the programming button.
- Switch on the bus voltage or attach the bus terminal. Release the programming button only after the programming LED starts flashing slowly.

  Safe-state mode is activated.

Even in safe-state mode, a brief press of the programming button can switch the programming mode on or off as usual as long as the bus power supply is switched on. The programming LED then stops flashing, even though safe-state mode is still active.

Deactivating safe-state mode

- Switch off the mains voltage supply (wait approx. 10 s),

  or

- Perform the ETS programming operation,
  or
- Cause bus voltage failure.

5 Application programs

ETS search path:	Lighting / Dimmer / DALI actuator Colour, 4-gang
Configuration:	S-mode standard

Applications:

Name	DALI actuator C02F21
Version	2.1 for ETS5 version 5.7.7 or higher, or ETS6 version 6.1.1 or higher.
from mask version	SystemB (07B0)

6 Scope of functions

- Control of up to 128 DALI devices in 4 DALI systems
- Switching and dimming of a maximum of 128 lights with a DALI operating device (e.g. electronic ballast).
- Support of the control of DALI operating devices of device type "Tunable White" (DALI Device Type 8 - TW). Colour temperature control via relative or absolute dimming as well as via scenes and effects. The colour temperature control is largely independent of the brightness control and lamp used.
- Control of the light colour when using DALI operating devices of device type "Colour Control" (DALI Device Type 8 - RGBW Colour Control). The DALI actuator enables flexible colour control in the "RGB", "RGBW" or "HSV" colour spaces. In the RGB colour spaces, the colour can be controlled by relative or absolute dimming by means of either combined or separate communication objects according to the KNX specification. In the "HSV" colour space, separate objects are always available for the absolute control of the light colour by the hue (H), saturation (S) and brightness value (V).
- With colour control: execution of automatic colour wheel and brightness sequences. The colour wheel sequence is used for the automatic overall colour control of DALI lights. This function uses the cyclical adjustment of the hue in the colour wheel. This results in continuous colour gradients that can be started and stopped at will during the running time of the DALI actuator. The automatic brightness sequence works in the same way. This function cyclically adjusts the brightness within the entire brightness range and thus creates individual brightness scenarios.
- Manual operation of DALI systems independently of the bus (also building site operation with broadcast control) separately for the DALI systems. Control of the switching status and brightness.
- Feedback of DALI error status, DALI short-circuit and message that the supply voltage has failed.
- Up to six central switching and dimming functions.
- Standby switch-off of the connected electronic ballast can be implemented. Collective feedback of all switching states possible.
- It is possible to include each of the four DALI systems in up to 16 light scenes per DALI system to control the brightness, colour temperature or colour.
- Active status messages for switching state, brightness value, colour temperature and colour possible for each DALI system.
- Setting of brightness and colour temperature limit values (minimum, maximum) possible.
- Dimming behaviour and dimming characteristics configurable.
- Lamp preserving switch on and switch off (soft ON or soft OFF).
- Disabling function, or alternatively, forced position function is configurable. During a disabling function, the flashing of lights in a DALI system is not possible.

- Time functions (switch-on delay, switch-off delay, staircase lighting function, also with pre-warning function).
- Operating hours counter
- DALI power ON level adjustable (by behaviour "after bus/mains voltage return" parameter) and DALI system failure level (adjustable by behaviour "at bus/ mains voltage failure" parameter).
- Reactions in the event of bus/mains voltage failure and return as well as after an ETS programming operation can be set (for brightness control). Fixed for colour temperature control and colour control.
- Multi-master capable, further DALI-2 sensors can be installed as application controllers in every DALI system.

7 Notes on software

ETS project design and commissioning

For project design and commissioning of this device, we recommend using the ETS6. Project design and commissioning of the device with ETS5 version 5.7.7 or ETS6 version 6.1.1 or higher is possible.

8 Description of device-independent functions

8.1 Application basics

8.1.1 DALI System

The DALI actuator is the interface between a KNX installation and a digital DALI (**D**igital **A**ddressable **L**ighting **I**nterface) lighting installation. The DALI actuator enables switching and dimming of DALI operating devices in four separate DALI systems. The four DALI systems can be used to control DALI lights via KNX telegrams. This allows the integration of room-specific light control, for example of open-plan offices, multipurpose spaces, production facilities, training and presentation rooms or showcases, into the higher-level KNX building management.

The DALI actuator is certified as a DALI-2 control device in accordance with IEC 62386 Ed. 2.

The complete functionality of the DALI system can only be ensured if DALI-2 operating device is used exclusively. It is recommended to use DALI-2 operating devices. A complete list of DALI-2 operating and control devices is available via the following link: https://www.DALI alliance.org/products

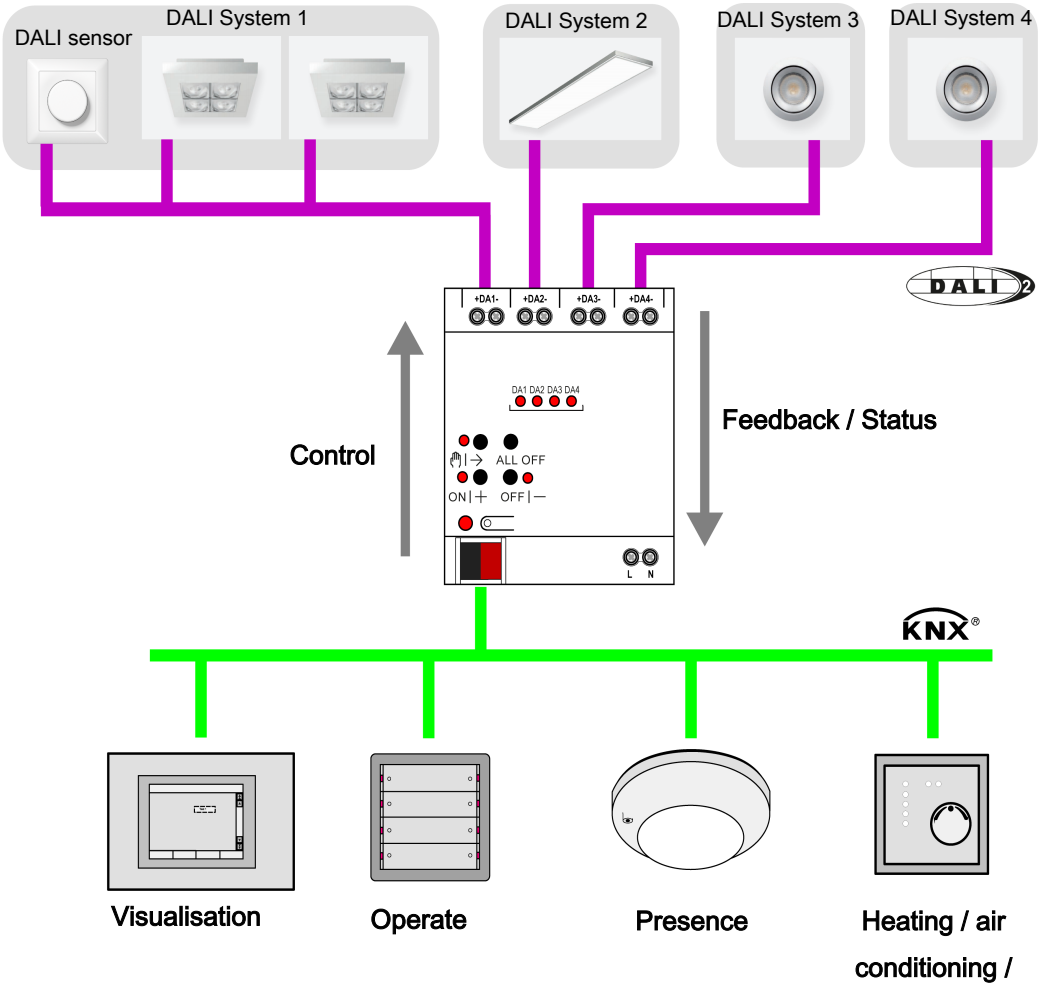


Figure 5: Principle overview of a KNX-DALI system integration (example)

The DALI actuator functions as a master control component (master controller) within a system, which also guarantees the power supply of the DALI interface. The DALI operating devices, e.g. electronic ballasts, work as command receivers (slaves), which only return states or status messages to the master on request. It is the sole task of the DALI actuator to transmit control commands received from the KNX onto the DALI cable and to check the operating devices.

Communication between the KNX system and the DALI interface takes place bidirectionally via the DALI actuator. On the one hand, the DALI actuator receives telegrams from the KNX, which either directly influence the brightness state of a DALI system (e.g. by switching, dimming, brightness value specification or scene recall) or adjust it indirectly (e.g. with time, disabling or forced position functions). Internally, the DALI actuator always determines the current brightness states of the DALI systems and forwards brightness commands (broadcast) to the DALI operating devices, which then set themselves to the appropriate brightness. On the other hand, the internally-tracked switching or brightness states of the DALI systems can be fed back to the KNX. It is also possible to transmit the status information of the DALI actuator (mains voltage failure, DALI short-circuit) to the KNX.

The DALI actuator supports the control of DALI operating devices of device type "Tunable White." This makes it possible to control the colour temperature of a luminaire by means of suitable DALI operating devices and lamps. The DALI actuator allows the colour temperature to be controlled by relative or absolute dimming and additionally by scenes.

Furthermore, the light colour can be controlled when using DALI operating devices of device type "Colour Control". The DALI actuator enables flexible colour control in the "RGB", "RGBW", "HSV" or "HSVW" colour spaces. In the RGB colour spaces, the colour can be controlled by relative or absolute dimming by means of either combined or separate communication objects according to the KNX specification. In the "HSV" colour space, separate objects are always available for the absolute control of the light colour by the hue (H), saturation (S) and brightness value (V). It is also possible to integrate colour control in scenes.

The four DALI systems can be optionally integrated in up to 16 independent scenes. Brightness values, colour temperatures and colours can be configured separately within a scene in the ETS for each DALI system or adjusted at any time later on during operation with scene memory telegrams.

DALI-2 sensors

The DALI actuator is a DALI-2 multi-master device that allows the use of additional DALI control components in multi-master operation. The DALI actuator reads the telegrams from a connected DALI-2 sensor and tracks the status of the individual systems so that a KNX visualisation displays the correct status of the DALI systems. A DALI-2 rotary control device can, for example, be integrated into a DALI system (see figure 5) as an additional control point. This DALI sensor must fulfil the following requirements:

- It must be a certified DALI-2 sensor.
- The application controller must be activated in the respective sensor.
- No DALI power supply may be connected.
- Broadcast commands for absolute brightness (Arc Power Level) and/or absolute colour temperature values (Color Temperature Tc) are sent.

If DALI-2 sensors are used to control individual DALI systems, the DALI actuator no longer has sole control over the DALI systems. This means that DALI systems that are blocked or forcibly controlled via the DALI actuator can still be operated via the DALI sensor. This is because the control commands from the DALI sensor are sent directly to the DALI operating device and directly implemented there. Similarly, time delays configured in the DALI actuator for individual DALI systems are not taken into account when controlling via the DALI sensor.

The number of DALI sensors is not limited. However, DALI sensors count as DALI subscribers, which means that fewer DALI operating devices can be connected.

The DALI sensors are not taken into account during ETS project design and commissioning.

8.1.2 Central control

With the DALI actuator, the individual DALI systems are centrally controlled. All the connected DALI components are controlled via broadcast commands. This means that there is no need for DALI commissioning, meaning that lighting systems with low functional requirements can be commissioned quickly and easily.

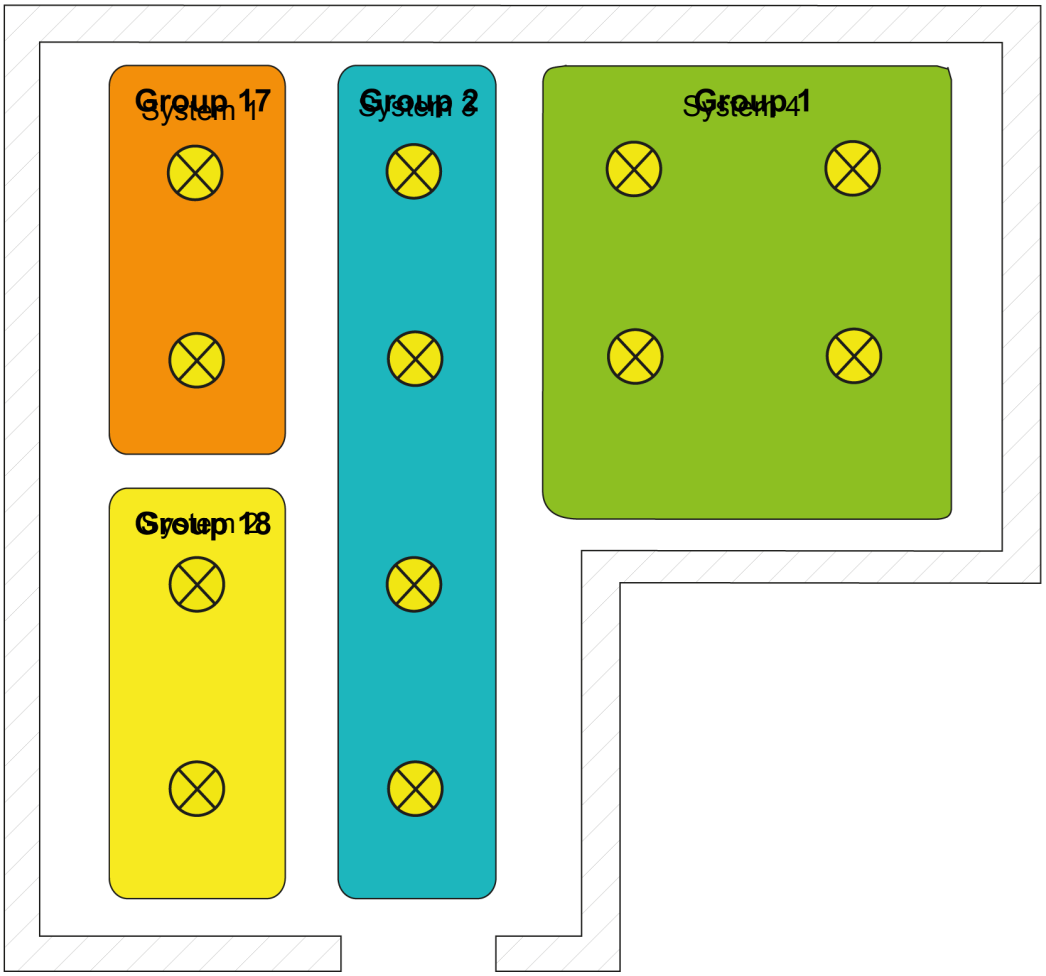


Figure 6: Example of an arrangement of the DALI system in an open-plan office

8.1.3 DALI device types

Depending on the device type, DALI operating devices with different functional scopes can be controlled via the DALI actuator. The following table lists the supported functional scopes.

As a result of the unnecessary DALI commissioning and the associated system check, the installation engineer must, when installing the DALI system, ensure that only DALI operating devices are installed that correspond to the projected scope of functions and can perform the intended functions.

Scope of functions	Type	Compatible DALI device types	Use
Brightness	DIM	All	Only control the brightness

Scope of functions	Type	Compatible DALI device types	Use
Brightness & colour temperature[3]	TW	Only DT8 with colour type "colour temperature (Tc)	Control of brightness and colour temperature
Brightness & colour RGB[3]	RGB	Only DT8 with colour type "Colour Control (RGB-WAF)"[1]	Control the brightness and colour in the RGB colour space
Brightness & colour RGBW[3]	RGBW	Only DT8 with colour type "Colour Control (RGB-WAF)"[2]	Control brightness and colour in the RGBW colour space

Table 1: Configurable scope of functions for each DALI system

1: DALI operating devices of DT8 device type must correspond at least to the "Colour Control RGB" colour type. The extended DALI colour types "WAF" (White [W], Amber [A], Freecolour [F]) are not supported.

2: DALI operating devices of the DT8 device type must correspond at least to the "Colour Control RGBW" colour type. The extended DALI colour types "AF" (Amber [A], Freecolour [F]) are not supported.

3: The device types "DT8 (colour temperature)", "DT8 (RGB colour)" and "DT8 (RGBW colour)" can be configured only if the integration of DT8 operating devices is intended.

8.1.4 Parameters for DALI System

DALI System... -> Configuration

Use	Checkbox (**yes**/no)
The individual DALI systems can be activated or deactivated at this point. An inactive DALI system cannot be configured.	

Scope of functions	**Brightness** Brightness & colour temperature (DT8) Brightness & colour RGB (DT8) Brightness & colour RGBW (DT8)
The type of lighting to be controlled can be configured here for each of the four DALI systems. As there is no testing of compatible devices with this device, the installation engineer or system integrator must ensure that the connected DALI operating devices correspond to the configured range of functions. Brightness: Only the brightness can be controlled. DT8-specific commands are not used. Brightness & colour temperature (DT8): It is possible to control the brightness and also the colour temperature. Brightness & colour RGB (DT8): It is possible to control the brightness and also the colour in the "RGB" colour space. Brightness & colour RGBW (DT8): It is possible to control the brightness and also the colour in the "RGBW" colour space.	

8.2 Operation and indication

8.2.1 Button operation and indication functions

The DALI actuator offers manual operation to control the switching status and brightness of all connected DALI operating devices. The keypad with function buttons and status LEDs on the front of the device can be used to operate the four DALI systems. The following operating modes can be set:

- Bus mode: operation by push-button sensors or other KNX devices,
- Temporary manual operation mode: manual operation locally with keypad, automatic return to bus control,
- Permanent manual control: local manual control with keypad.

The operating modes can be enabled or disabled by parameter settings in the ETS.

In manual control mode, the DALI systems cannot be controlled via the KNX.

Manual control is possible only while the DALI actuator is supplied with power from the mains. In the delivery state of the DALI actuator, manual operation is enabled. In this unprogrammed state, all connected DALI operating devices of all four DALI systems can be controlled using the broadcast function to enable fast function checking of the connected electronic ballasts (e.g. on the construction site).

In manual operation mode, bus operation can be disabled via a telegram. Manual operation mode is terminated on activation of the disabling function.

Only the switching state (ON/OFF) and the brightness value (dimming) can be controlled by manual operation. The colour temperature cannot be changed. In the case of colour-controllable DALI operating devices, the colour is set to the maximum colour value (RGB: #FFFFFF) and, if necessary, also to the maximum white value (#FF) during manual operation, but only if the current colour corresponds to the state "#000000" (black) and the optional white value corresponds to "#00". This ensures that manual brightness control by manual operation can be recognised by the user.

Controls and indicators for manual control

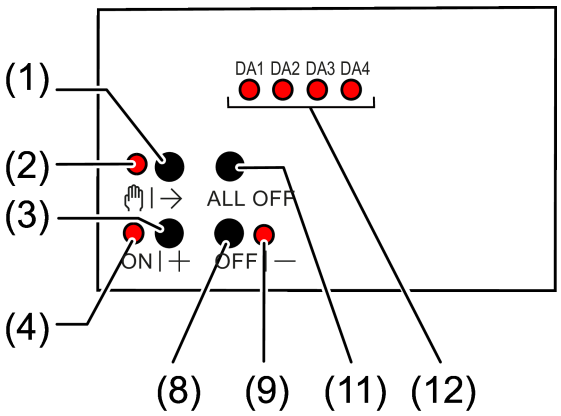


Figure 7: Control panel

(1) Button ✋|→
Manual operation

(2) LED ✋|→
On: continuous manual mode active
Flashing: temporary manual mode active

(3) Button **ON|+**
Short press (< 1 s): ON / long press (1...5 s): dims brighter.

(4) LED **ON|+**
LED ON in manual operation indicates a switched-on DALI system (brightness: 1...100 %).

(8) Button **OFF|–**
Short press (< 1 s): OFF / long press (1...5 s): dims darker.

(9) LED **OFF|–**
LED ON in manual operation indicates a switched-off DALI system (brightness: 0 %).

(11) Button **ALL OFF**
All DALI subscribers OFF (only in permanent manual operation).

(12) Status LED of the DALI systems DA1 ... DA4
On: DALI system switched on
Flashes slowly: manual operation mode active
Flashes quickly: DALI system locked by manual operation
OR: Indication of an unauthorised external voltage on the corresponding DALI system (e.g. mains voltage connected). DALI actuator without function. The actuator is not ready for operation again until the error has been eliminated and initialisation has been performed again (mains voltage return).

When operating the DALI systems with the keypad, the device differentiates between short and long actuation.

- Short: Pressing for less than 1 second
- Long: Pressing for between 1 and 5 seconds

Switching on temporary manual operation mode

Manual operation is configured in the ETS and not disabled.

- Press the 🖐|→ (1) button briefly.

  The LED 🖐|→ (2) flashes.

  The LED (12) of the first DALI system flashes.

After 5 seconds without a button actuation, the device returns automatically to bus mode.

Switching on/off the permanent manual mode

Manual operation is configured in the ETS and not disabled.

- Press the 🖐|→ (1) button for at least 5 seconds.
  The LED 🖐|→ (2) lights up. LED (12) of the first DALI system flashes.

  Permanent manual operation is switched on.

  - or in case of repeated actuation for at least 5 seconds -

  LED 🖐|→ (2) is off, indication (12) is off, bus mode is switched on.

Operating DALI systems

The device is in temporary or permanent manual operation mode.

- Keep pressing the button 🖐|→ (1) until the indication (12) of the desired DALI system flashes.
- Operate the system using the button **ON|+** (3) or the button **OFF|–** (8).
  Short: switch on/off.
  Long: dim brighter/darker.
  Release: Stop dimming.
  The LEDs **ON|+** (4) and **OFF|–** (9) indicate the status.

ℹ Short-term manual operation: After running through all of the DALI systems the device exits manual mode after another brief press.

ℹ After a device reset (mains voltage return, ETS programming operation), the switching state "OFF" may be signalled initially, regardless of the actual switching states of the DALI operating devices. In this case, the switching status is displayed correctly only after manual operation. This must be observed when individual operating devices of the DALI system are switched on before manual operation is carried out. The status LEDs then show the command of the last manual operation.

Switch off all DALI devices of all DALI systems

The device is in permanent manual operation mode.

- Press the **ALL OFF** (11) button briefly.

Locking/unlocking an individual DALI system

The device is in permanent manual operation mode and the lock is released.

- Keep pressing the button (1) until the LED (12) of the desired DALI system flashes.
- Press the **ON|+** (3) and **OFF|–** (8) buttons simultaneously for at least 5 seconds.

  The LED of the selected DALI system (12) flashes quickly.

  DALI system is blocked.

  - or in case of repeated actuation -

  The LED (12) flashes slowly.

  DALI system is enabled.
- Activate bus mode (see section Switching the permanent manual mode on/ off).

DALI systems blocked via manual operation can be operated in manual mode.

8.2.2 ETS configuration

8.2.2.1 Manual operation

The DALI actuator has a manual control for manual control of the four DALI systems individually or together. The keypad with function buttons and status LEDs on the front of the device can be used to set the following operating modes.

- Bus control: operation from touch sensors or other bus devices,
- Temporary manual control: manual control locally with keypad, automatic return to bus control,
- Permanent manual control: local manual control with keypad.

Manual control is possible only while the actuator is supplied with power from the mains. In the delivery state of the actuator, manual operation is enabled. In this unprogrammed state, all connected DALI operating devices of the DALI systems can be controlled using the broadcast function to enable fast function checking of the connected electronic ballasts (e.g. on the construction site).

After initial commissioning of the actuator via the ETS, manual control can be enabled or disabled separately for various states of operation. Manual operation, for instance, can be deactivated during bus operation (bus voltage applied). It is also possible to deactivate manual operation in the event of a bus voltage failure.

i Only the switching state (ON/OFF) and the brightness value (dimming) can be controlled by manual operation. The colour temperature cannot be changed. In the case of colour-controllable DALI operating devices, the colour is set to the maximum colour value (RGB: #FFFFFF) and, if necessary, also to the maximum white value (#FF) during manual operation, but only if the current colour corresponds to the state "#000000" (black) and the optional white value corresponds to "#00". This ensures that manual brightness control by manual operation can be recognised by the user.

Enabling the manual control mode

Manual operation is enabled for the different states of operation by means of the parameters "Manual control in case of bus voltage failure" and "Manual control during bus operation".

- Activate the parameter "Manual control during bus operation".

  Manual control is then basically enabled when the bus voltage is on. The DALI systems can be activated via the bus or manually. This setting corresponds to the setting of the actuator as delivered.

- Deactivate the parameter "Manual control during bus operation".

  Manual control is completely disabled when the bus voltage is on. In this configuration, the DALI systems can be controlled only via KNX.

- Activate the parameter "Manual control in case of bus voltage failure".

Manual control is then basically enabled when the bus voltage is off. This setting corresponds to the setting of the actuator as delivered.

- Deactivate the parameter "Manual control in case of bus voltage failure".

  Manual control is completely disabled when the bus voltage is off. Since bus operation is also not possible in this state, the DALI operating devices can no longer be controlled.

Manual control is only possible when the mains voltage is on. The parameter "On bus voltage return" defines whether temporary or permanent manual operation is automatically terminated as soon as the bus voltage is switched on.

Presetting the behaviour at the beginning and at the end of manual operation

Manual operation distinguishes between the temporary and permanent manual operation modes. The behaviour is different depending on these operating modes, especially at the end of manual operation. It should be noted that bus operation, - i. e. control of the DALI systems by direct operation (switching/dimming/value/scenes/ central) or by the disabling or forced position functions - is always disabled during activated manual operation. This means that the manual control mode has the highest priority.

Behaviour at the beginning of manual operation:
The behaviour at the beginning of manual operation does not differ for temporary and permanent manual operation modes. During activation of the manual operation, the brightness statuses of the DALI systems remain unchanged.

"Flashing during disabling function" feature: The flashing of a disabling function is interrupted at the beginning of a manual operation. The brightness remains at the most recently set flash state ("ON" or "OFF). The switching status is indicated as "ON".

Behaviour at the end of manual operation:
The behaviour at the end of manual operation is different for temporary and permanent manual operation modes. The temporary manual mode is shut off automatically when the last DALI system has been addressed and when the select button is pressed once more. During deactivation of the temporary manual operation mode, the DALI actuator returns to 'normal' bus operation and does not change the brightness states selected by manual control. If a forced position or disabling function has been activated via the KNX before or during manual control, the actuator executes these functions of a higher priority for the DALI system concerned.

The permanent manual operation mode is shut off when the selection button is pressed for more than 5 seconds. Depending on the configuration of the DALI actuator in the ETS, the DALI systems are set to the state last set by manual operation or to the state internally tracked (direct bus operation, disabling function, forced position) when permanent manual operation is switched off. The parameter "At end of permanent manual operation" defines the corresponding reaction.

- Set the parameter "At end of permanent manual operation" to "no change".

All telegrams received during the active permanent manual operation for direct bus operation (switching, dimming, value, central, scenes) are rejected. After the end of the permanent manual control mode, the current brightness state of the DALI systems remains unchanged. If, however, a forced position or disabling function was activated before or during manual operation, the actuator executes these functions of higher priority for the DALI system concerned.

- Set the parameter "At end of permanent manual operation" to "track outputs".

  During active permanent manual operation, all incoming telegrams are tracked internally. At the end of manual operation, the DALI systems are set to the last tracked brightness states. If, however, a forced position or disabling function was activated before or during manual operation, the DALI actuator executes these functions of higher priority for the DALI systems concerned.

i When tracking enabling functions or forced positions: If a disabling function was activated via the KNX before or during temporary or permanent manual operation, the DALI actuator always executes these higher-priority functions for the affected DALI systems at the end of the manual operation (locking of bus operation). Only in the setting "At end of permanent manual operation = Track outputs" does the DALI actuator perform the behaviour at the beginning of the disabling function again. Bus operation by switching, dimming, value, scene, central is then disabled.

i The behaviour at the end of the permanent manual control when the bus voltage is off (only manual control) is permanently set to "no change".

i The operating processes triggered during manual operation are transmitted to the KNX by means of the status objects, provided the bus voltage is switched on.

i Activated manual operation is always exited in the event of an ETS programming operation. If manual operation is possible in the event of a bus voltage failure, the parameter "On bus voltage return" decides whether manual operation is terminated or not when the bus voltage is switched on again. In both cases, when manual operation is ended, the specified behaviour at the end of the manual operation is not executed. Instead, the DALI actuator executes the behaviour configured for the DALI systems after an ETS programming operation or when the bus/mains voltage returns.

Presetting a manual control disable

Manual operation can be disabled separately via the KNX, even if it is already active. If the disabling function is enabled, the DALI actuator immediately terminates an activated manual operation and locks the function buttons on the front of the device as soon as a disabling telegram is received. The telegram polarity of the disabling object can be configured.

The manual control mode during bus operation must be enabled.

- Activate the parameter "Disabling function" on the "Manual operation" parameter page.

The disabling function of manual operation is enabled and the disabling object becomes visible.

- Select the desired telegram polarity in the parameter "Object polarity".

i In the polarity "1 = enabled / 0 = disabled", the disabling function is immediately active on return of bus/mains voltage or after an ETS programming operation (object value = "0"). To activate the manual control in this case, an enable telegram "1" must first be sent to the disabling object.

In case of bus voltage failure, disabling via the disabling object is always inactive (depending on parameterization, the manual control is then either enabled or completely disabled). After the bus voltage returns, a disabled state that was active beforehand is always inactive when the polarity of the disabling object is non-inverted.

i In the event of failure of the supply voltage (mains voltage failure), disabling is deactivated via the disabling object.

i If an active manual operation is terminated by disabling, the actuator also transmits a "Manual operation inactive" status message to the KNX if the status message is enabled.

Presetting the status message function for manual operation

The device can transmit a status message to the KNX by means of a separate object when the manual operation is activated or deactivated. The status telegram can only be transmitted when the bus voltage is switched on. The function of the status message can be configured.

The manual control mode during bus operation must be enabled.

- Activate the parameter "Status object" on the "Manual operation" parameter page.

  The status messaging function of manual operation is enabled and the status object is visible.

- In the "Function" parameter, define whether the status telegram always becomes "1" whenever manual operation is activated or only if permanent manual operation is activated.

i The status object is always "0" when the manual control mode is deactivated.

i The status ("0") is always actively transmitted to the KNX after the mains voltage returns, provided the bus voltage is available. The status is actively transmitted to the KNX only after the bus voltage returns with an existing mains voltage supply if the manual operation was activated during the bus failure or is terminated by the bus voltage return. In these cases, the status telegram is transmitted without delay.

i When an active manual operation is terminated by disabling, the actuator also transmits a "Manual control inactive" status message to the KNX.

Setting disabling of the bus control

Individual DALI systems can be disabled locally so that the DALI operating devices of the DALI system can no longer be controlled via the KNX. Such disabling of the bus operation is initiated by local operation in permanent manual operation and is indicated by flashing LEDs of the DALI system. The disabled DALI system can then only be activated in permanent manual control.

The manual control mode during bus operation must be enabled.

- Activate the parameter "Bus control of individual DALI systems can be disabled" on the parameter page "Manual operation".

  The function for disabling the bus control is enabled and can be activated locally. Alternatively, deactivating the parameter prevents disabling of the bus control from being activated in permanent manual operation mode.

i The disabling initiated locally has the highest priority. Thus all other functions of the actuator that can be activated via KNX (e.g. forced position or disabling function) are overridden. Depending on the parameterization of the actuator in the ETS, the DALI systems will be set to the state last adjusted in the manual mode or to the state internally tracked (direct operation, forced position, disabling) when the permanent manual mode is reactivated and subsequently shut off.

i Any disabling of the bus control activated locally is not reset in case of bus voltage failure or return. A failure of the supply voltage (mains voltage failure) or an ETS programming operation always deactivates disabling of the bus control.

8.2.2.2 Status indication

The status LEDs on the front of the device can indicate the current status of the DALI systems permanently or temporarily.

- Continuous status indication:
  The parameter "Indicate status temporarily" on the "Status indication" parameter page is deactivated. In the case of a continuous status indication, the status LEDs always indicate the current status of the outputs.
- Temporary status indication:
  The parameter "Indicate status temporarily" on the "Status indication" parameter page is activated. During temporary indication, the status indication is activated by pressing the "Manual operation" button. The display length is set in the ETS.
  If manual operation is enabled in the ETS, pressing the "Manual operation" button also activates the temporary or permanent manual operation mode. The status indication always remains active during manual operation. At the end of manual operation mode, the display length of the temporary status indication is restarted. The status LEDs then go out after the configured time has elapsed.

If manual operation is not enabled in the ETS, all status LEDs only show the status of the outputs when the "Manual operation" button is pressed, depending on the duration of the display.

In the as-delivered state, the continuous status indication is preset.

If the parameter "Control via object" is activated, the "Temporary status indication" communication object is available in the ETS. This object is bidirectional and can firstly signal the status of the temporary status indication, and secondly, activate the status display. If a temporary status indication has been activated by pressing the "Manual operation" button, the object transmits the value "ON". If the object receives a telegram with the value "OFF" or "ON", the status LEDs indicate the status of the outputs according to the display length. Manual operation is not activated in this case.

By linking the "Temporary status indication" objects of several actuators using a common group address, the indication functions of the status LED can be synchronized with one another. It is thus possible to activate the status indications of all actuators in a control cabinet at the same time if manual operation is triggered on one actuator only - e.g. for service or maintenance purposes.
In addition, the "Temporary status display" object could be controlled, for example, by a magnetic contact connected to the KNX, so that the status indications of all actuators are activated by opening the control cabinet door. If the door is closed, the status indications for energy saving remain switched off.

During a running display length, the "Temporary status indication" object does not transmit any new telegrams if the "Manual operation" button is pressed again.

8.2.3 Operation and indication parameters

Manual operation

Manual control during bus operation	Checkbox (**yes**/no)
Whether the manual operation is to be possible or deactivated during bus operation (bus voltage on) can be configured here.	

Manual control in case of bus voltage failure	Checkbox (**yes**/no)
Whether the manual operation is to be possible or deactivated in the event of a bus voltage failure (bus voltage switched off) can be configured here.	

Disabling function	Checkbox (yes/**no**)
Manual operation can be disabled via the KNX, even if it is already active. For this purpose, the disabling object can be enabled here. This parameter is only visible if manual control is enabled during bus operation.	

Object polarity	**0 = unlock / 1 = lock** 1 = unlock / 0 = lock
This parameter sets the polarity of the disabling object. This parameter is only visible if the disabling function is enabled.	

Status object	Checkbox (yes/**no**)
The DALI actuator can transmit a status telegram to the KNX via a separate object when the manual operation is activated or deactivated. This parameter is only visible if manual control is enabled during bus operation.	

Function	**0 = inactive / 1 = manual operation active** 0 = inactive / 1 = permanent manual operation active
This parameter defines the information contained in the status object. The object is always "OFF" when manual operation is deactivated. 0 = inactive / 1 = manual operation active: The object is "ON" when manual operation is active (temporary or permanent). 0 = inactive / 1 = permanent manual operation active: The object is only "ON" when permanent manual operation is active. This parameter is only visible if the status function is enabled.	

At end of permanent manual operation	**No change** Output tracking
The behaviour of the DALI actuator at the end of permanent manual operation depends on this parameter. This parameter is only visible if manual control is enabled during bus operation. No change: all telegrams received during an active permanent manual control mode for direct operation (switching, dimming, brightness value, scenes) will be rejected. After ending the permanent manual operation, the states of all DALI systems that were active last in manual operation remain unchanged. If, however, a forced position or disabling function has been activated via the KNX before or during manual operation, the actuator executes these functions of a higher priority for the corresponding DALI system. Track outputs: during active permanent manual operation, all incoming telegrams and state changes are tracked internally. At the end of manual operation, the DALI systems are set to the last tracked brightness states. If a forced position or disabling function has been activated via the KNX before or during manual control, the actuator executes these functions of a higher priority for the DALI systems concerned.	

On bus voltage return	**Exit manual operation** Do not exit manual operation
This parameter defines whether a temporary or permanent manual operation is automatically terminated as soon as the bus voltage is switched on. It can be set only if the manual operation is active during bus operation.	

Bus control of individual DALI systems can be disabled	Checkbox (yes/**no**)
Individual DALI systems can be disabled locally during permanent manual control, so that the disabled systems can no longer be controlled via the KNX. Disabling via manual operation is only permitted if this parameter is activated. This parameter is only visible if manual control is enabled during bus operation.	

Status indication

Indicating status temporarily	Checkbox (yes/**no**)
The status LEDs on the front of the device can indicate the current status of the DALI systems permanently or temporarily. Parameter deactivated: Continuous status indication. In this case, the status LEDs always indicate the current status of the DALI systems. Parameter activated: Temporary status indication is activated. In this case, the status LEDs indicate the current status of the DALI systems only for the configured display length. The display length is set in the ETS. If manual operation is enabled in the ETS, pressing the "Manual operation" button also activates the temporary or permanent manual operation mode. The status indication always remains active during manual operation. At the end of manual operation mode, the display length of the temporary status indication is restarted. The status indication goes out after the configured time has elapsed.	

Display length	6 ... **10** ... 255 s
This parameter defines the display length if the temporary status indication is activated.	

Control via object	Checkbox (yes/**no**)
If the parameter "Control via object" is activated, the "Temporary status indication" communication object is available in the ETS. This object is bidirectional and can firstly signal the status of the temporary status indication, and secondly, activate the status display. If a temporary status indication has been activated by pressing the "Manual operation" button, the object transmits the value "ON". If the object receives a telegram with the value "OFF" or "ON", the status LEDs indicate the status of the outputs according to the display length. Manual operation is not activated in this case.	

8.2.4 Object list for operation and indication

Function	Name	Type	DPT	Flag
Disabling	Manual operation - Input	1-bit	1.003	C, -, W, -, U
1-bit object for disabling the manual operation on the device. The polarity can be configured.				

Function	Name	Type	DPT	Flag
Status	Manual operation - Output	1-bit	1.002	C, R, -, T, A
1-bit object for transmission of the manual operation status. The object is "OFF" when manual operation is deactivated (bus control). The object is "ON" when manual operation is activated. You can configure whether temporary or permanent manual operation will be indicated as status information or not.				

Function	Name	Type	DPT	Flag
Temporary status indication	Manual operation - Input/Output	1-bit	1.017	C, (R), W, T, A
1-bit object to signal and activate the temporary status indication. This object is bidirectional and can firstly signal the status of the temporary status indication, and secondly, activate the status display. If a temporary status indication has been activated by pressing the "Manual operation" button, the object transmits the value "ON". If the object receives a telegram with the value "OFF" or "ON", the status LEDs indicate the status of the outputs according to the display length. Manual operation is not activated in this case. The object is visible only if the temporary status indication is activated with control by means of the object.				

8.3 Priorities

The DALI actuator distinguishes between different functions that can have an effect on a DALI system. In order to prevent conflicting output states, each available function has a certain priority. The function with the higher priority overrides the one with the lower priority. Functions that are on the same priority level influence each other.

The priority of the scene function over the disabling or forced position functions of the DALI systems can be configured. Thus, it is possible for a scene recall to override a disabling or forced position function. Alternatively, a scene can have a lower priority, which means that disabling functions or forced positions cannot be overridden by a scene recall. This results in different priority orders.

Priority sequence for priority to disabling/forced position "low":

- 1st priority: manual control (highest priority)
- 2rd priority: forced position function or disabling function
- 3rd priority: normal operation / direct bus operation. These rules include...
  Switching
  Dimming
  Brightness value
  Colour temperature value
  Colour values
  Scenes
  Central functions
  Staircase function
  Colour wheel sequence that is more automatic
  Automatic brightness cycle

Priority sequence for priority to disabling/forced position "high":

- 1st priority: manual control (highest priority)
- 2nd priority: scenes
- 3rd priority: forced position function or disabling function
- 4th priority: normal operation / direct bus operation. These rules include...
  Switching
  Dimming
  Brightness value
  Colour temperature value
  Colour values
  Central functions
  Staircase function
  Colour wheel sequence that is more automatic

Automatic brightness cycle

With priority to disabling/forced position "high": A scene recall does not statically lock the lower-level functions of a DALI system. The higher priority solely specifies that the scene brightness value is set at the moment of the scene recall and the previously specified brightness value is overridden. After recalling a scene, it is possible that the scene brightness value will be changed by other functions of the DALI actuator (e.g. on terminating an additional function or by switching or dimming).

When tracking disabling functions or forced positions: If a forced position or a disabling function was activated via the KNX before or during temporary or permanent manual operation, the DALI actuator always executes these higher-priority functions for the affected DALI system at the end of manual operation, but without re-executing the behaviour at the beginning of these functions. The brightness then always remains in the state of manual operation. Bus operation by switching, dimming, value, scene, central is disabled.

8.4 Central functions

The DALI actuator offers the option of connecting specific DALI systems with up to 6 central functions. Each central function has a 1-bit object, a 4-bit object and a 1-byte object. The behaviour during the control of an DALI system via the central functions can be set to "Switching & dimming" or alternatively to "Permanent" (Switching with priority).

Central function = "Switching & dimming":
This function is comparable to various central group addresses that are linked to the objects "Switching - Setting", "Dimming - Setting" and "Brightness value - Setting" of a DALI system. The last command received (ON or OFF, dimming or brightness value) is executed. The polarity of the switching telegram can be configured as inverted if necessary.
The parameter "With relative dimming up in the switched-off state" defines whether a DALI system in the "OFF" state reacts to a relative dimming telegram of the central dimming object or not.

Central function = "Permanent":
The assigned DALI systems are controlled according to the parameterised command (ON or OFF) and locked during central control. The "Dimming" and "Brightness value" objects of the central function are not evaluated by the assigned DALI systems. This means that no other central function with the "switching & dimming" function can control a locked DALI system. Controls via normal switching objects are possible. If a DALI system is assigned to several permanent central functions, the parameterised command decides on the priority of the central function. A "Permanent OFF" has a higher priority than a "Permanent ON" and thus is preferably executed. Activating a central function "Permanent OFF" deactivates other assigned functions for a DALI system with the setting "Permanent ON".

Example of permanent central functions
A DALI system is assigned to the central function 1 "Switching", central function 2 "Permanent OFF" and central function 3 "Permanent ON". Central functions 2 and 3 are initially deactivated. When a central telegram = "activate" is received on central function 3, the assigned DALI system switches on. In this state, it can no longer be controlled by central function 1, since a simple "switching" has a lower priority. When a central telegram = "activate" is received on central function 2, the assigned DALI system switches off immediately. Central function 3 is thus deactivated automatically. Only when central functions 2 and 3 are deactivated can the assigned DALI system be controlled again by central function 1.

All central functions are inactive after the bus/mains voltage returns. No central functions are saved in the event of a bus/mains voltage failure.

In the case of control by a central function, the transmission of the switching status and brightness value can be delayed for each DALI system.

Disconnect central functions

- Activate the central functions on the parameter page "DALI systems" with the parameter "Central functions".

  The central objects become visible in the ETS. Names can optionally be assigned for the central functions. The names should illustrate the use of the individual central functions (e.g. "All ON", "Central OFF"). The names are only used in the ETS in the text of the central functions and central objects.

Assign DALI systems to the central functions

Each DALI system can be assigned to the central functions.

The central functions must be enabled.

- On the "DALI systems -> DALI system [x] " parameter pages, set the "Central functions function and polarity" parameters to the desired function.

  The appropriate DALI system is assigned to the central function. It can be influenced centrally.

The new state set by the central functions is tracked in the status objects and also transmitted to the KNX.

8.4.1 Parameters for central functions

DALI systems

Central functions	Checkbox (yes/**no**)
If the parameter is activated, the 6 central functions and thus the objects "DALI Systeme 1..4 - Central function ..." are enabled. An assignment of individual DALI systems to the central functions is only possible if the function is enabled.	

Name of the central functions	Free text
Names can optionally be assigned for the central functions. The names should illustrate the use of the individual central functions (e.g. "All ON", "Central OFF"). The names are only used in the ETS in the text of the central functions and central objects.	

DALI systems -> DALI System...

Delay for feedbacks	Checkbox (yes/**no**)
The states of the switching status and brightness value objects can be transmitted to the KNX with a delay in the event of control with a central function. The parameter is visible only if central functions are enabled.	

Delay time	**0** ... 59 min 0 ... **5** ... 59 s
This parameter defines the time delay for the switching status and brightness value feedback for control with a central function. These parameters are only available if the delay for feedback signals is activated.	

Assignment...	Checkbox (yes/**no**)
This parameter assigns the supplementary functions to the DALI system. The parameter is visible only if central functions are enabled.	

Function and polarity	**Switching (1 = ON / 0 = OFF) & dimming** Switching (0 = ON / 1 = OFF) & dimming Permanent ON (switching: 1 = active / 0 = inactive) Permanent OFF (switching: 1 = active / 0 = inactive)
The function and polarity of the central function is selected here. Switching (1 = ON/0 = OFF) & dimming: The last command received (ON or OFF) or dimming is executed. The polarity of the central telegram for switching is preset: 1 = ON/0 = OFF Switching (0 = ON/1 = OFF) & dimming: The last command received (ON or OFF) or dimming is executed. The polarity of the central telegram for switching is preset: 0 = ON/1 = OFF Permanent ON (1 = active/0 = inactive): The assigned DALI system is switched on and locked during central control. The "Dimming" object and "Brightness value" object of the central function is not evaluated by the DALI system assigned. Permanent OFF (1 = active/0 = inactive): The assigned DALI system is switched off and locked during central control. The "Dimming" object and "Brightness value" object of the central function is not evaluated by the DALI system assigned. If a DALI system is assigned to several permanent central functions, the configured command decides on the priority of the central function. A "Permanent OFF" has a higher priority than a "Permanent ON" and thus is preferably executed. With permanent function, the polarity of the central telegram is always fixed: 1 = activate permanent control / 0 = deactivate permanent control. This parameter is visible only if central functions are enabled and assigned.	

With relative dimming up in the switched-off state	**Switch on** No reaction
This parameter defines whether or not a DALI system in the "OFF" state reacts to a relative dimming telegram. Switch on: The DALI system always reacts to a relative dimming telegram and executes a dimming process. In the "OFF" state, the DALI system switches on with a "dim up" telegram. no reaction: The DALI system only reacts to a relative dimming telegram when it is switched on. In the "OFF" state, the DALI system ignores a "dim up" telegram. The parameter is visible only with enabled central functions and the "switching & dimming" function.	

8.4.2 Object list for central functions

Function	Name	Type	DPT	Flag
Switching	DALI System 1..4 - Central function... - Input	1-bit	1.001	C, -, W, -, U
1-bit object for central switching of the DALI system.				

Function	Name	Type	DPT	Flag
Dimming	DALI System 1..4 - Central function... - Input	4-bit	3.007	C, -, W, -, U
4-bit object for central relative dimming of the brightness of the DALI system.				

Function	Name	Type	DPT	Flag
Brightness value	DALI System 1..4 - Central function... - Input	1-byte	5.001	C, -, W, -, U
1-byte object for central specification of an absolute brightness value within the limits of minimum to maximum brightness.				

8.5 Status functions

Delay after bus/mains voltage return

To reduce telegram traffic on the bus line after the bus voltage (bus reset) or the mains voltage supply is switched on, after connection of the device to the bus line or after programming with the ETS, it is possible to delay all actively transmitted feedback telegrams of the DALI actuator. For this purpose, a delay time can be defined across functions. Only after the configured time has elapsed are status telegrams for initialisation transmitted to the KNX.
Which status telegrams are actually delayed can be configured independently for each status function.

The delay has no effect on the behaviour of the DALI system and not on other functions of the device either. Only the status telegrams are delayed. DALI systems can be controlled also during the delay after the bus/mains voltage returns.

A setting of "0" for the delay after the bus/main supply returns deactivates the delaying function completely. In this case, all status telegrams are transmitted to the KNX without delay.

8.5.1 Collective feedback switching status

After central commands or after the bus/mains voltage returns, a KNX line is generally heavily loaded by telegrams because numerous bus devices transmit the state of their communication objects as status. This effect occurs particularly when using visualisations. Collective feedback of the DALI actuator can be used to keep the telegram load low during initialisation.

The collective feedback summarises the switching states of the DALI systems in bit-orientated form. A 4-byte communication object according to KNX DPT 27.001 is available for this purpose. This object can visualise the switching status of the four DALI systems.

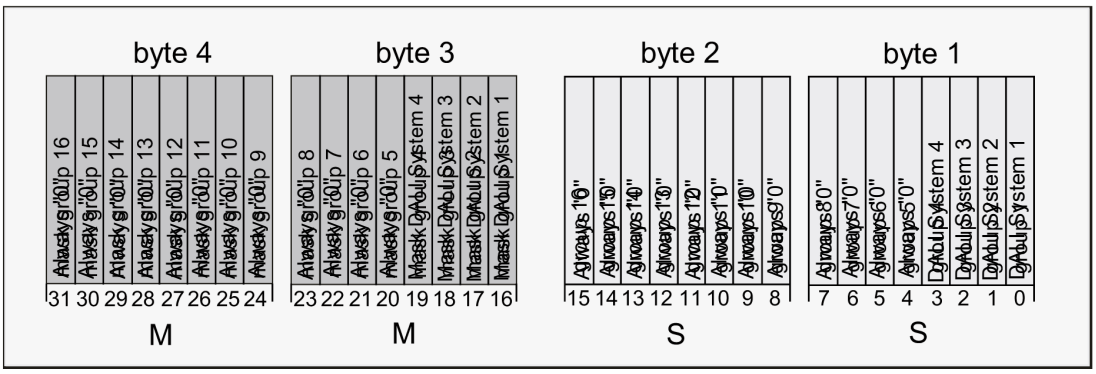


Figure 8: Structure of the collective feedback objects for DALI systems 1-4

The collective feedback displays 4 different switching states. Each DALI system has one bit representing the switching state ("S"-bit) and another one defining the masking ("M" bit). The "S"-bits correspond to the logical switching states of the DALI systems and are either "1" (switched on) or "0" (switched off).

The"M"-bits are "1" if this DALI system is available on the actuator, i. e. the channel configuration provides this DALI system. In the same way, the "M" bits are "0" when the appropriate DALI system is not available on the actuator. In the latter case, the corresponding "S"-bits are continuously "0" as there is no switching status.

i If the bus/mains voltage returns or after an ETS programming operation, the status objects are initially initialised with the value "0". If the reset behaviour is set to "no reaction", the switching status only corresponds to the actual state once the DALI system has been controlled at least once via the KNX or by manual operation.

After a device reset (ETS programming operation, bus or mains voltage return), the DALI actuator sends all the collective feedback. If only individual switching states change in DALI actuator operation, only the affected collective feedback objects are updated.

i A "flashing" DALI system (see "Disabling function") is always reported as "switched on".

Use of the collective feedback would be possible in appropriate visualisation applications - for example in public buildings such as schools or hospitals - where the switching states of the actuators are displayed centrally and no separate switching status is displayed at the control sections. In such applications the collective feedback can replace the 1-bit individual feedbacks and thereby significantly reduce the bus load.

Activate collective feedback

The "switching status collective feedback" is a global function for the DALI actuator and can be enabled on the parameter page "DALI systems".

- Activate the parameter "Collective feedback".

  Collective feedback is enabled. The collective feedback object becomes visible in the ETS.

- Deactivate the parameter.

  Collective feedback is deactivated. No collective feedback object is available.

Setting the update of collective feedback

In the ETS, it can be defined when the DALI actuator updates the feedback value for the collective feedback. The object value most recently updated by the DALI actuator is then actively reported to the KNX, provided the "Transmit" flag is set on the communication objects.
The parameter "Updating of the object value" is available on the parameter page "DALI systems".

Collective feedback must be enabled.

- Set the parameter to "after each update object 'Switching'/'Central'"

  The DALI actuator updates the feedback values in the collective feedback as soon as a new telegram is received for DALI systems at the input objects "Switching - Setting" or "Central function... - Switching" for groups or single devices are updated. A new telegram is also then actively transmitted to the KNX each time. The telegram value does not necessarily have to change. Hence, corresponding collective feedbacks are also generated, e.g. in the event of cyclical telegrams to the input objects.

- Set the parameter to "Only if the feedback value changes".

  The DALI actuator only updates the feedback values in the collective feedback objects when the telegram values of the inputs also change. The feedback remains unchanged if telegram values do not change (e. g. in the event of cyclical telegrams to the input objects with the same telegram value). Consequently, no telegram with the same content is then issued repeatedly.

Setting collective feedback after bus/mains voltage return or after programming with the ETS

The states of the collective feedback are transmitted to the KNX after the bus or mains voltage returns or after an ETS programming operation. In these cases, the feedback can be delayed with the delay being collectively preset globally for all DALI systems.
The parameter "Delay after bus/mains voltage return" is available on the parameter page "DALI systems".

Collective feedback must be enabled.

- Activate the parameter.

  The collective feedback objects are transmitted with a delay after bus or mains voltage return or after programming with the ETS. No feedback telegram is transmitted during a running delay, even if a switching state changes during this delay.

- Deactivate the parameter.

  The collective feedback is transmitted immediately after bus or mains voltage return or after programming with the ETS.

Setting the cyclical transmission of the collective feedback

The objects of the collective feedback can also transmit their value cyclically in addition to transmission when updating.
The "Cyclical transmission" parameter is available on the parameter page "DALI systems".

Collective feedback must be enabled.

- Activate the parameter. Configure the desired time for cyclical transmission in the "Cycle time" parameter.

Cyclical transmission is activated.

- Deactivate the parameter.

  Cyclical transmission is deactivated which means that collective feedback is transmitted to the KNX only if one of the switching states changes.

i During an active delay after bus voltage return no collective feedback telegram will be transmitted even if a switching state changes.

8.5.2 DALI feedback telegrams

Feedback for DALI short-circuit

The DALI actuator detects short-circuits on the DALI cable, as may occur in the case of an installation error. As soon as a short-circuit is identified on the DALI cable with the mains power supply switched on, the actuator transmits a status to the KNX when the status function for DALI short-circuits is enabled.

The actuator uses the 1-bit communication object "Status - DALI short-circuit" for the status of a DALI short-circuit. The telegram polarity of this object is fixed: No short-circuit = 0. Short-circuit = 1.

Setting feedback for DALI short-circuit

In the ETS, it can be defined whether the status for a DALI short circuit is to be transmitted to the KNX. When enabled, telegram transmission is always actively transmitting. As soon as a short-circuit has been detected and eliminated, the DALI actuator transmits a status telegram without a delay. The parameter "DALI short circuit" on the parameter page "DALI systems -> DALI system..." defines the behaviour of the short-circuit monitoring.

- Activate the parameter.

  The status for a DALI short circuit is activated and the communication object is available.

- Deactivate the parameter.

  The status for a DALI short circuit is deactivated. The communication object is hidden.

i The connected DALI operating devices also react to a short-circuit in the DALI cable. The devices set themselves to the specified "System Failure Level".

i The status of a DALI short-circuit can be transmitted only if the bus voltage is connected and switched on at the time of the short-circuit. If no bus voltage is connected and switched on at the time of the short-circuit, no status is transmitted either. Feedback is saved, however, which means that it is transmitted later when the bus voltage is switched on.

The DALI actuator initialises after switching on the mains power supply or after an ETS programming operation. If a short circuit is detected on the DALI line in this state, the actuator also transmits a corresponding status. After the bus voltage returns (mains voltage switched on permanently at the actuator during bus failure), the feedback is not automatically sent on the bus.

Feedback for mains voltage supply on the DALI actuator

The DALI actuator can monitor its supply voltage at the mains voltage connection. If there is a failure, the actuator is able to transmit a status telegram to the KNX before stopping operation, provided the bus voltage is uninterrupted. Optionally, the switch-on of the mains voltage supply can also be fed back.

If the mains voltage supply of the DALI actuator and the connected DALI operating devices are connected to the same circuit, the operating state of an entire DALI system can be monitored on the KNX side by evaluating the mains voltage status.

For the status of a power failure or mains voltage return, the 1-bit communication object "Status - Supply voltage" is used at the actuator. The telegram polarity of this object is fixed: Mains voltage available = 0. Mains voltage failure = 1.

Setting feedback for mains voltage supply

In the ETS, it is possible to define whether only a failure of the mains voltage supply of the actuator is reported to the KNX or additionally also a mains voltage return. Telegram transmission is always actively transmitting. As soon as there is a change of state in the mains voltage, a feedback telegram is transmitted once. The "Supply voltage status" parameter on the "General" defines the behaviour of the mains voltage monitoring.

- Activate the parameter. In addition, configure the "Transmission behaviour" parameter to "only on power failure".

  As soon as a mains voltage failure is detected at the DALI actuator, the device immediately transmits a status telegram. It stops operation just a few seconds later.

- Activate the parameter. In addition, configure the "Transmission behaviour" parameter to "on power failure and return".

  As soon as a mains voltage failure is detected at the DALI actuator, the device immediately transmits a status telegram. It stops operation just a few seconds later. The DALI actuator initialises when the mains power supply is switched on. Then it transmits a status telegram once and signals that the mains voltage is switched on.

- Deactivate the parameter.

  The status of the mains power supply state is deactivated. The communication object is hidden.

The status of a mains voltage failure can be transmitted only if also the bus voltage is connected and switched on at the time of the failure. If no bus voltage is connected and switched on when the mains voltage returns, no status is transmitted either. Feedback is saved, however, which means that it is subsequently transmitted when the bus voltage is switched on later.

The status is not transmitted automatically to the KNX after the bus voltage returns or after an ETS programming operation.

Error status in DALI System

The DALI actuator allows the error status of DALI operating devices to be indicated. This status function has the 1-bit communication object "Status - Error - DALI system", which allows a general error to be indicated in the DALI installation. The DALI actuator sets the object value to "ON" as soon as it detects an Lamp error in a previously commissioned DALI operating device. The DALI actuator does not reset the object value to "OFF" until all the previously identified errors have been eliminated.

To use the status function, the parameter "Error in DALI system" must be activated on the parameter page "DALI systems -> DALI system..." be activated.

Setting the error status in the DALI system

The error status in the DALI system is implemented as an active signalling object. The DALI actuator automatically transmits the status to the KNX with every change.

- Activate the parameter "Error in DALI system".

  The error status in the DALI system is transmitted as soon as the state changes.

- Deactivate the parameter "Error in DALI system".

  The error status in the DALI system is not available.

An error status saved in the actuator in the DALI system is lost when the mains voltage fails. For this reason, after all the errors have been eliminated by switching the mains voltage off and on again at the DALI actuator, no status is transmitted any more.

The actuator initialises after switching on the mains power supply or after an ETS programming operation. If a DALI error is detected in this state, the actuator also transmits an appropriate status telegram. After the bus voltage returns (mains voltage switched on permanently at the actuator during a bus failure), the feedback is not automatically sent to the KNX.

8.5.3 Parameters for status functions

DALI systems -> Times

Delay after bus/mains voltage return	**0**...59 min 0...**17**...59 s
This parameter provides a global definition of the delay time for automatic transmission of the status functions after a device reset for all DALI systems. The setting "0" deactivates the delay completely. In this case, all status telegrams are transmitted to the KNX without delay.	

DALI systems -> Collective feedback switching status

Collective feedback	Checkbox (yes/**no**)
After central commands or after the bus/mains voltage returns, a KNX line is generally heavily loaded by telegrams because numerous bus devices transmit the state of their communication objects as status. This effect occurs particularly when using visualisations. Collective feedback of the actuator can be used to keep the telegram load low during initialisation. The collective feedback summarises the switching states of the DALI systems in bit-orientated form. A 4-byte communication object is available for this purpose. This object can visualise the switching status of the four DALI systems.	

Updating of the object value	After each update "Switching"/"Central" object **only if the feedback value changes**
At this point, you can define when the actuator is to update the status of the collective feedback. The object value most recently updated by the actuator is then actively reported to the KNX, provided the "Transmit" flag is set on the communication objects. after each update of the "Switching"/"Central switching" object: The actuator updates the feedback values in the collective feedback as soon as the DALI systems "Switching - Default" or "Central Function... - Switching" for groups or single devices are updated. A new telegram is also then actively transmitted to the KNX each time. The telegram value does not necessarily have to change. Hence, corresponding collective feedbacks are also generated, e.g. in the event of cyclical telegrams to the input objects. only if the feedback value changes: The actuator updates the feedback values in the collective feedback objects only if the telegram values of the inputs also change. The feedback remains unchanged if telegram values do not change (e. g. in the event of cyclical telegrams to the input objects with the same telegram value). Consequently, no telegram with the same content is then issued repeatedly.	

Delay after bus/mains voltage return	Checkbox (yes/**no**)
The states of the collective feedback are transmitted to the KNX after the bus or mains voltage returns or after an ETS programming operation. In these cases, the feedback can be delayed with the delay being collectively preset globally for all DALI systems.	

Cyclical transmission	Checkbox (yes/**no**)
The objects of the collective feedback can also transmit their value cyclically in addition to transmission when updating.	

Cycle time	**0**...23 h 0...**2**...59 min **0**/(10)...59 s
The collective feedback can also be transmitted cyclically, in addition to transmission in the event of an update. If cyclical transmission is activated, the cycle time can be configured here.	

General

Supply voltage status	Checkbox (yes/**no**)
The DALI actuator can monitor its supply voltage at the mains voltage connection. If there is a failure, the DALI actuator is able to transmit a status telegram to the KNX before stopping operation, provided the bus voltage is uninterrupted. Optionally, the switch-on of the mains voltage supply can also be fed back.	

Transmission behaviour	**Only on power failure** On power failure and return
This parameter defines when the status for the supply voltage is transmitted by the DALI actuator. Only on voltage failure: As soon as a mains power failure is detected at the actuator, the device immediately transmits a status telegram. It stops operation just a few seconds later. On voltage failure and return: As soon as a mains power failure is detected at the actuator, the device immediately transmits a status telegram. It stops operation just a few seconds later. The actuator initialises itself when the mains power supply is switched on. Then it transmits a status telegram once and signals that the mains voltage is switched on. This parameter is available only if mains voltage monitoring is enabled.	

DALI systems -> DALI System ... -> DALI feedback telegrams

Error in DALI system	Checkbox (yes/**no**)
The DALI actuator allows the error status of DALI operating devices to be indicated. This status function has the 1-bit communication object "Status - Error - DALI system", which allows a general error to be indicated in the DALI installation. The DALI actuator sets the object value to "ON" as soon as it detects an Lamp error in a previously commissioned DALI operating device. The actuator does not reset the object value to "OFF" until all the previously identified errors have been eliminated.	

DALI short circuit	Checkbox (yes/**no**)
The actuator detects short-circuits on the DALI cable, as may occur in the case of an installation error. As soon as a short-circuit is identified on the DALI line with the mains power supply switched on, the actuator transmits a status to the KNX when the status function for DALI short-circuits is enabled here.	

8.5.4 Objects for status functions

Function	Name	Type	DPT	Flag
Status - Error - DALI system	DALI System 1...4 - Output	1-bit	1.005	C, R, -, T, A
1-bit object for signalling a general error in the DALI system. The polarity is fixed: "0" = no error / "1" = error. This object is available only if the error status is enabled in the DALI system.				

Function	Name	Type	DPT	Flag
Status - DALI short circuit	DALI System 1...4 - Output	1-bit	1.005	C, R, -, T, A
1-bit object for signalling a short-circuit in the DALI system. The polarity is fixed: "0" = no short-circuit / "1" = short-circuit. This object is available only if the "DALI short-circuit" feedback is enabled in the DALI system.				

Function	Name	Type	DPT	Flag
Status - Supply voltage	Actuator - Output	1-bit	1.005	C, R, -, T, A
For the status of a power failure or mains voltage return, this 1-bit communication object is used at the DALI actuator. The telegram polarity of this object is fixed: Mains voltage available = 0. Mains voltage failure = 1. This object is available only if the "Supply voltage" status message is activated.				

8.6 Standby switch-off

The DALI actuator is able to perform a standby switch-off of the connected DALI operating devices to save electrical energy when the lighting is switched off. The standby switch-off of a DALI system on the parameter page "DALI systems -> DALI system... -> Standby switch-off" is configured if required.

When using the standby switch-off, a KNX switch actuator must be linked to the status object of the same name (1 bit) of the DALI actuator. For this purpose, an output of the switch actuator in the function as a normally open contact must be connected to the status object of the DALI actuator. The output of the switching actuator switches the mains voltage supply of all the DALI operating devices of the DALI system in concern.

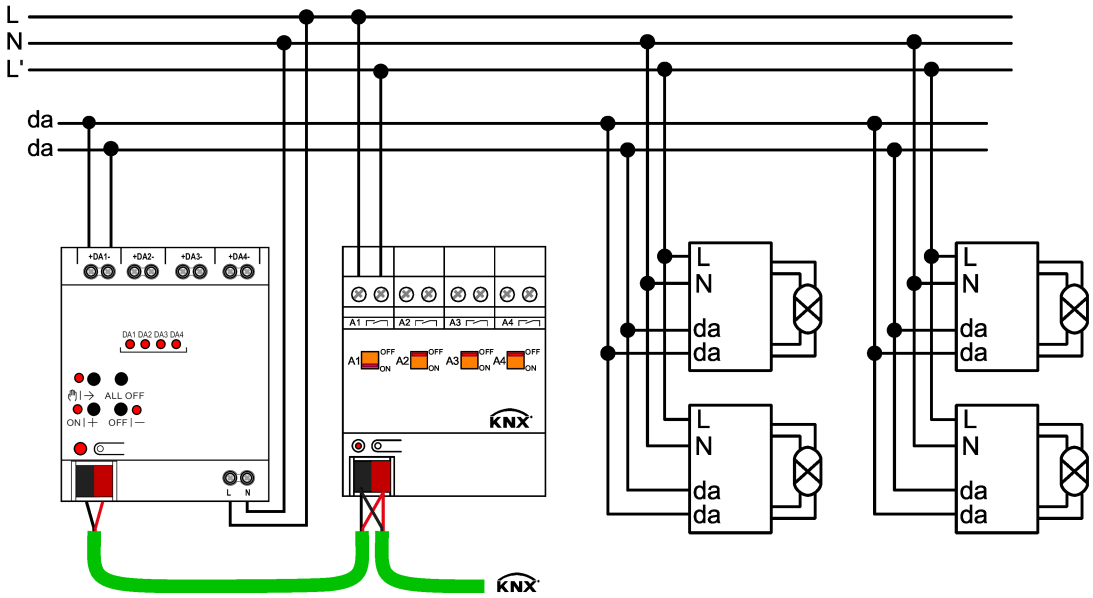


Figure 9: Example of a connection diagram for standby switch-off

If all DALI operating devices of the DALI system concerned were switched off during the running time, the object value of the standby switch-off subsequently switches to "OFF". In this case, the telegram to the actuator disconnects all DALI operating devices (but not the DALI actuator!) from the mains, thus saving electrical energy. Switching off the mains voltage can be delayed after transmitting the last DALI command to switch off the DALI systems by the "Switch-off delay" parameter. This delay is useful, for example, if the DALI system is to be prevented from being switched off prematurely in the event of frequent changes to the state of the brightness values. Only when the brightness state has been 0% for a while can the operating devices also be disconnected from the mains.
The mains voltage is switched on automatically by the "ON" status telegram of the standby switch-off as soon as the DALI actuator is to switch the DALI system by means of a DALI command. The time between the transmission of this status (switching on the mains voltage) and the transmission of the DALI command can be delayed by the parameter "Delay DALI restart" (0...10 s). This gives the DALI operating devices sufficient time after the return of the mains voltage to initialise themselves in order to be able to react properly to the commands of the DALI actuator.

If, during the course of a delay, additional telegrams are received via KNX until the restart of the DALI devices, then only the most recently received telegram is forwarded to the DALI system after the delay time has elapsed.

When using the delay until the restart of the DALI devices, ensure that the parameter "Behaviour after bus voltage return" (corresponds to the DALI power-on level) of the DALI system is configured as "Switch-off". This means that the affected devices do not switch on directly when the mains voltage returns but only after they have received an appropriate DALI command from the DALI actuator via the DALI cable.

Observe the current carrying capacity of the KNX switching actuator integrated in the standby switch-off! If necessary, use additional installation contactors. We do not recommend using multiple actuator channels, because it is usually not possible to implement simultaneous switching of all the channels.

The status object of the standby switch-off always works with active transmission as soon as the status changes. The state is transmitted to the KNX after the bus/mains voltage returns or after an ETS programming operation if a device is switched on or off after resetting it. Optionally, the status of the standby switch-off can also be transmitted cyclically in addition to transmission when the object value changes. The "Cyclical transmission" parameter defines whether cyclical transmission is enabled or not. If enabled, the "Cycle time" parameter on the same parameter page defines the time for cyclical transmission.

8.6.1 Parameters for standby switch-off

DALI systems -> DALI System ... -> Standby switch-off

Standby switch-off	Checkbox (yes/**no**)
The DALI actuator is able to perform a standby switch-off of the connected DALI operating devices to save electrical energy when the lighting is switched off.	

Cyclical transmission	Checkbox (yes/**no**)
Optionally, the status telegram of the standby switch-off can be transmitted cyclically in addition to transmission in the event of a change. This parameter then defines whether cyclical transmission is enabled or not. This parameter is available only when standby switch-off is enabled or when the global switching status is enabled.	

Cycle time	**0**...23 h 0...**2**...59 min **0**…59 s
At this point, the time for the cyclical transmission of the standby switch-off or global switching status is defined. This parameter is available only if cyclical transmission is enabled.	

Switch-off delay	0...**1**...59 min **0**…59 s
If all DALI operating devices of the DALI system concerned were switched off during the running time, the object value of the standby switch-off subsequently switches to "OFF". In this case, the telegram to the actuator disconnects all DALI operating devices (but not the DALI actuator!) from the mains, thus saving electrical energy. Switching off the mains voltage can be delayed after sending the last DALI command to switch off the DALI system with this parameter. This delay is useful, for example, if the DALI system is to be prevented from being switched off prematurely in the event of frequent changes to the state of the brightness values. Only when the brightness state has been 0% for a while can the operating devices also be disconnected from the mains. This parameter is available only if standby switch-off is enabled.	

DALI restart delay	0...**10**...59 s
The mains voltage is switched on automatically by the "ON" status telegram of the standby switch-off as soon as the DALI actuator is to switch on at least one operating device by means of a DALI command. The time between sending this status (switching on the mains voltage) and sending the DALI command can be delayed by this parameter. This gives the DALI operating devices sufficient time after the return of the mains voltage to initialise themselves in order to be able to react properly to the commands of the DALI actuator. This parameter is available only if standby switch-off is enabled.	

8.6.2 Objects for standby switch-off

Function	Name	Type	DPT	Flag
Standby switch-off	DALI System 1...4 - Output	1-bit	1.001	C, R, -, T, A
1-bit object for connecting a KNX switch actuator for the purpose of executing a standby switch-off of the controlled operating devices of a DALI system (switching the mains voltage supply of the operating devices off and on). This object is available only if the standby switch-off is configured.				

9 Description of device functions

9.1 Controlling the brightness

Settable brightness range

The adjustable brightness range of a DALI system can be limited by defining a lower and upper brightness value. The "Minimum brightness" and "Maximum brightness" parameters on the parameter page "DALI system... -> Brightness range" define the brightness values that are not undercut or exceeded when a brightness value is set or during a dimming process. In this way, the brightness of the controlled lamps of the DALI operating devices can be adapted individually – even to the brightness sensitivity of the human eye. The configured minimum brightness can be undershot only by switching off or when dimming up starting in the "OFF" state.

Furthermore, the brightness value, which is set for the DALI operating devices whenever switching on by means of the object "Switching - Setting" or "Central function... - Switching" is set for the DALI operating devices. The parameter "Switch-on brightness" defines this brightness separately for each DALI system. The settable value is anywhere between the minimum and maximum brightness.

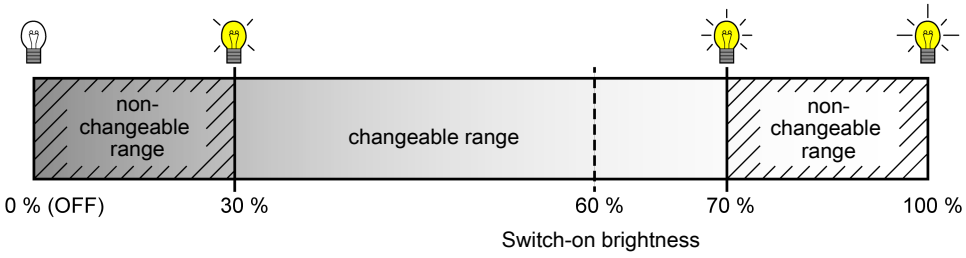


Figure 10: Example of a brightness range with switch-on brightness

Setting the minimum brightness

The minimum brightness can be set separately for each DALI system.

- Set the "Minimum brightness" parameter on the parameter page "DALI systems -> DALI system... -> Brightness range" to the required brightness value.

  The set brightness is not undershot when predefining a brightness value or during a dimming process in the "ON" state. The configured minimum brightness can be undershot during the dimming process only by switching off.

The configured minimum brightness must be less than the maximum brightness.

If values are received by means of the brightness value object and are less than the configured minimum brightness, the DALI actuator sets the minimum brightness as the new brightness value for the DALI system concerned.

Setting the maximum brightness

The maximum brightness can be set separately for each DALI system.

- Set the "Maximum brightness" parameter on the parameter page "DALI systems -> DALI system... -> Brightness range" to the required brightness value.

  The set brightness is not undershot in any switched-on operating state.

i The configured maximum brightness must be greater than the minimum brightness.

i If values are received by means of the brightness value object and are greater than the configured maximum brightness, the DALI actuator sets the maximum brightness as the new brightness value for the DALI system concerned.

Setting the switch-on brightness

The switch-on brightness can be set separately for each DALI system.

- Set the "Switch-on brightness" parameter on the parameter page "DALI systems -> DALI system... -> Switching/dimming behaviour" to a brightness value.

  The set brightness is set after receiving an ON telegram by means of the communication object "Switching - Setting" or after receiving a central telegram with the polarity "activated".

- Set the parameter "Switch-on brightness" to "Memory value (brightness before switching off last time)".

  When switching on, the brightness value is set that was active and internally stored before switching off the last time. This memory value is stored in a non-volatile manner in the DALI actuator so that the value is retained after the bus or mains voltage returns. After an ETS programming operation, the memory value is predefined to "100%". This value is optionally limited by the maximum brightness.

i The switch-on brightness can always be configured within a range of 1...100%. If the switch-on brightness is outside the range defined by the minimum or maximum brightness, the DALI actuator limits the switch-on brightness to the set limits.

i In the "memory value" setting: A memory value is stored internally by a switch-off telegram also if the bus-controlled switch-off is overridden, for example, by a disabling or forced position function or by a manual operation. In this case, the internally tracked brightness value is saved as memory value.

i If no soft ON function is activated, the brightness value is more or less jumped to when switching on (using minimum DALI fading of 0.7 s). Once a soft ON function is activated, the switch-on brightness is dimmed according to the dimming speed for the soft ON function.

Dimming characteristic and dimming speeds

The brightness of operating devices of a DALI system can be changed by a dimming operation. The limits of the brightness range that can be set by a dimming process are defined by the maximum brightness and minimum brightness predefined in the ETS.

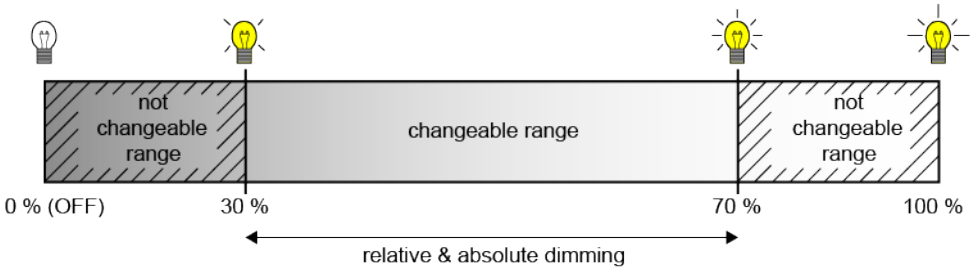


Figure 11: Example of a dimmable brightness range

A DALI system can be dimmed by...

– Relative dimming:
  Relative dimming can be triggered either by the 4-bit communication object "Dimming - Setting" available for each DALI system, additionally - in the event of colour temperature control - by the 3-byte combination object "Relative dimming (brightness and colour temperature) - Setting" or by pressing and holding a button of the manual control. The data format of the 4-bit object complies - as is normal with KNX dimming actuators - with the KNX DPT 3.007, which means that the dimming direction and relative dimming increments can be specified in the dimming telegram or dimming operations can also be stopped. The data format of the 3-byte object corresponds to KNX DPT 250.600, which enables combined relative dimming of brightness and colour temperature by means of separate dimming increments and dimming directions.

  In relative dimming by local manual operation on the DALI actuator, a dimming procedure is executed whilst the appropriate button is pressed. The dimming process ends when the button is released or when the maximum brightness or minimum brightness is reached. A relative dimming process allows a brightness value to be changed constantly and always starts from the brightness that is set at the time of the dimming command.

  In the ETS, the dimming speed for relative dimming can be configured separately for each DALI system.

– Absolute dimming:
  Absolute dimming is triggered by specifying a brightness value. This value can be triggered by the 1-byte communication object "Brightness value - Setting" present in each DALI system according to KNX DPT 5.001 or - in the case of colour temperature control - additionally by the 6-byte combination object "Absolute dimming (brightness and colour temperature) - Setting" according to KNX DPT 249.600. In addition, brightness values can also be set by a disabling or forced position function or by the scene function. Absolute dimming can also be activated, even in case of bus voltage failure, after bus or mains voltage return or after programming with the ETS, by specifying brightness values.

When specifying a brightness value by means of the objects or by a scene recall in the ETS, it can be configured whether the value is jumped to directly or alternatively dimmed to over a dimming time or fading is carried out. When dimming by means of the 6-byte combination object, it is possible to specify an individual dimming time in the KNX telegram. If a valid time is specified there, the DALI actuator executes the dimming time transmitted in the KNX telegram and not the one specified in the ETS. The brightness specified in the telegram value is then dimmed within the transmitted dimming time (fading). If the time is defined as "invalid" in the telegram, the DALI actuator always executes the dimming behaviour defined in the ETS parameters during absolute dimming.

The setting of a dimming time for relative or absolute dimming (with dimming to the brightness values) is carried out within the range of minimum to maximum brightness at the DALI actuator. The dimming times are derived directly from the configured times between two dimming steps.

Even if brightness values are instantly jumped to, the dimming procedure on DALI operating devices always takes a very short time as well as when switching without soft ON or soft OFF. This dimming procedure is dependent on the system. The brightness value jumped to is dimmed to within 0.7 s (short fading). This time cannot be altered.

Setting dimming behaviour for absolute dimming

In the ETS, the dimming behaviour for absolute dimming can be set separately for each DALI system. The parameter "When receiving a brightness value" on the parameter page "DALI systems -> DALI System... -> Switching/dimming behaviour" defines the behaviour.

- Set the parameter to "jumping to".

  As soon as a new brightness value is specified, it is instantly jumped to.

- Set the "dimming to" parameter.

  As soon as a new brightness value is specified, it is set by means of the configured "Time between two dimming steps for absolute dimming".

- Set the "fading" parameter. Configure the duration of the dimming process for the parameter "Time for brightness value via fading".

  As soon as a new brightness value is specified, it is set by means of the configured "Time for brightness value via fading" for the absolute dimming. The dimming process then always takes exactly the set time, regardless of the initial value of the dimming process.

During a scene recall, the dimming behaviour can be configured separately.

Setting dimming time for relative dimming

In the ETS, the dimming time for relative dimming can be set separately for each DALI system.

- Set the parameter "Time between two dimming steps for relative dimming" on the parameter page "DALI systems -> DALI system... -> "Switching/dimming behaviour" to set the required dimming step time.

The entire brightness range of 0...100% is divided into 255 dimming steps. The duration of a complete relative dimming process within this brightness range is calculated according to the formula: t = 255 x time between two dimming steps [ms]. The actual dimmable range is limited by the configured minimum and maximum brightness.

Setting dimming time for absolute dimming

In the ETS, the dimming time for absolute dimming can be set separately for the DALI system.

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

- Set the "Time between two dimming steps for absolute dimming" parameter on the parameter page "DALI systems -> DALI system... -> "Switching/dimming behaviour" to the required dimming time.

The entire brightness range of 0...100% is divided into 255 dimming steps. The duration of a complete absolute dimming process within this brightness range is calculated with the formula: t = 255 x time between two dimming steps [ms]. The actual dimmable range is limited by the configured minimum and maximum brightness.

Setting dimming behaviour in OFF state for relative dimming

A relative dimming telegram for controlling the brightness can also switch on a DALI system in the "OFF" state. In the ETS, the behaviour in the "OFF" state when receiving a relative dimming telegram can be set separately for each DALI system by the parameter "With relative dimming up in the switched-off state".

- Set the parameter to "Switch-on".

  The DALI system is switched on in the "OFF" state by a relative brightness dimming telegram and carries out the dimming process. After reaching the intended brightness, the dimming process stops.

- Set the parameter to "No reaction".

  The DALI system in the "OFF" state is not switched on by the relative dimming telegram. The DALI system remains switched off.

9.1.1 Dimming characteristic curves

The DALI actuator converts KNX brightness values and brightness values configured in the ETS into DALI brightness values. On the DALI page, the brightness commands are transmitted in an 8-bit data value to the operating devices. This data value according to IEC 62386-102 is referred to as "Arc Power Level (APL)" in the DALI specification. The ideally dimmable brightness range on the DALI page is represented in the data value by the decimal values 1...254. The value "0" is interpreted by the operating devices as "OFF". A value "255" means "no change of brightness" ("MASK").

The DALI specification also describes a logarithmic dimming characteristic. This characteristic curve determines how the 8-bit data value is converted by operating devices (e.g. electronic ballast for fluorescent lamps or LED drivers) into an equivalent luminous flux at the physical output via the connected lamp. The luminous flux (physical device "Lumen [lm]") is a measure for the light output emitted by a lamp. The dimming characteristic curve of the operating devices maps the 8-bit data values transmitted logarithmically on the DALI page onto the luminous flux within the range of 1...254. This range then corresponds to a physical light output of 0.1...100 %.

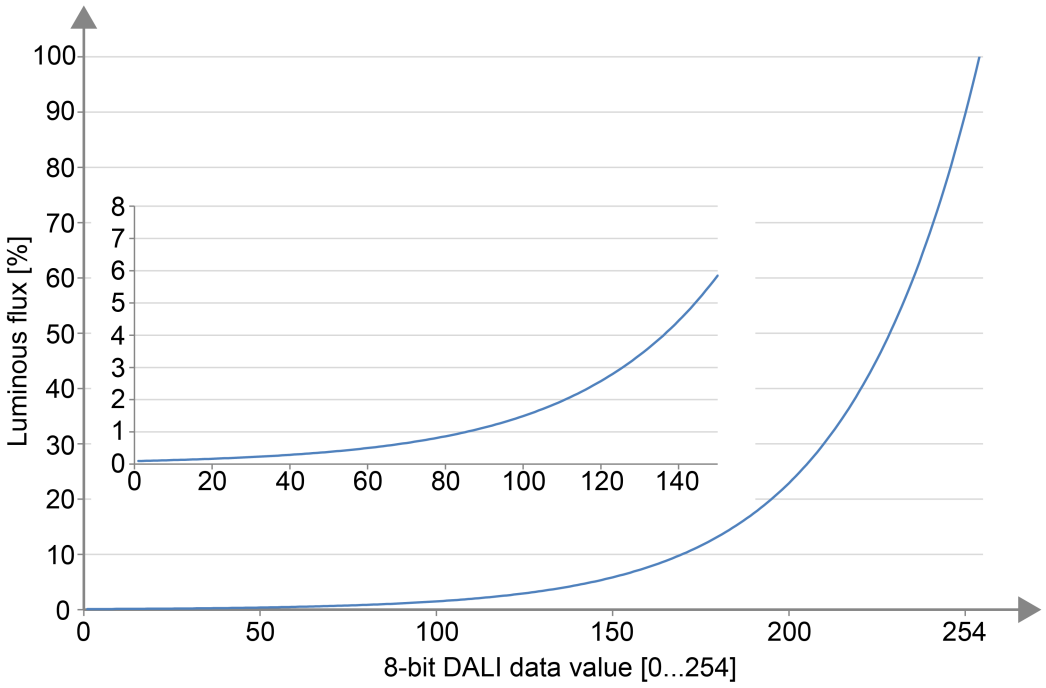


Figure 12: Logarithmic dimming curve in DALI operating devices
(relative luminous flux [%] depending on the 8-bit DALI data value [0...254])

The logarithmic representation of the dimming values in the characteristic is used to adapt the emitted luminous flux to the subjective brightness sensitivity of the human eye. The human eye already perceives a far greater brightness at a luminous flux of 50 % (the lamp emits half of its light output into the surrounding space). Brightness changes in the upper physically possible dimming range (> 50 % luminous flux) are usually hardly perceived by the eye anymore.
By using a logarithmic characteristic curve, the dimming range of the DALI data value is mapped in large parts onto an area of the relative luminous flux where the human eye can optimally perceive brightness changes.

The actual brightness range that can be dimmed by a DALI operating device does not always have to correspond to the maximum possible DALI dimming range (0.1...100 %). On a DALI operating device, the least adjustable brightness is referred to as the "physical minimum level (PHM)". This lower brightness limit value is defined by the physical properties of the operating device or connected lamp and is normally specified in the manufacturer's datasheet. The lower physical brightness limit value of an assigned operating device is independent of the adjustable minimum brightness. It is quite possible to set a lower minimum brightness (e.g. 0.1 %) in the ETS than an operating device can actually set as a minimum (e.g. 3 %). In such cases, the DALI actuator dims to the configured minimum brightness via the DALI data value. The operating device or lamp then already stops at the physical minimum, however. Ideally, the minimum brightness of a DALI system is configured to the physical minimum of the operating devices.

A logarithmic dimming characteristic is standard in DALI operating devices and can normally be found in the delivery state. However, there are some operating devices, in which the characteristic curve can be adjusted - often by manufacturer-specific software tools. As a rule, it is possible to switch between a linear characteristic and a logarithmic characteristic. Such operating devices must always be set to a logarithmic characteristic in conjunction with the DALI actuator. Otherwise, the mechanism of the configurable characteristics of the DALI actuator is incorrect!

When dimming, the logarithmic characteristic curve provided for DALI is not ideal for every control task. For this reason, the DALI actuator allows the DALI dimming characteristic curve to be influenced for absolute dimming without having to intervene in the operating devices. The parameter "Characteristic curve in the value range" is available for this purpose on the parameter page "DALI systems -> DALI system... -> Dimming characteristic" for each DALI system in the ETS.

The dimming characteristic curve within the time range (relative dimming) is always linear.

9.1.1.1 Linear dimming characteristic

In this setting, the DALI actuator linearises the DALI dimming characteristic by converting all brightness values, which are received from the KNX and configured in the ETS, appropriately into DALI data values. Thus, the KNX brightness values form linearly on the luminous flux emitted by the DALI lamps. The DALI actuator itself does not dim linearly in this setting. A linear dimming sequence of the relative luminous flux first results at the physical output of an operating device through the combination of the non-linear conversion of the DALI actuator and the logarithmic characteristic of the operating devices.
Status telegrams of the brightness value are also adjusted by conversion. On account of the internal calculation process, there may be slight deviations between the specified and fed back brightness value (e.g. specification = 50% -> Feedback = 49%).

Example of brightness change:
KNX brightness: 50 % -> DALI data value (APL): 229 -> luminous flux: approx. 50 % -> The human eye already perceives intense brightness.
KNX brightness: 75 % -> DALI data value (APL): 243 -> luminous flux: approx. 75 % -> The human eye hardly perceives the brightness difference to the previous dimming setting anymore. The dimming process appears unsteady.

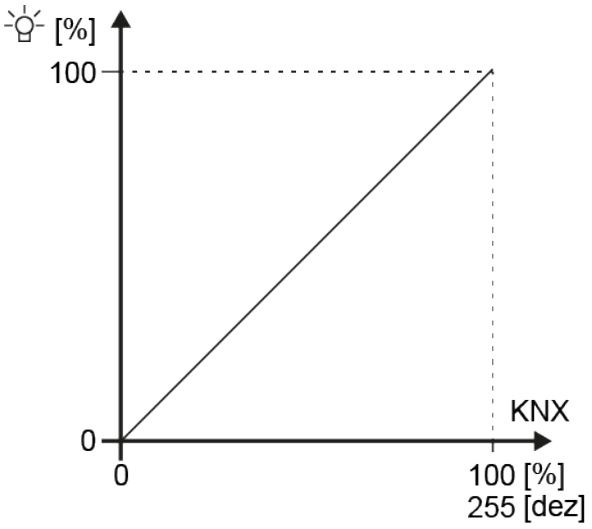


Figure 13: Linear dimming characteristic curve at the output of an operating device (relative luminous flux [%] depending on the 8-bit KNX data value [0...255])

KNX brightness value	KNX brightness value [%]	DALI value (APL)	Luminous flux [%]
0	0	0	0
1	0.4	27	0.2
10	4	136	4
50	20	194	19
80	32	212	32
100	40	220	40
128	50	229	50
150	60	235	60
175	70	240	68
200	80	245	78
225	90	249	87
255	100	254	100

Table 2: Transmission of data values with a linear dimming characteristic curve

Advantages of a linear DALI dimming characteristic:
Adjustment to existing KNX actuators possible. KNX dimming actuators or 1-10-V control units normally convert brightness values linearly into a physical output signal as defined in the KNX specification "Scaling" (DPT 5.001 / 0...255 -> 0.4...100 %). If a DALI system with such KNX actuators is combined in an installation, it is normally necessary to set a linear dimming characteristic in the DALI actuator in order to adapt the dimming behaviour to the other actuators. Otherwise, the lamp will dim to a differ-

ent brightness with identical KNX data values.
A linear dimming characteristic also has a positive effect on a multichannel RGB colour control, especially during dynamic colour changes (e.g. control of 3 different DALI channels for RGB colour mixing). By converting the KNX data values to a linear luminous flux for each primary colour, colours can be mixed reliably in a wide spectrum by the lamps.
In the event of operating devices with a high physical minimum brightness (> 3%) and thus a limited luminous flux range, a linear characteristic curve allows the possible KNX brightness range (0.4...100%) to be utilised usefully in the lower dimming range due to the increased DALI data values.

Disadvantages of a linear DALI dimming characteristic:
Dimming operations are not adjusted to the brightness perception of the human eye. This means that the dimming behaviour for mere brightness control is perceived as uneven due to the logarithmic human perception.

9.1.1.2 Logarithmic dimming characteristic curve

In this setting, the DALI actuator forwards KNX brightness values unprocessed to the DALI page. A logarithmic dimming sequence of the relative luminous flux results at the physical output of an operating device through the combination of forwarding the value of the actuator and the logarithmic characteristic of the operating devices. KNX status telegrams of the effective DALI brightness value are possible in this case too.

Example of brightness change:
KNX brightness: 50 % -> DALI data value (APL): 128 -> Luminous flux: approx. 3 % -> The human eye subjectively perceives about half of the lamp brightness.
KNX brightness: 75 % -> DALI data value (APL): 191 -> Luminous flux: approx. 18 % -> The human eye clearly perceives a brightness difference to the previous dimming setting. The dimming process is constantly effective.

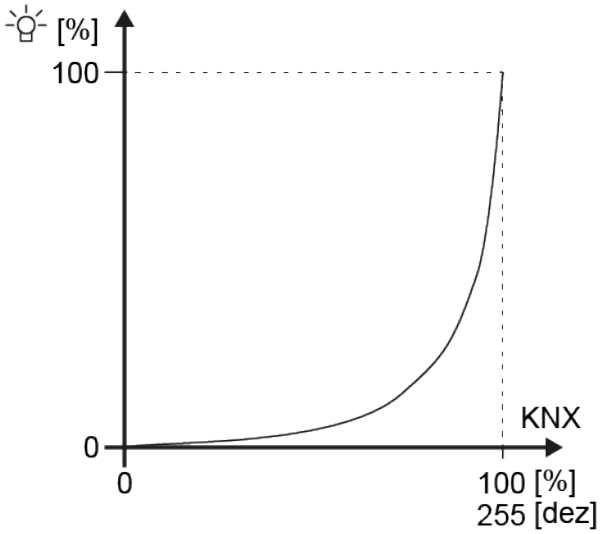


Figure 14: Logarithmic dimming characteristic curve at the output of an operating device
(relative luminous flux [%] depending on the 8-bit KNX data value [0...255])

KNX brightness value	KNX brightness value [%]	DALI value (APL)	Luminous flux [%]
0	0	0	0
1	0.4	1	0.1
10	4	10	0.13
50	20	50	0.38
80	32	80	0.86
100	40	100	1.5
128	50	128	3.2
150	60	150	5.8
175	70	175	12
200	80	200	23
225	90	225	45
255	100	254	100

Table 3: Transmission of data values in the event of a logarithmic dimming characteristic curve

Advantages of a logarithmic DALI dimming characteristic:
Ideal for pure brightness controls. Adjustment to the brightness perception of the human eye. As a result, brightness changes are perceived evenly in the entire dimming range. Fine number of levels in the lower dimming range.

Disadvantages of a logarithmic DALI dimming characteristic:
Difficult or even no adjustment at all at other KNX actuators that only dim linearly.
Poor sliding progression when mixing colours via separate DALI channels.
In the event of operating devices with a high physical minimum brightness (> 3%) and thus a limited luminous flux range, the lower KNX dimming range (0.4...50 %) cannot be utilised.

9.1.1.3 Combined dimming characteristic curve

This setting corresponds to a combination of linear and logarithmic dimming characteristic curve. The DALI actuator converts KNX brightness values into suitable DALI dimming values, but not as intensively as with linearisation of the characteristic curve. The combination of a less severe value adjustment and the logarithmic dimming characteristic curve of the DALI operating devices results in a curved characteristic curve of the relative luminous flux at the physical output of an operating device with a less severe gradient especially in the upper dimming range. KNX status telegrams of the effective DALI brightness value are possible in this case too.

Example of brightness change:
KNX brightness: 50% -> DALI data value (APL): 147 -> Luminous flux: approx. 5.4% -> The human eye subjectively perceives about slightly more than half of the lamp brightness.
KNX brightness: 75% -> DALI data value (APL): 224 -> Luminous flux: approx. 44%

-> The human eye clearly perceives a brightness difference to the previous dimming setting, however it is not very intensive. However, the dimming process may still be continuous, depending on the lamp.

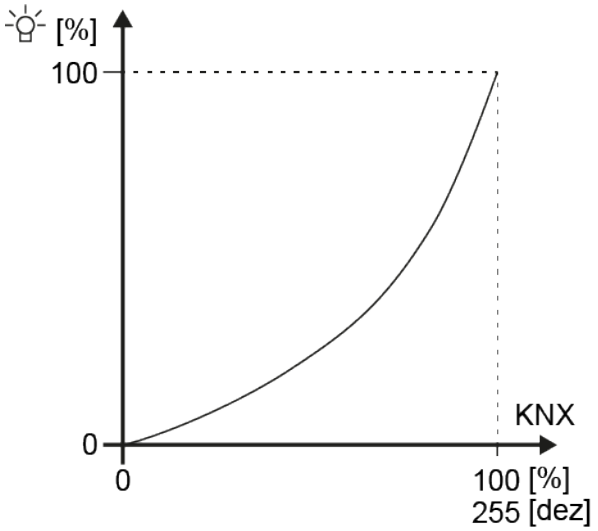


Figure 15: Combined dimming characteristic curve at the output of an operating device
(relative luminous flux [%] depending on the 8-bit KNX data value [0...255])

KNX brightness value	KNX brightness value [%]	DALI value (APL)	Luminous flux [%]
0	0	0	0
1	0.4	41	0.3
10	4	100	1.5
50	20	147	5.4
80	32	166	9
100	40	179	13
128	50	195	20
150	60	205	26
175	70	217	36
200	80	228	49
225	90	242	72
255	100	254	100

Table 4: Transmission of data values with a combined dimming characteristic curve

The combined dimming characteristic curve is a compromise between linearisation and adjustment to the subjective brightness perception of the human eye. It can be used as an alternative to the linear or logarithmic characteristic curve if the dimming behaviour of a lamp does not meet the user's requirements when using the other two dimming characteristic curves.

9.1.2 Parameters for brightness

DALI systems -> DALI System...

Minimum brightness	**1%**, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 15%, 20%...50%...100%
The adjustable brightness range of a DALI system can be limited by defining a lower and upper brightness value. This parameter defines the lower brightness value, which is not undercut in any operating state of the DALI actuator. In this way, the lower brightness of the controlled lamps of the DALI operating devices can be limited individually and adapted to the respective application. The set brightness is not undershot when predefining a brightness value or during a dimming process in the "ON" state. The configured minimum brightness can be undershot during the dimming process only by switching off or when dimming up starting in the "OFF" state. The configured minimum brightness must be less than the maximum brightness.	

Maximum brightness	1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 15%, 20%...50%...**100%**
The adjustable brightness range of a DALI system can be limited by defining a lower and upper brightness value. This parameter sets the upper brightness value, which is not exceeded in any operating state of the DALI actuator. In this way, the upper brightness of the controlled lamps of the DALI operating devices can be limited individually and adjusted to the respective application. The configured maximum brightness must be greater than the minimum brightness.	

Switch-on brightness	1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 15%, 20%...50%...**100%** Memory value (brightness like before the last switch-off)
At this point, the brightness value can be specified that is set when the device is switched on. Brightness value: The set brightness is set when receiving an ON telegram via the communication object "Switching - Setting" or when receiving a central telegram with the polarity "activated". Memory value (brightness as before switching off the last time): When switching on, the brightness value is set that was active and stored internally before switching off the last time. This memory value is stored in a non-volatile manner in the DALI actuator so that the value is retained after the bus or mains voltage returns. After an ETS programming operation, the memory value is predefined to "100%". This value is optionally limited by the maximum brightness.	

On receipt of a brightness value	Jumping to **dimming to** Fading
This parameter defines the dimming behaviour for absolute dimming by means of the object "Brightness value - Setting" for a DALI system. jumping to: As soon as a new brightness value is specified, it is instantly jumped to. Even if brightness values are instantly jumped to, the dimming procedure on DALI operating devices always takes a very short time as well as when switching without soft ON or soft OFF. This dimming procedure is dependent on the system. The brightness value jumped to is dimmed to within 0.7 s (short fading). This time cannot be altered. dimming to: As soon as a new brightness value is specified, it is set by means of the configured dimming increment time for absolute dimming. Fading: As soon as a new brightness value is specified, it is set by means of the configured fading time for absolute dimming. The dimming process then always takes exactly the set time, regardless of the initial value of the dimming process.	

Time between two dimming steps for absolute dimming	1...**25**...255 ms
Absolute dimming is triggered by specifying a brightness value. This value can be triggered by the 1-byte communication object "Brightness value - Setting" present in each DALI system according to KNX DPT 5.001 or - in the case of colour temperature control - additionally by the 6-byte combination object "Absolute dimming (brightness and colour temperature) - Setting" according to KNX DPT 249.600. The dimming speed for absolute dimming of the brightness can be configured here. The entire brightness range of 0...100% is divided into 255 dimming steps. The duration of a complete absolute dimming process within this brightness range is calculated with the formula: t = 255 x time between two dimming steps [ms]. The actual dimmable range is limited by the configured minimum and maximum brightness. This parameter is available only in the setting "On receipt of a brightness value = dimming to".	

Time between two dimming steps for relative dimming	1...**25**...255 ms
Relative dimming can be triggered either by the 4-bit communication object "Dimming - Setting" available for each DALI system, additionally - in the event of colour temperature control - by the 3-byte combination object "Relative dimming (brightness and colour temperature) - Setting" or by pressing and holding a button of the manual control. The dimming speed for relative dimming of the brightness can be configured here. The entire brightness range of 0...100% is divided into 255 dimming steps. The duration of a complete relative dimming process within this brightness range is calculated according to the formula: t = 255 x time between two dimming steps [ms]. The actual dimmable range is limited by the configured minimum and maximum brightness.	

With relative dimming up in the switched-off state	**Switch on** No reaction
A relative dimming telegram for controlling the brightness can also switch on a DALI system in the "OFF" state. Switch-on: The DALI system is switched on in the "OFF" state by a relative dimming telegram for the brightness and carries out the dimming process. After reaching the intended brightness, the dimming process stops. no reaction: The DALI system in the "OFF" state is not switched on by the relative dimming telegram. The DALI system remains switched off.	

DALI systems -> DALI System... -> Dimming characteristic

Characteristic curve in the value range	**Linear function** Logarithmic function Combined function
Setting the characteristic curve in the value range allows the 256 dimming steps possible on KNX to be adapted to the perception of the human eye. If this parameter is changed, the curve of the characteristic curve is shown in the diagram below. The choice of characteristic curve depends on the controlled operating device and the connected lamp. Linear function: In this setting, the DALI actuator linearises the DALI dimming characteristic curve by converting all brightness values received from the KNX and projected in the ETS, appropriately into DALI data values. Thus, the KNX brightness values form linearly on the luminous flux emitted by the DALI lamps. The DALI actuator itself does not dim linearly in this setting. A linear dimming sequence of the relative luminous flux first results at the physical output of an operating device through the combination of the non-linear conversion of the DALI actuator and the logarithmic characteristic of the operating devices. Status telegrams of the brightness value are also adjusted by conversion. On account of the internal calculation process, there may be slight deviations between the specified and fed back brightness value (e.g. specification = 50% -> Feedback = 49%). Logarithmic function: In this setting, the DALI actuator forwards KNX brightness values unprocessed on the DALI page. A logarithmic dimming sequence of the relative luminous flux results at the physical output of an operating device through the combination of forwarding the value of the actuator and the logarithmic characteristic of the operating devices. KNX status telegrams of the effective DALI brightness value are possible in this case too. Combined function: This setting corresponds to a combination of linear and logarithmic dimming characteristic curve. The DALI actuator converts KNX brightness values into suitable DALI dimming values, but not as intensively as with linearisation of the characteristic curve. The combination of a less severe value adjustment and the logarithmic dimming characteristic curve of the DALI operating devices results in a curved characteristic curve of the relative luminous flux at the physical output of an operating device with a less severe gradient especially in the upper dimming range. KNX status telegrams of the effective DALI brightness value are possible in this case too.	

9.1.3 Objects for brightness

Function	Name	Type	DPT	Flag
Switching - Setting	DALI System 1...4 - Input	1-bit	1.001	C, -, W, -, U
1-bit object for switching the DALI system.				

Function	Name	Type	DPT	Flag
Dimming - Default	DALI System 1...4 - Input	4-bit	3.007	C, -, W, -, U
4-bit object for relative dimming of the DALI system.				

Function	Name	Type	DPT	Flag
Brightness value - Setting	DALI System 1...4 - Input	1-byte	5.001	C, -, W, -, U
1-byte object for specifying an absolute brightness value within the limits of the minimum to maximum brightness.				

Function	Name	Type	DPT	Flag
Relative dimming (brightness value and colour temperature) - Setting	DALI System 1...4 - Input	3-byte	250.600	C, -, W, -, U
3-byte object for the combined relative dimming of the brightness and colour temperature by means of separate dimming increments and dimming directions. This object is available only in the "Colour temperature control" function range.				

Function	Name	Type	DPT	Flag
Absolute dimming (brightness value and colour temperature) - Setting	DALI System 1...4 - Input	6-byte	249,600	C, -, W, -, U
6-byte object for the combined absolute dimming of the brightness and colour temperature by means of separate dimming values and for the specification of a dimming time. When dimming by means of the 6-byte combination object, it is possible to specify an individual dimming time in the KNX telegram. If a valid time is specified there, the DALI actuator executes the dimming time transmitted in the KNX telegram and not the one specified in the ETS. The colour temperature and brightness specified in the telegram value is then dimmed to within the transmitted dimming time (fading). If the time is defined as "invalid" in the telegram, the DALI actuator always executes the dimming behaviour defined in the ETS parameters during absolute dimming. This object is available only in the "Colour temperature control" function range.				

9.2 Controlling the colour temperature

Settable colour temperature range

When controlling DALI operating devices that support the device type "DT8 - Tunable White", the colour temperature of the connected lamps can be changed. The adjustable colour temperature range of a DALI system can be limited by defining a lower and upper colour temperature value. The "Minimum colour temperature" and "Maximum colour temperature" parameters in the parameter node "DALI systems -> DALI system... -> Colour temperature" define the colour temperature values that are not undercut or exceeded in any operating state of the DALI actuator. In this way, the colour temperature of the controlled lamps of the DALI operating devices can be limited individually and adapted to the respective application.

In addition, the colour temperature value can be specified that is set when the device is switched on. The "Switch-on colour temperature" parameter defines this colour temperature value separately for each DALI system.

The switch-on colour temperature as a value specification can be configured basically within a range of 1,000...10,000 K. If the switch-on colour temperature is outside the range defined by the minimum or maximum colour temperature, the DALI actuator limits the switch-on colour temperature to the defined limits.

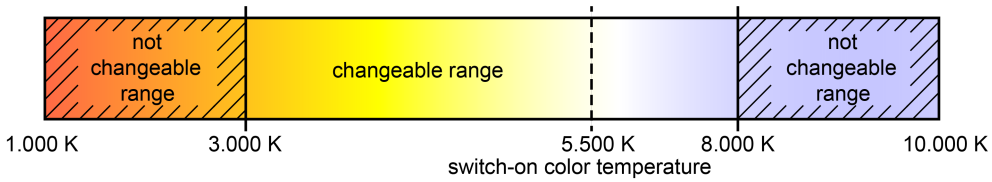


Figure 16: Example of a configured colour temperature range with switch-on colour temperature

DALI luminaires that can change the colour temperature are usually fitted with two different lamps for warm white and cold white light. The luminous flux of both lamps can be varied independently and thus the colour temperature changed within the specified range by varying control by the upstream DALI operating device (e.g. DALI DT8 LED driver). In the lower colour temperature range, only the warm white lamp is usually switched on. In the upper colour temperature range, only the cold white is switched on. A DALI operating device according to DALI device type 8 essentially changes the proportional luminous flux of the lamp while maintaining the total luminous flux that is specified by the brightness of the DALI system. During a dimming process of the colour temperature, the operating devices may switch the lamps on or off as required. This can lead to switching process within the transition ranges that cause the colour temperature dimming processes to briefly appear unsteady.

Setting minimum colour temperature

The minimum colour temperature can be set separately for each DALI system.

- Set the "Minimum colour temperature" parameter on the parameter page "DALI systems -> DALI system... -> Colour temperature" to the required colour temperature.

  The set colour temperature is not undershot in any operating state.

i The configured minimum colour temperature must be lower than the maximum colour temperature.

i If an absolute colour temperature is received by the KNX that is less than the configured minimum colour temperature, the DALI actuator will set the minimum colour temperature as the new colour temperature value. In this case, the "colour temperature invalid" status can be generated optionally.

Setting the maximum colour temperature

The maximum colour temperature can be set separately for each DALI system.

- Set the "Maximum colour temperature" parameter on the parameter page "DALI systems -> DALI system... -> Colour temperature" to the required colour temperature.

  The colour temperature set is not exceeded in any switched-on operating state.

i The configured maximum colour temperature must be greater than the minimum colour temperature.

i If an absolute colour temperature is received by the KNX that is higher than the configured maximum colour temperature, the DALI actuator will set the maximum colour temperature as the new colour temperature for the DALI system concerned. In this case, the "colour temperature invalid" status can be generated optionally.

Setting the switch-on colour temperature

The switch-on colour temperature can be set separately for each DALI system. The "Switch-on colour temperature" parameter on the parameter page "DALI systems -> DALI system... -> Colour temperature" defines the behaviour.

- Set the parameter to "Track".

  When switching on, the internally tracked colour temperature most recently specified and in the "Brightness 0%" 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. As long as no colour temperature value could be tracked yet, the default value is "2.700 K", which is optionally limited by the minimum or maximum colour temperature.

- Set the parameter to "preset". Set the desired colour temperature value in the "Colour temperature" parameter.

The set colour temperature is set when receiving an ON telegram via the communication object "Switching - Setting" or when receiving a central telegram with the polarity "activated".

- Set the parameter to "memory value (value before the last switch-off)".

  When switching on, the colour temperature is set that was active and stored internally before switching off the last time. This memory value is stored in a non-volatile manner in the DALI actuator so that the value is retained after the bus or mains voltage returns. After an ETS programming operation, the memory colour temperature value is predefined to "2.700 K". This value is optionally limited by the minimum or maximum colour temperature.

In the "preset" setting: The switch-on colour temperature can always be configured within a range of 1,000...10,000 K. If the switch-on colour temperature is outside the range defined by the minimum or maximum colour temperature, the DALI actuator limits the switch-on colour temperature to the defined limits.

In the "memory value" setting: A memory value is stored internally by a switch-off telegram also if the bus-controlled switch-off is overridden, for example, by a disabling 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 curve for colour temperature changes is always linear.

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 process. The limits of the colour temperature range adjustable by a dimming process is defined by the minimum and maximum colour temperature predefined in the ETS.

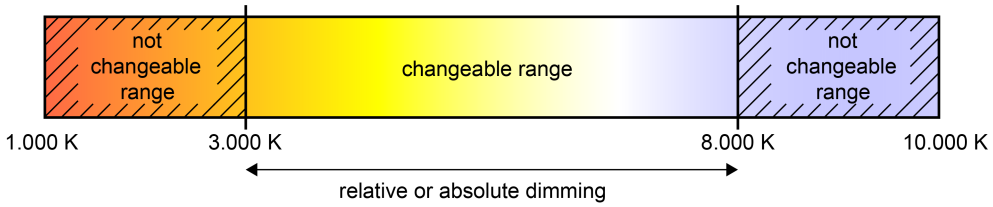


Figure 17: Example of a dimmable colour temperature range

A DALI system can be dimmed by...

– Relative dimming:
  Relative dimming of the colour temperature can be triggered either by the 4-bit communication object "Relative colour temperature - Setting" available for each DALI system or by the 3-byte combination object "Relative dimming (brightness and colour temperature) - Setting". As with relative dimming of the brightness, the data format of the 4-bit object complies with the KNX DPT 3.007, which means that the dimming direction and relative dimming incre-

ments can be specified in the dimming telegram or dimming processes can also be stopped. The data format of the 3-byte object corresponds to KNX DPT 250.600, which enables combined relative dimming of brightness and colour temperature by means of separate dimming increments and dimming directions. A relative dimming process 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 ETS, the dimming speed for relative dimming of the colour temperature can be configured for a brightness change separately for each DALI system and independently of the dimming speed.
A relative dimming telegram for controlling the colour temperature can also switch on a DALI system in the "OFF" state. In some applications, it may be necessary, however, for a switched off DALI system to still remain off until a relative dimming telegram of the colour temperature is received. This is interesting when using light scenes, for instance:
The parameter "Behaviour in switched off state when changing the colour temperature by relative dimming" defines whether a DALI system in the "OFF" state is switched by via a relative dimming telegram of the colour temperature or remains switched off and only tracks the dimming process internally.

– Absolute dimming:
Absolute dimming is triggered by specifying a colour temperature value. This value can be specified either by the 2-byte communication object "Absolute colour temperature - Setting" available in each DALI system according to KNX DPT 7.600 or by the 6-byte combination object "Absolute dimming (brightness and colour temperature) - Setting" according to KNX DPT 249.600 for the combined control of brightness and colour temperature. In addition, colour temperature values can also be set by the scene function.
When specifying a colour temperature value by the objects or by a scene call-up, it can be configured in the ETS whether the value is jumped to directly or alternatively dimmed to over a dimming time or fading is carried out. When dimming by means of the 6-byte combination object, it is possible to specify an individual dimming time in the KNX telegram. If a valid time is specified there, the DALI actuator executes the dimming time transmitted in the KNX telegram and not the one specified in the ETS. The colour temperature and brightness specified in the telegram value is then dimmed to within the transmitted dimming time (fading). If the time is defined as "invalid" in the telegram, the DALI actuator always executes the dimming behaviour defined in the ETS parameters during absolute dimming.
Just as with relative dimming, an absolute dimming telegram for controlling the colour temperature can also switch on the DALI system in the "OFF" state. Here too, it may be necessary in some applications for a switched off DALI system to still remain off if a new colour temperature value is specified absolutely. The parameter "Behaviour in switched off state when changing the colour temperature by absolute dimming" defines whether a DALI system in the "OFF" state is switched on by a new absolute dimming telegram of the colour temperature or remains switched off and only tracks the colour temperature value internally.

A dimming time for relative dimming or absolute dimming (with dimming to the colour temperature values) is set at the DALI actuator within the range from the minimum colour temperature to maximum colour temperature. The dimming times are derived directly from the configured times between two dimming steps.

i The dimming characteristic curve for colour temperature changes is always linear.

i Optionally, the 1-bit status object "Colour temperature invalid - Status" can be used to indicate whether an externally specified colour temperature is invalid. This is the case, if the specified colour temperature violates the set limits of the minimum and maximum colour temperature.

i The dimming of the colour temperature cannot be triggered by manual operation directly on site on the device.

i 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 lamp (perception of the light source such as an incandescent or halogen lamp).

Example:
A DALI luminaire is fitted with colour temperature controllable LED lamps. The luminaire is switched and its brightness dimmed by KNX telegrams. When dimming, the colour temperature should adjust automatically to the brightness of the dimming setting without the colour temperature being specified separately via the KNX. At low brightness, the lamp 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 within the limits of the dimmable brightness range.

The maximum possible KNX brightness range (0...100 %) is mapped proportionally to the configured colour temperature range (minimum colour temperature [0%]...maximum colour temperature [100%]) during the automatic adjustment of the colour temperature. 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.

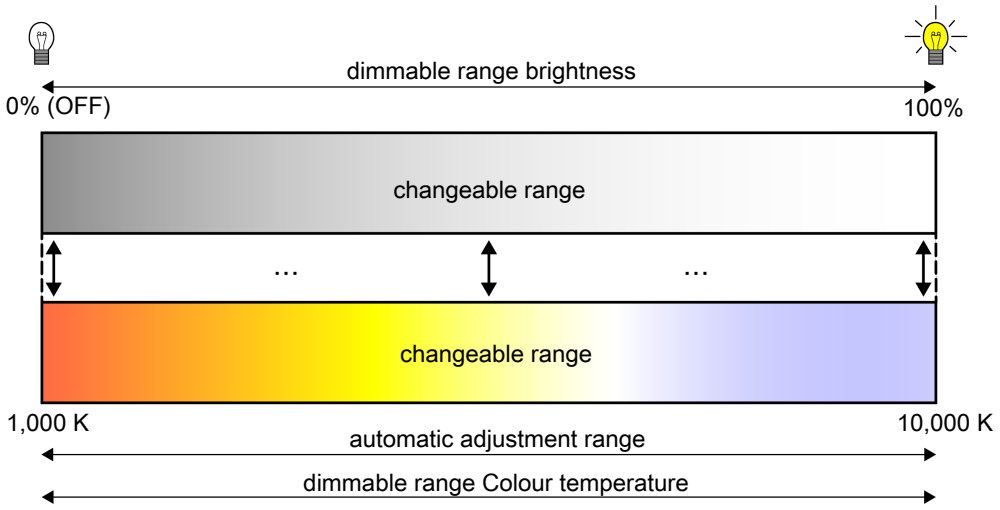


Figure 18: Automatic adjustment of the colour temperature to the set brightness
Example in the maximum brightness and colour temperature range

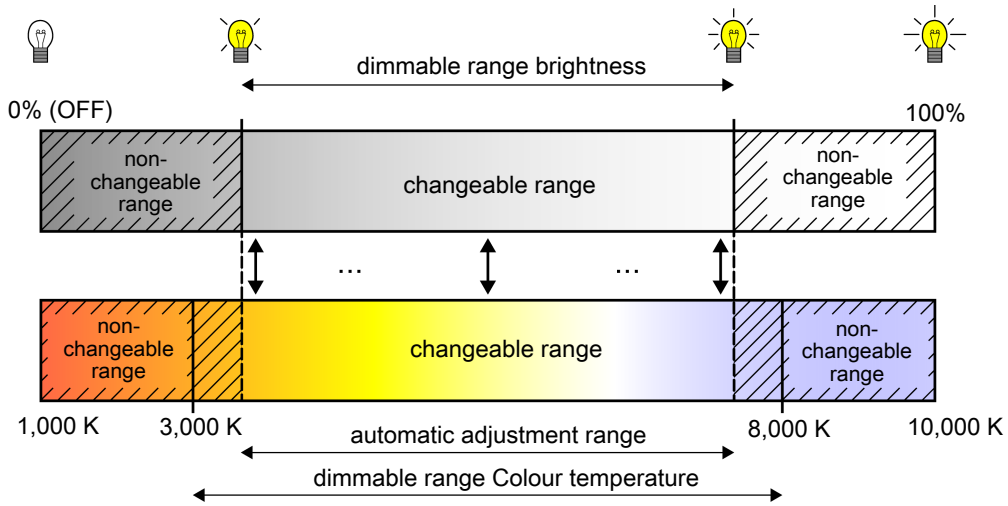


Figure 19: Automatic adjustment of the colour temperature to the set brightness
Example with limited brightness and colour temperature range

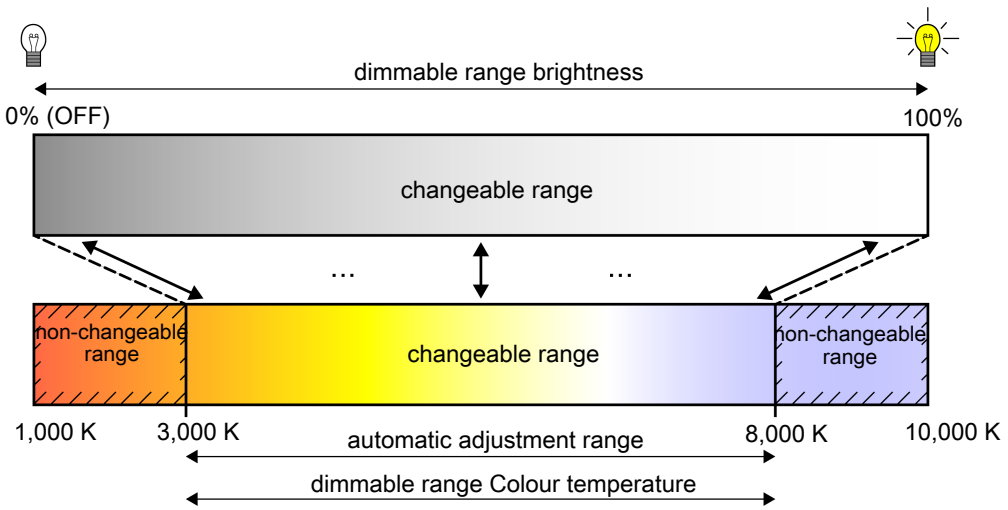


Figure 20: Automatic adjustment of the colour temperature to the set brightness
Example with limited colour temperature range

The colour temperature can be automatically adjusted to the brightness dimming setting of a DALI system by the DALI actuator during relative dimming and absolute dimming. The parameters "Behaviour of the colour temperature when changing the brightness by relative dimming" and "Behaviour of the colour temperature when changing the brightness by absolute dimming" allow the described function for relative or absolute dimming to be activated separately.

i The brightness of the lamp connected to the physical output of the controlled DALI operating device is dimmed by the DALI characteristic curve configured in the ETS for each DALI system. The colour temperature is constantly dimmed linearly.

Setting dimming behaviour for absolute dimming

In the ETS, the dimming behaviour for absolute dimming can be set separately for each DALI system. The parameter "When receiving a colour temperature value" on the parameter page "DALI systems -> DALI system... -> Colour temperature" defines the behaviour.

- Set the parameter to "jumping to".

  As soon as a new colour temperature value is specified, it is instantly jumped to.

- Set the "dimming to" parameter.

  Once a new colour temperature value is specified, it is set by means of the configured dimming step time for absolute dimming.

- Set the "fading" parameter. Configure the duration of the dimming process for the parameter "Time for colour temperature via fading".

  As soon as a new colour temperature value is specified, it is set by means of the configured fading time for absolute dimming. The dimming process then always takes exactly the set time, regardless of the initial value of the dimming process.

i During a scene recall, the dimming behaviour can be configured separately.

Setting dimming time for relative dimming

In the ETS, the dimming time for relative dimming of the colour temperature can be set separately for each DALI system.

- Set the parameter "Time between two dimming steps for relative dimming" on the parameter page "DALI systems -> DALI system... -> Colour temperature" to the required dimming step time.

i The relative dimming of the colour temperature always takes place within the range limited by the configured minimum and maximum colour temperature. This range is divided into 255 dimming steps. The duration of a complete dimming process within this colour temperature range is calculated with to the formula: t = 255 x time between two dimming steps [ms].

Setting dimming time for absolute dimming

In the ETS, the dimming time for absolute dimming can be set separately for each DALI system.

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

- Set the "Time between two dimming steps for absolute dimming" parameter on the parameter page "DALI systems -> DALI system... -> Colour temperature" to the required dimming time.

The absolute dimming of the colour temperature always takes place within the range limited by the configured minimum and maximum colour temperature. This range is divided into 255 dimming steps. The duration of a complete dimming process within this colour temperature range is calculated with to the formula: t = 255 x time between two dimming steps [ms].

Setting dimming behaviour in OFF state for absolute dimming

Absolute dimming of the colour temperature can also be switched on by a DALI system in the "OFF" state. In the ETS, the behaviour in the "OFF" state when receiving an absolute colour temperature telegram can be set separately for each DALI system by the parameter "Behaviour in switched-off state when changing the colour temperature by absolute dimming".

- Set the parameter to "Switch-on".

  The DALI system in the "OFF" state is switched to the configured switch-on brightness by an absolute colour temperature telegram. The colour temperature is set to the colour temperature value received. If the dimming behaviour is configured to "jumping to", the intended colour temperature value is immediately preset.

  If the dimming behaviour is configured to "dimming to", the dimming process starts at the colour temperature value most recently set by the DALI actuator or which was tracked in the "OFF" state. The dimming process is executed according to the set dimming step time. The dimming process stops after reaching the specified colour temperature.

  If the dimming behaviour is configured to "fading", the dimming process starts at the colour temperature value most recently set by the DALI actuator or tracked in the "OFF" state. The dimming process is executed according to the set fading time. The dimming process then always takes exactly the set time, regardless of the initial value of the dimming process. The dimming process stops after reaching the specified colour temperature.

- Set the parameter to "No reaction".

  The DALI system in the "OFF" state is not switched by the absolute colour temperature telegram. The DALI system remains switched off. The next time the device is switched on, the last colour temperature value received is tracked only if the "Switch-on colour temperature" parameter is configured to the "track" setting.

Setting dimming behaviour in OFF state for relative dimming

A relative dimming telegram for controlling the colour temperature can also switch on a DALI system in the "OFF" state. In the ETS, the behaviour in the "OFF" state when receiving a relative colour temperature telegram can be set separately for each DALI system by the parameter "Behaviour in switched-off state when changing the colour temperature by relative dimming".

- Set the parameter to "Switch-on".

  The DALI system is switched on in the "OFF" state by a relative dimming telegram of the colour temperature to the configured switch-on brightness. The colour temperature is set to the configured switch-on colour temperature. Based on this colour temperature state, the colour temperature to be dimmed is dimmed.Based on this colour temperature state, the colour temperature to be dimmed is dimmed.Based on this colour temperature state, the colour temperature to be dimmed is dimmed. The relative dimming telegram that leads to switching on, specifies the dimming direction and dimming increment. The dimming process stops after reaching the specified colour temperature.

- Set the parameter to "No reaction".

  The DALI system in the "OFF" state is not switched on by the relative dimming telegram. The DALI system remains switched off. The next time the device is switched on, the colour temperature value dimmed last is tracked only if the "Switch-on colour temperature" parameter is configured to the "track" setting.

Setting the behaviour of the colour temperature when dimming 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 lamp (perception of the light source such as an incandescent or halogen lamp). In the ETS, the behaviour of the colour temperature can be set separately by means of parameters for each DALI system for this application when dimming the brightness for relative or absolute dimming.

- Set the parameter "Behaviour of the colour temperature when changing the brightness by relative dimming" to "no change".

  The relative dimming of the brightness by a 4-bit dimming telegram has no effect on the colour temperature of the DALI system. The colour temperature can be controlled only separately.

- Set the parameter "Behaviour of the colour temperature when changing the brightness by relative dimming" to "change proportional to brightness".

  During relative dimming of the brightness with a 4-bit dimming telegram, the colour temperature of the DALI system 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 when changing the brightness by absolute dimming" to "no change".

The absolute dimming of the brightness with a 1-byte brightness value has no effect on the colour temperature of the DALI system. The colour temperature can be controlled only separately.

- Set the parameter "Behaviour of the colour temperature when changing the brightness by absolute dimming" to "change proportional to brightness".

  During absolute dimming of the brightness with a 1-byte brightness value, the colour temperature of the DALI system 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.

9.2.1 Parameters for colour temperature

DALI systems -> DALI System... -> Colour temperature

Minimum colour temperature	1,000...**2,000**...10,000 K
The adjustable colour temperature range of a DALI system can be limited by defining a lower and upper colour temperature value. This parameter defines the lower colour temperature value, which is not undercut in any operating state of the DALI actuator. In this way, the lower colour temperature of the controlled lamps of the DALI operating devices can be limited individually and adapted to the respective application. The configured minimum colour temperature must be lower than the maximum colour temperature.	

Maximum colour temperature	1,000...**6,000**...10,000 K
The adjustable colour temperature range of a DALI system can be limited by defining a lower and upper colour temperature value. This parameter defines the upper colour temperature value, which is not exceeded in any operating state of the DALI actuator. In this way, the upper colour temperature of the controlled lamps of the DALI operating devices can be limited individually and adapted to the respective application. The configured maximum colour temperature must be greater than the minimum colour temperature.	

Switch-on colour temperature	track preset **memory value (value bef. switching-off last time)**
At this point, the colour temperature value can be specified that is set when the device is switched on. Track: When switching on, the internally tracked colour temperature most recently specified and in the "Brightness 0%" 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. As long as no colour temperature value could be tracked yet, the default value is "2.700 K", which is optionally limited by the minimum or maximum colour temperature. Preset: The set colour temperature is set when receiving an ON telegram via the communication object "Switching - Setting" or when receiving a central telegram with the polarity "activated". Memory value (value before the last switch-off): When switching on, the colour temperature is set that was active and stored internally before switching off the last time. This memory value is stored in a non-volatile manner in the DALI actuator so that the value is retained after the bus or mains voltage returns. After an ETS programming operation, the memory colour temperature value is predefined to "2.700 K". This value is optionally limited by the minimum or maximum colour temperature.	

Colour temperature	1,000...**2,700**...10,000 K
Setting of the switch-on colour temperature value. The switch-on colour temperature as a value specification can be configured basically within a range of 1,000...10,000 K. If the switch-on colour temperature is outside the range defined by the minimum or maximum colour temperature, the DALI actuator limits the switch-on colour temperature to the defined limits. This parameter is available only in the setting "Switch-on colour temperature = preset".	

When receiving a colour temperature value	jumping to **dimming to** Fading
This parameter defines the dimming behaviour for absolute dimming using the object "Colour temperature - Setting" for a DALI system. jumping to: As soon as a new colour temperature value is specified, it is instantly jumped to. 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. dimming to: Once a new colour temperature value is specified, it is set by means of the configured dimming step time for absolute dimming. Fading: As soon as a new colour temperature value is specified, it is set by means of the configured fading time for absolute dimming. The dimming process then always takes exactly the set time, regardless of the initial value of the dimming process.	

Time between two dimming steps for absolute dimming	1...**25**...255 ms
Absolute dimming is triggered by specifying a colour temperature value. This value can be specified either by the 2-byte communication object "Absolute colour temperature - Setting" available in each DALI system according to KNX DPT 7.600 or by the 6-byte combination object "Absolute dimming (brightness and colour temperature) - Setting" according to KNX DPT 249.600 for the combined control of brightness and colour temperature. The dimming speed for absolute dimming of the colour temperature can be configured here. The absolute dimming of the colour temperature always takes place within the range limited by the configured minimum and maximum colour temperature. This range is divided into 255 dimming steps. The duration of a complete dimming process within this colour temperature range is calculated with to the formula: t = 255 x time between two dimming steps [ms]. This parameter is available only in the setting "When receiving a colour temperature value = dimming to".	

Time for colour temperature value via fading	0..**20**...240 s
Setting the fading time for absolute dimming. This parameter is available only in the setting "When receiving a colour temperature value = fading".	

Time between two dimming steps for relative dimming	1...**25**...255 ms
Relative dimming of the colour temperature can be triggered either by the 4-bit communication object "Relative colour temperature - Setting" available for each DALI system or by the 3-byte combination object "Relative dimming (brightness and colour temperature) - Setting". The dimming speed for relative dimming of the colour temperature can be configured here. The relative dimming of the colour temperature always takes place within the range limited by the configured minimum and maximum colour temperature. This range is divided into 255 dimming steps. The duration of a complete dimming process within this colour temperature range is calculated with to the formula: t = 255 x time between two dimming steps [ms].	

Behaviour in switched-off state when changing the colour temperature by absolute dimming	**Switch on** No reaction
An absolute colour temperature telegram can also be switched on by a DALI system in the "OFF" state, with the behaviour set by this parameter. Switch-on: The DALI system in the "OFF" state is switched to the configured switch-on brightness by an absolute colour temperature telegram. The colour temperature is set to the colour temperature value received. If the dimming behaviour is configured to "jumping to", the intended colour temperature value is immediately preset. If the dimming behaviour is configured to "dimming to", the dimming process starts at the colour temperature value most recently set by the DALI actuator or which was tracked in the "OFF" state. The dimming process is executed according to the set dimming step time. The dimming process stops after reaching the specified colour temperature. If the dimming behaviour is configured to "fading", the dimming process starts at the colour temperature value most recently set by the DALI actuator or tracked in the "OFF" state. The dimming process is executed according to the set fading time. The dimming process then always takes exactly the set time, regardless of the initial value of the dimming process. The dimming process stops after reaching the specified colour temperature. no reaction: The DALI system in the "OFF" state is not switched by the absolute colour temperature telegram. The DALI system remains switched off. The next time the device is switched on, the last colour temperature value received is tracked only if the "Switch-on colour temperature" parameter is configured to the "track" setting.	

Behaviour in switched-off state when changing the colour temperature by relative dimming	**Switch on** No reaction
A relative colour temperature dimming telegram can also switch on a DALI system in the "OFF" state, with the behaviour set by this parameter. Switch-on: The DALI system in the "OFF" state is switched on to the configured switch-on brightness by a relative dimming telegram of the colour temperature. The colour temperature is set to the configured switch-on colour temperature. Based on this colour temperature state, the colour temperature to be dimmed is dimmed.Based on this colour temperature state, the colour temperature to be dimmed is dimmed.Based on this colour temperature state, the colour temperature to be dimmed is dimmed. The relative dimming telegram that leads to switching on, specifies the dimming direction and dimming increment. The dimming process stops after reaching the specified colour temperature. no reaction: The DALI system in the "OFF" state is not switched on by the relative dimming telegram. The DALI system remains switched off. The next time the device is switched on, the colour temperature value dimmed last is tracked only if the "Switch-on colour temperature" parameter is configured to the "track" setting.	

Behaviour of the colour temperature when changing the brightness by absolute dimming	change proportional to brightness **No change**
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 lamp (perception of the light source such as an incandescent or halogen lamp). This parameter can be used to set the behaviour of the colour temperature during absolute dimming of the brightness for the application mentioned. change proportional to brightness: During absolute dimming of the brightness with a 1-byte brightness value, the colour temperature of the DALI system 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. no change: The absolute dimming of the brightness by a 1-byte brightness value has no effect on the colour temperature of the DALI system. The colour temperature can be controlled only separately.	

Behaviour of the colour temperature when changing the brightness by relative dimming	change proportional to brightness **No change**
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 lamp (perception of the light source such as an incandescent or halogen lamp). This parameter can be used to set the behaviour of the colour temperature during relative dimming of the brightness for the application mentioned. change proportional to brightness: During relative dimming of the brightness with a 4-bit dimming telegram, the colour temperature of the DALI system 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. no change: The relative dimming of the brightness by a 4-bit dimming telegram has no effect on the colour temperature of the DALI system. The colour temperature can be controlled only separately.	

9.2.2 Objects for colour temperature

Function	Name	Type	DPT	Flag
Relative colour temperature - Setting	DALI System (DA1...DA4) - Input	4-bit	3.007	C, -, W, -, U
4-bit object for relative dimming of the colour temperature.				

Function	Name	Type	DPT	Flag
Absolute colour temperature - Setting	DALI System (DA1...DA4) - Input	2-byte	7.600	C, -, W, -, U
2-byte object for specifying an absolute colour temperature value within the limits of the minimum and maximum colour temperature.				

Function	Name	Type	DPT	Flag
Relative dimming (brightness value and colour temperature) - Setting	DALI System (DA1...DA4) - Input	3-byte	250.600	C, -, W, -, U
3-byte object for the combined relative dimming of the brightness and colour temperature by means of separate dimming increments and dimming directions.				

Function	Name	Type	DPT	Flag
Absolute dimming (brightness value and colour temperature) - Setting	DALI System (DA1...DA4) - Input	6-byte	249,600	C, -, W, -, U
6-byte object for the combined absolute dimming of the brightness and colour temperature by means of separate dimming values and for the specification of a dimming time. When dimming by means of the 6-byte combination object, it is possible to specify an individual dimming time in the KNX telegram. If a valid time is specified there, the DALI actuator executes the dimming time transmitted in the KNX telegram and not the one specified in the ETS. The colour temperature and brightness specified in the telegram value is then dimmed to within the transmitted dimming time (fading). If the time is defined as "invalid" in the telegram, the DALI actuator always executes the dimming behaviour defined in the ETS parameters during absolute dimming.				

9.3 Colour control

Specifying the colour space

The DALI actuator can be used to control the light colour when using DALI operating devices of device type "DT8 - Colour Control". The DALI actuator enables flexible colour control in the "RGB", "RGBW", "HSV" or "HSVW" colour spaces. In the RGB colour spaces, the colours "red", "green", "blue" and optionally also "white" can be directly controlled by combined or separate communication objects according to the KNX specification. In the HSV colour spaces, separate objects are always available for controlling the light colour by absolute values for hue (H), saturation (S) and brightness value (V) and optionally also for the white value (W).

DALI operating devices of the "DT8 - Colour Control" device type must at least correspond to the "Colour Control RGB" colour type. The colour type "white" [W] is additionally required in the colour space "RGBW" or "HSVW". The extended DALI colour types "AF" (Amber [A], Freecolour [F]) are not supported by the DALI actuator.

The colour space to be used for DALI systems is defined by the parameter of the same name on the parameter pages "DALI systems -> DALI System... -> Colour" is specified. Whether the colour space is available with or without the white value "W" is set in the general configuration under "DALI systems".

- Set the parameter to "RGB combined" or "RGBW combined".

  The colours "red", "green", "blue" and optionally also "white" are individually controlled by absolute values or a common object. This object has a size of 3 bytes in the colour space "RGB" (DPT 232.600) and 6 bytes in the colour space "RGBW" (DPT 251.600). The default colours transmitted by the 6-byte value are evaluated only if the corresponding 1-bit enable flags (bits 0...3) are "1" in the data value. With "0", the respective colour is ignored.
  In addition to the default object, another object of the same data type is available for the status indication of the currently set colour.

  The DALI actuator transmits the RGBW colours received from the KNX directly to the DALI side. The parameter "On receipt of a colour value" defines whether the value is jumped to directly or alternatively a dimming process is carried out by means of time-controlled fading.

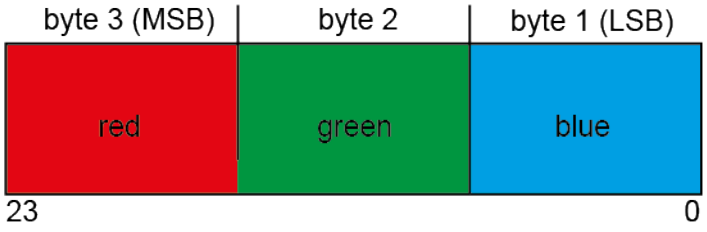


Figure 21: KNX data type "RGB combined" (DPT 232.600)

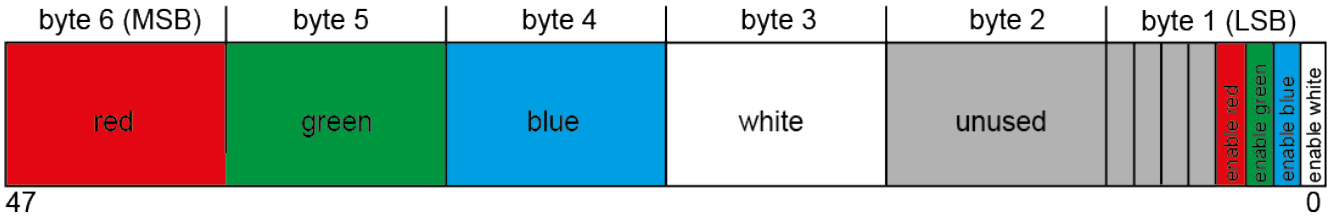


Figure 22: KNX data type "RGBW combined" (DPT 251.600)

- Set the parameter to "RGB individually" or "RGBW individually".

  The colours "red", "green", "blue" and optionally also "white" are individual controlled by separate objects. Switching (DPT 1.001 / ON & OFF), relative dimming (DPT 3.007 / dimming the colour intensity up and dim incl. stop) and the specification of an absolute value (DPT 5.001 / 0...100%) for each colour is possible. If required, a status object is available for each colour, which indicates the set absolute colour value (DPT 5.001 / 0...100%).

  When switching off a colour with the switching object, only the corresponding colour value is set to "#00" (dark colour). Other colour values remain unchanged. The switch-on behaviour is defined by the "Switch-on colour" parameter, whereby only the corresponding colour value in the parameter is evaluated. All other colour values remain unchanged. When a colour is switched on, the DALI actuator always also switches on the brightness in the configured switch-on brightness.

  If all colours are dark (#000000 / black) and in this state at least one colour is selected by the object "Colour ... (Switching) - Setting" is switched on, the switch-on colour value is always activated. Fading then does not take place.

  The DALI actuator transmits the RGBW colours received from the KNX directly to the DALI side. The parameter "On receipt of a colour value" defines whether the value is jumped to directly or alternatively a dimming process is carried out by means of time-controlled fading. When dimming a colour relatively, the DALI actuator calculates the corresponding dimming curve using the parameter "Time between two dimming steps for relative dimming".

- Set the parameter to "HSV" or "HSVW".

  The colours "red", "green" and "blue" are individually controlled in the HSV colour space as an absolute value specification by separate 1-byte objects for the hue (H / DPT 5.003 / 0...360°), the saturation (S / DPT 5.001 / 0...100%) and the brightness value (V / DPT 5.001 / 0...100%). The white value is optionally specified by a separate 1-byte object (DPT 5.001 / 0...100%).

  The DALI actuator calculates the RGB values used in the DALI from the specified HSV values. In addition to the default objects, four other objects of the same data types are available for the status indication of the colour currently set.

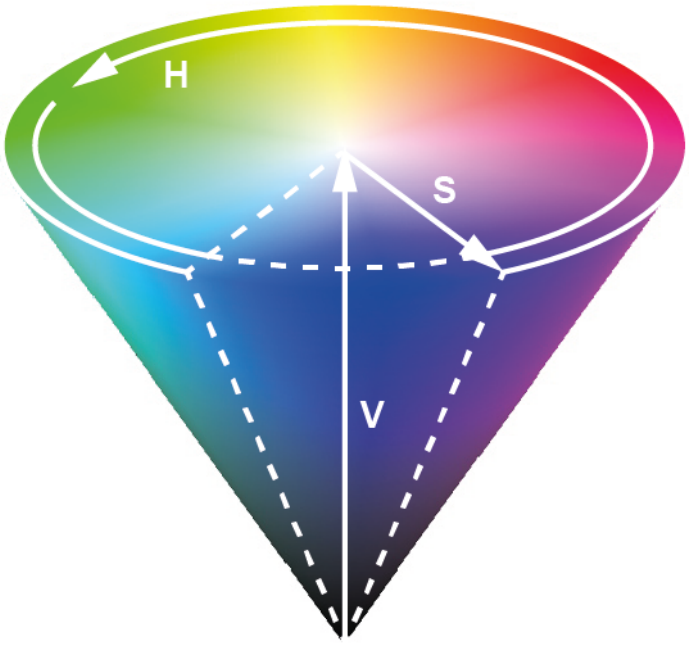


Figure 23: HSV colour space

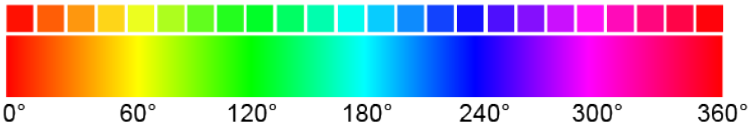


Figure 24: HSV colour (hue)

Setting the switch-on colour

The switch-on colour can be set separately for each DALI system.

- Set the "Switch-on colour" parameter in the parameter node "DALI systems -> DALI system... -> Colour" to "preset". Set the desired colour in the parameters "Colour value (RGB)" and optionally "White value (W)".

  The set colour is displayed on receipt of an ON telegram by the communication objects "Switching - Setting" or "Colour ... (Switching) - Setting" or when receiving a central telegram with the polarity "activated".

  In the "RGB individually" or "RGBW individually" colour spaces, only the corresponding colour value (red, green or blue) is evaluated in the parameter when switching on with the objects "Colour ... (Switching)". All other colour values remain unchanged. When a colour is switched on, the DALI actuator always also switches on the brightness in the configured switch-on brightness.

- Set the parameter "Switch-on colour" to "Memory value (value before last switch-off)".

  When switching on, the colour that was active and stored internally before the last switch-off is set. This memory value is composed of the colour value and the optional white value and is stored in a non-volatile manner in the DALI ac-

tuator so that the value is retained after a bus or mains voltage return. After an ETS programming operation, the memory colour value is predefined at "#FFFFFF" and the optional white value at "#FF".

- Set the parameter "Switch-on colour" to "track".

  On switching on, the internally tracked colour temperature value most recently specified and in the "Brightness 0%" state is preset. The tracked colour is not influenced by an ETS programming operation or by a bus voltage failure ("no change"). When the bus/mains voltage returns, the colour most recently active before the bus/mains voltage failure is restored. Consequently, this colour is taken into account as a value to be tracked when switching on.

i 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 value is saved as memory value.

i The colour 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 curve for colour changes is always linear.

Dimming characteristic and dimming speeds

When controlling DALI systems, the colour can be influenced by an absolute dimming process (value specification). In the "RGB individually" or "RGBW individually" colour space, it is also possible to relatively dim a colour or the white value with a 4-bit telegram (DPT 3.007).

- Absolute dimming:
  Absolute dimming is triggered by the specification of a colour or white value. Depending on the configured colour space, these values can be determined either by the RGB communication objects present in each DALI system "Colour ... (Value) - Setting" or alternatively by the HSV value objects "Hue (H)", "Saturation (S)" and "Brightness Value (V)". In addition, colour values can also be set by the scene function.
  When specifying a colour value by the objects mentioned or by a scene recall, it can be parameterised whether the value is jumped to directly or alternatively dimmed by a dimming time (Fading Time).
  An absolute dimming telegram for controlling the colour can also switch on a DALI system in the "OFF" state. Here too, it may be necessary in some applications for a switched off DALI system to still remain off if a new colour value is specified absolutely. The parameter "Behaviour in the switched-off state when changing the colour by absolute dimming" determines whether a DALI system in the "OFF" state is switched on by a new absolute colour dimming telegram or remains switched off.
- Relative dimming:
  Relative dimming can be triggered by the existing 4-bit communication object "Colour ... (Dimming) - Setting" for each colour or optionally also triggered by the object "White (Dimming) - Setting". The data format of these objects - as

well as with relative dimming of the brightness - complies with the KNX 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 process allows the colour intensity to be changed continuously.
The dimming speed for relative dimming can be configured separately for each DALI system and independent of the dimming speed for a brightness change.
Just as with absolute dimming, a relative colour dimming telegram can also switch on a DALI system in the "OFF" state. In some applications, it may be necessary, however, for a switched off DALI system to still remain off until a relative dimming telegram of the colour is received. This is interesting when using light scenes, for instance: DALI systems are set to a defined colour via a light scene. Other DALI systems are switched off by the scene. Only the colour of channels not switched off by the scene recall should be changed by dimming up afterwards. Here, it is necessary for DALI systems not to respond to a relative dimming telegram and thus not to switch on. The parameter "Behaviour in the switched-off state when changing the colour by relative dimming" determines whether the DALI system in the "OFF" state is switched on by a relative dimming telegram of the colour, or remains switched off.

i The dimming characteristic curve for colour changes is always linear.

i A dimming process of the colour cannot be triggered with the manual control on site at the device.

i Even if colour 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 value jumped to will be dimmed to within 0.7 seconds (short fading). This time cannot be altered.

Setting dimming behaviour for absolute dimming

- Set the parameter "On receipt of a colour value" in the parameter node "DALI systems -> DALI system... -> Colour" to "Fading..." "Dim to...".

  As soon as a new colour value is received, the DALI actuator sets this value within the specified fading time.

- Set the parameter "On receipt of a colour value" to "jumping to".

  As soon as a new colour value is received it will be instantly jumped to.

i During a scene recall, the dimming behaviour can be configured separately.

Setting dimming time for relative dimming

The dimming time for relative dimming can be set only in the colour space "RGB individually" and "RGBW individually".

The "Colour space" parameter must be set to "RGB individually" or "RGBW individually".

- Set the parameter "Time between two dimming steps for relative dimming" in the parameter node "DALI systems -> DALI system... -> Colour" to the required dimming time.

Setting dimming behaviour in OFF state for absolute dimming

An absolute colour telegram can switch on a DALI system in the "OFF" state, whereby the behaviour is set by the parameter "Behaviour in the off state when changing the colour by absolute dimming".

- Set the parameter to "Switch-on".

  The DALI system in the "OFF" state is switched to the configured switch-on brightness by an absolute colour telegram. The colour is set to the received colour value. If the colour dimming behaviour is configured to "jumping to", the intended colour value is set immediately. When the dimming behaviour is set to "Fading...", the dimming process starts at the colour value most recently set by the DALI actuator or that was tracked in the "OFF" state. The dimming process is executed according to the set fading time. After reaching the intended colour, the dimming process stops.

i Usually DALI operating devices initially switch on automatically with the last active colour value after being switched on. The operating devices then immediately dim to the absolutely specified colour (jumping to: by standard fading of 0.7 s / dimming: by configured fading).

- Set the parameter to "No reaction".

  The DALI system does not switch on in the "OFF" state by the absolute colour telegram. The DALI system remains switched off. The next time the device is switched on, the last colour value received is tracked only if the "Switch-on colour" parameter is set to "track".

Setting dimming behaviour in OFF state for relative dimming

A relative colour dimming telegram can also switch on a DALI system in the "RGB individually" and "RGBW individually" colour space in the "OFF" state, whereby the behaviour is set by the parameter "Behaviour in the off state when changing the colour by relative dimming". The colours "red", "green", "blue" and optionally also "white" are individually controlled by separate 4-bit objects.

- Set the parameter to "Switch-on".

  A DALI system switches on in the "OFF" state by a relative colour dimming telegram to the configured switch-on brightness. The colour is set to the configured switch-on colour. Based on this colour state, the colour to be dimmed is dimmed. The relative dimming telegram that leads to switching on, specifies the dimming direction and dimming increment. After reaching the intended colour, the dimming process stops.

i Usually DALI operating devices initially switch on automatically with the last active colour value after being switched on. Afterwards, the operating devices immediately dim to the predefined switch-on colour (by standard fading of 0.7

s). Only then does the relative dimming process of the colour to be dimmed start. Switching from the last active colour to the switch-on colour can initially cause rapid colour changes, which not only changes the relative colour to be dimmed.

- Set the parameter to "No reaction".

  The DALI system in the "OFF" state is not switched on by the relative colour dimming telegram. The DALI system remains switched off. The next time the device is switched on, the last dimmed colour value is tracked only if the "Switch-on colour" parameter is set to "track".

9.3.1 Parameters for colour control

DALI systems -> DALI System... -> Colour

Colour space	**RGB combined** **RGBW combined** RGB individually RGBW individually HSV HSVW
The DALI actuator can be used to control the light colour when using DALI operating devices of device type "DT8 - Colour Control". The DALI actuator enables flexible colour control in the "RGB", "RGBW", "HSV" or "HSVW" colour spaces. In the RGB colour spaces, the colours "red", "green", "blue" and optionally also "white" can be directly controlled by combined or separate communication objects according to the KNX specification. In the HSV colour spaces, separate objects are always available for controlling the light colour by absolute values for hue (H), saturation (S) and brightness value (V) and optionally also for the white value (W). Whether the colour space is available with or without the white value "W" is set in the general configuration of the DALI systems under "DALI systems". RGB combined: The colours "red", "green", "blue" and optionally also "white" are individually controlled by absolute values by means of a common object. This object is 3 bytes in size (DPT 232.600). In addition to the default object, another object of the same data type is available for the status indication of the currently set colour. The DALI actuator transmits the RGBW colours received from the KNX directly to the DALI side. RGBW combined: The colours "red", "green", "blue" and optionally also "white" are individually controlled by absolute values by means of a common object. This object is 6 bytes in size (DPT 251.600). The transmitted default colours are evaluated only if the corresponding 1-bit enable flags (bits 0...3) are in the data value "1". With "0", the respective colour is ignored. In addition to the default object, another object of the same data type is available for the status indication of the currently set colour. The DALI actuator transmits the RGBW colours received from the KNX directly to the DALI side. RGB individually: The colours "red", "green" and "blue" are individually controlled by separate objects. Switching (DPT 1.001 / ON & OFF), relative dimming (DPT 3.007 / dimming the colour intensity up and down incl. stop) and the specification of an absolute value (DPT 5.001 / 0...100%) are possible for each colour. If required, a status object is available for each colour, which indicates the absolute colour value set (DPT 5.001 / 0...100%). The DALI actuator transmits the RGB colours received from the KNX directly to the DALI side.	

Colour space (continued)	**RGB combined** **RGBW combined** RGB individually RGBW individually HSV HSVW
RGBW individually: The colours "red", "green" and "blue" and "white" are individually controlled by separate objects in each case. Switching (DPT 1.001 / ON & OFF), relative dimming (DPT 3.007 / dimming the colour intensity up and down incl. stop) and the specification of an absolute value (DPT 5.001 / 0...100%) are possible for each colour. If required, a status object is available for each colour that indicates the set absolute colour value (DPT 5.001 / 0...100%). The DALI actuator transmits the RGBW colours received from the KNX directly to the DALI side. HSV: The colours "red", "green" and "blue" are individually controlled in the HSV colour space as an absolute value specification by separate 1-byte objects for the hue (H / DPT 5.003 / 0...360°), saturation (S / DPT 5.001 / 0...100%) and brightness value (V / DPT 5.001 / 0...100%). The DALI actuator calculates the RGB values used in the DALI from the specified HSV values. In addition to the default objects, four other objects of the same data types are available for the status indication of the colour currently set. HSVW: The colours "red", "green" and "blue" are individually controlled in the HSV colour space as an absolute value specification by separate 1-byte objects for the hue (H / DPT 5.003 / 0...360°), saturation (S / DPT 5.001 / 0...100%) and brightness value (V / DPT 5.001 / 0...100%). The white value is optionally specified by a separate 1-byte object (DPT 5.001 / 0...100%). The DALI actuator calculates the RGB values used in the DALI from the specified HSV values. In addition to the default objects, four other objects of the same data types are available for the status indication of the colour currently set.	

Switch-on colour	track preset **memory value (value bef. switching-off last time)**
At this point, the colour can be specified, which is set every time the DALI operating devices are switched on. This parameter defines the switch-on colour value separately for each DALI system. Track: When switching on, the colour value specified last and internally tracked in the "Brightness 0%" state is set. The tracked colour is not influenced by an ETS programming operation or by a bus voltage failure ("no change"). When the bus/mains voltage returns, the colour most recently active before the bus/mains voltage failure is restored. Consequently, this colour is taken into account as a value to be tracked when switching on. Preset: The set colour is displayed on receipt of an ON telegram by the communication objects "Switching - Setting" or "Colour ... (Switching) - Setting" or when receiving a central telegram with the polarity "activated". In the "RGB individually" or "RGBW individually" colour spaces, only the corresponding colour value (red, green or blue) is evaluated in the parameter when switching on with the objects "Colour ... (Switching)". All other colour values remain unchanged. When a colour is switched on, the DALI actuator always also switches on the brightness in the configured switch-on brightness. Memory value (value before the last switch-off): When switching on, the colour is set that was active and stored internally before the last switch-off. This memory value is composed of the colour value and the optional white value and is stored in a non-volatile manner in the DALI actuator so that the value is retained after a bus or mains voltage return. After an ETS programming operation, the memory colour value is predefined at "#FFFFFF" and the optional white value at "#FF".	

Colour value (RGB)	#000000...**#FFFFFF**
Setting the switch-on colour value by means of the ETS colour picker. In the HSV colour space, the HSV values are calculated from the RGB values by means of the colour picker. This parameter is only available in the setting "Switch-on colour = preset".	

White value (W)	0...**255**
Setting of the white value of the switch-on colour. This parameter is available only in the setting "Switch-on colour = preset" in the colour spaces "RGBW combined", "RGBW individually" and "HSVW".	

On receipt of a colour value	jumping to Fading (0.7 s) Fading (1.0 s) Fading (1.4 s) **Fading (2.0 s)** Fading (2.8 s) Fading (4.0 s) Fading (5.7 s) Fading (8.0 s) Fading (11.3 s) Fading (16.0 s) Fading (22.5 s) Fading (32.0 s) Fading (45.3 s) Fading (64.0 s) Fading (90.5 s)

This parameter defines the dimming behaviour for absolute dimming by means of the object "Colour ... (value) - Setting" for a DALI system.

jumping to: As soon as a new colour value is received it will be instantly jumped to. Even if colour 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 value jumped to will be dimmed to within 0.7 seconds (short fading). This time cannot be altered.

Fading: As soon as a new colour value is received, the DALI actuator sets this value within the specified fading time.

Time between two dimming steps for relative dimming	1...**25**...255 ms

Relative dimming can be triggered by the existing 4-bit communication object "Colour ... (Dimming) - Setting" for each colour or optionally also triggered by the object "White (Dimming) - Setting". The data format of these objects - as well as with relative dimming of the brightness - complies with the KNX 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 process allows the colour intensity to be changed continuously.

The dimming speed for relative dimming of the colour can be configured at this point.

This parameter is available only in the colour spaces "RGB individually" and "RGBW individually".

Behaviour when switched-off when changing the colour by absolute dimming	**Switch on** No reaction
An absolute colour telegram can also switch on the DALI system in the "OFF" state, with the behaviour set by this parameter. Switch on: The DALI system switches on in the "OFF" state by an absolute colour telegram in the configured switch-on brightness. The colour is set to the received colour value. If the colour dimming behaviour is configured to "jumping to", the intended colour value is set immediately. When the dimming behaviour is set to "Fading...", the dimming process starts at the colour value most recently set by the DALI actuator or that was tracked in the "OFF" state. The dimming process is executed according to the set fading time. After reaching the intended colour, the dimming process stops. No reaction: The DALI system does not switch on in the "OFF" state by the absolute colour telegram. The DALI system remains switched off. The next time the device is switched on, the last colour value received is tracked only if the "Switch-on colour" parameter is set to "track".	

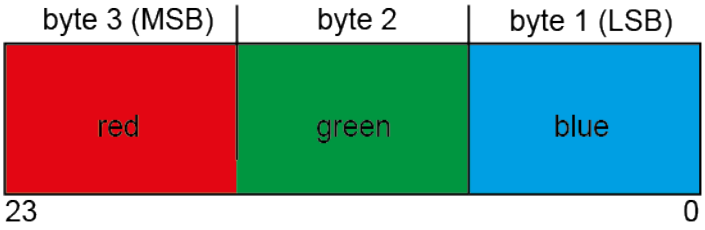
Behaviour when switched-off when changing the colour by relative dimming	**Switch on** No reaction
A relative colour dimming telegram can also switch on a DALI system in the "RGB individually" and "RGBW individually" colour space in the "OFF" state, with the behaviour set by this parameter. The colours "red", "green", "blue" and optionally also "white" are individually controlled by separate 4-bit objects. Switch on: The DALI system switches on in the configured switch-on brightness in the "OFF" state by a relative colour dimming telegram. The colour is set to the configured switch-on colour. Based on this colour state, the colour to be dimmed is dimmed. The relative dimming telegram that leads to switching on, specifies the dimming direction and dimming increment. After reaching the intended colour, the dimming process stops. No reaction: The DALI system in the "OFF" state is not switched on by the relative colour dimming telegram. The DALI system remains switched off. The next time the device is switched on, the last dimmed colour value is tracked only if the "Switch-on colour" parameter is set to "track".	

9.3.2 Objects for colour control

Objects for controlling the colour space

Function	Name	Type	DPT	Flag
Colour RGB (value) - Setting	DALI System 1...4 - Input	3-byte	232.600	C, -, W, -, U

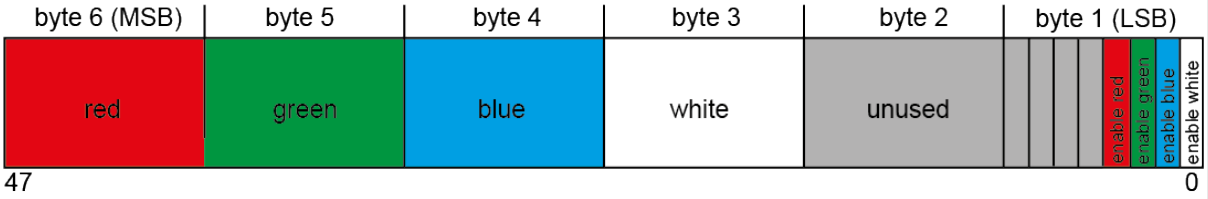
3-byte object for combined absolute specification of an RGB light colour.



This object is available only in the "RGB combined" colour space.

Function	Name	Type	DPT	Flag
Colour RGBW (value) - Setting	DALI System 1...4 - Input	6-byte	251.600	C, -, W, -, U

6-byte object for combined absolute specification of an RGB light colour.



This object is available only in the "RGBW combined" colour space.

Function	Name	Type	DPT	Flag
Colour red (switching) - Setting	DALI System 1...4 - Input	1-bit	1.001	C, -, W, -, U

1-bit object for switching the light colour red. When switching off the colour with the switching object, only the colour value for red is set to "#00" (black). Other colour values remain unchanged. The switch-on behaviour is defined by the "Switch-on colour" parameter, whereby only the colour value for red is evaluated in the parameter. All other colour values remain unchanged. When a colour is switched on, the DALI actuator always also switches on the brightness in the configured switch-on brightness.

This object is available only in the "RGB individually" or "RGBW individually" colour space.

Function	Name	Type	DPT	Flag
Colour green (switching) - Setting	DALI System 1...4 - Input	1-bit	1.001	C, -, W, -, U
1-bit object for switching the light colour green. When switching off the colour with the switching object, only the colour value for green is set to "#00" (black). Other colour values remain unchanged. The switch-on behaviour is defined by the "Switch-on colour" parameter, whereby only the colour value for green is evaluated in the parameter. All other colour values remain unchanged. When a colour is switched on, the DALI actuator always also switches on the brightness in the configured switch-on brightness. This object is available only in the "RGB individually" or "RGBW individually" colour space.				

Function	Name	Type	DPT	Flag
Colour blue (switching) - Setting	DALI System 1...4 - Input	1-bit	1.001	C, -, W, -, U
1-bit object for switching the light colour blue. When switching off the colour with the switching object, only the colour value for blue is set to "#00" (black). Other colour values remain unchanged. The switch-on behaviour is defined by the "Switch-on colour" parameter, whereby only the colour value for blue is evaluated in the parameter. All other colour values remain unchanged. When a colour is switched on, the DALI actuator always also switches on the brightness in the configured switch-on brightness. This object is available only in the "RGB individually" or "RGBW individually" colour space.				

Function	Name	Type	DPT	Flag
Colour white (switching) - Setting	DALI System 1...4 - Input	1-bit	1.001	C, -, W, -, U
1-bit object for switching the light colour white. When switching off the colour with the switching object, only the colour value for white is set to "#00" (black). Other colour values remain unchanged. The switch-on behaviour is defined by the "Switch-on colour" parameter, whereby only the colour value for white is evaluated in the parameter. All other colour values remain unchanged. When a colour is switched on, the DALI actuator always also switches on the brightness in the configured switch-on brightness. This object is available only in the "RGBW individually" colour space.				

Function	Name	Type	DPT	Flag
Colour red (value) - Setting	DALI System 1...4 - Input	1-byte	5.001	C, -, W, -, U
1-byte object for absolute specification of the light colour red (0...100%). This object is available only in the "RGB individually" or "RGBW individually" colour space.				

Function	Name	Type	DPT	Flag
Colour Green (Value) - Setting	DALI System 1...4 - Input	1-byte	5.001	C, -, W, -, U
1-byte object for absolute specification of the light colour green (0...100%). This object is available only in the "RGB individually" or "RGBW individually" colour space.				

Function	Name	Type	DPT	Flag
Colour Blue (value) - Setting	DALI System 1...4 - Input	1-byte	5.001	C, -, W, -, U
1-byte object for absolute presetting of the light colour blue (0...100%). This object is available only in the "RGB individually" or "RGBW individually" colour space.				

Function	Name	Type	DPT	Flag
Colour white (value) - Setting	DALI System 1...4 - Input	1-byte	5.001	C, -, W, -, U
1-byte object for absolute specification of the light colour white (0...100%). This object is available only in the "RGBW individually" colour space.				

Function	Name	Type	DPT	Flag
Colour red (dimming) - Setting	DALI System 1...4 - Input	4-bit	3.007	C, -, W, -, U
4-bit object for relative specification of the light colour red (0...100%). This object is available only in the "RGB individually" or "RGBW individually" colour space.				

Function	Name	Type	DPT	Flag
Colour green (dimming) - Setting	DALI System 1...4 - Input	4-bit	3.007	C, -, W, -, U
4-bit object for relative specification of the light colour green (0...100%). This object is available only in the "RGB individually" or "RGBW individually" colour space.				

Function	Name	Type	DPT	Flag
Colour blue (dimming) - Setting	DALI System 1...4 - Input	4-bit	3.007	C, -, W, -, U
4-bit object for relative specification of the light colour blue (0...100%). This object is available only in the "RGB individually" or "RGBW individually" colour space.				

Function	Name	Type	DPT	Flag
Colour white (dimming) - Setting	DALI System 1...4 - Input	4-bit	3.007	C, -, W, -, U
4-bit object for relative specification of the light colour white (0...100%). This object is available only in the "RGBW individually" colour space.				

Function	Name	Type	DPT	Flag
Colour hue (H) - Setting	DALI System 1...4 - Input	1-byte	5.003	C, -, W, -, U
1-byte object for direct specification of the hue (H / 0...360°). This object is available only in the "HSV" or "HSVW" colour space.				

Function	Name	Type	DPT	Flag
Saturation (S) - Setting	DALI System 1...4 - Input	1-byte	5.001	C, -, W, -, U
1-byte object for direct specification of the saturation (S / 0...100%). This object is available only in the "HSV" or "HSVW" colour space.				

Function	Name	Type	DPT	Flag
Brightness (V) - Setting	DALI System 1...4 - Input	1-byte	5.001	C, -, W, -, U
1-byte object for direct specification of the brightness value (V / 0...100%). This object is available only in the "HSV" or "HSVW" colour space.				

Function	Name	Type	DPT	Flag
White value (W) - Setting	DALI System 1...4 - Input	1-byte	5.001	C, -, W, -, U
1-byte object for direct specification of the white value (W / 0...100%). This object is available only in the "HSVW" colour space.				

9.3.3 Automatic colour wheel sequence

Introduction

The colour wheel sequence is used for the automatic overall colour control of DALI lights. This function uses the cyclical adjustment of the hue angle in the HSV colour wheel. This results in continuous colour gradients that can be started and stopped at will during the running time of the DALI actuator.

After starting, the automatically controlled step-by-step sequence of the colour wheel begins. With each step, the current hue is either increased or decreased depending on the configured "sequence direction", converted into an RGB value and transmitted on the DALI line. The number of steps and consequently the increment of the hue is derived from the configured "total running time". The longer the total running time is considered in a full colour wheel sequence, the finer is the hue adjustment during the sequence and thus the colour resolution.

The adjustment of the hue always starts with the colour currently set when DALI system are switched on. For switched-off DALI system, the start-up behaviour is determined by the parameter "When starting in switched-off state". Here it is possible that the start does not switch on the affected DALI system and the DALI actuator executes the colour sequence only internally. Only a subsequent switch-on then switches the lamps to the internally tracked colour. Alternatively, starting a colour wheel sequence can immediately switch on the DALI system in the OFF state. In this case, the colour wheel sequence starts at an individual start value. This start value can either be specified as a fixed initial hue (optionally with static white value) in the ETS, or alternatively it can be set to the colour at which a stop was last executed in the course of a previous colour wheel sequence.

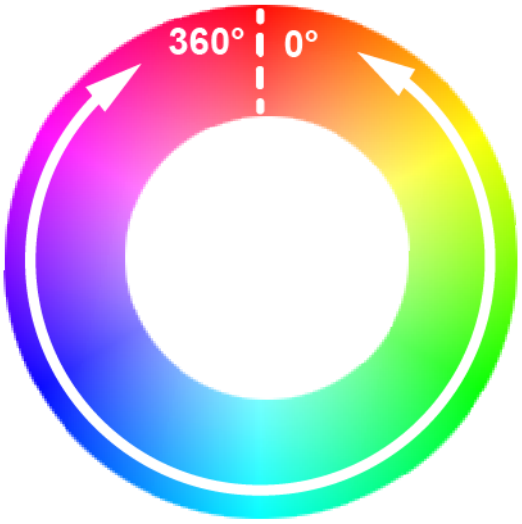


Figure 25: Colour run depending on the colour hue during the automatic colour wheel sequence

The sequence direction may be either clockwise, anti-clockwise or alternating (toggling). When switching over, the DALI actuator automatically changes the direction of the colour wheel sequence after each start. The hue adjustment range is limited to 0° to 360° according to the HSV colour space. It can be defined in the ETS whether the

colour wheel sequence is stopped or continued in the same direction without interruption after reaching the range limit 360° or 0°. Optionally, a short visualisation can be carried out by the lamp when the range limit is reached in order to continue the sequence afterwards. This visual feedback is provided by briefly switching the assigned DALI operating devices off and on again. The time between OFF and ON is invariably 1 second.

A colour wheel sequence always stops as soon as a stop command is received with the KNX communication object "Automatic colour wheel sequence - Start/stop". The colour last set by the colour wheel sequence is initially retained until it is changed by a new colour wheel sequence or by other functions of the DALI actuator. A sequence is started and stopped by an object whose data format can be configured either to 1-bit (DPT 1.010 / "1" = start, "0" = stop) or alternatively to 4-bit (DPT 3.007 / "Dimming step up or down" = start, "Dimming stop" = stop).

i The colour wheel is always run through according to the hue of the HSV colour space, regardless of which colour space is configured for the DALI system. The colour specified by the hue is automatically converted by the DALI actuator into an equivalent RGB value and forwarded to the DALI operating devices.

i The additionally controllable white value (W) available in the "RGBW..." or "HSVW..." colour spaces is always static in the automatic colour wheel sequence. The white value is not changed dynamically.

i During a colour wheel sequence, the values for colour saturation and brightness remain constant at the maximum value (100%). Only the hue is adjusted.

Setting the start/stop behaviour of the colour wheel sequence

The parameter "Start and stop by" on the parameter page "DALI systems -> DALI system... -> Colour -> Colour wheel sequence" specifies the data format of the communication object for starting and stopping the automatic colour wheel sequence.

- Set the parameter to "Start/Stop object (1 bit)".

  A sequence is started and stopped by the object "Automatic colour wheel sequence - Start/Stop". The data format is set to 1-bit (DPT 1.010). A sequence is started by an ON telegram. A sequence is stopped by an OFF telegram.

- Set the parameter to "Dimming object (4-bit)".

  A sequence is started and stopped by the object "Automatic colour wheel sequence - Start/Stop". The data format is set to 4-bit (DPT 3.007). A sequence is started by a "Dimming step up or down" telegram. A sequence is stopped by a "Dimming stop" telegram.

i Changes in brightness do not stop a colour wheel sequence in progress if this does not change the switching status. The colour wheel sequence is stopped when the DALI system is switched off (brightness 0%).

The colour wheel sequence and brightness sequence cannot run at the same time. As soon as the colour wheel sequence has been started, the brightness sequence is automatically stopped. The same applies vice versa. It is not permissible to link the start/stop objects of both functions of the DALI system with identical group addresses!

During an activated lock or forced position, any colour wheel sequence that has been started has no effect. If the parameter for the specification of the behaviour of the colour at the end of the disabling function is configured to the setting "track", the tracked colour of a running colour wheel sequence is set at the end of the lock, provided the DALI system is switched on. If no colour tracking is configured at the end of disabling, the automatic colour wheel sequence is stopped.

During an active manual operation, any colour wheel sequence that has been started has no effect. At the end of a manual operation, the tracked colour of a current colour wheel sequence is set. A valid scene recall stops the automatic colour wheel sequence. After an ETS programming operation, a colour wheel sequence is always stopped.

No colour status telegrams are generated during a colour wheel sequence (not even during a continuous sequence after reaching the range limits and direction reversal). Only when a sequence is stopped does the DALI actuator send out the current colour as a status.

Setting the starting behaviour of the colour wheel sequence in switched-off state

The adjustment of the hue always starts with the colour currently set when DALI system are switched on. When groups or single devices are switched off, the start-up behaviour is determined by the parameter "When starting in switched-off state" on the parameter page "DALI systems ->DALI system... -> Colour -> Colour wheel sequence".

- Set the parameter to "No reaction".

  The DALI system is not switched on at start-up. The DALI actuator executes the colour sequence only internally. Only when the brightness is subsequently switched on does the lamp change to the internally tracked colour, but only if the switch-on colour is also configured to "track".

- Set the parameter to "Switch-on".

  Starting a colour wheel sequence immediately switches on the DALI system. In this case, the colour wheel sequence starts at the start value configured by the parameter of the same name.

- Set the "Start value" parameter to "preset".

  A fixed start value is specified as the start hue (optionally with static white value).

- Set the "Start value" parameter to "value as before last stop".

The colour wheel sequence starts at the colour that was stopped last during the previous colour wheel sequence.

Setting the direction of the colour wheel sequence

The "Sequence direction" parameter on the parameter page "DALI systems -> DALI system... -> Colour -> Colour wheel sequence" defines the sequence direction of an automatic colour wheel sequence after starting.

- Set the parameter to "clockwise".

  According to the HSV colour space, the colour wheel is always run though clockwise (0° --> 360° / red --> green --> blue --> red).

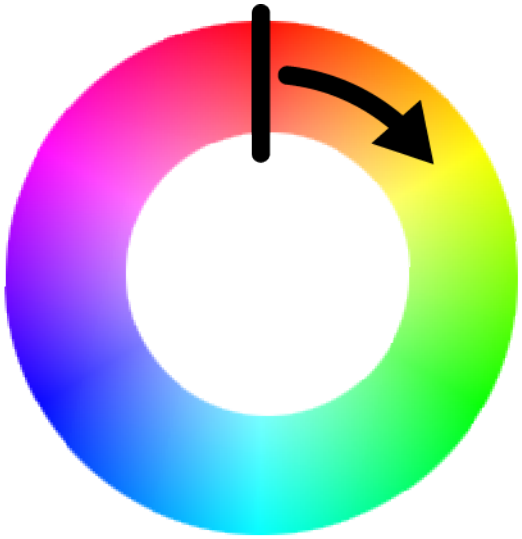


Figure 26: Clockwise colour wheel sequence

- Set the parameter to "anti-clockwise".

  According to the HSV colour space, the colour wheel is always run through anti-clockwise (360° --> 0° / red --> blue --> green --> red).

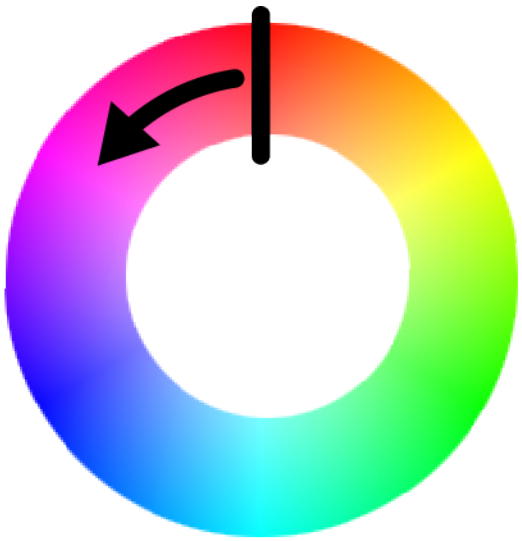


Figure 27: Colour wheel sequence anti-clockwise

- Set the parameter to "toggle".

  When switching over, the DALI actuator automatically changes the direction of the colour wheel sequence after each start (clockwise --> anti-clockwise --> clockwise).

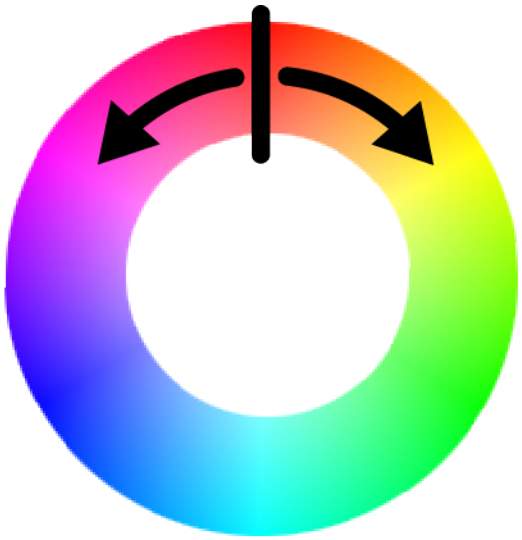


Figure 28: Colour wheel sequence with switching sequence direction

Setting the behaviour at the range limit of the colour wheel sequence

The hue adjustment range is limited to 0° to 360° according to the HSV colour space. The parameter "On reaching the range limit" on the parameter page "DALI systems -> DALI system... -> Colour -> Colour wheel sequence" defines the behaviour when the range limit (360° or 0°) is reached.

- Set the parameter to "Stop sequence".

  After reaching the range limit 360° or 0° (red), the colour wheel sequence is automatically stopped.

- Set the parameter to "Continue sequence".

  After reaching the range limit 360° or 0° (red), the colour wheel sequence is automatically continued until it is stopped by the communication object.

- Set the parameter to "Visualise and continue sequence".

  When the range limit 360° or 0° (red) is reached, a short visualisation is carried out by the lamp and then the sequence is continued in the same direction. Visual feedback is provided by briefly switching the assigned DALI operating devices off and on again. The time between OFF and ON is invariably 1 second. No status telegrams are generated by the short switching process.

Setting the total running time of the colour wheel sequence

After starting the colour wheel sequence, the step-by-step run through the HSV colour wheel begins. With each step, the current hue is either increased or decreased depending on the configured sequence direction, converted into an RGB value and transmitted on the DALI line. The number of steps and consequently the increment of

the hue is derived from the configured "Total running time", which can set by the corresponding parameter on the parameter page "DALI systems -> DALI system... -> Colour -> Colour wheel sequence".

- Configure the parameter to the desired "total running time".

  A colour sequence from 0° to 360° takes the specified time. The longer the total running time, the finer the hue adjustment during the sequence and thus the colour resolution is. The hue increment is calculated by "360°: total running time [s]".

The total running time exclusively defines the duration and the hue increment of a full colour wheel sequence. It does not specify a start or stop time. A sequence can be stopped before the total running time has elapsed.

9.3.3.1 Parameters for colour wheel sequence

DALI systems -> DALI System... -> Colour -> Colour wheel sequence

Start and stop by	**Start/stop object (1-bit)** Dimming object (4-bit)
A sequence is started and stopped by an object whose data format can be configured either to 1-bit or alternatively to 4-bit. Start/Stop object (1 bit): A sequence is started and stopped by the object "Automatic wheel sequence - Start/stop". The data format is set to 1-bit (DPT 1.010). A sequence is started by an ON telegram. A sequence is stopped by an OFF telegram. Dimming object (4 bits): A sequence is started and stopped by the object "Automatic colour wheel sequence - Start/stop". The data format is set to 4-bit (DPT 3.007). A sequence is started by a "Dimming step up or down" telegram. A sequence is stopped by a "Dimming stop" telegram.	

When starting in switched-off state	Switch on **No reaction**
The adjustment of the hue always starts at the currently set colour if DALI system are switched on. When the DALI system is switched off, the starting behaviour is determined by this parameter. No reaction: The DALI system is not switched on at start-up. The DALI actuator executes the colour sequence only internally. Only when the brightness is subsequently switched on does the lamp change to the internally tracked colour, but only if the switch-on colour is also configured to "track". Switch-on: Starting a colour wheel sequence immediately switches on the DALI system. In this case, the colour wheel sequence starts at the start value configured by the parameter of the same name.	

Start value	**preset** Value as before last stop
If the DALI system is to be switched on by starting a colour wheel sequence, the sequence starts at a configurable start value. Preset: A fixed start value is specified as the initial hue (optionally with static white value). Value as before last stop: The colour wheel sequence starts at the colour where a stop was performed last in the course of a previous colour wheel sequence. This parameter is available only if the parameter "When starting in switched-off state = switch-on" is configured.	

Colour hue	**0°**...360°
Setting the start hue value. This parameter is available only in the setting "Start value = preset".	

White value (W)	0...**255**
Setting the white value of the start value. This parameter is available only in the setting "Start value = preset" in the "RGBW combined", "RGBW individually" and "HSVW" colour spaces.	

Sequence direction	**in clockwise direction** anti-clockwise Toggle
The sequence direction may be either clockwise, anti-clockwise or alternating (toggling). When switching over, the DALI actuator automatically changes the direction of the colour wheel sequence after each start.	

On reaching the range limit	**Stop sequence** Continue sequence Visualise and continue the sequence
The hue adjustment range is limited to 0° to 360° according to the HSV colour space. This parameter defines the behaviour when the range limit (360° or 0°) is reached. Stop sequence: After reaching the range limit 360° or 0° (red), the colour wheel sequence is stopped automatically. Continue sequence: After reaching the range limit 360° or 0° (red), the colour wheel sequence is automatically continued until it is stopped by the communication object. Visualise and continue the sequence: When the range limit 360° or 0° (red) is reached, a short visualisation is carried out by the lamp and the sequence is then continued in the same direction. Visual feedback is provided by briefly switching the assigned DALI operating devices off and on again. The time between OFF and ON is invariably 1 second. No status telegrams are generated by the short switching process.	

Total running time	**0**...23 h **0**...59 min 10...**30**...59 s
After starting the colour wheel sequence, the step-by-step run through the HSV colour wheel begins. With each step, the current hue is either increased or decreased depending on the configured sequence direction, converted into an RGB value and transmitted on the DALI line. The number of steps and consequently the hue increment is derived from the total running time configured at this point. A colour sequence from 0° to 360° takes the specified time. The longer the total running time, the finer the hue adjustment during the sequence and thus the colour resolution is. The hue increment is calculated by "360°: total running time [s]". The total running time exclusively defines the duration and the hue increment of a full colour wheel sequence. It does not specify a start or stop time. A sequence can be stopped before the total running time has elapsed.	

9.3.3.2 Objects for colour wheel sequence

Function	Name	Type	DPT	Flag
Automatic colour wheel sequence - Start/stop	DALI System 1...4 - Input	1-bit	1.010	C, -, W, -, U
1-bit object for starting and stopping an automatic colour wheel sequence ("1" = start, "0" = stop). This object is available if the colour wheel sequence is started and stopped by the 1-bit start/stop object.				

Function	Name	Type	DPT	Flag
Automatic colour wheel sequence - Start/stop	DALI System 1...4 - Input	4-bit	3.007	C, -, W, -, U
4-bit object for starting and stopping an automatic colour wheel sequence ("Dimming step up or down" = start, "Dimming stop" = stop). This object is available if colour wheel sequence is to be started and stopped by the 4-bit dimming object.				

9.3.4 Automatic brightness cycle

Introduction

The automatic brightness sequence cyclically adjusts the brightness in the configured brightness range and thus creates individual brightness scenarios. A brightness sequence is available for each DALI system that also enable colour control and can be started and stopped at will during the running time of the DALI actuators.

After starting, the automatically controlled step-by-step run through the dimmable brightness range begins. With each step, the current brightness value is either increased or decreased depending on the configured "sequence direction" and transmitted as ARC power level on the DALI line. The number of steps and consequently the brightness value increment is derived from the configured "total running time". The longer the total running time is considered to a full brightness sequence (0...100%), the finer the brightness adjustment during the sequence and thus the resolution is.

When DALI system is switched on, the adjustment of the brightness always starts at the currently effective brightness. For switched-off DALI system, the start-up behaviour is determined by the parameter "When starting in switched-off state". In this case, it is possible that the start does not switch on the affected DALI system and the DALI actuator executes the brightness curve only internally. Only a subsequent switch-on then switches over the lamps to the internally tracked brightness. Alternatively, starting a brightness sequence can immediately switch on the DALI system in the OFF state. In this case, the brightness sequence then begins at an individual start value. This start value can either be specified as a fixed brightness value in the ETS or, alternatively, it can be set to the brightness at which a stop was last executed in the course of a previous brightness sequence.

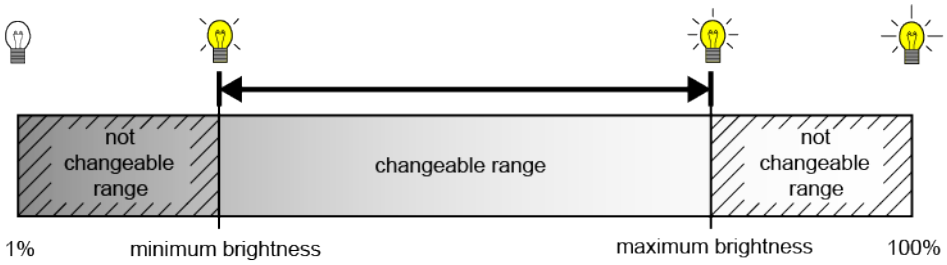


Figure 29: Brightness sequence during automatic brightness sequence

The sequence direction may be either in the direction of lighter, in the direction of darker or alternating (switching the direction by toggling). When switching over, the DALI actuator automatically changes the direction of the brightness sequence after each start. The range of brightness adjustment is limited according to the configured minimum and maximum brightness. It can be defined in the ETS whether the brightness sequence is stopped or continued in the opposite direction after reaching the range limits (maximum brightness or minimum brightness). Optionally, it is possible to carry out a short visualisation by the lamp when a range limit is reached, in order to then continue the sequence in the opposite direction. This visual feedback is provided by briefly switching the assigned DALI operating devices off and on again. The time between OFF and ON is invariably 1 second.

A brightness sequence always stops as soon as a stop command is received via the KNX communication object "Automatic brightness sequence - Start/Stop". The brightness last set by the brightness sequence is initially retained until it is changed by a new brightness sequence or by other functions of the DALI actuator. A sequence is started and stopped by an object whose data format can be configured either to 1-bit (DPT 1.010 / "1" = start, "0" = stop) or alternatively to 4-bit (DPT 3.007 / "Dimming step up or down" = start, "Dimming stop" = stop).

i The specified brightness range is always run through according to the effective brightness value of the DALI actuator (via DALI ARC power level). The configured colour space has no influence on this.

i A brightness sequence does not affect the colour. However, the colour can also be changed by the communication objects provided during a brightness sequence. However, an automatic colour wheel sequence cannot run simultaneously.

Setting the start/stop behaviour of the brightness sequence

The parameter "Start and stop by" on the parameter page "DALI systems -> DALI system... -> Colour -> Brightness sequence" specifies the data format of the communication object for starting and stopping the automatic brightness sequence.

- Set the parameter to "Start/Stop object (1 bit)".

  A sequence is started and stopped by the object "Automatic brightness sequence - Start/stop". The data format is set to 1-bit (DPT 1.010). A sequence is started by an ON telegram. A sequence is stopped by an OFF telegram.

- Set the parameter to "Dimming object (4-bit)".

  A sequence is started and stopped by the object "Automatic brightness sequence - Start/stop". The data format is set to 4-bit (DPT 3.007). A sequence is started by a "Dimming step up or down" telegram. A sequence is stopped by a "Dimming stop" telegram.

i Changes to the brightness with the object "Brightness value - Setting" stop a running brightness sequence. The brightness sequence is also stopped when the affected DALI system is switched off (brightness 0%).

i The colour wheel sequence and brightness sequence cannot run at the same time. As soon as the brightness sequence has been started, the colour wheel sequence is automatically stopped. The same applies vice versa. It is not permissible to link the start/stop objects of both functions of a DALI system with identical group addresses!

i During an activated lock or forced position, a started brightness sequence has no effect. If the parameter for specifying the behaviour of the brightness at the end of the disabling function is configured to the "track" setting, the tracked brightness of a current brightness sequence is set at the end of disabling, provided the DALI system is switched on. If no brightness tracking is configured at the end of the disabling, the automatic brightness sequence is stopped.

During an active manual operation, a started brightness sequence has no effect. At the end of a manual operation, the tracked brightness of a current brightness sequence is set. A valid scene recall stops the automatic brightness sequence. After an ETS programming operation, a brightness sequence is always stopped.

No brightness or switching status telegrams are generated during a brightness sequence (not even during a continuous sequence after reaching the brightness limit values and direction reversal). Only when a sequence is stopped does the DALI actuator send out the current brightness as a status.

Setting the start behaviour of the brightness sequence in the switched-off state

When DALI system is switched on, the adjustment of the brightness always starts at the currently effective brightness. When groups or single devices are switched off, the start-up behaviour is determined by the parameter "When starting in switched-off state" on the parameter page "DALI systems ->DALI system... -> Colour -> Brightness sequence".

- Set the parameter to "No reaction".

  The DALI system is not switched on at start-up. The DALI actuator ignores the start of the brightness sequence.

- Set the parameter to "Switch-on".

  Starting a brightness sequence immediately switches on the DALI system. In this case, the brightness sequence then begins at the start value configured by the parameter of the same name.

- Set the "Start value" parameter to "preset".

  A fixed start value is preset as the initial brightness value. Make sure the configured brightness value is not below the set minimum brightness or above the maximum brightness! Otherwise, the DALI actuator will limit the start value to minimum or maximum brightness.

- Set the "Start value" parameter to "memory value (value as before last switch-off)".

  When starting, the brightness value that was active and stored internally before the last switch-off is set. This memory value is stored in a non-volatile manner in the DALI actuator so that the value is retained after the bus or mains voltage returns. After programming with the ETS, the value is predefined to maximum brightness.

- Set the "Start value" parameter to "value as before last stop".

  The brightness sequence starts at the brightness value at which a stop was last executed in the course of the previous brightness sequence.

Setting the direction of the brightness sequence

The "Sequence direction" parameter on the parameter page "DALI systems -> DALI system... -> Colour -> Brightness sequence" defines the sequence direction of an automatic brightness sequence after starting.

- Set the parameter to "brighter".

  After starting, the brightness range is first run through in the direction of "brighter".

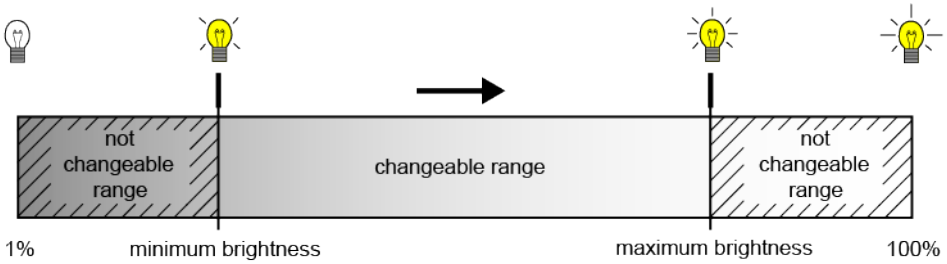


Figure 30: Brightness sequence direction "brighter"

- Set the parameter to "darker".

  After starting, the brightness range is initially run through in the direction of "darker".

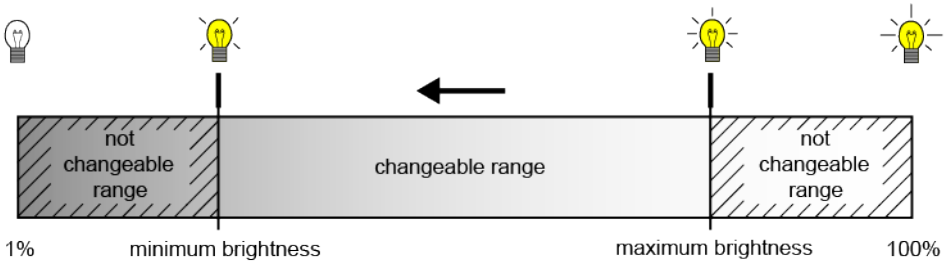


Figure 31: Brightness sequence direction "darker"

- Set the parameter to "toggle".

  When switching over, the DALI actuator automatically changes the direction of the brightness sequence after each start.

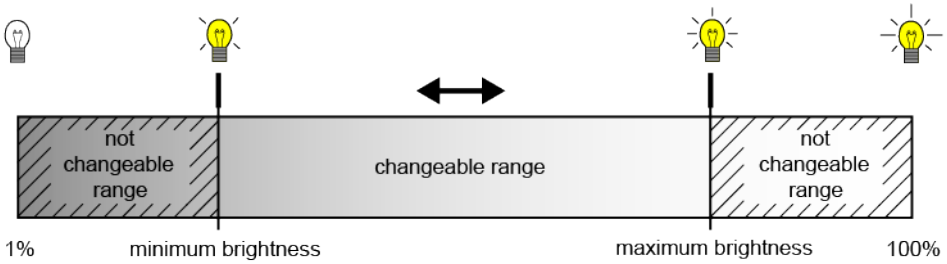


Figure 32: Brightness sequence with switching sequence direction

The parameter "When reaching the range limit" determines whether the direction of brightness adjustment is reversed at the end of the range (maximum or minimum brightness) or whether the automatic adjustment ends.

Setting the behaviour at the range limit of the brightness sequence

The range of brightness adjustment is limited by the minimum brightness and maximum brightness. The parameter "On reaching the range limit" on the parameter page "DALI systems -> DALI system... -> Colour -> Brightness sequence" defines the behaviour when the range limits are reached.

- Set the parameter to "Stop sequence".

  The brightness sequence is automatically stopped after reaching the range limits defined by the minimum brightness and maximum brightness.

- Set the parameter to "Reverse direction and continue sequence".

  After the range limits are reached, the direction is reversed and the adjustment is automatically continued in the opposite direction until it is stopped by the communication object.

- Set the parameter to "Visualise, reverse direction and continue sequence".

  When the range limits are reached, a short visualisation is carried out by the lamp and then the sequence is continued in the opposite direction. Visual feedback is provided by briefly switching the assigned DALI operating devices off and on again. The time between OFF and ON is invariably 1 second. No status telegrams are generated by the short switching process.

Setting the total running time of the brightness sequence

After starting the brightness sequence, the step-by-step run through the configured brightness range begins. With each step, the current brightness value is either increased or decreased depending on the configured sequence direction and transmitted as ARC power level on the DALI line. The number of steps and consequently the increment of the brightness value is derived from the configured total running time, which can be set by the parameter of the same name on the parameter page "DALI systems -> DALI system... -> Colour -> Brightness sequence".

- Configure the parameter to the desired "total running time".

  A brightness sequence from 1% to 100% takes the specified time. The longer the total running time, the finer the brightness adjustment during the sequence and thus the resolution is. The brightness value increment is calculated by "100% : total running time [s]".

- If the brightness range has been limited by setting a minimum brightness greater than 1% and a maximum brightness less than 100%, the effective running time of the brightness sequence is correspondingly shorter than the configured total running time.

i The total running time exclusively defines the duration and the brightness value increment of a full brightness sequence. It does not specify a start or stop time. A sequence can be stopped before the total running time has elapsed.

9.3.4.1 Parameters for brightness sequence

DALI systems -> DALI System... -> Colour -> Brightness sequence

Start and stop by	**Start/stop object (1-bit)** Dimming object (4-bit)
A sequence is started and stopped by an object whose data format can be configured either to 1-bit or alternatively to 4-bit. Start/stop object (1 bit): A sequence is started and stopped by the "Automatic brightness run - Start/stop" object. The data format is set to 1-bit (DPT 1.010). A sequence is started by an ON telegram. A sequence is stopped by an OFF telegram. Dimming object (4-bit): A sequence is started and stopped by the "Automatic brightness sequence - Start/stop" object. The data format is set to 4-bit (DPT 3.007). A sequence is started by a "Dimming step up or down" telegram. A sequence is stopped by a "Dimming stop" telegram.	

When starting in switched-off state	Switch on **No reaction**
When DALI system are switched on, the adjustment of the brightness always starts at the currently effective brightness. When the DALI system is switched off, the starting behaviour is determined by this parameter. No reaction: The DALI system is not switched on at start-up. The DALI actuator ignores the start of the brightness sequence. Switch-on: A fixed start value is preset as the start brightness value.	

Start value	preset **memory value (value bef. switching-off last time)** Value as before last stop
If a DALI system is to be switched on by starting a brightness sequence, the sequence starts at a configurable start value. Preset: A fixed start value is preset as the start brightness value. Make sure the configured brightness value is not below the set minimum brightness or above the maximum brightness! Otherwise, the DALI actuator will limit the start value to minimum or maximum brightness. Memory value (value before switching-off last time): When starting, the brightness value that was active and stored internally before the last switch-off is set. This memory value is stored in a non-volatile manner in the DALI actuator so that the value is retained after the bus or mains voltage returns. After programming with the ETS, the value is predefined to maximum brightness. Value as before last stop: The brightness sequence starts at the brightness value at which a stop was last executed during the previous brightness sequence. This parameter is available only if the parameter "When starting in switched-off state = switch-on" is configured.	

Brightness value	1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 15%, 20%...**50%**...100%
Setting of the start brightness value. This parameter is available only in the setting "Start value = preset".	

Sequence direction	**Brighter** Darker Toggle
The sequence direction may be either in the direction of lighter, in the direction of darker or alternating (switching the direction by toggling). When switching over, the DALI actuator automatically changes the direction of the brightness sequence after each start.	

On reaching the range limit	**Stop sequence** Reverse direction and continue sequence Visualise, reverse direction and continue sequence
The range of brightness adjustment is limited to the range between the configured minimum brightness and maximum brightness. This parameter defines the behaviour when the range limits are reached. Stop sequence: The brightness sequence is automatically stopped after reaching the range limits. Reverse direction and continue sequence: After reaching the range limits, the brightness sequence is automatically continued in opposite direction until it is stopped by the communication object. Visualise, reverse direction and continue sequence: When the range limits are reached, a short visualisation is carried out by the lamp and the sequence is then continued in the opposite direction. Visual feedback is provided by briefly switching the assigned DALI operating devices off and on again. The time between OFF and ON is invariably 1 second. No status telegrams are generated by the short switching process.	

Total running time	**0**...23 h **0**...59 min 10...**30**...59 s
After starting the brightness sequence, the step-by-step run through the predefined brightness range begins. With each step, the effective brightness value is either increased or decreased depending on the configured sequence direction and transmitted as ARC power level on the DALI line. The number of steps and consequently the brightness value increment is derived from the total running time parameterised at this point. A brightness sequence from 1% to 100% takes the specified time. The longer the total running time, the finer the brightness adjustment during the sequence and thus the resolution is. The brightness value increment is calculated by "100% : total running time [s]". If the brightness range has been limited by setting a minimum brightness greater than 1% and a maximum brightness less than 100%, the effective running time of the brightness sequence is correspondingly shorter than the configured total running time. The total running time exclusively defines the duration and the brightness value increment of a full brightness sequence. It does not specify a start or stop time. A sequence can be stopped before the total running time has elapsed.	

9.3.4.2 Objects for brightness sequence

Function	Name	Type	DPT	Flag
Automatic brightness sequence - Start/stop	DALI System 1...4 - Input	1-bit	1.010	C, -, W, -, U
1-bit object for starting and stopping an automatic brightness sequence ("1" = start, "0" = stop). This object is available if the brightness sequence is to be started and stopped by a 1-bit start/stop object.				

Function	Name	Type	DPT	Flag
Automatic brightness sequence - Start/stop	DALI System 1...4 - Input	4-bit	3.007	C, -, W, -, U
4-bit object for starting and stopping an automatic brightness sequence ("Dimming step up or down" = start, "Dimming stop" = stop). This object is available if the brightness sequence is to be started and stopped by a 4-bit dimming object.				

9.4 Response after a device reset

The switching states or brightness values that set themselves after a bus voltage failure, bus or mains voltage return or after an ETS programming operation for DALI systems can be configured in the ETS. The behaviour of the colour temperature of the colour of a DALI system is unalterably predefined in the case of a device reset.

The configuration options and permanently defined functions are described below.

Setting the behaviour of the brightness in case of bus voltage failure

The parameter "In case of bus/mains voltage failure" is separately available for each DALI system in the parameter node "DALI systems -> DALI system..." .

- Set the parameter to "no reaction".

  In the event of a bus or mains voltage failure, the DALI actuator does not send any commands to the DALI operating devices. The assigned DALI operating devices, provided their mains voltage supply is still switched on, show no response and remain in the brightness state that was last set.

- Set the parameter to "Switch off".

  The DALI operating devices are switched off via the DALI cable in the case of a bus voltage failure if the mains voltage supply of the DALI actuator is still switched on. If the mains voltage fails at the DALI actuator, this command can no longer be issued. Here, too, the DALI operating devices set themselves to the programmed system failure level that corresponds to this parameter, provided their mains voltage supply is still switched on.

- Set the parameter to "Brightness value". Configure the required value in the following parameter "Brightness value".

  In the event of a bus voltage failure at the DALI actuator, the DALI operating devices are set via the DALI line to the value specified by the "Brightness value" parameter, provided the mains voltage supply of the DALI actuator is still switched on. If the mains voltage fails at the DALI actuator, this command can no longer be issued. In this case, the DALI operating devices set themselves to the programmed system failure level corresponding to this parameter, provided their mains voltage supply is still switched on.

  The selection of the configurable brightness value is not limited at the limits by the specified minimum and maximum brightness. If brightness values lower than the minimum brightness or higher than the maximum brightness are set, the DALI actuator sets the brightness to the configured minimum and maximum limit values.

i If there is a voltage failure on the DALI cable (e.g. due to short-circuit, cable break, mains voltage failure on DALI actuator), then the assigned DALI operating devices will also show the configured behaviour when the bus voltage fails. This is guaranteed because the parameter setting in the DALI operating devices is applied as the "System Failure Level" for the brightness after an ETS programming operation.

i In the event of a bus failure or mains voltage failure, the current states of the forced positions are also saved so that they can be tracked in the event of bus or mains voltage return if necessary (depending on the configuration of the forced positions).

i Active disabling functions or forced position functions are always cancelled by a bus voltage failure and are subsequently inactive in the connection.

Setting the behaviour of the brightness after bus voltage return

The "After bus/mains voltage return" parameter is separately available for each DALI system in the parameter node "DALI systems -> DALI system..." .

- Set the parameter to "no reaction".

  After bus or mains voltage return, the DALI actuator does not transmit any commands to the DALI operating devices. The assigned DALI operating devices show no response and remain in the brightness state that was last set (also see the note on "Power-On Level" further below).

i In this state, no colour temperature control or colour control is possible after bus or mains voltage return even if the devices are still switched on due to the last brightness state. In this case, the DALI system concerned must either be switched off and switched on again after bus or mains voltage return or must be preset to a brightness value unequal "0%" by a new telegram. Only in this way does the DALI actuator evaluate the state "ON" for the operating devices and permits a control of the colour temperature or colour by new commands.

- Set the parameter to "Switch off".

  The DALI operating devices are switched off on bus/mains voltage return via the DALI cable.

- Set the parameter to "brightness before bus/mains voltage failure".

  After bus or mains voltage return, the brightness value set most recently before the bus or mains voltage failure and saved internally on bus/mains voltage failure will be tracked.

- Set the parameter to "Brightness value". Configure the required value in the following parameter "Brightness value".

  The DALI operating devices are set to the predefined brightness value via the DALI cable. The selection of the configurable value is not limited at the limits by the specified minimum and maximum brightness. If brightness values lower than the minimum brightness or higher than the maximum brightness are set, the DALI actuator sets the brightness to the configured minimum and maximum limit values.

- Preset parameter to "Activate staircase function".

  The staircase function is activated – irrespective of the object " 'Staircase function - Start/Stop" - after bus or mains voltage return.

- After mains voltage return, the DALI actuator initialises the connected operating devices briefly.
- The "Activate staircase function" setting is only available when the staircase function is enabled for the affected DALI system.
- Setting "Brightness before bus/mains voltage failure": An ETS programming operation of the application or the parameter resets the internally stored brightness state to "OFF".
- In the "No reaction" setting: The communication objects of the DALI actuator are initialised with "0" after bus/mains voltage return. In this case, the switching status or brightness value feedback only corresponds to the 'true' brightness state when the DALI system have been controlled at least once via the KNX or by manual operation.
- If mains voltage only on the connected DALI operating devices (e.g. supply from an external mains conductor) is switched on or the DALI actuator is also switched on again and the response is configured to "no reaction", the operating devices set themselves to the brightness specified in their "Power-On level". After an ETS programming operation, this value is programmed into the operating devices by the DALI actuator and corresponds to the setting of the parameter "After bus /mains voltage return". In the settings "Brightness before bus/mains voltage failure" and "Activate staircase function", the command "no reaction" is programmed as a power-on level into the operating devices. In the case of all other settings, the configured commands are applied directly in the operating devices. If the mains voltage of the DALI actuator is switched on, the device executes the parameter "After bus/mains voltage return" only after initialisation. It may occur that the DALI operating devices react more quickly after bus voltage return and set themselves to the power-on level before the DALI actuator can transmit individual commands on the DALI line. This may result in short brightness jumps. If KNX telegrams for DALI systems are received during the initialisation of the DALI actuator, the device will perform the most recently specified command and not the configured behaviour after the bus voltage returns.
- When using standby switch-off and the delay until start-up of the DALI devices, ensure that the parameter "After bus/main voltage return" is configured as "Switch off". This means that the affected devices do not switch on directly when the mains voltage returns but only after they have received an appropriate DALI command from the DALI actuator via the DALI cable.
- In the case of forced position as supplementary function: The communication object of the forced position can be initialised separately after bus voltage return. This has an effect on the reaction of the DALI system in case of bus voltage return when the forced position is activated. The configured behaviour "after bus/mains voltage return" will only be executed if no forced position on bus voltage return is activated.
- With disabling function as supplementary function: Active disabling functions are always inactive after bus or mains voltage return.

Manual control is possible only while the DALI actuator is supplied with power from the mains. Manual operation ends in case of bus voltage failure, bus voltage return or mains voltage failure.

Presetting the behaviour of the brightness after an ETS programming operation

The parameter "After ETS programming operation" is available separately for each DALI system in the parameter node "DALI systems -> DALI System..." .

- Set the parameter to "no reaction".

  After an ETS programming operation, the DALI actuator does not transmit any commands to the DALI operating devices. The assigned DALI operating devices show no response and remain in the brightness state that was last set.

In this state, no colour temperature control or colour control is possible after an ETS programming operation of the operating devices concerned even if the devices are still switched on due to the last brightness state. In this case, the DALI system concerned must either be switched off and switched on again after the ETS programming operation or must be preset to a brightness value unequal "0 %" by a new telegram. Only in this way does the DALI actuator evaluate the state "ON" for the operating devices and permits a control of the colour temperature or colour by new commands.

- Set the parameter to "Switch off".

  The DALI operating devices are switched off by the ETS after an ETS programming operation.

- Set the parameter to "Brightness value". Configure the required value in the following parameter "Brightness value".

  The DALI operating devices are set to the predefined brightness value via the DALI cable. The selection of the configurable value is not limited at the limits by the specified minimum and maximum brightness. If brightness values lower than the minimum brightness or higher than the maximum brightness are set, the DALI actuator sets the brightness to the configured minimum and maximum limit values.

- Set the parameter to "as for bus/mains voltage return".

  In this setting, the DALI actuator shows the same behaviour after an ETS programming operation as with a bus or mains voltage return. The behaviour is specified by the parameter "After bus/mains voltage return".

The configured behaviour will be executed after every application or parameter download by the ETS. A simple download of the physical address alone or partial programming of only the group addresses has the effect that this parameter is disregarded and that the configured "Behaviour after bus voltage return" will be executed instead.

An ETS programming operation can only be executed if the mains voltage supply of the DALI actuator is switched on.

- In the "no reaction" setting: The communication objects of the DALI actuator are initialised with "0" after a programming operation. In this case, the switching status or brightness value feedback only corresponds to the 'true' brightness state when the DALI system have been controlled at least once via the KNX or by manual operation. In this setting, feedback objects set as actively transmitting do not transmit a telegram.

- After an ETS programming operation, the disabling functions and the forced-positions are always deactivated.

- After an ETS programming operation, the DALI actuator initialises itself and configures the connected operating devices with relevant data via the DALI cable (e.g. minimum brightness, maximum brightness, power-on level, system failure level). For this reason, the entire DALI system should ideally be connected and completely ready for operation so that all operating devices apply configuration changes. After each DALI commissioning with changes (fully or partially), the application program must be reloaded into the DALI actuator using the ETS. When doing so, it must be ensured that at least the newly added operating devices are ready for operation after the ETS programming operation during the commissioning! If there is an error on the DALI cable (e.g. short-circuit, cable break) during the initialisation of the operating devices, then the DALI configuration cannot be executed. The error must then be eliminated and ETS programming restarted.

- If KNX telegrams for DALI systems are received during the initialisation of the DALI actuator, the device will perform the most recently specified command and not the configured behaviour after an ETS programming operation.

Behaviour of the colour temperature in case of bus voltage failure

The behaviour of the colour temperature in case of bus voltage failure, just like the behaviour after an ETS programming operation, is permanently preset to "no change". In the case of a bus voltage failure, the DALI actuator does not transmit any colour temperature commands to the DALI operating devices. The assigned DALI operating devices remain at the colour temperature most recently set provided that the mains voltage supply of the operating devices is still guaranteed. After bus voltage failure, it is no longer possible to control the colour temperature.

Behaviour of the colour temperature after bus voltage return

The behaviour of the colour temperature after bus or mains voltage return is preset permanently to "Colour temperature before bus voltage failure". After the bus or mains voltage returns, the colour temperature set most recently before the bus/mains voltage failure by relative or absolute dimming and stored internally in the event of a bus/mains voltage failure is tracked.

- The DALI actuator transmits the tracked colour temperature to the operating devices only in the state "ON". Consequently, after bus or mains voltage return a tracked or new colour temperature is only then preset in the operating devices via the colour temperature predefined via the KNX after the DALI system was switched on to a brightness value unequal "0 %".

An ETS programming operation of the application or the parameter resets the internally stored colour temperature (0 K). This means that the operating devices concerned normally set themselves to minimum or maximum colour temperature as soon as the DALI system is switched on after bus or mains voltage return (e.g. by the configured behaviour of the brightness after bus voltage return). In this case, the behaviour of the operating devices with regard to the colour temperature is defined immediately by the operating devices and cannot be influenced by the DALI actuator. The colour temperature is only then valid after an ETS programming operation as soon as a colour temperature value is newly specified as a result of relative or absolute dimming. The colour temperature only becomes invalid after an ETS programming operation by recalling a scene with a defined colour temperature value.

The communication objects of the DALI actuator are initialised with "0" after bus/mains voltage return. After bus voltage return, actively transmitting feedback objects transmit a telegram corresponding to the most recently effective colour temperature in the DALI actuator, but only if the DALI system is also switched on after mains voltage return (brightness unequal "0%"). After a mains voltage return, only telegrams corresponding to the effective colour temperature in the DALI actuator are transmitted when the DALI system is actively on after mains voltage return (brightness unequal "0%").

Behaviour of the colour after ETS programming

The behaviour of the colour after an ETS programming operation is permanently set to "no change". After an ETS programming operation, the DALI actuator does not transmit any colours to the DALI operating devices. This means that the assigned DALI operating devices remain in the colour most recently specified.

The DALI actuator transmits new colours only in the state "ON" to the operating devices. Consequently, after an ETS programming operation, a new colour specified via the KNX is set in the operating devices only after the DALI system has been switched on to a brightness value not equal to "0%".

The communication objects of the DALI actuator are initialised with "0" after a programming operation. In this case, the feedback of the colour only then corresponds to a valid value when the colour of the DALI system was controlled at least once via the KNX and the transmission criterion of the feedback was met. Actively transmitting feedback objects of the colour automatically do not transmit any telegram immediately after an ETS programming operation.

The predefined behaviour is executed by the ETS after every application or parameter download. The simple download of the physical address alone or partial programming of only the group addresses has the effect that the setting "no change" is disregarded and that the specified "Behaviour of the colour after bus voltage return" will be executed instead.

DALI operating devices normally only store the most recently specified colour in the volatile memory. This means that the most recently transmitted colour information will be lost due to a failure of the mains voltage on the operating

devices. After mains voltage return, operating devices normally set themselves to an internally initialized colour provided that the brightness of the DALI system was predefined greater than "0%" (power-on level). The behaviour on the operating devices with regard to the colour after mains voltage return is defined immediately by the operating devices and cannot be influenced or signalled back by the DALI actuator. The DALI actuator can influence the colour temperature only after mains voltage return if the mains voltage was also switched off and switched on again at the DALI actuator (see "Behaviour of the colour after bus voltage return").

Behaviour of the colour in the event of a bus voltage failure

The behaviour of the colour in case of bus voltage failure, just like the behaviour after an ETS programming operation, is permanently preset to "no change". In the case of a bus voltage failure, the DALI actuator does not transmit any commands to the DALI operating devices. The assigned DALI operating devices remain at the colour value most recently set provided that the mains voltage supply of the operating devices is still guaranteed. After bus voltage failure, it is no longer possible to control the colour.

DALI operating devices that support the device type "Colour Control" (DT8 - RGBW) are able to store a specific value during the commissioning, which defines the effective colour for the failure of the DALI operating voltage for selectively influencing the colour control. The DALI actuator always initialises this DALI parameter in the operating devices during the configuration of the "System Failure Level" for the brightness with the command "no change" (value "255" / "MASK"), so that a failure of the DALI operating voltage (e.g. due to a failure of the mains voltage supply on the DALI actuator) does not cause a change in the colour value most recently specified.

Behaviour of colour after bus voltage return

The behaviour of the colour after bus or mains voltage return is preset permanently to "Colour before bus voltage failure". After the bus or mains voltage returns, the colour set most recently before the bus/mains voltage failure by relative or absolute dimming and stored internally in the event of a bus/mains voltage failure is tracked.

The DALI actuator transmits the tracked colour to the operating devices only in the state "ON". Consequently, after bus or mains voltage return a tracked or new colour temperature is only then preset in the operating devices via the colour predefined via the KNX after the DALI system was switched on to a brightness value unequal "0%".

An ETS programming operation of the application or the parameter resets the internally stored colour (#000000). In this case, the behaviour of the operating devices after the mains voltage returns with regard to the colour temperature is defined immediately by the operating devices and cannot be influenced by the DALI actuator. The colour is only then valid after an ETS programming operation as soon as a colour value is newly specified as a result of relative or absolute dimming. The colour does not become valid after an ETS programming operation only by recalling a scene with a defined colour value.

The communication objects of the DALI actuator are initialised with "0" after bus/mains voltage return. After bus voltage return, actively transmitting feedback objects transmit a telegram corresponding to the most recently effective colour in the DALI actuator, but only if the DALI system is also switched on after mains voltage return (brightness unequal "0%"). After a mains voltage return, only telegrams corresponding to the effective colour in the DALI actuator are transmitted when the DALI system is actively on after mains voltage return (brightness unequal "0%").

Behaviour of the colour temperature after an ETS programming operation

The behaviour of the colour temperature after an ETS programming operation is permanently set to "no change". After an ETS programming operation, the DALI actuator does not transmit any colour temperatures to the DALI operating devices. This means that the assigned DALI operating devices remain in the colour temperature most recently specified.

The DALI actuator transmits new colour temperatures only in the state "ON" to the operating devices. Consequently, after an ETS programming operation, a new colour temperature specified via the KNX is set in the operating devices only after the DALI system has been switched on to a brightness value not equal to "0%".

The communication objects of the DALI actuator are initialised with "0" after a programming operation. In this case, the feedback of the colour temperature only then corresponds to a valid value when the colour temperature of the DALI system was controlled at least once via the KNX and the transmission criterion of the feedback was met. Actively transmitting feedback objects of the colour temperature automatically do not transmit any telegram immediately after an ETS programming operation.

The predefined behaviour is executed by the ETS after every application or parameter download. The simple download of the physical address alone or partial programming of only the group addresses has the effect that the setting "no change" is disregarded and that the specified "Behaviour of the colour temperature after bus voltage return" will be executed instead.

DALI operating devices normally only store the most recently specified colour temperature in the volatile memory. This means that the most recently transmitted colour temperature information will be lost due to a failure of the mains voltage on the operating devices. After mains voltage return, operating devices normally set themselves to minimum or maximum colour temperature provided that the brightness of the DALI system was predefined greater than "0%" (power-on level). The behaviour on the operating devices with regard to the colour temperature after mains voltage return is defined immediately by the operating devices and cannot be influenced or signalled back by the DALI actuator. The DALI actuator can only influence the colour temperature after mains voltage return if the mains voltage was also switched off and switched on again on the DALI actuator (see "Behaviour of the colour temperature after bus voltage return").

9.4.1 Parameters for device reset

DALI systems -> DALI System...

After ETS programming operation	Brightness value Switch off **No reaction** as for bus/mains voltage return
The configured behaviour will be executed after every application or parameter download by the ETS. A simple download of the physical address alone or partial programming of only the group addresses has the effect that this parameter is disregarded and that the configured "Behaviour after bus voltage return" will be executed instead. Brightness value: The DALI operating devices are set to the value specified by the "Brightness value" parameter via the DALI line after an ETS programming operation. Switch off: The DALI operating devices are switched off by the ETS after an ETS programming operation. no reaction: After an ETS programming operation, the DALI actuator does not transmit any commands to the DALI operating devices. The DALI operating devices do not respond and remain in the brightness state that was last set. In this state, no colour temperature control or colour control is possible after an ETS programming operation of the operating devices even if the devices are still switched on due to the last brightness state. In this case, the DALI system concerned must either be switched off and switched on again after the ETS programming operation or must be preset to a brightness value unequal "0 %" by a new telegram. Only in this way does the DALI actuator evaluate the state "ON" for the operating devices and permits a control of the colour temperature or colour by new commands. as with bus/mains voltage return: In this setting, the DALI actuator shows the same behaviour after an ETS programming operation as with a bus or mains voltage return. The behaviour is specified by the parameter "After bus/mains voltage return".	

Brightness value	1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 15%, 20%...50%...**100%**
At this point, the brightness value to be set after an ETS programming operation is specified. The selection of the configurable value is not limited at the limits by the specified minimum and maximum brightness. If brightness values lower than the minimum brightness or higher than the maximum brightness are set, the DALI actuator sets the brightness to the configured minimum and maximum limit values. This parameter is available only with "After ETS programming operation = brightness value".	

At bus/mains voltage failure	Brightness value Switch off **No reaction**

The behaviour parameterised at this point is executed in the event of a bus or mains voltage failure (mains voltage of the DALI actuator). If there is a voltage failure on the DALI cable (e.g. due to short-circuit, cable break, mains voltage failure on DALI actuator), then the assigned DALI operating devices will also show the configured behaviour when the bus voltage fails.

Brightness value: The DALI operating devices are set to the value specified by the "Brightness value" parameter via the DALI line in the event of a bus voltage failure at the DALI actuator, provided the mains voltage supply of the DALI actuator is still switched on. If the mains voltage fails at the DALI actuator, this command can no longer be issued. In this case, the DALI operating devices set themselves to the "system failure level", provided their mains voltage supply is still switched on.

Switch off: The DALI operating devices are switched off via the DALI cable in the case of a bus voltage failure if the mains voltage supply of the DALI actuator is still switched on. If the mains voltage fails at the DALI actuator, this command can no longer be issued. Here, too, the DALI operating devices set themselves to the "system failure level", provided their mains voltage supply is still switched on.

no reaction: The DALI actuator does not send any commands to the DALI operating devices in the event of a bus or mains voltage failure. The assigned DALI operating devices, provided their mains voltage supply is still switched on, show no response and remain in the brightness state that was last set.

Brightness value	1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 15%, 20%...50%...**100%**

At this point, the brightness value to be set in the event of a bus or mains voltage failure is specified.

The selection of the configurable value is not limited at the limits by the specified minimum and maximum brightness. If brightness values lower than the minimum brightness or higher than the maximum brightness are set, the DALI actuator sets the brightness to the configured minimum and maximum limit values.

This parameter is available only with "at bus/mains voltage failure = brightness value".

After bus/mains voltage return	Brightness value Switch off **Brightness before bus/mains voltage failure** No reaction Activating staircase function

The behaviour configured at this point is executed after the bus or mains voltage returns (mains voltage of the DALI actuator). If mains voltage only on the connected DALI operating devices (e.g. supply from an external mains conductor) is switched on or the DALI actuator is also switched on again and the response is configured to "no reaction", the operating devices set themselves to the brightness specified in their "Power-On level". If the mains voltage of the DALI actuator is switched on, the device executes the parameter only after initialisation. It may occur that the DALI operating devices react more quickly after bus voltage return and set themselves to the power-on level before the DALI actuator can transmit individual commands on the DALI line. This may result in short brightness jumps. If KNX telegrams for DALI systems are received during the initialisation of the DALI actuator, the device will perform the most recently specified command and not the configured behaviour after the bus voltage returns.

When using standby switch-off and the delay until start-up of the DALI devices, ensure that this parameter is configured to "Switch off". This means that the affected devices do not switch on directly when the mains voltage returns but only after they have received an appropriate DALI command from the DALI actuator via the DALI cable.

Brightness value: The DALI operating devices are set to the value specified by the "Brightness value" parameter over the DALI line after the bus or mains voltage returns at the DALI actuator.

Switch off: The DALI operating devices are switched off when the bus/mains voltage returns via the DALI line.

Brightness before bus/mains voltage failure: After the bus or mains voltage returns, the brightness value set most recently before the bus or mains voltage failure and saved internally on bus/mains voltage failure is tracked. An ETS programming operation of the application or the parameter resets the internally stored brightness state to "OFF".

After bus/mains voltage return	Brightness value Switch off **Brightness before bus/mains voltage failure** No reaction Activating staircase function
No reaction: After the bus or mains voltage returns, the DALI actuator does not transmit any commands to the DALI operating devices. The assigned operating devices do not respond and remain in the brightness state that was last set. In this state, no colour temperature control or colour control is possible after bus or mains voltage return even if the devices are still switched on due to the last brightness state. In this case, the DALI system concerned must either be switched off and switched on again after bus or mains voltage return or must be preset to a brightness value unequal "0%" by a new telegram. Only in this way does the DALI actuator evaluate the state "ON" for the operating devices and permits a control of the colour temperature or colour by new commands. Activate staircase function: The staircase function is activated - independently of the object "Staircase function - Start/Stop" - after the bus or mains voltage returns. This setting is only available when the staircase function is enabled for the affected DALI system.	

Brightness value	1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 15%, 20%...50%...**100%**
At this point, the brightness value to be set after the bus or mains voltage returns is specified. The selection of the configurable value is not limited at the limits by the specified minimum and maximum brightness. If brightness values lower than the minimum brightness or higher than the maximum brightness are set, the DALI actuator sets the brightness to the configured minimum and maximum limit values. This parameter is available only with "After bus/mains voltage return = brightness value".	

DALI systems -> DALI System...

Behaviour of the colour temperature after an ETS programming operation	**No change**
The behaviour of the colour temperature after an ETS programming operation is permanently set to "no change". After an ETS programming operation, the DALI actuator does not transmit any colour temperatures to the DALI operating devices. This means that the assigned DALI operating devices remain in the colour temperature most recently specified.	

Behaviour of the colour temperature in case of bus voltage failure	**No change**
The behaviour of the colour temperature in case of bus voltage failure, just like the behaviour after an ETS programming operation, is permanently preset to "no change". In the case of a bus voltage failure, the DALI actuator does not transmit any commands to the DALI operating devices. The assigned DALI operating devices remain at the colour temperature most recently set provided that the mains voltage supply of the operating devices is still guaranteed. After bus voltage failure, it is no longer possible to control the colour temperature.	

Behaviour of the colour temperature when the bus voltage returns	**Colour temperature before bus mains voltage failure**
The behaviour of the colour temperature after the bus or mains voltage returns is set permanently to "Colour temperature before bus/mains voltage failure". After the bus or mains voltage returns, the colour temperature set most recently before the bus/ mains voltage failure by relative or absolute dimming and stored internally in the event of a bus/mains voltage failure is tracked.	

DALI systems -> DALI System...

Behaviour of the colour after ETS programming	**No change**
The behaviour of the colour after an ETS programming operation is permanently set to "no change". After an ETS programming operation, the DALI actuator does not transmit any colours to the DALI operating devices. This means that the assigned DALI operating devices remain in the colour most recently specified.	

Behaviour of the colour in the event of a bus voltage failure	**No change**
The behaviour of the colour in case of bus voltage failure, just like the behaviour after an ETS programming operation, is permanently preset to "no change". In the case of a bus voltage failure, the DALI actuator does not transmit any commands to the DALI operating devices. The assigned DALI operating devices remain in the colour most recently set, provided that the mains voltage supply of the operating devices is still guaranteed. After bus voltage failure, it is no longer possible to control the colour.	

Behaviour of the colour when the bus voltage returns	**Colour before bus/mains voltage failure**
The behaviour of the colour after the bus or mains voltage returns is set permanently to "Colour before bus/mains voltage failure". After the bus or mains voltage returns, the colour set most recently before the bus/mains voltage failure by relative or absolute dimming and stored internally in the event of a bus/mains voltage failure is tracked.	

9.5 Disabling function / Forced position

A disabling function, or alternatively, a forced position can be configured for each DALI system. Only one of these functions can be enabled for a DALI system.

The disabling function / forced position are enabled on the parameter pages "DALI systems -> DALI system... -> Enabled functions". When activated, further parameter pages become visible on which the functions can be configured.

9.5.1 Disabling function

During an active disabling function, the KNX control of the DALI system is overridden and locked. Continuous light switching, for example, can also be overridden. The disabling function can be optionally revoked with an additional 1-bit acknowledgement object. This prevents the deactivation of the disabling function by the disabling object.

- On the parameter page "DALI systems -> DALI System... - Enabled functions", set the parameter "Disabling function/Forced position" to "Disabling function".

  The disabling function is enabled. The communication objects "Disable - Activate / Deactivate", "Disable - Status" and the parameters of the disable function become visible.

The parameters for configuring the disabling function are available on the parameter page "DALI systems -> DALI System... -> Disabling function".

Status message of the disabling function

- Activate the parameter "Status object".

  The status object is available. The object sends a telegram with the value "1" if the disabling function is active. The object sends a telegram with the value "0" if the disabling function is inactive.

The behaviour at the beginning of the disabling function can be specified separately for the brightness control and optionally - if the DALI system has this range of functions - also for the colour temperature control and colour control.

- Configure the "Object polarity" parameter to the desired polarity for activating and deactivating the disabling function.
- Set the parameter "At beginning... brightness" to the required behaviour.

  At the beginning of the disabling function, the configured behaviour will be executed and the bus control of the DALI system locked.

  Switch off: The DALI system switches off at the beginning of the disabling function.

  Preset: The brightness specified by the "Brightness value" parameter is set at the beginning of the disabling function.

  Memory value (brightness before last switch-off): The brightness value is set that was active before the last switch-off and stored internally in the device. This memory value is stored in a non-volatile manner in the DALI actuator so

that the value is retained after the bus or mains voltage returns. After an ETS programming operation, the memory value is predefined to "100%". This value is optionally limited by the maximum brightness.

No reaction: The operating devices of the disabled DALI system do not react. The devices remain in the most recently set brightness state.

Flashing: The affected devices are switched on and off cyclically during disabling. The "Time for flashing of the disabling functions" is generally configured on the parameter page "DALI Systems -> Times". During flashing, the logical switching state is fed back as "Switched on" and the brightness value as "Switch-on brightness". A soft ON/OFF function is not executed during flashing.

- Set the parameter "At beginning... colour temperature" to the required behaviour.

  At the beginning of the disabling function, the configured behaviour will be executed and the bus control of the DALI system locked.

  Preset: The colour temperature specified by the "Colour temperature" parameter is set at the beginning of the disabling function.

  Memory value (colour temperature before last switch-off): The colour temperature value is set that was active before the last switch-off and stored internally in the device. This memory value is stored in a non-volatile manner in the DALI actuator so that the value is retained after the bus or mains voltage returns. After ETS programming, the memory value is predefined to "minimum colour temperature".

  No reaction: The operating devices of the disabled DALI system do not react. The devices remain in the colour temperature state last set.

- Set the parameter "At start... colour" to the required behaviour.

  At the beginning of the disabling function, the configured behaviour will be executed and the bus control of the DALI system locked.

  Preset: The colour specified by the parameter "Colour (RGB)" and optionally "White value (W)" is set at the beginning of the disabling function.

  Memory value (colour before last switch-off): The colour is set that was active before the last switch-off and stored internally in the device. This memory value is stored in a non-volatile manner in the DALI actuator so that the value is retained after the bus or mains voltage returns. After an ETS programming operation, the memory colour value is predefined at "#FFFFFF" and the optional white value at "#FF".

  No reaction: The operating devices of the disabled DALI system do not react. The devices remain in the colour state last set.

The behaviour at the end of the disabling function can also be specified separately for the brightness control and optionally also for the colour temperature control and colour control. The behaviour is influenced by the acknowledgement object.

For disabling function without acknowledgement object...

- Deactivate the parameter "Confirmation".

  No additional acknowledgement object is available. The disabling function is deactivated by the disabling object according to the set polarity.

For disabling function with acknowledgement object...

- Activate the parameter "Acknowledgement".

  The acknowledgement object is available. The disabling function can only be deactivated using the acknowledgement object by an "ON telegram". Telegrams to the disabling object according to the "Deactivate disabling" polarity are ignored by the DALI actuator.

i OFF telegrams to the acknowledgement object do not product a reaction.

- Set the parameter "At the end... brightness" to the required behaviour.

  At the end of the disabling function, the configured behaviour will be executed and the bus control of the DALI system enabled again.

  Switch off: The DALI system switches off at the end of the disabling function.

  Track: The set state received during the disabling function or adjusted before the disabling function can be tracked at the end of the disabling with the appropriate brightness value.

  Preset: The brightness specified by the "Brightness value" parameter is set at the end of the disabling function.

  Memory value (brightness before last switch-off). The brightness value is set that was active before the last switch-off and stored internally in the device. This memory value is stored in a non-volatile manner in the DALI actuator so that the value is retained after the bus or mains voltage returns. After an ETS programming operation, the memory value is predefined to "100%". This value is optionally limited by the maximum brightness.

  No reaction: The operating devices of the disabled DALI system do not react. The devices remain in the state most recently set by the disabling function.

  Flashing: The affected devices are switched on and off cyclically after disabling. The flashing time is generally configured on the parameter page "DALI System... -> General". During flashing, the logical switching state is fed back as "Switched on" and the brightness value as "Switch-on brightness". A soft ON/OFF function is not executed during flashing. The flashing status remains active until another bus command is received or manual operation specifies another brightness value.

- Set the parameter "At the end... colour temperature" to the required behaviour.

  At the beginning of the disabling function, the configured behaviour will be executed and the bus control of the DALI system locked.

Track: The set state received during the disabling function or adjusted before the disabling function can be tracked at the end of the disabling with the appropriate colour temperature value.

Preset: The colour temperature specified by the "Colour temperature" parameter is set at the beginning of the disabling function.

Memory value (colour temperature before last switch-off): The colour temperature value is set that was active before the last switch-off and stored internally in the device. This memory value is stored in a non-volatile manner in the DALI actuator so that the value is retained after the bus or mains voltage returns. After ETS programming, the memory value is predefined to "minimum colour temperature".

No reaction: The operating devices of the disabled DALI system do not react. The devices remain in the colour temperature state last set.

- Set the parameter "At the end... colour" to the required behaviour.

  At the beginning of the disabling function, the configured behaviour will be executed and the bus control of the DALI system locked.

  Track: The set state received during the disabling function or adjusted before the disabling function can be tracked at the end of the disabling with the appropriate colour value.

  Preset: The colour specified by the parameter "Colour (RGB)" and optionally "White value (W)" is set at the beginning of the disabling function.

  Memory value (colour before last switch-off): The colour is set that was active before the last switch-off and stored internally in the device. This memory value is stored in a non-volatile manner in the DALI actuator so that the value is retained after the bus or mains voltage returns. After an ETS programming operation, the memory colour value is predefined at "#FFFFFF" and the optional white value at "#FF".

  No reaction: The operating devices of the disabled DALI system do not react. The devices remain in the colour state last set.

i In the "track" setting: During disabling, the overridden functions of the DALI actuator (switching, dimming, value specifications) continue to be processed internally in the device. Consequently, newly received KNX telegrams are evaluated and time functions are triggered as well. At the end of the disabling, the tracked states are set. A scene recall (low priority) is not tracked.

i After a bus failure or mains voltage failure or programming the application or the parameters with the ETS, the disabling function is always deactivated (object value "0"). With the inverted setting ("1 = enabled / 0 = disabled"), a telegram update "0" must first be carried out after the initialisation until the disabling is activated.

When tracking disabling functions at the end of a manual operation: If a disabling function was activated via the KNX before or during temporary or permanent manual operation, the DALI actuator always executes this higher-priority function for the affected DALI system at the end of the manual operation (disabling of bus operation). Only in the setting "At end of permanent manual operation = Track outputs" does the DALI actuator perform the behaviour at the beginning of the disabling function again. Bus operation by switching, dimming, value, scene, central is then disabled.

Updates of the disabling object from "activated" to "deactivated do not produce a reaction. Exception: If the behaviour is set to "no change" at the end of a manual operation, the DALI actuator subsequently performs active disabling functions (locking of bus operation). If a "Disabling function activated" telegram is received again in this state, the DALI actuator carries out the behaviour at the beginning of the disabling function again.

9.5.2 Forced position

The forced position function can also be combined with other functions of a DALI system. With an active forced position the upstream functions are overridden so that the DALI system concerned is locked. The forced position function possesses a separate 2-bit communication object. The first bit (bit 0) of the object "Forced position - Activate/Deactivate" indicates whether switch-off or switch-on is forced. If the dimming channel is switched on by force, an ETS parameter defines which brightness value it should be switched on to. The second bit (bit 1) of the object activates or deactivates the restraint. The behaviour at the end of the forced position function can be configured. In addition, the forced object can be initialised after bus or mains voltage return.

Bit 1	Bit 0	Function
0	X	Forced position not active -> normal control
0	X	Forced position not active -> normal control
1	0	Forced position active: switch off
1	1	Forced position active: switch on to predefined brightness value

Figure 33: Bit coding of forced position

- On the parameter page "DALI systems -> DALI System... -> Enabled functions", set the parameter "Disabling function/Forced position" to "Forced position".

  The forced position is enabled. The communication object "Forced position - Activate/Deactivate" and the parameter of the forced position function become visible.

The parameters for configuring the forced position are available on the parameter page "DALI systems -> DALI system... -> Forced position".

A forced position influences only the brightness control of a DALI system. The colour temperature or colour - provided that the DALI systems have this range of functions - always remains unchanged in a forced position.

With colour-controllable DALI operating devices, the colour is set to the maximum colour value (RGB: #FFFFFF) and, if necessary, additionally to the maximum white value (#FF) in the event of a forced position, but only if the current colour corresponds to the state "#000000" (black) and the optional white value corresponds to "#00". This ensures that manual brightness control via the forced position is recognisable to the user.

- Configure the parameter "forced position 'active, switch-on'" to the required behaviour that should be executed if a forced control is activated via the communication object.

  Preset: The DALI operating devices set themselves to the brightness configured in the "Brightness value" parameter in the event of a restraint.

  No reaction: The bus operation is locked but the operating devices show no response and remain in the most recently set brightness state.

  Memory value (brightness before last switch-off): The brightness value is set that was active before the last switch-off and stored internally in the device. This memory value is stored in a non-volatile manner in the DALI actuator so that the value is retained after the bus or mains voltage returns. After an ETS programming operation, the memory value is predefined to "100%". This value is optionally limited by the maximum brightness.

- Set the parameter "forced position end 'inactive'" to the required behaviour.

  At the end of the forced position, the configured behaviour will be executed. Bus operation is enabled again.

  Track: The state received during the forced position function or the brightness value adjusted before the function can be tracked at the end of the forced position. Any time functions still in progress will also be taken into account if necessary. A scene recall (low priority) is not tracked.

  No reaction: The operating devices show no response and remain in the brightness state last selected by the forced position.

When tracking forced positions at the end of a manual operation: If a forced position was activated via the KNX before or during a temporary or permanent manual operation, the DALI actuator always executes this higher-priority function for the affected DALI systems at the end of the manual operation (locking of bus operation). Only in the setting "At end of permanent manual operation = Track outputs" does the DALI actuator carry out the behaviour at the beginning of the forced position again. Bus operation by switching, dimming, value, scene, central is then disabled.

Updates of the forced position object (e. g. "forced position active" to "forced position active" while maintaining the switching status or from "forced position inactive" to "forced position inactive") show no reaction. Exception: If the behaviour is set to "no change" at the end of a manual operation, the DALI actuator tracks active forced positions (locking of bus operation). If a "Forced position active" telegram is received again in this state, the DALI actuator executes the behaviour at the beginning of the forced position again.

The current state of the object of the forced position function will be stored in case of bus or mains voltage failure.

- Set the parameter "After bus/mains voltage return" to the required behaviour.

  After bus or mains voltage return, the configured state is transferred to the "Forced position - Activate/Deactivate" communication object. When a forced position is activated, the DALI system is immediately activated and interlocked accordingly by forced control after bus/mains voltage return until a forced control takes place via the KNX. In this case, the parameter "After bus voltage return" is not evaluated.

  State before bus/mains voltage failure: The last existing and internally stored state of the forced position before bus or mains voltage failure will be tracked. An ETS programming operation deletes the stored state (reaction in that case same as with "no forced position active"). If the tracked state corresponds to "No forced position active", the force-independent parameter "After bus voltage return" will be executed on return of bus voltage. If forced position is activated, the DALI operating devices are switched on to the brightness value predefined by the parameter "Forced position 'active, switch-on'".

After programming the application or parameters with the ETS, the forced position function is always deactivated (object value "0").

9.5.3 Position parameter for disabling function / forced position

DALI systems -> DALI System... -> Enabled functions

Disabling function / Forced position	**no selection** Disabling function Forced position
A disabling function or forced position can be enabled for each DALI system. Only one of these functions can be enabled for each DALI system. Disabling function: During an active disabling function, the KNX operation of the DALI system is overridden and locked. Continuous light switching, for example, can also be overridden. The disabling function can be optionally revoked with an additional 1-bit acknowledgement object. This prevents the deactivation of the disabling function by the disabling object. The disabling function is enabled. The communication object "Disabling function - Activate/ Deactivate" and the parameters of the disabling function become visible. Forced position: The forced position function can also be combined with other functions of a DALI system. With an active forced position the upstream functions are overridden so that the DALI system concerned is locked. The forced position function possesses a separate 2-bit communication object. The forced position is enabled. The communication object "Forced position - Activate/Deactivate" and the parameter of the forced position function become visible.	

For disabling function:

DALI systems -> Times

Time for flashing the disabling functions	**1 s** 2 s 5 s 10 s
At the beginning and end of a disabling function, assigned DALI systems can flash (cyclical switching on and off). The flashing time is configured globally for all disabling functions of the DALI systems at this point.	

DALI systems -> DALI System... -> Disabling function

Status object	Checkbox (yes/**no**)
The parameter determines whether the communication object "Disabling - Status" is visible. Parameter activated: The status object is available. The object sends a telegram with the value "1" if the disabling function is active. The object sends a telegram with the value "0" if the disabling function is inactive. Parameter deactivated: No additional status object is available.	

Status object	Checkbox (yes/**no**)
When activated, the "Disabling - Status" object appears, which can be used to visualise an active disabling function. Checkbox activated: The status object is available, which can use to display an active disabling function of a DALI system. Checkbox deactivated: No additional status object is available.	

Acknowledgement	Checkbox (yes/**no**)
The acknowledgment prevents the deactivation of the disabling function by the disabling object. The behaviour at the end of the disabling function is influenced by the acknowledgement object. Checkbox activated: The acknowledgement object is available. The disabling function can only be deactivated using the acknowledgement object by an "ON telegram". Telegrams to the disabling object according to the "Deactivate disabling" polarity are ignored by the DALI actuator. Checkbox deactivated: No additional acknowledgement object is available. The disabling function is deactivated by the disabling object according to the set polarity.	

Object polarity	**0 = unlock / 1 = lock** 1 = unlock / 0 = lock
This parameter configures the desired polarity for activating and deactivating the disabling function. After a bus failure or mains voltage failure or programming the application or the parameters with the ETS, the disabling function is always deactivated (object value "0"). With the inverted setting ("1 = enabled / 0 = disabled"), a telegram update "0" must first be carried out after the initialisation until the disabling is activated.	

At start...	**Switch off**
Brightness	preset
	Memory value (brightness before last switch-off)
	No reaction
	Flashing

The behaviour at the beginning of the disabling function can be specified separately for the brightness control and optionally - if the DALI system has this range of functions - also for the colour temperature control and colour control. This parameter defines the behaviour of the brightness at the beginning of the disabling function.

Switch off: The DALI system switches off at the beginning of the disabling function.

Preset: The brightness specified by the "Brightness value" parameter is set at the beginning of the disabling function.

Memory value (brightness as before last switch-off): The brightness value is set that was active before the last switch-off and stored internally in the device. This memory value is stored in a non-volatile manner in the DALI actuator so that the value is retained after the bus or mains voltage returns. After an ETS programming operation, the memory value is predefined to "100%". This value is optionally limited by the maximum brightness.

No reaction: The operating devices of the disabled DALI system do not react. The devices remain in the most recently set brightness state.

Flashing: The affected devices are switched on and off cyclically during disabling. The "Time for flashing of the disabling functions" is generally configured on the parameter page "DALI Systems -> Times". During flashing, the logical switching state is fed back as "Switched on" and the brightness value as "Switch-on brightness". A soft ON/OFF function is not executed during flashing.

Brightness value	1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 15%, 20%...50%...**100%**

This parameter configures the brightness value to be retrieved at the beginning of the disabling function.

This parameter is available only if a brightness value is to be retrieved at the beginning of the disabling function.

At start...	preset
Colour temperature	Memory value (colour temp. bef. switching-off last time)
	No reaction

The behaviour at the beginning of the disabling function can be specified separately for the brightness control and optionally - if the DALI system has this range of functions - also for the colour temperature control and colour control. This parameter defines the behaviour of the colour temperature at the beginning of the disabling function.

Preset: The colour temperature specified by the "Colour temperature" parameter is set at the beginning of the disabling function.

Memory value (colour temperature as before last switch-off): The colour temperature value is set that was active before the last switch-off and stored internally in the device. This memory value is stored in a non-volatile manner in the DALI actuator so that the value is retained after the bus or mains voltage returns. After ETS programming, the memory value is predefined to "minimum colour temperature".

No reaction: The operating devices of the disabled DALI system do not react. The devices remain in the colour temperature state last set.

This parameter is available only if the DALI system support this range of functions.

Colour temperature value	1.000...**2.700**...10.000

This parameter configures the colour temperature value to be recalled at the beginning of the disabling function.

This parameter is available only if a colour temperature value is to be recalled at the beginning of the disabling function.

At start...	preset
Colour	Memory value (colour like before switching off the last time)
	No reaction

The behaviour at the beginning of the disabling function can be specified separately for the brightness control and optionally - if the DALI system has this range of functions - also for the colour temperature control and colour control. This parameter defines the behaviour of the colour at the beginning of the disabling function.

Preset: The colour specified by the parameter "Colour (RGB)" and optionally "White value (W)" is set at the beginning of the disabling function.

Memory value (colour as before last switch-off): The colour is set that was active before the last switch-off and stored internally in the device. This memory value is stored in a non-volatile manner in the DALI actuator so that the value is retained after the bus or mains voltage returns. After an ETS programming operation, the memory colour value is predefined at "#FFFFFF" and the optional white value at "#FF".

No reaction: The operating devices of the disabled DALI system do not react. The devices remain in the colour state last set.

This parameter is available only if the DALI system support this range of functions.

Colour value (RGB)	#000000...**#FFFFFF**
This parameter configures the RGB colour value to be retrieved at the beginning of the disabling function. This parameter is available only if a colour value is to be retrieved at the beginning of the disabling function.	

White value (W)	0...**255**
This parameter configures the optional white level to be retrieved at the start of the disabling function. This parameter is available only if a colour value is to be retrieved at the start of the disabling function and an RGBW colour space has been configured for the DALI system.	

At the end...	Switch off
Brightness	**track**
	preset
	Memory value (brightness like before the last switch-off)
	No reaction
	Flashing

The behaviour at the end of the disabling function can also be specified separately for the brightness control and optionally also for the colour temperature control and colour control. The behaviour is influenced by the acknowledgement object. This parameter defines the behaviour of the brightness at the end of the disabling function.

Switch off: The DALI system switches off at the end of the disabling function.

Track: The set state received during the disabling function or adjusted before the disabling function can be tracked at the end of the disabling with the appropriate brightness value. During disabling, the overridden functions of the DALI actuator (switching, dimming, value specifications) continue to be processed internally in the device. Consequently, newly received KNX telegrams are evaluated and time functions are triggered as well. At the end of the disabling, the tracked states are set. A scene recall (low priority) is not tracked.

Preset: The brightness specified by the "Brightness value" parameter is set at the end of the disabling function.

Memory value (brightness as before last switch-off): The brightness value is set that was active before the last switch-off and stored internally in the device. This memory value is stored in a non-volatile manner in the DALI actuator so that the value is retained after the bus or mains voltage returns. After an ETS programming operation, the memory value is predefined to "100%". This value is optionally limited by the maximum brightness.

No reaction: The operating devices of the disabled DALI system do not react. The devices remain in the state most recently set by the disabling function.

Flashing: The affected devices are switched on and off cyclically after disabling. The flashing time is generally configured on the parameter page "DALI systems -> Times". During flashing, the logical switching state is fed back as "Switched on" and the brightness value as "Switch-on brightness". A soft ON/OFF function is not executed during flashing. The flashing status remains active until another bus command is received or manual operation specifies another brightness value.

Brightness value	1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 15%, 20%...50%...**100%**

This parameter configures the brightness value to be retrieved at the end of the disabling function.

This parameter is available only if a brightness value is to be retrieved at the end of the disabling function.

At the end...	**track**
Colour temperature	preset
	Memory value (colour temp. bef. switching-off last time)
	No reaction

The behaviour at the end of the disabling function can also be specified separately for the brightness control and optionally also for the colour temperature control and colour control. The behaviour is influenced by the acknowledgement object. This parameter defines the behaviour of the colour temperature at the end of the disabling function.

Track: The set state received during the disabling function or adjusted before the disabling function can be tracked at the end of the disabling with the appropriate colour temperature value. During disabling, the overridden functions of the DALI actuator (switching, dimming, value specifications) continue to be processed internally in the device. Consequently, newly received KNX telegrams are evaluated and time functions are triggered as well. At the end of the disabling, the tracked states are set. A scene recall (low priority) is not tracked.

Preset: The colour temperature specified by the "Colour temperature" parameter is set at the beginning of the disabling function.

Memory value (colour temperature as before last switch-off): The colour temperature value is set that was active before the last switch-off and stored internally in the device. This memory value is stored in a non-volatile manner in the DALI actuator so that the value is retained after the bus or mains voltage returns. After ETS programming, the memory value is predefined to "minimum colour temperature".

No reaction: The operating devices of the disabled DALI system do not react. The devices remain in the colour temperature state last set.

This parameter is available only if the DALI system support this range of functions.

Colour temperature value	1.000...**2.700**...10.000

This parameter configures the colour temperature value to be recalled at the end of the disabling function.

This parameter is available only if a colour temperature value is to be retrieved at the end of the disabling function.

At the end...	**track**
Colour	preset
	Memory value (colour like before switching off the last time)
	No reaction

The behaviour at the end of the disabling function can also be specified separately for the brightness control and optionally also for the colour temperature control and colour control. The behaviour is influenced by the acknowledgement object. This parameter defines the behaviour of the colour at the end of the disabling function.

Track: The set state received during the disabling function or adjusted before the disabling function can be tracked at the end of the disabling with the appropriate colour value. During disabling, the overridden functions of the DALI actuator (switching, dimming, value specifications) continue to be processed internally in the device. Consequently, newly received KNX telegrams are evaluated and time functions are triggered as well. At the end of the disabling, the tracked states are set. A scene recall (low priority) is not tracked.

Preset: The colour specified by the parameter "Colour (RGB)" and optionally "White value (W)" is set at the beginning of the disabling function.

Memory value (colour as before last switch-off): The colour is set that was active before the last switch-off and stored internally in the device. This memory value is stored in a non-volatile manner in the DALI actuator so that the value is retained after the bus or mains voltage returns. After an ETS programming operation, the memory colour value is predefined at "#FFFFFF" and the optional white value at "#FF".

No reaction: The operating devices of the disabled DALI actuator do not react. The devices remain in the colour state last set.

This parameter is available only if the DALI system support this range of functions.

Colour value (RGB)	#000000...**#FFFFFF**

This parameter configures the RGB colour value to be retrieved at the end of the disabling function.

This parameter is available only if a colour value is to be retrieved at the end of the disabling function.

White value (W)	0...**255**

This parameter configures the optional white level to be retrieved at the end of the disabling function.

This parameter is available only if a colour value is to be retrieved at the end of the disabling function and an RGBW colour space has been configured for the DALI system.

For forced position:

DALI systems -> DALI System... -> Forced position

Forced position "active, switch-on"	**preset** Memory value (brightness like before the last switch-off) No reaction
A forced position influences only the brightness control of a DALI system. The colour temperature or colour - provided that the DALI system has this range of functions - always remains unchanged in a forced position. This parameter defines the behaviour to be carried out when a forced position is activated via the communication object and the DALI system is to be forcibly switched on. Preset: The DALI operating devices set themselves to the brightness configured in the "Brightness value" parameter in the event of a restraint. No reaction: The bus operation is locked but the operating devices show no response and remain in the most recently set brightness state. Memory value (brightness before last switch-off): The brightness value is set that was active before the last switch-off and stored internally in the device. This memory value is stored in a non-volatile manner in the DALI actuator so that the value is retained after the bus or mains voltage returns. After an ETS programming operation, the memory value is predefined to "100%". This value is optionally limited by the maximum brightness.	

Brightness value	1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 15%, 20%...50%...**100%**
This parameter configures the brightness value to be recalled when a forced position is activated. This parameter is available only if a brightness value is to be retrieved when the forced position is activated.	

Forced position "active, switch-off"	**Switch off**
The behaviour that is executed when a forced position is activated via the communication object and the DALI system is to be forcibly switched off is permanently defined as "Switch-off". This parameter is therefore not adjustable.	

Forced position end "inactive"	**track** No reaction
At the end of the forced position, the configured behaviour is executed here. Bus operation is enabled again. Track: The state received during the forced position function or the brightness value adjusted before the function can be tracked at the end of the forced position. Any time functions still in progress will also be taken into account if necessary. A scene recall (low priority) is not tracked. No reaction: The operating devices show no response and remain in the brightness state last selected by the forced position.	

After bus/mains voltage return	**no forced position** Forced position active, switch-on Forced position active, switch-off State as before bus/mains voltage failure
The behaviour of the forced position after a bus or mains voltage return can be specified by this parameter. This initialises the forced position after a device reset. After bus or mains voltage return, the configured state is transferred to the "Forced position - Activate/Deactivate" communication object. When a forced position is activated, the DALI system is immediately activated and interlocked accordingly by forced control after bus/mains voltage return until a forced control takes place via the KNX. In this case, the parameter "After bus voltage return" is not evaluated. State before bus/mains voltage failure: The last existing and internally stored state of the forced position before bus or mains voltage failure will be tracked. An ETS programming operation deletes the stored state (reaction in that case same as with "no forced position active"). If the tracked state corresponds to "No forced position active", the force-independent parameter "After bus voltage return" will be executed on return of bus voltage. If forced position is activated, the DALI operating devices are switched on to the brightness value predefined by the parameter "Forced position 'active, switch-on'".	

9.5.4 Objects for disabling function / forced position

Function	Name	Type	DPT	Flag
Disabling - Status	DALI System 1...4 - Output	1-bit	1.003	C, R, -, T, A
1-bit object for transmitting the status of the disabling function. The object sends a telegram with the value "1" if the disabling function is active. The object sends a telegram with the value "0" if the disabling function is inactive.				

Function	Name	Type	DPT	Flag
Disabling function - Activate / Deactivate	DALI System 1...4 - Input	1-bit	1.003	C, -, W, -, U
1-bit object for activation and deactivation of the disabling function (polarity configurable).				

Function	Name	Type	DPT	Flag
Disabling function - Acknowledgment	DALI System 1...4 - Input	1-bit	1.016	C, -, W, -, U
1-bit object to acknowledge an active disabling function. This object is visible only if the acknowledgement is to be used with the disabling function ("1" = disabling function is deactivated / "0" = no reaction).				

Function	Name	Type	DPT	Flag
Forced position - Activate / Deactivate	DALI System 1...4 - Input	2-bit	2.001	C, -, W, -, U
2-bit object for activating or deactivating the forced position. The polarity is fixed by the telegram.				

9.6 Status functions

9.6.1 Switching status and brightness value

The DALI actuator can track the current switching state and brightness value of a DALI system by means of separate status objects and also transmit them to the KNX, provided the bus voltage is switched on. The following status objects can be enabled independently of each other for each DALI system...
– Switching - Status (1-bit),
– Brightness value – Status (1-byte).

The DALI actuator calculates the object value of the status objects during each switching or dimming process. The DALI actuator tracks the switching state or brightness value and updates the status objects, even if a DALI system is activated by the manual operation or scene function.

The switching status object is updated during the following events...

- immediately after switch-on, (if necessary, only after a switch-on delay has elapsed and at the beginning of a soft ON dimming process / also in the event of a staircase function),
- after switch-off, (if necessary, only after a switch-off delay has elapsed and at the end of a soft OFF dimming process / also in the event of a staircase function),
- immediately after switching off by means of the automatic switch-off function,
- at the beginning of a dimming process when dimming ON (relative dimming up or brightness value = 1…100%),
- at the end of a dimming procedure when dimming OFF (brightness value = 0 %),
- if the switching state changes in normal operation (therefore not in the event of a dimming process without changing the switching state e. g. from 10% to50 % brightness),
- at the start or end of a disabling or forced position function (if the switching state changes as a result),
- at the beginning of a scene recall (whenever the switching state is consequently changed),

The brightness value status object is updated in the event of the following events...

- at the end of a relative (4-bit) or absolute (1-byte) dimming process,
- after switch-on, if the switch-on brightness is set (if necessary, first only a switch-on delay has elapsed and at the end of a soft ON dimming process / also in the event of a staircase function),
- after switch-off, (if necessary, only after a switch-off delay has elapsed and at the end of a soft OFF dimming process / also in the event of a staircase function),
- immediately after switching off by means of the automatic switch-off function,

– if, in normal operation, the brightness value changes (if a brightness value specification exceeds/undershoots the maximum/minimum brightness as a result of relative or absolute dimming from outside or exceeds the maximum brightness, the DALI actuator updates brightness value feedback according to the maximum brightness or minimum brightness),
– at the start or end of a disabling or forced position function (if the brightness value changes as a result),
– at the beginning of a scene recall (if this changes the brightness value),

i If the bus/mains voltage returns or after an ETS programming operation, the status objects are initially initialised with the value "0". After device initialisation, the DALI actuator evaluates the parameters for the reset behaviour and sets the state of the DALI systems accordingly. If the reset behaviour is set to "no reaction", the switching and brightness value status only correspond to the actual state if the DALI system has been controlled at least once via the KNX or by manual operation.

i In the case of disabling function as supplementary function: A flashing DALI system is always signalled back as "switched on" and with switch-on brightness. The switching status is transmitted also for a disabled DALI system if the DALI system is adjusted, for example, by a manual operation.

Activating the switching status

The switching status is implemented as an active signalling object so that the object value is also transmitted directly to the KNX during each update. The ETS automatically sets by default the communication flags of the status object required for proper functioning.

i If the "Transmit" flag of the switching status object is deleted, the object can be used as a passive status object.

The "Switching status" parameter is separately available for each DALI system on the parameter page "DALI systems -> DALI system... -> Status" if the enabling has taken place on the corresponding parameter page for the status.

- Activate the parameter.

  The object "Switching -Status" is enabled. The switching status is transmitted once the status is updated.

- Deactivate the parameter.

  No switching status is available.

Activating the brightness value status

The brightness value status is implemented as an active signalling object so that the object value is also transmitted directly to the KNX with each update. The ETS automatically sets by default the communication flags of the status object required for proper functioning.

If the "Transmit" flag of the brightness value status object is deleted, the object can be used as a passive status object.

The "Brightness value" parameter is separately available for each DALI system on the parameter page "DALI systems -> DALI system... -> Status" if the enabling has taken place on the corresponding parameter page for the status.

- Activate the parameter.

  The object "Brightness value - Status" is enabled. The brightness value status is transmitted as soon as the status is updated.

- Deactivate the parameter.

  No brightness value status is available.

Setting the updating of the switching status

In the ETS, it can be defined when the DALI actuator updates the feedback value for the switching status. The object value updated last by the DALI actuator is then actively signalled to the KNX, provided the "Transmit" flag is set on the communication object.

The parameter "Updating of the object value" is available on the parameter page "DALI systems -> DALI system... -> Status".

The switching status must be enabled.

- Set the parameter to "after each update object 'Switching'/'Central switching'".

  The DALI actuator updates the feedback value in the object once a new telegram is received on the input objects "Switching - Setting" or "Central function... - Switching" for groups or single devices are updated. A new telegram is also then actively transmitted to the KNX each time. The telegram value does not necessarily have to change. Consequently, in the event of, for example, cyclical telegrams to the input objects, the corresponding switching status telegrams are also generated.

  With other functions of the DALI actuator (e.g. at the beginning or end of a disabling or forced position function or in the event of a manual operation or scene recall), no status is sent in this setting if the switching status does not change.

- Set the parameter to "Only if the feedback value changes".

  The DALI actuator updates the switching status only if the telegram value (e.g. "OFF" to "ON") also changes. If the telegram value does not change (e.g. in the case of cyclical telegrams to the input objects with the same telegram value), the status then remains unchanged. Consequently, no telegram with the same content is output repeatedly either.

  This setting is recommended, for instance, if the objects "Switching - Setting" and "Switching - Status" are linked to an identical group address. This is often the case when activating by means of light scene push-button sensors (recall and storage function).

Setting the update of the brightness value status

In the ETS, it can be defined when the DALI actuator updates the feedback value for the brightness value status. The object value updated last by the DALI actuator is then actively signalled to the KNX, provided the "Transmit" flag is set on the communication object.

The parameter "Updating of the object value" is available on the parameter page "DALI systems -> DALI system... -> Status".

The brightness value status must be enabled.

- Set the parameter to "after each update 'Brightness value'/'Central brightness value' object".

  The DALI actuator updates the feedback value in the object as soon as a new telegram is received at the input objects "Brightness value - Setting" or "Central function... - Brightness value". A new telegram is also then actively transmitted to the KNX each time. The telegram value does not necessarily have to change. Consequently, the corresponding brightness value status telegrams are also generated, for example, in the event of cyclical telegrams to the input objects.

  With other functions of the DALI actuator (e.g. at the beginning or end of a disabling or forced position function or in the event of a manual operation or scene recall), no status is sent in this setting if the brightness value status does not change.

- Set the parameter to "Only if the feedback value changes".

  The DALI actuator updates the brightness value status only if the telegram value also changes. If the telegram value does not change (e.g. in the case of cyclical telegrams to the input objects with the same telegram value), the status then remains unchanged. Consequently, no telegram with the same content is output repeatedly either.

  This setting is recommended, for instance, if the objects "Brightness value - Setting" and "Brightness value - Status" are linked to an identical group address. This is often the case when activating by means of light scene pushbutton sensors (recall and storage function).

9.6.2 Colour temperature

The DALI actuator can track the set colour temperature of a DALI system via a separate 2-byte status object according to DPT 7.600 and can also transmit it to the KNX, provided the bus voltage is switched on. In addition, the DALI actuator can indicate whether an externally specified colour temperature is valid ("ON" object value) or invalid ("OFF" object value) by means of a separate 1-bit status object. An invalid colour temperature exists if the specified value violates the set limits of the minimum and maximum colour temperature.

The DALI actuator determines the object value of the status objects each time the colour temperature is influenced. Even if a DALI system is controlled via the scene function, the DALI actuator tracks the colour temperature value and updates the status objects.

The status object "Colour temperature - Status" is updated in the event of the following events...

– after a completed relative or absolute colour temperature dimming process. If the DALI system is switched off and a colour temperature dimming process is carried out, the DALI actuator updates the colour temperature status only if the "Switch-on colour temperature" parameter is configured to the "Track" setting.
– immediately after switching on a DALI system, but only if the colour temperature value differs from the last value that was fed back,
– at the beginning of a scene recall (whenever this changes the colour temperature),

i If the bus/mains voltage returns or after an ETS programming operation, the colour temperature status object is initially initialised with the value "0". After the device initialisation, the DALI actuator evaluates the parameters for the reset behaviour, sets the state of the DALI system accordingly and updates the status object.

i If a colour temperature specification exceeds or undershoots the minimum or maximum colour temperature as a result of relative or absolute dimming specified externally, the DALI actuator updates the status according to the minimum or maximum temperature.

The status object "Colour temperature invalid - Status" is updated during the following events...

– when a new absolute colour temperature is specified (depending on the configured transmission behaviour),
– always after a device reset (ETS programming operation, bus/mains voltage return), with the "valid colour temperature" status.

Activating the colour temperature status

The colour temperature status is implemented as an active signalling object so that the object value is transmitted also directly to the KNX with each update. The ETS automatically sets by default the communication flags of the status object required for proper functioning.

i If the "Transmit" flag of the colour temperature status object is deleted, the object can be used as a passive status object.

The "Colour temperature" parameter is separately available for each DALI system on the parameter page "DALI systems -> DALI system... -> Status" if the enabling has taken place on the corresponding parameter page for the status.

■ Activate the parameter.

The object "Colour temperature - Status" is enabled. The colour temperature status is transmitted as soon as the status is updated.

- Deactivate the parameter.

  No colour temperature status is available.

Activating the status for an invalid colour temperature

The status for an invalid colour temperature is implemented as an active message object, so that the object value is transmitted also directly to the KNX with each update. The ETS automatically sets by default the communication flags of the status object required for proper functioning.

i If the "Transmit" flag of the status object is deleted, the object can be used as a passive status object.

The "Invalid colour temperature" parameter is separately available for each DALI system on the parameter page "DALI systems -> DALI system... -> Status" if the enabling has taken place on the corresponding parameter page for the status.

- Activate the parameter.

  The object "Colour temperature invalid - Status" is enabled. The status for an invalid colour temperature is transmitted as soon as the status is updated.

- Deactivate the parameter.

  There is no status available for an invalid colour temperature.

Setting the colour temperature status update

In the ETS, it can be defined when the DALI actuator updates the feedback value for the colour temperature status. The object value updated last by the DALI actuator is then actively signalled to the KNX, provided the "Transmit" flag is set on the communication object.

The parameter "Updating of the object value" is available on the parameter page "DALI systems -> DALI system... -> Status".

The colour temperature status must be enabled.

- Set the parameter to "after each update of feedback value".

  The DALI actuator updates the feedback value in the object as soon as a new telegram for the specification of a colour temperature value is received or a value is specified by an internal function of the DALI actuator (e. g. scene function, HCL matrices). The default colour temperature value does not necessarily have to change. Consequently, in the event of, for example, cyclical telegrams to the input objects, the corresponding colour temperature status telegrams are also generated.

- Set the parameter to "Only if the feedback value changes".

The DALI actuator updates the colour temperature status only when the telegram value also changes. If the telegram value does not change (e.g. in the case of cyclical telegrams to the input objects with the same telegram value), the status then remains unchanged. Consequently, no telegram with the same content is output repeatedly either.

This setting is recommended, for instance, if the objects "Absolute colour temperature - Setting" and "Colour temperature -Status" are linked to an identical group address. This is often the case when activating by means of light scene push-button sensors (recall and storage function).

Setting an invalid colour temperature status update

In the ETS it can be defined when the DALI actuator updates the feedback value for the status of an invalid colour temperature. The object value updated last by the DALI actuator is then actively signalled to the KNX, provided the "Transmit" flag is set on the communication object.

The parameter "Updating of the object value" is available on the parameter page "DALI systems -> DALI system... -> Status".

The status of an invalid colour temperature must be enabled.

- Set the parameter to "after each update of feedback value".

  The DALI actuator updates the feedback value in the object as soon as a new telegram is received to specify a colour temperature value. The default colour temperature value does not necessarily have to change. Consequently, in the event of, for example, cyclical telegrams to the input objects, the corresponding status telegrams are also generated.

- Set the parameter to "Only if the feedback value changes".

  The DALI actuator updates the status of an invalid colour temperature only if the telegram value also changes. If the telegram value does not change (e.g. in the case of cyclical telegrams to the input objects with the same telegram value), the status then remains unchanged. Consequently, no telegram with the same content is output repeatedly either.

9.6.3 Colour

The DALI actuator can track the set colour of a DALI system by means of separate objects and transmit it also to the KNX, provided the bus voltage is switched on. The data format of the status objects depends on the selected colour space (RGB[W] combined, RGB[W] individually, HSV[W]) and is based on the format of the input objects.

The DALI actuator determines the object value of the status objects each time the colour is influenced. Even if a DALI system is controlled via the scene function or via a colour wheel sequence, the DALI actuator tracks the colour value and updates the status objects.

The status objects are updated during the following events...

– after a completed relative or absolute colour dimming process. If the DALI system is switched off and a colour dimming process is carried out, the DALI actuator updates the status of the colour, provided the parameter "Switch-on colour" is configured to the "track" setting.
– immediately after switching on a DALI system, but only if the colour differs from the last value that was fed back,
– at the beginning of a scene recall (whenever this changes the colour),

i When the bus/mains voltage returns or after an ETS programming operation, the status objects of the colour are first initialised with the value "0". After the device initialisation, the DALI actuator evaluates the parameters for the reset behaviour, sets the state of the DALI system accordingly and updates the status object.

Activating the colour status

The colour status is implemented with active signalling objects so that the object values are transmitted also directly to the KNX during each update. The ETS automatically sets the communication flags of the status objects required for proper functioning as a standard feature.

i If the "Transmit" flags of the status objects are deleted, the objects can be used as passive status objects.

The "Colour" parameter is separately available for each DALI system on the parameter page "DALI systems -> DALI system... -> Status" if the enabling has taken place on the corresponding parameter page for the status.

- Activate the parameter.

  The objects for the colour status are enabled. The colour status is transmitted as soon as the status is updated.

- Deactivate the parameter.

  No colour status is available.

Setting the updating of the colour status

In the ETS, it can be defined when the DALI actuator updates the feedback values for the colour status. The object values updated last by the DALI actuator are then actively signalled to the KNX, provided the "Transmit" flags are set on the communication objects.

The parameter "Updating of the object value" is available on the parameter page "DALI systems -> DALI system... -> Status".

The colour status must be enabled.

- Set the parameter to "after each update of feedback value".

  The DALI actuator updates the feedback value in the objects as soon as new telegrams are received to specify a colour value or values are specified by an internal function of the DALI actuator (e.g. scene function, colour wheel se-

quence, HCL matrices). The default colour value does not necessarily have to change. Consequently, corresponding colour status telegrams are also generated, for example, in the event of cyclical telegrams to the input objects.

- Set the parameter to "Only if the feedback value changes".

  The DALI actuator updates the colour status only when the telegram values change. If the telegram values do not change (e. g. in the case of cyclical telegrams to the input objects with the same telegram value), the status remains unchanged. Consequently, no telegram with the same content is output repeatedly either.

9.6.4 Reset behaviour and cyclical transmission

Setting the status when the bus/mains voltage returns or after ETS programming

Any status can be transmitted to the KNX after a bus or mains voltage return or after an ETS programming operation, provided the "Transmit" flag is set on the communication object and the reset behaviour of the underlying functions is not configured to "no reaction". In these cases, the status telegram can be transmitted with a time delay, whereby the delay time is set globally for all DALI systems together.

The "Behaviour after bus/mains voltage return" parameter is separately available for each DALI system on the parameter page "DALI systems -> DALI system... -> Status" for each status function.

- Activate the parameter.

  The status is transmitted after a delay after the bus or mains voltage returns or an ETS programming operation. No status is transmitted during a delay even if the state changes during this delay.

  The delay time is started immediately after the ETS programming operation is completed, i. e. already before the device is initialised. If the initialisation of the DALI actuators takes longer than the delay time configured in the ETS, the status is transmitted only after the initialisation phase has been completed.

- Deactivate the parameter.

  The status is transmitted immediately after the bus or mains voltage returns or an ETS programming operation directly during the device initialisation.

Setting the cyclical transmission of the switching status

Each status can be transmitted also cyclically in addition to being transmitted when updated.

The "Cyclical transmission" parameter is separately available for each DALI system on the parameter page "DALI systems -> DALI system... -> Status" available for all status functions.

- Activate the parameter.

Cyclical transmission is activated. The cycle time is defined uniformly for all status messages of the DALI system by the parameter with the same name on the same parameter page.

- Deactivate the parameter.

  Cyclical transmission is deactivated so that the status is transmitted to the KNX only if a state is updated.

No cyclical transmission takes place during an active delay time or device initialisation.

With the switching status and brightness value status, the cyclical transmission after a device reset does not begin until a defined state is set for the DALI system by the parameters "After ETS programming operation" or "After bus/mains voltage return". If the reset behaviour is set to "no reaction", the cyclical transmission for the switching and brightness value status does not begin until the DALI system has been controlled at least once via the KNX or by manual operation.

9.6.5 Parameters for status functions

DALI systems -> DALI System... -> Enabled functions

Status	Checkbox (**yes**/no)
This parameter enables the status function for the DALI system. When enabled, the "Status" parameter page is visible.	

"DALI systems -> DALI System... -> Status"

Cycle time	**0**...23 h 0...**2**...59 min **0**/(10)...59 s
Each status can be transmitted also cyclically in addition to being transmitted when updated. The cycle time is defined uniformly for all status messages of the affected DALI system by this parameter.	

Parameters for switching status

Switching status	Checkbox (**yes**/no)
The DALI actuator can track the current switching state of a DALI system via a separate status object and can also transmit them to the KNX, provided the bus voltage is switched on. Activated: The object "Switching - Status" is enabled. The switching status is transmitted once the status is updated. Deactivated: No switching status is available.	

Switching status Updating of the object value	After each update "Switching"/"Central" object **only if the feedback value changes**
It can be defined here when the DALI actuator updates the feedback value for the switching status. The object value updated last by the DALI actuator is then actively signalled to the KNX, provided the "Transmit" flag is set on the communication object. after each update object "Switching"/"Central switching": The DALI actuator updates the feedback value in the object as soon as a new telegram is received at the input objects "Switching - Setting" or "Central function... - Switching" for groups or single devices are updated. A new telegram is also then actively transmitted to the KNX each time. The telegram value does not necessarily have to change. Consequently, in the event of, for example, cyclical telegrams to the input objects, the corresponding switching status telegrams are also generated. With other functions of the DALI actuator (e.g. at the beginning or end of a disabling or forced position function or in the event of a manual operation or scene recall), no status is sent in this setting if the switching status does not change. Only if the feedback value changes: The DALI actuator updates the switching status only when the telegram value also changes (e.g. "OFF" to "ON"). If the telegram value does not change (e.g. in the case of cyclical telegrams to the input objects with the same telegram value), the status then remains unchanged. Consequently, no telegram with the same content is output repeatedly either. This setting is recommended, for instance, if the objects "Switching - Setting" and "Switching - Status" are linked to an identical group address. This is often the case when activating by means of light scene push-button sensors (recall and storage function).	

Switching status Delay after bus/mains voltage return	Checkbox (yes/**no**)
The switching status can be transmitted to the KNX after the bus or mains voltage returns or after an ETS programming operation, provided the "Transmit" flag is set on the communication object and the reset behaviour of the underlying functions is not configured to "no reaction". In these cases, the status telegram can be transmitted with a time delay, whereby the delay time is set globally for all DALI systems together. Activated: The status is transmitted after a delay after the bus or mains voltage returns or an ETS programming operation. No status is transmitted during a delay even if the state changes during this delay. The delay time is started immediately after the ETS programming operation is completed, i. e. already before the device is initialised. If the initialisation of the DALI actuators takes longer than the delay time configured in the ETS, the status is transmitted only after the initialisation phase has been completed. Deactivated: The status is transmitted immediately after the bus or mains voltage returns or after an ETS programming operation during the device initialisation.	

Switching status Cyclical transmission	Checkbox (yes/**no**)
The switching status can also be transmitted cyclically in addition to being transmitted when updated. Activated: Cyclical transmission is activated. The cycle time is defined uniformly for all status messages of the DALI system by the parameter with the same name on the same parameter page. Deactivated: Cyclical transmission is deactivated so that the status is transmitted to the KNX only when a state is updated.	

Parameters for brightness value status

Brightness value	Checkbox (**yes**/no)
The DALI actuator can track the current brightness value of a DALI system via a separate status object and can also transmit them to the KNX, provided the bus voltage is switched on. Activated: The object "Brightness value - Status" is enabled. The brightness value status is transmitted as soon as the status is updated. Deactivated: No brightness value status is available.	

Brightness value Updating of the object value	after each update "Brightness value"/"Central brightness value" object **only if the feedback value changes**
It can be defined here when the DALI actuator updates the feedback value for the brightness value status. The object value updated last by the DALI actuator is then actively signalled to the KNX, provided the "Transmit" flag is set on the communication object. after each update object "Brightness value"/"Central brightness value": The DALI actuator updates the feedback value in the object as soon as a new telegram is received at the input objects "Brightness value - Setting" or "Central function... - Brightness value". A new telegram is also then actively transmitted to the KNX each time. The telegram value does not necessarily have to change. Consequently, the corresponding brightness value status telegrams are also generated, for example, in the event of cyclical telegrams to the input objects. With other functions of the DALI actuator (e.g. at the beginning or end of a disabling or forced position function or in the event of a manual operation or scene recall), no status is sent in this setting if the brightness value status does not change. only if the feedback value changes: The DALI actuator updates the brightness value status only if the telegram value also changes. If the telegram value does not change (e.g. in the case of cyclical telegrams to the input objects with the same telegram value), the status then remains unchanged. Consequently, no telegram with the same content is output repeatedly either. This setting is recommended, for instance, if the objects "Brightness value - Setting" and "Brightness value - Status" are linked to an identical group address. This is often the case when activating by means of light scene push-button sensors (recall and storage function).	

Brightness value Delay after bus/mains voltage return	Checkbox (yes/**no**)
The brightness value status can be transmitted to the KNX after the bus or mains voltage returns or after an ETS programming operation, provided the "Transmit" flag is set on the communication object and the reset behaviour of the underlying functions is not configured to "no reaction". In these cases, the status telegram can be transmitted with a time delay, whereby the delay time is set globally for all DALI systems together. Activated: The status is transmitted after a delay after the bus or mains voltage returns or an ETS programming operation. No status is transmitted during a delay even if the state changes during this delay. The delay time is started immediately after the ETS programming operation is completed, i. e. already before the device is initialised. If the initialisation of the DALI actuators takes longer than the delay time configured in the ETS, the status is transmitted only after the initialisation phase has been completed. Deactivated: The status is transmitted immediately after the bus or mains voltage returns or after an ETS programming operation during the device initialisation.	

Brightness value Cyclical transmission	Checkbox (yes/**no**)
The brightness value status can also be sent out cyclically in addition to being transmitted when updated. Activated: Cyclical transmission is activated. The cycle time is defined uniformly for all status messages of the DALI system by the parameter with the same name on the same parameter page. Deactivated: Cyclical transmission is deactivated so that the status is transmitted to the KNX only when a state is updated.	

Parameters for colour temperature status

Colour temperature	Checkbox (**yes**/no)
The DALI actuator can track the set colour temperature of a DALI system via a separate 2-byte status object according to DPT 7.600 and can also transmit it to the KNX, provided the bus voltage is switched on. Activated: The object "Colour temperature - Status" is enabled. The colour temperature status is transmitted as soon as the status is updated. Deactivated: No colour temperature status is available.	

Colour temperature Updating of the object value	after each update of feedback value **only if the feedback value changes**

At this point, you can define when the DALI actuator updates the feedback value for the colour temperature status. The object value updated last by the DALI actuator is then actively signalled to the KNX, provided the "Transmit" flag is set on the communication object.

after each update of feedback value: The DALI actuator updates the feedback value in the object as soon as a new telegram is received to specify a colour temperature value or a value is specified by an internal function of the DALI actuator (e. g. scene function). The default colour temperature value does not necessarily have to change. Consequently, in the event of, for example, cyclical telegrams to the input objects, the corresponding colour temperature status telegrams are also generated.

only if the feedback value changes: The DALI actuator updates the colour temperature status only when the telegram value also changes. If the telegram value does not change (e.g. in the case of cyclical telegrams to the input objects with the same telegram value), the status then remains unchanged. Consequently, no telegram with the same content is output repeatedly either. This setting is recommended, for instance, if the objects "Absolute colour temperature - Setting" and "Colour temperature -Status" are linked to an identical group address. This is often the case when activating by means of light scene push-button sensors (recall and storage function).

Colour temperature Delay after bus/mains voltage return	Checkbox (yes/**no**)

The colour temperature status can be transmitted to the KNX after the bus or mains voltage returns or after an ETS programming operation, provided the "Transmit" flag is set on the communication object and the reset behaviour of the underlying functions is not configured to "no reaction". In these cases, the status telegram can be transmitted with a time delay, whereby the delay time is set globally for all DALI systems together.

Activated: The status is transmitted after a delay after the bus or mains voltage returns or an ETS programming operation. No status is transmitted during a delay even if the state changes during this delay. The delay time is started immediately after the ETS programming operation is completed, i. e. already before the device is initialised. If the initialisation of the DALI actuators takes longer than the delay time configured in the ETS, the status is transmitted only after the initialisation phase has been completed.

Deactivated: The status is transmitted immediately after the bus or mains voltage returns or after an ETS programming operation during the device initialisation.

Colour temperature Cyclical transmission	Checkbox (yes/**no**)
The colour temperature status can be transmitted also cyclically in addition to being transmitted when updated. Activated: Cyclical transmission is activated. The cycle time is defined uniformly for all status messages of the affected DALI system by the parameter with the same name on the same parameter page. Deactivated: Cyclical transmission is deactivated so that the status is transmitted to the KNX only when a state is updated.	

Invalid colour temperature	Checkbox (yes/**no**)
In addition to the status for displaying the current colour temperature, the DALI actuator can use a separate 1-bit status object to indicate whether an externally specified colour temperature is valid ("ON" object value) or invalid ("OFF" object value). An invalid colour temperature exists if the specified value violates the set limits of the minimum and maximum colour temperature. Activated: The object "Colour temperature invalid - Status" is enabled. The status for an invalid colour temperature is transmitted as soon as the status is updated. Deactivated: No status is available for an invalid colour temperature.	

Invalid colour temperature Updating of the object value	after each update of feedback value **only if the feedback value changes**
At this point, you can define when the DALI actuator updates the feedback value for the status of an invalid colour temperature. The object value updated last by the DALI actuator is then actively signalled to the KNX, provided the "Transmit" flag is set on the communication object. after each update of feedback value: The DALI actuator updates the feedback value in the object as soon as a new telegram is received to specify a colour temperature value. The default colour temperature value does not necessarily have to change. Consequently, in the event of, for example, cyclical telegrams to the input objects, the corresponding status telegrams are also generated. only if the feedback value changes: The DALI actuator updates the status of an invalid colour temperature only if the telegram value also changes. If the telegram value does not change (e.g. in the case of cyclical telegrams to the input objects with the same telegram value), the status then remains unchanged. Consequently, no telegram with the same content is output repeatedly either.	

Invalid colour temperature Delay after bus/mains voltage return	Checkbox (yes/**no**)
The status for an invalid colour temperature can be transmitted to the KNX after the bus or mains voltage returns or after an ETS programming operation, provided the "Transmit" flag is set on the communication object and the reset behaviour of the underlying functions is not configured to "no reaction". In these cases, the status telegram can be transmitted with a time delay, whereby the delay time is set globally for all DALI systems together. Activated: The status is transmitted after a delay after the bus or mains voltage returns or an ETS programming operation. No status is transmitted during a delay even if the state changes during this delay. The delay time is started immediately after the ETS programming operation is completed, i. e. already before the device is initialised. If the initialisation of the DALI actuators takes longer than the delay time configured in the ETS, the status is transmitted only after the initialisation phase has been completed. Deactivated: The status is transmitted immediately after the bus or mains voltage returns or after an ETS programming operation during the device initialisation.	

Invalid colour temperature Cyclical transmission	Checkbox (yes/**no**)
The status for an invalid colour temperature can be transmitted also cyclically in addition to being transmitted when updated. Activated: Cyclical transmission is activated. The cycle time is defined uniformly for all status messages of the affected DALI system by the parameter with the same name on the same parameter page. Deactivated: Cyclical transmission is deactivated so that the status is transmitted to the KNX only when a state is updated.	

Parameters for colour status

Colour	Checkbox (**yes**/no)
The DALI actuator can track the set colour of a DALI system by means of separate objects and transmit it also to the KNX, provided the bus voltage is switched on. The data format of the status objects depends on the selected colour space (RGB[W] combined, RGB[W] individually, HSV[W]) and is based on the format of the input objects. Activated: The objects for the colour status are enabled. The colour status is transmitted as soon as the status is updated. Deactivated: No colour status is available.	

Colour Updating of the object value	after each update of feedback value **only if the feedback value changes**

At this point, you can define when the DALI actuator updates the feedback values for the colour status. The object values updated last by the DALI actuator are then actively signalled to the KNX, provided the "Transmit" flags are set on the communication objects.

after each update of feedback value: The DALI actuator updates the feedback value in the objects as soon as new telegrams are received to specify a colour value or values are specified by an internal function of the DALI actuator (e. g. scene function, colour wheel sequence). The default colour value does not necessarily have to change. Consequently, corresponding colour status telegrams are also generated, for example, in the event of cyclical telegrams to the input objects.

only if the feedback value changes: The DALI actuator updates the colour status only when the telegram values also change. If the telegram values do not change (e. g. in the case of cyclical telegrams to the input objects with the same telegram value), the status remains unchanged. Consequently, no telegram with the same content is output repeatedly either.

Colour Delay after bus/mains voltage return	Checkbox (yes/**no**)

The colour status can be transmitted to the KNX after the bus or mains voltage returns or after an ETS programming operation, provided the "Transmit" flag is set on the communication object and the reset behaviour of the underlying functions is not configured to "no reaction". In these cases, the status telegram can be transmitted with a time delay, whereby the delay time is set globally for all DALI systems together.

Activated: The status is transmitted after a delay after the bus or mains voltage returns or an ETS programming operation. No status is transmitted during a delay even if the state changes during this delay. The delay time is started immediately after the ETS programming operation is completed, i. e. already before the device is initialised. If the initialisation of the DALI actuators takes longer than the delay time configured in the ETS, the status is transmitted only after the initialisation phase has been completed.

Deactivated: The status is transmitted immediately after the bus or mains voltage returns or after an ETS programming operation during the device initialisation.

Colour Cyclical transmission	Checkbox (yes/**no**)

The colour status can be transmitted also cyclically in addition to being transmitted when updated.

Activated: Cyclical transmission is activated. The cycle time is defined uniformly for all status messages of the DALI system by the parameter with the same name on the same parameter page.

Deactivated: Cyclical transmission is deactivated so that the status is transmitted to the KNX only when a state is updated.

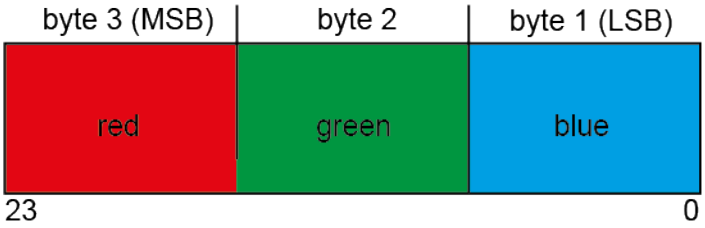
9.6.6 Objects for status functions

Function	Name	Type	DPT	Flag
Switching - Status	DALI System 1...4 - Output	1-bit	1.001	C, R, -, T, A
1-bit object for status indication of the current switching state of the DALI system.				

Function	Name	Type	DPT	Flag
Brightness value - Status	DALI System 1...4 - Output	1-byte	5.001	C, R, -, T, A
1-byte object for status indication of the set brightness of the DALI system.				

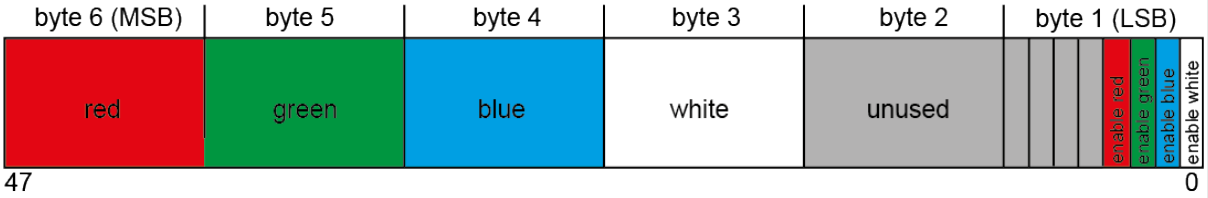
Function	Name	Type	DPT	Flag
Colour temperature - Status	DALI System 1...4 - Output	2-byte	7.600	C, R, -, T, A
2-byte object for status indication of the set colour temperature. This object is available only if the DALI system has the "Colour temperature control" function range.				

Function	Name	Type	DPT	Flag
Colour temperature invalid - Status	DALI System 1...4 - Output	1-bit	1.002	C, R, -, T, A
1-bit object for feedback of an invalid colour temperature set ("1" = colour temperature invalid, "0" = colour temperature valid). A colour temperature set externally is invalid if this violates the set limits of the minimum and maximum colour temperature. After a device reset (ETS programming operation, mains voltage return), the "valid colour temperature" state is always transmitted if an object is actively transmitting. This object is available only if the DALI system has the "Colour temperature control" function range.				

Function	Name	Type	DPT	Flag
Colour RGB (value) - Status	DALI System 1...4 - Output	3-byte	232.600	C, R, -, T, A
3-byte object for status indication of the currently set RGB light colour.  This object is available only for DALI systems in the "Colour" function range and in the "RGB combined" colour space.				

Function	Name	Type	DPT	Flag
Colour RGBW (value) - Status	DALI System 1...4 - Output	6-byte	251.600	C, R, -, T, A

6-byte object for status indication of the currently set RGB light colour.



This object is available only for DALI systems in the "Colour" function range and in the "RGBW combined" colour space.

Function	Name	Type	DPT	Flag
Colour Red (value) - Status	DALI System 1...4 - Output	1-byte	5.001	C, R, -, T, A

1-byte object for status indication of the currently set light colour red.

This object is available only for DALI systems within the "Colour" function range and in the "RGB individually" or "RGBW individually" colour space.

Function	Name	Type	DPT	Flag
Colour Green (value) - Status	DALI System 1...4 - Output	1-byte	5.001	C, R, -, T, A

1-byte object for status indication of the currently set light colour green.

This object is available only for DALI systems within the "Colour" function range and in the "RGB individually" or "RGBW individually" colour space.

Function	Name	Type	DPT	Flag
Colour Blue (value) - Status	DALI System 1...4 - Output	1-byte	5.001	C, R, -, T, A

1-byte object for status indication of the currently set light colour blue.

This object is available only for DALI systems within the "Colour" function range and in the "RGB individually" or "RGBW individually" colour space.

Function	Name	Type	DPT	Flag
Colour white (value) - Status	DALI System 1...4 - Output	1-byte	5.001	C, R, -, T, A

1-byte object for status indication of the currently set light colour white.

This object is available only in the "RGBW individually" colour space.

This object is available only for DALI systems within the "Colour" function range and in the "RGBW individually" colour space.

Function	Name	Type	DPT	Flag
Colour hue (H) - Status	DALI System 1...4 - Output	1-byte	5.003	C, R, -, T, A
1-byte object for status indication of the hue (H / 0...360°). This object is available only in the "HSV" or "HSVW" colour space. This object is available only for DALI systems within the "Colour" function range and in the "HSV" or "HSVW" colour space.				

Function	Name	Type	DPT	Flag
Saturation (S) - Status	DALI System 1...4 - Output	1-byte	5.001	C, R, -, T, A
1-byte object for indicating the status of the saturation (S / 0...100%). This object is available only for DALI systems within the "Colour" function range and in the "HSV" or "HSVW" colour space.				

Function	Name	Type	DPT	Flag
Brightness (V) - Status	DALI System 1...4 - Output	1-byte	5.001	C, R, -, T, A
1-byte object for status indication of the brightness value (V / 0...100%). This object is available only for DALI systems within the "Colour" function range and in the "HSV" or "HSVW" colour space.				

Function	Name	Type	DPT	Flag
White value (W) - Status	DALI System 1...4 - Output	1-byte	5.001	C, R, -, T, A
1-byte object for status indication of the white value (W / 0...100%). This object is available only for DALI systems within the "Colour" function range and in the "HSVW" colour space.				

9.7 Switch-on and switch-off behaviour

9.7.1 Switch-on and switch-off delays

Up to two time functions can be preset independently of each other for each DALI system. The time functions apply only to the communication objects "Switching - Setting" or "Central function... - Switching" (if the central function is assigned to the DALI system) and delay the received object value depending on the telegram polarity.

To use the time delays, the "Time delays" parameter must be activated on the parameter page "DALI systems > DALI system... -> Enabled functions".

i At the end of a disabling function or forced position function, the brightness state received during the function or adjusted before the function can be tracked. Residual times of time functions are also tracked if these had not yet fully elapsed at the time of the reactivation or forced control.

i The time delays do not influence the staircase function if this is enabled.

i A time delay still in progress will be fully aborted by a device reset (bus/mains voltage failure or ETS programming operation).

Activating switch-on delay

The switch-on delay can be activated separately in the ETS for each DALI system on the parameter page "DALI systems > DALI system... -> Time delays".

The time delays must be enabled for the DALI system.

- Activate the parameter "switch-on delay".

  The switch-on delay is activated. After receiving an ON telegram by means of the object "Switching - Setting" or "Central function... - Switching", the configurable time is started. Another ON telegram triggers the time only if the parameter "Retriggerable" is activated. An OFF-telegram received during the switch-on delay will end the delay and set the switching status to "OFF".

Activating switch-off delay

The switch-off delay can be activated separately in the ETS for DALI system on the parameter page "DALI systems > DALI system... -> Time delays".

The time delays must be enabled for the DALI system.

- Activate the parameter "Switch-off delay".

  The switch-off delay is activated. After receiving an OFF telegram by means of the object "Switching - Setting" or "Central function... - Switching", the configurable time is started. Another OFF telegram triggers the time only if the "Retriggerable" parameter is activated. An ON-telegram received during the switch-off delay will end the delay and set the switching status to "ON".

9.7.2 Soft ON/OFF function

The soft-functions permit a DALI system to be switched on or off at reduced speed if a switching command is received via the communication objects "Switching - Setting" or "Central function... - Switching". If the soft ON function is activated, a dimming procedure is executed until the switch-on brightness when switching on. This also occurs if the DALI system is already switched on to a brightness value smaller than switch-on brightness. Likewise, with the soft OFF function, a dimming process is executed to 0% brightness when receiving an OFF telegram.

The dimming speeds can be configured separately in the ETS for the soft ON and soft OFF function. Just as with relative or absolute dimming, the dimming step time is specified. The soft ON or soft OFF functions are not retriggerable by the receipt of further switching telegrams while maintaining the switching status.

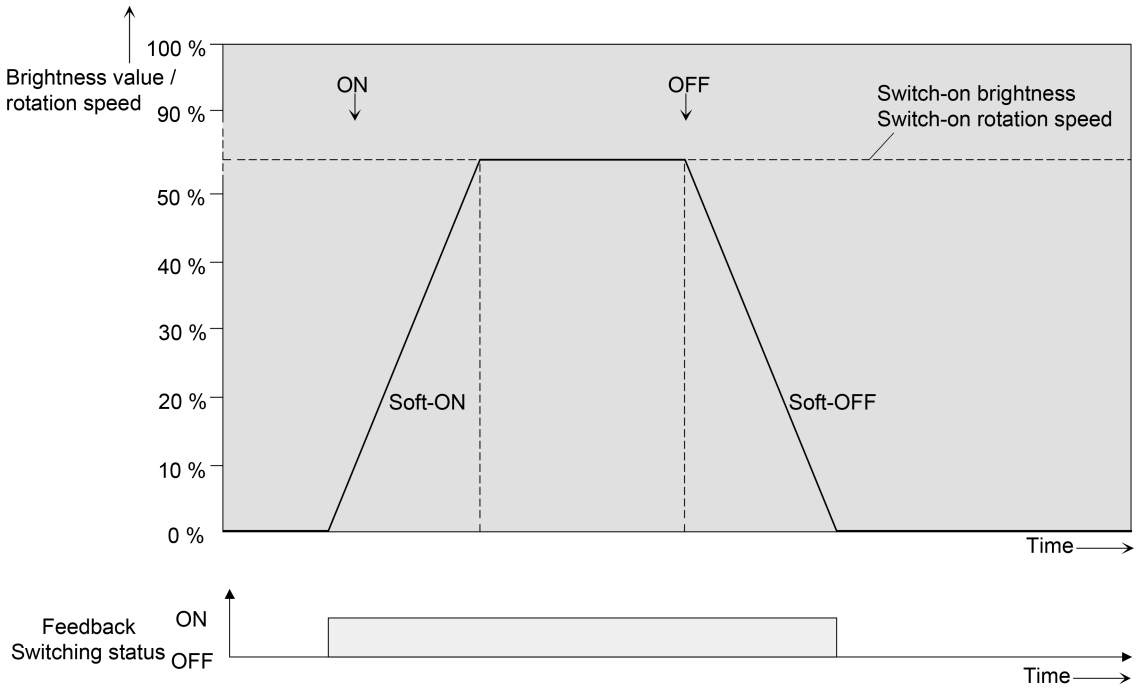


Figure 34: Dimming behaviour of the soft ON/OFF functions as an example with minimum brightness > 0%

To use the soft functions, the parameter "Switch-on/switch-off behaviour" must be activated on the parameter page "DALI systems -> DALI system... -> Enabled functions". The soft functions can then be configured separately for each DALI system on the parameter page "DALI systems -> DALI system... -> Switch-on/switch-off behaviour".

The dimming process for a soft ON function starts at the minimum brightness configured in the ETS. If a DALI system is switched off and then switched on, the operating devices jumping to the configured minimum brightness and start with the soft ON dimming process to the switch-on brightness.

The soft functions also have effects on the switching edges of the staircase function.

A DALI system disabled via the KNX can also flash depending on the ETS configuration for the disabling function. Dimming is not executed with the soft functions during ON and OFF flashing.

Activating and setting the soft ON function

In the ETS, the soft ON function can be activated separately for each DALI system on the parameter page "DALI systems > DALI system... -> Switch-on/switch-off behaviour".

- Activate the "Soft ON function" parameter.

  The soft ON function has been activated. The parameter for the dimming step time of the soft ON function becomes visible.

- Configure the parameter "Time between two dimming increments " to the necessary dimming step time.

Activating and setting the soft OFF function

In the ETS, the soft OFF function can be activated separately for each DALI system on the parameter page "DALI systems > DALI system.... -> Switch-on/switch-off behaviour".

- Activate the "Soft OFF function" parameter.

  The soft OFF function has been activated. The parameter for the dimming step time of the soft OFF function becomes visible.

- Configure the parameter "Time between two dimming increments " to the necessary dimming step time.

9.7.3 Automatic switch-off

The switch-off function permits automatic switching of a DALI system after a brightness value was dimmed or jumped to and this new brightness value is below a switch-off brightness set in the ETS. A delay can be configured optionally until switching off.

The switch-off function is activated after reaching a constant brightness value, i. e. after a completed dimming procedure through absolute or relative dimming. A new dimming process, which ends below switch-off brightness starts, starts any time delay which may be present. In the same way, the switch-off function is interrupted if the switch-off brightness is exceed during a dimming process.

The automatic switch-off function, for example, not only makes it possible to set the lighting to minimum brightness but to switch off by means of relative dimming as well. A further application, for example, is time-controlled "Good night switch-off" of a dimmed children's room lighting.

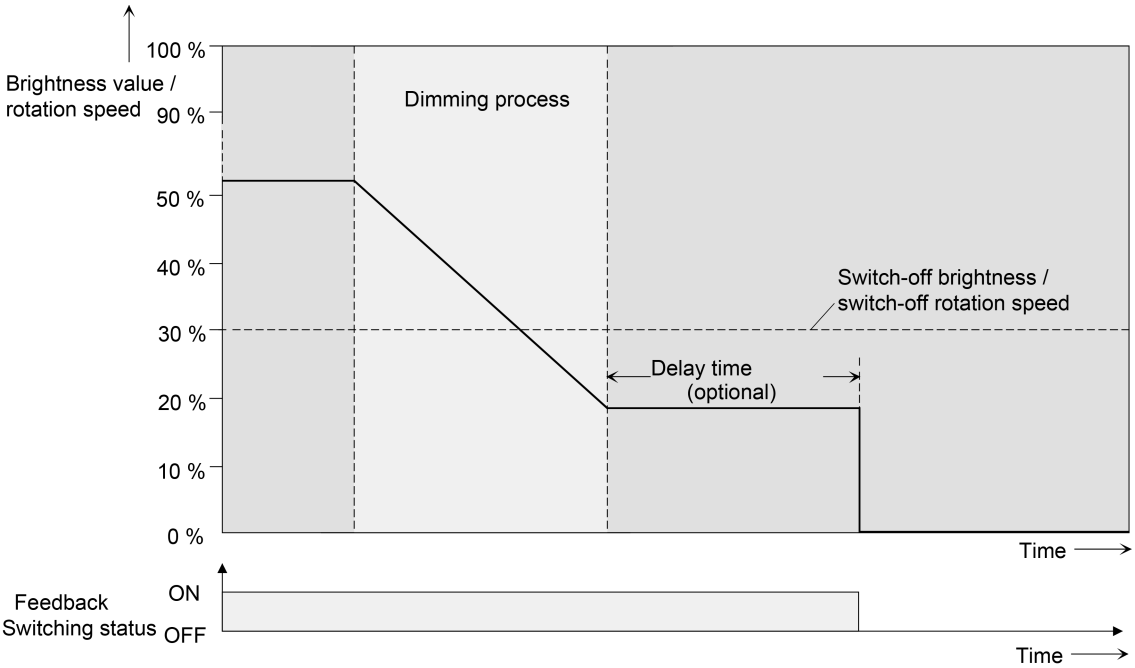


Figure 35: Dimming and switching behaviour of the automatic switch-off function

The switch-off function can also be combined with other functions of the DALI actuator. It should be noted that the disabling function, the forced position function and the scene function override the switch-off function. The automatic switch-off can be activated only by a dimming process initiated by the communication objects for dimming (relative or absolute). If the switch-off function is overridden, the DALI actuator terminates the processing of the delay time and the evaluation of the switch-off brightness.

Switching on via the communication object "Switching - Setting" or "Central function... - Switching" does not activate the switch-off function if the switch-on brightness is below the switch-off brightness and the switch-on brightness is jumped to directly. If a soft ON function is configured, the switch-on brightness is dimmed. In this case, the switch-off function is activated as soon as the switch-on brightness has been set to static. To prevent this, configure the switch-on brightness to be greater than the switch-off brightness.

To use the switch-off function, the "Switch-on/switch-off behaviour" parameter must be activated on the parameter page "DALI systems -> DALI system... -> Switch-on/ switch-off behaviour".

Switching off always takes place without soft OFF function, i. e. jumping.

The status objects for the switching state and brightness value are updated by the automatic switch-off function after switching off.

Enabling automatic switch-off function

In the ETS, the automatic switch-off function can be activated separately for each DALI system on the parameter page "DALI systems -> DALI system... -> Switch-on/ switch-off behaviour".

The switch on/off behaviour must be enabled for the DALI system.

- Activate the "Automatic switch-off" parameter.

  The automatic switch-off function has been activated. Additional parameters become visible.

Setting the switch-off brightness

The switch-off brightness must be defined for the switch-off function. The switch-off brightness is set separately for each DALI system on the parameter page "DALI Systems -> DALI System... -> Switch-on/switch-off behaviour".

The switch-on/switch-off behaviour and the switch-off function must be enabled for the DALI system.

- Set the parameter "Switch off if brightness value is smaller than" to the required brightness value.

  As soon as a dimming process causes a value to fall below the configured switch-off brightness and the brightness has been set to constant, the DALI system switches off or alternatively starts the delay until switching off.

The switch-off brightness in the dimmable brightness range must be set between the configured maximum and minimum brightness. Automatic switch-off does not take place if "Switch-off brightness = Minimum brightness" is set, since the switch-off brightness cannot be undershot. The switch-off function is always active if the switch-off brightness is configured to maximum brightness and the maximum brightness is undershot by dimming.

Setting the delay of the switch-off function

A time delay can be activated before the switch-off function switches-off automatically after undershooting the switch-off brightness at the end of a dimming procedure. The time delay can be optionally activated separately for each DALI system on the parameter page "DALI systems -> DALI System... -> Switch-on/switch-off behaviour".

The switch-on/switch-off behaviour and the switch-off function must be enabled for the DALI system.

- Activate the parameter "Delay until switch-off". Configure the parameter "Delay time" to the required time.

  As soon as a dimming process causes a value to fall below the configured switch-off brightness and the brightness has been set to constant, the DALI actuator triggers the delay time. The DALI system concerned switches off once the delay time has elapsed. The delay time can be re-triggered by further dimming procedures.

9.7.4 Parameters for switch-on/switch-off behaviour

DALI systems -> DALI System... -> Enabled functions

Time delays	Checkbox (yes/**no**)
Up to two time functions can be preset independently of each other for each DALI system. The time functions apply only to the communication objects "Switching - Setting" or "Central function... - Switching" (if the central function is assigned to the DALI system) and delay the received object value depending on the telegram polarity. This parameter must be activated so that the time delays can be used.	

Switch-on/switch-off behaviour	Checkbox (yes/**no**)
The configurable switch-on/off behaviour includes the soft functions as well as the automatic switch-off function. The soft-functions permit a DALI system to be switched on or off at reduced speed if a switching command is received via the communication objects "Switching - Setting" or "Central function... - Switching". If the soft ON function is activated, a dimming procedure is executed until the switch-on brightness when switching on. This also occurs if the DALI system is already switched on to a brightness value smaller than switch-on brightness. Likewise, with the soft OFF function, a dimming process is executed to 0% brightness when receiving an OFF telegram. The switch-off function permits automatic switching of a DALI system after a brightness value was dimmed or jumped to and this new brightness value is below a switch-off brightness set in the ETS. A delay can be configured optionally until switching off. This parameter must be activated so that the soft functions and the automatic switch-off function can be used.	

Parameters for the time delays

DALI systems -> DALI System... -> Time delays

Switch-on delay	Checkbox (yes/**no**)
This parameter activates the switch-on delay. After receiving an ON telegram by means of the object "Switching - Setting" or "Central function... - Switching", the configurable time is started. An OFF-telegram received during the switch-on delay will end the delay and set the switching status to "OFF".	

Delay time	**0**...59 min 0...**10**...59 s
This parameter defines the delay time for the switch-on delay. It is available only if the switch-on delay is enabled.	

Retriggerable	Checkbox (yes/**no**)
This parameter defines whether a running switch-on delay can be retriggered. It is available only if the switch-on delay is enabled. Another ON telegram retriggers the time only if this parameter is activated.	

Switch-off delay	Checkbox (yes/**no**)
This parameter activates the switch-off delay. After receiving an OFF telegram by means of the object "Switching - Setting" or "Central function... - Switching", the configurable time is started. An ON-telegram received during the switch-off delay will end the delay and set the switching status to "ON".	

Delay time	**0**...59 min 0...**10**...59 s
This parameter defines the delay time for the switch-off delay. It is available only if the switch-off delay is enabled.	

Retriggerable	Checkbox (yes/**no**)
This parameter defines whether a running switch-off delay can be retriggered. It is available only if the switch-off delay is enabled. Another OFF telegram retriggers the time only if this parameter is activated.	

Parameters for the soft functions

DALI systems -> DALI System... Switch-on/switch-off behaviour

Soft ON function	Checkbox (yes/**no**)
This parameter activates the soft ON function. If the soft ON function is activated, a dimming procedure is executed until the switch-on brightness when switching on.	

Time between two dimming increments	**0**…59 s **10**...990 ms
This parameter defines the dimming speed for the soft ON function. It is available only if the soft ON function is enabled.	

Soft OFF function	Checkbox (yes/**no**)
This parameter activates the soft OFF function. With the soft OFF function activated, a dimming process is executed to 0% brightness after receiving an OFF telegram.	

Time between two dimming increments	**0**…59 s **10**...990 ms
This parameter defines the dimming speed for the soft OFF function. It is available only if the soft OFF function is enabled.	

Automatic switch-off	Checkbox (yes/**no**)
This parameter activates the switch-off function. The switch-off function permits automatic switching of a DALI system after a brightness value was dimmed or jumped to and this new brightness value is below a switch-off brightness set in the ETS.	

Switch-off if brightness value smaller than	1%, 2%, 3%, 4%, **5%**, 6%, 7%, 8%, 9%, 10%, 15%, 20%...50%...100%
The switch-off brightness must be defined for the switch-off function. As soon as a dimming process causes a value to fall below the configured switch-off brightness and the brightness has been set to constant, the DALI system switches off or alternatively starts the delay until switching off. The switch-off brightness in the dimmable brightness range must be set between the configured maximum and minimum brightness. Automatic switch-off does not take place if "Switch-off brightness = Minimum brightness" is set, since the switch-off brightness cannot be undershot. The switch-off function is always active if the switch-off brightness is configured to maximum brightness and the maximum brightness is undershot by dimming. This parameter is available only if the switch-off function is enabled.	

Delay until switch-off	Checkbox (yes/**no**)
A time delay can be activated before the switch-off function switches-off automatically after undershooting the switch-off brightness at the end of a dimming procedure. If the function is activated, the DALI actuator triggers the delay time as soon as the dimming process causes a value to fall below the configured switch-off brightness and the brightness has been set to constant. The DALI system concerned switches off once the delay time has elapsed. The delay time can be re-triggered by further dimming procedures. This parameter is available only if the switch-off function is enabled.	

Delay time	**0**...23 h **0**...59 min 0...**30**...59 s
This parameter defines the delay time for the switch-off function. It is available only if the delay time is enabled.	

9.8 Staircase function

The staircase function can be used for implementing time-controlled lighting of a staircase or for function-related applications. The staircase function must be enabled on the parameter page "DALI systems -> DALI system... -> Enabled functions" so that the required communication objects and parameters are available.

The staircase function is activated via the communication object "Staircase function - Start/Stop" and is independent of the "Switching - Setting" object. In this way, parallel operation of time control and normal control is possible, whereby the last command received is always executed. A telegram on the object "Switching - Setting" at the time of an active staircase function aborts the staircase time prematurely and sets the switching state according to the received object value (the time delays are also taken into account). Likewise, the switching state of the object "Switching - Setting" can be overridden by a staircase function.
Time-independent continuous light switching can also be implemented in combination with a disabling function because the disabling function has a higher priority and overrides the switching state of the staircase function.

The staircase function can be extended by means of a supplementary function. At the same time, it is possible activate a time extension. The "time extension" permits retriggering of an activated staircase via the object "Staircase function - Start/Stop" n times. Alternatively, the "time preset via the bus" can be set. With this supplementary function, the configured staircase time can be multiplied by a factor received via the bus, thus it can be adapted dynamically.

Furthermore, an extension of the staircase function can be implemented by means of a pre-warning function. During the pre-warning, the brightness can be reduced. The pre-warning should warn people in the staircase that the light will soon be switched off. As an alternative to the pre-warning at the end of the staircase time, the DALI actuator can activate reduced continuous lighting. In this way, for example, long, dark hallways can have permanent basic lighting.

The staircase function influences only the brightness of a DALI system. The colour temperature or colour is not affected by the staircase function.

Specifying switch-on behaviour of the staircase function

An ON telegram to the "Staircase function - Start/Stop" object activates the staircase time (T_{ON}), the duration of which is defined by the "Staircase time" parameters. The DALI system switches on to switch-on brightness. At the end of the staircase time, the DALI system shows the "At the end of the staircase time" configured in the ETS. At the same time, the DALI system can switch off, optionally activate the pre-warning time ($T_{Prewarn}$) of the pre-warning function or dim to the reduced continuous lighting (application: e.g. long, dark hallways). Taking into account a possible pre-warning function, this gives rise to the example switch-on behaviour of the staircase function.

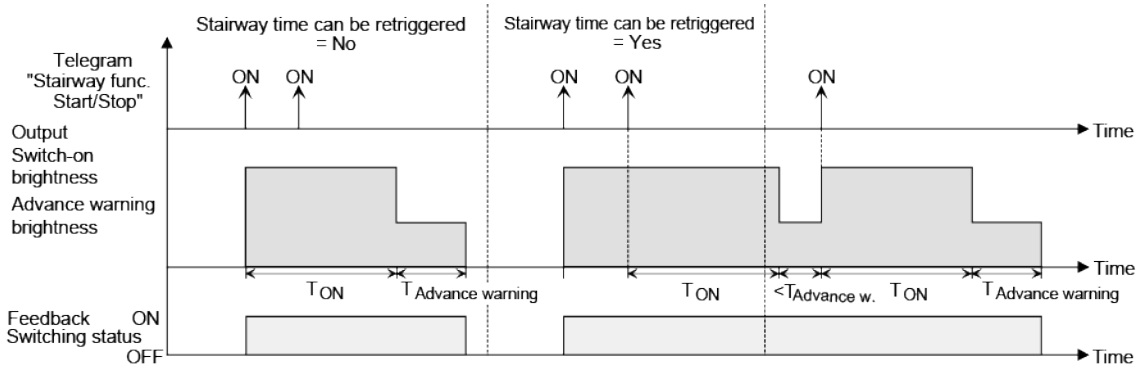


Figure 36: Switch-on behaviour of the staircase function without soft functions

In addition, switching on can be influenced by the soft functions of the DALI actuator. Taking into account a soft ON and soft OFF function, this gives rise to the switch-on behaviour of the staircase function shown below.

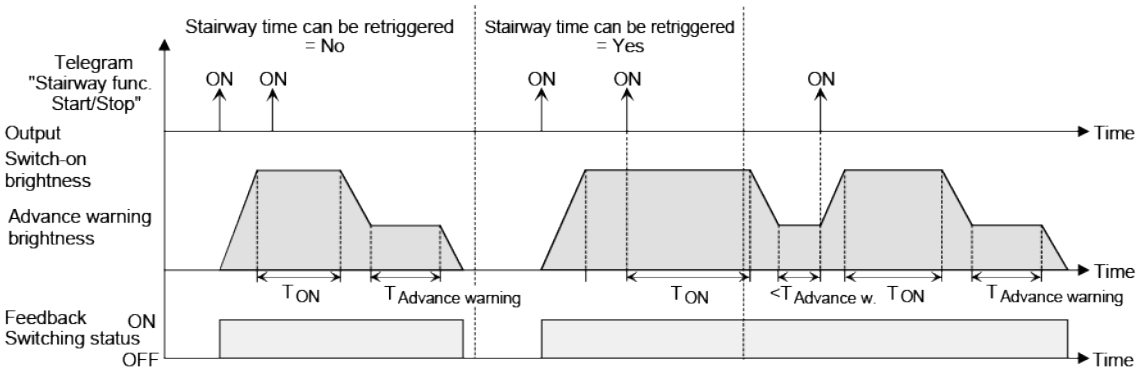


Figure 37: Switch-on behaviour of the staircase function with soft functions (as an example with minimum brightness = 0 %)

- Activate the "Staircase function" parameter on the parameter page "DALI systems -> DALI System... -> Enabled functions".

  The staircase function is enabled. The parameter page "DALI systems -> DALI System... -> Staircase function" and other parameters are visible.

The staircase function must be enabled.

- In the "Staircase time" parameter, configure the necessary switch-on time of the staircase function.
- Activate the "Retriggerable" parameter.

  Every ON telegram received during the ON phase of the staircase time retriggers the staircase time completely.

- Alternatively, deactivate the "Retriggerable" parameter.

  ON telegrams received during the ON phase of the staircase time are rejected. The staircase time is not retriggered.

An ON telegram received during the pre-warning time or during the reduced continuous lighting always subsequently triggers the staircase time independently of the "Retriggerable" parameter.

Setting the switch-on delay of the staircase function

An ON telegram for activation of the staircase function can also be evaluated with a time delay. This switch-on delay can be activated separately for the staircase function and has no influence on the configurable time delays for the object "Switching - Setting".

The staircase function must be enabled.

- On the parameter page "DALI systems -> DALI System... - General -> Staircase function", deactivate the parameter "Switch-on delay".

  The switch-on delay is deactivated. After receiving an ON telegram on the object "Staircase function - Start/Stop", the staircase time is activated immediately.

- Activate the parameter "switch-on delay".

  The switch-on delay has been activated for the staircase function. The desired switch-on delay time can be specified. After receipt of an ON telegram on the object "Staircase function - Start/Stop", the switch-on delay is started. Another ON-telegram triggers the time only when the parameter "Switch-on delay retriggerable" is activated. The staircase time is activated only after the time delay has elapsed.

i An OFF telegram via the object "Staircase function - Start/Stop" during the switch-on delay only terminates the delay if the parameter "Reaction to OFF-telegram" is set to "switch off". Otherwise, the OFF telegram is ignored.

i When the supplementary function "Time extension" is preset, the parameter "Switch-on delay retriggerable" cannot be adjusted. In this case, it is permanently deactivated.

Specifying switch-off behaviour of the staircase function

In the case of a staircase function, the reaction to an OFF telegram can also be configured to the object "Staircase function - Start/Stop". At the end of the staircase time, the DALI system always shows the "At the end of the staircase time" configured in the ETS, without the receipt of an OFF telegram. At the same time, the DALI system can switch off, optionally activate the pre-warning time ($T_{Prewarn}$) of the pre-warning function or dim to the reduced continuous lighting (application: e.g. long, dark hallways).

If, on the other hand, the DALI system receives an OFF telegram via the object "Staircase function start/stop", the DALI actuator evaluates the parameter "Reaction to an OFF-telegram". In this case, the DALI system can react immediately to the OFF telegram and end the staircase time prematurely. Alternatively, the OFF telegram can be ignored. Taking into account any possible pre-warning function, this gives rise to the example switch-off behaviour of the staircase function.

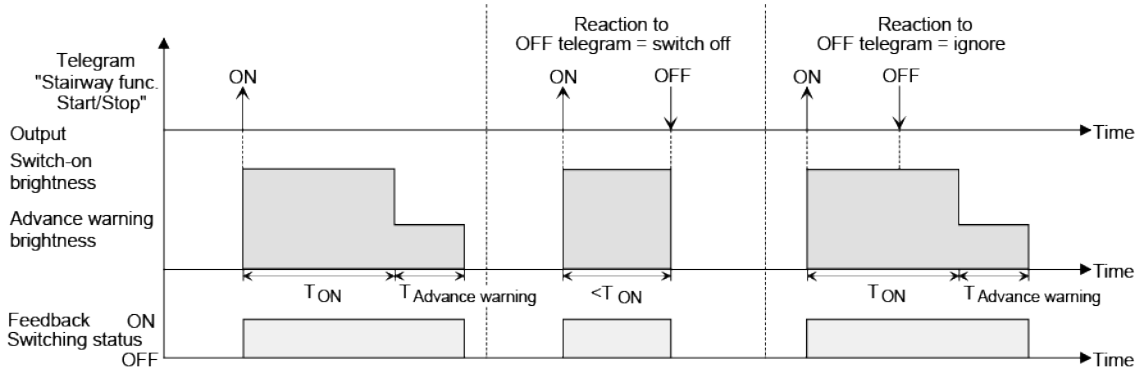


Figure 38: Switch-off behaviour of the staircase function without soft functions

In addition, the switch-off can be influenced by the soft functions of the DALI actuator. Taking into account a soft ON and soft OFF function, this gives rise to the switch-off behaviour of the staircase function shown below.

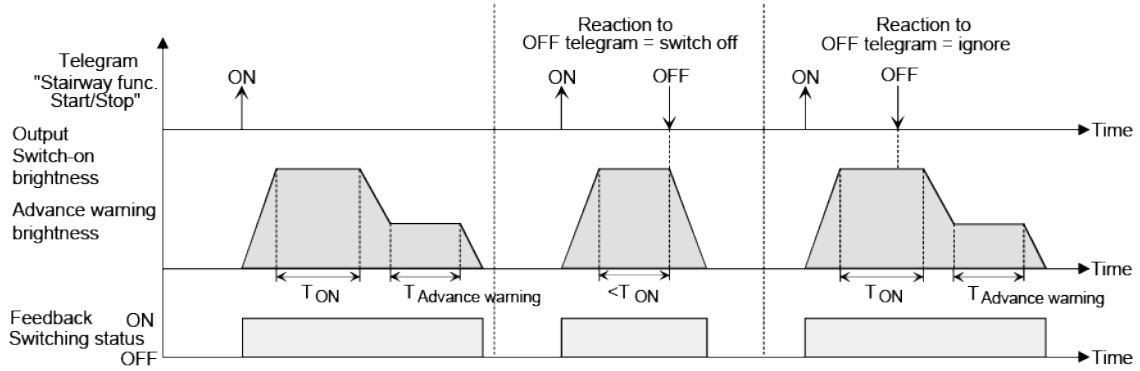


Figure 39: Switch-off behaviour of the staircase function with soft functions (as an example with minimum brightness = 0 %)

The parameter "Reaction to OFF-telegram" defines whether the staircase time (T_{ON}) of the staircase function can be aborted prematurely. This parameter can be found on the parameter page "DALI systems -> DALI system... -> Staircase function" and relates exclusively to the "Staircase function start / stop" object.

The staircase function must be enabled.

- Set parameter "Reaction to OFF-telegram" to "switch off".

  Once an OFF telegram is received via the object "Staircase function - Start/Stop" during the ON phase of the staircase time, the operating devices switch off immediately. If the staircase time is stopped prematurely by such a telegram, there is no pre-warning, i. e. the pre-warning time is not started. It is also not dimmed to a reduced continuous lighting. It is also possible to switch off prematurely during a dimming process of a soft function or during a pre-warning or reduced continuous lighting.

- Set parameter "Reaction to OFF-telegram" to ignore".

  OFF telegrams received via the object "Staircase function - Start/Stop" during the ON phase of the staircase function are rejected. The staircase time is executed completely to the end with the configured "at the end of the staircase time".

Setting the pre-warning function of the staircase function

At the end of the switch-on time of the staircase function, the DALI system shows the "at the end of the staircase time" configured in the ETS. The DALI system can be set to switch off immediately, alternatively to dim to the reduced continuous lighting (application: e.g. long, dark hallways) or to execute the pre-warning function. If the parameter is configured to "activate pre-warning time", the pre-warning time ($T_{Prewarn}$) and pre-warning brightness can be configured in the ETS.

The pre-warning should warn people still on the staircase that the light will soon be switched off. As a pre-warning, the operating devices can be set to a reduced brightness (pre-warning brightness) before they switch off permanently. The pre-warning brightness is normally reduced in the brightness value compared to the switch-on brightness. The pre-warning time ($T_{prewarn}$) and the pre-warning brightness can be configured separately. The pre-warning time is added to the staircase time (T_{ON}). The pre-warning time influences the values of the status objects so that the switching state "OFF" and the value "0" are not tracked in the objects until the pre-warning time has elapsed.

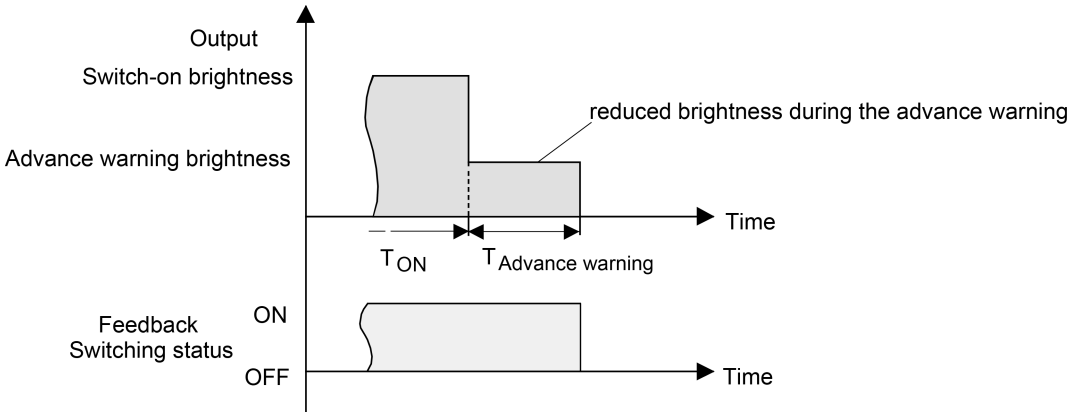


Figure 40: The pre-warning function of the staircase function without soft OFF function

Additionally, the pre-warning function can also be extended by the soft OFF function. Taking into account a soft OFF function, this gives rise to the switch-off behaviour of the staircase function shown below after the pre-warning has elapsed.

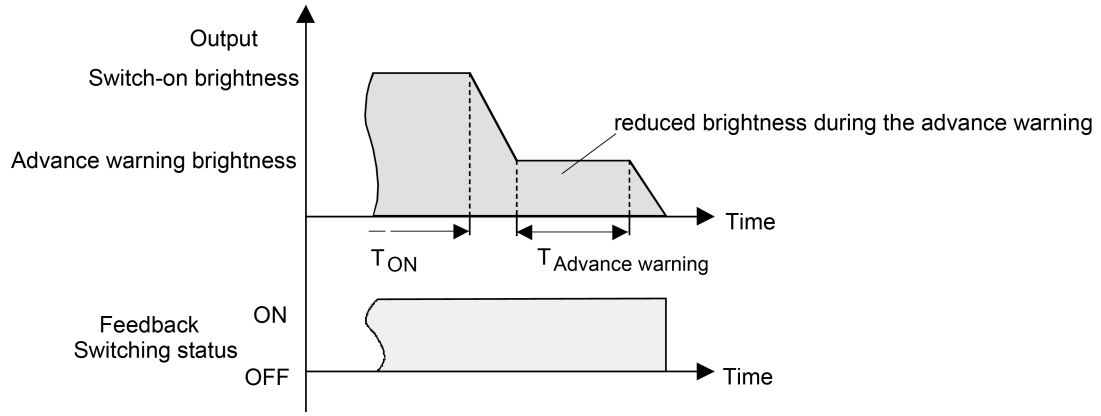


Figure 41: The pre-warning function of the staircase function with soft OFF function (as an example with minimum brightness = 0%)

The pre-warning brightness does not necessarily have to be less than the switch-on brightness. The pre-warning brightness can always be configured to values between maximum brightness and minimum brightness.

The staircase function must be enabled.

- On the parameter page "DALI systems -> DALI System... -> Staircase function" set the parameter "At the end of the staircase time" to "activate pre-warning time".

  The pre-warning function is enabled. The desired pre-warning time ($T_{Prewarn}$) can be preset.

- Configure the "pre-warning time".
- Set the parameter "Reduced brightness" to the desired brightness value.

  During the pre-warning time, the DALI system is set to the configured brightness value.

An ON telegram on the object "Staircase function - Start/Stop" while a pre-warning function is in progress stops the pre-warning time and always restarts (independently of the "Retriggerable" parameter) the staircase time again. Even during the pre-warning time, the parameter "reaction to OFF telegram" is evaluated so that a pre-warning in progress can be terminated early by switching off.

Using the automatic switch-off function: The reduced brightness of the pre-warning does not start the switch-off function after reaching or undershooting the switch-off brightness!

Setting continuous lighting of the staircase function

At the end of the switch-on time of the staircase function, the DALI actuator shows the configured behaviour "at the end of the staircase time" for the DALI system concerned. The DALI system can be set to switch off immediately, alternatively to execute a pre-warning function, or to dim to reduced continuous lighting. The reduction of the lighting to continuous lighting after the staircase time has elapsed is appropriate, for example, if a certain degree of artificial light should be switched on permanently in long, dark hallways. Switching to switch-on brightness by activating the staircase function normally takes place by additional presence detectors or motion detectors when people are present in the hallway.

If the parameter "At the end of the staircase time" is configured to "activate reduced continuous lighting", the brightness for the continuous lighting can be configured. The continuous brightness is normally reduced in the brightness value compared to the switch-on brightness.

The continuous lighting remains permanently active after the staircase time has elapsed. Only when an ON telegram is received again via the object "Staircase function start/stop" does the DALI actuator switch back to the switch-on brightness and start counting the staircase time again. The receipt of an OFF telegram via the object "Staircase function - Start/Stop" switches the continuous lighting off only if the parameter "Reaction to OFF-telegram" is configured to "Switch-off".

A DALI system can always be switched on and off via the object "Switching - Setting", independently of the staircase function. Consequently, continuous lighting will also be overridden if telegrams arrive via this object. If permanent continuous lighting is desired, which cannot be influenced by the object "Switching - Setting" nor by the object of the staircase function, the disabling function should be used.

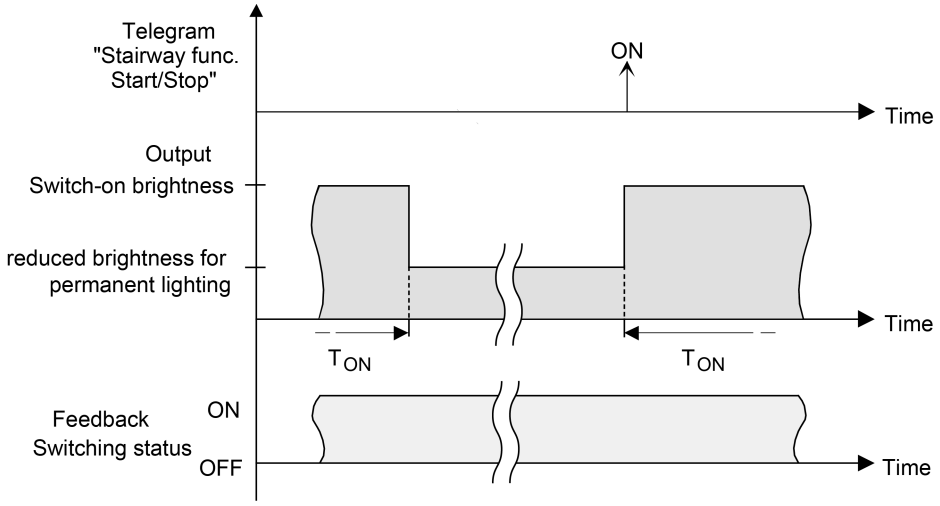


Figure 42: The continuous lighting of the staircase function without soft functions

Additionally, the continuous lighting can also be extended by the soft function. Taking into account any soft ON and soft OFF function, this gives rise to modified continuous lighting behaviour of the staircase function.

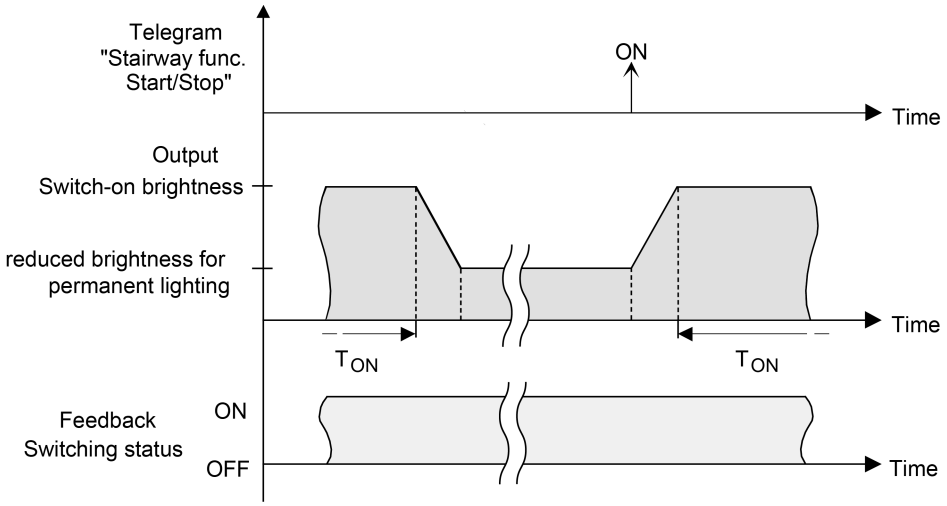


Figure 43: The continuous lighting of the staircase function with soft OFF functions

The brightness of the continuous lighting does not necessarily have to be less than the switch-on brightness. The brightness of the continuous lighting can always be configured to values between minimum brightness and maximum brightness.

The staircase function must be enabled.

- On the parameter page "DALI systems -> DALI System... -> Staircase function", set the parameter "At end of the staircase time" to "Activate reduced continuous lighting".

  The continuous lighting is enabled. The "Reduced brightness" can be set to the desired brightness value.

The configured value for the reduced brightness must be greater than or equal the minimum brightness or less than or equal the maximum brightness!

An ON telegram on the object "Staircase function - Start/Stop" always restarts (independently of the "Retriggerable" parameter). Even during activated continuous lighting, the parameter "Reaction to OFF telegram" is evaluated so that continuous lighting can be switched off.

Using the automatic switch-off function: The reduced brightness of the continuous lighting does not start the switch-off function after reaching or undershooting the switch-off brightness!

Setting supplementary function of the staircase function – time extension

With the time extension function, the staircase time can be retriggered several times, i. e. extended, via the "Staircase function - Start/Stop" object. The duration of the extension is predefined by several operations at the control section (several ON telegrams in succession). The configured staircase time can be extended in this way within a time period by a maximum of the configured factor (a maximum of 5-fold). The time is always extended automatically at the end of a single staircase time (T_{ON}).

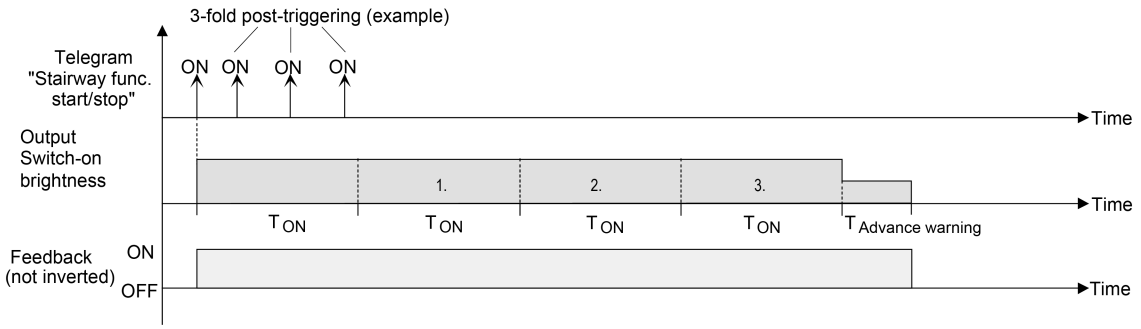


Figure 44: Time extension of the staircase function

With this function, the duration of a switched on light in a staircase can be extended (e.g. by a person after shopping) by a defined length of time without having to retrigger the switch-on time of the lighting every time the lighting shuts off automatically.

- Set the parameter "Supplementary function" to "time extension" and set the maximum desired factor in the "maximum time extension" parameter.

  Each time an ON telegram is received on the object "Staircase function - Start/Stop", the staircase time is extended automatically by retriggering after it has elapsed. The number of telegrams received determines how often the staircase time is retriggered. The retriggering within the period of a staircase time (T_{ON}) can occur only as often as specified by the configured factor. For ex-

ample, the "3-fold time" setting means that after the started staircase time has elapsed and within the current retriggered time period, it is retriggered automatically a maximum of three additional times.

A time extension can generally be triggered during the entire switch-on time. In each period of an extended staircase time, new extensions can take place by telegrams. The "Maximum time extension" parameter is re-evaluated in each new time period.

Telegrams for the time extension are only evaluated during the staircase time. An ON telegram during the pre-warning function or continuous lighting triggers the staircase time as a restart, which means that a new time extension is possible.

If a time extension has been configured as a supplementary function, the "Retriggerable" parameter is permanently set to "No" because the retriggering is carried out by the time extension.

Setting supplementary function of the staircase function – time preset via the bus

With the time preset via the bus, the configured staircase time can be multiplied by an 8-bit factor received via the bus, thus it can be adapted dynamically. In this setting, the factor is derived from the object "Staircase time - Factor". The possible factor value for setting the staircase time is between 1…255.

The entire staircase time arises as a product from factor (object value) and the configured staircase time as a basis as follows...
Staircase time = (staircase time object value) x (staircase time parameter)

Example:
Object value "staircase time factor" = 5; parameter "staircase value" = 10s.
-> set staircase time = 5 x 10s = 50 s

Alternatively, the staircase function parameter can define whether the receipt of a new factor also starts the staircase time of the staircase function at the same time. In this case, the object "Staircase function - Start/Stop" is not necessary and the received factor value determines the starting and stopping.

- Set the "Supplementary function" parameter to "time preset via the bus" and deactivate the parameter "staircase function activatable via 'staircase time' object".

  The staircase time can be adapted dynamically by the object "Staircase time - Factor". The value "0" is interpreted as the value "1". The staircase function is started and stopped exclusively via the "Staircase function - Start/Stop" object.

- Set the parameter "supplementary function for staircase function" to "time preset via the bus" and activate the parameter "staircase function activatable via 'staircase time' object".

The staircase time can be adapted dynamically by the object "Staircase time - Factor". In addition, the staircase function is started with the new staircase time (the object "Staircase function - Start/Stop" is not necessary). The factor value "0" is interpreted as an OFF telegram, whereby in this case, the configured reaction to an OFF telegram is evaluated, too.

A larger staircase with several floors is an example as an application for the time preset via the bus with automatic starting of the staircase time. On each floor there is a push-button sensor that transmits a factor value to the staircase function. The higher the floor, the greater the factor value transmitted so that the lighting stays switched on longer if the passing through the staircase needs more time. When a person enters a staircase and a pushbutton is pressed, the staircase time is now adjusted dynamically to the staircase time and switches on the lighting at the same time, too.

- A factor > 0 received during a warning time triggers the staircase time independently of the "Retriggerable" parameter.

i After a reset (bus voltage return or ETS programming operation) the object "Staircase time - Factor" is always initialised with "1". The staircase function is not started automatically solely as the result of this, however.

Presetting behaviour of the staircase function after bus or mains voltage return

The staircase function can be started automatically after bus or mains voltage return.

The staircase function must be enabled.

- On the parameter page "DALI systems -> DALI System...", set the parameter "After bus or mains voltage return" to "activate staircase function".

  Immediately after bus or mains voltage return, the staircase time of the staircase function is started.

i The configured behaviour will only be executed, if no forced position on bus voltage return is activated.

9.8.1 Parameters for staircase function

DALI systems -> DALI System... -> Enabled functions

Staircase function	Checkbox (yes/**no**)
The staircase function can be used for implementing time-controlled lighting of a staircase or for function-related applications. This parameter must be activated so that the staircase function can be used.	

DALI systems -> DALI System... -> Staircase function

Staircase time	**0**...23 h 0...**3**...59 min **0**…59 s
The duration of the switch-on time for the staircase function is configured here.	

Retriggerable	Checkbox (yes/**no**)
The staircase time can be retriggered if necessary. Activated: Every ON telegram received during the ON phase of the staircase time re-triggers the staircase time completely. Deactivated: ON telegrams received during the ON phase of the staircase time are rejected. The staircase time is not retriggered. An ON telegram received during the pre-warning time or during the reduced continuous lighting always subsequently triggers the staircase time independently of the "Retriggerable" parameter. If a time extension has been configured as a supplementary function, the "Retriggerable" parameter is permanently set to "No" because the retriggering is carried out by the time extension.	

Switch-on delay	Checkbox (yes/**no**)
An ON telegram for activation of the staircase function can also be evaluated with a time delay. This parameter activates the switch-on delay of the staircase function if required. Activated: The switch-on delay has been deactivated for the staircase function. The desired switch-on delay time can be specified. After receipt of an ON telegram on the object "Staircase function - Start/Stop", the switch-on delay is started. Another ON-telegram triggers the time only when the parameter "Switch-on delay retriggerable" is activated. The staircase time is activated only after the time delay has elapsed. Deactivated: The switch-on delay is deactivated. After receipt of an ON telegram on the object "Staircase function - Start/Stop", the staircase time is activated immediately and the output switched on.	

Switch-on delay	**0**...23 h **0**...59 min 0...**30**...59 s
The time of the switch-on delay is configured here. The staircase time is activated only after the time delay has elapsed. This parameter is available only if the switch-on delay of the staircase function is enabled.	

Switch-on delay retriggerable	Checkbox (yes/**no**)
An ON telegram for activation of the staircase function can also be evaluated with a time delay. This parameter activates the switch-on delay of the staircase function if required. Activated: The switch-on delay has been deactivated for the staircase function. The desired switch-on delay time can be specified. After receipt of an ON telegram on the object "Staircase function - Start/Stop", the switch-on delay is started. Another ON-telegram triggers the time only when the parameter "Switch-on delay retriggerable" is activated. The staircase time is activated and the output is switched on only after the time delay has elapsed. Deactivated: The switch-on delay is deactivated. After receipt of an ON telegram on the object "Staircase function - Start/Stop", the staircase time is activated immediately and the output switched on. This parameter cannot be adjusted if the "Time extension" supplementary function is set. In this case, it is permanently deactivated. This parameter is available only if the switch-on delay of the staircase function is enabled.	

Reaction to OFF-telegram	**Switch off** ignore
In the event of a staircase function, the reaction to an OFF telegram to the object "Staircase function - Start/Stop" can also be set with this parameter. Switch off: Once an OFF telegram is received via the object "Staircase function - Start/Stop" during the ON phase of the staircase time, the operating devices switch off immediately. If the staircase time is stopped prematurely by such a telegram, there is no pre-warning, i. e. the pre-warning time is not started. It is also not dimmed to a reduced continuous lighting. It is also possible to switch off prematurely during a dimming process of a soft function or during a pre-warning or reduced continuous lighting. Ignore: OFF telegrams received via the object "Staircase function - Start/Stop" during the ON phase of the staircase function are rejected. The staircase time is executed completely to the end with the configured "at the end of the staircase time".	

Supplementary function	**no supplementary function** Time extension Time preset via the bus
The staircase function can be extended by means of a supplementary function. Time extension: The staircase time can be retriggered several times, i. e. extended by means of the time extension. The duration of the extension is predefined by several operations at the control section (several ON telegrams in succession). The configured staircase time can be extended in this way within a time period by a maximum of the configured factor (a maximum of 5-fold). The time is then always extended automatically at the end of a single staircase time. Each time an ON telegram is received on the object "Staircase function - Start/Stop", the staircase time is extended automatically by retriggering after it has elapsed. The number of telegrams received determines how often the staircase time is retriggered. The retriggering within the period of a staircase time (TON) can occur only as often as specified by the configured factor. Time preset via the bus: With the time preset via the bus, the configured staircase time can be multiplied by an 8-bit factor received via the bus, thus it can be adapted dynamically. In this setting, the factor is derived from the object "Staircase time - Factor".	

Maximum time extension	**1-fold staircase time** 2-fold staircase time 3-fold staircase time 4-fold staircase time 5-fold staircase time
The configured staircase time can be extended within a time period by a maximum of the factor configured here. The time is then always extended automatically at the end of a single staircase time. The retriggering within the period of a staircase time can only occur as often as the configured factor specifies. This parameter is available only with "supplementary function = time extension".	

Staircase function activatable via "Staircase time" object	Checkbox (yes/**no**)
At this point it can be defined whether the reception of a new factor also starts the staircase time of the staircase function at the same time. In this case, the object "Staircase function - Start/Stop" is not necessary and the received factor value determines the starting and stopping. Activated: The staircase time can be adapted dynamically by the object "Staircase time - Factor". In addition, the staircase function is started with the new staircase time (the object "Staircase function - Start/Stop" is not necessary). The factor value "0" is interpreted as an OFF telegram, whereby in this case, the configured reaction to an OFF telegram is evaluated, too. Deactivated: The staircase time can be adapted dynamically by the object "Staircase time - Factor". The value "0" is interpreted as the value "1". The staircase function is started and stopped exclusively via the "Staircase function - Start/Stop" object. This parameter is available only with "supplementary function = time preset via the bus.	

At the end of staircase time	**Switch off** Activate pre-warning time activate reduced continuous lighting
At the end of the switch-on time of the staircase function, the DALI system shows the behaviour configured here. The DALI system can be set to switch off immediately, alternatively to dim to the reduced continuous lighting (application: e.g. long, dark hallways) or to execute the pre-warning function.	

Pre-warning time	**0**...59 min 0...**30**...59 s
This parameter is used for setting the duration of the pre-warning time. The pre-warning time is added to the switch-on time. The reduced brightness is set during the time configured here. This parameter is visible only with activated pre-warning time.	

Reduced brightness	1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 15%, 20%...**50%**...100%
This parameter defines the reduced brightness that is set for pre-warning or continuous lighting. This parameter is visible only with activated pre-warning time or continuously lighting.	

9.8.2 Objects for staircase function

Function	Name	Type	DPT	Flag
Staircase function - Start/Stop	DALI System 1...4 - Input	1-bit	1.010	C, -, W, -, U
1-bit object to activate or deactivate the switch-on time of the staircase function ("1" = switch-on / "0" = switch-off).				

Function	Name	Type	DPT	Flag
Staircase time - Factor	DALI System 1...4 - Input	1-byte	5.010	C, -, W, -, U
1-byte object to specify a time factor for the switch-on time of the staircase function (value range: 0...255).				

9.9 Operating hours counter

The operating hours counter determines the switch-on time of a DALI system. A DALI system is switched on for the operating hours counter if the brightness value is greater than "0", i. e. when the lamp is lit up. The operating hours counter can either be configured as a second counter or alternatively as an hour counter.

– Second counter
  The DALI actuator adds up the determined switch-on time accurately to the second for a DALI system. The totalled operating seconds are added in a 4-byte counter and stored permanently in the DALI actuator. The current counter reading can be transmitted cyclically to the KNX by the "Operating hours counter - Counter reading - Status" communication object or when there is a change in an interval value in accordance with DPT 13.100.

– Hour counter
  The DALI actuator adds up the determined switch-on time accurately to the minute for a DALI system in full operating hours. The totalled operating hours are added in a 2-byte counter and stored permanently in the device. The current counter reading can be transmitted cyclically to the KNX by the "Operating hours counter - Counter reading - Status" communication object or when there is a change in an interval value in accordance with DPT 7.007.

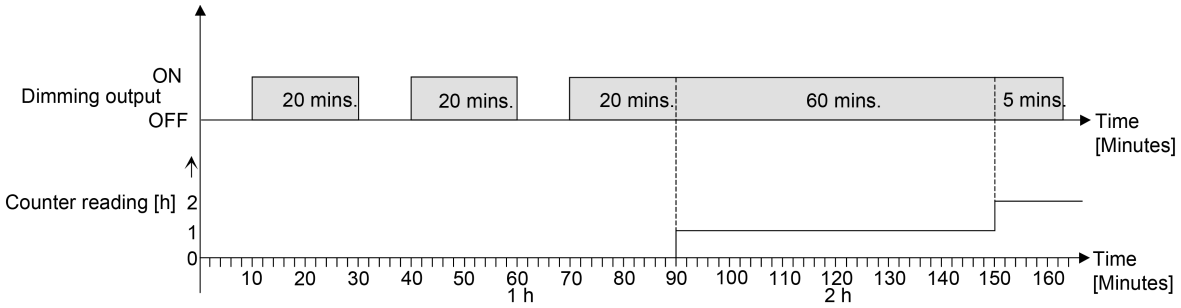


Figure 45: Function of the operating hours counter (using the example of counted hours)

In the delivery state, all values of the DALI actuator are "0". If the operating hours counter is not enabled in the configuration of a DALI system, no operating hours or operating seconds are counted. Once the operating hours counter is enabled in the ETS, however, the operating hours or operating seconds are determined and added up by the ETS immediately after commissioning the DALI actuator. If the operating hours counter is subsequently disabled again in the parameters and the DALI actuator is programmed with this disabling function, all operating hours pr operating seconds previously counted for the appropriate DALI system will be deleted. When enabled again, the counter reading of the operating hours counter is always set to "0".

The operating hour values (full hours) or operating seconds stored in the device are not lost in the event of a bus/mains voltage failure or due to an ETS programming operation. On the hour counter: Any summed up operating minutes (full hour not yet reached) will be rejected in this case, however.

After the bus or mains voltage returns or after an ETS programming operation, the DALI actuator updates the communication object "Operating hours counter - Counter reading" for each DALI system and actively transmits the object value to the KNX. The object value can also be read out at any time with the read flag set.

Activating the operating hours counter

- On the parameter page "DALI systems -> DALI System... -> Enabled functions" activate the parameter "operating hours counter".

  The operating hours counter is activated.

- Deactivate the operating hours counter".

  The operating hours counter is deactivated.

Disabling of the operating hours counter and subsequent programming with the ETS resets the counter status to "0".

Setting the counter type

The operating hours counter can optionally be configured as an up-counter or down-counter. Depending on this type of counter, a limit or start value can be set optionally, whereby, for example, the operating time of a lamp can be monitored by restricting the counter range.

Up-counter:
After activating the operating hours counter by enabling in the ETS or by restarting, the operating hours are counted starting at "0". A maximum of 65,535 hours or 2,147,483,647 seconds can be counted (corresponds to approx. 66 years). After that the counter stops and signals a counter operation via the object "Operating hours counter - Counter reading elapsed - Status".
A limit value can be optionally set in the ETS or specified via the communication object "Operating hours counter - Signal value". In this case, the counter operation is signalled to the KNX via the "Operating hours counter - Counter reading elapsed - Status" object if the signal value is reached, but the counter continues counting - if it is not restarted - up to the maximum value and then stops. Only a restart initiates a new counting operation.

Down-counter:
After enabling the operating hours counter in the ETS, the counter reading is set to "0" and the DALI actuator signals a counter operation for the DALI system concerned after the programming operation or after the bus voltage returns via the object "Operating hours counter - Counter reading elapsed - Status". Only after a restart is the down-counter set to the maximum value of 65,535 hours or 2,147,483,647 seconds (corresponds to approx. 66 years) and the counter operation is started.
A start value can optionally be set in the ETS or specified via the communication object "Operating hours counter - Start value". If a start value is set, the down-counter is initialised with this value instead of the maximum value after a restart. The counter then counts the start value downwards by the hour. When the down-counter reaches

the value "0", the counter operation is signalled to the KNX via the object "Operating hours counter - Counter reading elapsed - Status" and counting is stopped. Only a restart initiates a new counting operation.

The operating hours counter must be enabled.

- Set the "Counting direction" parameter on the parameter page "DALI systems -> DALI System... -> Operating hours counter" to "Forward". Activate the parameter "Specify signal value" if monitoring of a signal value is necessary. Otherwise deactivate the parameter. If signal value monitoring is activated with "preset value", decide whether the signal value is to be specified by parameters or an object. Configure the required signal value if parameters is specified.

  The counter counts the operating hours forwards starting from "0 h". If signal value monitoring is activated, the DALI actuator transmits an "ON" telegram for the DALI system concerned via the object "Operating hours counter - Counter reading elapsed - Status" as soon as the specified signal value is reached. Otherwise, the counter operation is first transmitted when the maximum value is reached.

- Set the "Counting direction" parameter to "Backward". Activate the "Specify start value" parameter if it is necessary to specify the start value. Otherwise deactivate the parameter. If start value monitoring is activated with "preset value", decide whether the start value is to be specified by parameters or an object. Configure the required start value if parameters is specified.

  The counter counts the operating hours down to "0" after a restart. With a start value preset, the start value is counted down, otherwise the counting operation starts at the maximum value. The DALI actuator transmits an "ON" telegram for the affected DALI system via the object "Operating hours counter - Counter reading elapsed - Status" as soon as the value "0" is reached.

i The value of the communication object "Operating hours counter - Counter reading elapsed - Status" is permanently stored internally in the device. When switching on the bus/mains voltage or after an ETS programming operation, the object is initialised with the most recently saved value. If, in this case, an operating hours counter is identified as elapsed, i. e. if the object value is set to "ON", an additional telegram is actively transmitted to the KNX as soon as the configured transmit delay has elapsed after the bus/mains voltage returns. If the counter has not yet elapsed ("OFF" object value), then no telegram is transmitted after the bus/mains voltage returns or after an ETS programming operation.

i If a signal value or start value is specified by the communication object, the values received via the object are not accepted as valid and permanently stored internally in the device until the operating hours counter is restarted. On switching on the supply voltage or after an ETS programming operation, the object is initialised with the most recently saved value. The values received are lost in the event of a mains voltage failure or due to an ETS programming operation if no counter restart was executed beforehand. For this reason, when specifying a new signal or start value, it is advisable always to restart the counter afterwards as well. A standard value of 65,535 hours or 2,147,483,647

seconds is predefined provided that no signal value or start value has been received yet via the object. The values received and stored via the object are reset to the standard value if the operating hours counter is disabled in the parameters of the ETS and an ETS programming operation is being performed.

i If a signal value or start value is specified by the object: If the signal or value or start value is specified with "0", the DALI actuator will ignore a counter restart in order to avoid an undesired reset (e.g. in construction site mode -> operating hours already counted in manual operation).

i If the counting direction of an operating hours counter is reversed by reconfiguration in the ETS, the counter should always be restarted after programming the DALI actuator so that the counter is reinitialised.

Restarting the operating hours counter

The counter reading of the operating hours can be reset at any time by the communication object "Operating hours counter - Reset". The polarity of the reset telegram is predefined: "1" = Restart / "0" = No reaction.
In the up-counter the counter is initialised with the value "0" after a restart and in the down-counter initialised with the start value. If no start value was configured or predefined by the object, the start value is preset to 65,535 hours or 2,147,483,647 seconds.

During every counter restart, the initialised counter reading is transmitted actively to the KNX. After a restart, the signal of a counter operation is also reset. At the same time, an "OFF" telegram is transmitted to the KNX via the object "Operating hours counter - Counter reading elapsed - Status". In addition, the signal or start value is initialised.

i If a new signal or start value was specified via the communication object, the counter should always be restarted afterwards too. Otherwise, the values received will be lost in the case of a bus voltage failure or by an ETS programming operation.

i If a signal value or start value is specified with "0", there are different behaviours after a restart, depending on the value specification principle...
If specified by parameters:
The counter elapses immediately after a counter restart.
Preset via object:
A counter restart will be ignored to avoid an undesired reset (e.g. after installation of the devices with hours already being counted by manual operation). A start value or signal value greater than "0" must be specified in order to perform the restart.

Setting the transmission behaviour

The current value of the operating hours counter is continuously tracked in the communication object "Operating hours counter - Counter reading - Status". The content of the object is transmitted to the KNX when there is a change by the set count interval or cyclically active. The object value can also be read out at any time (set read flag).

The operating hours counter must be enabled.

- Set the "Transmission behaviour" parameter on the parameter page "DALI systems -> DALI system... -> Operating hours counter" to "After change by interval value". Configure the parameter "Counting interval" to the desired value.

  The counter reading is transmitted to the KNX as soon as it changes by the specified counting interval.

- Set the parameter "Transmission behaviour" to "cyclical".

  The counter value is transmitted cyclically. The cycle time is defined via the parameter of the same name.

i After the bus/mains voltage returns or an ETS programming operation, the counter reading is always immediately transmitted automatically.

9.9.1 Parameters for operating hours counter

DALI systems -> DALI System... -> Enabled functions

Operating hours counter	Checkbox (yes/**no**)
The operating hours counter can be enabled here. The operating hours counter determines the switch-on time of a DALI system. A DALI system is switched on for the operating hours counter if the lamp is lit. If the operating hours counter is not enabled, no operating hours will be counted for the DALI system concerned. Once the operating hours counter is enabled, however, the operating hours will be determined and added up by the ETS immediately after commissioning the DALI actuator. If the operating hours counter is subsequently disabled again in the parameters and the DALI actuator is programmed with this disabling function, all operating hours previously counted will be deleted. When enabled again, the counter reading of the operating hours counter is always set to "0".	

DALI systems -> DALI System... -> Operating hours counter

Counting method	**Seconds** Hours
The operating hours counter can either be configured as a second counter or alternatively as an hour counter. Seconds: The DALI actuator adds the determined switch-on time for a switched-on DALI system to the second. The totalled operating seconds are added in a 4-byte counter and stored permanently in the device. The current counter reading can be transmitted cyclically to the KNX by the "Operating hours counter - Counter reading - Status" communication object or when there is a change in an interval value in accordance with DPT 13.100. Hours: The actuator adds up the determined switch-on time accurately to the minute for a switched-on DALI system in full operating hours. The totalled operating hours are added in a 2-byte counter and stored permanently in the device. The current counter reading can be transmitted cyclically to the KNX by the "Operating hours counter - Counter reading - Status" communication object or when there is a change in an interval value in accordance with DPT 7.007.	

Counting direction	**Forwards** Backwards
The operating hours counter can be configured as an up-counter or down-counter. The setting here influences the visibility of the other parameters and objects of the operating hours counter.	

Specify signal value	Checkbox (yes/**no**)
If the up-counter is used, a signal value can optionally be predefined. This parameter is visible only in "forwards" counting direction.	

Preset value	Via parameter Via object
This parameter defines whether the signal value can be set via a separate parameter or adapted individually by a communication object from the bus. This parameter is visible only in "forwards" counting direction.	

Signal value	0...**2147483647*** 0...**65535****
The signal value of the up-counter is set here. Once the signal value is reached, an "ON" telegram is transmitted via the object "Operating hours counter - Counter elapsed - Status". The counter itself continues until the maximum counter status is reached and then stops. *: With second counter **: With hour counter This parameter is visible only if the parameter "Specify signal value" is activated and the "Preset value" parameter set to "via parameter".	

Specify start value	Checkbox (yes/**no**)
If the down-counter is used, a start value can optionally be predefined. This parameter is visible only in "backwards" counting direction.	

Preset value	Via parameter Via object
This parameter defines whether the start value can be set via a separate parameter or adapted individually by a communication object from the bus. This parameter is visible only in "backwards" counting direction.	

Start value	0...**2147483647*** 0...**65535****
The start value of the down-counter is set here. *: With second counter **: With hour counter This parameter is visible only if the parameter "Specify start value" is activated and the "Preset value " parameter set to "via parameter".	

Transmission behaviour	**Cyclical** after change by interval value
The current value of the operating hours counter is continuously tracked in the communication object "Operating hours counter - Counter reading - Status". The content of the object is transmitted to the KNX when there is a change by the set count interval or cyclically active. Cyclical: The counter value is transmitted cyclically. The cycle time is defined via the parameter of the same name. After change by interval value: The counter reading is transmitted to the KNX as soon as it is changed by the specified counting interval.	

Cycle time	**0**...23 h 0...**15**...59 min **0**…59 s
This parameter defines the cycle time for the cyclical transmission. Setting the cycle time hours, minutes and seconds. This parameter is available only with "Transmission behaviour = cyclical".	

Counting interval	0...**3600**...2147483647 s * 0...**1**...65535 h **
The interval of the counter value is set here for automatic transmission. The current counter reading is transmitted to the KNX after the interval configured here. *: With second counter **: With hour counter This parameter is available only with "Transmission behaviour = on change by interval value".	

9.9.2 Objects for operating hours counter

Function	Name	Type	DPT	Flag
Operating hours counter - Restart	DALI System 1...4 - Input	1-bit	1.015	C, -, W, -, U
1-bit object for resetting the operating hours counter ("1" = restart, "0" = no reaction).				

Function	Name	Type	DPT	Flag
Operating hours counter - Counter reading - Status	DALI System 1...4 - Output	4-byte	13.100	C, R, -, T, A
4-byte object to transmit or read out the current counter reading of the operating hours counter. Value range: 0...2147483647 seconds The value of the communication object is not lost in the event of a bus/mains voltage failure and is actively transmitted to the KNX after the bus/mains voltage returns or after an ETS programming operation. In the as-delivered state, the value is "0". This object is only available with the second counter.				

Function	Name	Type	DPT	Flag
Operating hours counter - Counter reading - Status	DALI System 1...4 - Output	2-byte	7.007	C, R, -, T, A
2-byte object to transmit or read out the current counter reading of the operating hours counter. Value range: 0...65,535 hours The value of the communication object is not lost in the event of a bus/mains voltage failure and is actively transmitted to the KNX after the bus/mains voltage returns or after an ETS programming operation. In the as-delivered state, the value is "0". This object is only available with the hour counter.				

Function	Name	Type	DPT	Flag
Operating hours counter - Counter elapsed - Status	DALI System 1...4 - Output	1-bit	1.002	C, R, -, T, A
1-bit object to signal that the operating hours counter has elapsed (forwards counter = signal value reached / backwards counter = value "0" reached). With a message, the object value is actively transmitted to the KNX ("1" = message active / "0" = message inactive). The value of the communication object is not lost in the event of a bus/mains voltage failure and is actively transmitted to the KNX after the bus/mains voltage returns or after an ETS programming operation. In the as-delivered state, the value is "0".				

Function	Name	Type	DPT	Flag
Operating hours counter - Signal value / Start value	DALI System 1...4 - Input	4-byte	13.100	C, -, W, -, U
4-byte object for external specification of a signal/start value of the operating hours counter. Value range: 0...2147483647 seconds This object is only available with the second counter.				

Function	Name	Type	DPT	Flag
Operating hours counter - Signal value / Start value	DALI System 1...4 - Input	2-byte	7.007	C, -, W, -, U
2-byte object for external specification of a signal/start value of the operating hours counter. Value range: 0...65,535 hours This object is only available with the hour counter.				

10 Scene function

Each DALI system can optionally be integrated in up to 16 scenes, which means that pre-programmed static light scenes can be recalled by influencing the brightness, colour temperature or colour. If necessary, the scene values can be switched over and individually adapted and saved during operation of the device, allowing the user to replace the presettings of the ETS as desired. The extended scene recall allows scenes to be switched over by switching commands.

The scene function must be enabled separately on the parameter page "DALI systems -> DALI system... -> Scenes" for each DALI system so that the required communication objects and parameters become available.

Each scene is given a unique number (1...16). This number is only a label within the ETS in order to distinguish clearly between the individual scenes, even if they have the same name. In addition, scenes have KNX numbers (1...64). These KNX numbers can be used to recall a scene or a scene memory function using the scene extension object. Scene numbers do not have to be identical to KNX extension numbers. However, KNX numbers must be unique. It is not possible to assign the same KNX numbers to multiple scenes of a DALI system.

The scene configuration selected in the ETS decides whether the number of scenes is either variable (1...16) or alternatively fixed to the maximum (16).

– Scene configuration = "variable (1 ... 16 scenes)"
  With this setting, the number of scenes used can be selected anywhere in the range 1 to 16. The "Number of scenes" parameter decides how many scenes are available in the ETS for the selected DALI system. It is possible to specify which scene number (1 ... 64) controls each scene. If necessary, individual scenes can be switched to inactive by configuring the scene number "0".
– Scene configuration = "fixed (16 scenes)"
  With this setting, all scenes are always visible and can therefore be used. The scenes are controlled via permanently assigned scene numbers (1 ... 16) (scene number 1 -> scene 1, scene number 2 -> scene 2 ...). If necessary, individual scenes can be deactivated.

A scene recall overrides a brightness value specification and a switching or dimming process and also colour temperature or colour specifications by means of the respective communication objects. A staircase function is also overridden by a scene recall. The priority of the scene function over the disabling or forced position functions of a DALI system can be configured for each scene. Thus, it is possible for a scene recall to override a disabling or forced position function. Alternatively, a scene can have a lower priority, which means that disabling functions or forced positions cannot be overridden by a scene recall. A function overridden by a scene recall is executed again when the function is updated via the KNX.
A scene recall can optionally take place after a delay.

Configuring extended scene recall

The extended scene recall allows up to 16 scenes of a DALI system to be called up in sequence. Here, scene recall takes place via the 1-bit communication object "Extended scene recall". Each ON telegram received via this object recalls the next of the available scenes in the configuration. Each OFF telegram received recalls the previous scene.

In the event of an extended scene recall, the DALI actuator always recalls the neighbouring scene - starting with the scene most recently recalled by the extended recall. It is irrelevant whether the scene is active (scene number = "1...64" or scene active) or inactive (scene number = "0" or scene inactive). When an ineffective scene is recalled by the extended scene recall, the assigned DALI system does not react.

Only the scenes available in the scene configuration can be selected via the extended scene recall (with "variable" defined by the parameter "number of scenes", with "fixed" always all 16 scenes). After a reset (bus/mains voltage return, ETS programming operation), an ON or OFF telegram always recalls scene 1 first.

Recall of a scene via the 1-byte extension object does not influence the scene sequence of the extended scene recall. The two recall functions work independently of each other.

- Activate the "Extended scene recall" parameter on the parameter page "DALI system... -> Scenes" activate.

  The object "Extended scene recall" is available. Each ON telegram recalls the next scene. Each OFF telegram recalls the previous scene.

- Deactivate the "Extended scene recall" parameter.

  The extended scene recall is deactivated. A scene can be recalled only with the 1-byte extension device object.

The extended scene recall can take place with or without an overflow at the scene limits. An overflow occurs when the last scene of the selected configuration is reached when counting up or scene 1 when counting down and an additional telegram is received in the last counting direction. The overflow behaviour is defined in the ETS.

- Activate the parameter "with overflow".

  After reaching the last scene of the selected configuration, a further ON telegram of the overflow is executed and scene 1 is recalled. Similarly, after reaching scene 1, the overflow is executed by further OFF telegram and the last scene of the selected configuration is recalled.

- Deactivate the parameter "With overflow".

  A scene overflow is not possible. After reaching the last scene of the selected configuration, further ON telegrams of the extended scene recall are ignored. In the same way, the DALI actuator ignores further OFF telegrams if scene 1 was recalled last.

Setting scene values

For each DALI system, it is necessary to specify which brightness value is to be set when a scene is recalled. When using colour temperature control, a colour temperature can also be defined. The same applies to the colour control.

A DALI system must be assigned to a scene.

- On the parameter page "DALI systems -> DALI System... -> Scenes", specify the necessary scene brightness value for each scene. Deactivate the "Active" parameter if the DALI system is not to change any brightness value when the selected scene is recalled.

  During a scene recall, the respective configured brightness value is set on the operating devices.

  In the setting "Active = deactivated", the brightness value of the DALI system remains unchanged when recalling the scene.

- When using the colour temperature control: specify the necessary scene colour temperature value for each assigned DALI system. Deactivate the "Active" parameter if the corresponding DALI system is not to change any colour temperature value when the selected scene is recalled.

  During a scene recall, the appropriate configured colour temperature is set on the operating devices. It should be noted that a colour temperature specified in the scene is only visually effective for the DALI lights if the DALI system is switched on too.
  Even when the DALI system is switched off, colour temperature changes are tracked internally in the device when recalling a scene. When switching on a DALI system after a scene recall, the colour temperature most recently recalled according to the scene is set.

  In the setting "Active = deactivated", the colour temperature value of the DALI system remains unchanged when the scene is called up.

- When using the colour control: specify the necessary scene colour temperature value for each assigned DALI system. Deactivate the "Active" parameter if the DALI system should not change any colour values when the selected scene is recalled.

  When a scene is recalled, the respective configured colour and, if applicable, the white value are set in the operating devices. It should be noted that a colour specified in the scene is only visually effective in the DALI lights if the DALI system is switched on too.
  Even when the DALI system is switched off, colour changes are tracked internally in the device when recalling a scene. When switching on the DALI system after a scene recall, the colour most recently recalled according to the scene is set.

  In the setting "Active = deactivated", the colour values of the DALI system remain unchanged when the scene is called up.

The configured scene values are then adopted in the DALI actuator during an ETS programming operation only if the parameter "Overwrite values stored in the device during the ETS programming operation" is activated.

Recalling a scene also triggers status telegrams, provided they are configured. It should be noted that, even with long scene dimming sequences, the scene target values are transmitted as a status immediately after starting the dimming process, i. e. already when the target value has not yet been statically reached.

The selection of scene values is not limited in the ETS to the configured minimum and maximum values of the DALI system. If the scene values are outside the range defined by the minimum and maximum values, the DALI actuator limits the values to the defined limits.

Presetting the storage behaviour for the scene function

The scene values of assigned DALI systems can be stored internally in the device when a storage telegram is received by means of the scene extension object during the running time of the DALI actuator. It is possible to influence the values to be saved before saving them (e.g. switching, dimming, preset value, manual operation). The values are always saved for an entire scene and for all assigned DALI systems, whereby it can be individually configured which brightness values, colour temperature values or colours are saved.

A DALI system must be assigned to a scene.

- On the parameter page "DALI systems -> DALI System... -> Scene", activate the "Save" parameter in the "Brightness" category for the scenes that are to include the brightness value in the saving process.

  The storage function of the brightness is activated for the scene in question. The current brightness value is stored internally in the scene by means of the extension object when receiving a storage telegram.

- Deactivate the "Save" parameter in the "Brightness" category for the scenes that are not to include the brightness value in the saving process.

  The storage function of the brightness is deactivated for the scene in question. A storage telegram received via the extension object will be rejected based on the brightness. During a scene recall, the brightness permanently defined in the ETS is then recalled.

- When using colour temperature control: On the parameter page "DALI systems -> DALI system... -> Scenes", activate the "Save" parameter in the "Colour temperature" category for the scenes that are to include the colour temperature value in the saving process.

  The storage function of the colour temperature is activated for the scene in question. The current colour temperature value is stored internally in the scene by means of the extension object when receiving a storage telegram.

- When using colour temperature control, deactivate the "Save" parameter in the "Colour temperature" category for the scenes that are not to include the colour temperature value in the saving process.

  The storage function of the colour temperature is deactivated for the scene in question. A storage telegram received via the extension object is rejected based on the colour temperature. During a scene recall, the colour temperature permanently defined in the ETS is then recalled.

- When using colour control: On the parameter page "DALI systems -> DALI system... -> Scenes", activate the "Save" parameter in the "Colour" category for the scene that are to include the colour values in the saving process.

  The storage function of the colour is activated for the scene in question. When a memory telegram is received via the extension object, the current colour values are saved in the scene within the device.

- When using colour control, deactivate the "Save" parameter in the "Colour" category for the scenes that are not to include the colour values in the saving process.

  The storage function of the colour is deactivated for the scene in question. A storage telegram received via the extension object is rejected based on the colours. When a scene is called up, the colours defined in the ETS are called up.

i Whenever scene values are not active ("Active = deactivated" parameter), the storage function for the affected values cannot be executed. In the ETS, the "Save" parameter cannot be activated in the respective category.

i During a saving operation, scene values are saved to an internal non-volatile memory in the DALI actuator, thus overwriting the values of a DALI system programmed by the ETS. The scene values configured in the ETS are then adopted in the DALI actuator during ETS programming again only if the parameter "Overwrite values stored in the device during the ETS programming operation" is activated.

Setting the scene priority

The priority of the scene function over the disabling or forced position functions of a DALI system can be configured for each DALI system. Thus, it is possible for a scene recall to override a disabling or forced position function. Alternatively, a scene can have a lower priority, which means that disabling functions or forced positions cannot be overridden by a scene recall.
The scene priority can be configured for each DALI system.

- On the parameter page "DALI systems -> DALI System... -> Scenes", configure the parameter "Priority to disabling/forced position" to "low".

  The scene has a lower priority than the disabling functions/forced positions of the assigned DALI system. It is not possible to recall or save a scene if a disabling function/forced position is activated in an assigned DALI system.

- Configure the parameter "Priority to disabling/forced position" to "high".

The scene has a higher priority than the disabling functions/forced positions of the assigned DALI system. Scenes are only ever called-up or saved when a scene extension device is received.

A scene recall does not statically lock subordinate functions of a DALI system. The higher priority only determines that scene values are set at the moment the scene is recalled and override the previously active values. After a scene is recalled, it is possible for the scene values to be subsequently changed by other functions of the DALI actuator (e.g. on terminating a disabling functions/ forced position or by switching, dimming or preset value).

Setting the ETS programming behaviour for the scene function

When storing a scene, the scene values are stored internally to a non-volatile memory in the device. To prevent the stored values from being replaced during ETS programming of the application or parameters by the originally programmed scene brightness values, the DALI actuator can inhibit overwriting of the scene values. As an alternative, the original values can be reloaded into the device during each programming run of the ETS.
The ETS programming behaviour can be configured separately for each DALI system.

- On the parameter page "DALI systems -> DALI System... -> Scenes", activate the parameter "Overwrite values stored in the device during the ETS programming operation".

  During each ETS programming operation of the application program or of the parameters, the scene values configured in the ETS will be programmed into the DALI actuator. Scene values stored in the device by means of a storage function will be overwritten, if any.

- Deactivate the parameter "Overwrite values stored in the device during the ETS programming operation".

  Scene values stored in the device with a storage function will be maintained. If no scene values have been stored, the scene values last programmed in the ETS remain valid.

i During the initial commissioning of the DALI actuator, this parameter should be set to activated so that the scenes are initialised with valid scene values.

Presetting the recall delay for the scene function

A scene recall can optionally also be evaluated after a delay. With this feature, dynamical scene sequences can, for example, be configured if several actuators are combined with cyclical scene telegrams.
The scene recall delay can be configured for each DALI system.

- On the parameter page "DALI systems -> DALI System... -> Scenes", activate the parameter "Delay scene recall". Configure the delay time.

The delay time is activated. The delay influences the scene recall of the DALI system. The delay time is started on arrival of a recall telegram. Only after the time has elapsed is the corresponding scene called up and the scene values set.

- Deactivate the "Delay scene recall" parameter.

  The delay time is deactivated. A scene recall is carried out without a delay immediately after the receipt of a scene recall telegram.

i Each scene recall telegram restarts the delay time and, in this way, retriggers it.

i The scene recall delay has no influence on the storage of scene values. A scene storage telegram within a scene recall delay terminates the delay and thus the scene recall.

i All time functions are stopped if the mains voltage supply to the DALI actuator fails. Therefore, all scene recalls that are still in the delay stage will be aborted. A scene recall received shortly before a mains voltage failure will then be lost if the corresponding delay has not yet elapsed. A bus voltage failure alone does not stop an elapsing delay. If the mains voltage supply is still available, the last scene called up is executed at the end of the delay. A delayed scene recall is also aborted if a function of higher priority (e.g. manual operation, forced position function, disabling function) is activated.

Setting the dimming behaviour when recalling a scene

In the scene configuration, it is possible to define whether the scene values for the assigned DALI system jump instantly or dim. A scene recall can therefore be executed independently of the set dimming behaviour.
The behaviour during a scene recall can be configured separately for each scene.

- On the parameter page "DALI systems -> DALI System... -> Scenes", set the parameter "On scene request" to "Jumping to values".

  The values of the scenes are jumped to instantly during a recall.

- Set the "On scene request" parameter to "dimming values via fading". At the same time, define the required fading time.

  The values of the scene concerned are dimmed to during a recall. The dim fading is activated. The fading time defines the duration of the dimming process until the new values are achieved. The brightness, colour temperature and colour values are irrelevant. The dimming procedure in case of a scene recall always requires the exact predefined time.

i The configured dimming time for the dim fading of the scene function may deviate from the standard dimming behaviour of the DALI system. The DALI actuator always works with a standard fading time of 2 seconds.

10.1 Parameters for scenes

DALI systems -> DALI System... -> Enabled functions

Scenes	Checkbox (yes/**no**)
The DALI systems can optionally be integrated in up to 16 scenes, which means that pre-programmed static light scenes can be recalled by influencing the brightness, colour temperature or colour. If necessary, the scene values can be switched over and individually adapted and saved during operation of the device, allowing the user to replace the presettings of the ETS as desired. The extended scene recall allows scenes to be switched over by switching commands. The scene function must be enabled by this parameter so that the required communication objects and parameters become available.	

DALI systems -> DALI System... -> Scenes

Priority to disabling/forced position	**low** high
The priority of the scene function over the disabling or forced position functions can be configured for each DALI system. Thus, it is possible for a scene recall to override a disabling or forced position function. Alternatively, a scene can have a lower priority, which means that disabling functions or forced positions cannot be overridden by a scene recall. low: The scene has a lower priority than the disabling or forced position functions. It is not possible to recall or save a scene if the disabling or forced position functions are activated in the DALI system. high: The scene has a higher priority than the disabling or forced position functions. Scenes are only ever called-up or saved when a scene extension device is received. A scene recall does not statically lock lower-level functions of the DALI system. The higher priority only determines that scene values are set at the moment the scene is recalled and override the previously active values. After a scene is recalled, it is possible for the scene values to be subsequently changed by other functions of the DALI actuators (e.g. on terminating the disabling or forced position functions or by switching, dimming or preset value).	

Overwrite values stored in the device during the ETS programming operation	Checkbox (**yes**/no)
When storing a scene, the scene values are stored internally to a non-volatile memory in the device. To prevent the stored values from being replaced during ETS programming of the application or parameters by the originally programmed scene brightness values, the DALI actuator can inhibit overwriting of the scene values. As an alternative, the original values can be reloaded into the device during each programming run of the ETS. Parameter activated: During each ETS programming operation of the application program or of the parameters, the scene values configured in the ETS are programmed into the DALI actuator. Scene values stored in the device by means of a storage function will be overwritten, if any. Parameter deactivated: The scene values stored in the device by a storage function are maintained. If no scene values have been stored, the scene values last programmed in the ETS remain valid.	

On scene request	Jumping to values **Dimming values via fading**
You can define here whether the scene values for the DALI system are to be called up by being instantly jumped to or dimmed to. A scene recall can therefore be executed independently of the set dimming behaviour. Jumping to values: The values of the scene concerned are jumped to instantly during a recall. Dimming to values via fading: The values of the scene concerned are dimmed to during a recall. The dim fading is activated. The fading time defines the duration of the dimming process until the new values are achieved. The brightness, colour temperature and colour values of the DALI system at which the dimming process starts has no significance. The dimming procedure in case of a scene recall always requires the exact predefined time.	

Fading time	Fading (0.7 s) Fading (1.4 s) **Fading (2.0 s)** Fading (2.8 s) Fading (4.0 s) Fading (5.7 s) Fading (8.0 s) Fading (11.3 s) Fading (16.0 s) Fading (22.5 s) Fading (32.0 s) Fading (45.3 s) Fading (64.0 s) Fading (90.5 s)
Setting of the fading time for dimming to the scene values. This parameter is available only for "On scene request = dimming values via fading".	

Delay scene recall	Checkbox (yes/**no**)
Each scene recall can optionally also be evaluated after a delay. With this feature, dynamical scene sequences can, for example, be configured if several actuators are combined with cyclical scene telegrams. Parameter activated: The delay time is activated. The delay influences the scene recall of the DALI system. The delay time is started on arrival of a recall telegram. Only after the time has elapsed is the corresponding scene called up and the scene values set. Parameter deactivated: The delay time is deactivated. A scene recall is carried out without a delay immediately after the receipt of a scene recall telegram.	

Delay time	**0**...59 min 0...**10**...59 s
The delay time configured here is started when a recall telegram arrives. Only after the time has elapsed is the corresponding scene called up and the scene values set. Each scene recall telegram restarts the delay time and retriggers it. If a new scene recall telegram is received while a delay is active (scene recall not yet executed), the old (and not yet recalled scene) will be rejected and only the scene last received executed. This parameter is available only when the scene recall delay is active.	

Extended scene recall	Checkbox (yes/**no**)
The extended scene recall allows up to 16 scenes of a DALI system to be called up in sequence. Here, scene recall takes place via the 1-bit communication object "Extended scene recall". Each ON telegram received via this object recalls the next of the available scenes in the configuration. Each OFF telegram received recalls the previous scene. In the event of an extended scene recall, the DALI actuator always recalls the neighbouring scene - starting with the scene most recently recalled by the extended recall. It is irrelevant whether the scene is active (scene number = "1...64" or scene active) or inactive (scene number = "0" or scene inactive). When an inactive scene is recalled by the extended scene recall, the DALI system does not react. Only the scenes available in the scene configuration can be selected via the extended scene recall (with "variable" defined by the parameter "number of scenes", with "fixed" always all 16 scenes). After a reset (bus/mains voltage return, ETS programming operation), an ON or OFF telegram always recalls scene 1 first.	

With overflow	Checkbox (yes/**no**)
The extended scene recall can take place with or without an overflow at the scene limits. An overflow occurs when the last scene of the selected configuration is reached when counting up or scene 1 when counting down and an additional telegram is received in the last counting direction.	

Scene configuration	**variable (1...16 scenes)** fixed (16 scenes)
Each scene receives a unique number (1...16), which is shown in square brackets before the name in the view of the parameter pages. This number is only a label within the ETS in order to distinguish clearly between the individual scenes, even if they have the same name. In addition, scenes have KNX numbers (1...64). These KNX numbers can be used to recall a scene or a scene memory function using the scene extension object. Scene numbers do not have to be identical to KNX extension numbers. However, KNX numbers must be unique. It is not possible to assign the same KNX numbers to multiple scenes of a DALI system. The scene configuration selected here decides whether the number of scenes is either variable (1 ... 16) or alternatively fixed to the maximum (16). variable (1...16 scenes): With this setting, the number of scenes used can be selected anywhere in the range 1 to 16. The "Number of scenes" parameter decides how many scenes are available in the ETS for the selected DALI system. It is possible to specify which scene number (1 ... 64) controls each scene. If necessary, individual scenes can be switched to inactive by configuring the scene number "0". fixed (16 scenes): With this setting, all scenes are always visible and can therefore be used. The scenes are controlled via permanently assigned scene numbers (1 ... 16) (scene number 1 -> scene 1, scene number 2 -> scene 2 ...). If necessary, individual scenes can be deactivated.	

Number of scenes	1...**10**...16
This parameter decides how many scenes are available in the ETS for the selected DALI system. This parameter is only available with variable scene configuration.	

KNX scene number	0...64
Each scene receives a unique number (1...16), which is shown in square brackets before the name in the view of the parameter pages. This number is only a label within the ETS in order to distinguish clearly between the individual scenes, even if they have the same name. In addition, scenes have KNX numbers (1...64). These KNX numbers can be used to recall a scene or a scene memory function using the scene extension object. Scene numbers do not have to be identical to KNX extension numbers. However, KNX numbers must be unique. It is not possible to assign the same KNX numbers to multiple scenes of a DALI system. If necessary, individual scenes can be switched to inactive by configuring the scene number "0". The default setting of the parameter depends on the number of the selected scene. This parameter is only available with variable scene configuration. With a fixed scene configuration, the scenes are controlled by permanently assigned scene numbers.	

Scene active	Checkbox (**yes**/no)
With a fixed scene configuration, individual scenes can be switched to inactive by this parameter if necessary. This parameter is only available with fixed scene configuration.	

Name	Scene...
Each scene can be given a designation, which is visible only in the ETS for better identification.	

Assign	Checkbox (yes/**no**)
This parameter defines the assignment of the DALI system to the scene. Only assigned scenes are processed during a scene recall or when saving a scene. If the parameter is deactivated, no scene parameters can be set for the DALI system.	

Brightness Active	Checkbox (**yes**/no)
This parameter defines the assignment of the DALI system to the brightness control of the scene. If the checkbox is selected, the scene influences the brightness. If it is deleted, the brightness value of the DALI system remains unchanged when the scene is recalled.	

Brightness Value	OFF, 1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9%, 10%, 15%, 20%...50%...**100%**
During a scene recall, the appropriate configured brightness value is set on the operating devices.	

Brightness Save	Checkbox (yes/**no**)
The current brightness value can be saved in the DALI actuator when a storage telegram is received via the scene extension object. When the checkbox is activated, the brightness storage function is activated for the scene concerned. The current brightness value is stored in the DALI actuator in the scene via the extension object when a storage telegram is received.	

Colour temperature Active	Checkbox (yes/**no**)
This parameter defines the assignment of the DALI system to the colour temperature control of the scene. If the checkbox is selected, the scene influences the colour temperature. If it is deleted, the colour temperature value of the scene remains unchanged when the scene is recalled. The "Colour temperature" category is available only for DALI systems that enable this range of functions.	

Colour temperature Value	1.000...**2.000**...10.000
When a scene is recalled, the respective configured colour temperature value is set on the operating devices.	

Colour temperature Save	Checkbox (yes/**no**)
The current colour temperature value can be saved in the DALI actuator when a storage telegram is received via the scene extension object. When the checkbox is activated, the colour temperature storage function is activated for the scene. The current colour temperature value is stored in the DALI actuator in the scene via the extension object when a storage telegram is received.	

Colour Active	Checkbox (yes/**no**)
This parameter defines the assignment of the DALI system to the colour control of the scene. If the checkbox is selected, the scene influences the colour and optionally the white value. If it is deleted, the colour or the white value of the DALI system remains unchanged when the scene is recalled. The "Colour" category is available only for DALI systems that enable this range of functions.	

Colour Colour value	#000000...**#FFFFFF**
When a scene is recalled, the respective configured RGB colour value is set on the operating devices.	

Colour White value	0...**255**
For DALI systems, a white value can also be defined in the scene in addition to the RGB colour value in the "Colour RGBW" scope of functions.	

Colour Save	Checkbox (yes/**no**)
The current colour value can be saved in the DALI actuator when a storage telegram is received via the scene extension object. When the checkbox is activated, the storage function for the colour and optionally also the white value is activated for the DALI system. When a storage telegram is received via the extension object, the colour and the white value in the DALI actuator are stored in the scene.	

10.2 Objects for scenes

Function	Name	Type	DPT	Flag
Scenes - Extension	DALI System 1...4 - Input	1-byte	18.001	C, -, W, -, U
1-byte object for recalling scenes (bit 7 deleted) or for storing new scene values (bit 7 set). Bits 0...6 carry the KNX scene number (data value 0...63 -> KNX scene number 1...64).				

Function	Name	Type	DPT	Flag
Extended scene recall	DALI System 1...4 - Input	1-bit	1.001	C, -, W, -, U
1-bit object for extended scene recall. Each ON telegram received recalls the next scene in sequence. Each OFF telegram received recalls the previous scene. After a reset (bus/mains voltage return, ETS programming operation), an ON or OFF telegram always recalls scene 1 first.				

Gira
Giersiepen GmbH & Co. KG
Elektro-Installations-
Systeme

Industriegebiet Mermbach
Dahlienstraße
42477 Radevormwald

Postfach 12 20
42461 Radevormwald

Deutschland

Tel +49(0)21 95 - 602-0
Fax +49(0)21 95 - 602-191

www.gira.de
info@gira.de