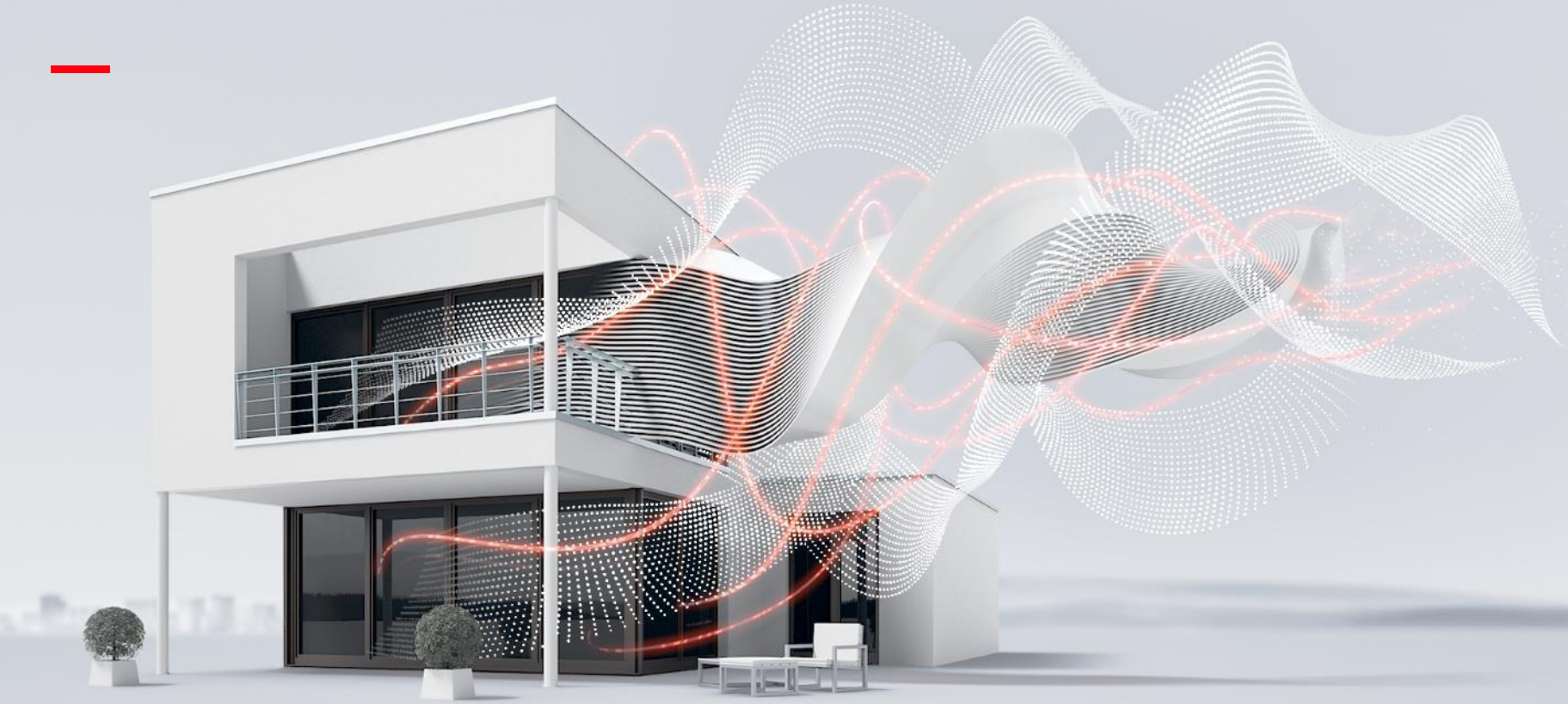

MAY 2020

KNX DALI Gateway Premium DG/S x.64.5.1

Competence Center Europe – Smart Buildings

Thorsten Reibel, Jürgen Schilder

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Agenda

Why new KNX DALI Gateways?

Overview of all KNX DALI Gateways from ABB

Definitions

- Tunable White
- Human Centric Lighting (HCL)
- Dim2Warm

KNX DALI Gateway Premium DG/S x.64.5.1

- Overview and Functions
- ETS Application and ABB i-bus® Tool (Practical Demonstration)
- Commercial and Marketing Aspects

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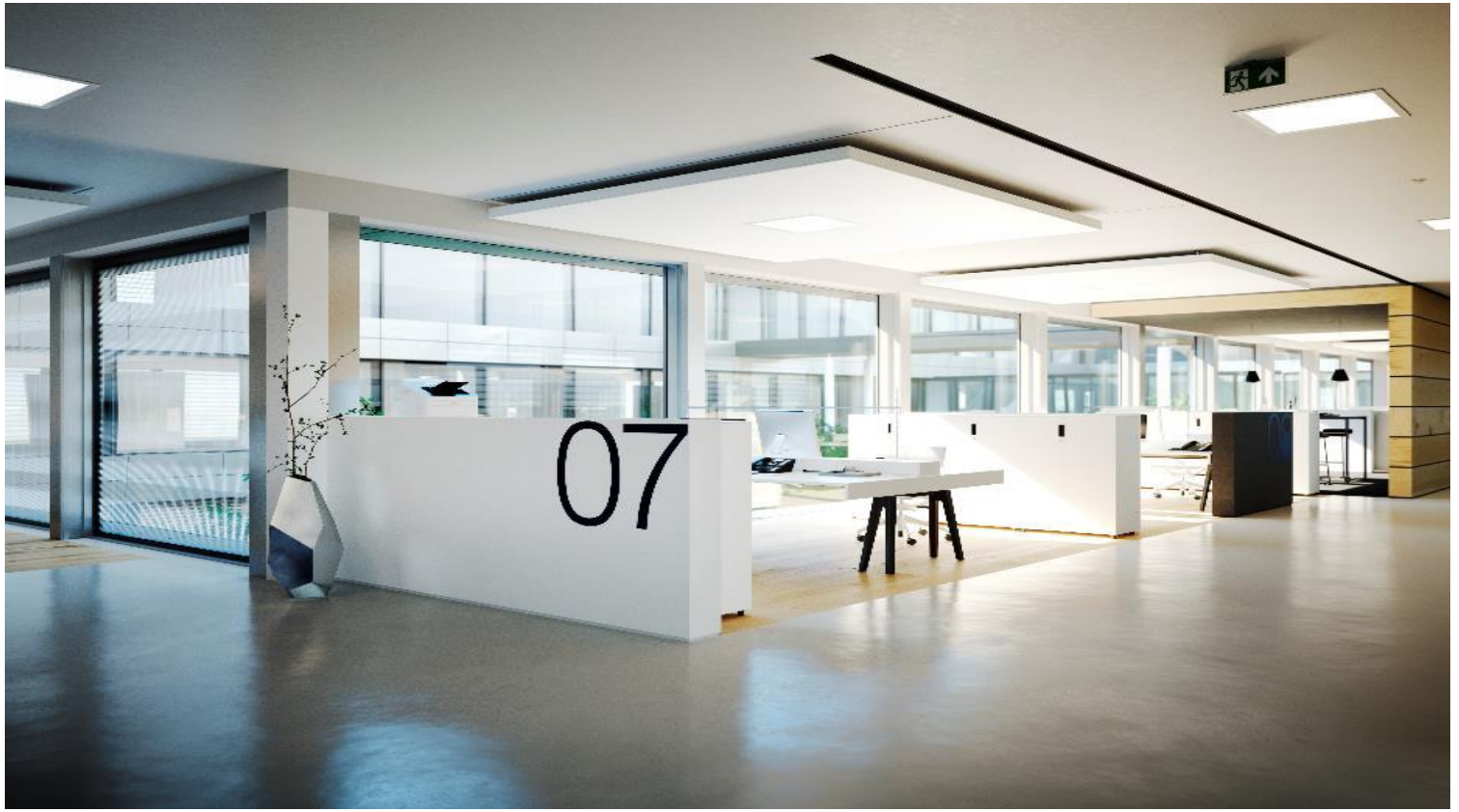
Why new KNX DALI Gateways?

KNX DALI Gateway Premium DG/S x.64.5.1

Why new KNX DALI Gateways?

Situation

- KNX products from ABB are well known, have a great performance and a good reputation, with innovative features and local support
- Since the beginning of KNX DALI Gateways ABB has offered various devices, developed and launched continuously further components with great success
- Lighting control, especially with DALI, both in commercial and more and more in residential projects has a significant value for the building market and for ABB
- Increased demands in Lighting Control of buildings, visible in specification texts
- Keywords:
  Tunable White, Human Centric Lighting (HCL)



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Overview of all KNX DALI Gateways from ABB

KNX DALI Gateway Premium DG/S x.64.5.1

Status February 2020

	Gateway DG/S 8.1	Gateway DG/S 1.64.1.1	Gateway DG/S 2.64.1.1	Light Controller DLR/S 8.16.1M	Light Controller DLR/A 4.8.1.1
Controlled	Broadcast	Group and individual	Group and individual	Group	Group
DALI outputs	8 (A…H)	1	2	1	1
DALI ballast	128 (max. 16 per output)	64	2 x 64	64	64
DALI addressing	not necessary	64	2 x 64	64	64
Lighting groups established via	cable installation	DALI and KNX	DALI and KNX	DALI	DALI
Lighting groups per Gateway	8 (installation)	16 (DALI) + via KNX	2 x 16 (DALI) + via KNX	16 (DALI)	8 (DALI)
Constant light control				8 groups	4 groups

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KNX DALI Gateway Premium DG/S x.64.5.1

Status March 2020

	Gateway DG/S 8.1	Gateway DG/S x.64.1.1	Gateway DG/S x.64.**5**.1 (new)	Light Controller DLR/S 8.16.1M	Light Controller DLR/A 4.8.1.1
Controlled	Broadcast	- Group or individual control - DALI Outputs 230V secure - ABB i-bus Tool support - DALI Emergency Lighting - …	All Functions of DG/S x.64.1.1 + Tunable White, Human Centric Lighting, Dim2Warm and more	Group	Group
DALI outputs	8 (A…H)			1	1
DALI ballast	128 (max. 16 per output)			64	64
DALI addressing	not necessary			64	64
Lighting groups established via	cable installation			DALI	DALI
Lighting groups per Gateway	8 (installation)			16 (DALI)	8 (DALI)
Constant light control				8 groups	4 groups

KNX DALI Gateway Premium DG/S x.64.5.1

Definition: Tunable White

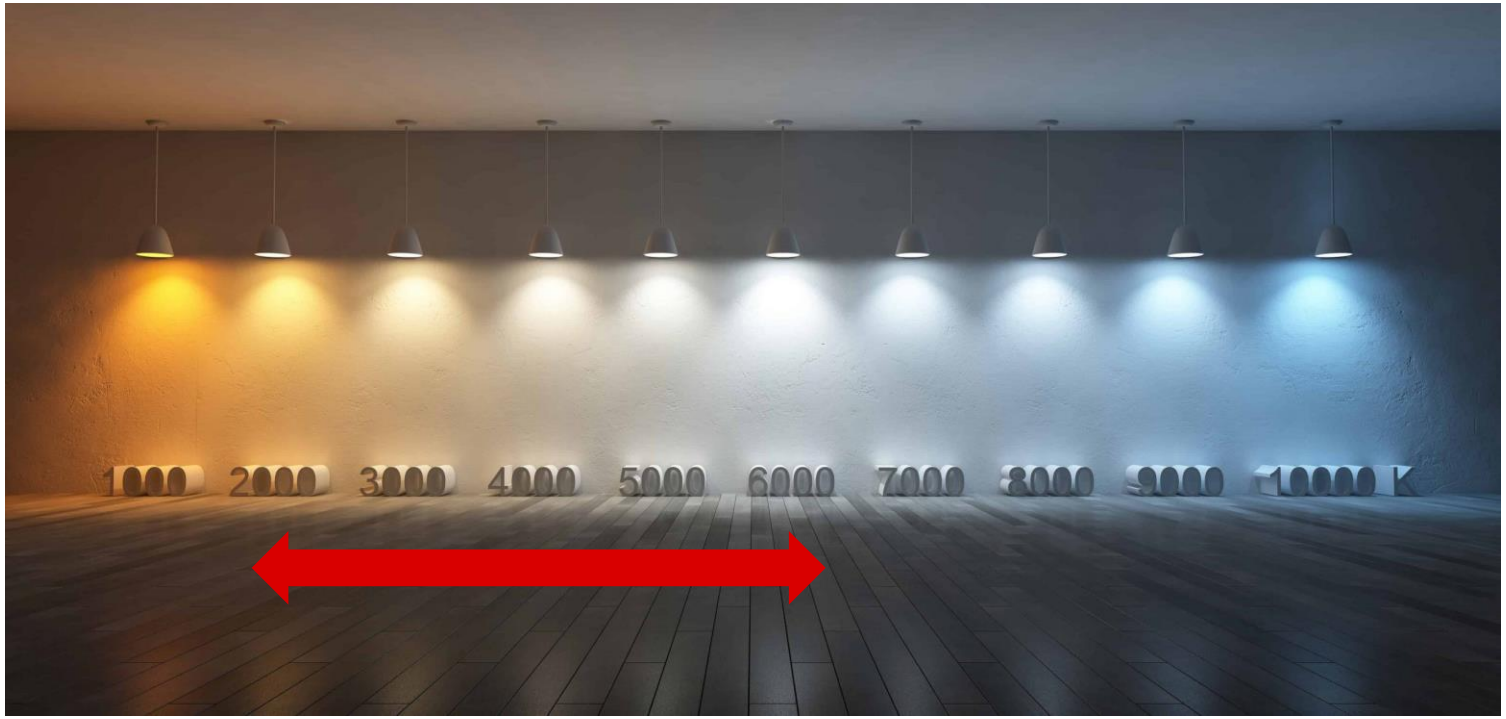
KNX DALI Gateway Premium DG/S x.64.5.1

Tunable white

Principle

Change of colour temperature T_C (Cold←→ warm white) with dimming of colour temperature

- Typical range between 2,000K (Kelvin) and 6,000K depending on ballast and lamp
- 2,000K (warm white) … 6,000K (cold white)
- Quality feature of light is not only brightness level, distribution in the room, no glare effects but also colour temperature T_C
- Optimization of biological and emotional effects (performance and well-being) of light for human beings both in private environment and working activities
- Cold white → activity, warm white → relaxation
- Demand from the market and in projects, driven also by LED technology



Source: Internet

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Definition: Human Centric Lighting (HCL)

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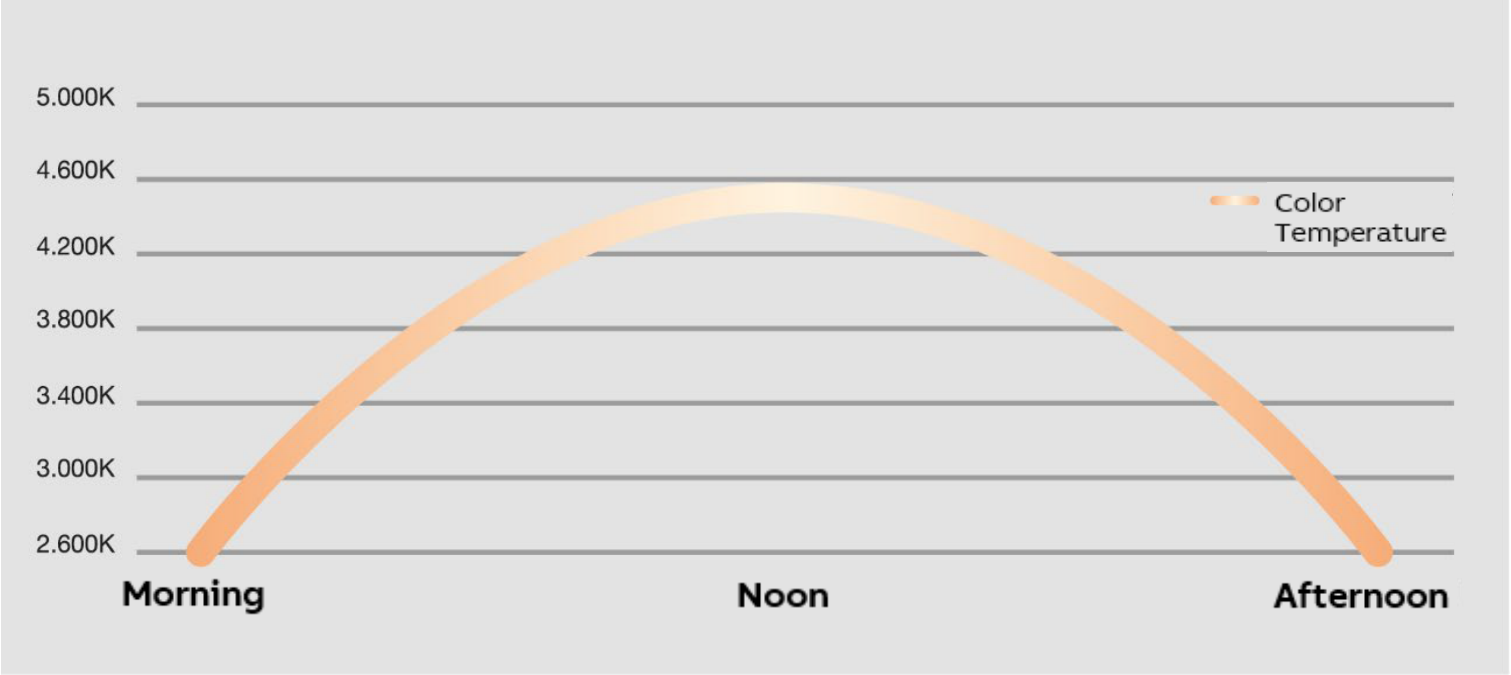
Human Centric Lighting (HCL)

Principle

With Human Centric Lighting (HCL), the daylight is simulated in the building, means the colour temperature of the outside light is reproduced by colour temperature controllable lights in the room

Actually it is the function tunable white, automized for a dynamic and suitable light situation with change of colour temperature over the day and with all positive aspects mentioned before

In complex HCL lighting systems, brightness, light distribution, direction of light and colour temperature are varied. The dynamic of the daylight, the seasons and the location of the building are considered. Furthermore special light situation can be created, e.g. scene with cold light for focused working at a machine.



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Definition: Dim2Warm

KNX DALI Gateway Premium DG/S x.64.5.1

Dim2Warm

Principle

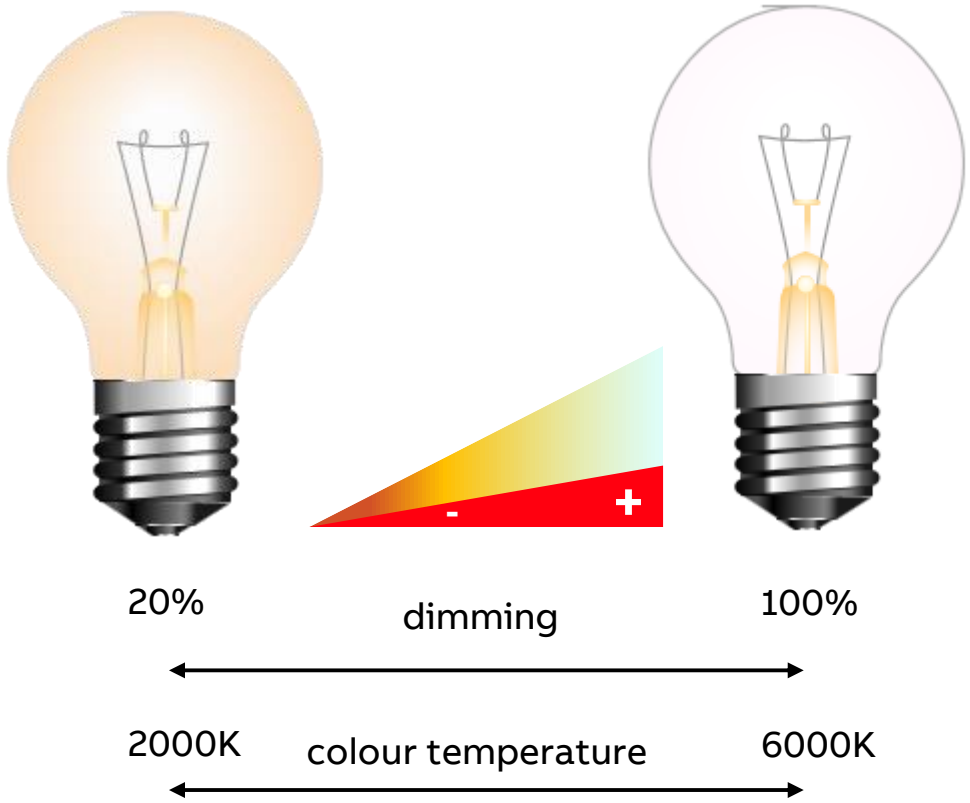
Change of colour temperature proportionally to brightness, resulting in an effect like a light bulb

- Dimming up: Increasing of colour temperature → cold white
- Dimming down: Decreasing of colour temperature → warm white

Basically it copies the colour temperature behavior of a light bulb or halogen lamp in case of dimming

Especially in residential lighting solutions this feature is preferred, as it is known and accepted from traditional light bulbs or halogen lamps

Thus LED lighting with tunable white functionality can be used for the same effect



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KNX DALI Gateway Premium DG/S x.64.5.1

KNX DALI Gateway Premium DG/S x.64.5.1

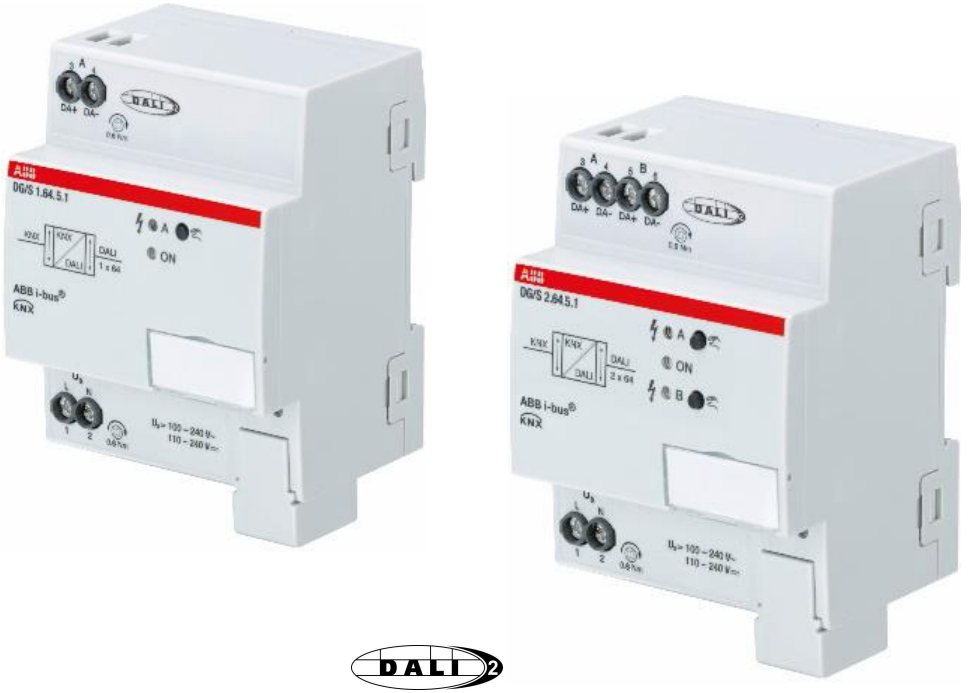
KNX DALI Gateway Premium DG/S x.64.5.1

Features

Overview

– Two devices
  - DG/S 1.64.5.1 (one channel, 64 ballasts)
  - DG/S 2.64.5.1 (two independent channels, 2 x 64 ballasts)

– All functions of DG/S x.64.1.1 included
  - Flexible combination of DALI groups, single control or KNX groups
  - DALI Outputs 230V secure
  - ABB i-bus® Tool support
  - Emergency Lighting
  - Templates
  - Manual operation
  - …



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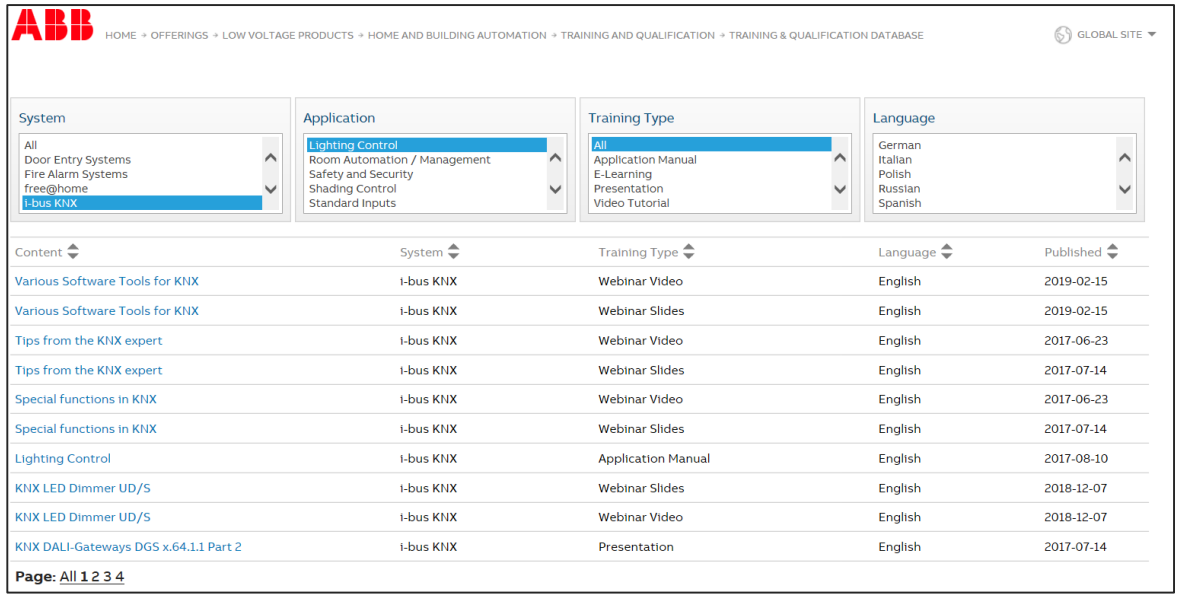
KNX DALI Gateway Premium DG/S x.64.5.1

Features

Training material of DG/S x.64.1.1

Training & Qualification Database:
https://go.abb/ba-training

- Webinar videos and slides KNX ABB DALI Gateway DG/S x.64.1.1 Part 1 and 2
- Video Tutorials ABB i-bus® Tool with DG/S x.64.1.1 Part 1 – 5
- eLearning ABB i-bus® KNX Lighting: DALI and DALI Gateways
- …



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Features

What is new? – Main Features

Tunable White

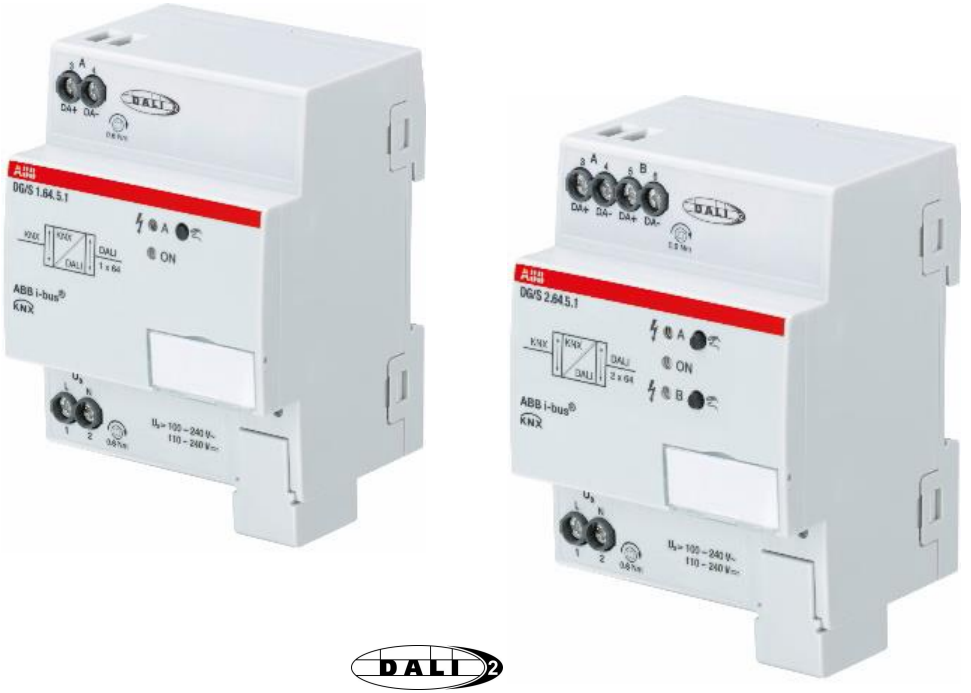
– Change of colour temperature T_C (Cold to warm white) with setting and dimming of colour temperature and brightness for lamps according to device type 8 (tunable white, no colour lighting functions like RGB)

Human Centric Lighting (HCL)

– Colour temperature curve following daylight

Dim2Warm

– Colour temperature changes proportionally to brightness with the effect like a light bulb



KNX DALI Gateway Premium DG/S x.64.5.1

Features

What is new? – Various Features

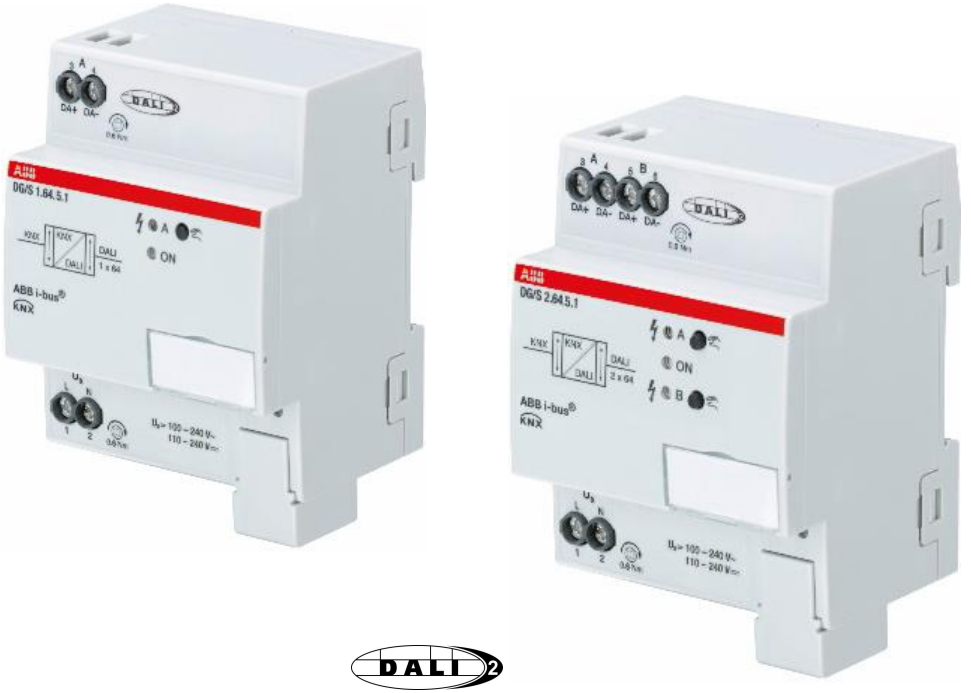
Standby switch-off

– Ballast voltage switch-off via additional switching actuator
  - In case of all connected lights are turned off all ballasts are only in standby mode
  - Ballasts can be switched off to save energy, e.g. during the night

Operating Hours

– Counting of operating hours by means of ABB i-bus® Tool

– Monitoring of circuits/lamps concerning life span for maintenance or replacement



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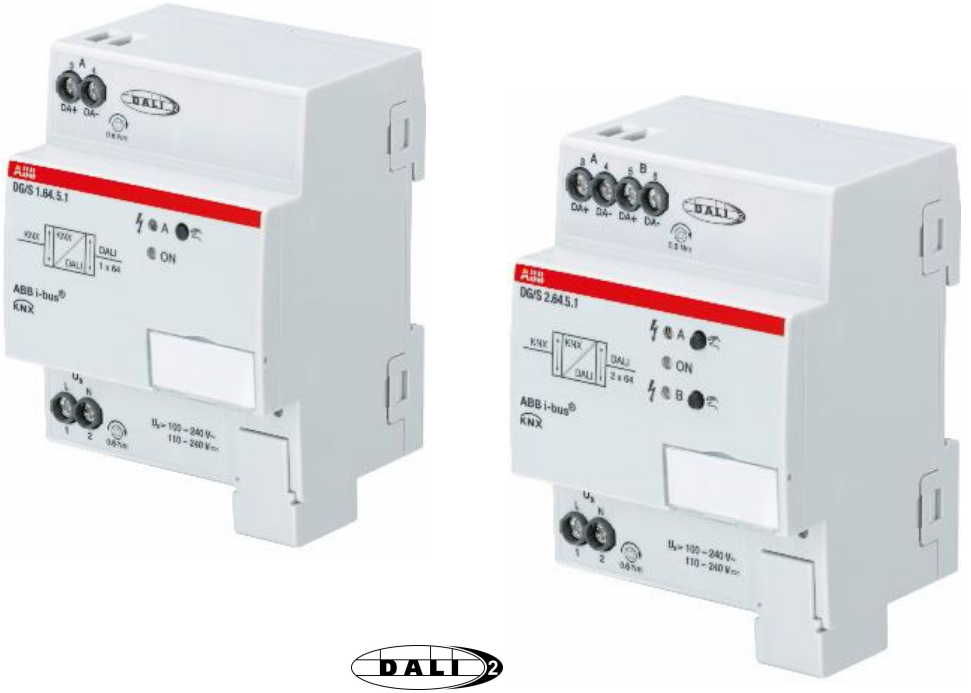
KNX DALI Gateway Premium DG/S x.64.5.1

Features

What is new? – Various Features

Scenes

- Beside brightness level also the colour temperature can be adjusted in a scene
- For each of the 16 DALI scenes a 1 bit object to recall the scene can be established.
  - Standard is 1 byte with coded content (recall, store and scene number)
  - Advantage 1 bit recall: Easy to use by any sensor or operating element



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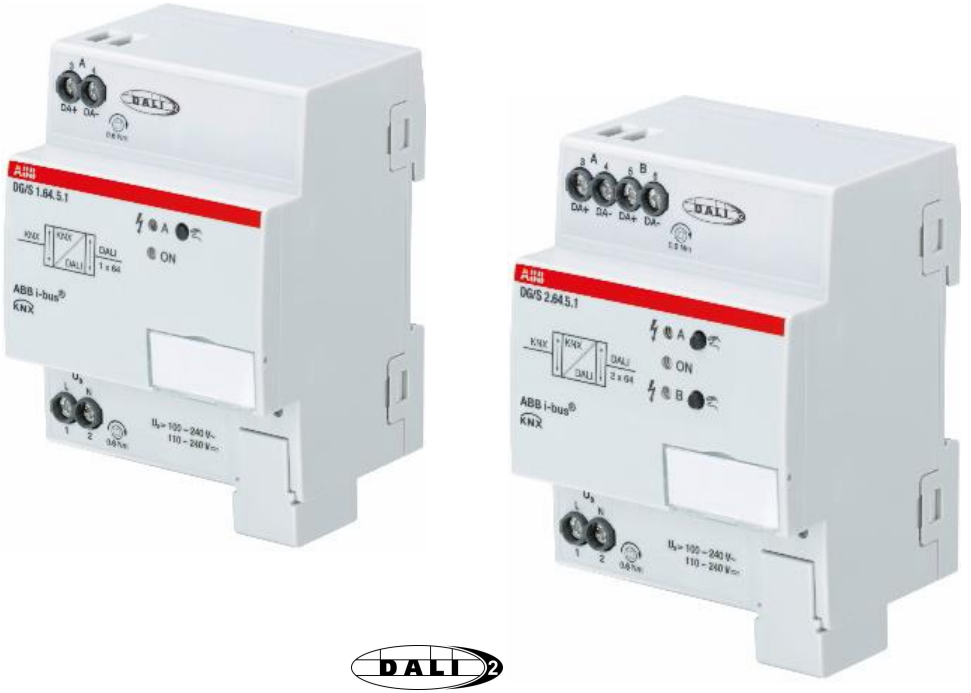
Features

What is new? – Various Features

- Fully functional and individual DALI outputs for 64 DALI devices each in accordance with IEC 62 386 Part 201, 202 and 209
  - Normal DALI luminaires (device type 0)
  - DALI single battery emergency light (device type 1)
  - Colour-controlled DALI luminaires (device type 8)
    Note: DG/S x.64.5.1 supports tunable white, right now no other DT8 colour lighting functions like XY coordinate, RGBWAF, …
- Long-frames + extended memory service support (shorter download times, e.g. with USB/S 1.2, IPS/S 3.1.1 and IPR/S 3.x.1)
- ABB i-bus® Tool for diagnostics and commissioning with more functions
- DALI protocol controller can be updated via application download
- Application for ETS5 only
- Set colour temperature (Object 1 byte in % or 2 byte colour temp.)
- Relative dimming (4 bit) of colour temperature
- Additional template page for colour temperature



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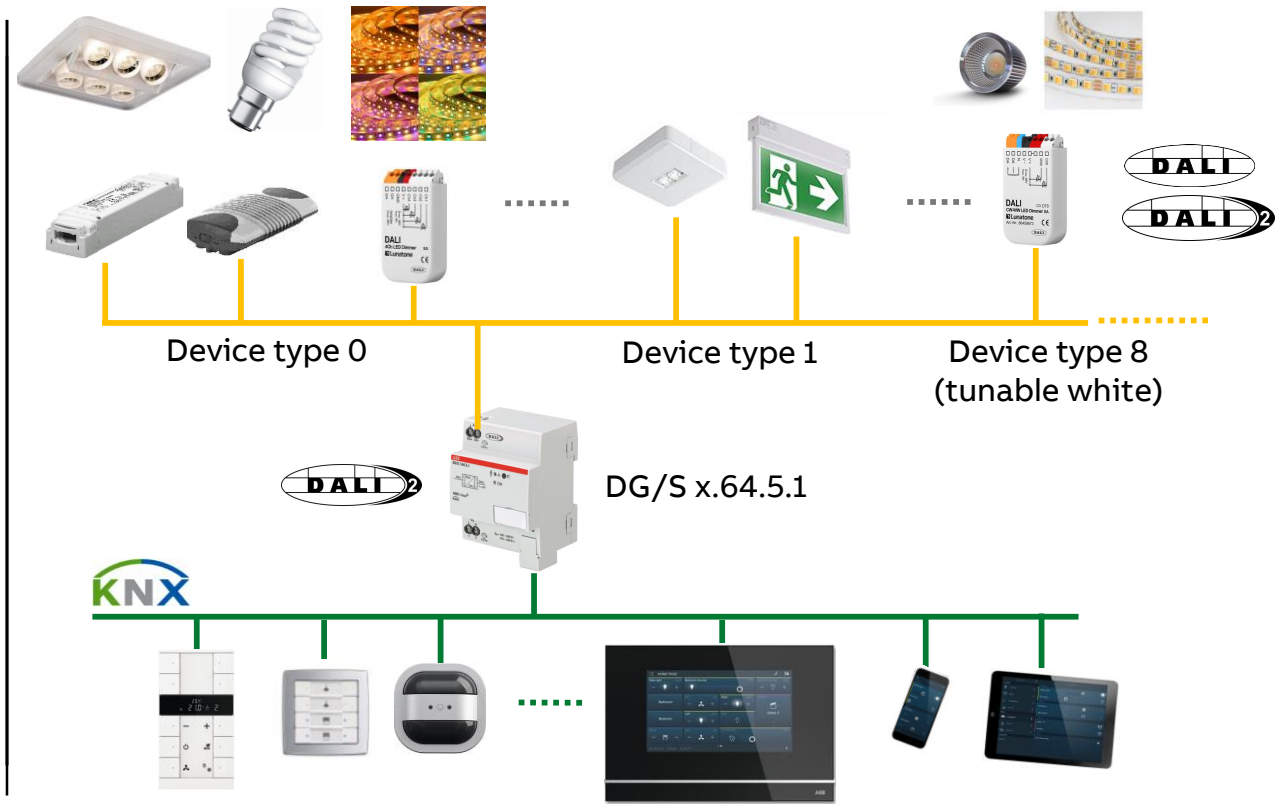
KNX DALI Gateway Premium DG/S x.64.5.1

System overview

The DALI Gateways DG/S x.64.5.1 are used to control DALI equipment (only slaves) to EN 62386 with

- Device type 0: DALI interfaces (Part 201)
  - Ballasts, transformers, LED drivers, …
- Device type 1: DALI self-contained emergency converter with individual batteries (Part 202), e.g.
  - ABB Kaufel route escape signs “Ovano”
  - ABB Kaufel LED downlights “Serenga”
- Device type 8: DALI Colour-controlled luminaires (Part 209)
  - LED drivers for tunable white (Colour temperature T_C)

Note: The DALI Gateway is a DALI single master with integrated DALI power supply and up to 64 DALI devices (slaves) can be connected per output. Other DALI masters, DALI power supplies or functional devices must not be connected to the DALI output.



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Certified DALI-2 Products

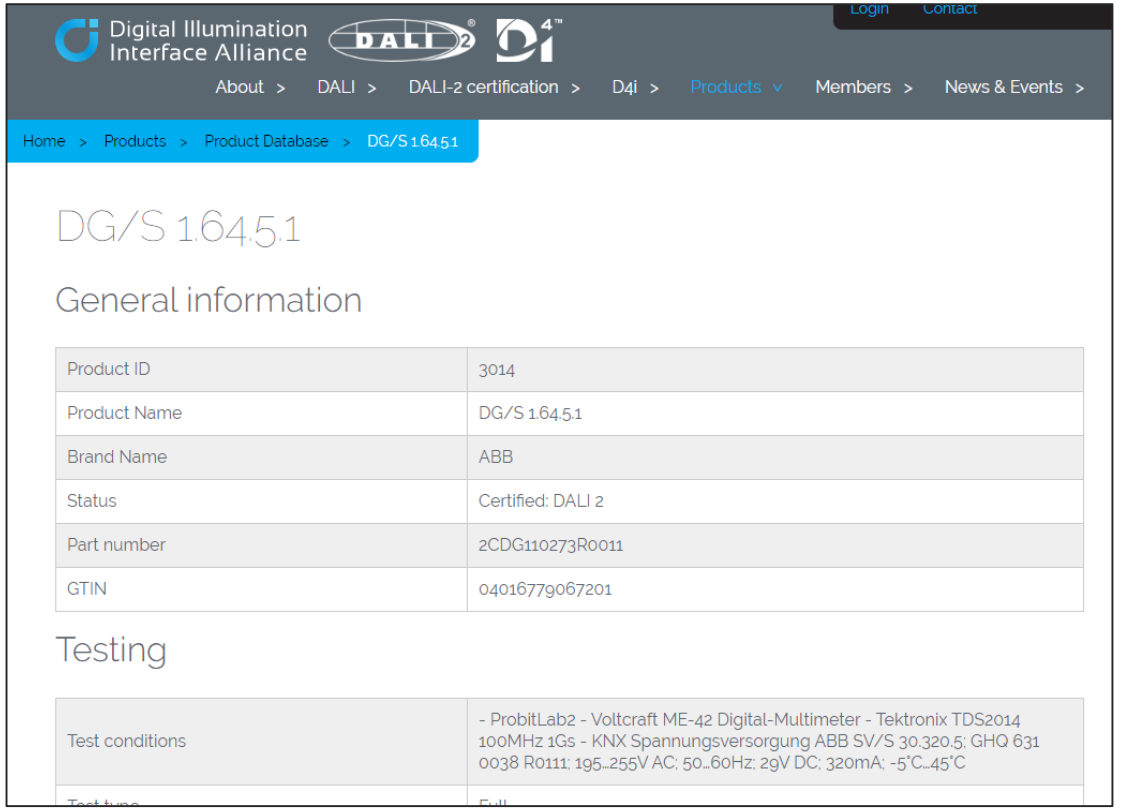
ABB DALI Gateways DG/S x.64.x.1 have successfully completed the DALI-2 certification process and are certified

https://www.digitalilluminationinterface.org/

Digital Illumination Interface Alliance

→ Products → Product Database

Brand Name	Product Name	DALI Parts	Initial registration	DALI 2 Certified
ABB	DG/S 1.64.5.1 DALI Gateway, Premium 1-fold	101, 103	Feb 20, 2020	Yes
ABB	DG/S 2.64.5.1 DALI Gateway, Premium 2-fold	101, 103	Feb 20, 2020	Yes
ABB	DG/S 1.64.1.1 DALI Gateway, Basic 1-fold	101, 103	Sep 4, 2019	Yes
ABB	DG/S 2.64.1.1 DALI Gateway, Basic 2-fold	101, 103	Sep 4, 2019	Yes



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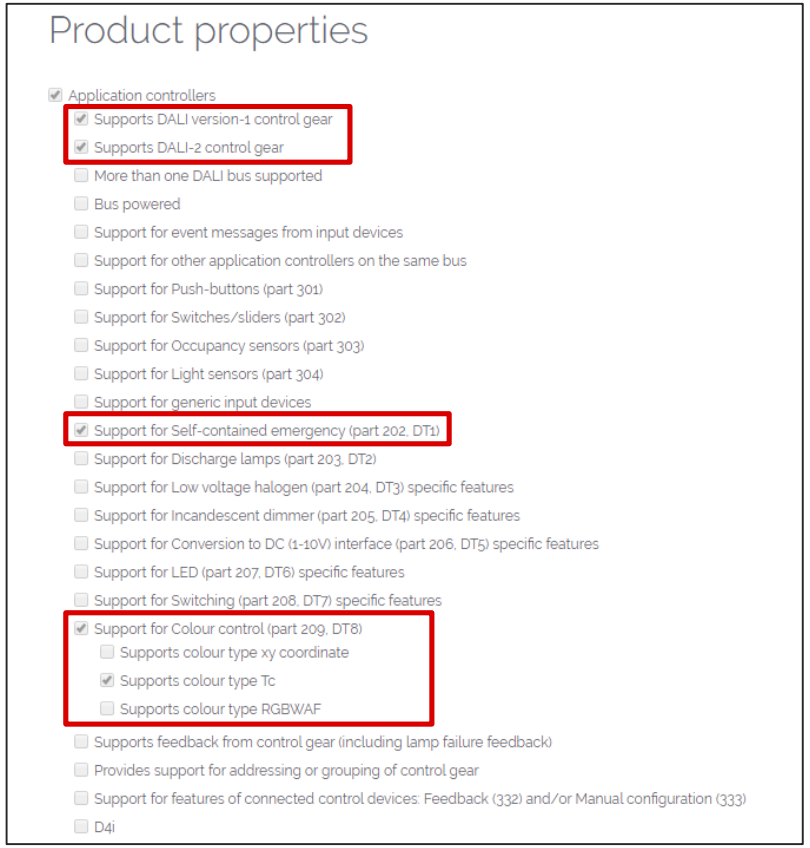

Product properties of DG/S 1.64.5.1

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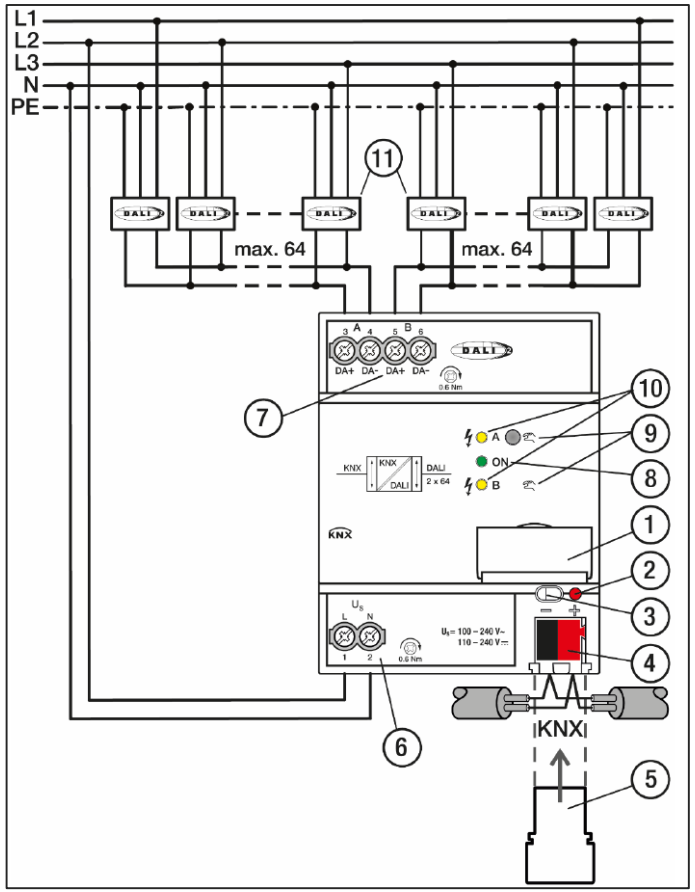
KNX DALI Gateway Premium DG/S x.64.5.1

Connection Diagram

1. Label Carriers
2. Programming LED
3. Programming Button
4. Bus Connection Terminal
5. Cover Cap
6. Operating voltage (100-240V AC 50/60Hz, 110-240V DC)
7. DALI Output
8. Operation LED (green)
9. Manual operation channel A/B
10. Manual Operation LED (yellow)
11. DALI ballasts



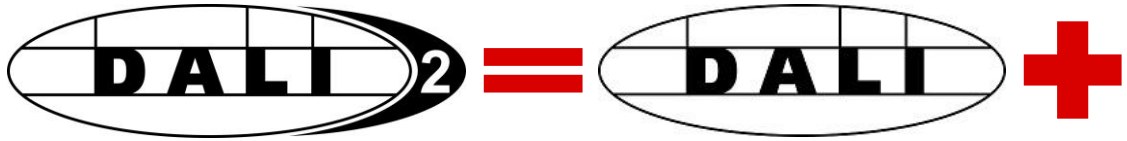
KNX DALI Gateway Premium DG/S x.64.5.1

DALI - DALI-2

Changes from DALI to DALI-2?

- Extension for control devices
- New commands/features
- Higher quality standards, increased testing procedures and thus higher compatibility
- Backwards compatibility
- More detailed specification, less risk for misinterpretations
- Restructuring of specification, dedicated system description

Please note: DALI-2 certification does not mean that all DALI-2 features are supported with DG/S x.64.5.1, e.g. no Multi Master



- Fix errors & gaps
- New features
- Controls (standardized)
- Mandatory certification

The new KNX DALI Gateways are the only ones on the market with DALI-2 certification

KNX DALI Gateway Premium DG/S x.64.5.1

ETS Application

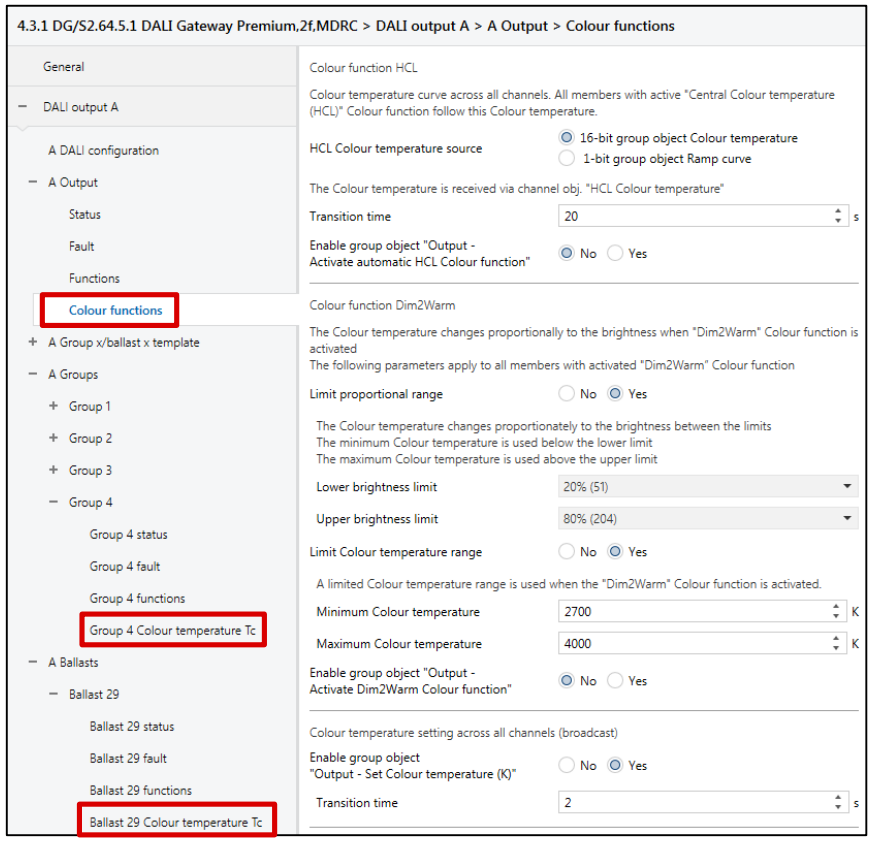
KNX DALI Gateway Premium DG/S x.64.5.1

ETS

General

Application like DG/S x.64.1.1 with mainly additional parameters for the new (colour) functions

- Output A or B → Colour functions
  - Dim2Warm
  - HCL
- Group → Colour temperature T_C
- Ballast → Colour Temperature T_C



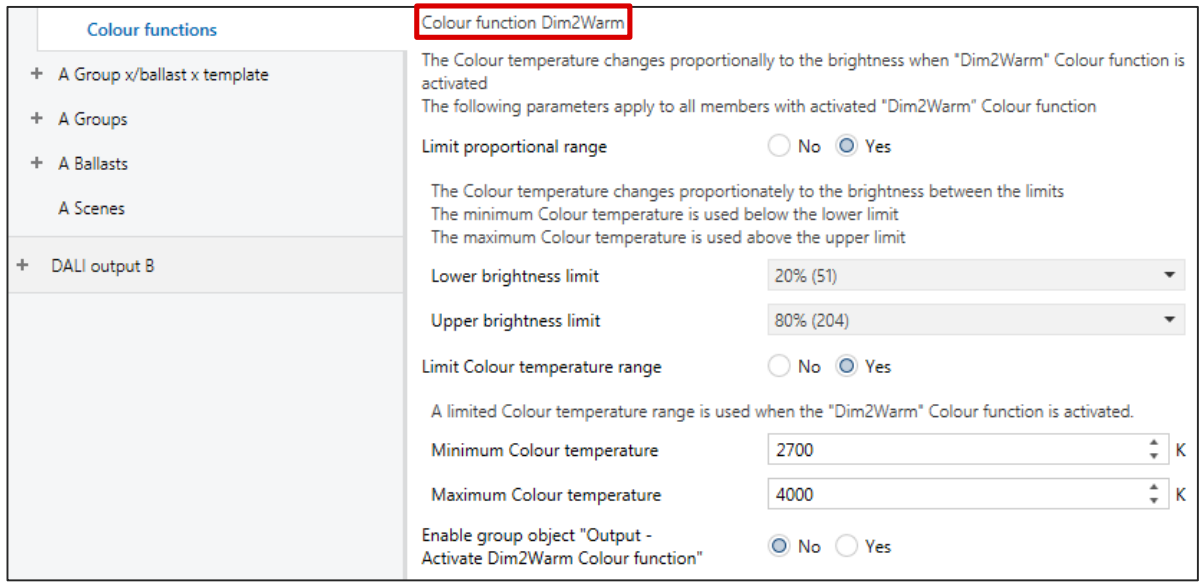
KNX DALI Gateway Premium DG/S x.64.5.1

ETS

Dim2Warm

Parameter block Output A or B → Colour functions

– **Colour function Dim2Warm**
  - Limit proportional range in %
  - Limit Colour temperature range in K



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ETS

Dim2Warm

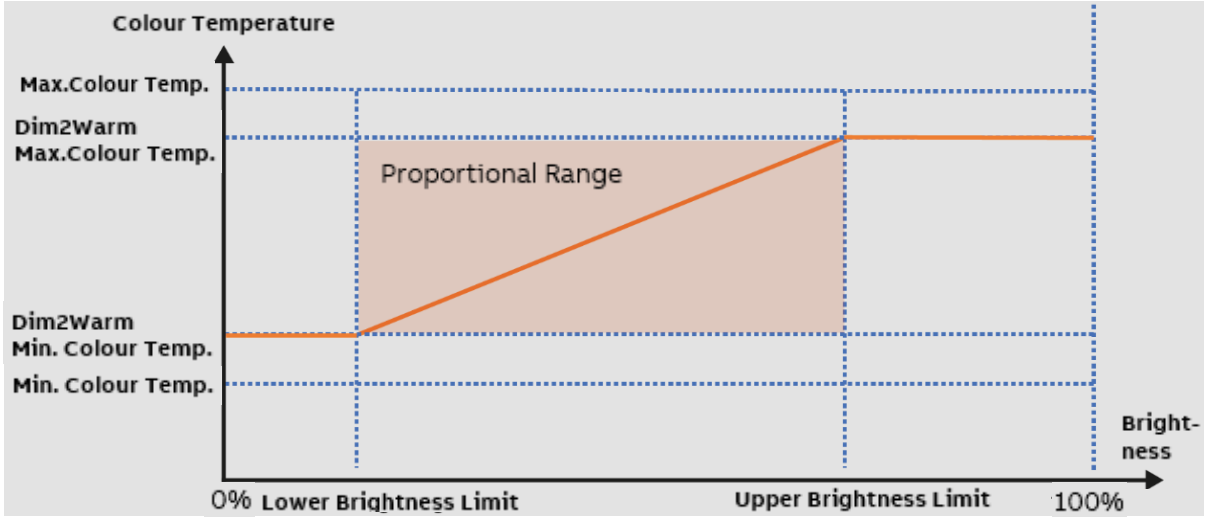
The proportional range describes the range in which is a linear relationship between the colour temperature and the brightness

The brightness range can be reduced with a lower and upper brightness limit

The colour temperature range can be adjusted by setting a minimum and maximum colour temperature for Dim2Warm

The proportional range is always within the parameterized limits If a group or ballast is activated with active Dim2Warm function and brightness value outside the limits, the colour temperature remains at the value of the exceeded limits, either min. colour temperature or maximum colour temperature with Dim2Warm

Thus it is possible not to undershoot or overshoot certain colour temperature levels



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ETS

Human Centric Lighting (HCL): Example: classroom

A classroom is equipped with tunable white lights, which are partly controlled by an automatic sequence and partly via a control element/panel

The automatic sequence is parameterized in the DALI gateway (rising and falling ramp plus transition times)

The teacher can set a focus light with a short-term alertness-promoting effect for concentration tasks and a relaxation light during relaxation phases

- Energy light in the morning or focus light for class examinations: High illuminance 6,500 K
- Automatic light for normal activities: Normal illuminance and HCL active
- Relaxation light for relaxation phases and for storytelling: Normal illuminance 2,700 K

Source: Internet

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KNX DALI Gateway Premium DG/S x.64.5.1

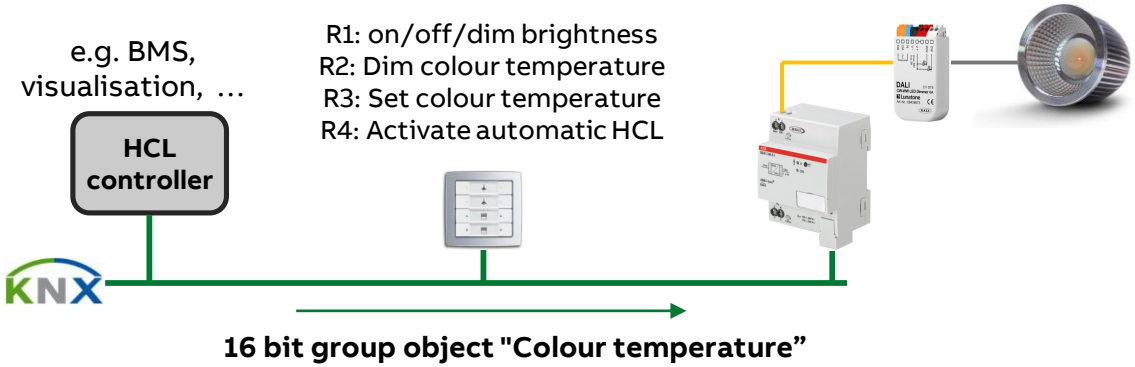
ETS

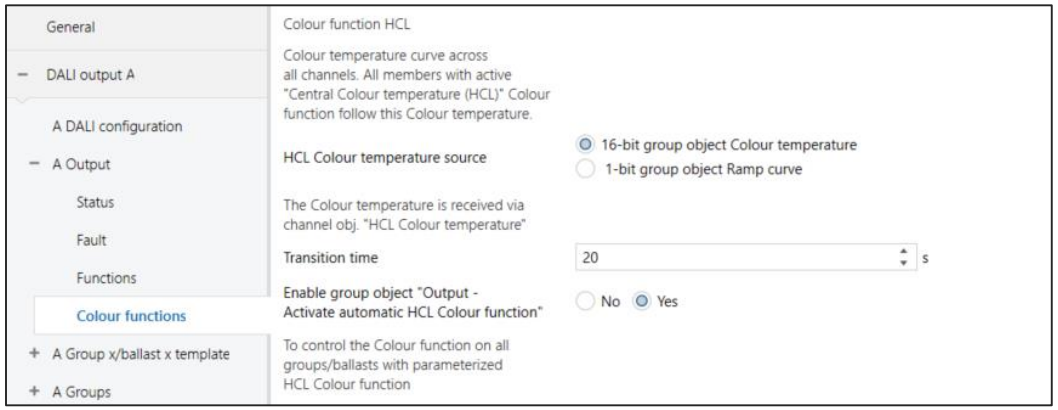
Human Centric Lighting (HCL)

Parameter block Output A or B → Colour functions

Colour function Human Centric Lighting (HCL)

- Colour temperature source 16 bit or 1 bit
- 16 bit (e.g. from visualization or logic), which calculates and provides cyclically colour temperature values
  - Individual and different curves are possible
- 1 bit, dynamic start of a simplified curve with rising and falling ramp plus transition times
  - Start of rising and falling ramp depending on time (sunrise and sunset time plus offset), e.g. with time switch FW/S 8.2.1, TR/A 1.1 and DCF- or GPS time
  - Transition times, initial and final colour temperature adjustable





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ETS

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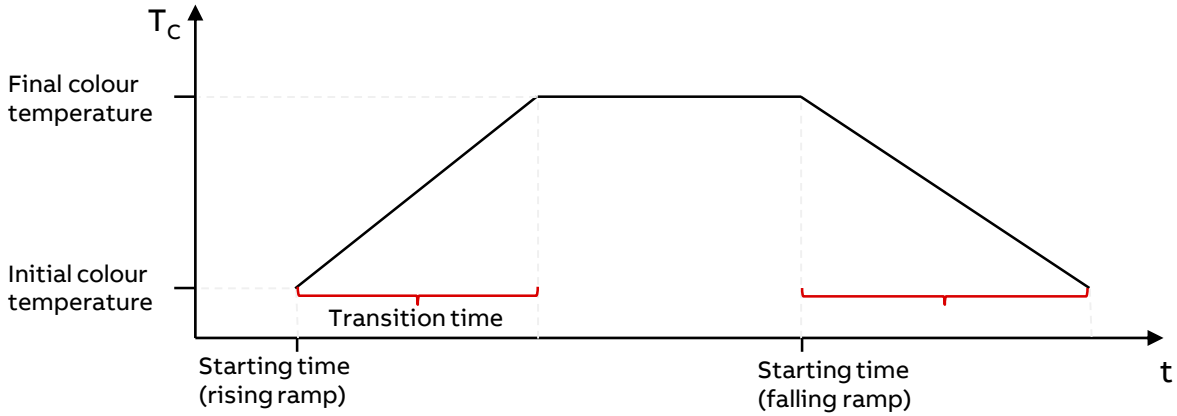
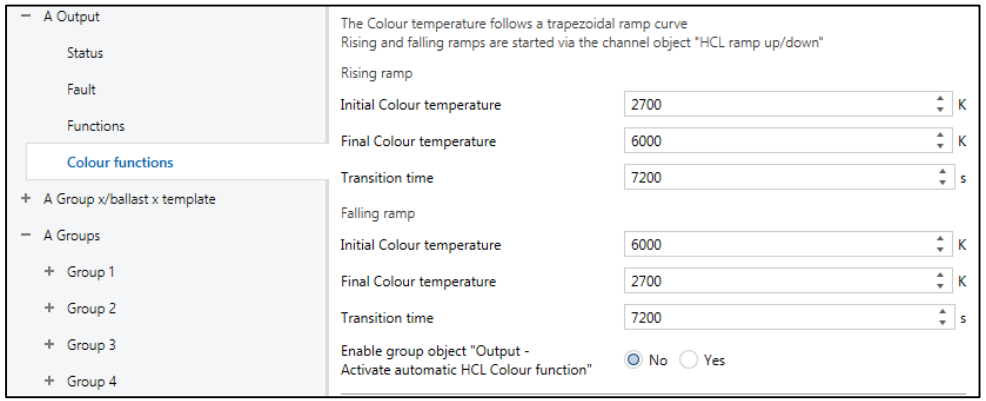


1 bit group object Ramp curve



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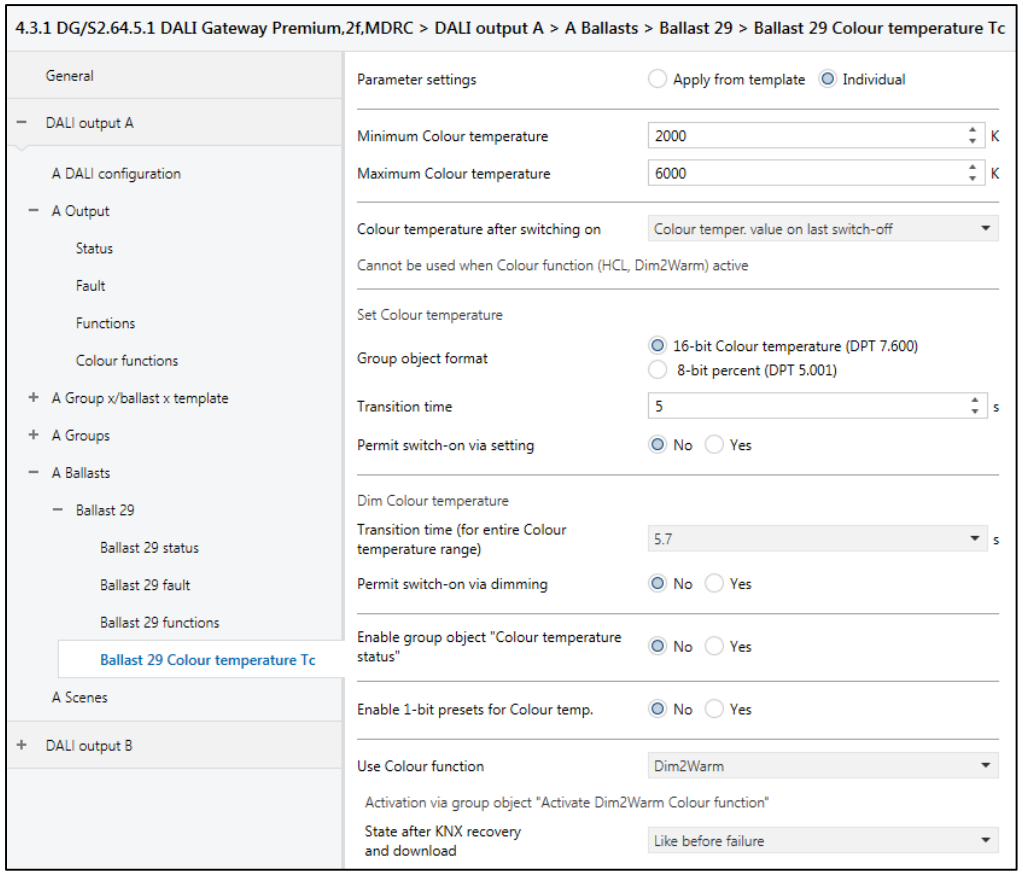
KNX DALI Gateway Premium DG/S x.64.5.1

ETS

Tunable White Parameters

Further parameter per ballast or DALI group for the colour functions

- Minimum/Maximum colour temperature
  - Note: Possible range depending on ballast and lamp
- Group object format to set colour temperature (8 bit in % or 16 bit as absolute colour temperature value)
- 1 bit preset for two individual colour temperatures
- Type of colour function (Dim2Warm or Human Centric Lighting HCL)



KNX DALI Gateway Premium DG/S x.64.5.1

Example: Assignment of Group Addresses

DALI Gateway Premium DG/S x.64.5.16

Output A
… Set Colour Temperature (2 bytes)
… HCL Colour Temperature (2 bytes)
… KNX Scenes 1…64 (1 byte)
… KNX Scene 1 (1 bit)
… KNX Scene 2 (1 bit)
… KNX Scene x (1 bit)
Output A – group/ballast X
… Switch (1 bit)
… Relative dimming (4 bit)
… Status Switch (1 bit)
… Brightness value (1 byte)
… Status Brightness value (1 byte)
… Set Colour temperature (2 byte)
… Dim Colour temperature (4 bit)
… Status Colour temperature (2 bytes)

Data type of group object “Set Colour temperature” and “Status Colour temperature”:
2 byte unsigned value “7.600 absolute colour temperature”

…
… S1.1 Switching (1 bit)
… S1.1 Relative dimming (4 bit)
… LED 1.1 Status (1 bit)
… LED 1.2 Status (1 bit)
… S2.1 Value Switching (1 byte)
… S3.1 Value Switching (2 byte)
… S4.1 Switching (1 bit)
… S4.1 Relative dimming (4 bit)

Control element solo® stand. 6127/01-500

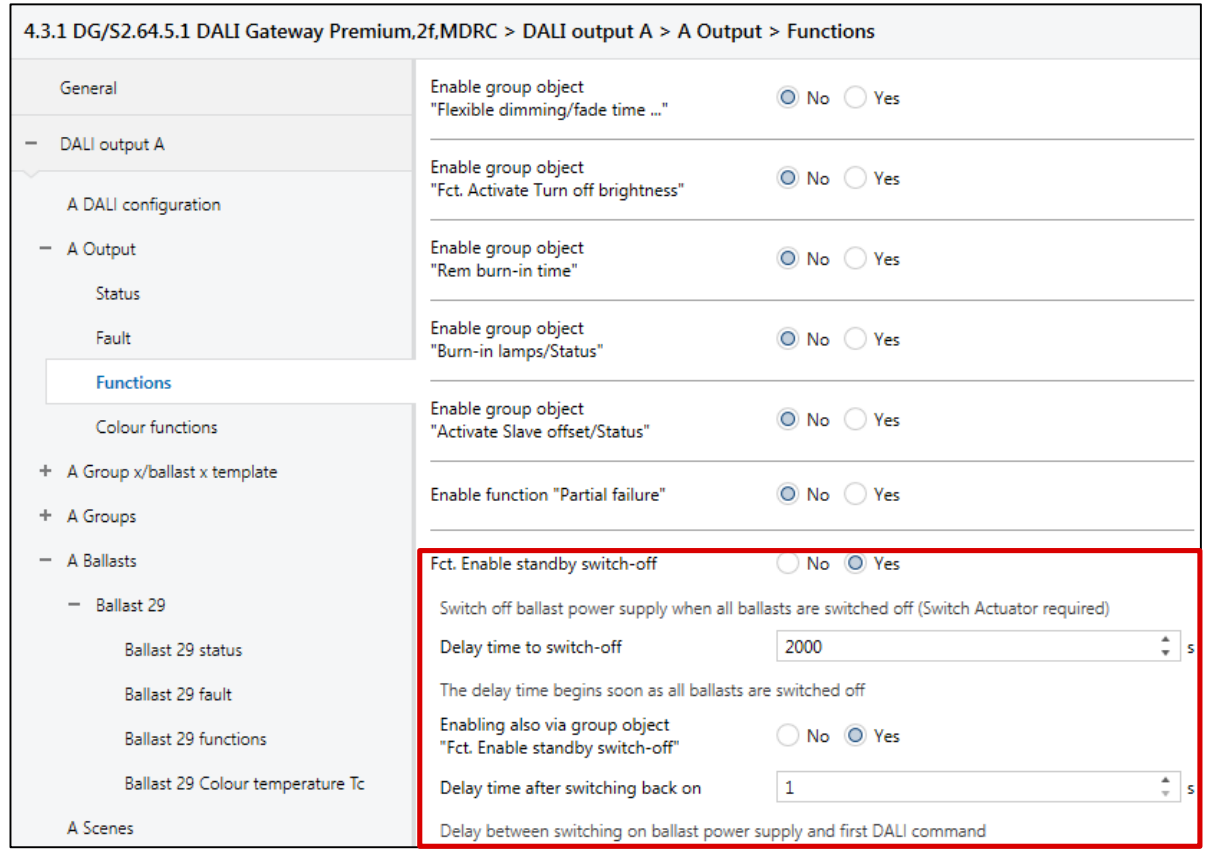
KNX DALI Gateway Premium DG/S x.64.5.1

ETS

Standby switch-off

Standby switch-off means, when every ballast is in standby mode, the ballast voltage can be switched off with a group object. This group object must be connected to an output of a switch actuator

1. Enable DALI standby switch-off in the ETS
2. Set time of delay till switch-off (e.g. 5 min to avoid standby switch-off in case of short term standby situation)
3. Optional: Enable group object "*Enable DALI standby switch-off*"
4. Set time (1 …10s) of delay after restart (needed for restart of ballasts, ballast restart time less than 1s according to DALI standard)
5. Connect the "*DALI Standby switch-off*" group object to a switching actuator output



KNX DALI Gateway Premium DG/S x.64.5.1

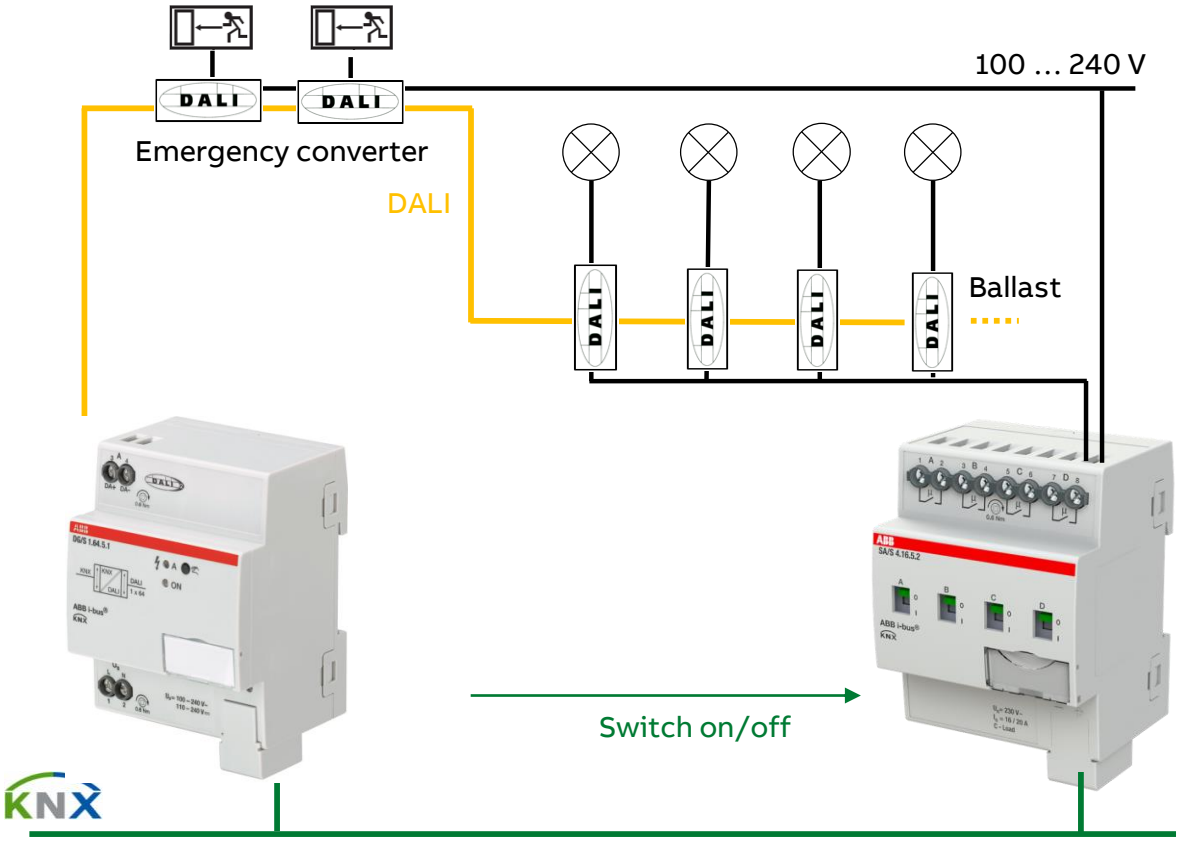
ETS

Standby switch-off

- Some lights are turned on, all ballasts with main supply
- All lights are off, after an adjustable delay time switch off telegram from DG/S is sent
- Linked switch actuator(s) deenergize all connected ballasts
- Local push button pressed to turn on one light
- After adjustable delay time (needed for restart of ballasts) all ballasts are ready to work and command is carried out
- Further actions to turn on lights are without delay

Note:

- Ballasts must support individual DALI power-on level (last value before failure), to be adjusted in the ETS Application under “Fault”
- In case of power off via Standby switch-off message “Ballast Fault” is suppressed
- DALI emergency converter are not be integrated in Standby switch-off

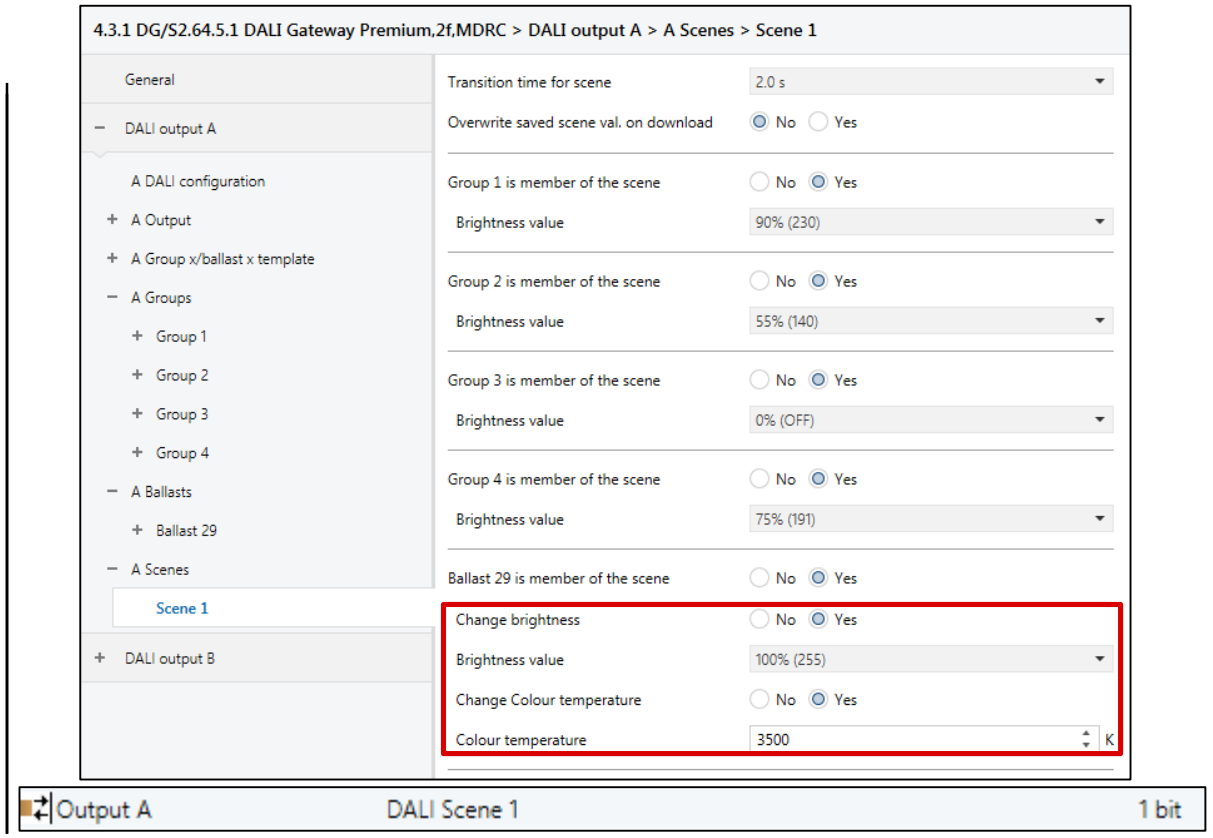


KNX DALI Gateway Premium DG/S x.64.5.1

ETS

Scenes

- 16 scenes, can be assigned to 64 possible scene numbers used in KNX for 8 bit scenes
- For each member of the scene (DALI group or ballast) brightness level can be adjusted
- For tunable white ballasts also colour temperature parametrizable
  - Now scenes are possible both with brightness and colour temperature
- Recall of each scene with 1 bit object available
- Better overview for selecting scene members, only enabled groups or ballasts are visible and can be chosen



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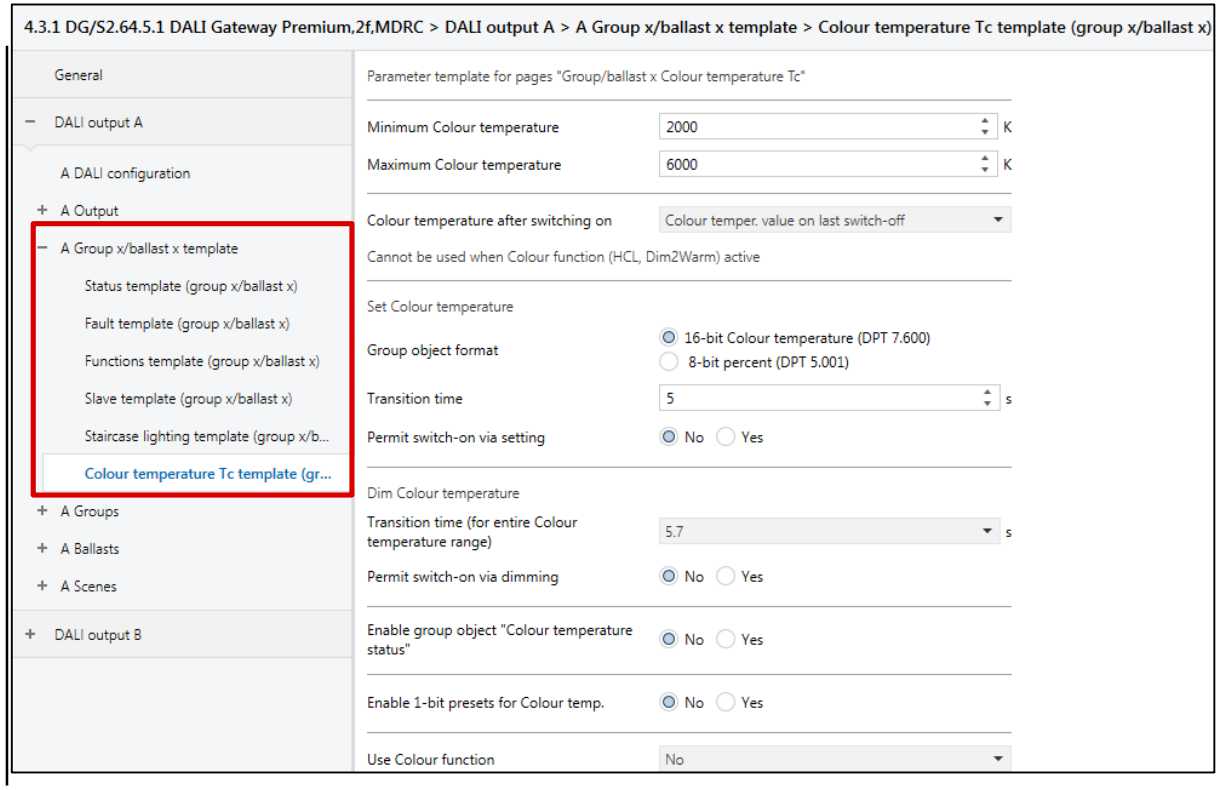
KNX DALI Gateway Premium DG/S x.64.5.1

ETS

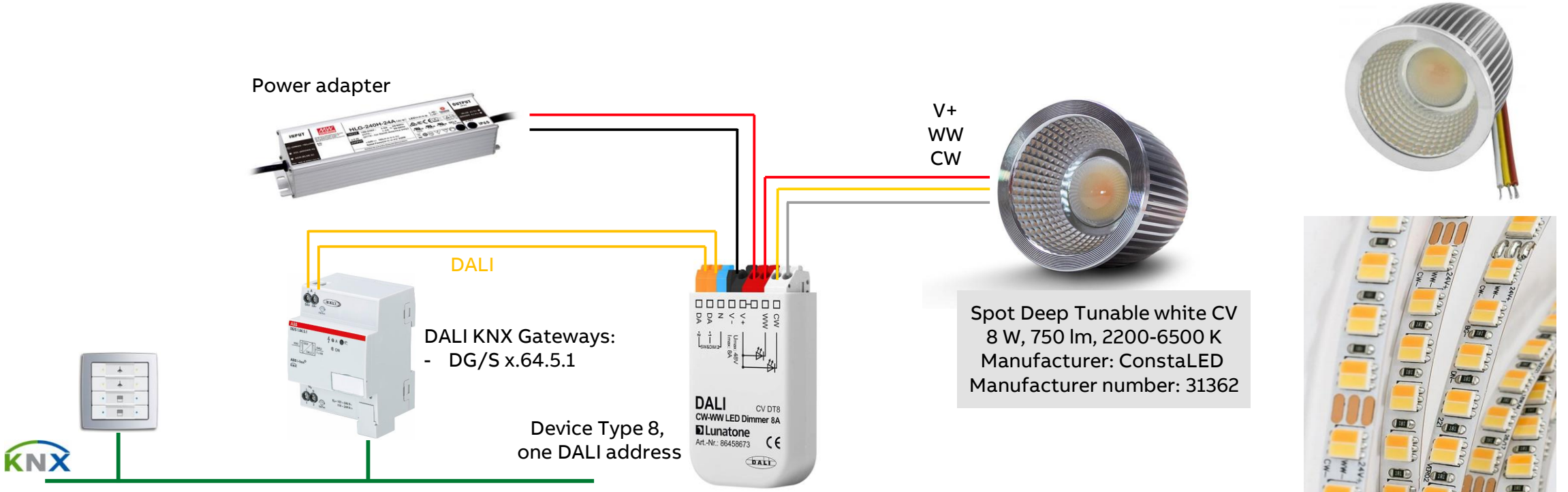
Template Colour Temperature

- Further template to adjust colour temperature parameter, to be assigned to DALI groups or individual ballasts
- Templates available per channel
- For each group or ballast individual parameters instead of templates also available



KNX DALI Gateway Premium DG/S x.64.5.1

Example: Hardware for Tunable White with DALI and KNX



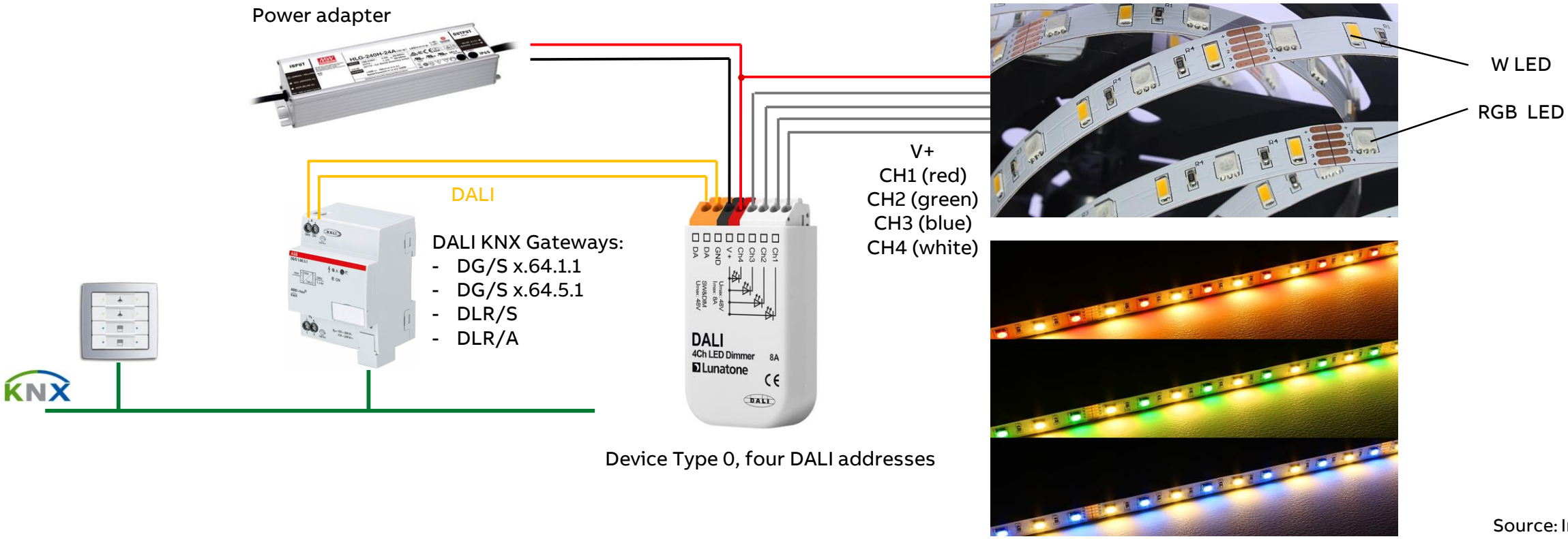
Spot Deep Tunable white CV
8 W, 750 lm, 2200-6500 K
Manufacturer: ConstaLED
Manufacturer number: 31362

DALI CW-WW LED-Dimmer CV
12V DC – 28V DC, 4A
Manufacturer: Lunatone
Manufacturer number: 89453836

Source: Internet

KNX DALI Gateway Premium DG/S x.64.5.1

Example: Hardware for RGBW with DALI and KNX (group or individual controlled)



Device Type 0, four DALI addresses

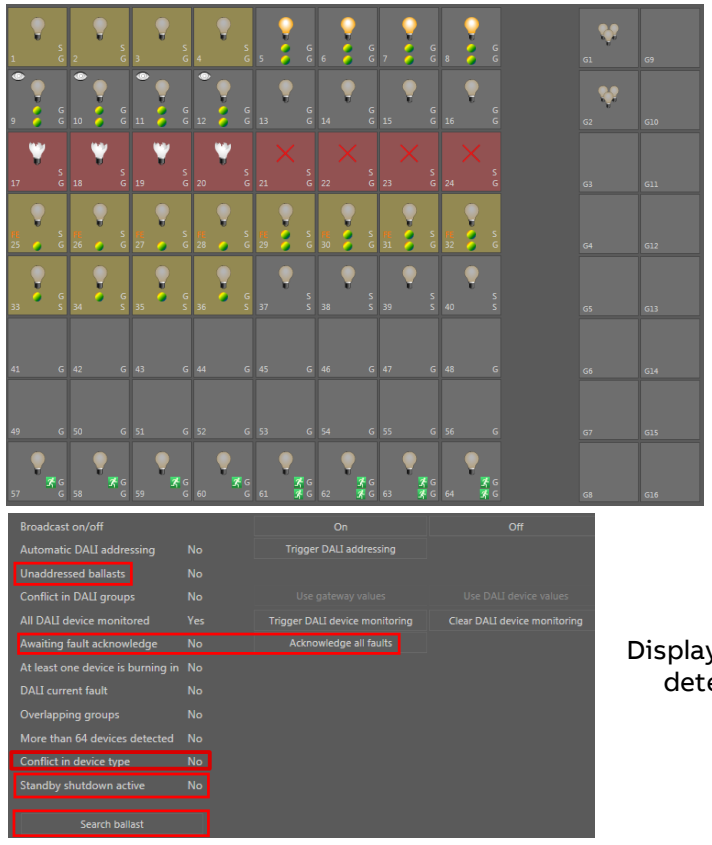
Source: Internet

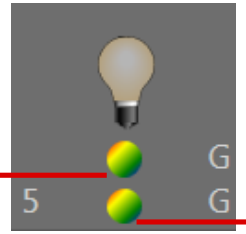
KNX DALI Gateway Premium DG/S x.64.5.1

ABB i-bus® Tool

ABB i-bus® Tool – *menu* "DALI"

- Integration of colour functions **new**
- Shows a detected and in ETS enabled colour ballast **new**
- Broadcast on/off **new**
- Indicates whether there are unaddressed DALI devices **new**
- Acknowledgment of fault notifications **new**
- Conflict in device type **new**
- Standby switch-off active yes/no **new**
- Search ballasts **new**





Displayed if colour ballast detected in runtime

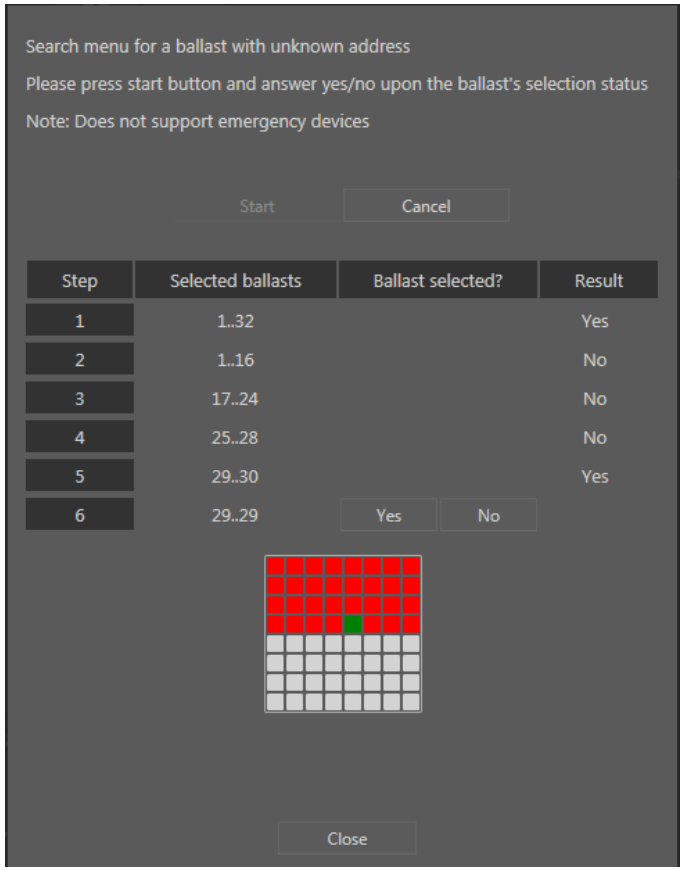
Displayed if colour ballast enabled in ETS

KNX DALI Gateway Premium DG/S x.64.5.1

ABB i-bus® Tool

ABB i-bus® Tool – Search Menu

- Search menu for a ballast with unknown address **new**
- Current situation: to identify address of a ballast worst case up to 64 address buttons in i-bus Tool have to be pushed
- Search Menu reduces it to a few clicks



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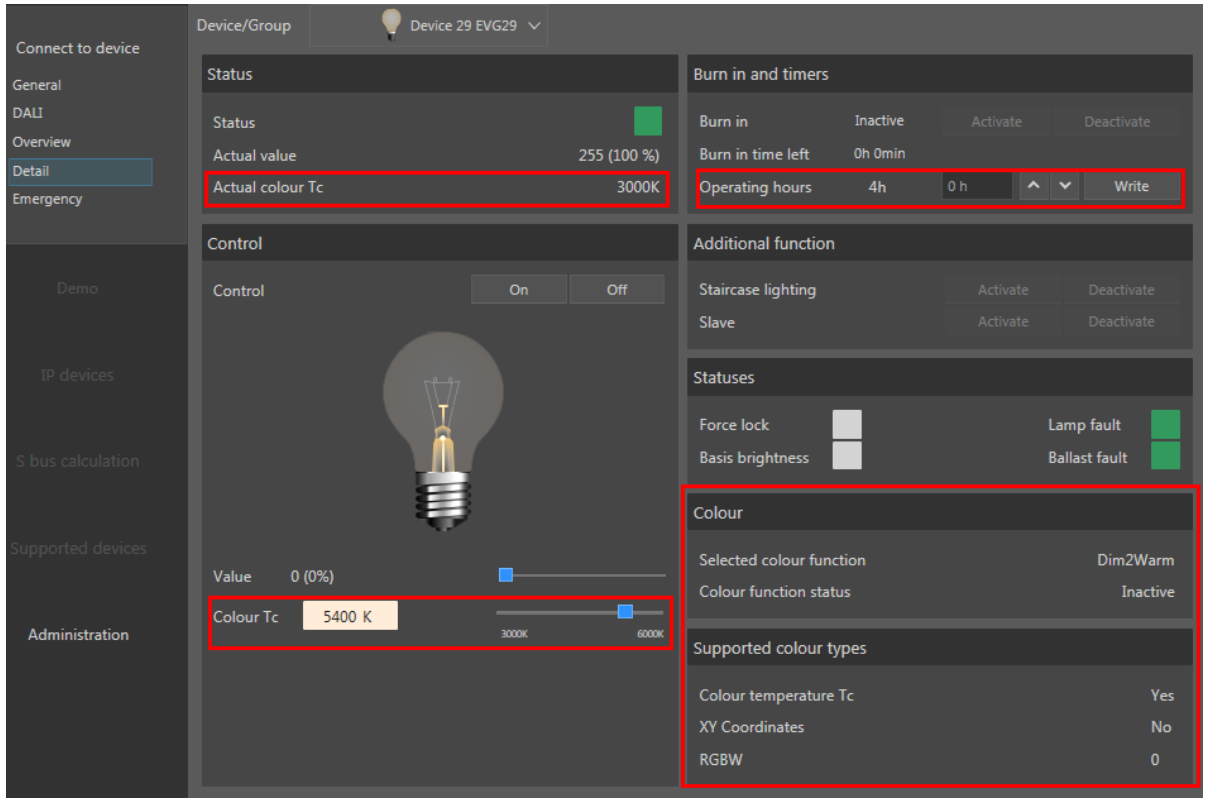
KNX DALI Gateway Premium DG/S x.64.5.1

ABB i-bus® Tool

ABB i-bus® Tool – *menu* "Detail"

- Read/write operating hours **new**
- Status actual colour temperature T_c **new**
- Adjustment of colour temperature T_c **new**
- Status information **new**
  - Selected colour function (Dim2 Warm, HCL) **new**
  - Colour function active/inactive **new**
  - Supported colour type of selected ballast/group (right now colour temperature T_c) **new**
  - Colour temperature range of connected ballast **new**



KNX DALI Gateway Premium DG/S x.64.5.1

Commercial and Marketing Aspects

KNX DALI Gateway Premium DG/S x.64.5.1

Range

Type and Order Code (ABB Version)

KNX DALI Gateway Premium	Order Code
DG/S 1.64.5.1	2CDG110273R0011
DG/S 2.64.5.1	2CDG110274R0011

Type and Order Code (Busch-Jaeger Version)

KNX DALI Gateway Premium	Order Code
DG/S 1.64.5.11	2CDG110273R0021
DG/S 2.64.5.11	2CDG110274R0021

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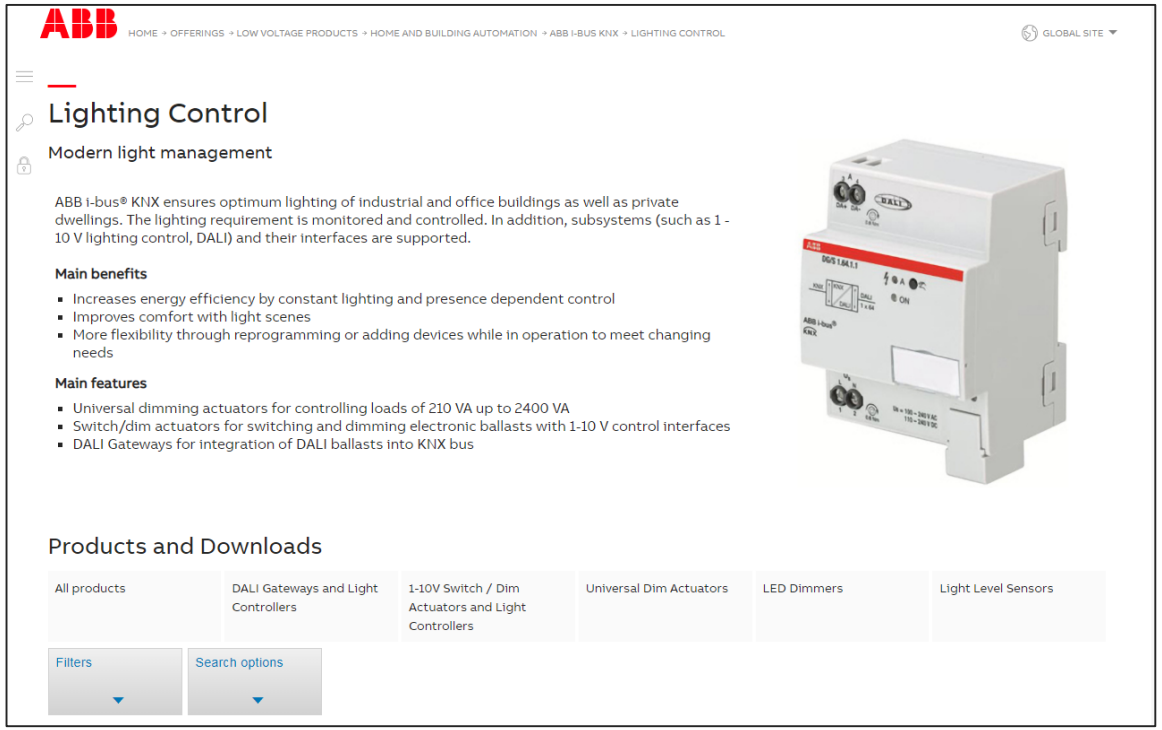
KNX DALI Gateway Premium DG/S x.64.5.1

Homepage

www.abb.com/KNX

→ Products and Downloads
→ Lighting Control
→ Search Options DG/S

- Product Manual
- CAD Drawing
- Installation and Operating Instructions
- Specification Text
- ETS Application
- Selection Table
- CE & RoHS Declaration of Conformity
- • •



KNX DALI Gateway Premium DG/S x.64.5.1

Range Overview

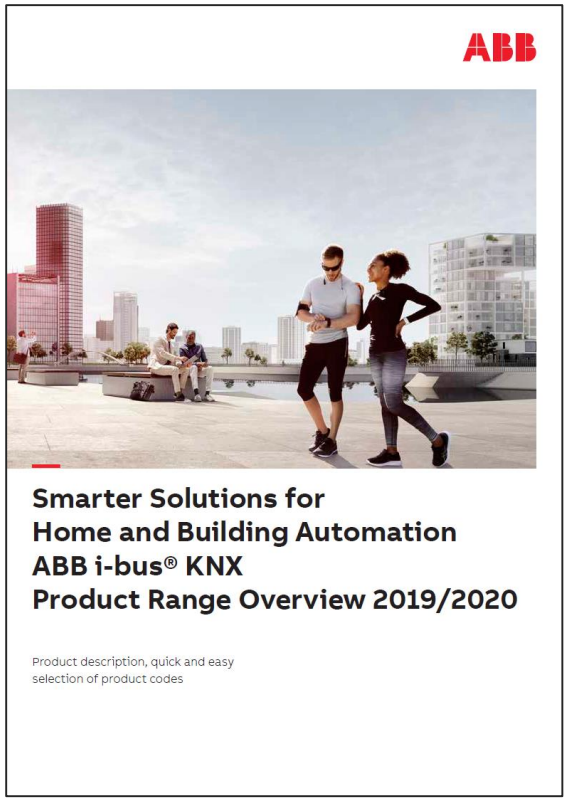
Smarter Solutions for Home and Building Automation

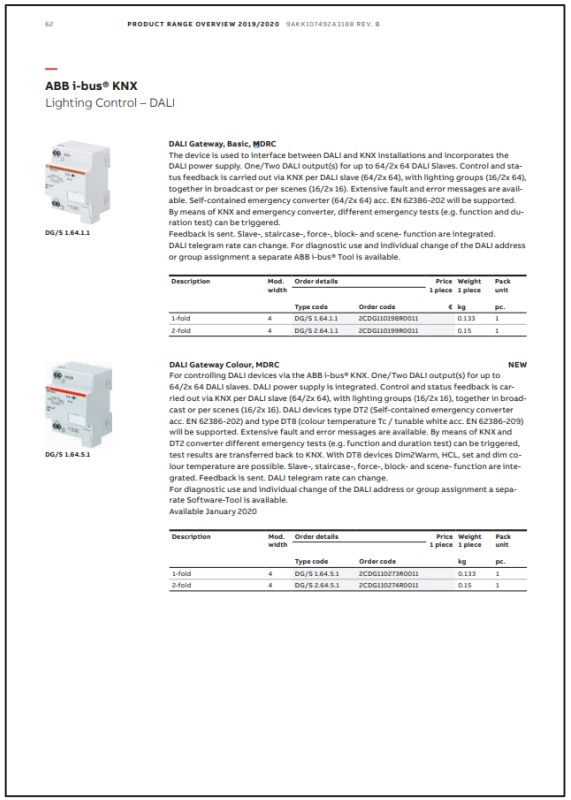
ABB i-bus KNX

Product Range Overview 2019/2020

– Including KNX DALI Gateway Premium DG/S x.64.5.1

LINK





KNX DALI Gateway Premium DG/S x.64.5.1

Summary of the Features and Advantages

- Components based on the successful and well known DALI Gateways DG/S x.64.1.1
  → proven devices with powerful and now more features
- Choice between one channel (64 ballasts) and two channels (2 x 64 ballasts)
  → the right device situation depending, very cost efficient
- ABB i-bus® Tool for DALI adjustments, testing and monitoring
  → unique solution, makes life easier for integrator and user
- Solutions like
- Flexible combination of DALI groups, single control or KNX groups
- 230V secured DALI Outputs
- Integration of Emergency Lighting
- Templates

→ real benefits for customers in projects

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KNX DALI Gateway Premium DG/S x.64.5.1

Summary of the Features and Advantages

Main new features:

- Tunable white
- Human Centric Lighting
- Dim2Warm
- Standby switch-off
- Operating hours (via ABB i-bus® Tool)
- Light scenes with individual brightness **and** colour temperature level

→ Valuable functions, required in projects, allowing to implement more sophisticated lighting solutions

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KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm”

KNX DALI Gateway Premium DG/S x.64.5.1

Overview

KNX DALI Gateway Premium DG/S x.64.5.1

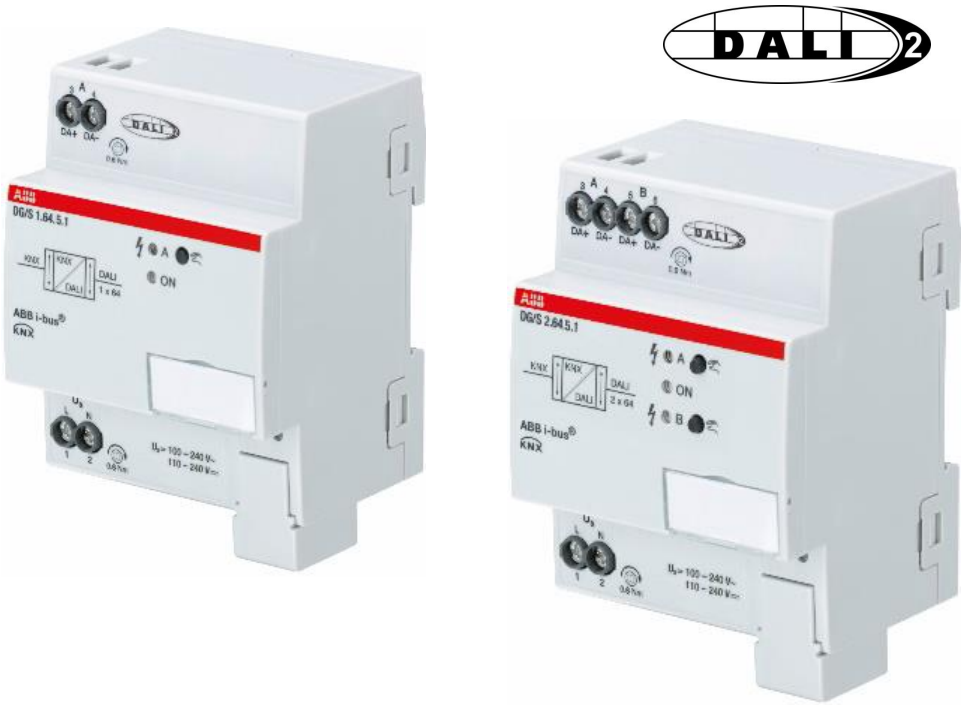
Hardware

– DG/S 1.64.5.1 (one channel, 64 ballasts)
– DG/S 2.64.5.1 (two independent channels, 2 x 64 ballasts)

The following ballast can be operated on the gateway

– Normal DALI ballasts (device type 0)
– DALI single battery emergency lighting converter (device type 1)
– Colour-controlled DALI ballast (device type 8)

– Functions
  - Flexible combination of DALI groups or single control
  - ABB i-bus® Tool support
  - Templates
  - Tunable white
  - **Dim2Warm**
  - Human Centric Lighting
  - Standby switch-off
  - …



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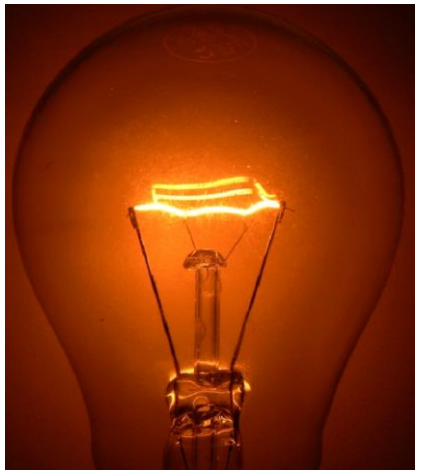
Colour function “Dim2Warm”

Dim2Warm

The following consideration is behind “Dim2Warm”

- The good old light bulb was never economical, but it could be dimmed so wonderfully: When we turned the dimmer down, the light became weaker and warmer at the same time
- A strongly dimmed light bulb no longer appears warm white, but already clearly orange
- When dimming LEDs, however, the colour temperature usually does not change
- No matter how far down a warm white LED strip is dimmed, it always remains constant - depending on which LED strip is used
- This is where Colour function “Dim2Warm” comes in, which simulate exactly this behavior



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Colour function “Dim2Warm”

What is “Dim2Warm”?

→ A change in colour temperature during dimming

Applications

- Quite a few people associate the change in colour temperature when dimming in the direction of warmer colours with cosiness and comfort
  - At home in the bedroom or in the living room like in the glow of candles or by the cozy fireplace
- To give the feeling of the warm and welcoming atmosphere
  - Hotel bar, restaurant, … in the evening
  - In the morning at breakfast
- …

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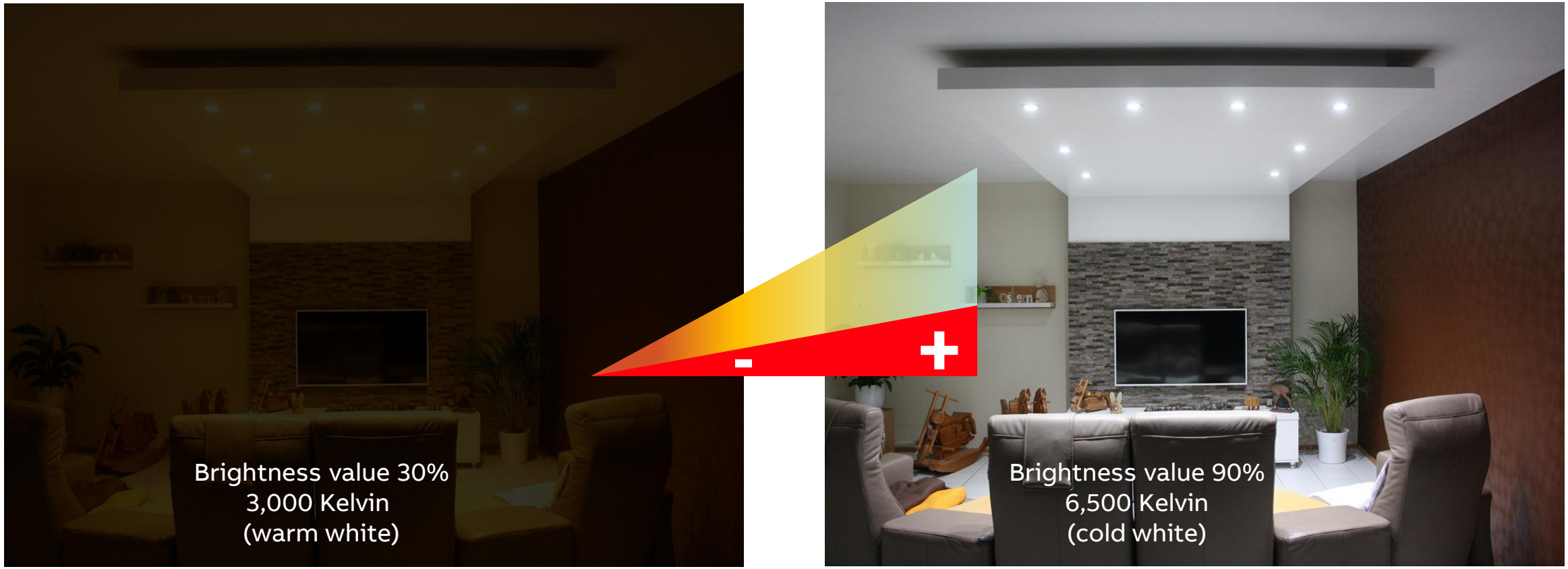
KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm”



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KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm”

Start video: Move the mouse over the image and press the start button at the bottom

KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm”

What is “Dim2Warm”?

The DALI Gateway has an additional function called “Dim2Warm”, which changes the colour temperature based on the brightness

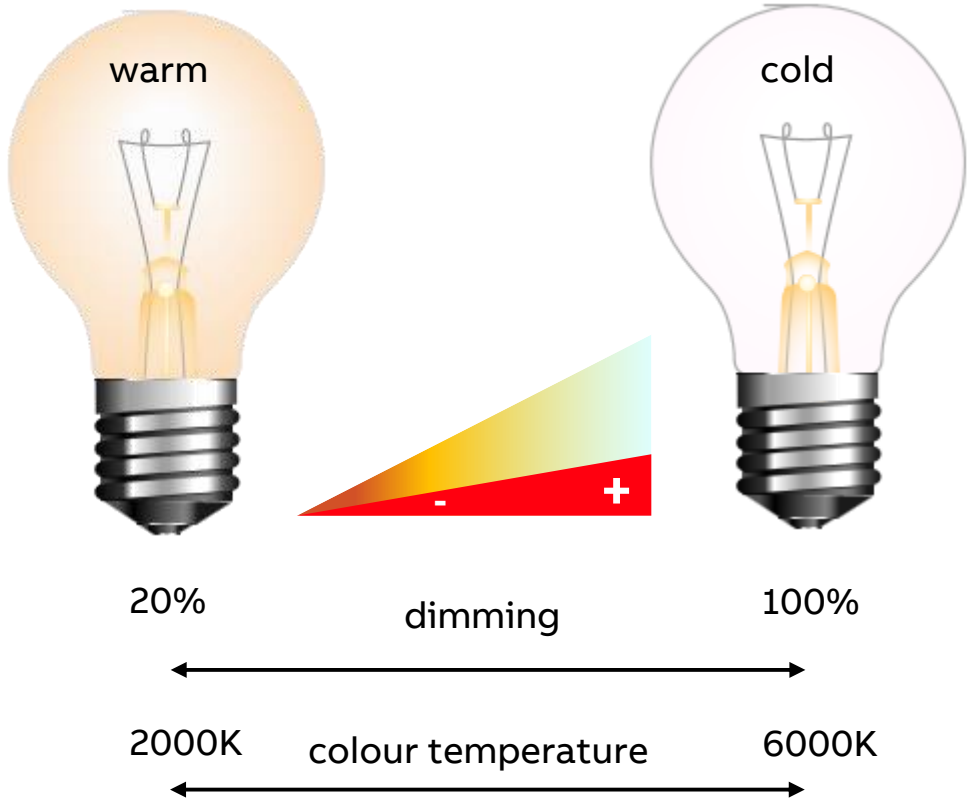
The colour temperature changes proportionally to brightness

– Dimming up: Increasing of colour temperature
→ cold white

– Dimming down: Decreasing of colour temperature
→ warm white

Dim2Warm can be activated on a group or a ballast

This dependency is similar to the dimming behavior of a light bulb (light bulb effect)



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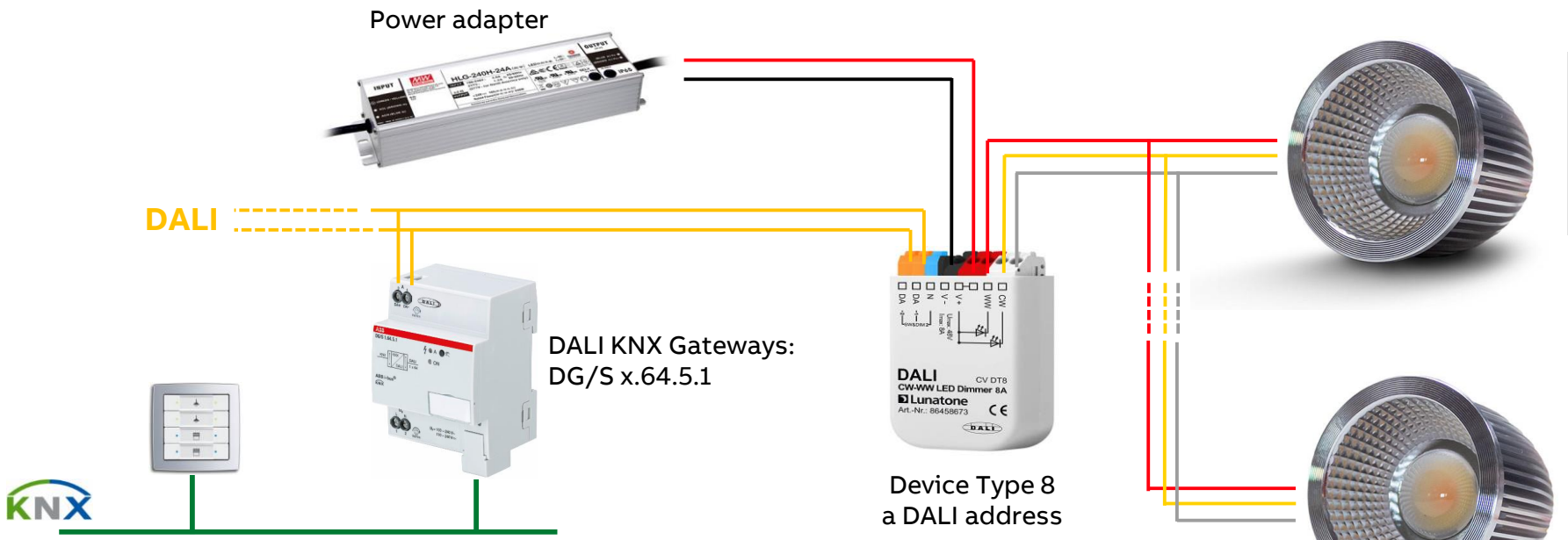
Colour function “Dim2Warm” – Example: Hardware for Tunable White with DALI and KNX



For example:
Spot Deep Tunable white CV
8 W, 750 lm, 2200-6500 K
Manufacturer: ConstaLED
Manufacturer number: 31362

For example:
DALI CW-WW LED-Dimmer CV
12V DC – 28V DC, 4A, 3000-6500K
Manufacturer: Lunatone
Manufacturer number: 89453836

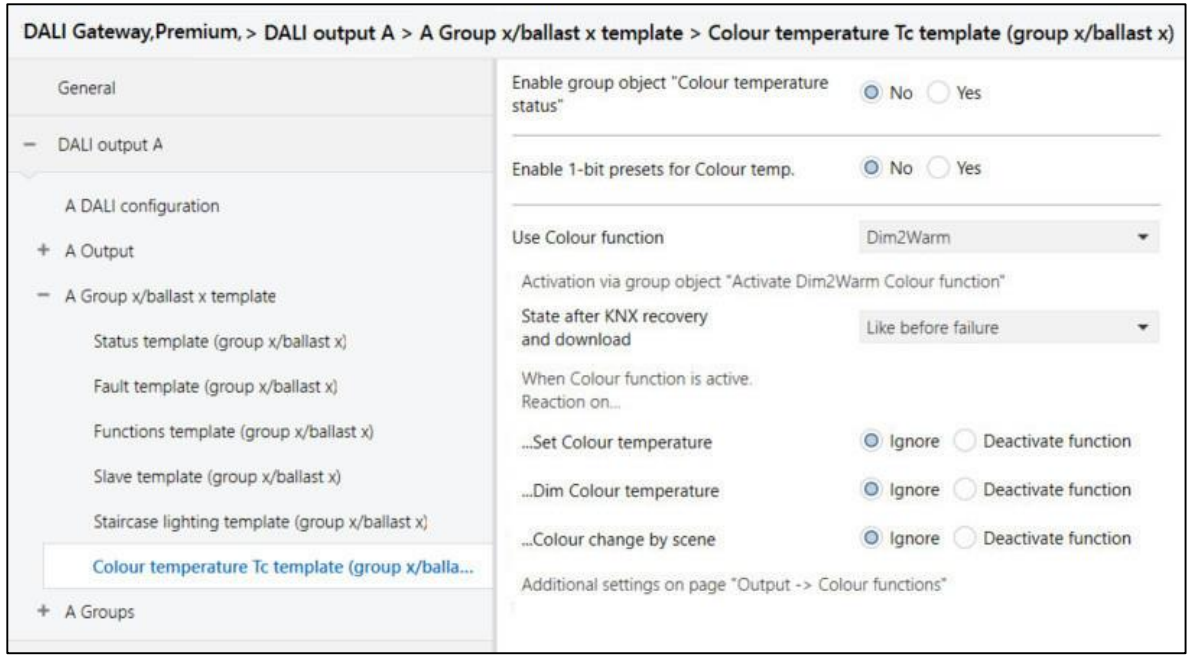
Source: Internet

KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm”

Commissioning of the Colour function Dim2Warm

- Set ETS parameter: DALI Output A → Group X or ballast X → Colour functions … (template or individual)
  - Enable colour function “The Dim2Warm” for the group/ballast
  - “State after KNX recovery and download”
  - Reaction on “Set colour temperature, “Dim colour temperature” and “Colour change by scene” when Colour function is active
- Set ETS parameter: DALI Output A → Output → Colour functions
  - Enable the group object “*Output – Activate Dim2Warm colour function”* (if necessary)
  - Limitation of the proportional and Colour temperature range (if necessary)



KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm”

Group x/ballast x templates

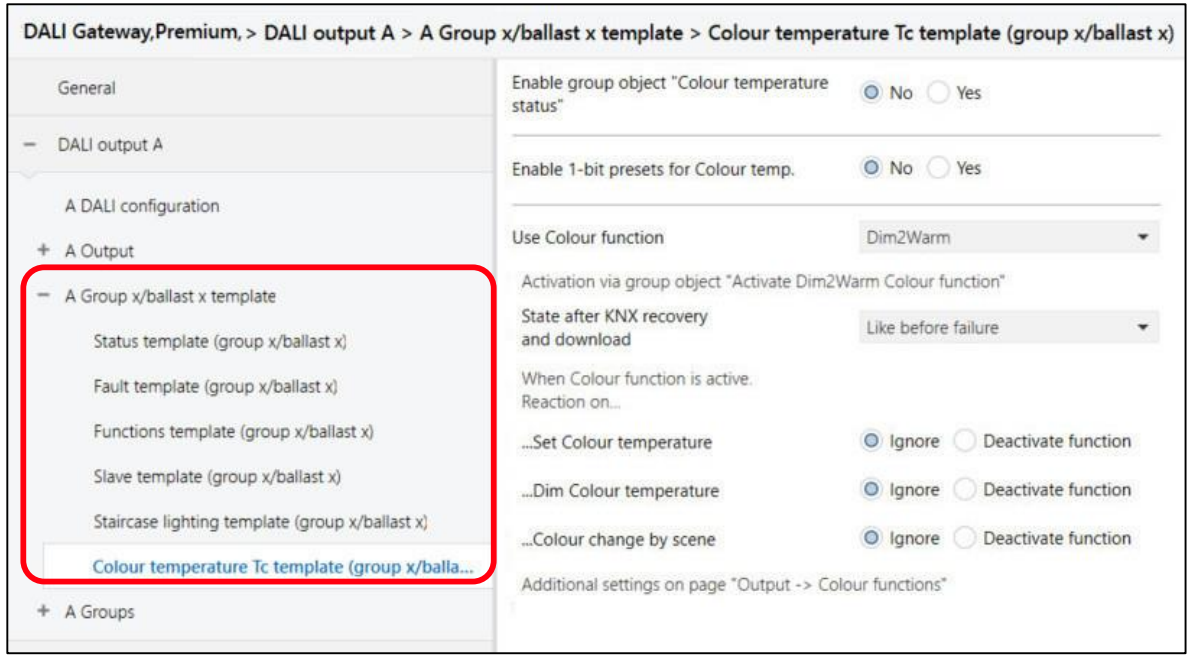
In the ETS application of the gateways, up to 64 individual ballasts or up to 16 DALI groups can be parameterized per channel with different parameter (e.g. status, burn-in, partial failure)

Normally not necessary to make individual parameter settings for each ballast or group

This is very time-intensive so that simplify-cation is useful for identical or slightly different settings

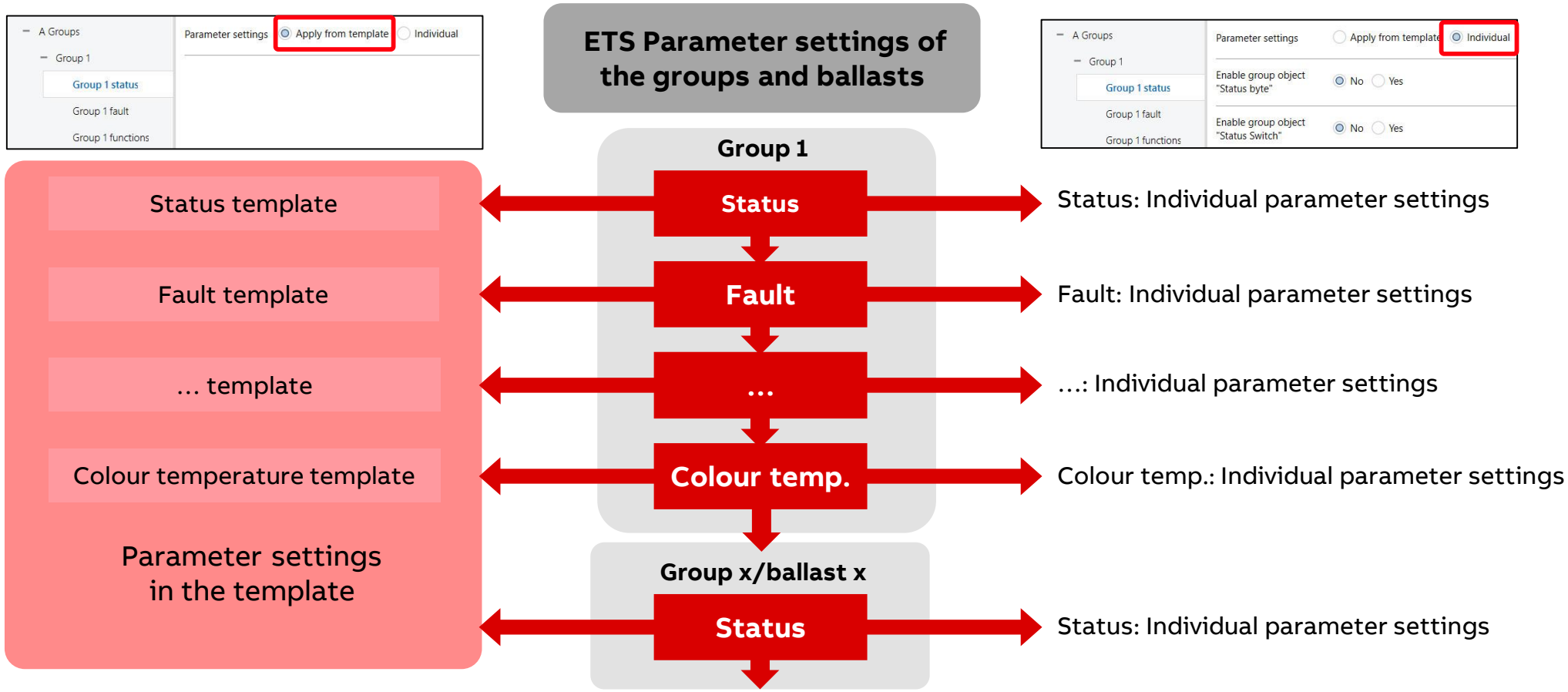
The template is used in the ETS application of the KNX DALI-Gateways divided into the six parameter menus mentioned plus general parameter

For the individual ballasts, DALI groups and for output A or B (Broadcast) you have the choice between using the template or individual parameter settings



KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm” – Group x/ballast x templates



KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm”

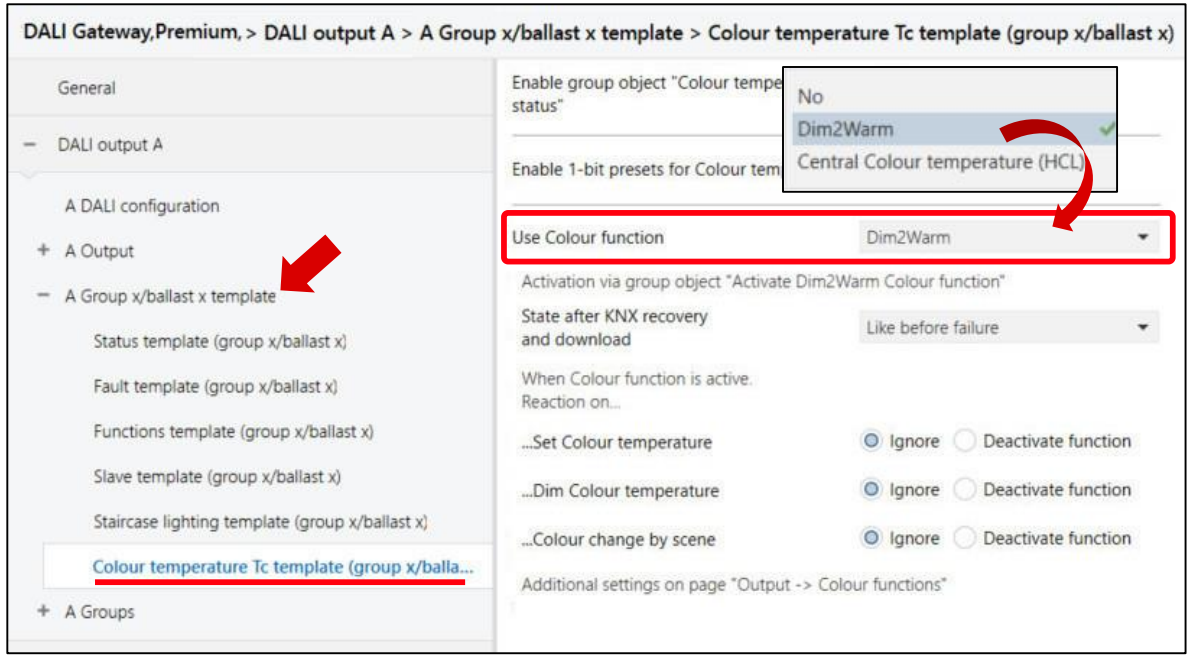
Use colour function (per group/ballast)

The settings can be made per ballast/group or in the template

This parameter determines whether a colour function is used

Only the Dim2Warm or HCL colour function can be used per group/ballast

- No
  - No colour function is used
- Dim2Warm
  - The Dim2Warm colour function is used
  - All Dim2Warm settings are active
- Central colour temperature (HCL)
  - The central colour temperature (HCL) colour function is used
  - All HCL settings are active



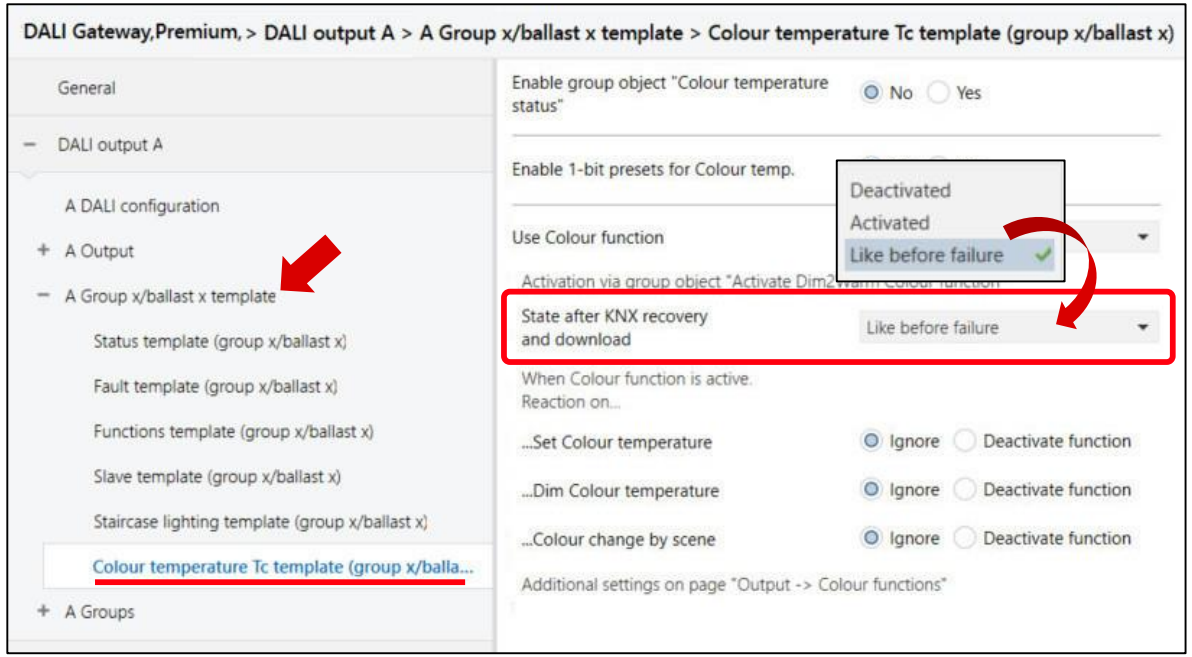
KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm”

State after KNX recovery and download (per group/ballast)

This parameter defines the state of the Colour function after KNX bus voltage recovery or a download

– Deactivated
  - The Colour function is deactivated after KNX bus voltage recovery
  - The group/ballast reacts like a normal group/ballast without an additional function
– Activated
  - The Colour function is activated after KNX bus voltage recovery or a download
– Like before failure
  - The Colour function retains the operating state (activated or deactivated) that it had before the KNX bus voltage recovery or download



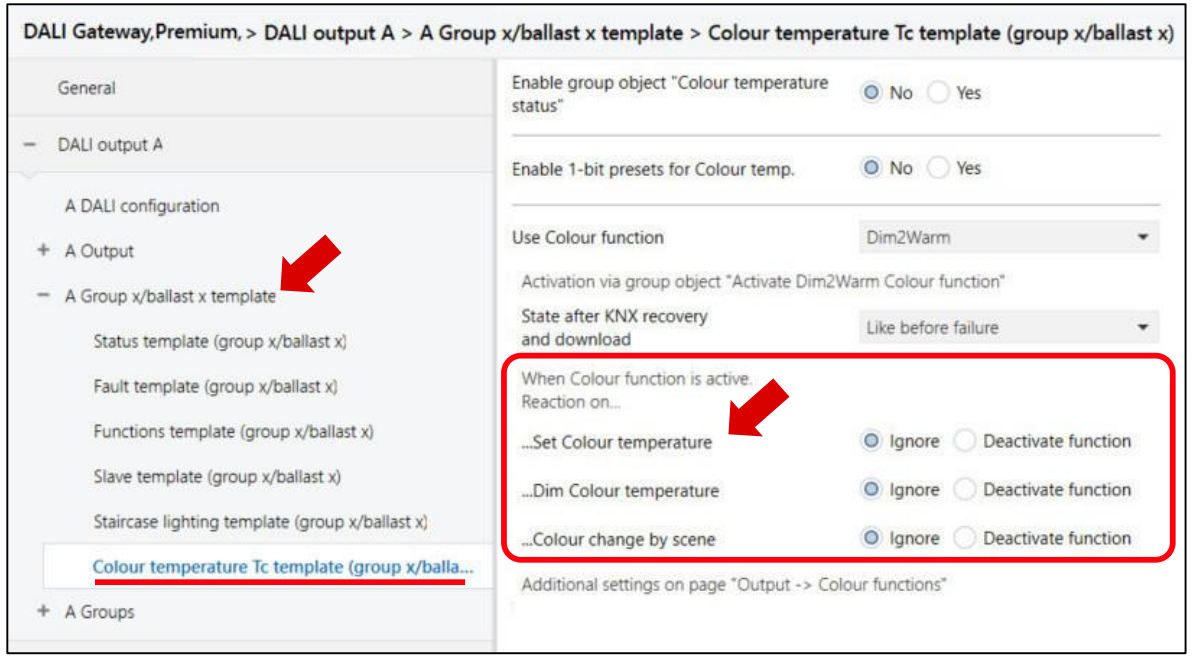
KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm”

Active Colour function: Reaction on “Set colour temperature”

This parameter describes how the group/ballast responds if a colour temperature is set while the colour function Dim2Warm is active

– Ignore
  - The colour temperature setting is ignored
  - The colour function remains active
– Deactivate function
  - Setting a colour temperature deactivates the colour function and the group/ballast adopts the set colour temperature



KNX DALI Gateway Premium DG/S x.64.5.1

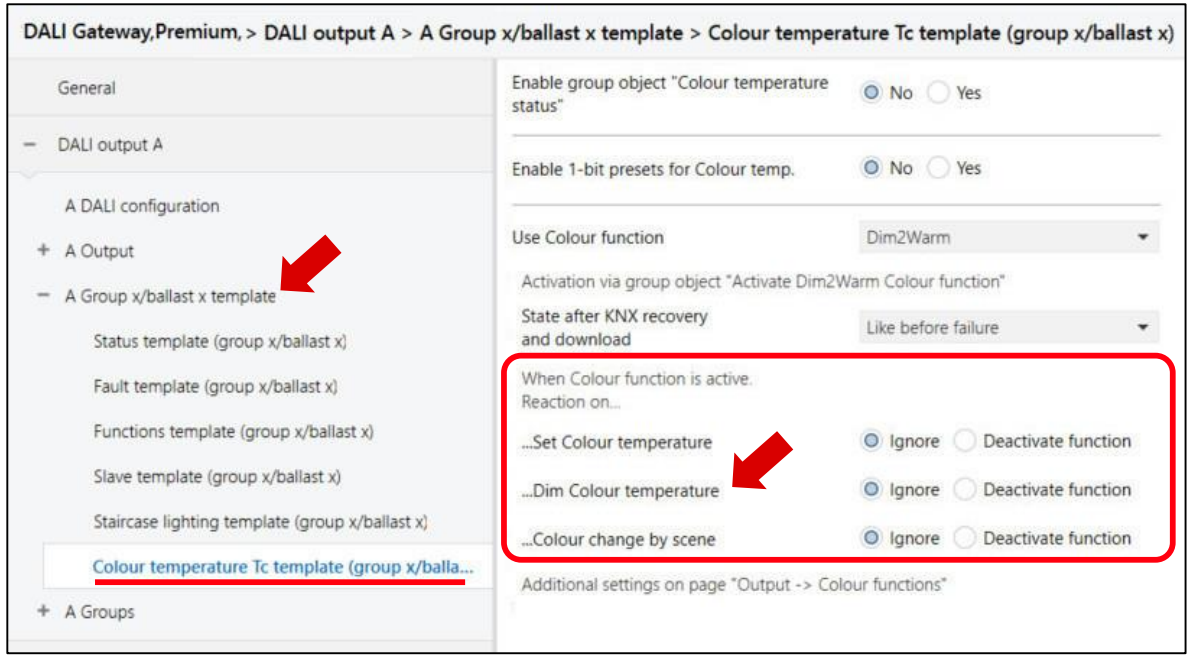
Colour function “Dim2Warm”

Active Colour function: Reaction on “Dim colour temperature”

This parameter describes how the group/ballast responds if the colour temperature is dimmed while the colour function Dim2Warm is active

– Ignore
  - The Colour function remains active and the colour temperature dimming is ignored

– Deactivate function
  - Dimming a colour temperature deactivates the colour function and the group/ballast adopts the dimmed colour temperature



KNX DALI Gateway Premium DG/S x.64.5.1

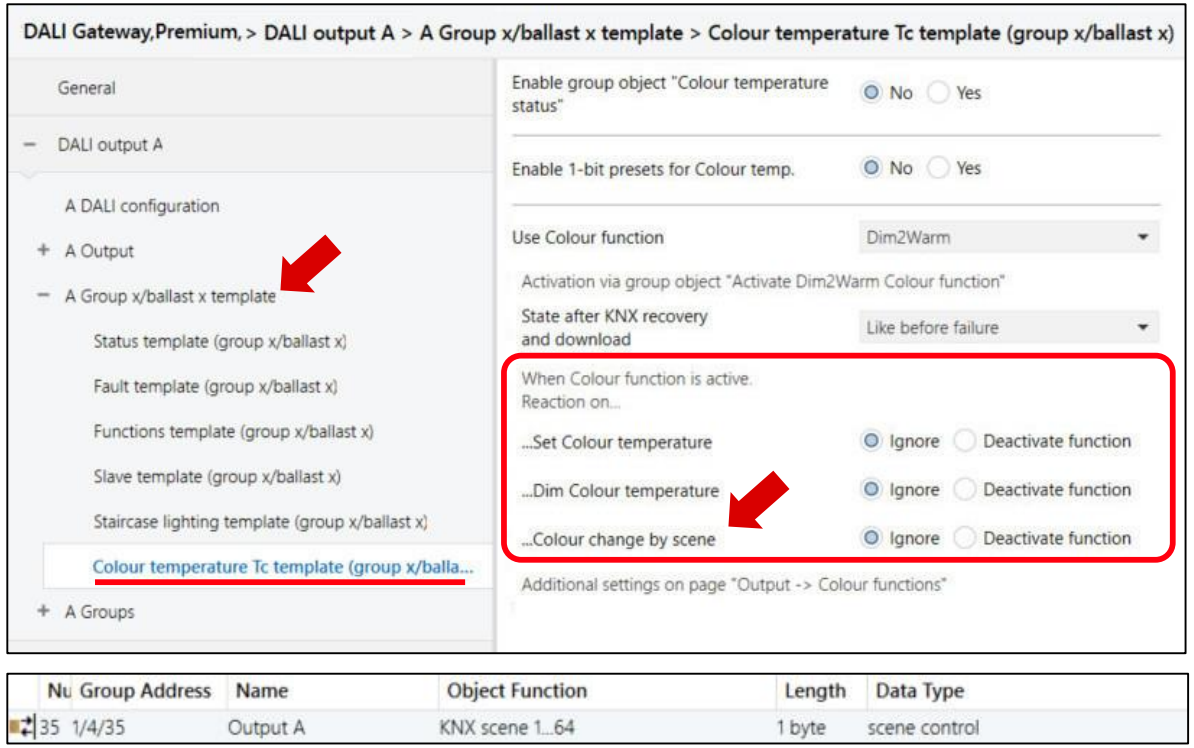
Colour function “Dim2Warm”

Active Colour function: Reaction on “Colour change by scene”

This parameter defines how the group/ballast responds if a colour is recalled by a scene retrieval while the colour function Dim2Warm is active

– Ignore
  - The Colour function remains active and the scene retrieval colour change is ignored

– Deactivate function
  - The Colour function is deactivated as soon as a colour change is recalled by a scene retrieval
  - The group/ballast adopts the colour temperature of the scene



KNX DALI Gateway Premium DG/S x.64.5.1

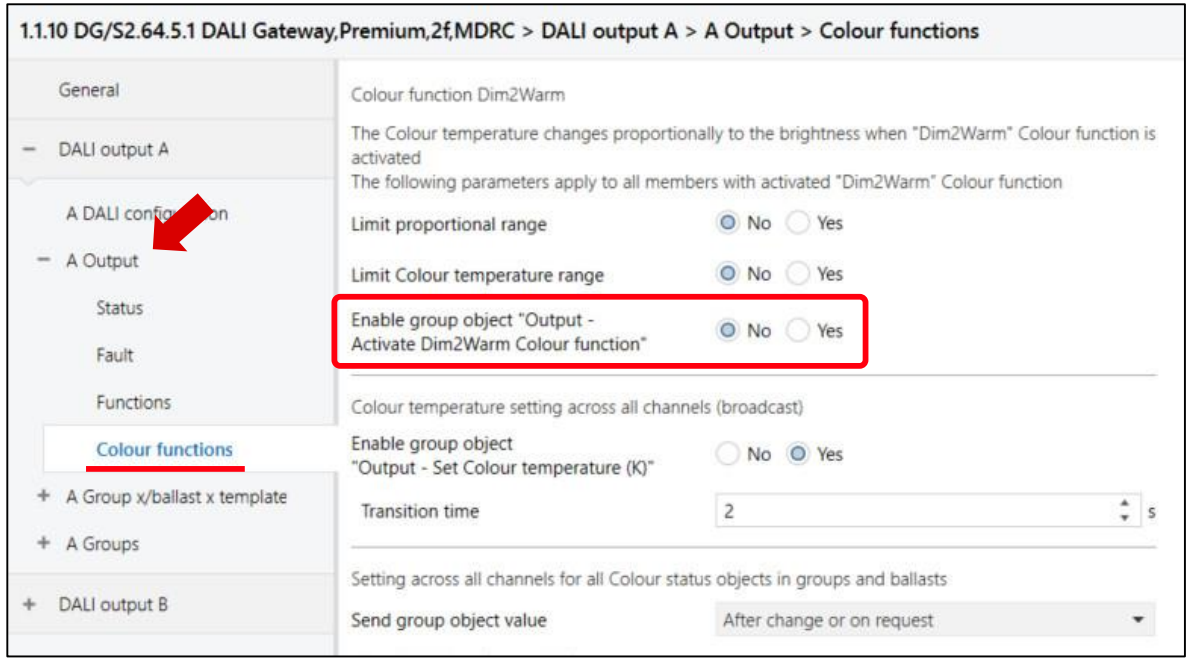
Colour function “Dim2Warm”

Group object “Output – Activate Dim2Warm colour function”

This parameter enables the “*Output – Activate Dim2Warm colour function”* group object, which activates/deactivates the Dim2Warm colour function

– No
  - The “*Output – Activate Dim2Warm colour function*” group object is not enabled
  - The Dim2Warm function is activated/deactivated for each parameterized group/ballast

– Yes
  - The “*Output – Activate Dim2Warm colour function”* group object is enabled
  - This group object also controls all groups/ballasts <u>per output</u> for which the Dim2Warm function is parametrized, i.e. the function can be activated/deactivated centrally



Nu	Group Address	Name	Object Function	Length	Data Type
65	1/4/65	Output A	Activate Dim2Warm Colour function	1 bit	start/stop

KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm”

Activation/deactivation of the Dim2Warm colour function

The Dim2Warm colour function is activated and deactivated via a group object

- Individually for each group
- Individually for each ballast
- Centrally for all group/ballasts per output for which the Dim2Warm function is parametrized

Telegram value:

- 1 = Activates the Dim2Warm colour function
- 0 = Deactivates the Dim2Warm colour function

Furthermore, the state after KNX recovery and download can be set (deactivated, activated or like before failure)

Nu	Group Address	Name	Object Function	Length	Data Type
89	1/4/89	Output A - group 1	Activate Dim2Warm Colour function	1 bit	start/stop

Nu	Group Address	Name	Object Function	Length	Data Type
359	1/4/248	Output A - ballast 3	Activate Dim2Warm Colour function	1 bit	start/stop

Nu	Group Address	Name	Object Function	Length	Data Type
65	1/4/65	Output A	Activate Dim2Warm Colour function	1 bit	start/stop

KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm”

Limitation of proportional and/or colour temperature range

The proportional range is the range with a linear relationship between colour temperature and brightness and refers to an output

– No limitation of the proportional range

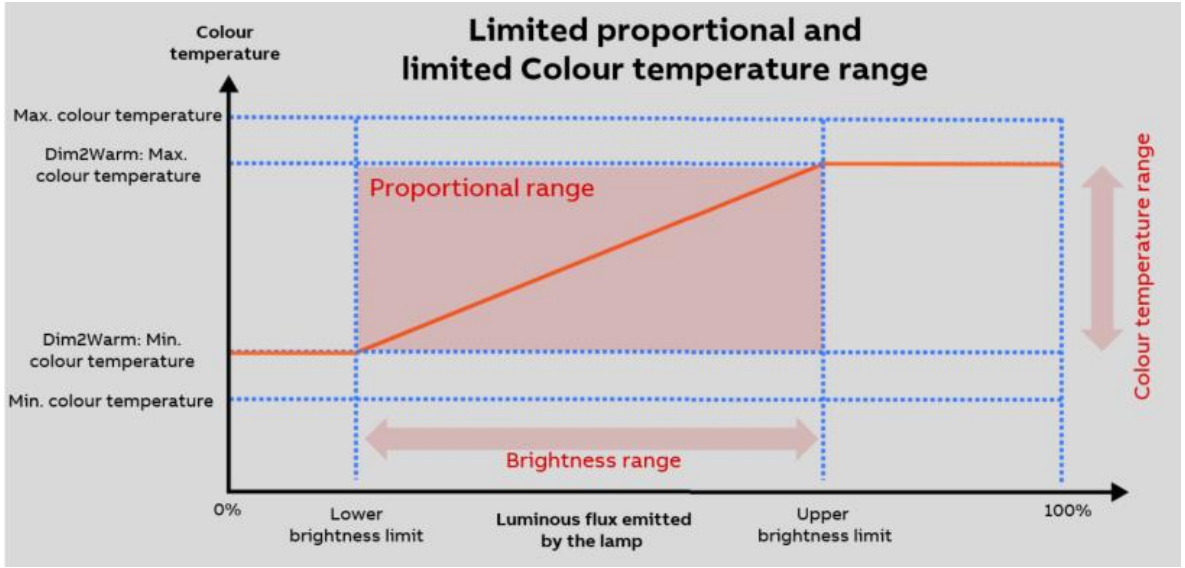
– There are two different factors that can limit this range

  • Reduction of the brightness range by setting an upper and lower brightness limit (limited proportional range)

  • Adjusting the colour temperature range by setting a minimum and maximum colour temperature value

The proportional area always stays within the parametrized limits (limited or not limited)

When the Dim2Warm function is active and a group/ballast is actuated with a brightness value outside the limits, its colour temperature remains at the value of the exceeded limits (Dim2Warm min or max colour temperature)



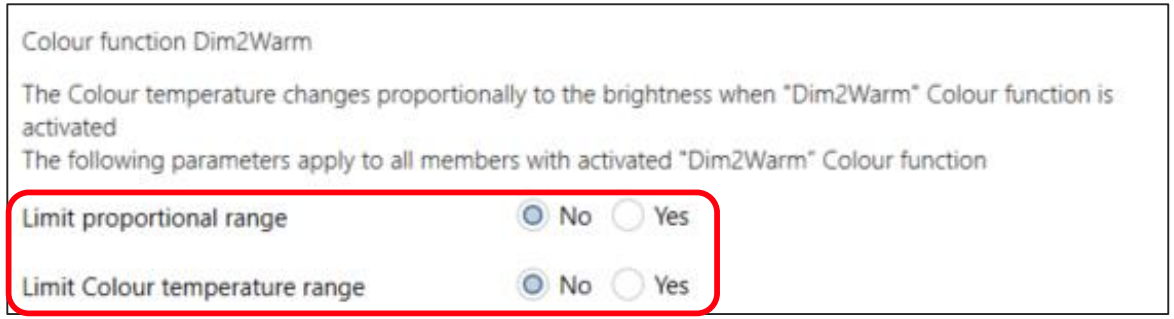
KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm”

Limitation of proportional and/or colour temperature range

The proportional range is the range with a linear relationship between colour temperature and brightness and refers to an output

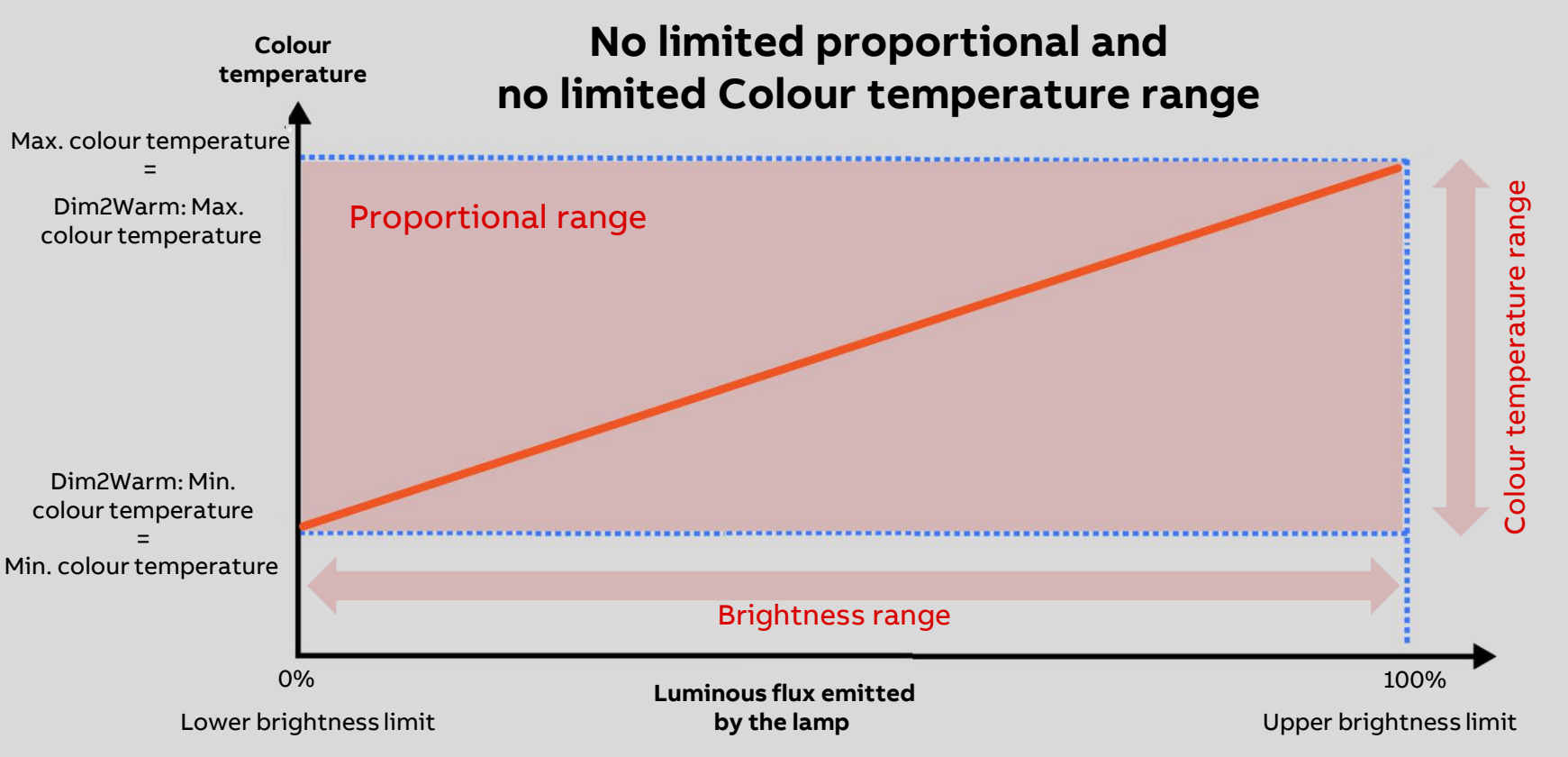
- No limitation of the proportional range
- Reduction of the brightness range by setting an upper and lower brightness limit (min/max level)
  → limited proportional range
- Adjusting the colour temperature range by setting a minimum and maximum colour temperature value (min/max colour temperature)



ETS Parameter:
A Output → Colour functions „Dim2Warm“

KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm”



KNX DALI Gateway Premium DG/S x.64.5.1

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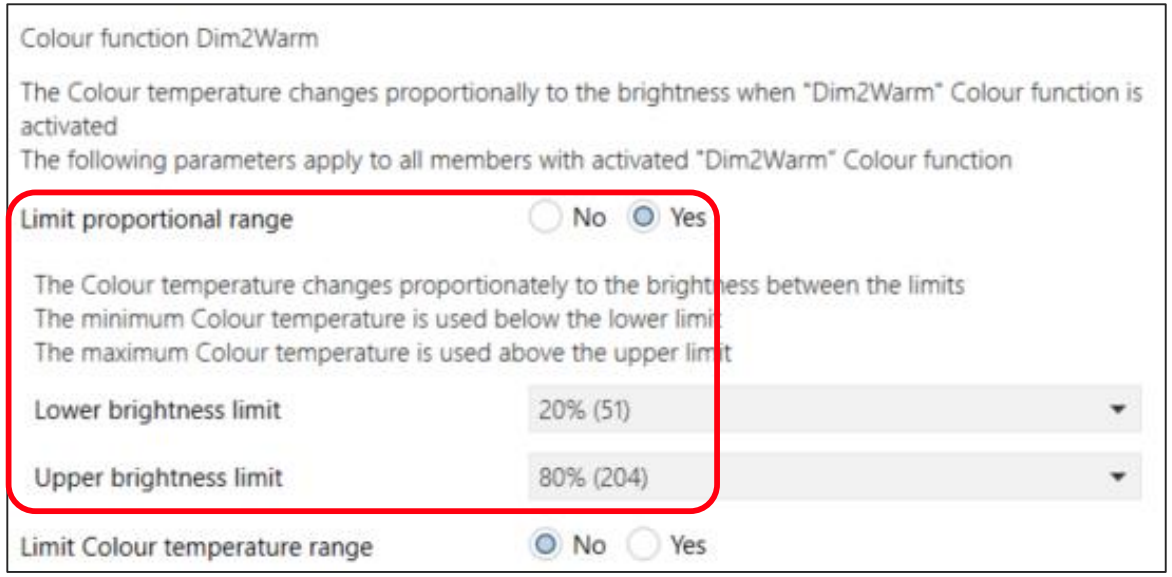
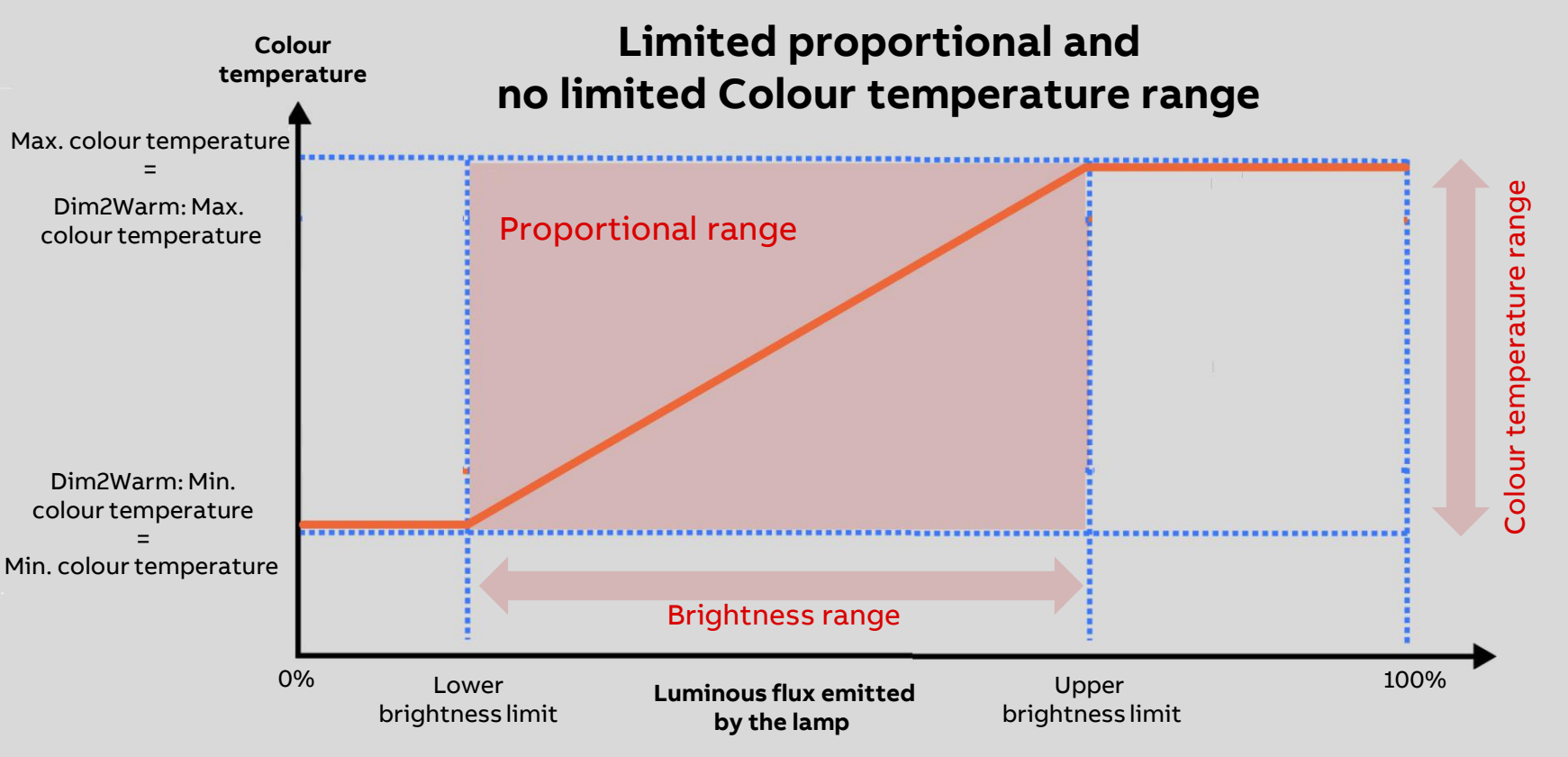


KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm”



KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm”

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  - Reduction of the brightness range by setting an upper and lower brightness limit (min/max level)
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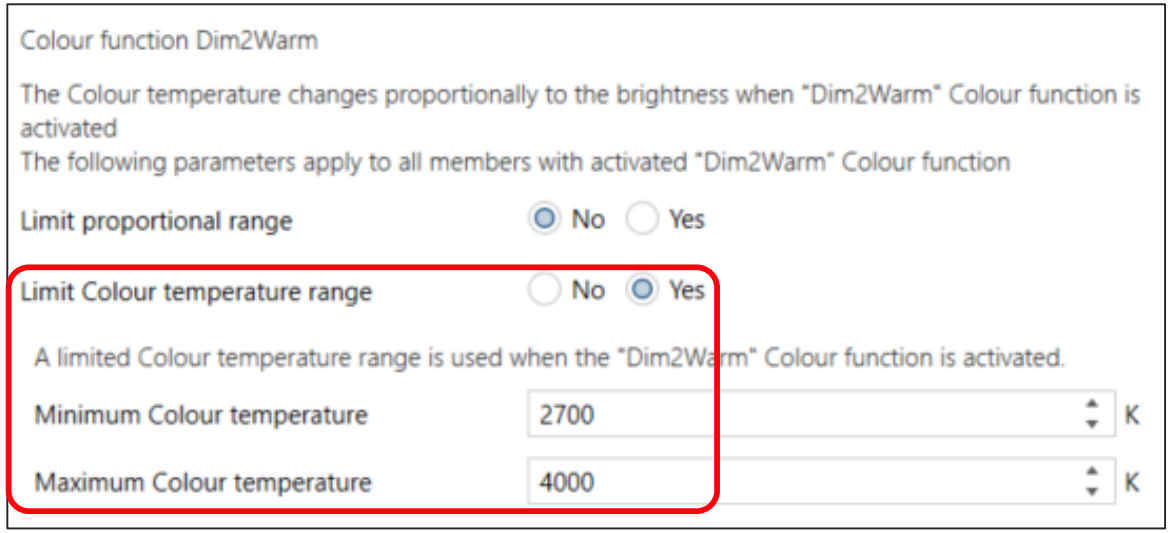
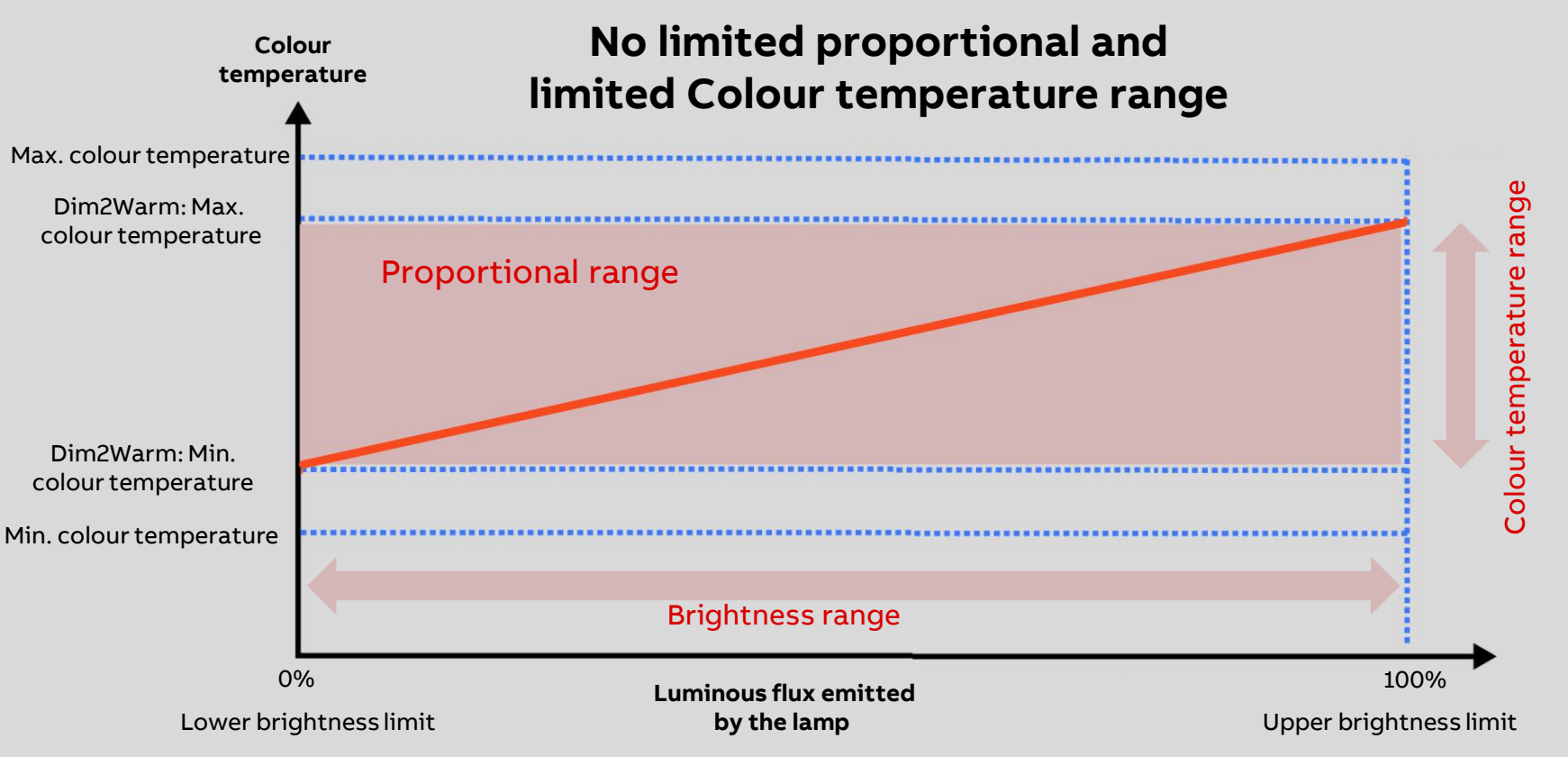
  - Adjusting the colour temperature range by setting a minimum and maximum colour temperature value (min/max colour temperature)



KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm”



KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm”

Limitation of proportional and/or colour temperature range

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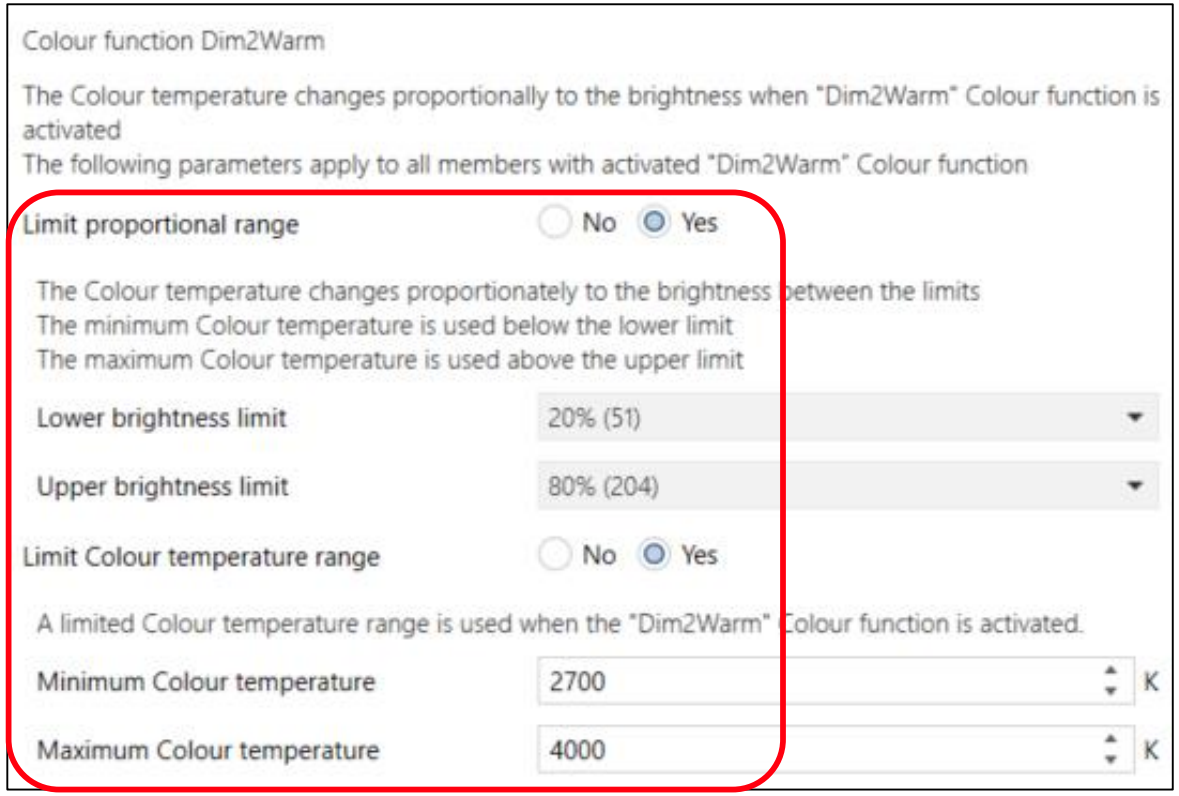
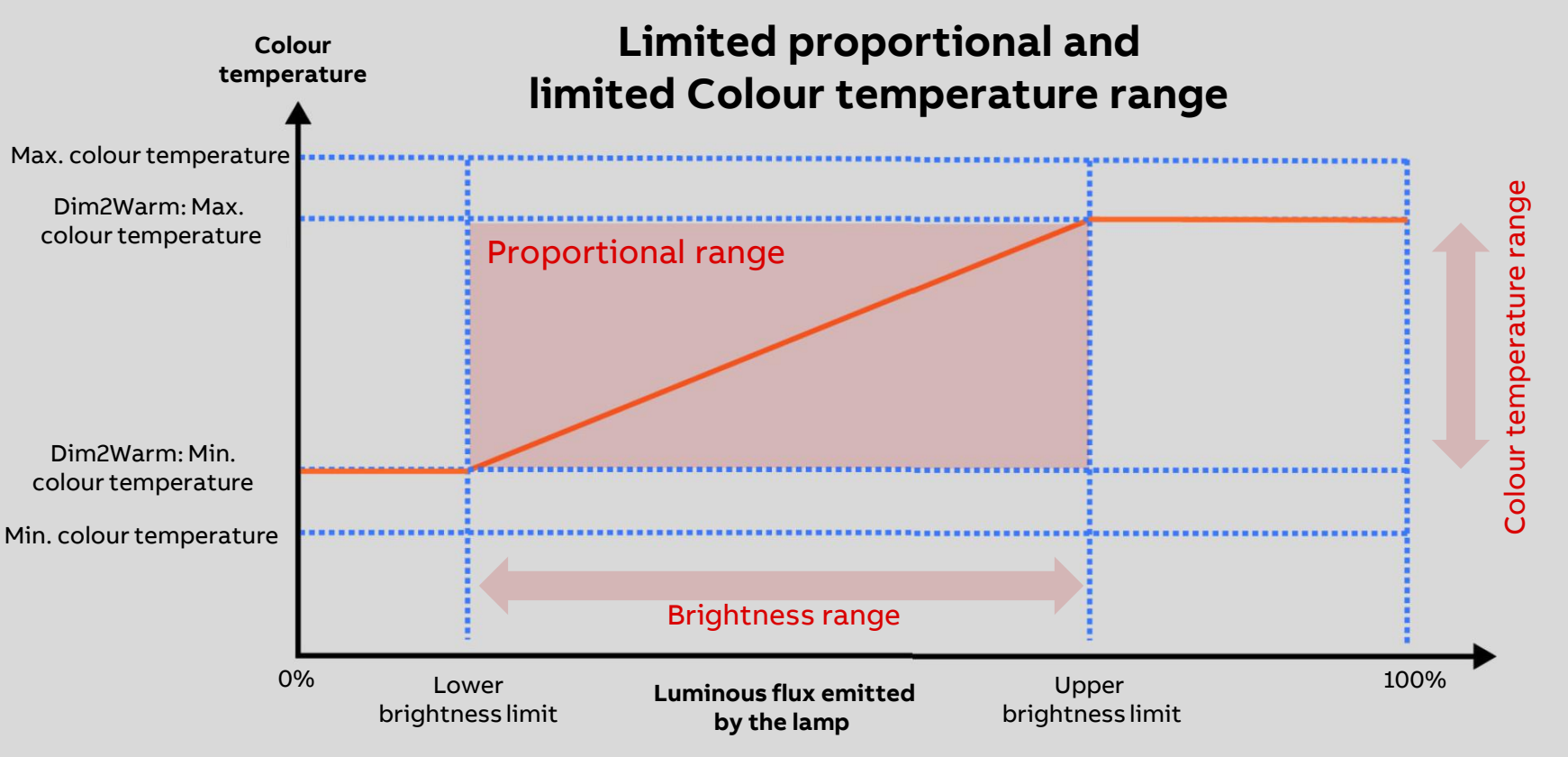
  - Adjusting the colour temperature range by setting a minimum and maximum colour temperature value (min/max colour temperature)



KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm”



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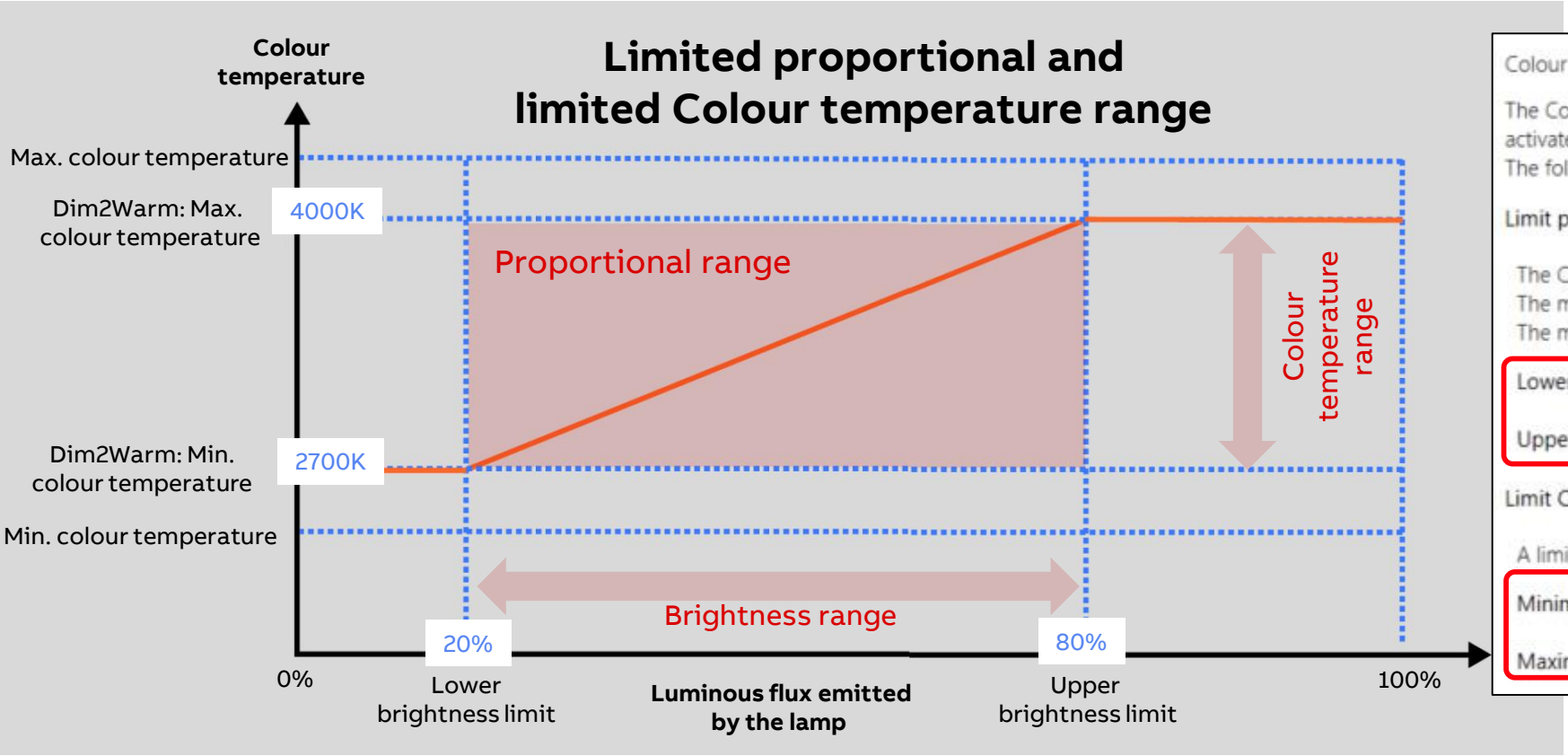
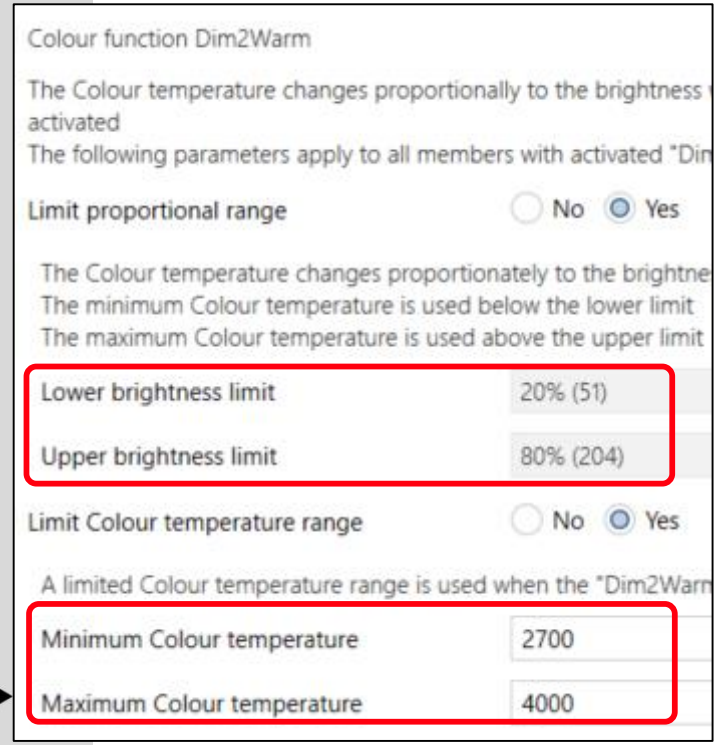
Colour function “Dim2Warm”





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Colour function “Dim2Warm”

DALI logarithmic dimming curve

The DALI dimming curve is adjusted to the sensitivity of the human eye

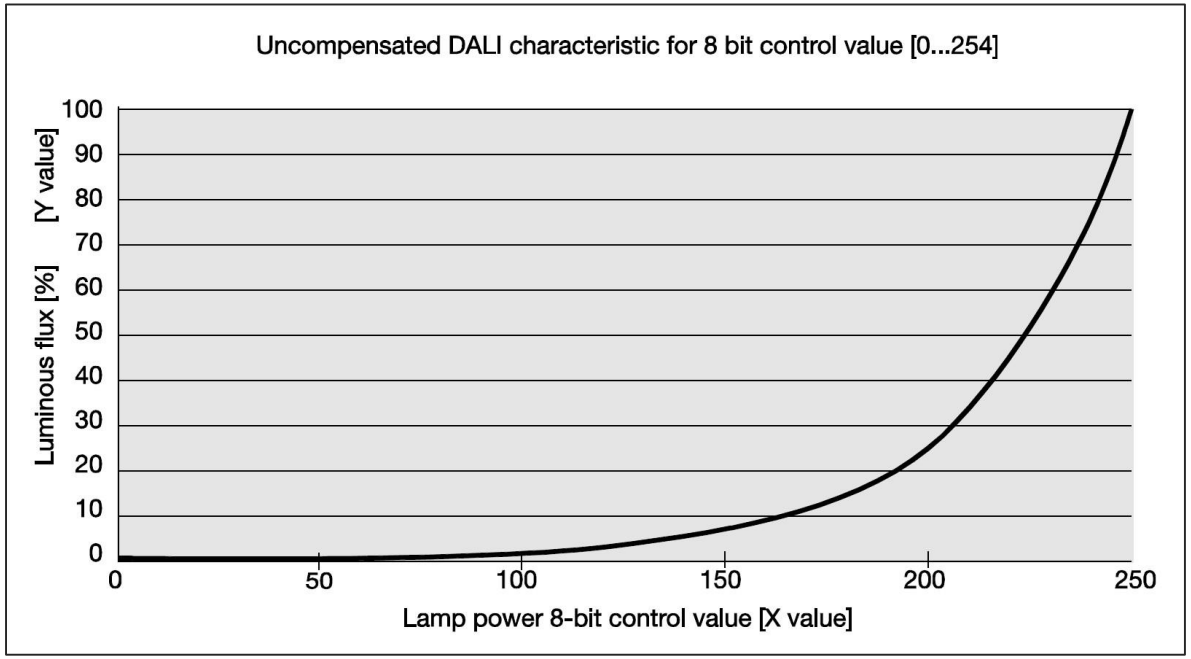
This results in a logarithmic characteristic curve for the luminous flux that is perceived by the human eye as a linear brightness sequence

Luminous flux describes the lighting power emitted from a light source in all directions (lumens lm)

Luminous flux under DALI has been defined in compliance with the DALI standard (EN 60 929 or IEC 62 386-102)

If a DALI (logarithmic) dimming curve is selected in the gateway, the KNX value relates to the 8-bit lamp power control value, the X value

If a KNX (linear) dimming curve is selected in the gateway, the KNX value relates directly to the luminous flux, the Y value.



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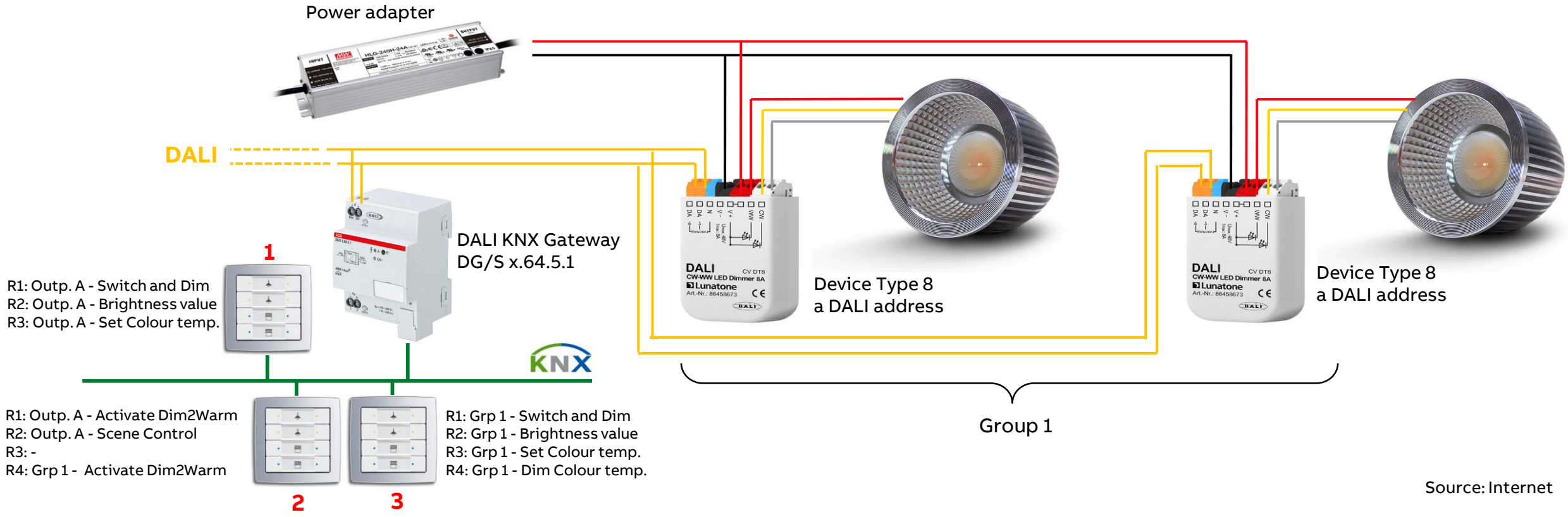
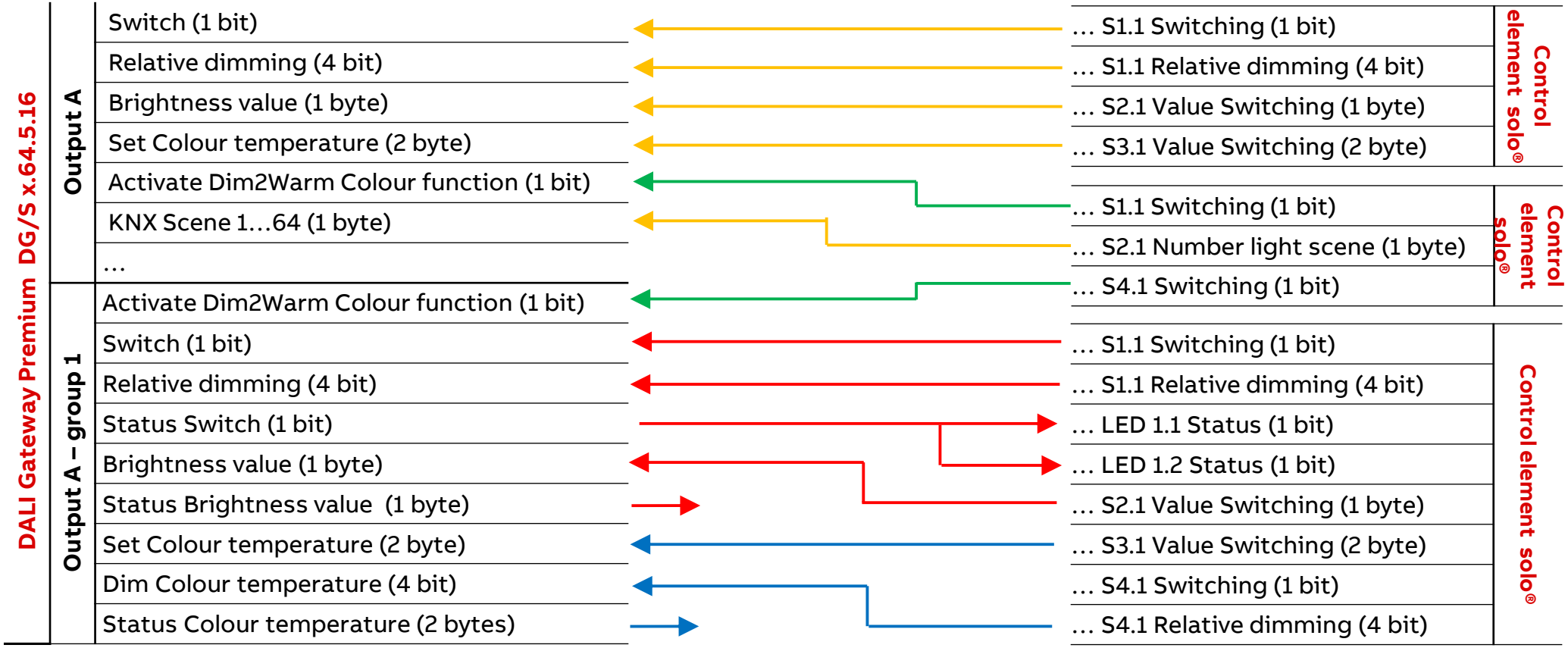
Colour function “Dim2Warm” – Example: Hardware for Tunable White with DALI and KNX



Source: Internet

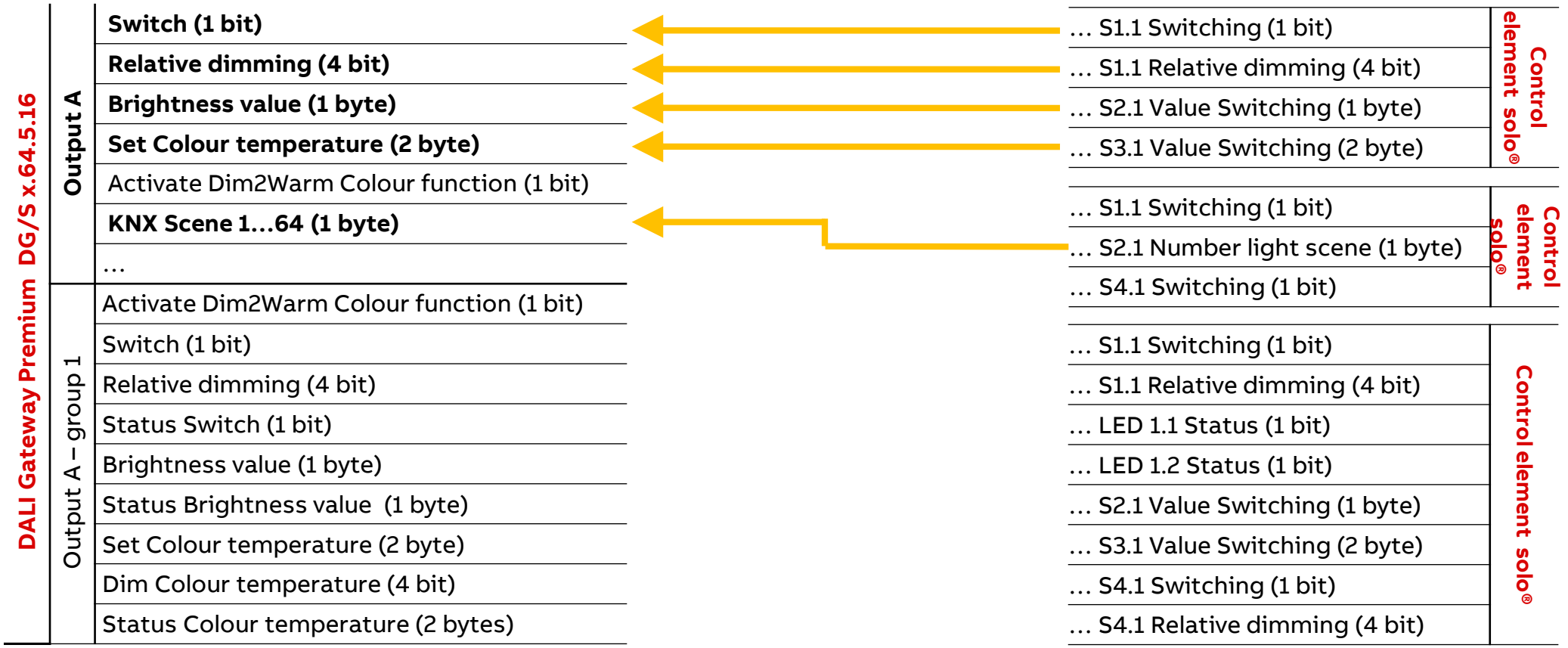
KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm” – Example: Assignment of Group Addresses



KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Dim2Warm” – Example: Assignment of Group Addresses



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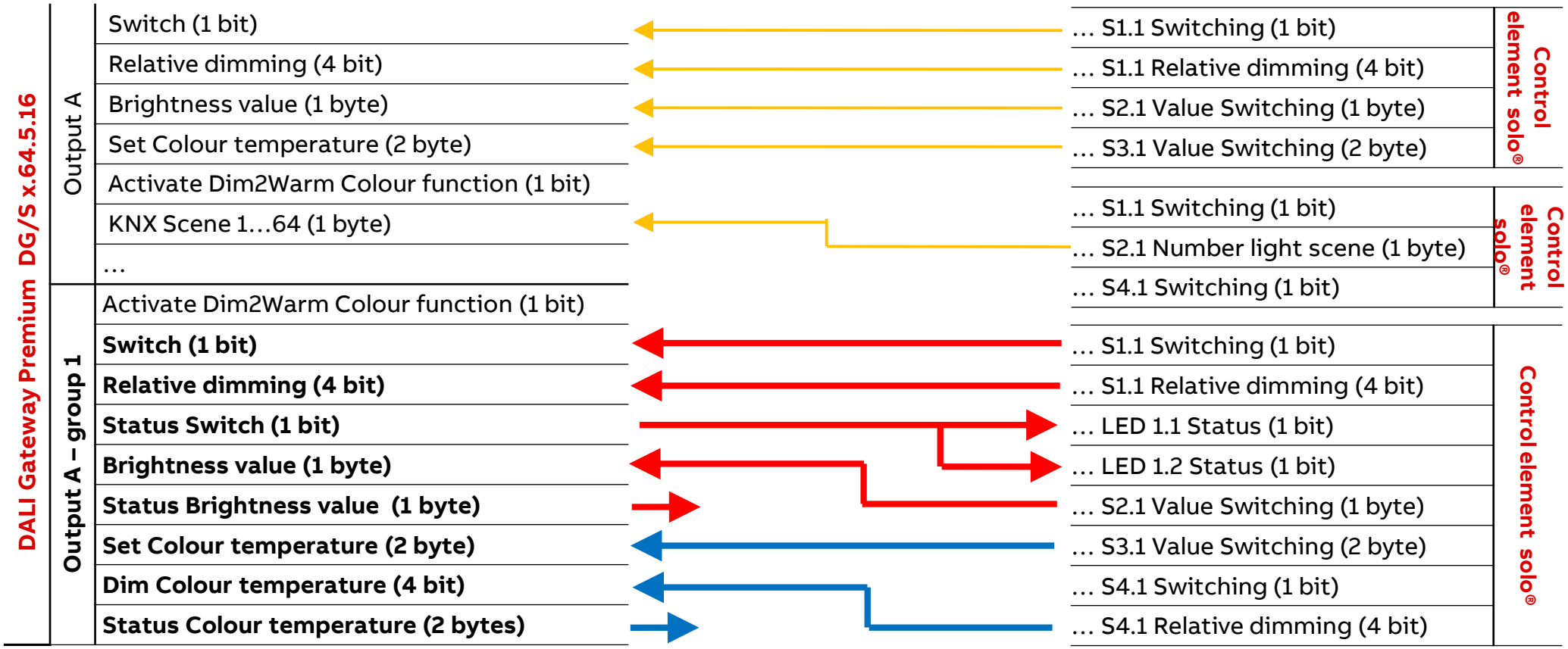
Colour function “Dim2Warm” – Example: Assignment of Group Addresses



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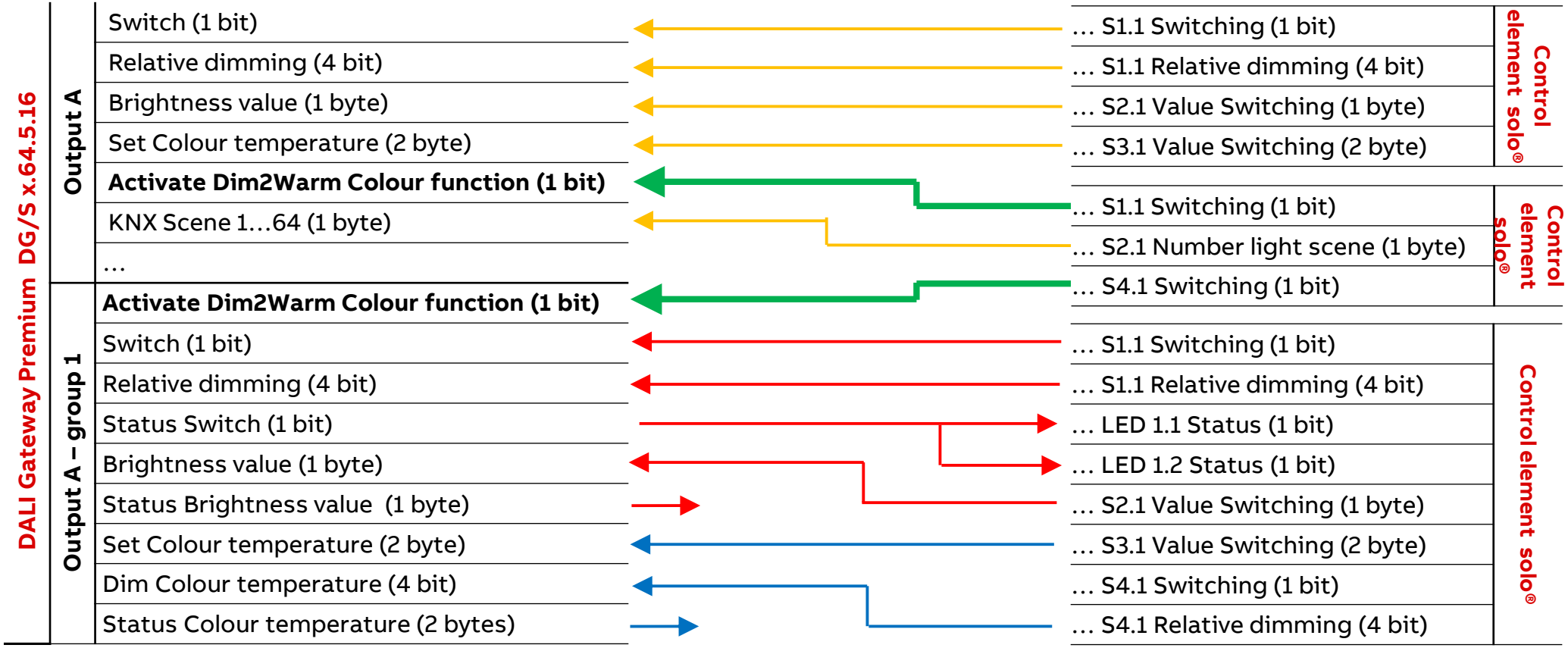
Colour function “Dim2Warm” – Example: Assignment of Group Addresses



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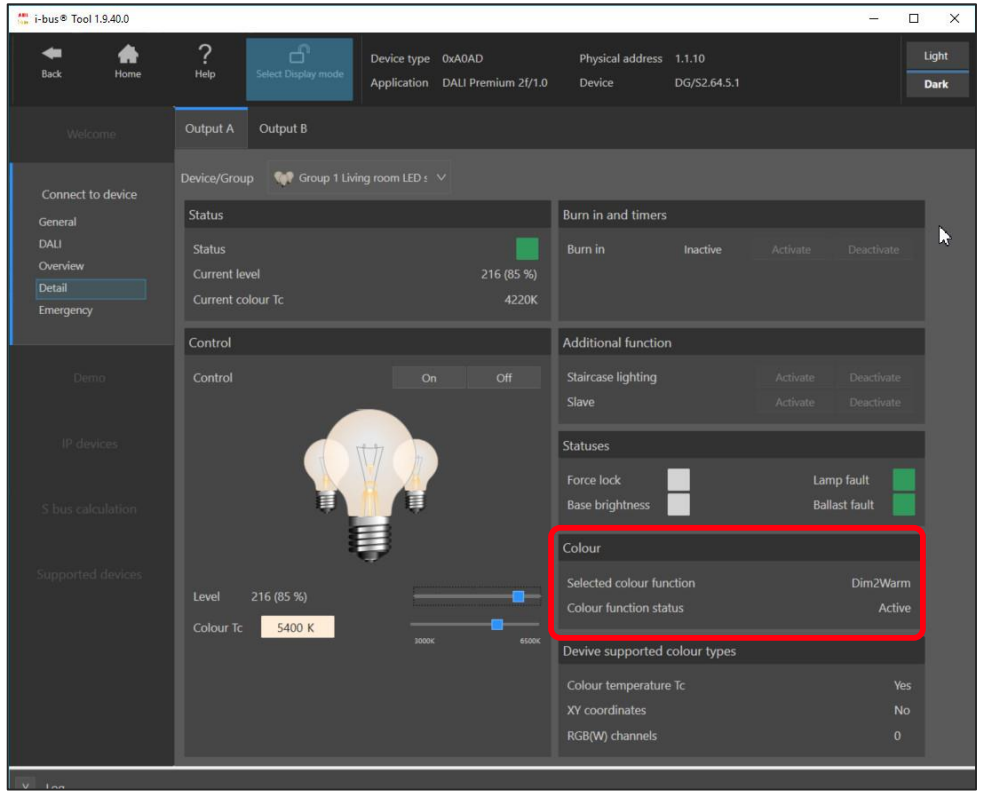
Colour function “Dim2Warm”

ABB i-bus® Tool

The selected and the state of the Colour function “Dim2Warm” is displayed

The prerequisite is that the additional function is parameterized in the ETS



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Colour function “Dim2Warm”

Summary

- When dimming LEDs the colour temperature does not change
- The “Dim2Warm” Colour function copies the colour temperature behavior of a light bulb or halogen lamp in case of dimming LEDs
- Especially in residential lighting solutions this feature is preferred, as it is known and accepted from traditional light bulbs lamps
- The colour temperature changes proportionally to brightness
  - Dimming up: Increasing of colour temperature → cold white
  - Dimming down: Decreasing of colour temperature → warm white
- Dim2Warm can be activated on a group/ballast or central
- The Colour function Dim2Warm or HCL can be used for a group/ ballast
- Ballasts of device Type 8 and tunable white LEDs are required

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KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL”

KNX DALI Gateway Premium DG/S x.64.5.1

Overview

KNX DALI Gateway Premium DG/S x.64.5.1

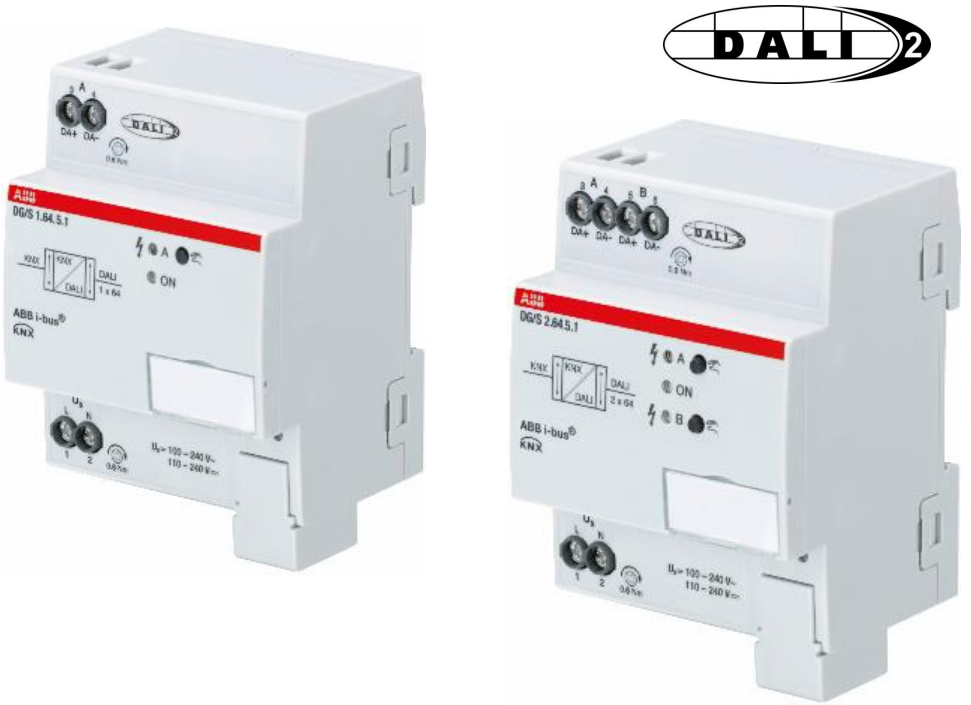
Hardware

– DG/S 1.64.5.1 (one channel, 64 ballasts)
– DG/S 2.64.5.1 (two independent channels, 2 x 64 ballasts)

The following ballast can be operated on the gateway

– Normal DALI ballasts (device type 0)
– DALI single battery emergency lighting converter (device type 1)
– Colour-controlled DALI ballast (device type 8)

– Functions
  - Flexible combination of DALI groups or single control
  - ABB i-bus® Tool support
  - Templates
  - Tunable white
  - Dim2Warm
  - **Human Centric Lighting**
  - Standby Shutdown
  - …



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Colour function “Human Centric Lighting HCL”

What is Human Centric Lighting ?

The light of the sun is crucial for our health and well-being

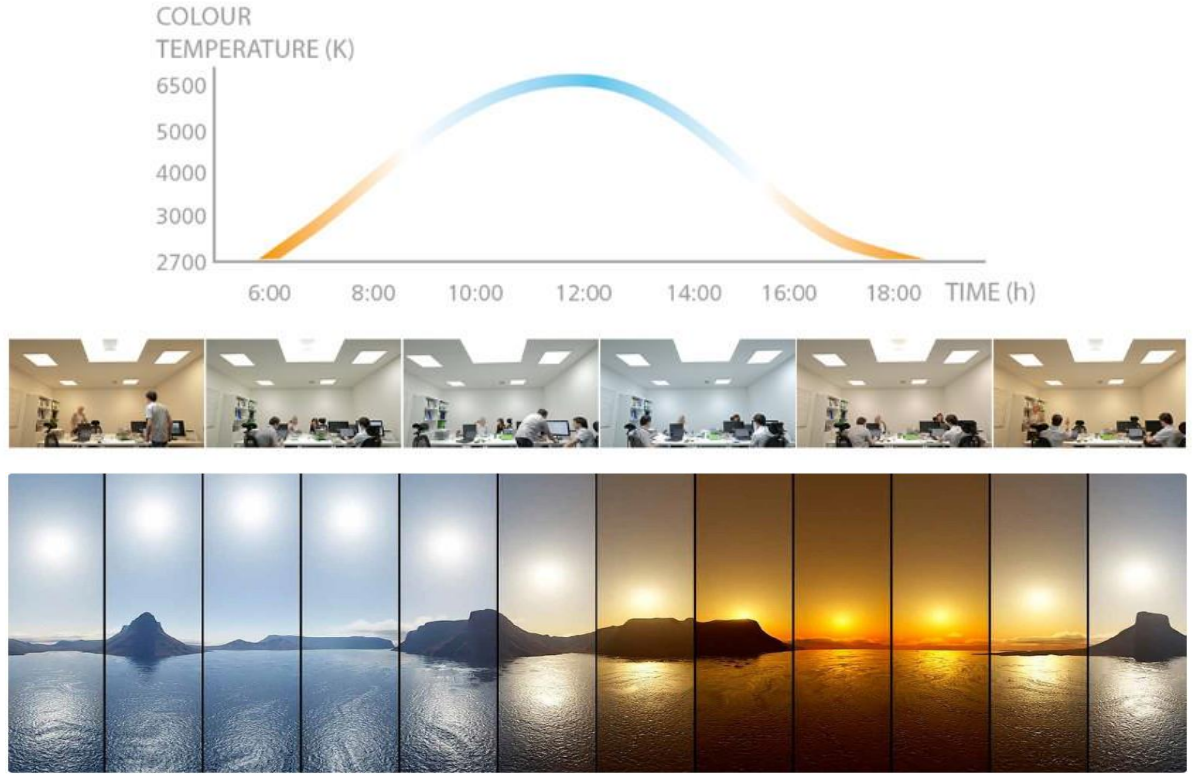
Every artificial light source should therefore match the properties of sunlight as closely as possible

Light affects our mood and level of activity

Human Centric Lighting can adapt people's daily rhythms to one another and increase their motivation, well-being and productivity

Because our physiological response to light depends on the properties of light such as colour spectrum, intensity and timing, the properties of artificial light in our environment are of great importance when we spend a long time in closed rooms

Solutions with Human Centric Lighting can promote the circadian rhythm, improve the ability to concentrate, prevent sleep disorders and increase our general well-being



Source: Internet

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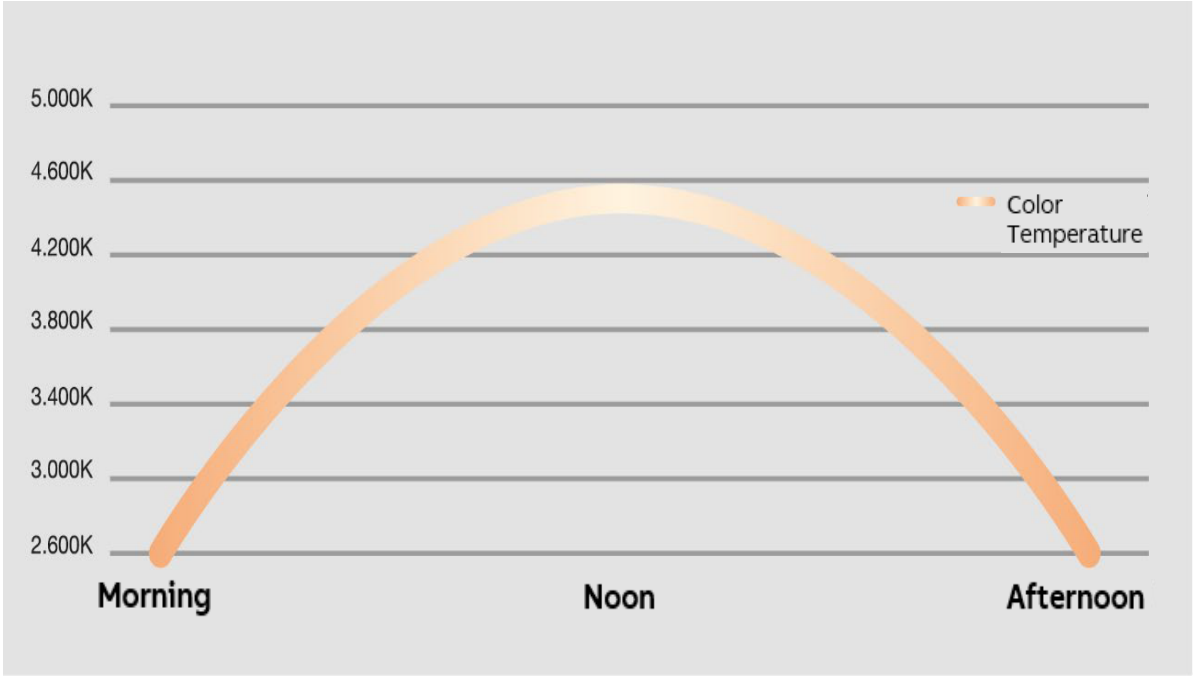
Colour function “Human Centric Lighting HCL”

Principle

With Human Centric Lighting (HCL), the daylight is simulated in the building, means the colour temperature of the outside light is reproduced by colour temperature controllable lights in the room

Actually it is the function tunable white, automized for a dynamic and suitable light situation with change of colour temperature over the day and with all positive aspects mentioned before

In complex HCL lighting systems, brightness, light distribution, direction of light and colour temperature are varied. The dynamic of the daylight, the seasons and the location of the building are considered. Furthermore special light situation can be created, e.g. scene with cold light for focused working at a machine.



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Colour function “Human Centric Lighting HCL”

HCL solutions in educational institutions

A classroom is equipped with tunable white lights, which are partly controlled by an automatic sequence and partly via a control element/panel

The automatic sequence is parameterized in the DALI gateway (rising and falling ramp plus transition times)

The teacher can set a focus light with a short-term alertness-promoting effect for concentration tasks and a relaxation light during relaxation phases

- Energy light in the morning or focus light for class examinations: High illuminance, 6500 K
- Automatic light for normal activities: Normal illuminance and HCL active
- Relaxation light for relaxation phases and for storytelling: Normal illuminance, 2700 K

Source: Internet

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Colour function “Human Centric Lighting HCL”

HCL in offices

People spend most of their time awake in closed rooms

For this reason, office space is an excellent place for introducing Human Centric Lighting solutions

Such solutions can improve the energy and motivation of employees

- Exposure to more intense light can increase the feeling of alertness and vitality of the employee during the day and at night
- Intense, blue-enriched light can affect the individual's ability to maintain constant attention and cognitive performance during the day and at night
- Exposure to light during the day that affects the circadian rhythm can have a positive effect on the sleep of the worker the following night

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Colour function “Human Centric Lighting HCL”

HCL in healthcare facilities

In hospitals and nursing homes, residents often suffer from a lack of daylight due to their illness or restricted mobility

The long stay in closed rooms can interrupt the sleep patterns

Patients with dementia or other cognitive disorders in particular are sensitive to the loss of daylight

- Avoid mood swings and depression
- The emotional and physical well-being improves due to the more relaxing nights
- Reduce the need for sedatives
- The lack of daylight is compensated, which counteracts insomnia
- Improved employee well-being

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Colour function “Human Centric Lighting HCL”

HCL in industry

Lighting Installations with high illuminance and "tunable white" can have a positive effect on production output and reduce fatigue, errors and accidents

These effects are even greater with repetitive work tasks

Higher illuminance in combination with the correct light colour spectrum and careful timing of the different light settings can lead to increased alertness and attention among industrial workers

The result is less fatigue, which in turn reduces the risk of mistakes

For shift workers, the light can be used to shift the phases of the daily rhythm and to adapt more easily to the night work

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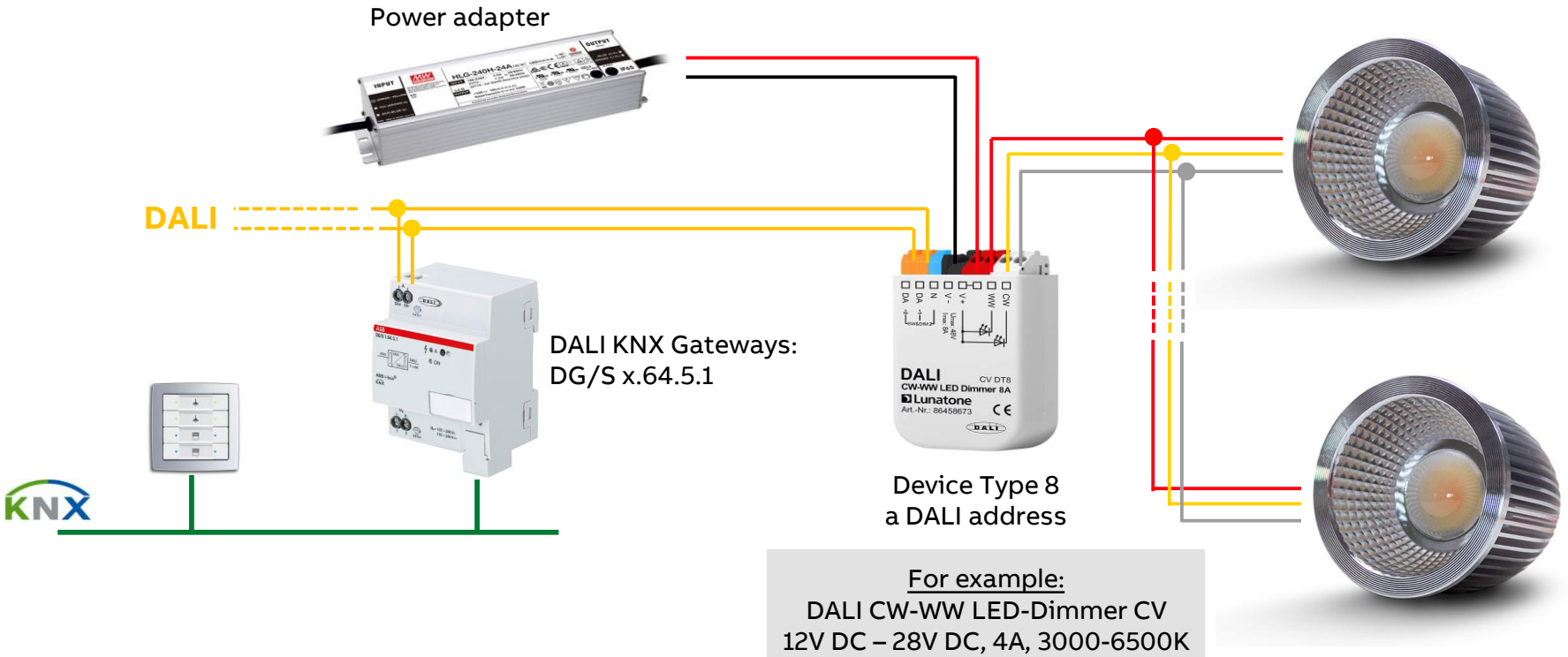
Colour function “Human Centric Lighting HCL” – Example: Hardware for Tunable White with DALI and KNX



For example:
Spot Deep Tunable white CV
8 W, 750 lm, 2200-6500 K
Manufacturer: ConstaLED
Manufacturer number: 31362

For example:
DALI CW-WW LED-Dimmer CV
12V DC – 28V DC, 4A, 3000-6500K
Manufacturer: Lunatone
Manufacturer number: 89453836

Source: Internet

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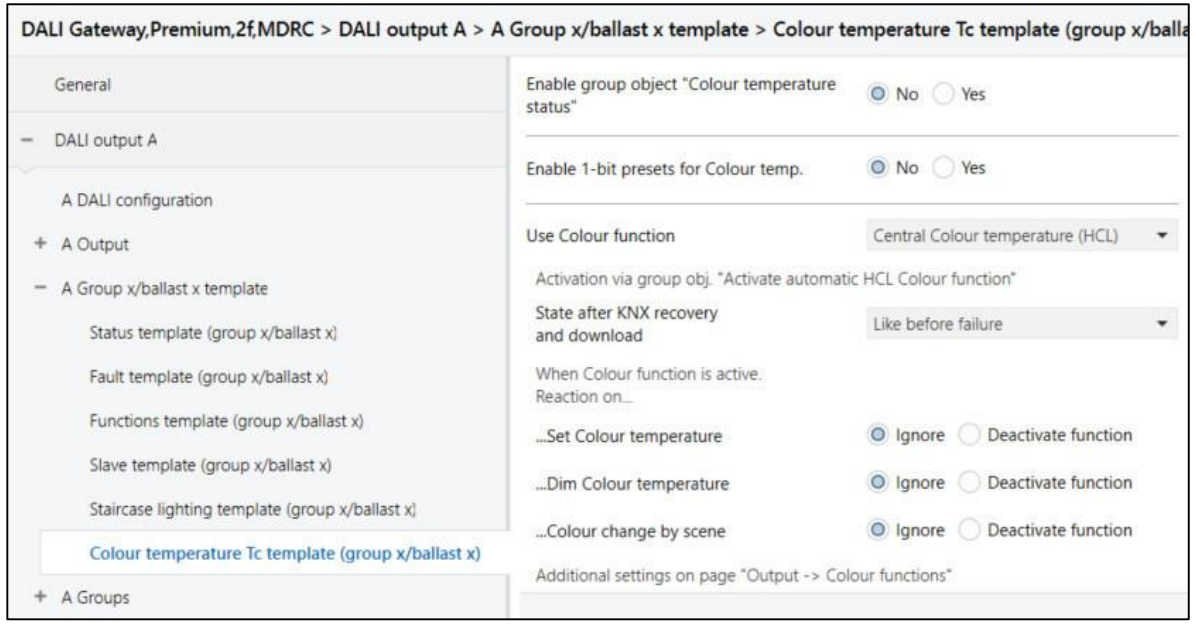
Colour function “Human Centric Lighting HCL”

Commissioning of the Colour function HCL

- Set ETS parameter: DALI Output A → Group X or ballast X → Colour functions … (template or individual)
  - Enable the colour function “Central Colour temperature (HCL)” for the group/ballast
  - “State after KNX recovery and download”
  - Reaction on “Set colour temperature, “Dim colour temperature” and “Colour change by scene” when Colour function is active
- Set ETS parameter: DALI Output A → Output → Colour functions
  - HCL colour temperature source (16-bit group object *“Colour temperature”* or 1-bit group object *“Ramp curve”*)
  - Enable the group object “*Output – Activate automatic HCL colour function colour function*” (if necessary)



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Colour function “Human Centric Lighting HCL”

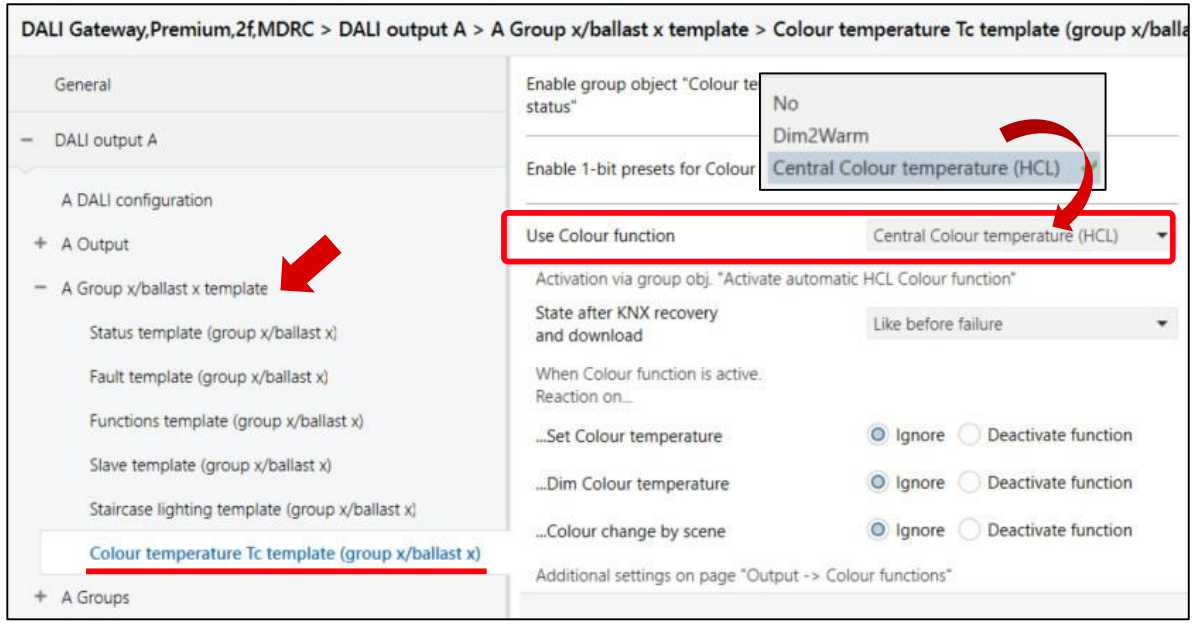
Use colour function (per group/ballast)

This parameter determines whether a colour function is used

HCL only controls the colour temperature and has no influence on the brightness (dimming, value)

Only the Dim2Warm or HCL colour function can be used per group/ballast

- No
  - No colour function is used
- Dim2Warm
  - The Dim2Warm colour function is used
  - All Dim2Warm settings are active
- Central colour temperature (HCL)
  - The central colour temperature (HCL) colour function is used
  - All HCL settings are active



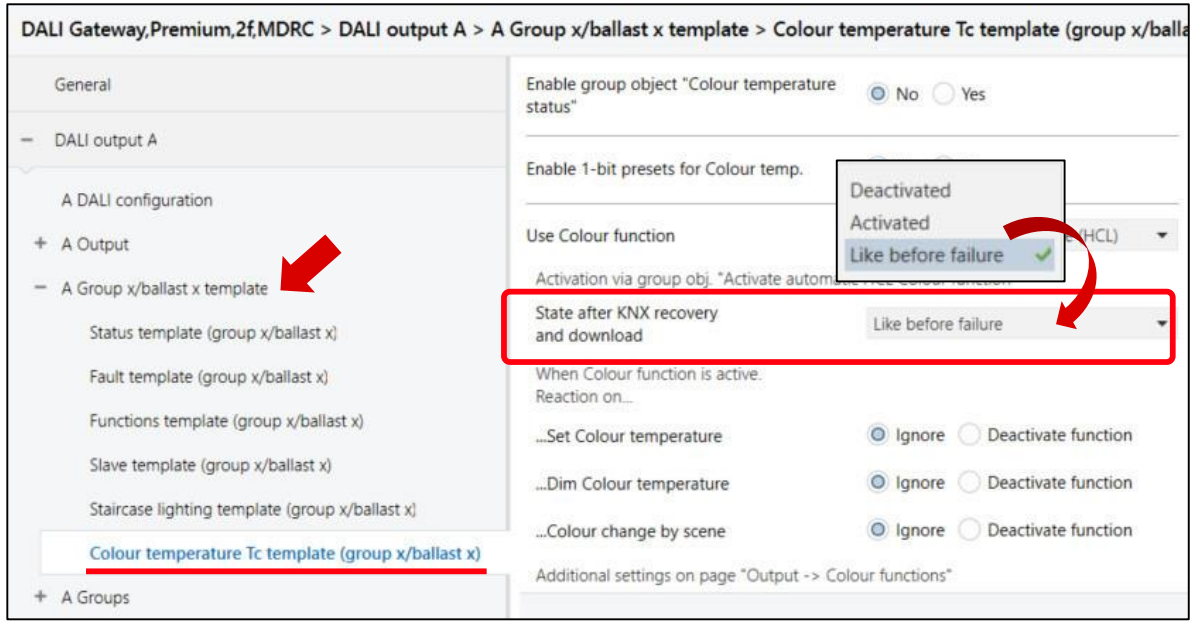
KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL”

State after KNX recovery and download (per group/ballast)

This parameter defines the state of the Colour function after KNX bus voltage recovery or a download

– Deactivated
  - The Colour function is deactivated after KNX bus voltage recovery
  - The group/ballast reacts like a normal group/ballast without an additional function
– Activated
  - The Colour function is activated after KNX bus voltage recovery or a download
– Like before failure
  - The Colour function retains the operating state (activated or deactivated) that it had before the KNX bus voltage recovery or download



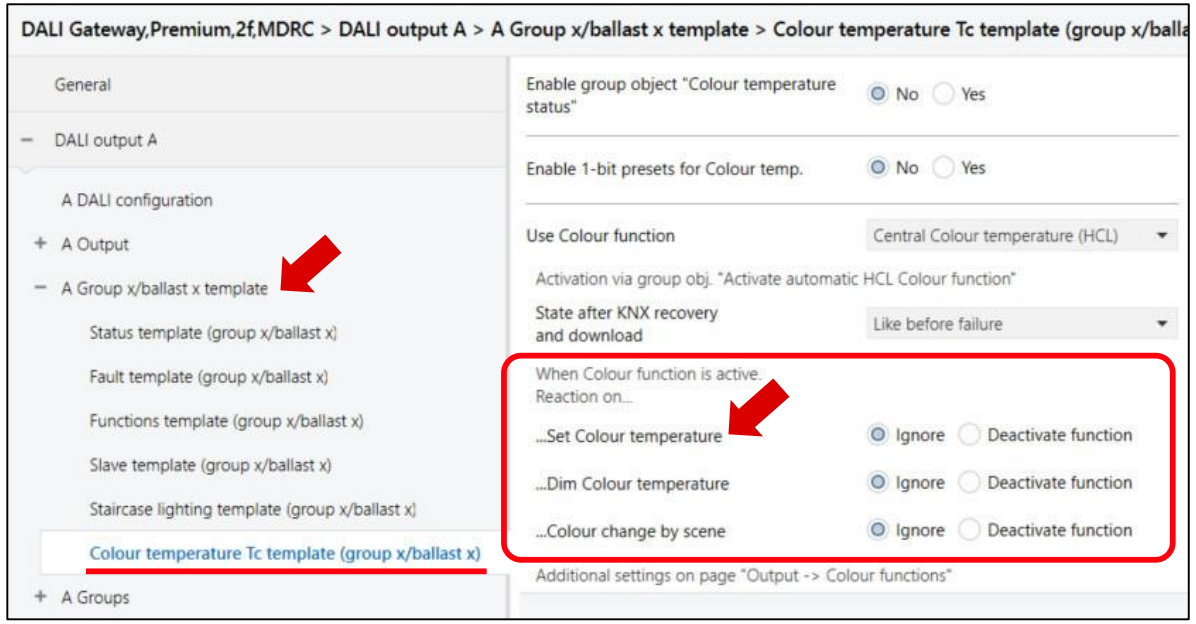
KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL”

Active Colour function: Reaction on “Set colour temperature”

This parameter describes how the group/ballast responds if a colour temperature is set while the colour function Human Centric Lighting HCL is active

– Ignore
  - The colour temperature setting is ignored
  - The colour function remains active
– Deactivate function
  - Setting a colour temperature deactivates the colour function and the group/ballast adopts the set colour temperature



Nu	Group Address	Name	Object Function	Length	Data Type
86	1/4/86	Output A - group 1	Set Colour temperature (K)	2 bytes	absolute colour temperature (K)

KNX DALI Gateway Premium DG/S x.64.5.1

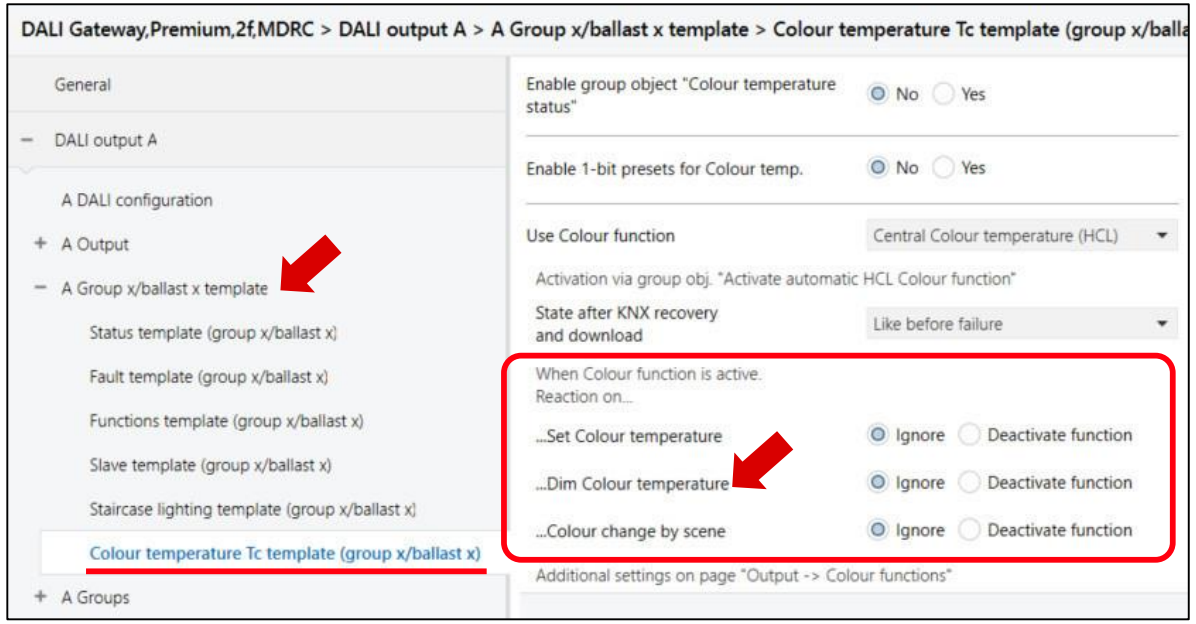
Colour function “Human Centric Lighting HCL”

Active Colour function: Reaction on “Dim colour temperature”

This parameter describes how the group/ballast responds if the colour temperature is dimmed while the colour function Human Centric Lighting HCL is active

– Ignore
  - The Colour function remains active and the colour temperature dimming is ignored

– Deactivate function
  - Dimming a colour temperature deactivates the colour function and the group/ballast adopts the dimmed colour temperature



Nu	Group Address	Name	Object Function	Length	Data Type
87	1/4/87	Output A - group 1	Dim Colour temperature	4 bit	dimming control

KNX DALI Gateway Premium DG/S x.64.5.1

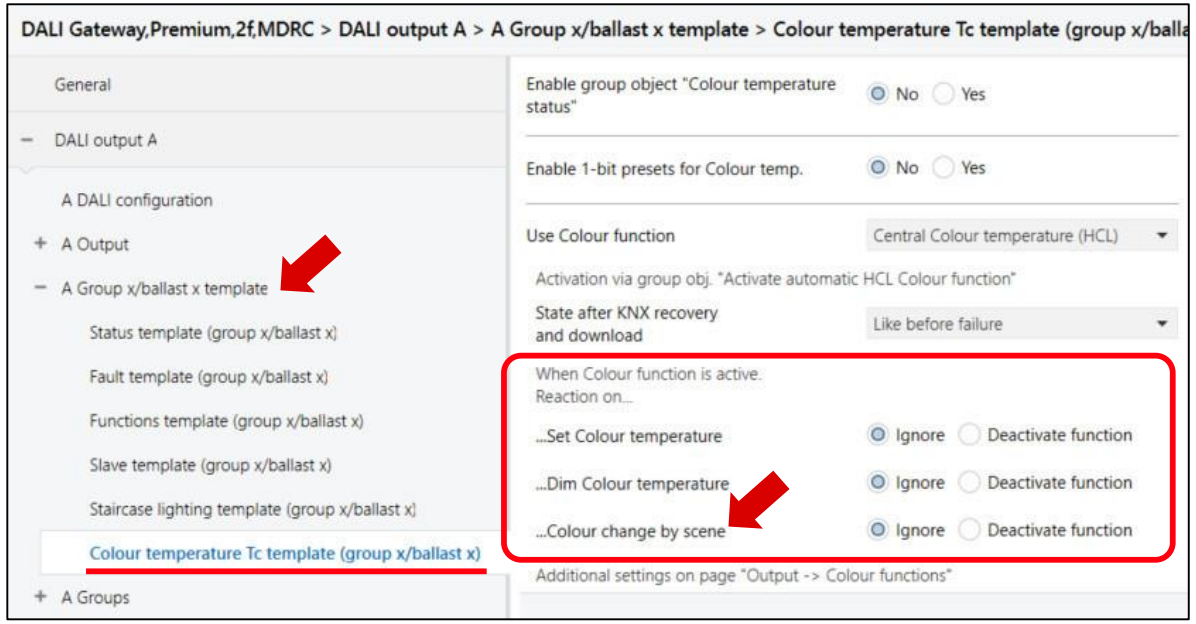
Colour function “Human Centric Lighting HCL”

Active Colour function: Reaction on “Colour change by scene”

This parameter defines how the group/ballast responds if a colour is recalled by a scene retrieval while the colour function Human Centric Lighting HCL is active

– Ignore
  - The Colour function remains active and the scene retrieval colour change is ignored

– Deactivate function
  - The Colour function is deactivated as soon as a colour change is recalled by a scene retrieval
  - The group/ballast adopts the colour temperature of the scene



Nu	Group Address	Name	Object Function	Length	Data Type
35	1/4/35	Output A	KNX scene 1...64	1 byte	scene control

KNX DALI Gateway Premium DG/S x.64.5.1

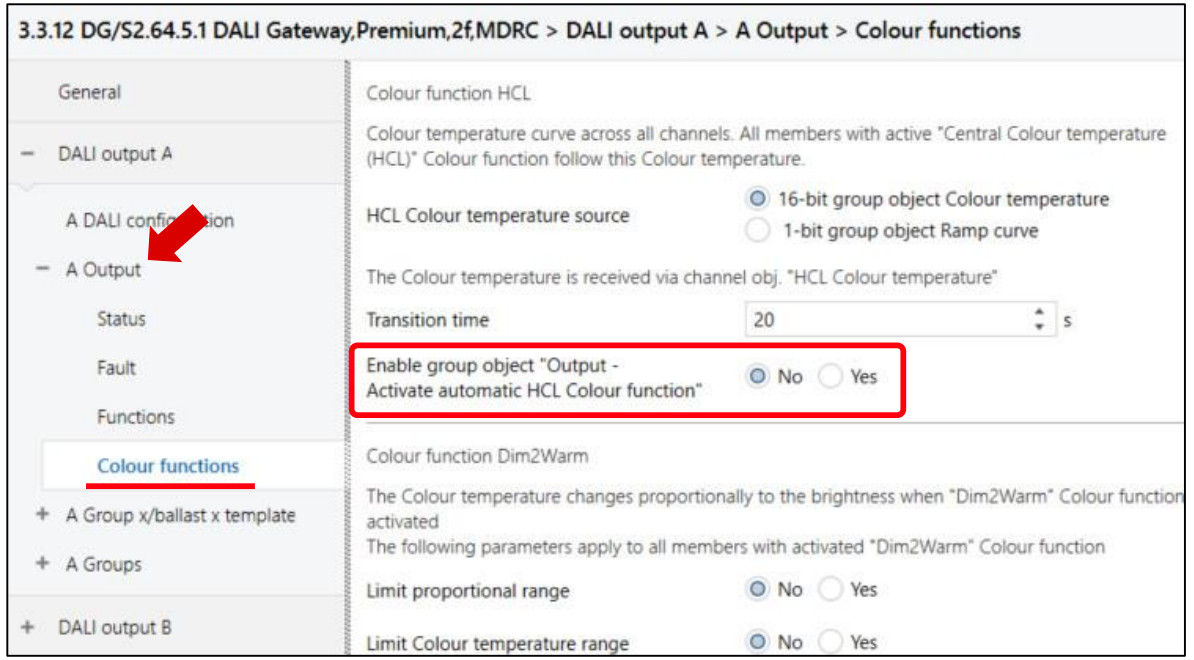
Colour function “Human Centric Lighting HCL”

Group object “Output – Activate automatic HCL colour fct.”

This parameter enables the *“Output – Activate automatic HCL colour function”* group object, which automatically activates and deactivates the HCL function for the whole output

– No
  - The “*Output – Activate automatic HCL colour function*” group object is not enabled
  - The Human Centric Lighting HCL function is activated/ deactivated for each parameterized group/ballast

– Yes
  - The *“Output – Activate automatic HCL colour function”* group object is enabled and can automatically activate/deactivate the parametrized HCL colour function on <u>all ballasts/groups</u> on the output



Nu	Group Address	Name	Object Function	Length	Data Type
64	1/4/64	Output A	Activate automatic HCL Colour function	1 bit	start/stop

KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL”

Activation/deactivation of the HCL colour function

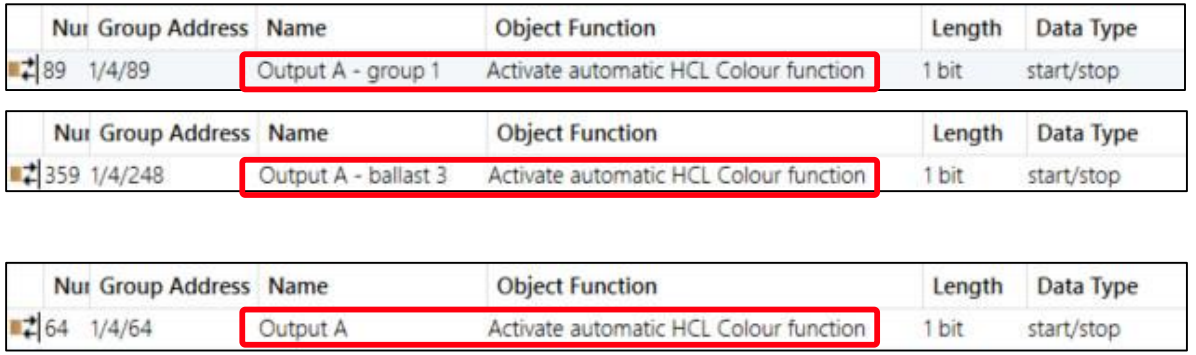
The Human Centric Lighting HCL colour function is activated and deactivated via a group object

- Individually for each group
- Individually for each ballast
- Centrally for all group/ballasts per output for which the HCL function is parametrized

Telegram value:

- 1 = Activates the HCL colour function
- 0 = Deactivates the HCL colour function

Furthermore, the state after KNX recovery and download can be set (deactivated, activated or like before failure)



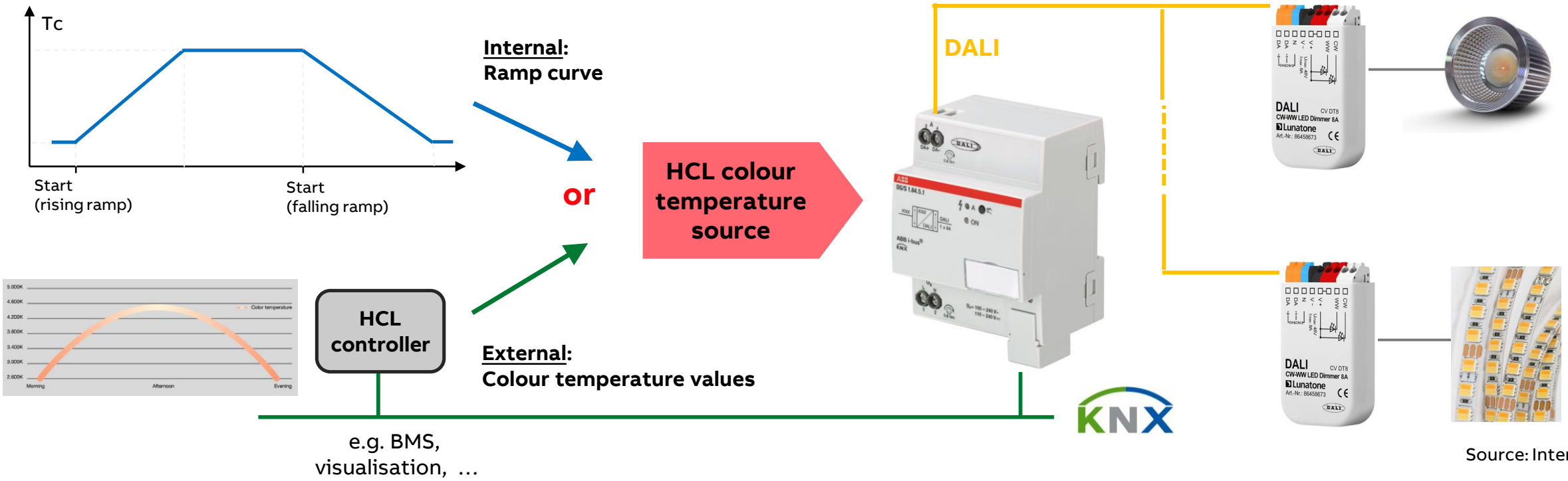
Nu	Group Address	Name	Object Function	Length	Data Type
89	1/4/89	Output A - group 1	Activate automatic HCL Colour function	1 bit	start/stop

Nu	Group Address	Name	Object Function	Length	Data Type
359	1/4/248	Output A - ballast 3	Activate automatic HCL Colour function	1 bit	start/stop

Nu	Group Address	Name	Object Function	Length	Data Type
64	1/4/64	Output A	Activate automatic HCL Colour function	1 bit	start/stop

KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL”



Source: Internet

KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL”

Colour function HCL colour temperature source

This parameter specifies the HCL colour temperature source

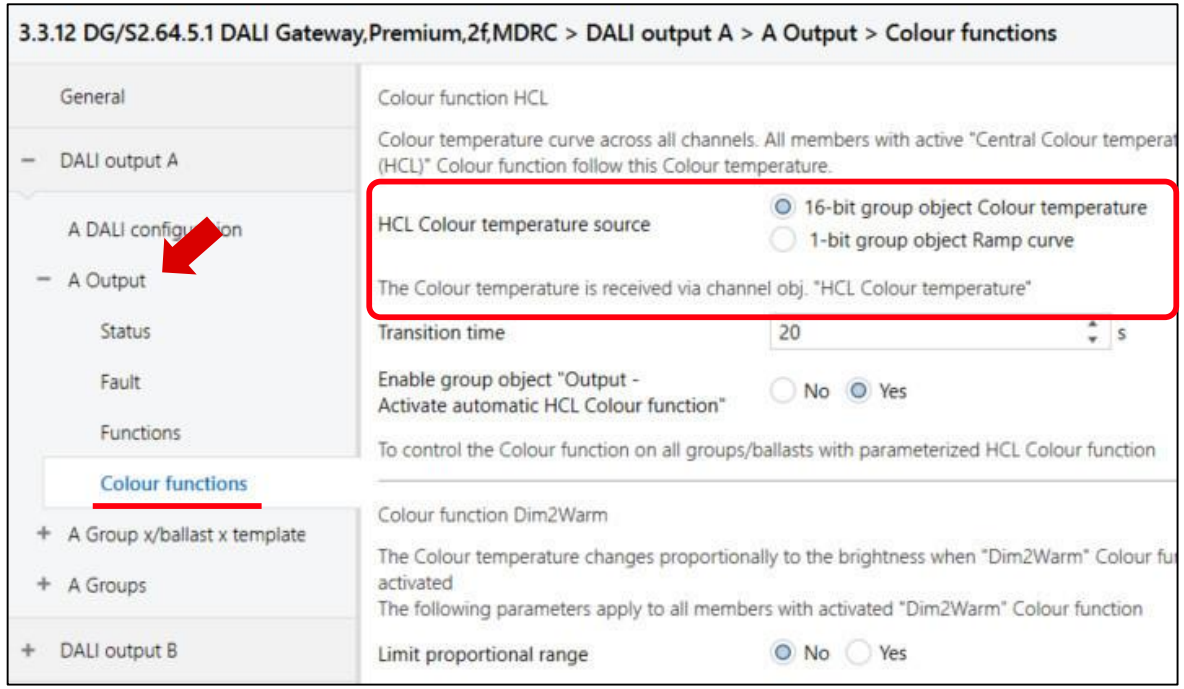
The colour temperature curve applies to the channel
→ All groups/ballast with active “Central Colour temperature (HCL)” Colour function follow this colour temperature

HCL colour temperature source:

– 16-bit group object *“HCL Colour temperature”* → external
  - A visualization, BMS, … calculates and provides cyclically colour temperature values

– 1-bit group object Ramp curve → internal
  - Start a parametrizable colour temperature ramp curve (rising and falling ramp)

Each source option has different HCL characteristics



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KNX DALI Gateway Premium DG/S x.64.5.1

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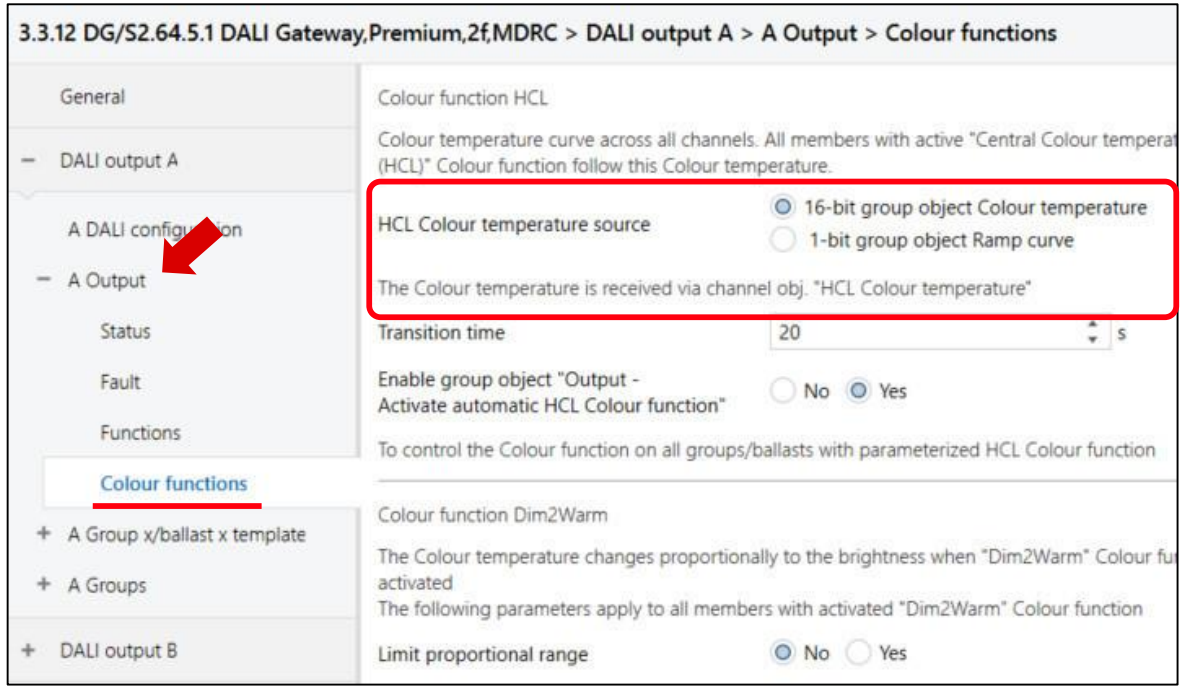

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Colour function “Human Centric Lighting HCL” – Colour temperature source: “16-bit group object (external)”

HCL colour temp. source: “16-bit group object CT (ext.)”

A visualization, BMS, … calculates and provides cyclically colour temperature values

→ Individual and different curves are possible

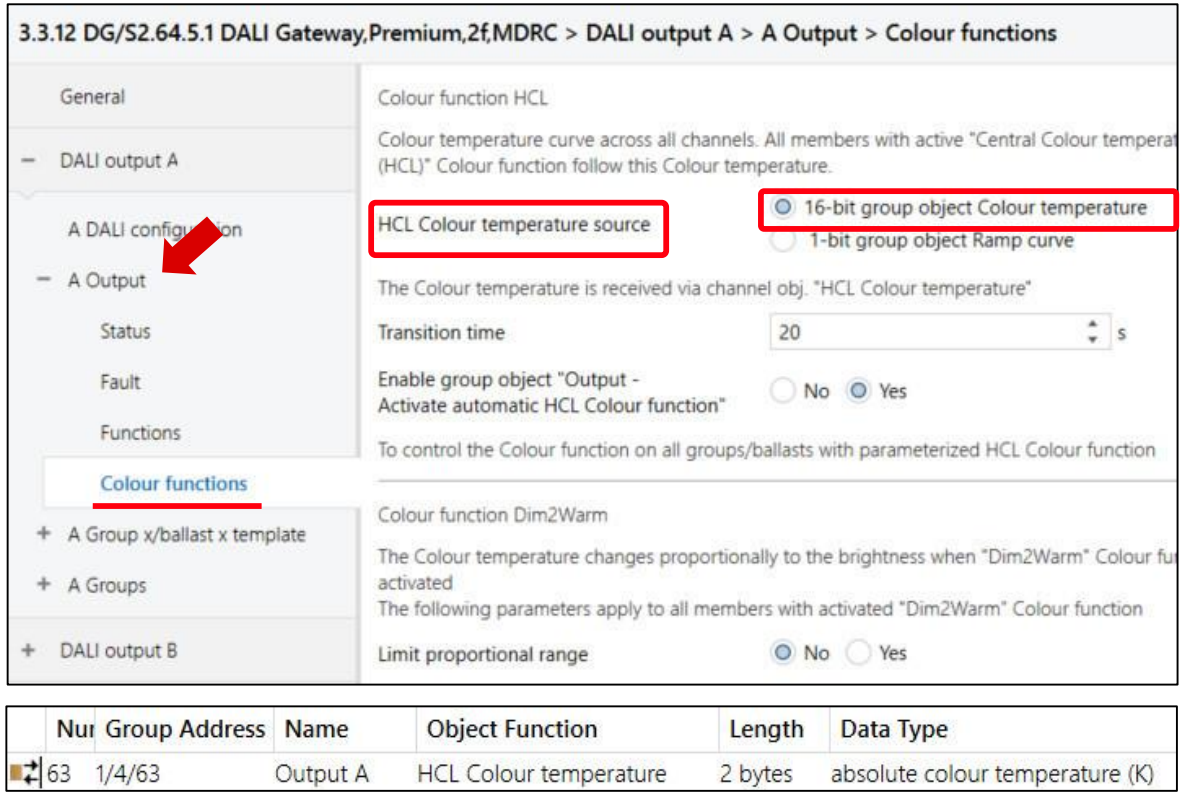
The 16-bit group object is the source for the HCL characteristic

This group object receives a colour temperature value that is used to control HCL

The DALI gateway dims all included ballasts/groups to the colour temperature value

The more often the group object sends new values, the more accurately the lighting mimics the passage of the day

If a group/ballast is switched on while HCL is activated the last received colour temperature value is dimmed within 5 seconds



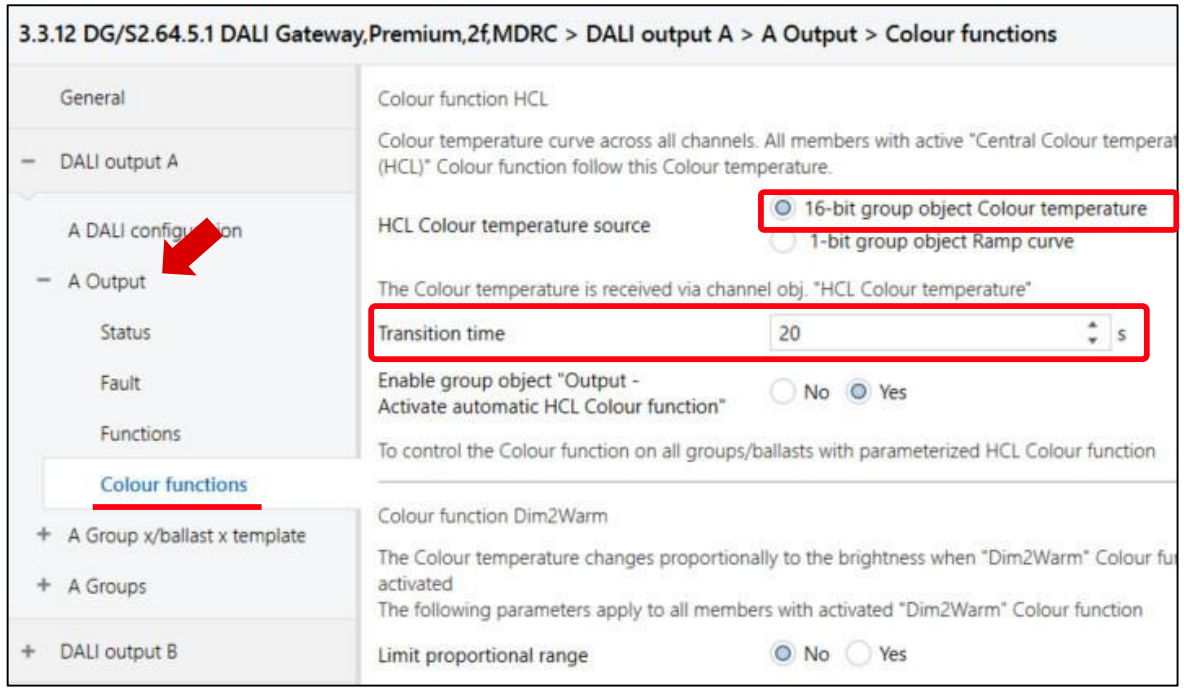
KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temperature source: “16-bit group object (external)”

Transition time

This parameter defines the time it takes for the HCL curve to adopt the new colour temperature values

– 0…20…65,535 sec



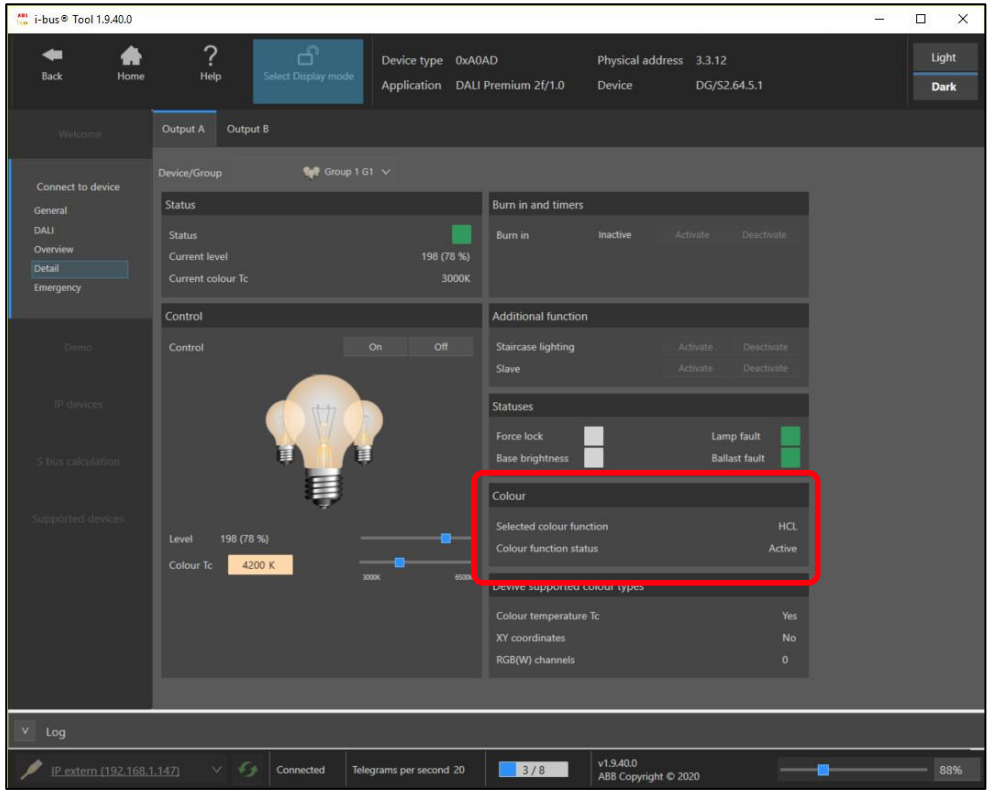
KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temperature source: “16-bit group object (external)”

ABB i-bus® Tool

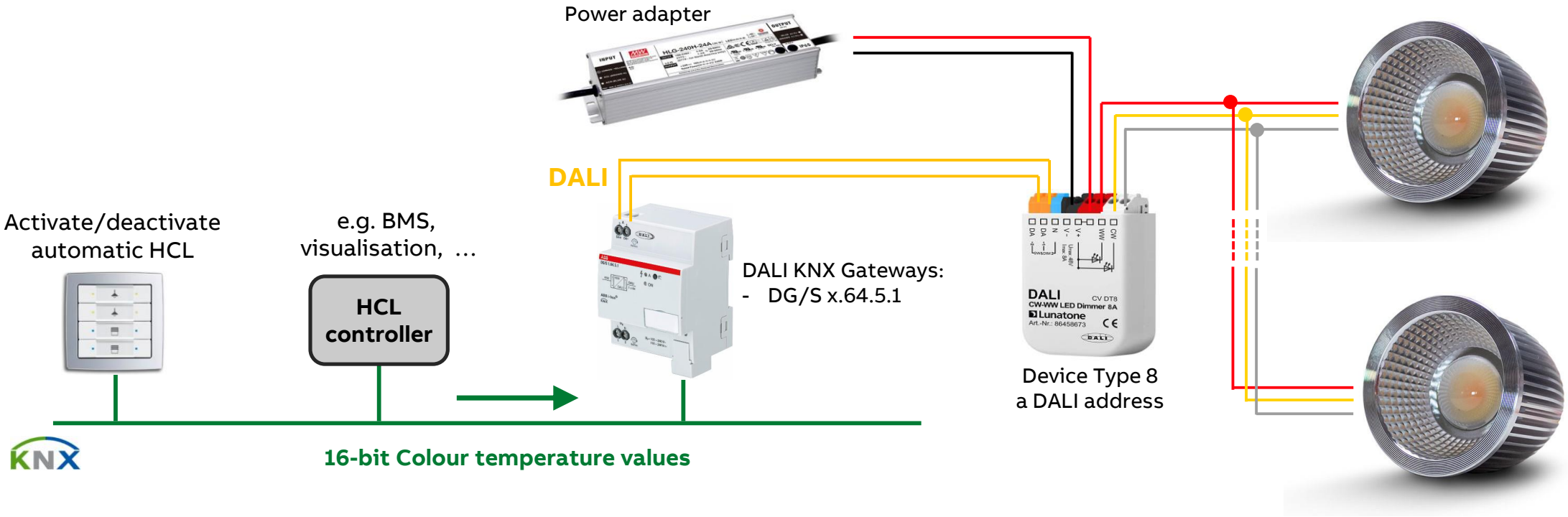
The selected and the state of the Colour function “Human Centric Lighting HCL” is displayed

The prerequisite is that the additional function is parameterized in the ETS



KNX DALI Gateway Premium DG/S x.64.5.1

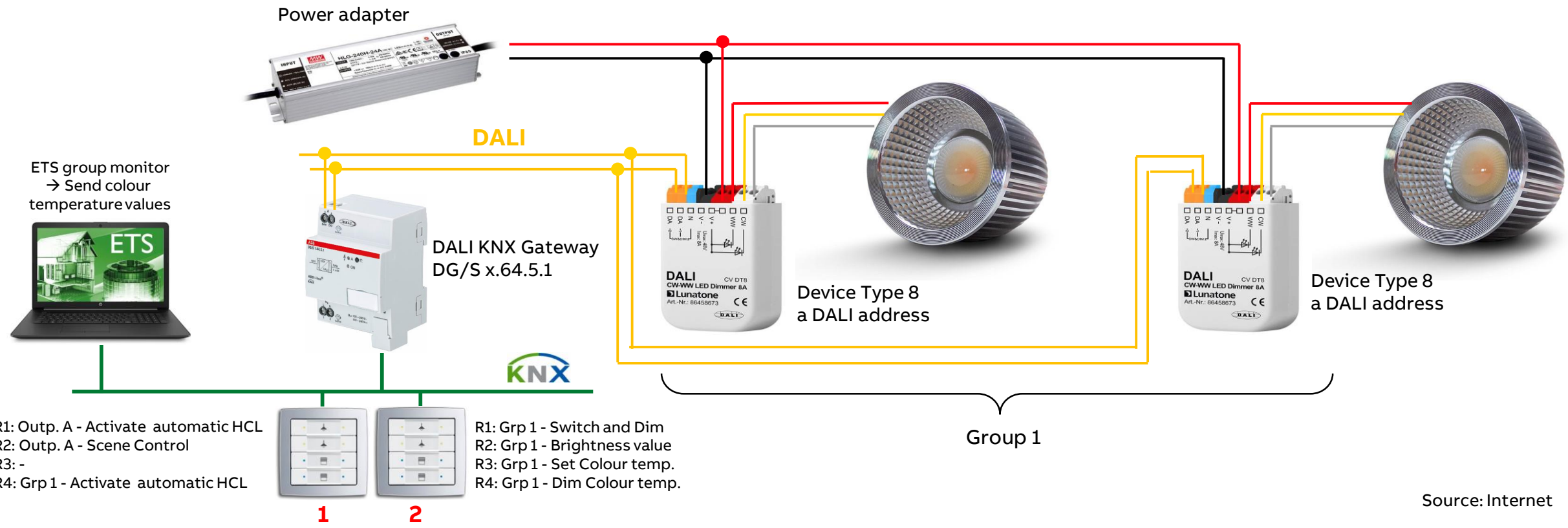
Colour function “Human Centric Lighting HCL” – Colour temperature source: “16-bit group object (external)”



Source: Internet

KNX DALI Gateway Premium DG/S x.64.5.1

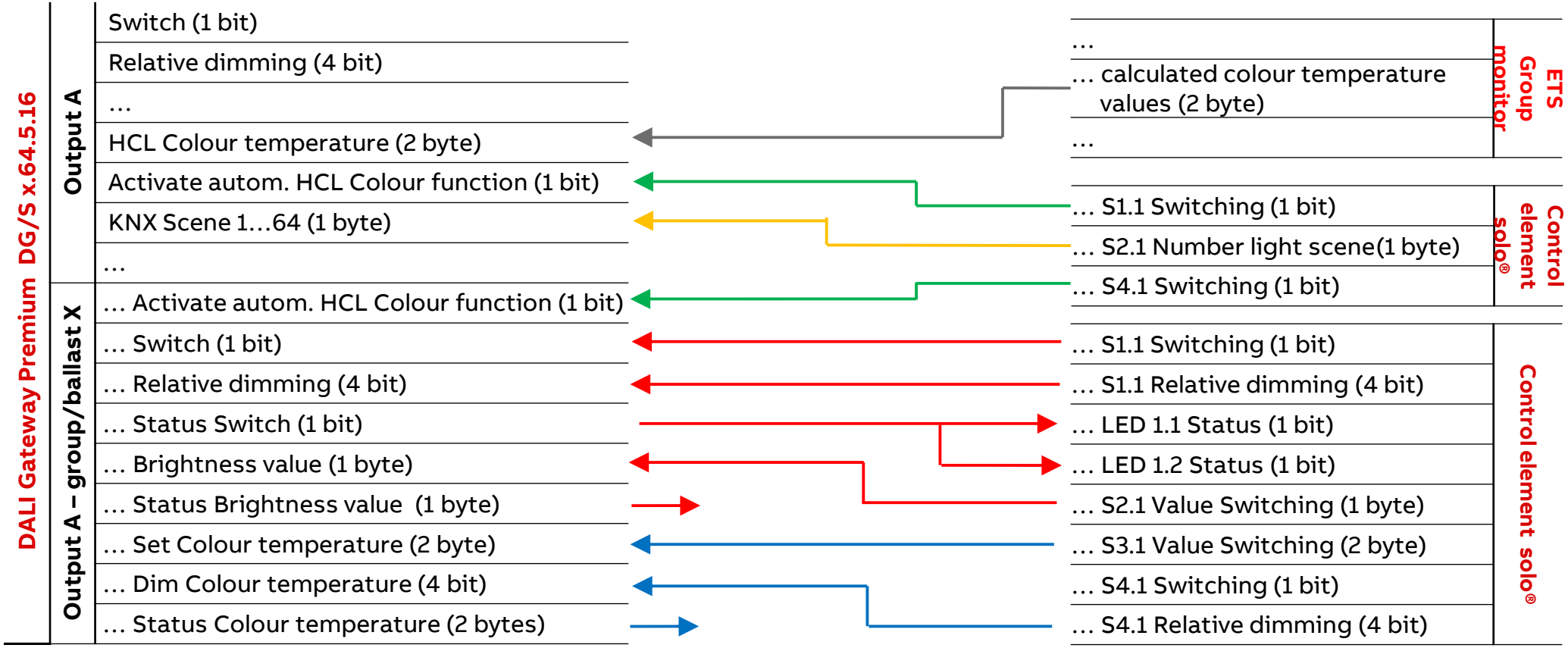
Colour function “Human Centric Lighting HCL” – Colour temperature source: “16-bit group object (external)”



Source: Internet

KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temperature source: “16-bit group object (external)”
Example: Assignment of Group Addresses



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KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temperature source: “16-bit group object (external)”
Example: Assignment of Group Addresses

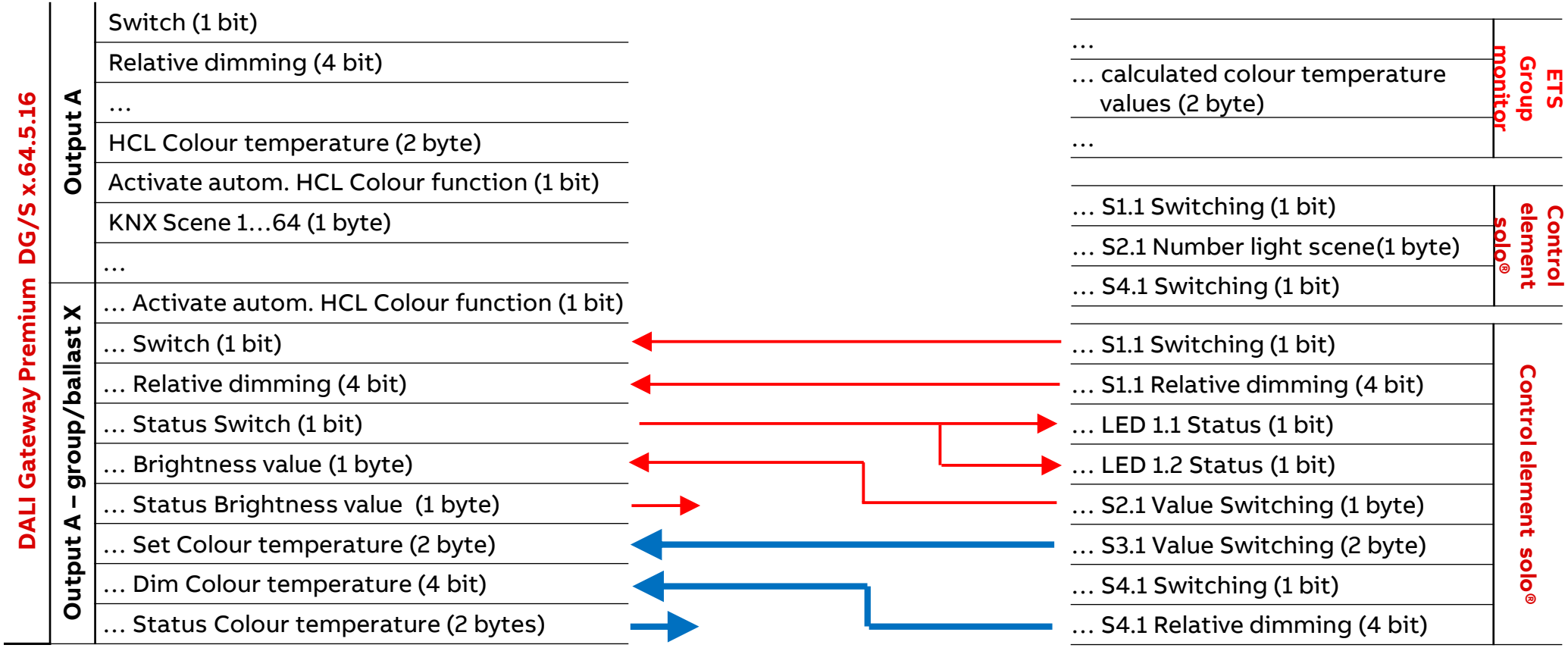
DALI Gateway Premium DG/S x.64.5.16

Output A	Switch (1 bit)
	Relative dimming (4 bit)
	…
	HCL Colour temperature (2 byte)
	Activate autom. HCL Colour function (1 bit)
	KNX Scene 1…64 (1 byte)
	…
Output A – group/ballast X	… Activate autom. HCL Colour function (1 bit)
	… Switch (1 bit)
	… Relative dimming (4 bit)
	… Status Switch (1 bit)
	… Brightness value (1 byte)
	… Status Brightness value (1 byte)
	… Set Colour temperature (2 byte)
	… Dim Colour temperature (4 bit)
	… Status Colour temperature (2 bytes)

ETS Group monitor	…	
	… calculated colour temperature values (2 byte)	
	…	
Control element solo®	… S1.1 Switching (1 bit)	1
	… S2.1 Number light scene(1 byte)	
	… S4.1 Switching (1 bit)	
Control element solo®	… S1.1 Switching (1 bit)	
	… S1.1 Relative dimming (4 bit)	
	… LED 1.1 Status (1 bit)	
	… LED 1.2 Status (1 bit)	2
	… S2.1 Value Switching (1 byte)	
	… S3.1 Value Switching (2 byte)	
	… S4.1 Switching (1 bit)	
	… S4.1 Relative dimming (4 bit)	

KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temperature source: “16-bit group object (external)”
Example: Assignment of Group Addresses



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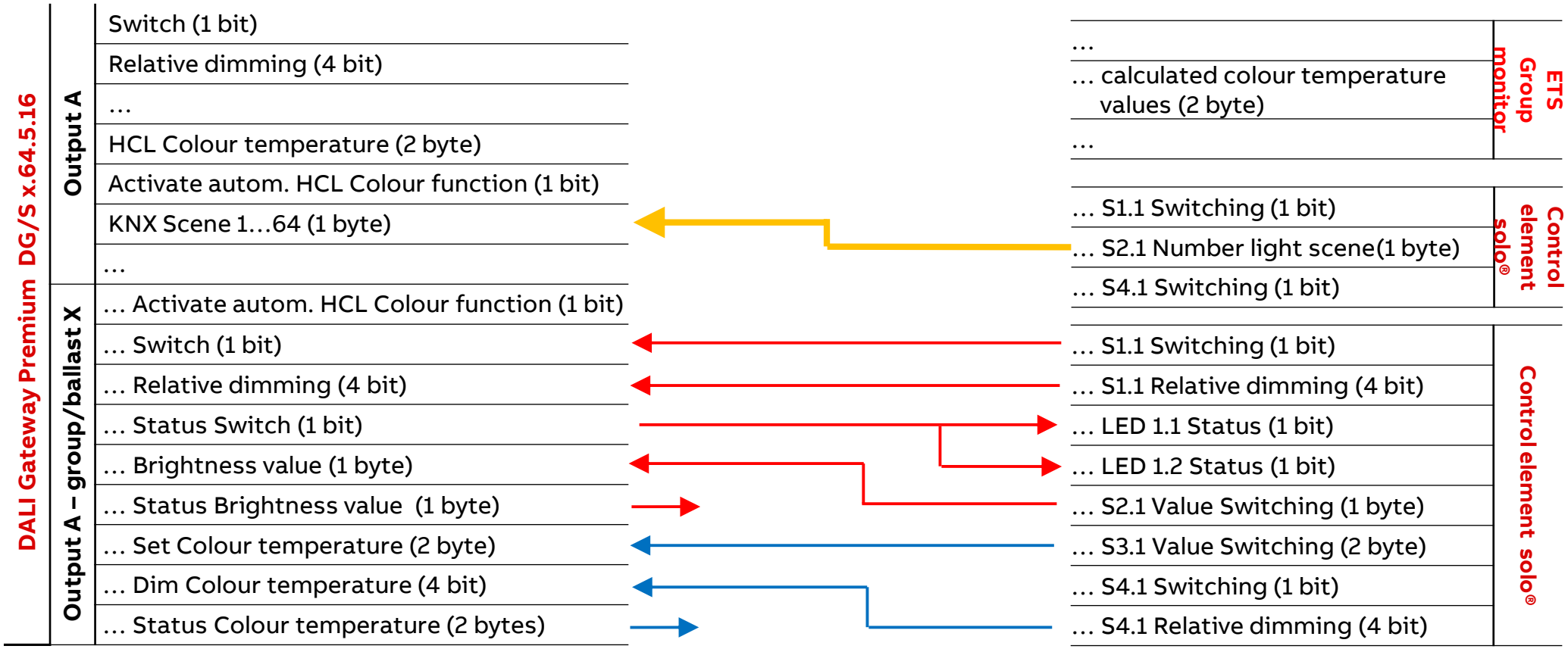
KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temperature source: “16-bit group object (external)”
Example: Assignment of Group Addresses



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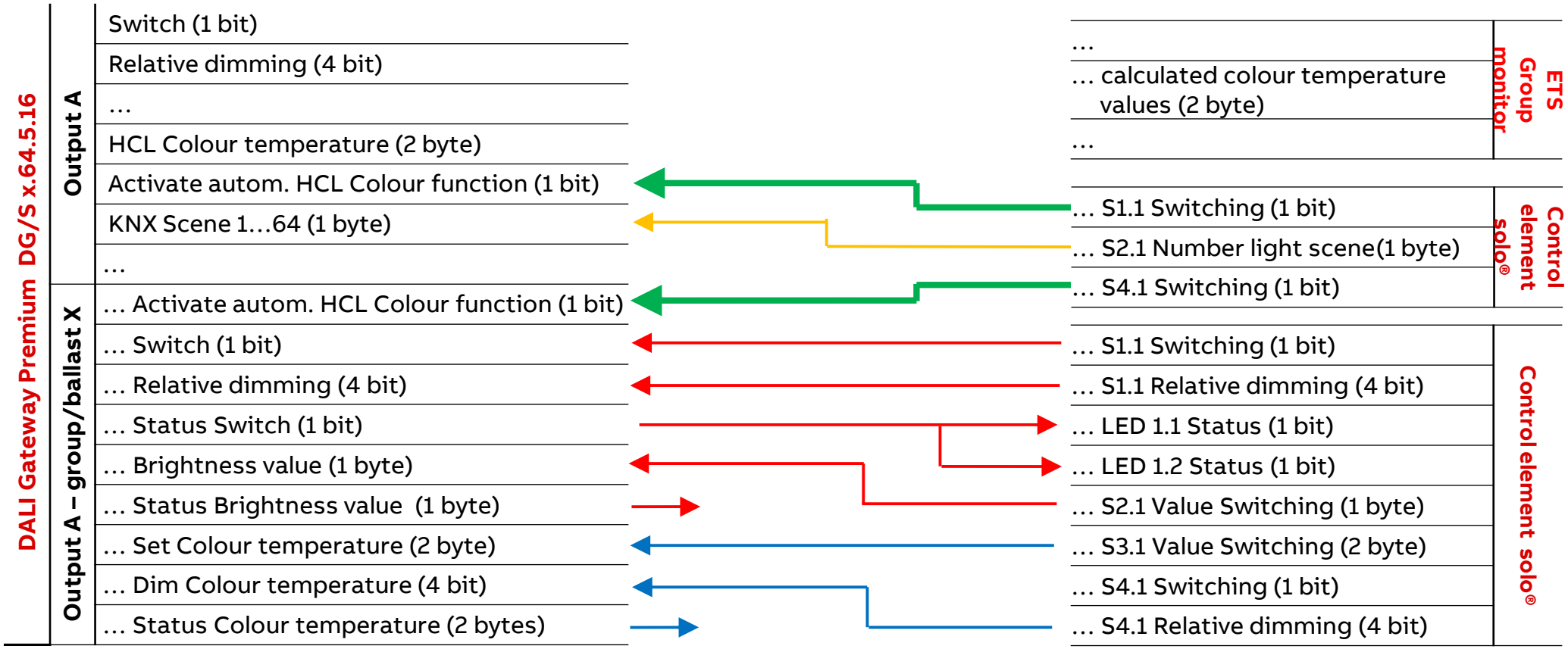
KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temperature source: “16-bit group object (external)”
Example: Assignment of Group Addresses



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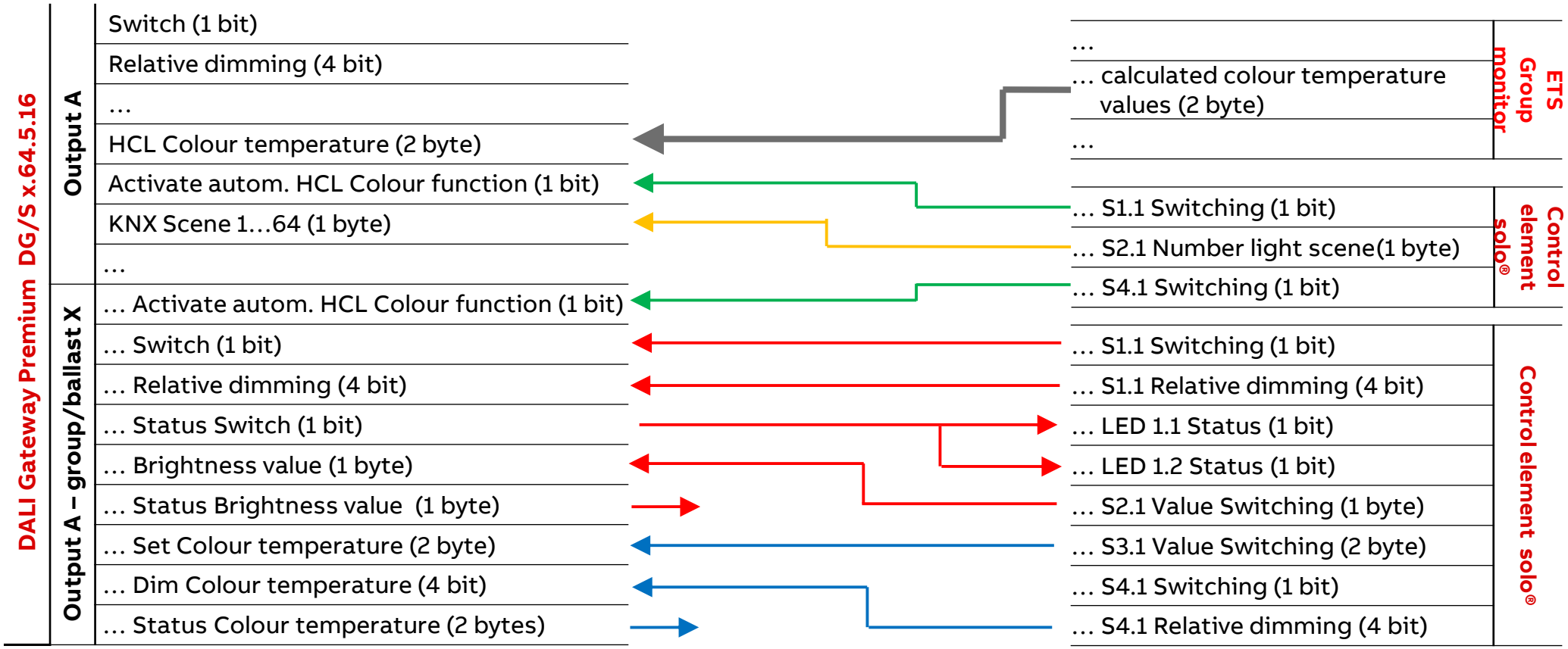
KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temperature source: “16-bit group object (external)”
Example: Assignment of Group Addresses



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KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temp. source: “1-bit group object Ramp curve (int.)”

Colour function HCL colour temperature source

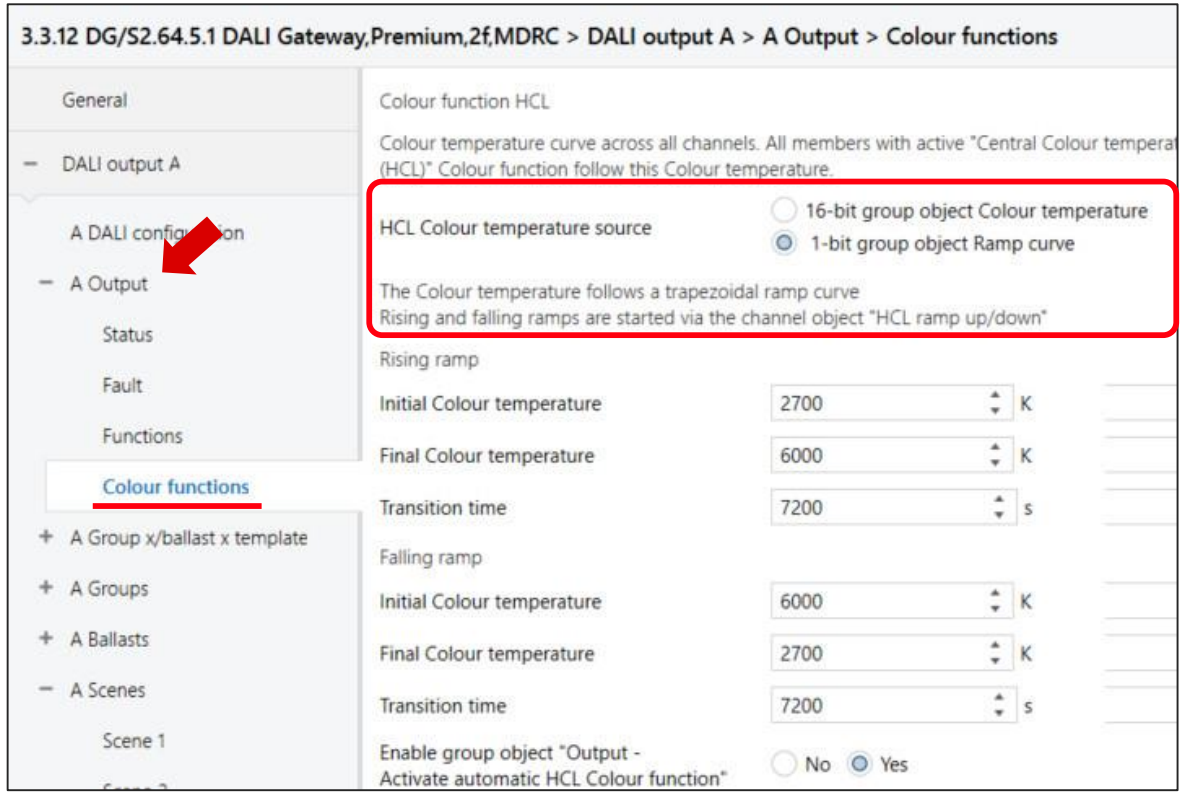
This parameter specifies the HCL colour temperature source

The colour temperature curve applies to the channel
→ All groups/ballast with active “Central Colour temperature (HCL)” Colour function follow this colour temperature

HCL colour temperature source:

– 16-bit group object “*HCL Colour temperature*” → external
  • A visualization, BMS, … calculates and provides cyclically colour temperature values
– 1-bit group object Ramp curve → internal
  • Start a parametrizable colour temperature ramp curve (rising and falling ramp)

Each source option has different HCL characteristics



KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temp. source: “1-bit group object Ramp curve (int.)”

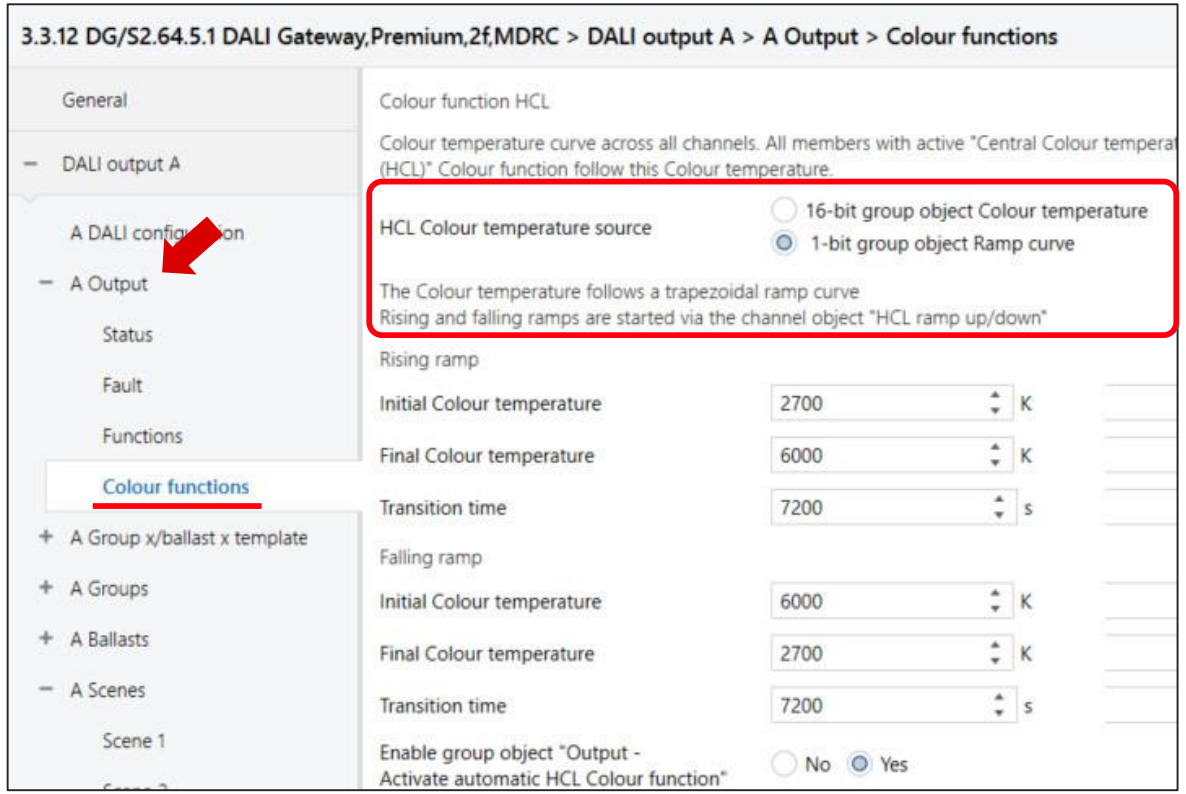
HCL colour temp. source: “1-bit group object Ramp curve (int.)”

The HCL ramp curve can easily mimic the passage of the day using colour temperature

A dynamic start of a simplified curve with rising and falling ramp plus transition times

Start of rising and falling ramp depending on time (sunrise and sunset time plus offset), e.g. with time switch FW/S 8.2.1, TR/A 1.1 and DCF- or GPS time

Transition times, initial and final colour temperature adjustable



KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temp. source: “1-bit group object Ramp curve (int.)”

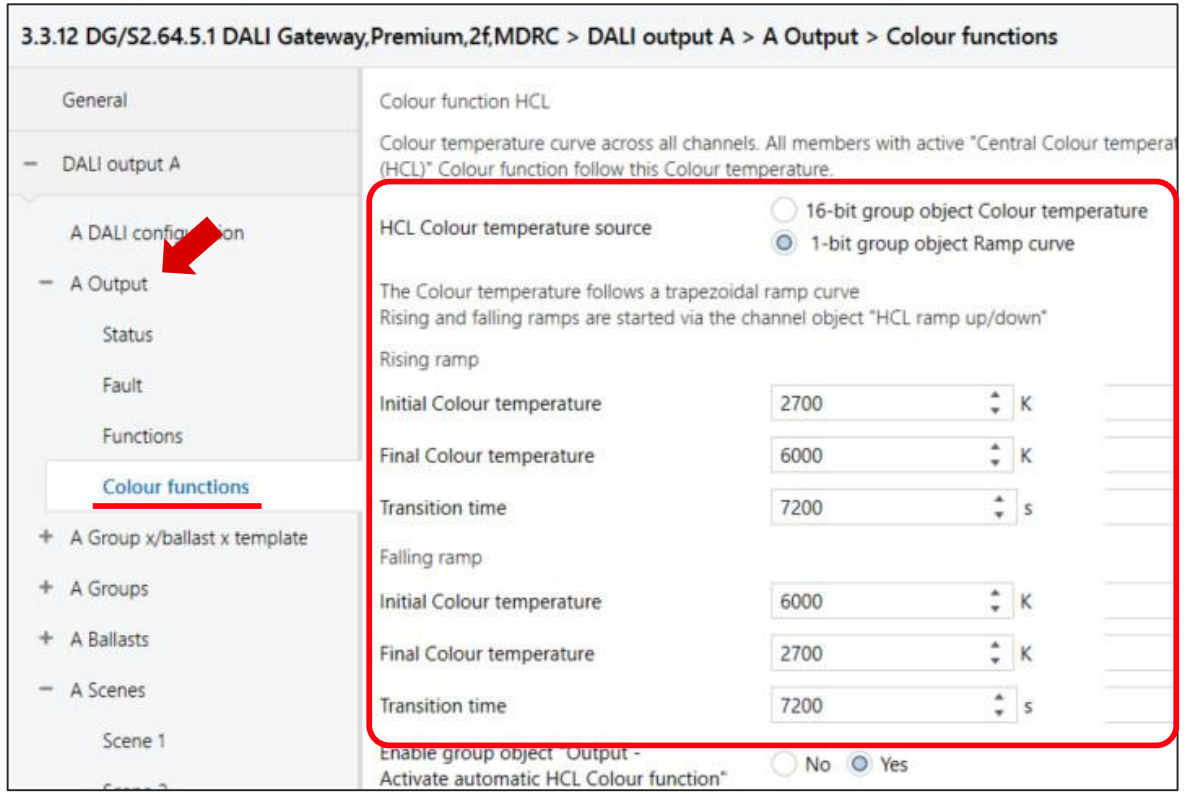
HCL colour temp. source: “1-bit group object Ramp curve (int.)”

Rising ramp

- Initial colour temperature at the start of the ramp up: 1,000…2,700…20,000 K
- Final colour temperature at the end of the ramp up: 1,000…6,000…20,000 K
- The transition time defines the ramp-up time, i.e. how long it takes for the ramp to go from beginning to end

Falling ramp

- Initial colour temperature at the start of the ramp down: 1,000…6,000…20,000 K
- Final colour temperature at the end of the ramp down 1,000 to 20,000 K
- The transition time defines the ramp-down time, i.e. how long it takes for the ramp to go from beginning to end



KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temp. source: “1-bit group object Ramp curve (int.)”

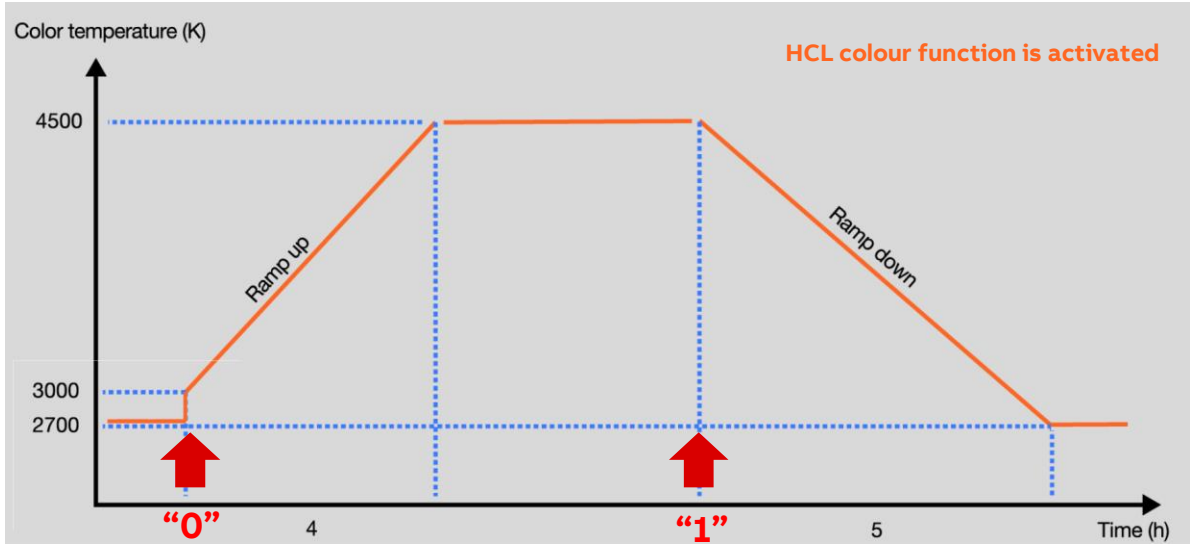
HCL colour temp. source: “1-bit group object Ramp curve (int.)”

The ramp up is triggered by a 1-bit group object, "*HCL ramp up/down*" (value “0”)

- The ramp up starts at a colour temperature of 3,000 K
- After 4 hours, it reaches the setpoint value of 4,500 K (final colour temperature)

The colour temperature value then stays at the setpoint until the "*HCL ramp up/down*" group object triggers the ramp down (value “1”)

- This starts at 4,500 K and after 5 hours, reaches 2,700 K



Nu	Group Address	Name	Object Function	Length	Data Type
63	1/4/63	Output A	HCL ramp up/down	1 bit	up/down

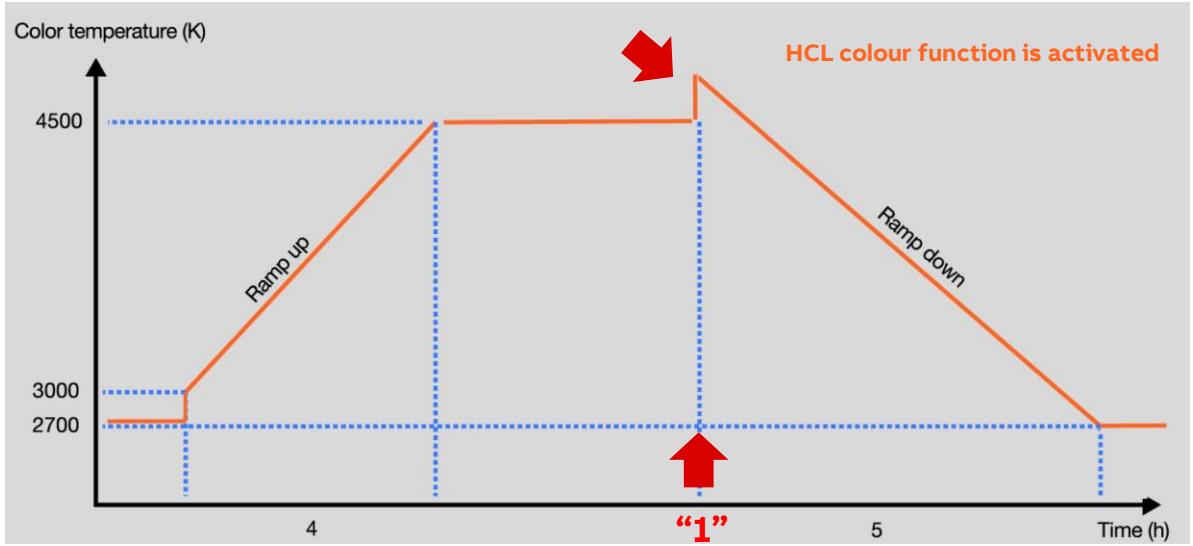
KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temp. source: “1-bit group object Ramp curve (int.)”

HCL colour temp. source: “1-bit group object Ramp curve (int.)”

It is also possible to set the start of the falling edge to a different colour temperature value to the one previously set for the end of the ramp up

When the *"HCL ramp up/down*" group object triggers the ramp down, it takes a fixed time of 5 seconds to dim the group/ballast to the colour temperature value set for the start of the ramp down



Nu	Group Address	Name	Object Function	Length	Data Type
63	1/4/63	Output A	HCL ramp up/down	1 bit	up/down

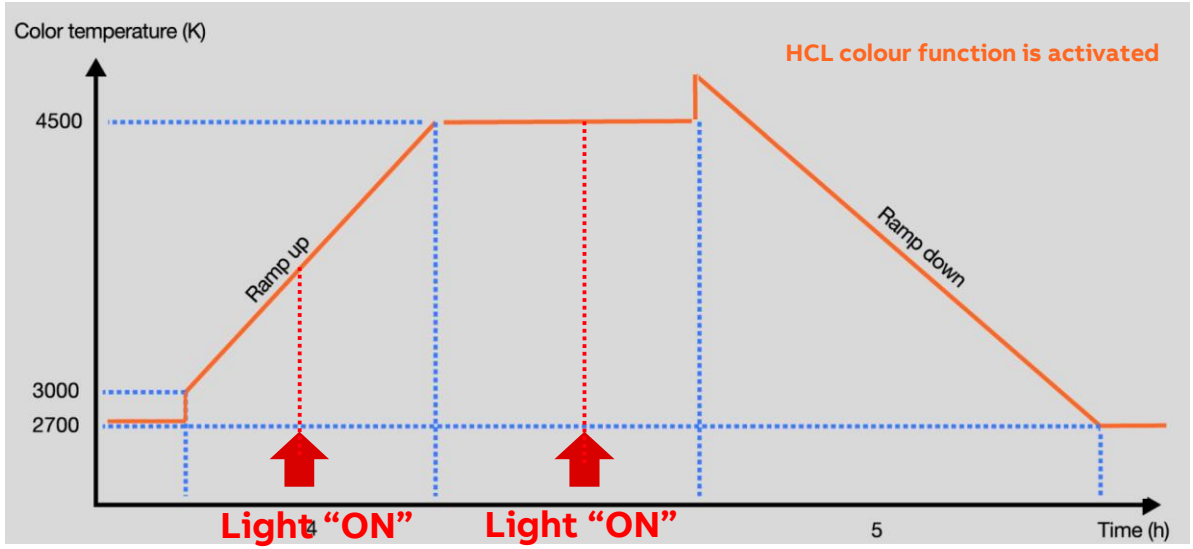
KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temp. source: “1-bit group object Ramp curve (int.)”

HCL colour temp. source: “1-bit group object Ramp curve (int.)”

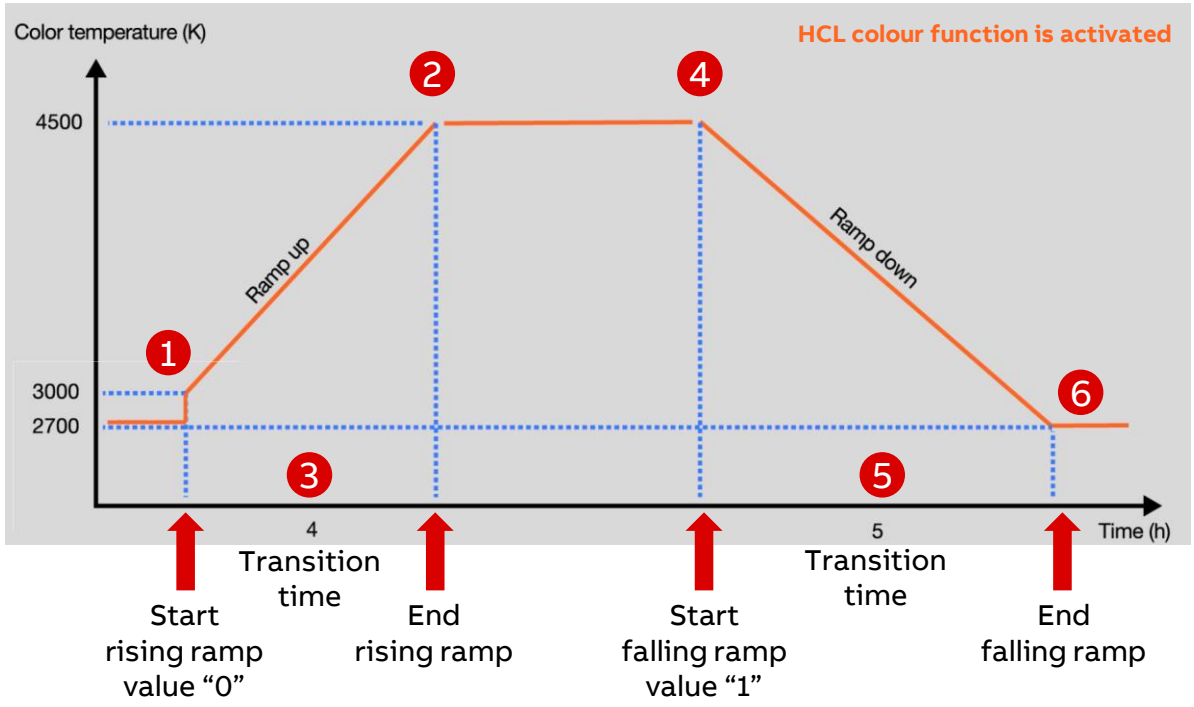
If a group/ballast is switched on while an HCL is activated and the ramp

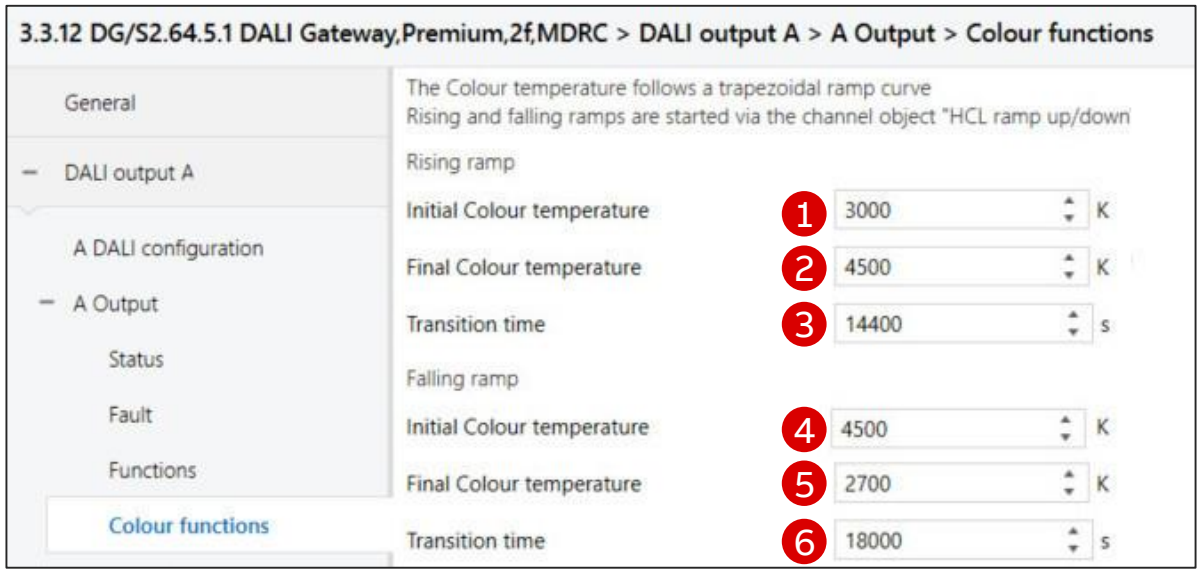
- is running, it will be dimmed to the current colour temperature within 5 seconds
- has expired, the final colour temperature is dimmed within 5 seconds



KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temp. source: “1-bit group object Ramp curve (int.)”





Nu	Group Address	Name	Object Function	Length	Data Type
63	1/4/63	Output A	HCL ramp up/down	1 bit	up/down

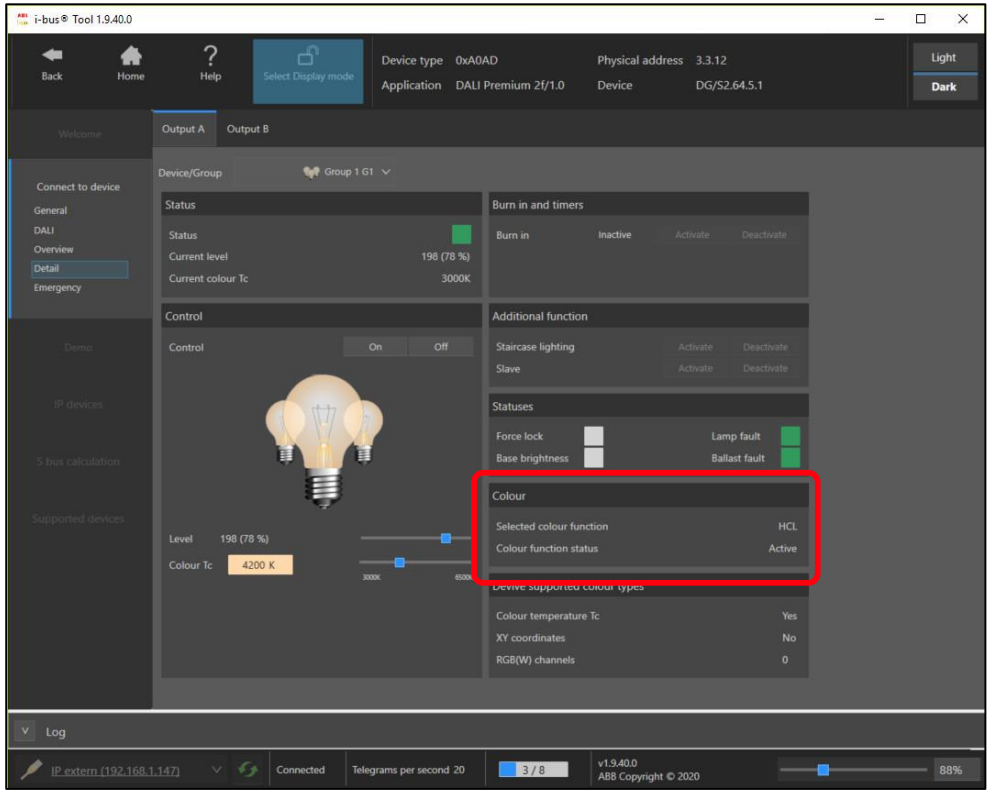
KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temp. source: “1-bit group object Ramp curve (int.)”

ABB i-bus® Tool

The selected and the state of the Colour function “Human Centric Lighting HCL” is displayed

The prerequisite is that the additional function is parameterized in the ETS



KNX DALI Gateway Premium DG/S x.64.5.1

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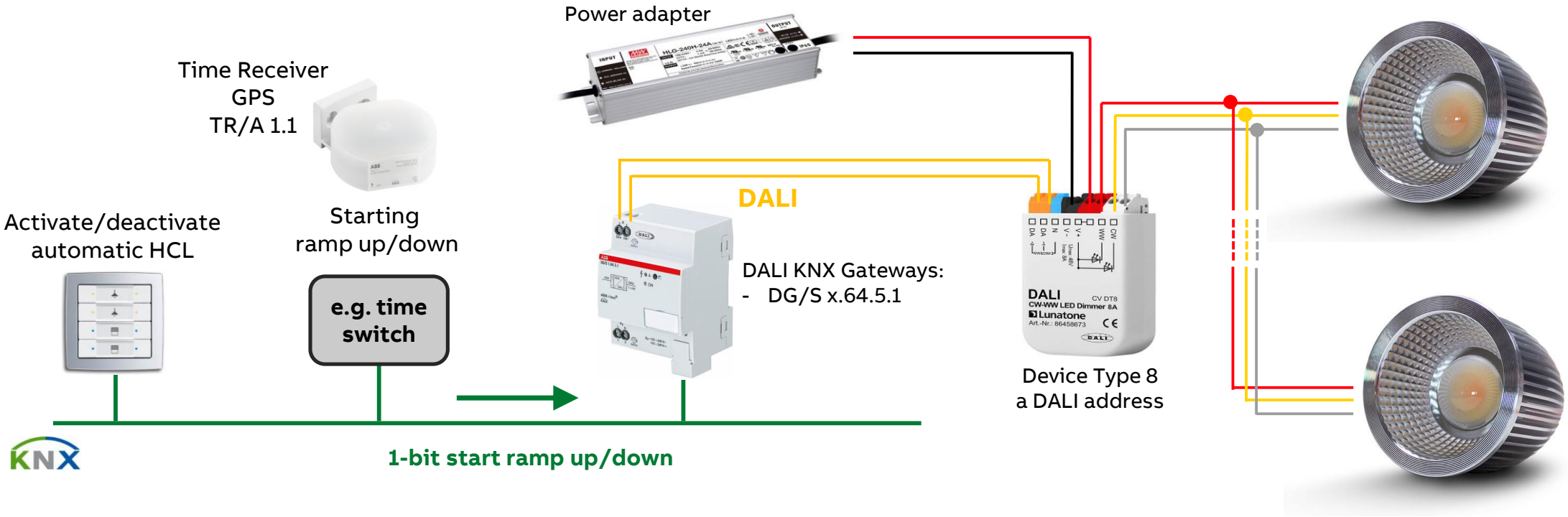
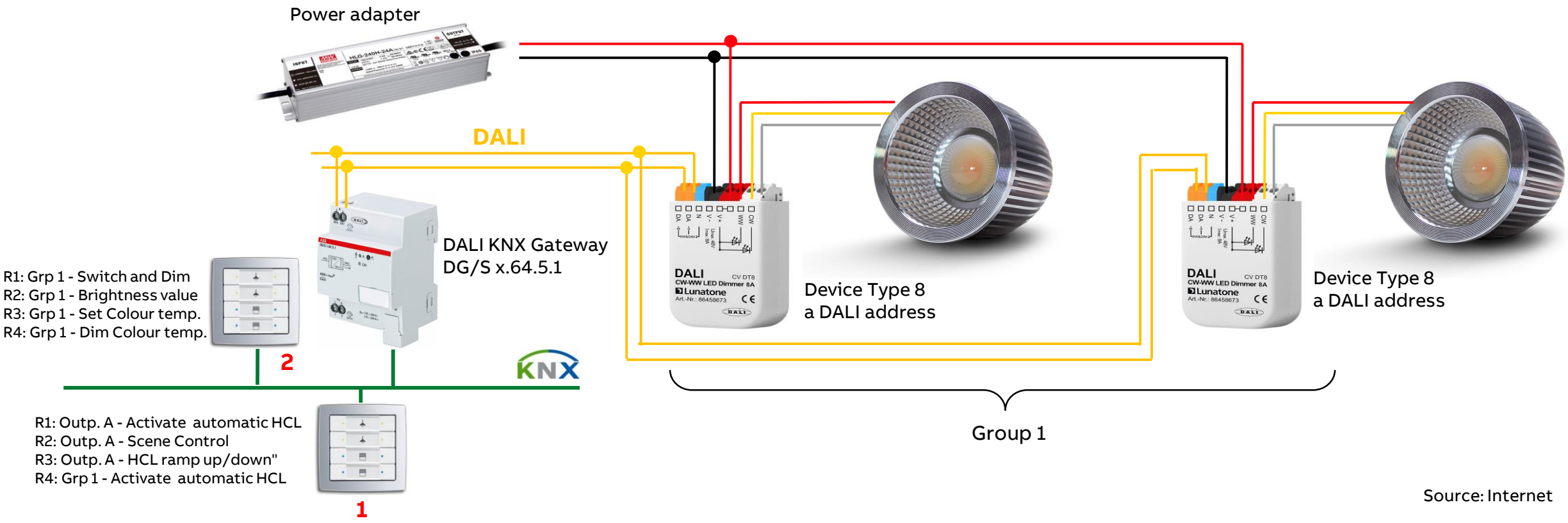


Source: Internet

KNX DALI Gateway Premium DG/S x.64.5.1

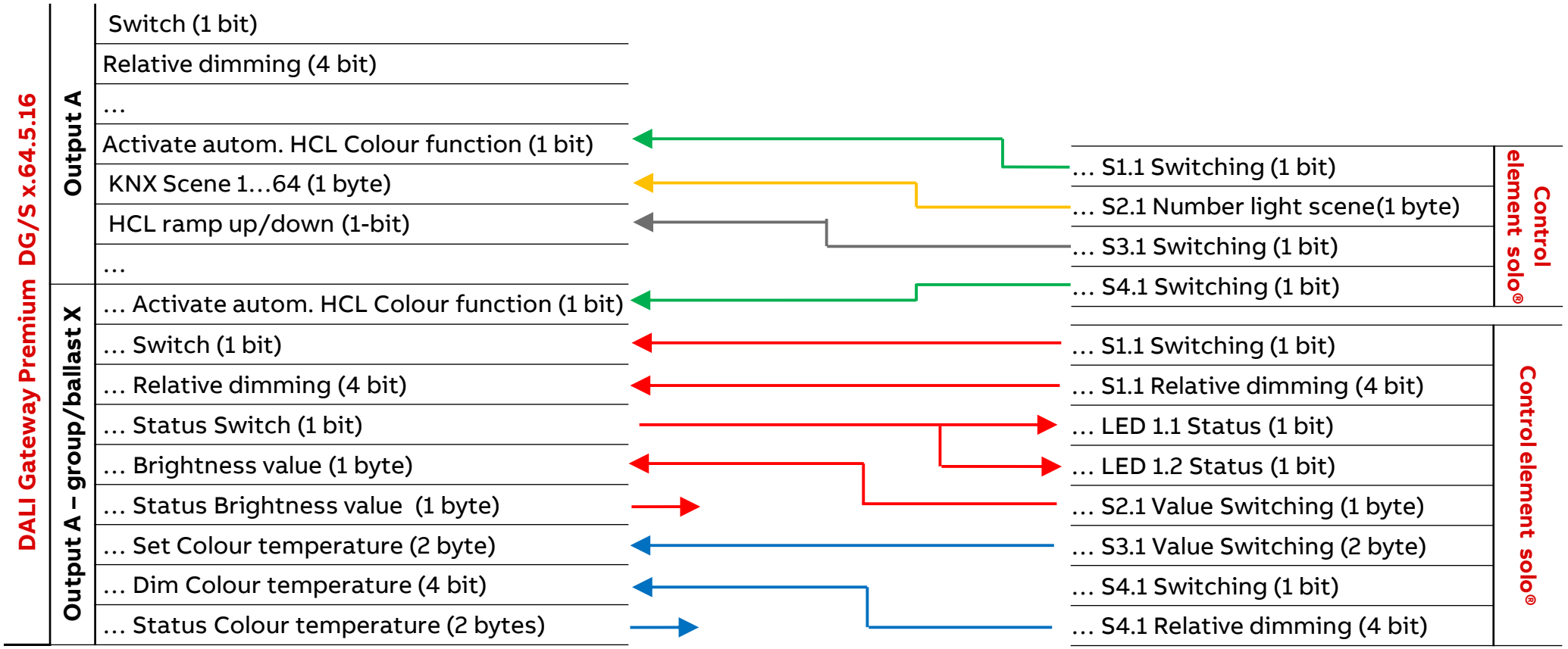
Colour function “Human Centric Lighting HCL” – Colour temp. source: “1-bit group object Ramp curve (int.)”



Source: Internet

KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temp. source: “1-bit group object Ramp curve (int.)”
Example: Assignment of Group Addresses



KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temp. source: “1-bit group object Ramp curve (int.)”
Example: Assignment of Group Addresses

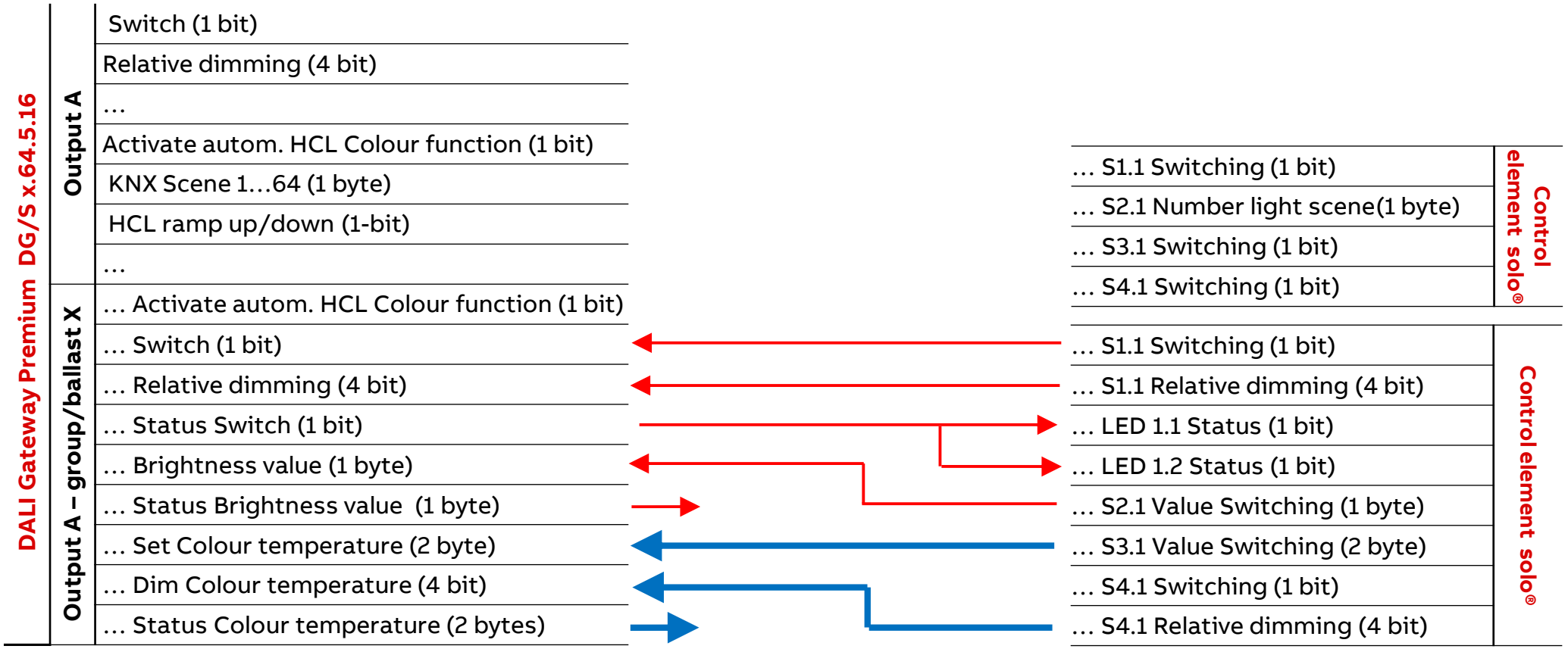
DALI Gateway Premium DG/S x.64.5.16

Output A	Switch (1 bit)
	Relative dimming (4 bit)
	…
	Activate autom. HCL Colour function (1 bit)
	KNX Scene 1…64 (1 byte)
	HCL ramp up/down (1-bit)
	…
Output A – group/ballast X	… Activate autom. HCL Colour function (1 bit)
	… Switch (1 bit)
	… Relative dimming (4 bit)
	… Status Switch (1 bit)
	… Brightness value (1 byte)
	… Status Brightness value (1 byte)
	… Set Colour temperature (2 byte)
	… Dim Colour temperature (4 bit)
	… Status Colour temperature (2 bytes)

Control element solo®	… S1.1 Switching (1 bit)	1
	… S2.1 Number light scene(1 byte)	
	… S3.1 Switching (1 bit)	
	… S4.1 Switching (1 bit)	
Control element solo®	… S1.1 Switching (1 bit)	2
	… S1.1 Relative dimming (4 bit)	
	… LED 1.1 Status (1 bit)	
	… LED 1.2 Status (1 bit)	
	… S2.1 Value Switching (1 byte)	
	… S3.1 Value Switching (2 byte)	
	… S4.1 Switching (1 bit)	
	… S4.1 Relative dimming (4 bit)	

KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temp. source: “1-bit group object Ramp curve (int.)”
Example: Assignment of Group Addresses



KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temp. source: “1-bit group object Ramp curve (int.)”
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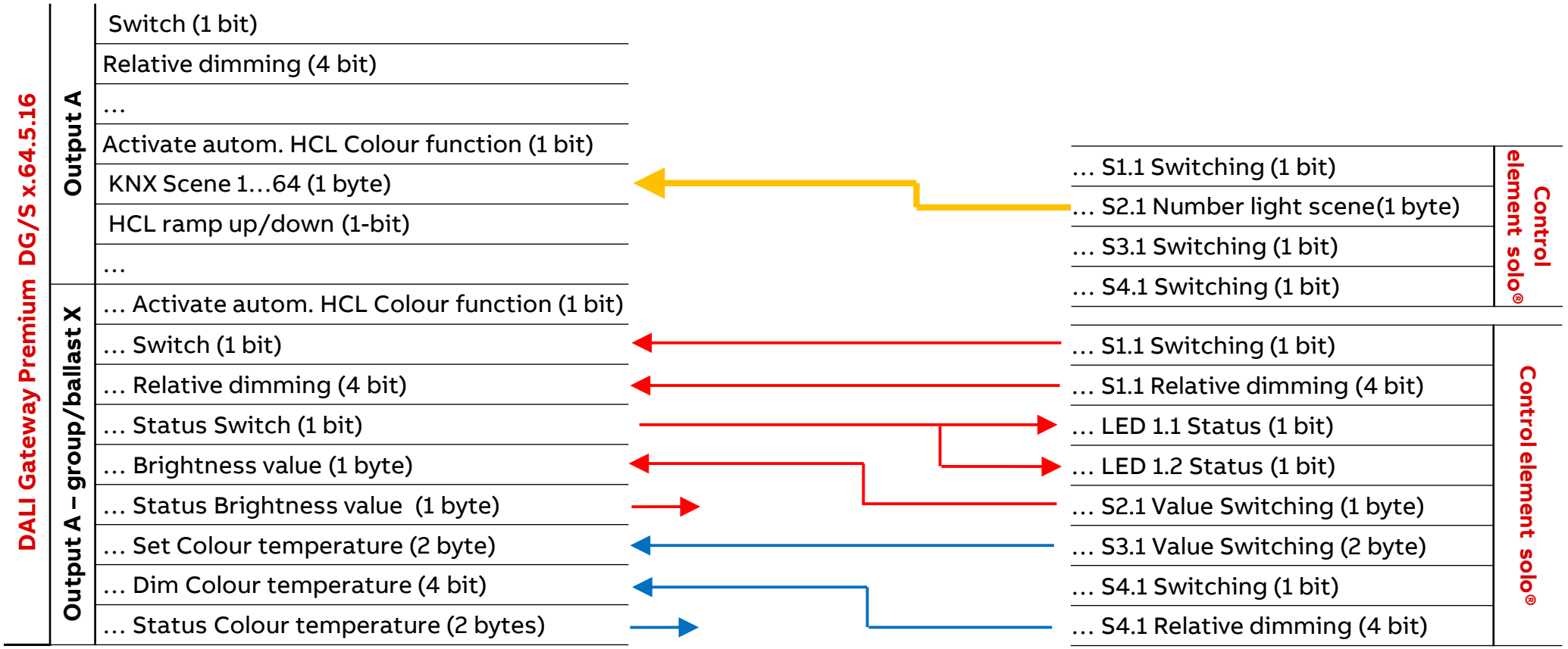

KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL” – Colour temp. source: “1-bit group object Ramp curve (int.)”
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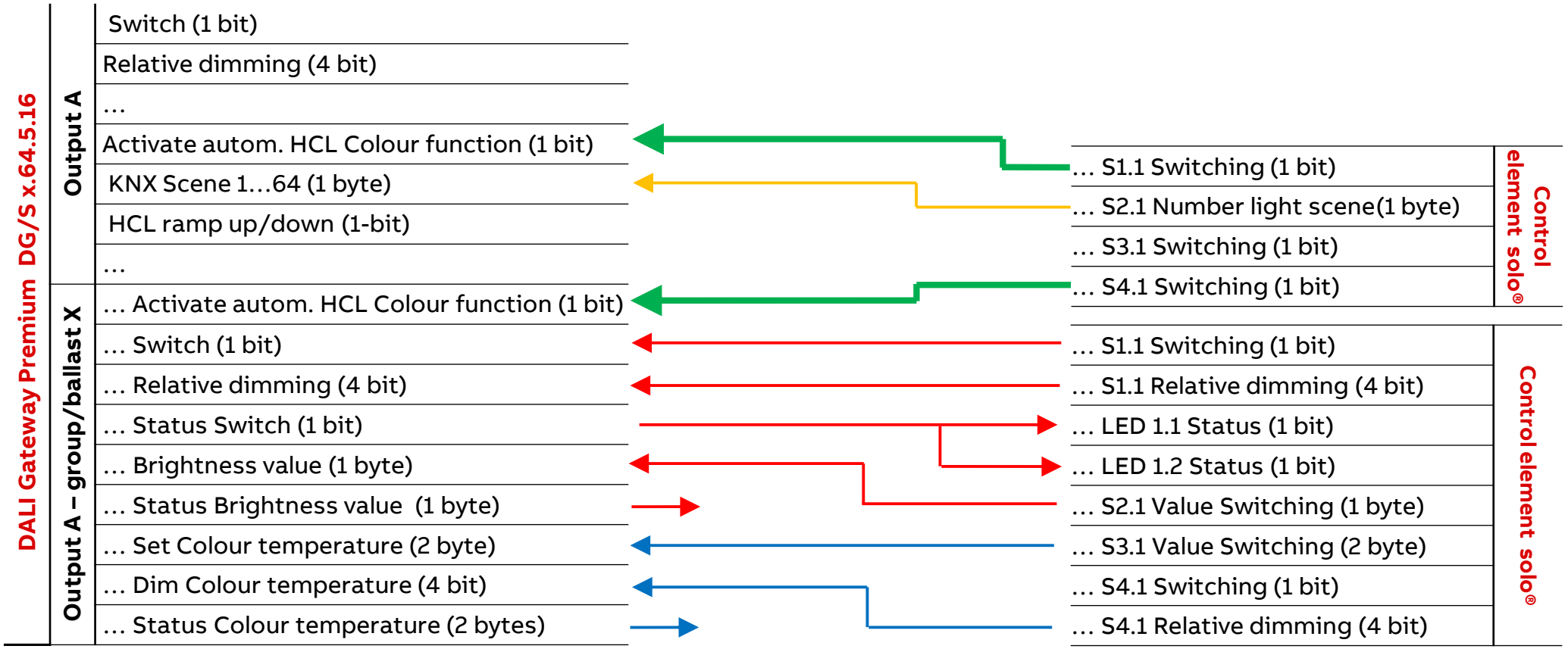

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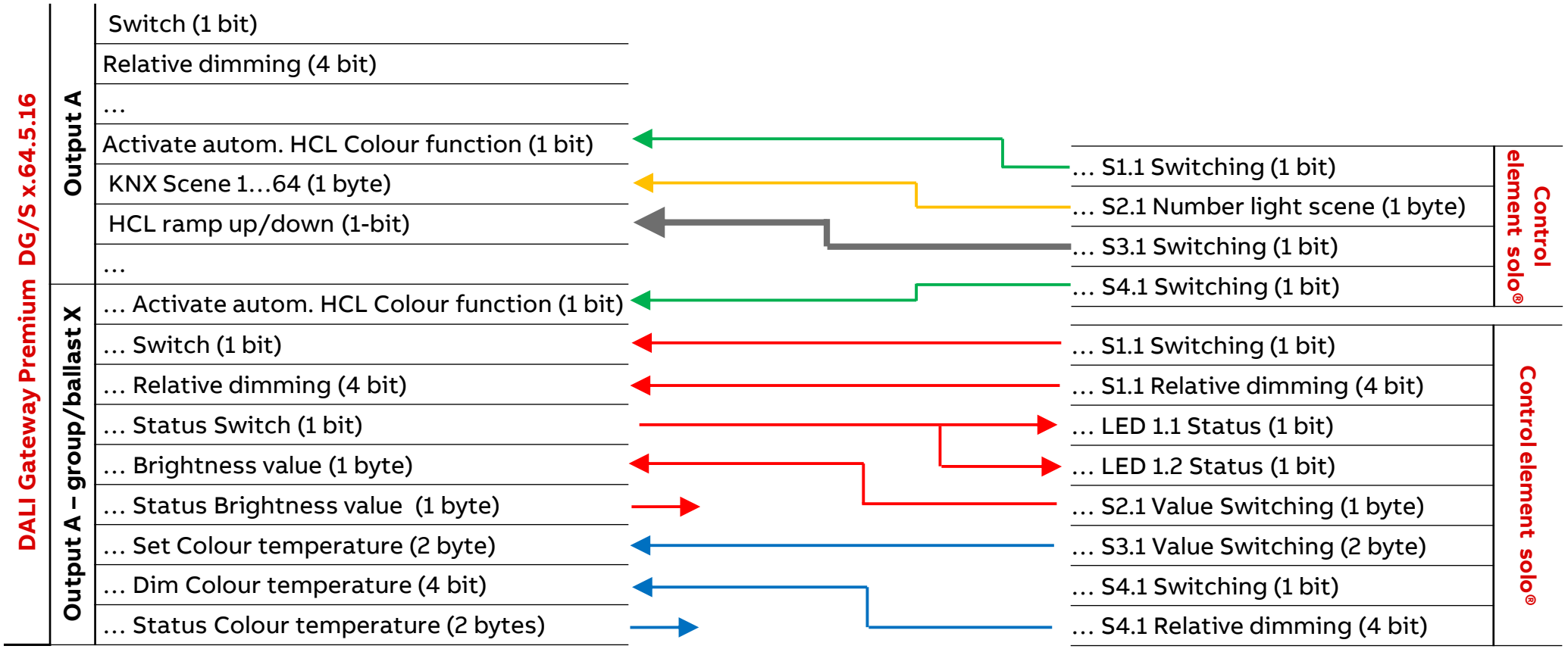
Colour function “Human Centric Lighting HCL” – Colour temp. source: “1-bit group object Ramp curve (int.)”
Example: Assignment of Group Addresses

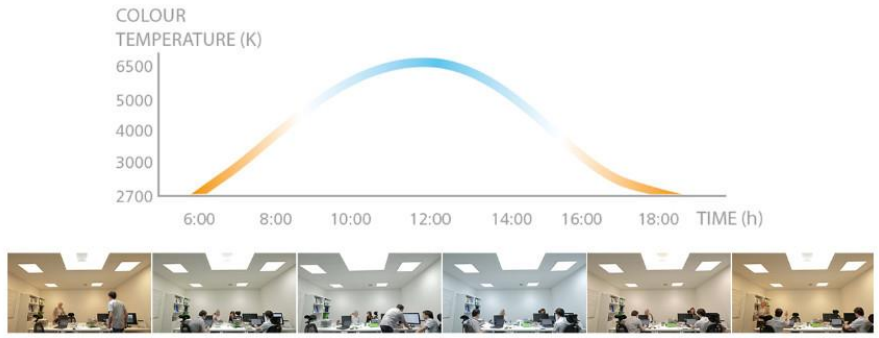


KNX DALI Gateway Premium DG/S x.64.5.1

Colour function “Human Centric Lighting HCL”

Summary

- Human Centric Lighting can adapt people's daily rhythms to one another and increase their motivation, well-being and productivity
- Human Centric Lighting (HCL) simulates the daylight in a building
- HCL only controls the colour temperature and has no influence on the brightness (dimming, value)
- HCL colour temperature source:
  - External: A visualization, BMS, … calculates and provides cyclically colour temperature values
  - Internal: Start a parametrizable colour temperature ramp curve (rising and falling ramp)
- HCL can be activated on a group/ballast or central
- The Colour function HCL or Dim2Warm can be used for a group/ ballast
- Ballasts of device type 8 and tunable white LEDs are required



Source: Internet

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KNX DALI Gateway Premium DG/S x.64.5.1

Function “Standby switch-off”

KNX DALI Gateway Premium DG/S x.64.5.1

Overview

KNX DALI Gateway Premium DG/S x.64.5.1

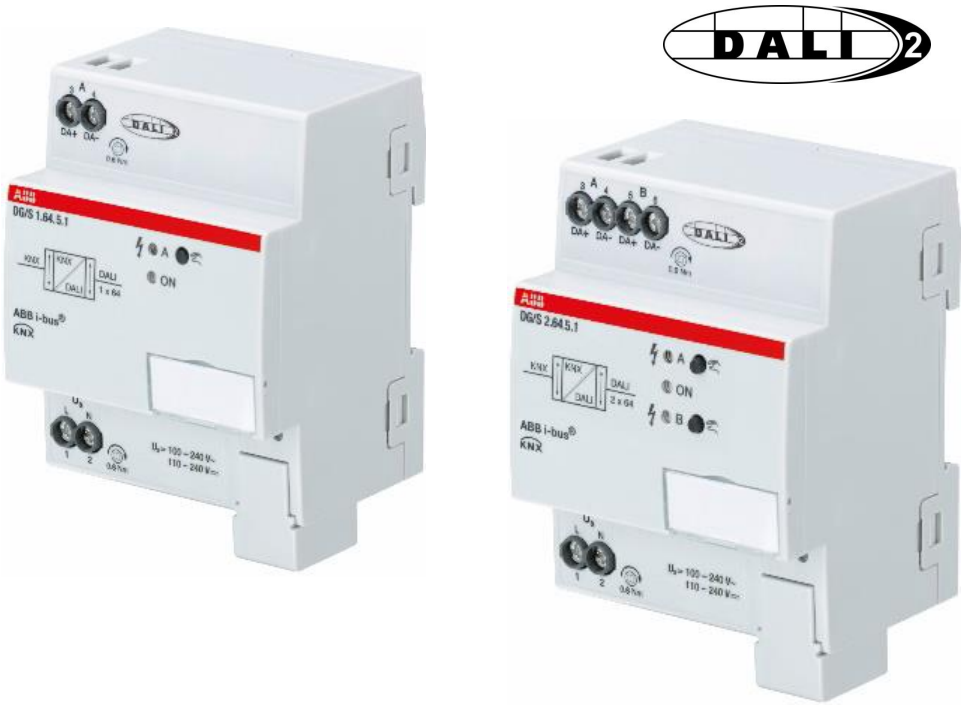
Hardware

– DG/S 1.64.5.1 (one channel, 64 ballasts)
– DG/S 2.64.5.1 (two independent channels, 2 x 64 ballasts)

The following ballast can be operated on the gateway

– Normal DALI ballasts (device type 0)
– DALI single battery emergency lighting converter (device type 1)
– Colour-controlled DALI ballast (device type 8)

– Functions
  - Flexible combination of DALI groups or single control
  - ABB i-bus® Tool support
  - Templates
  - Tunable white
  - Dim2Warm
  - Human Centric Lighting
  - **Standby switch-off**
  - …



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Function “Standby switch-off”

What is the “Standby switch-off” function?

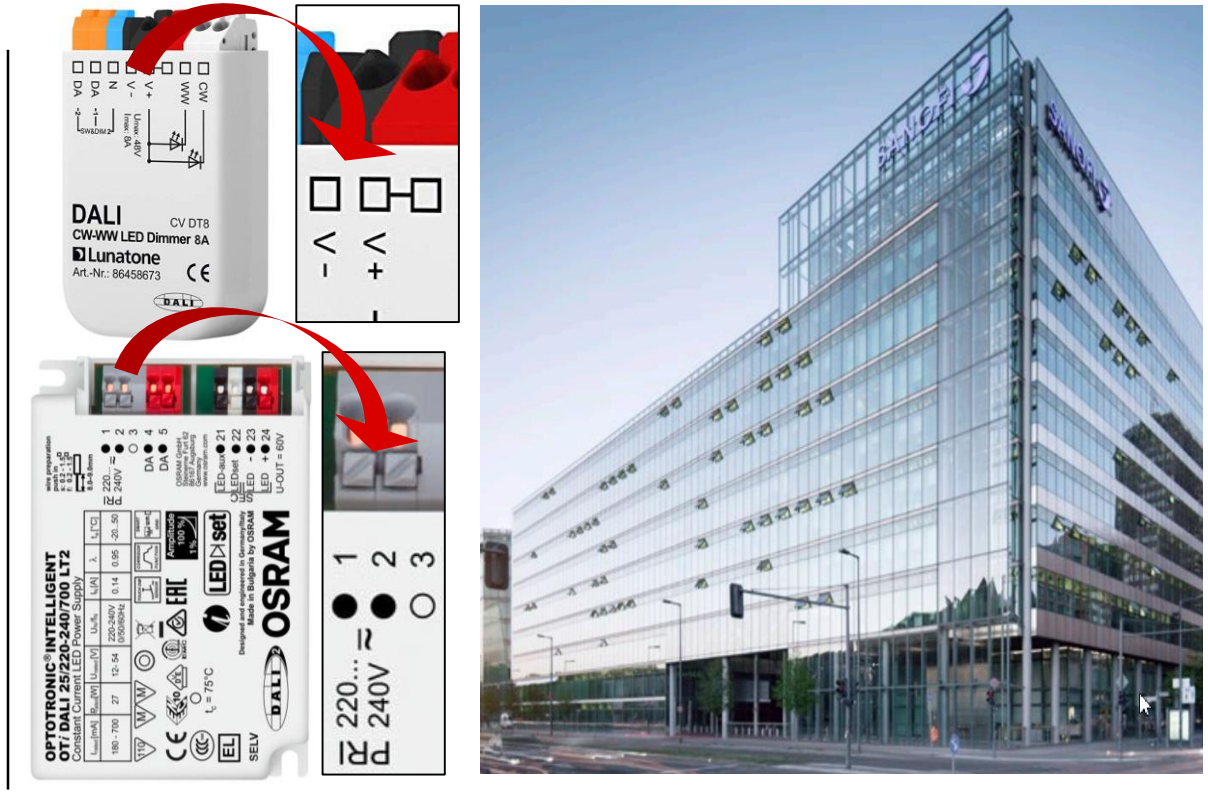
All ballasts are permanently connected to the supply voltage

A modern ballast has a power loss of approx. 0.12 to 0.2 Watts in stand-by mode (switched off)

With a large number of ballasts in a building, this leads to a not inconsiderable energy requirement

The “Standby switch-off” function saves energy by switching off the supply voltage of ballasts when they are all in standby (switched off)

→This serves to save energy



Source: Internet

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Function “Standby switch-off”

What is the “Standby switch-off” function?

If only one ballast remains on at a DALI output, no standby switch-off can be carried out

Standby switch-off is available for each DALI output, not for every ballast or group

The supply voltage can, but does not have to, be switched off for all ballasts

The supply voltage of the ballasts is switched on or off in combination with a KNX Switch Actuator SA/S and with a higher load via an installation contactor (e.g. ESB40)

The message "Ballast fault" is suppressed when the ballasts are switched off using the standby switch-off function

Installation contactor (e.g. ESB40)

Switch Actuator SA/S

Source: Lunatone Industrielle Elektronik GmbH

KNX DALI Gateway Premium DG/S x.64.5.1

Function “Standby switch-off”

What is the “Standby switch-off” function?

DALI emergency converter are not be integrated in Standby switch-off function

Note:

– Ballasts must support individual DALI power-on level (last value before failure), to be adjusted in the ETS Application under “Fault”

Installation contactor (e.g. ESB40)

Switch Actuator SA/S

Source: Lunatone Industrielle Elektronik GmbH

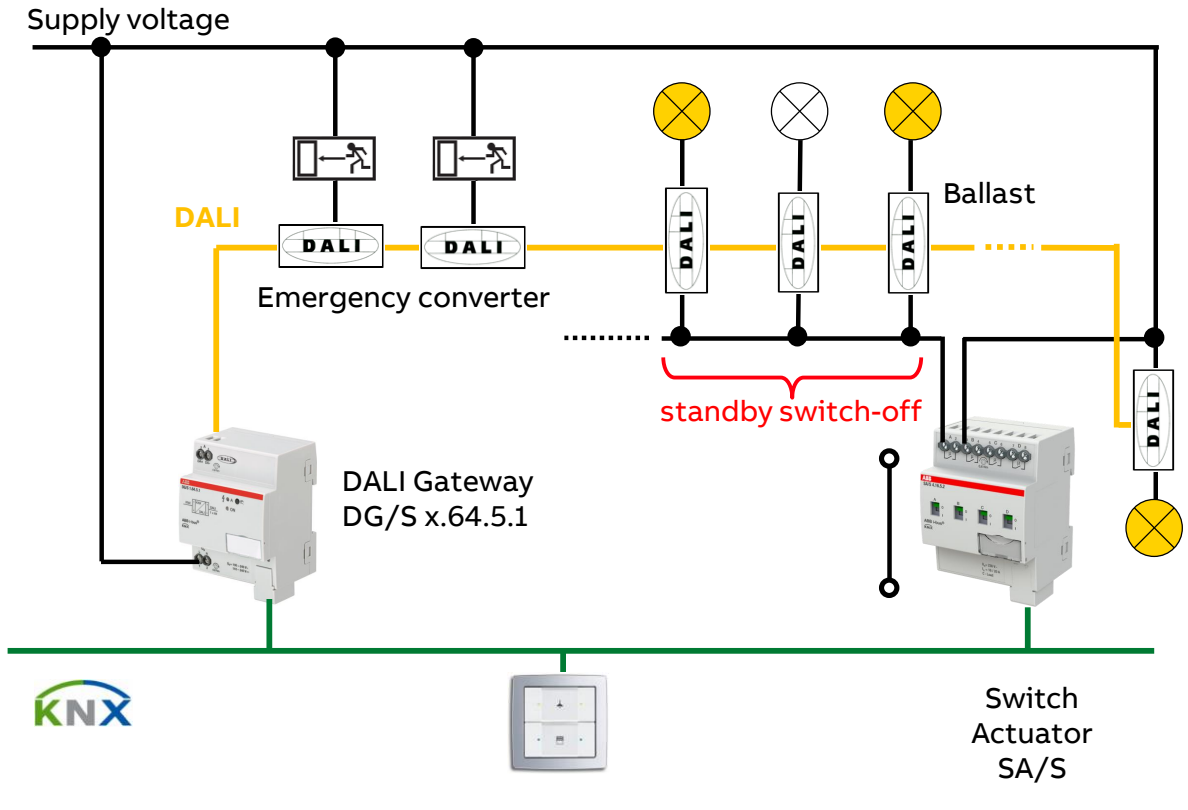
KNX DALI Gateway Premium DG/S x.64.5.1

Function “Standby switch-off”

How does a “Standby switch-off” function work?

Some lights are turned on and all ballasts are supplied with supply voltage

→ no standby switch-off is possible



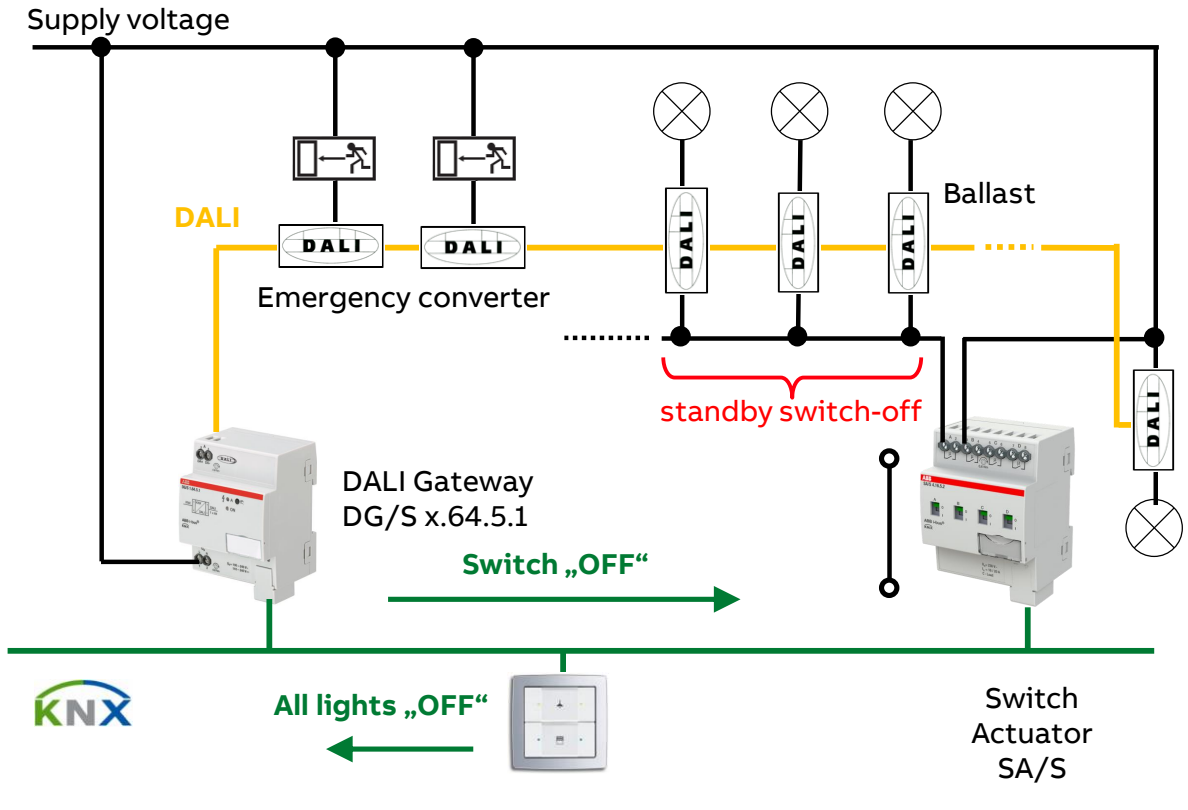
KNX DALI Gateway Premium DG/S x.64.5.1

Function “Standby switch-off”

How does a “Standby switch-off” function work?

All lights are turned off and all ballasts are in standby at a DALI output

- After an adjustable delay time (1…65,535sec.) the standby switch-off function is activated
- A switch “OFF” telegram is sent on KNX
- All Switch Actuator SA/S channels linked with this group address switches off the ballasts supply voltage
  → All connected ballasts are deenergized
- The DG/S message "Ballast fault" is suppressed



KNX DALI Gateway Premium DG/S x.64.5.1

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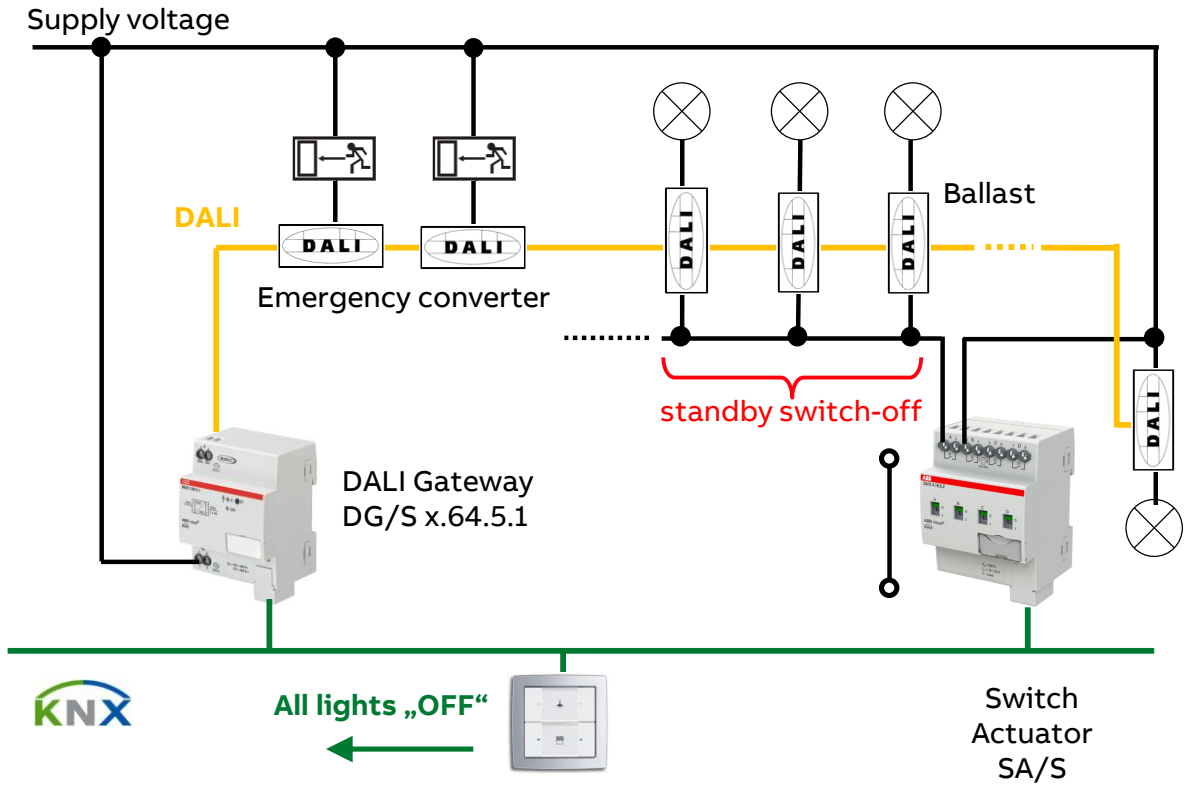
All lights are turned off and all ballasts are in standby at a DALI output



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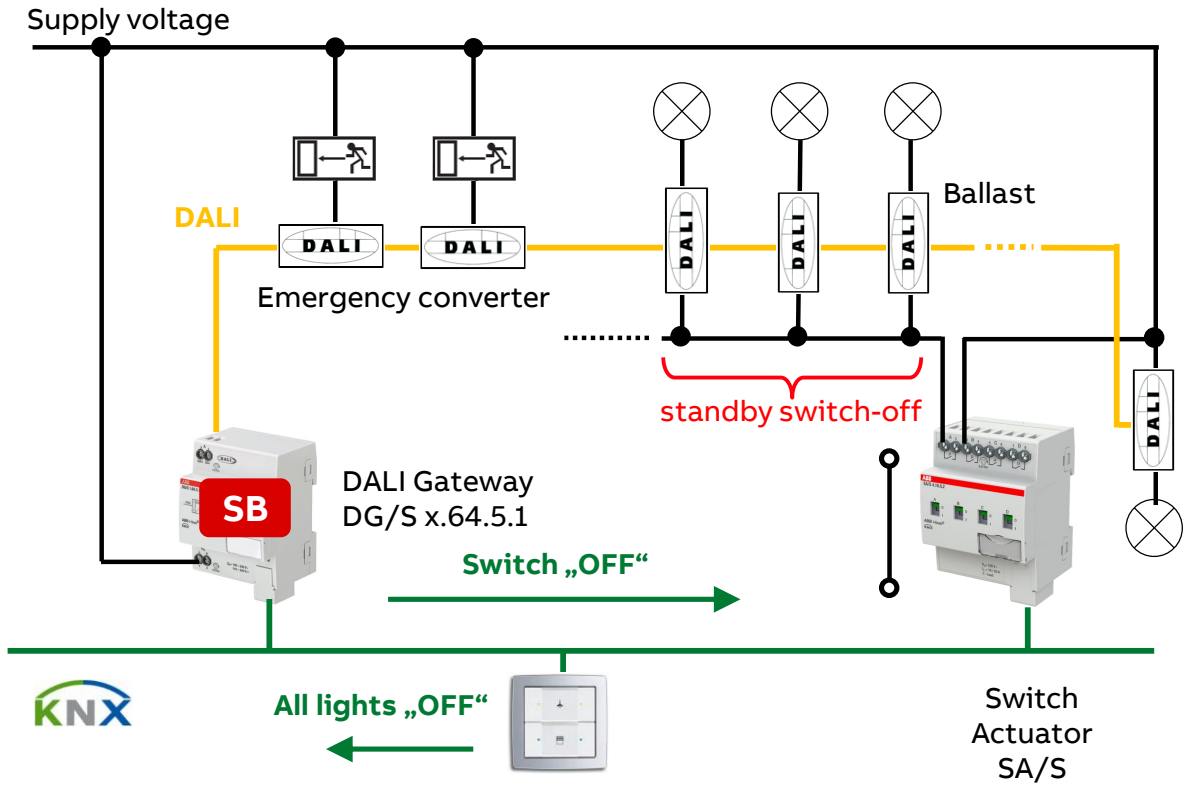

KNX DALI Gateway Premium DG/S x.64.5.1

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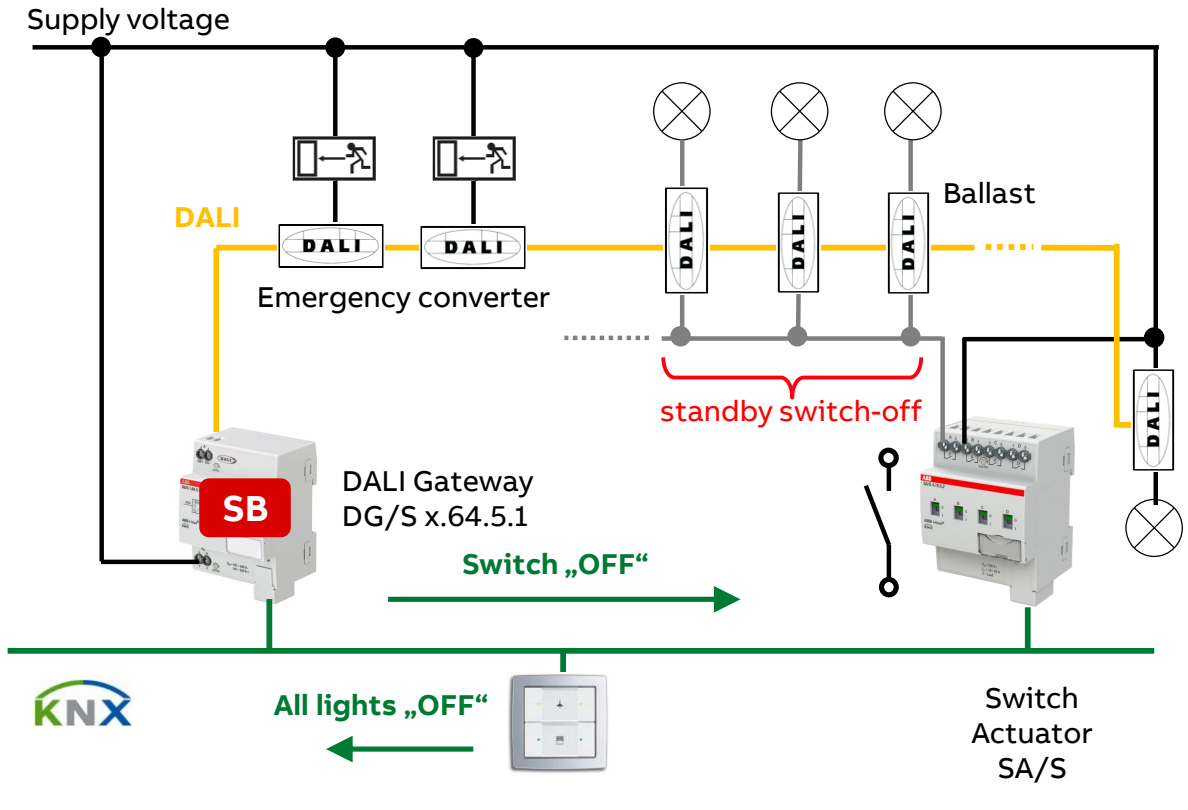

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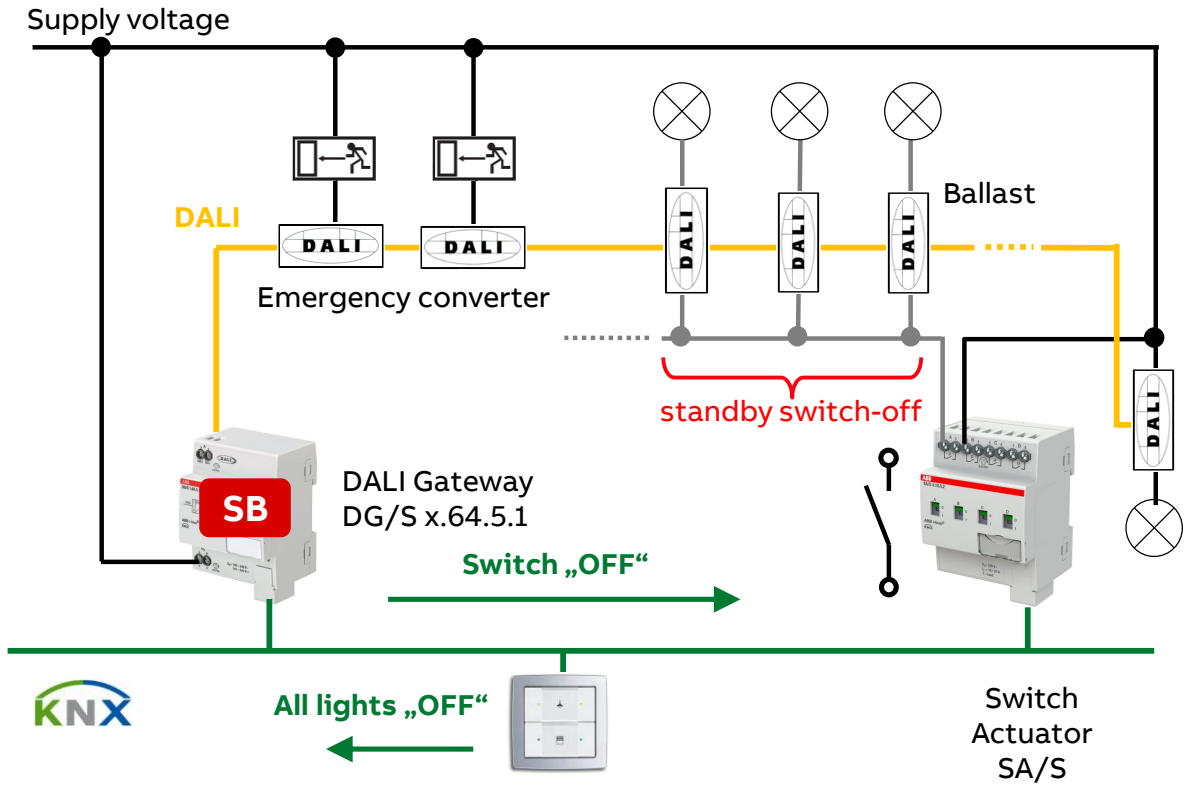


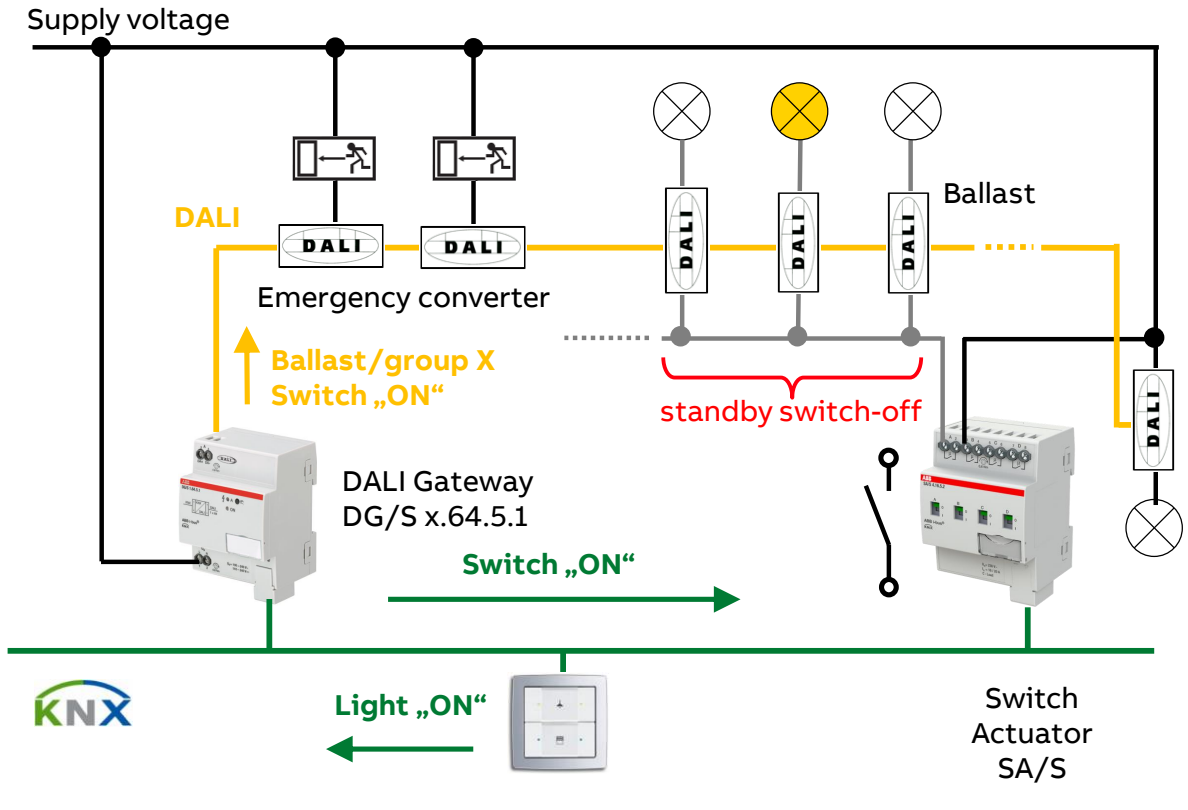
KNX DALI Gateway Premium DG/S x.64.5.1

Function “Standby switch-off”

How does a “Standby switch-off” function work?

When the function is active, a KNX sensor (e.g. control element or presence detector) sends a group address to the DALI Gateway to switch on a DALI ballast/group

- The standby switch-off function is deactivated
- A switch “ON” telegram is sent on KNX
- All Switch Actuator SA/S channels linked with this group address switches on the ballasts supply voltage
  → All connected ballasts are energized
- After adjustable delay time (1…10sec., needed for restart of ballasts) all ballasts are ready to work
- The DALI Gateway sends an “ON” command to the DALI ballast/group and the light switches on
- Further actions to turn on lights are without delay



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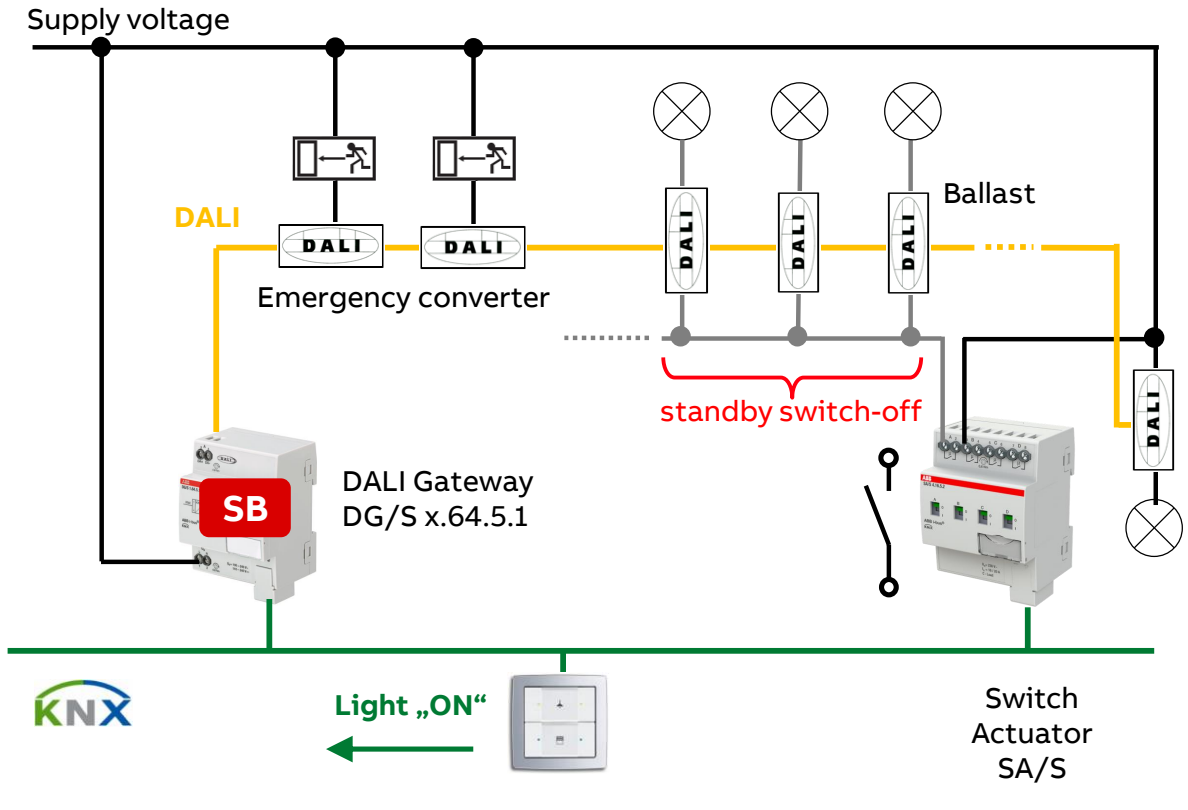

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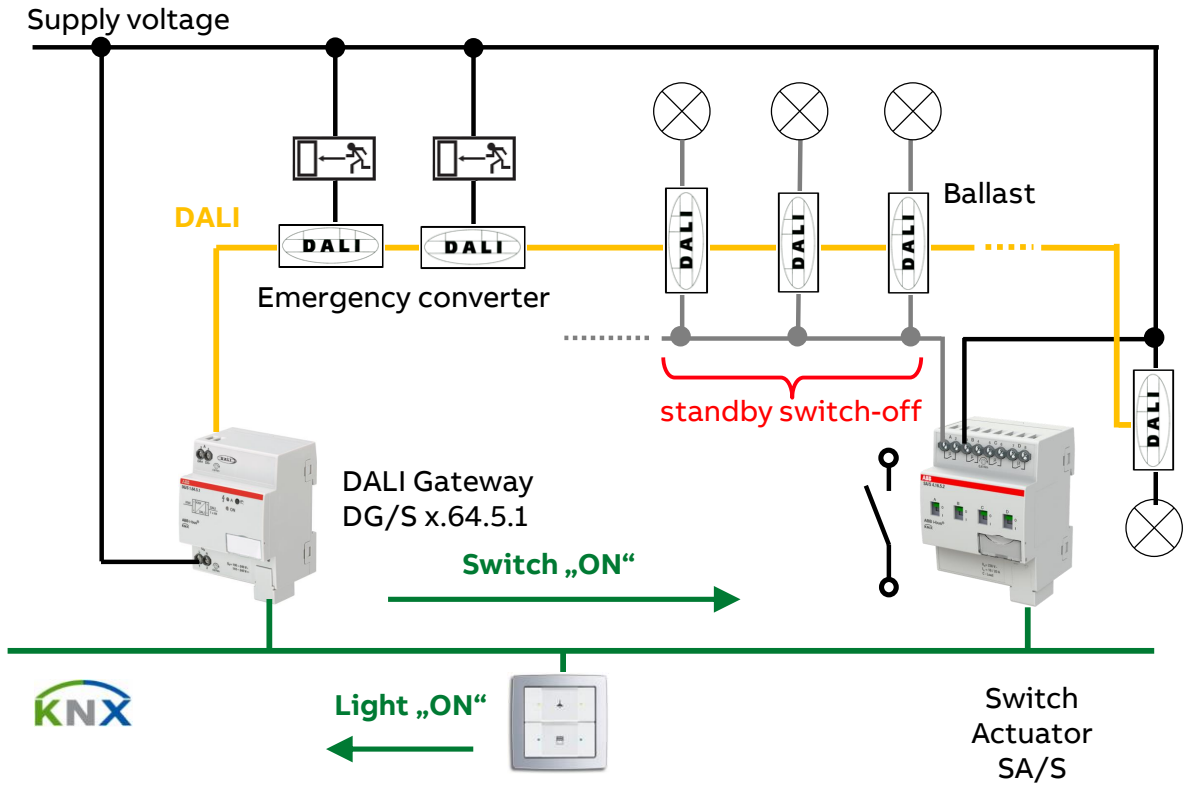

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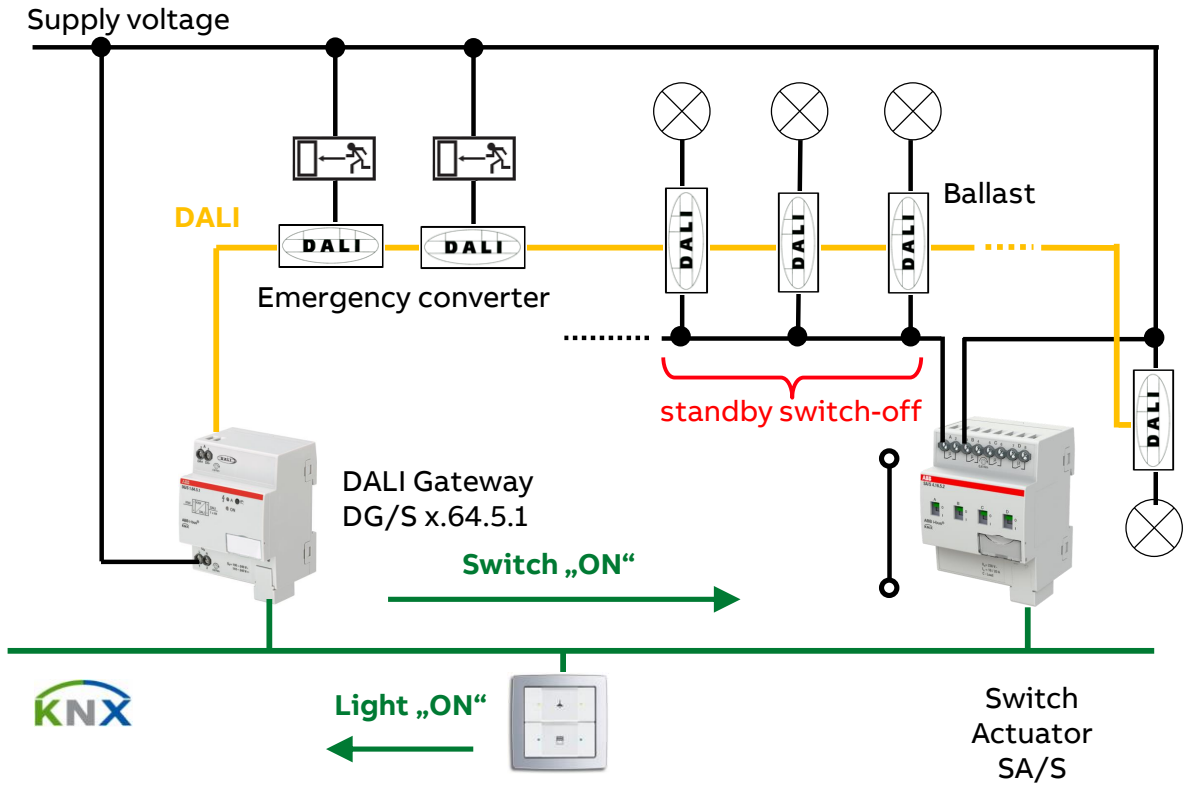

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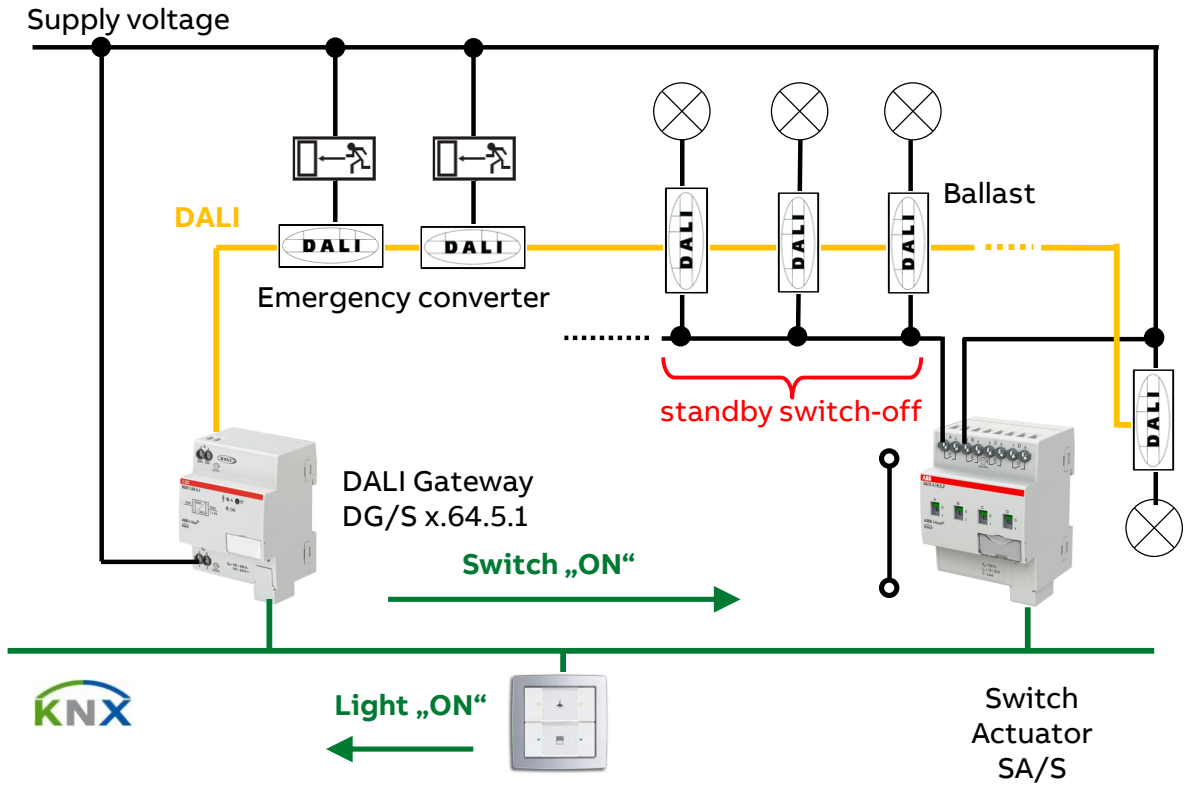

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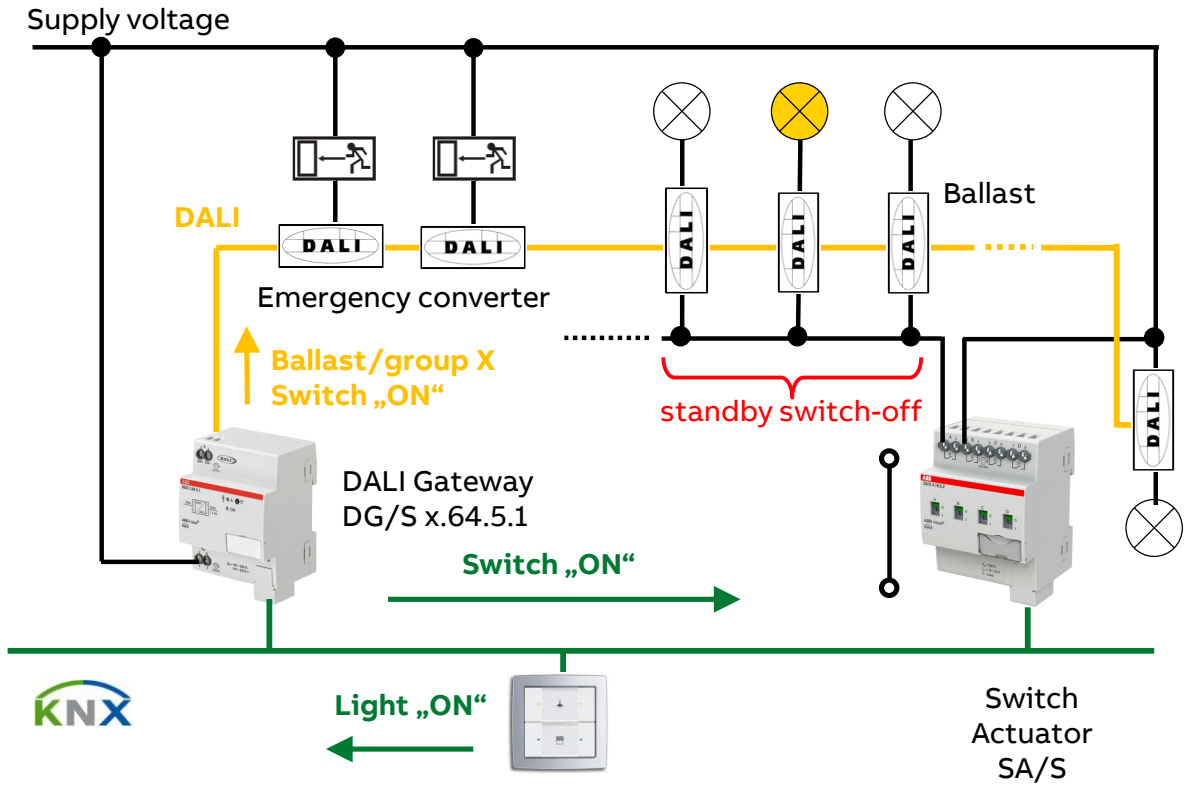


KNX DALI Gateway Premium DG/S x.64.5.1

Function “Standby switch-off”

Commissioning of a “Standby switch-off” function

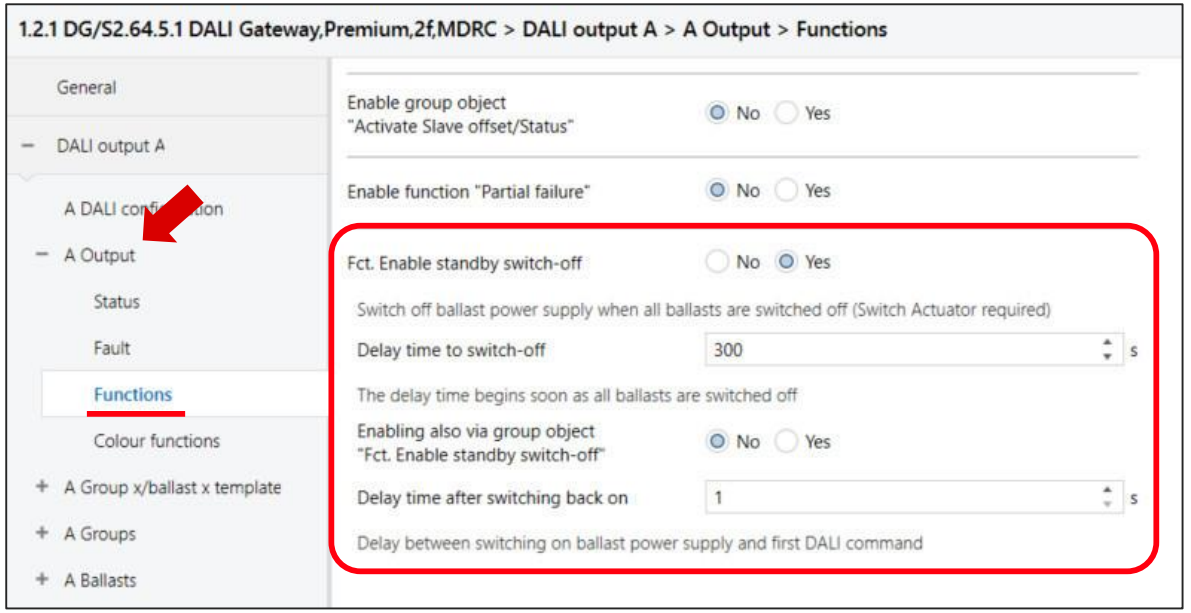
Set ETS parameter: DALI Output A → Output → Functions

- Enable DALI standby switch-off
- Set time of delay till switch-off (e.g. 5 min to avoid standby switch-off in case of short term standby situation)
- Optional: Enable group object “*Enable DALI standby switch-off*”
- Set time (1 …10s) of delay after restart (needed for restart of ballasts, ballast restart time less than 1 sec. according to DALI standard)

Set ETS parameter: DALI Output A → Group X or ballast X → Fault template … (template or individual)

- Select the "Last value before failure" parameter for all ballasts involved in Standby switch-off function

Connect the “*Standby switch-off*” group object to a Switch Actuator SA/S channel(s)



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KNX DALI Gateway Premium DG/S x.64.5.1

Function “Standby switch-off”

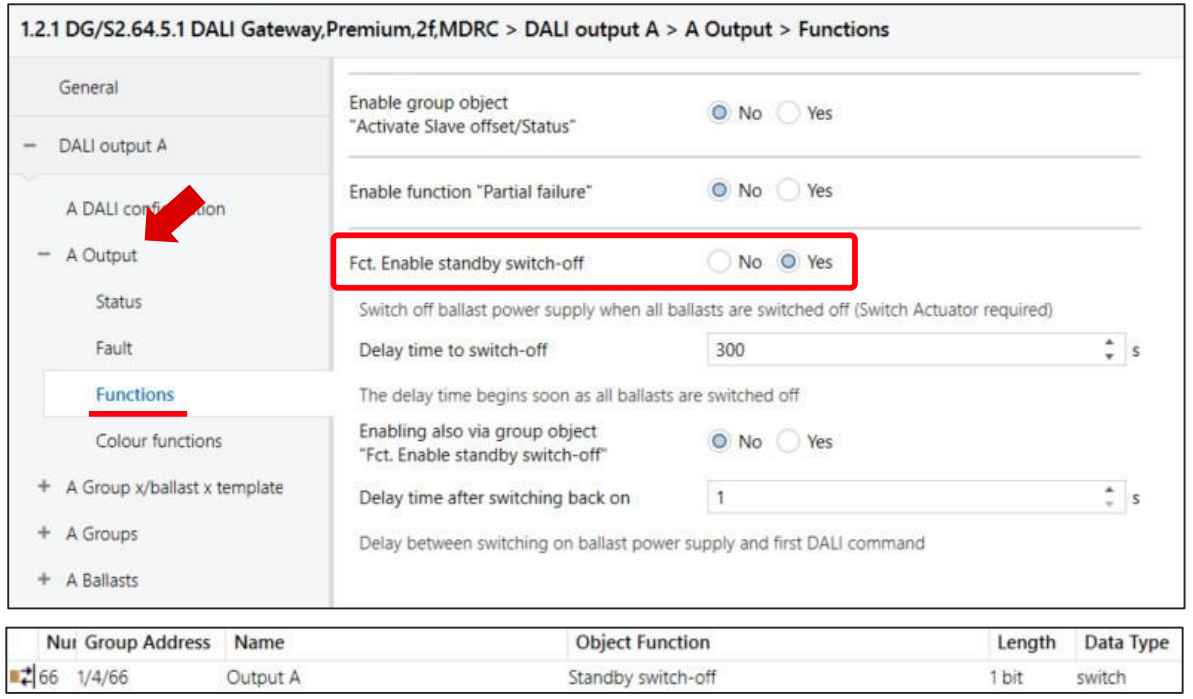
Enable standby switch-off

This parameter determines whether standby switch-off is enabled

Standby switch-off is when the ballast supply voltage switches off if all connected ballasts on an DALI output are in standby

– No
  - The Standby switch-off function is not enabled

– Yes
  - The Standby switch-off function is enabled
  - If all the ballasts on an DALI Output are switched off, the ballast supply voltage can be switched off too
  - However, this requires the "*Standby switch-off*" group object to be linked with a Switch Actuator SA/S channel



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Function “Standby switch-off”

Delay time to switch-off

This parameter can be used to set a ballast supply voltage standby switch-off delay time before the "*Standby switch-off*" group object is sent on KNX and switches off all the ballasts on DALI output A/B

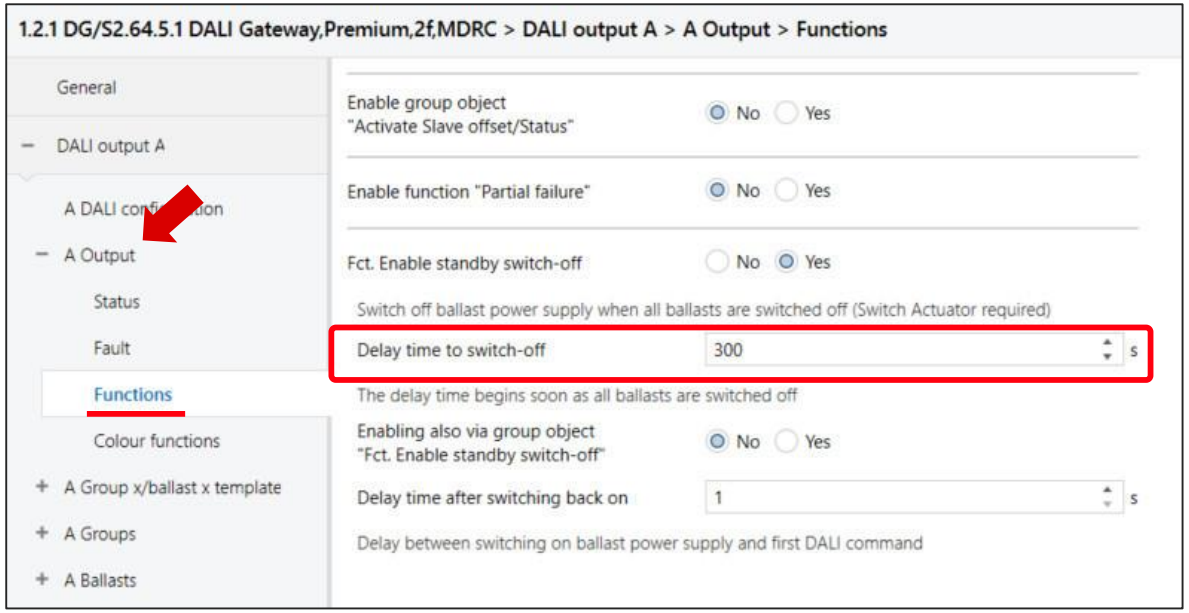
– 1…300…65,535sec.

Note

– Each time the supply voltage is switched off, the current values (brightness, colour temperature, …) are saved to the ballast's flash memory

– Note that the lifetime of the ballast memory and associated storage space reduces each time

– We therefore recommend switching off no more than once a day



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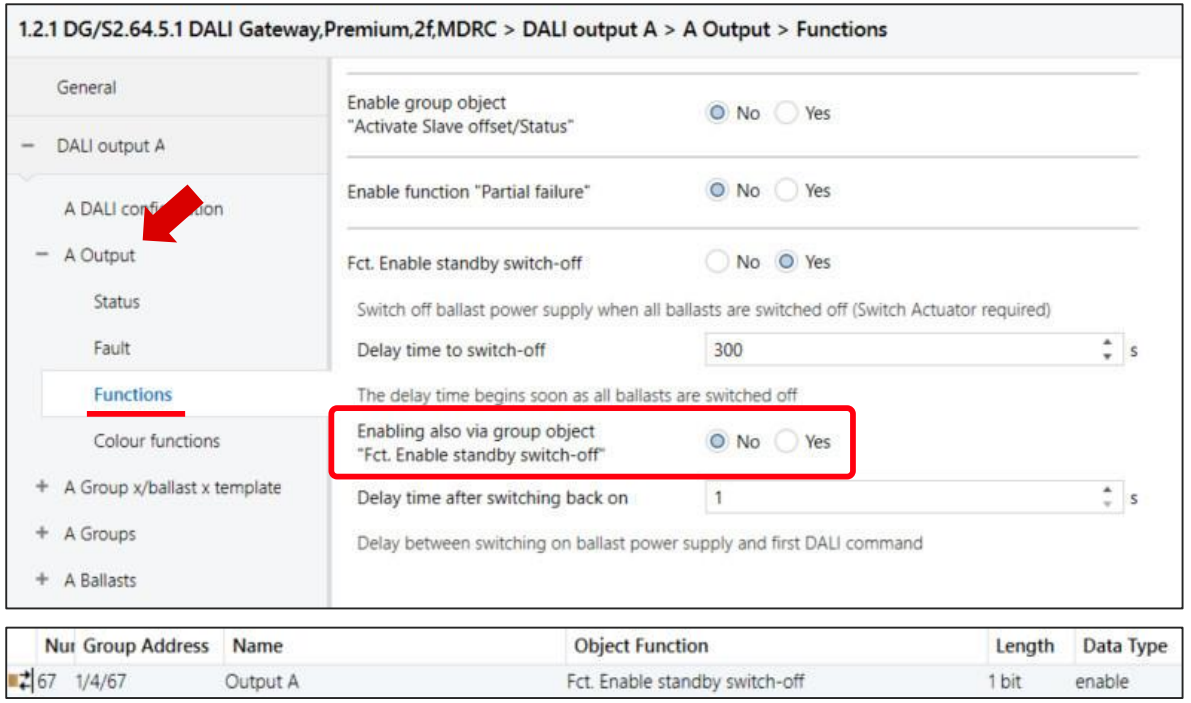
Function “Standby switch-off”

Enabling via group object “Fct. Enable standby switch-off”

This parameter allows you to enable ballast supply voltage switch-off using the “*Enable Standby switch-off*” group object

– No
  - The standby switch-off function cannot be enabled or blocked

– Yes
  - Standby switch-off function using the “*Function Enable standby switch-off*” group object is enabled
  - This group object can be used to enable or block the standby switch-off function
  - Telegram value:
    1 = Enables the standby switch-off function
    0 = Blocks the standby switch-off function



KNX DALI Gateway Premium DG/S x.64.5.1

Function “Standby switch-off”

Delay time after switching back on

This parameter sets a delay time before the ballast supply voltage is switched back on by a Switch Actuator SA/S

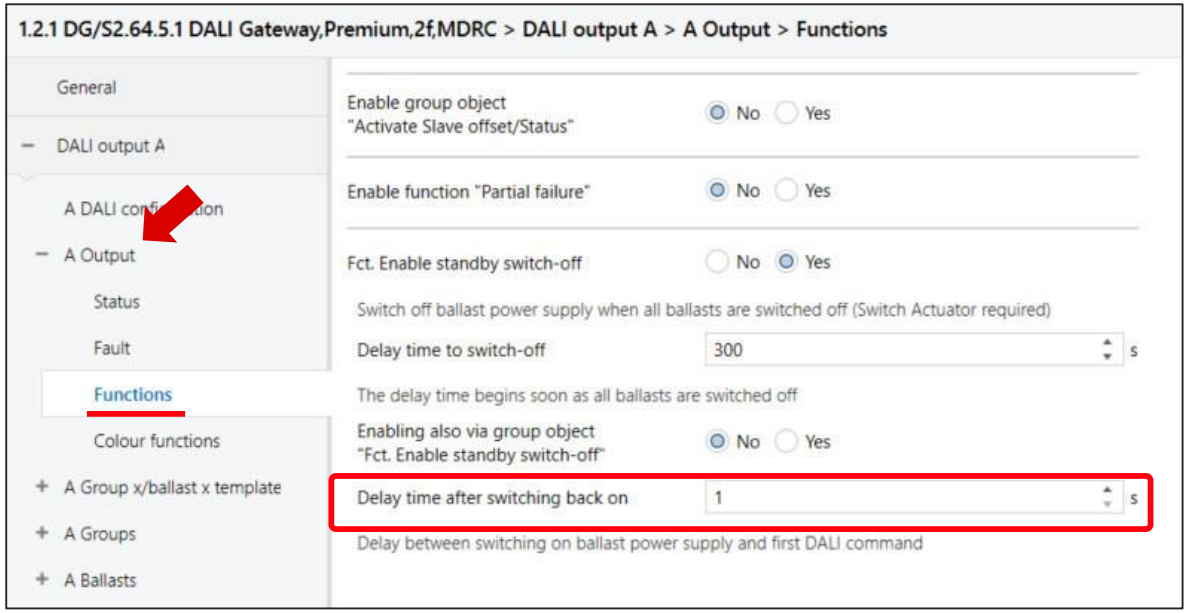
The delay time delays transmission of the first DALI commands after the ballast supply voltage is switched on (thus taking account of ballast start up behavior)

– 1…10sec.

When using power supplies, a time longer than one second may have to be set (stabilization of the output voltage)

Note:

– According to the DALI standard – depending on the type – a DALI device must be ready to receive a command between 100msec. and 1,200msec. after supply voltage recovery



KNX DALI Gateway Premium DG/S x.64.5.1

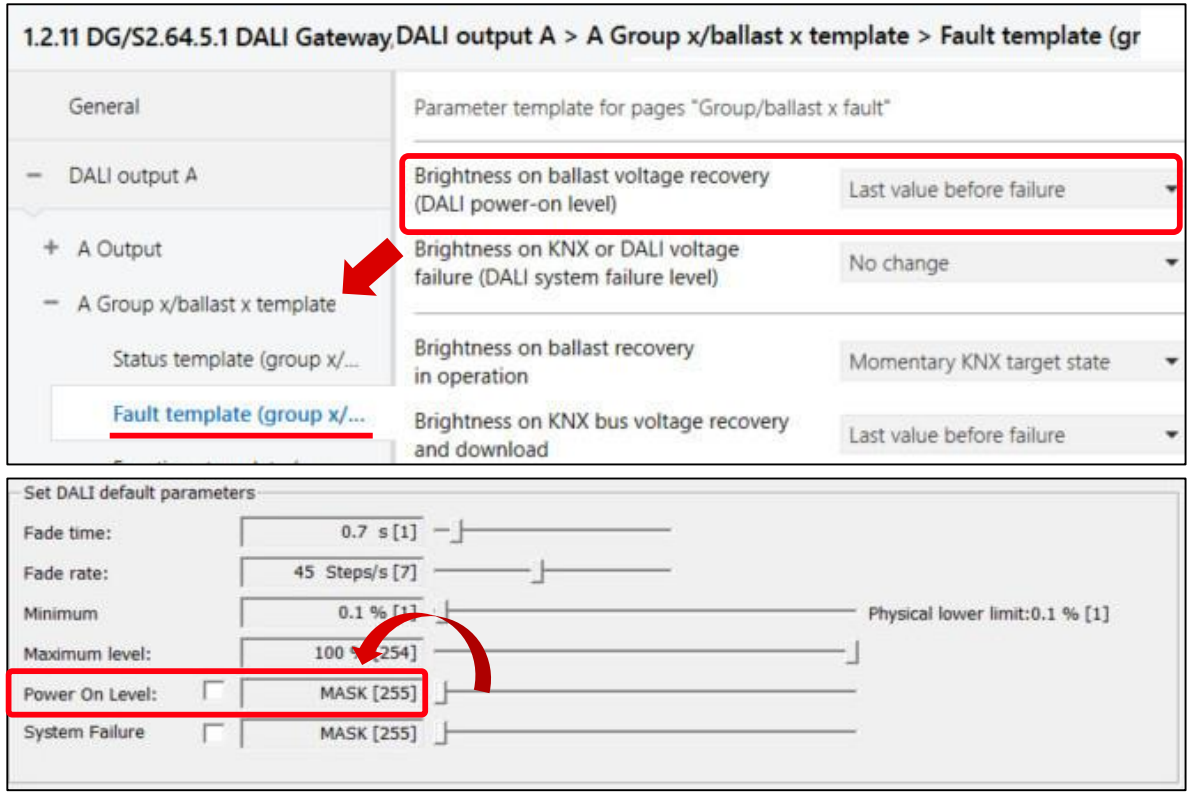
Function “Standby switch-off”

Brightness on ballast voltage recovery (DALI power-on level)

Set ETS parameter: DALI Output A → Group X or ballast X → Fault template … (template or individual)

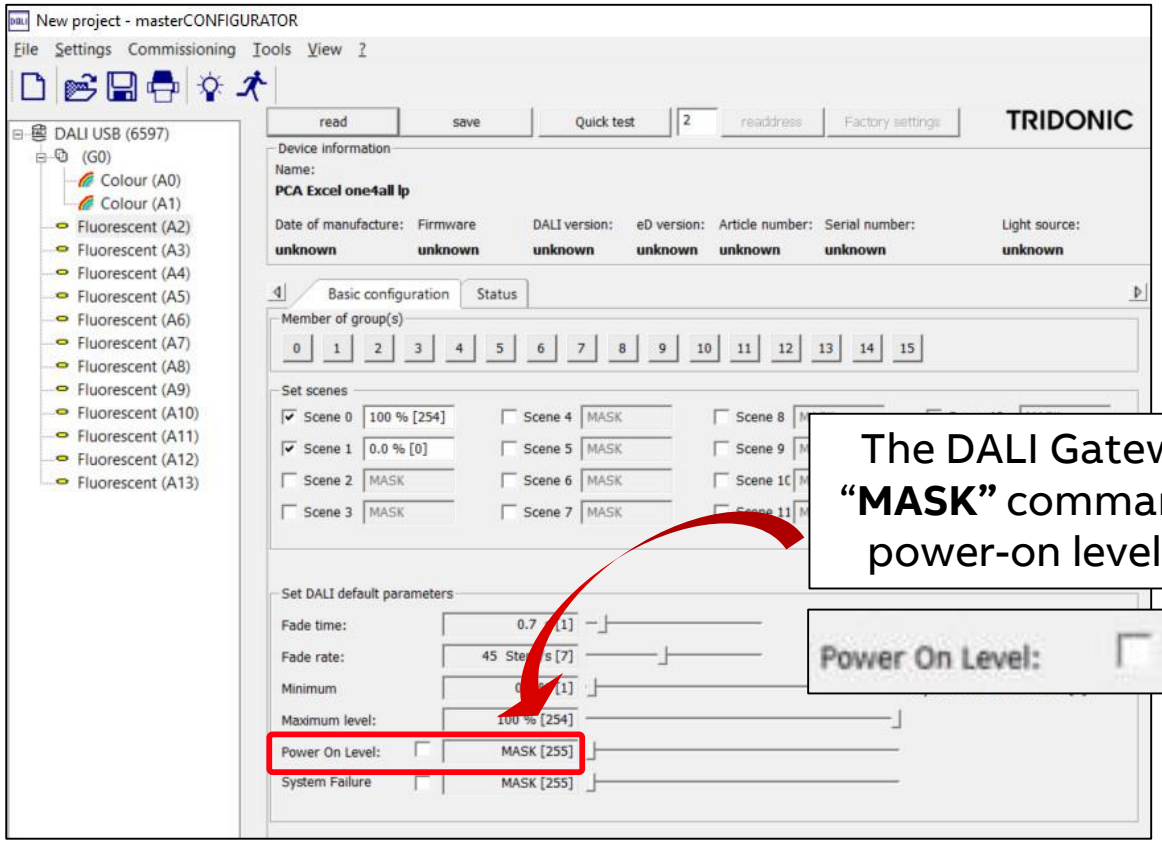
– Select the "Last value before failure" parameter for all ballasts involved in Standby switch-off function

- The DALI device (ballast) is switched on using the last (previous) set brightness value used before ballast supply voltage failure
- This function must be supported by the DALI devices
- Since the end of 2009, this property has been defined in the standard for DALI devices
- Please contact the ballast manufacturer in case of doubt
- The DALI Gateway writes the “MASK" command for the DALI power-on level in the ballast
- This parameter changes the factory setting of the ballast

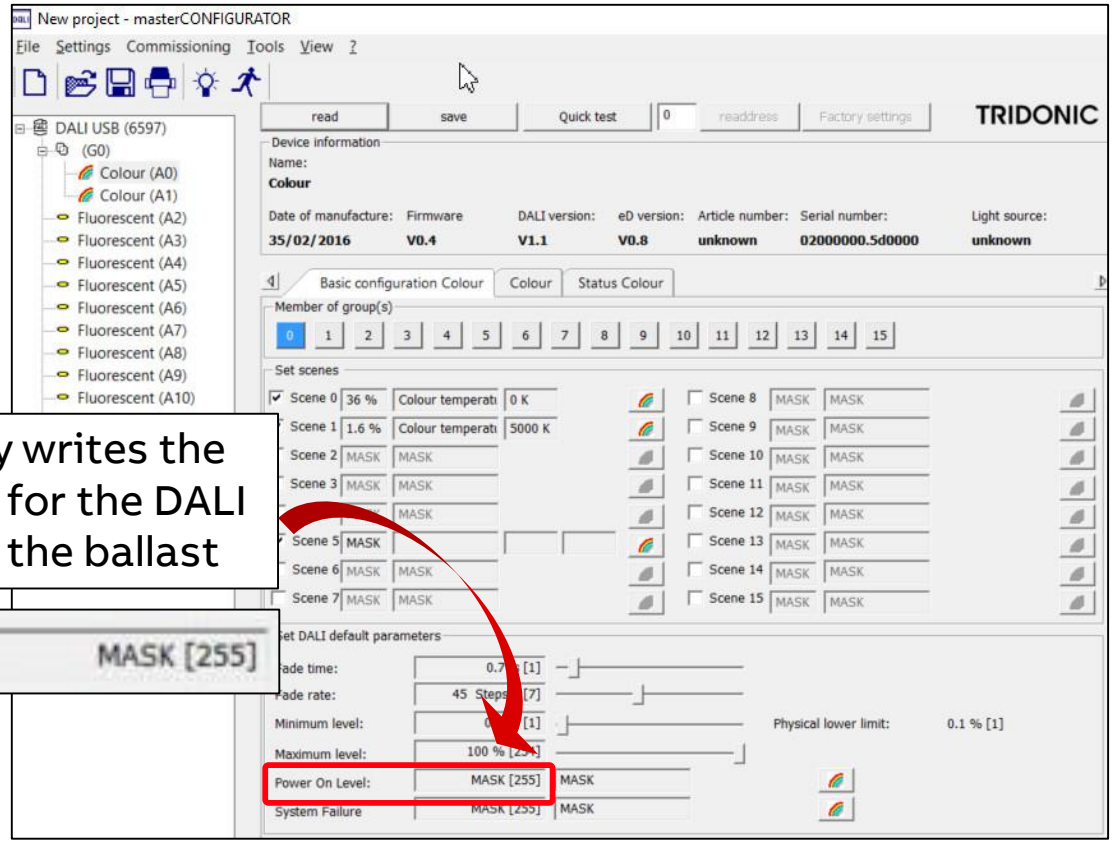


KNX DALI Gateway Premium DG/S x.64.5.1

Function “Standby switch-off” – diagnosis with “DALI masterCONFIGURATOR” software (TRIDONIC)



The DALI Gateway writes the “**MASK**” command for the DALI power-on level in the ballast



KNX DALI Gateway Premium DG/S x.64.5.1

Function “Standby switch-off”

DALI software “masterCONFIGURATOR” (TRIDONIC)

The masterCONFIGURATOR software is a configuration and parameterization program for DALI devices

www.tridonic.com

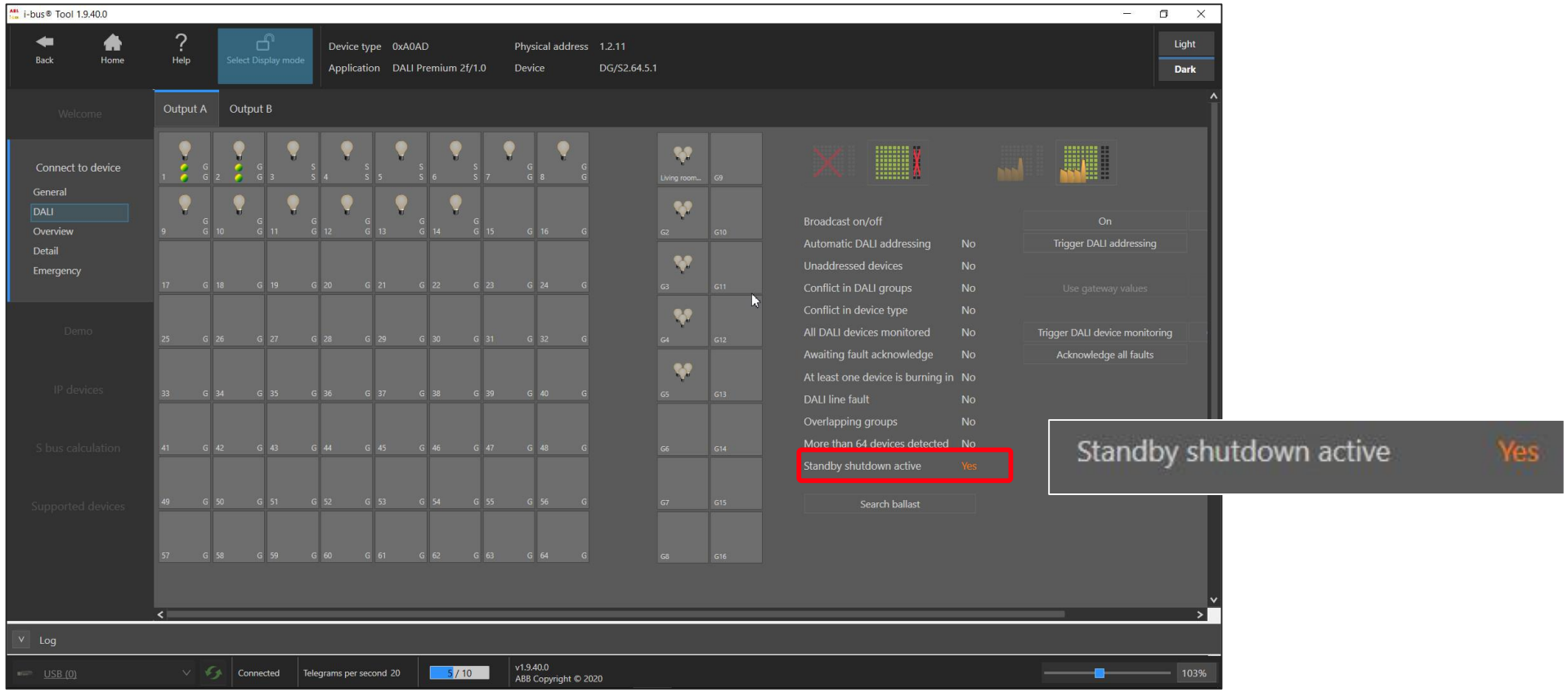
The “DALI USB” interface module is required for communication with the DALI and the ballasts (TRIDONIC article number 24138923)

Note:

- The “masterCONFIGURATOR” software should only be used for testing or diagnosis (e.g. reading out power-on level)
- All other settings (parameterizing, settings, addressing, grouping,, ...) are made via the ETS and the ABB i-busTool!

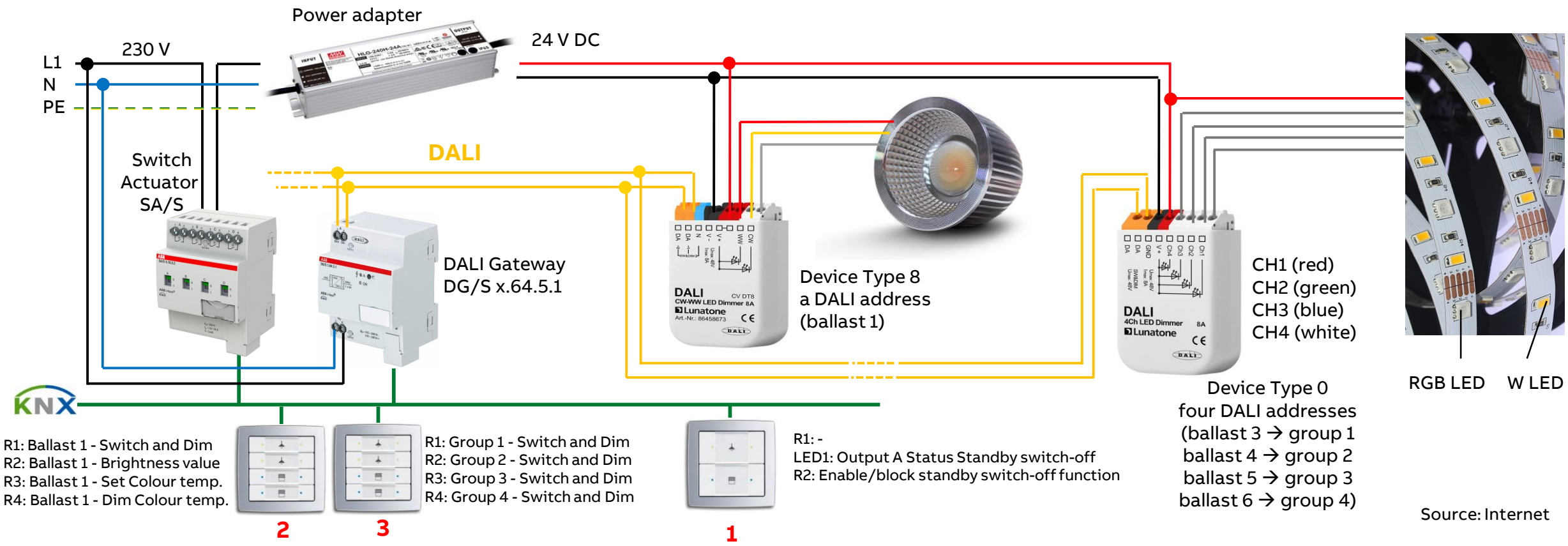
KNX DALI Gateway Premium DG/S x.64.5.1

Function “Standby switch-off” – ABB i-bus® Tool



KNX DALI Gateway Premium DG/S x.64.5.1

Function “Standby switch-off” – Example



Source: Internet

KNX DALI Gateway Premium DG/S x.64.5.1

Function “Standby switch-off” – Example: Assignment of Group Addresses

DALI Gateway Premium DG/S x.64.5.16		
	Output A	Switch (1 bit)
		Relative dimming (4 bit)
		Brightness value (1 byte)
		Standby switch-off
		Fct. Enable standby switch-off
		…
	Output A – group/ballast X	Grp./Ballast ….
		Ballast 1 Switch (1 bit)
		Ballast 1 Relative dimming (4 bit)
		Ballast 1 Brightness value (1 byte)
		Ballast 1 Set Colour temperature (2 byte)
		Ballast 1 Dim Colour temperature (4 bit)
		Grp./Ballast ….
		Grp. 1 Switch (1 bit)
		Grp. 1 Relative dimming (4 bit)

… Output A Switch	Switch Actuator SA/S	
… Output B Switch		
… Output X Switch		
… LED 1.x Status (1 bit)	Control element solo®	1
… S2.1 Switching (1 bit)		
… LED 2.x Status (1 bit)		
… S1.1 Switching (1 bit)	Control element solo®	2
… S1.1 Relative dimming (4 bit)		
… S2.1 Value Switching (1 byte)		
… S3.1 Value Switching (2 byte)		
… S4.1 Relative dimming (4 bit)		
… S1.1 Switching (1 bit)	C.E. solo®	3
… S1.1 Relative dimming (4 bit)		

KNX DALI Gateway Premium DG/S x.64.5.1

Function “Standby switch-off” – Example: Assignment of Group Addresses

DALI Gateway Premium DG/S x.64.5.16

Output A	Switch (1 bit)
	Relative dimming (4 bit)
	Brightness value (1 byte)
	Standby switch-off
	Fct. Enable standby switch-off
	…
Output A – group/ballast X	Grp./Ballast ….
	Ballast 1 Switch (1 bit)
	Ballast 1 Relative dimming (4 bit)
	Ballast 1 Brightness value (1 byte)
	Ballast 1 Set Colour temperature (2 byte)
	Ballast 1 Dim Colour temperature (4 bit)
	Grp./Ballast ….
	Grp. 1 Switch (1 bit)
	Grp. 1 Relative dimming (4 bit)

… Output A Switch	Switch Actuator SA/S	
… Output B Switch		
… Output X Switch		
… LED 1.x Status (1 bit)	Control element solo®	1
… S2.1 Switching (1 bit)		
… LED 2.x Status (1 bit)		
… S1.1 Switching (1 bit)	Control element solo®	2
… S1.1 Relative dimming (4 bit)		
… S2.1 Value Switching (1 byte)		
… S3.1 Value Switching (2 byte)		
… S4.1 Relative dimming (4 bit)		
… S1.1 Switching (1 bit)	C.E. solo®	3
… S1.1 Relative dimming (4 bit)		

KNX DALI Gateway Premium DG/S x.64.5.1

Function “Standby switch-off” – Example: Assignment of Group Addresses

DALI Gateway Premium DG/S x.64.5.16

Output A	Switch (1 bit)	
	Relative dimming (4 bit)	
	Brightness value (1 byte)	
	Standby switch-off	
	Fct. Enable standby switch-off	
	…	
Output A – group/ballast X	Grp./Ballast ….	
	Ballast 1 Switch (1 bit)	… S1.1 Switching (1 bit)
	Ballast 1 Relative dimming (4 bit)	… S1.1 Relative dimming (4 bit)
	Ballast 1 Brightness value (1 byte)	… S2.1 Value Switching (1 byte)
	Ballast 1 Set Colour temperature (2 byte)	… S3.1 Value Switching (2 byte)
	Ballast 1 Dim Colour temperature (4 bit)	… S4.1 Relative dimming (4 bit)
	Grp./Ballast ….	
	Grp. 1 Switch (1 bit)	… S1.1 Switching (1 bit)
	Grp. 1 Relative dimming (4 bit)	… S1.1 Relative dimming (4 bit)

Switch Actuator SA/S	… Output A Switch	
	… Output B Switch	
	… Output X Switch	
Control element solo®	… LED 1.x Status (1 bit)	1
	… S2.1 Switching (1 bit)	
	… LED 2.x Status (1 bit)	
Control element solo®	… S1.1 Switching (1 bit)	2
	… S1.1 Relative dimming (4 bit)	
	… S2.1 Value Switching (1 byte)	
	… S3.1 Value Switching (2 byte)	
	… S4.1 Relative dimming (4 bit)	
C.E. solo®	… S1.1 Switching (1 bit)	3
	… S1.1 Relative dimming (4 bit)	

KNX DALI Gateway Premium DG/S x.64.5.1

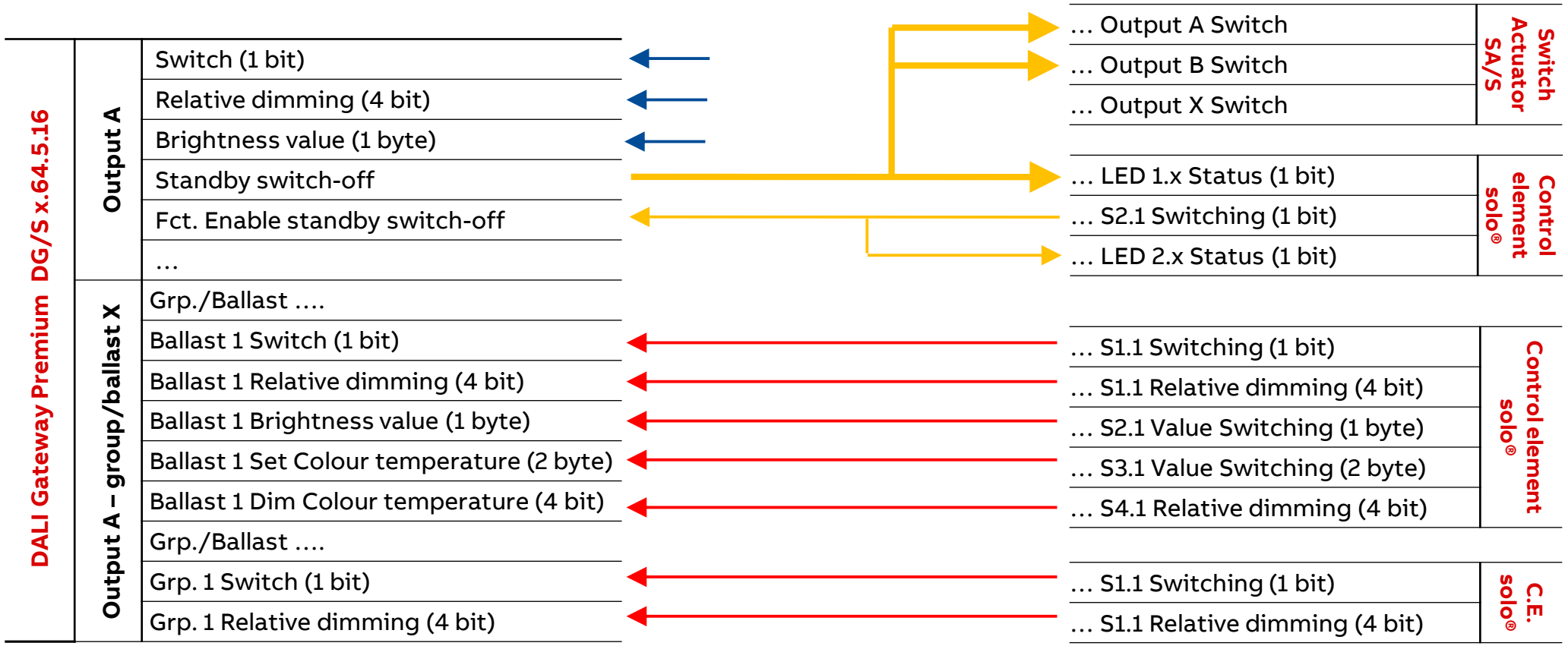
Function “Standby switch-off” – Example: Assignment of Group Addresses

DALI Gateway Premium DG/S x.64.5.16

Output A	Switch (1 bit)	←	… Output A Switch	Switch Actuator SA/S	
	Relative dimming (4 bit)	←	… Output B Switch		
	Brightness value (1 byte)	←	… Output X Switch		
	Standby switch-off				
	Fct. Enable standby switch-off	→	… LED 1.x Status (1 bit)	Control element solo®	1
			… S2.1 Switching (1 bit)		
	…		… LED 2.x Status (1 bit)		
Output A – group/ballast X	Grp./Ballast ….				
	Ballast 1 Switch (1 bit)	←	… S1.1 Switching (1 bit)	Control element solo®	2
	Ballast 1 Relative dimming (4 bit)	←	… S1.1 Relative dimming (4 bit)		
	Ballast 1 Brightness value (1 byte)	←	… S2.1 Value Switching (1 byte)		
	Ballast 1 Set Colour temperature (2 byte)	←	… S3.1 Value Switching (2 byte)		
	Ballast 1 Dim Colour temperature (4 bit)	←	… S4.1 Relative dimming (4 bit)		
	Grp./Ballast ….				
	Grp. 1 Switch (1 bit)	←	… S1.1 Switching (1 bit)	C.E. solo®	3
	Grp. 1 Relative dimming (4 bit)	←	… S1.1 Relative dimming (4 bit)		

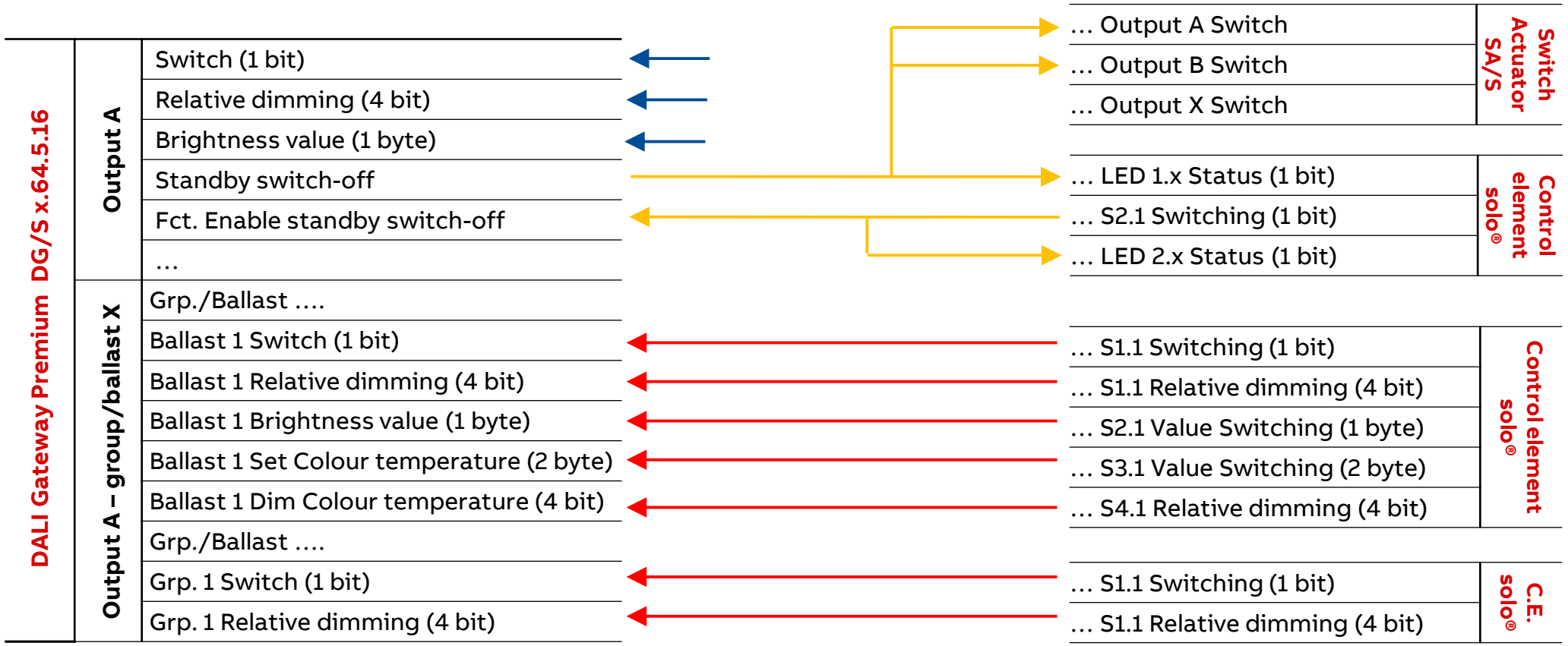
KNX DALI Gateway Premium DG/S x.64.5.1

Function “Standby switch-off” – Example: Assignment of Group Addresses



KNX DALI Gateway Premium DG/S x.64.5.1

Function “Standby switch-off” – Example: Assignment of Group Addresses

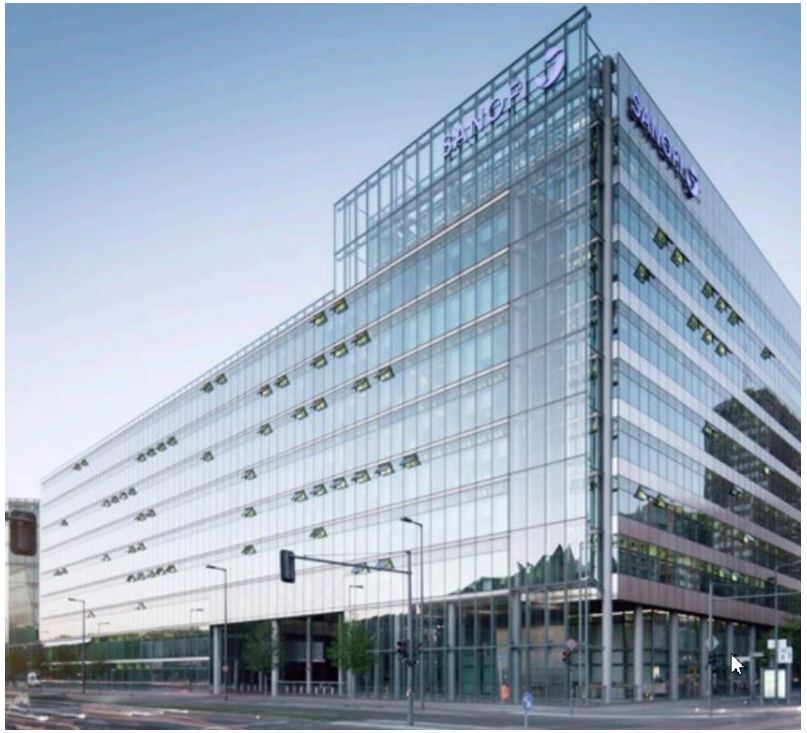


KNX DALI Gateway Premium DG/S x.64.5.1

Function “Standby switch-off”

Summary

- The “Standby switch-off” function saves energy by switching off the supply voltage of ballasts when they are all in standby (switched off) → This serves to save energy
- The supply voltage of the ballasts is switched off via a Switch Actuator SA/S
- Standby switch-off is available for each DALI output, not for every ballast or group
- The message "Ballast fault" is suppressed when the ballasts are switched off using the standby switch-off function
- When it is switched on again, the DG/S sends an “ON” command to the ballast(s) after a restart of the ballasts
- DALI Ballasts must support individual DALI power-on level
- It is recommend switching off no more than once a day (limited write cycles to the ballast's flash memory)



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DALI light scenes with individual brightness and colour temperature level

KNX DALI Gateway Premium DG/S x.64.5.1

DALI light scenes with individual brightness and colour temperature level

Controlling Scenes

Typical applications of scenes

- Training room: Start, coffee break, end, …
- Hotel room: Access, insert and remove key card, , …
- Residential home: Night, welcome, good bye, alarm, vacation, …
- Shutter control: Sunrise, night, rain, …
- Room: Occupied and not occupied
- RGB control (DALI): Coloured light
- Tunable white (DALI): Coloured temperature light

and many more

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KNX DALI Gateway Premium DG/S x.64.5.1

DALI light scenes with individual brightness and colour temperature level

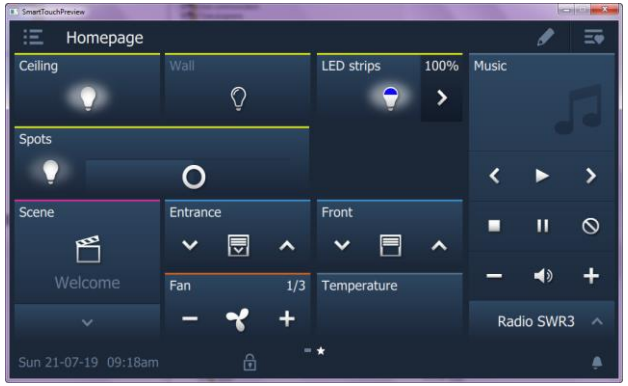
Controlling Scenes

One touch control

- Lighting
- Curtains, blinds, shutters
- HVAC
- Music
- Media technology
- …

→ Scenes to suit your mood

→ More than central on/off



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KNX DALI Gateway Premium DG/S x.64.5.1

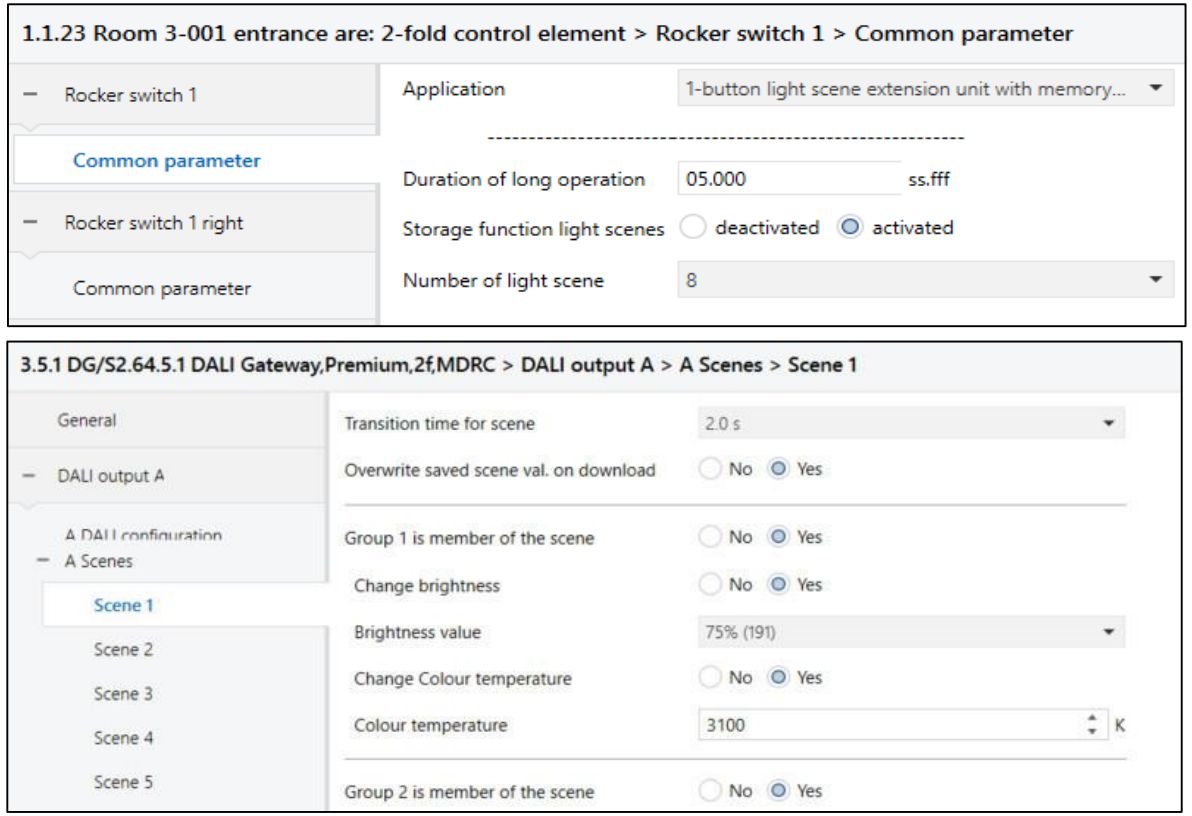
DALI light scenes with individual brightness and colour temperature level

Controlling Scenes – Store scenes in actuators

Advantages

- With a single scene telegram, e.g. a pushbutton, panel or a visualization, the system receives an instruction to store/call max. 64 different KNX scenes !!!
- The information (brightness value, colour temperature, transition time, …) are not stored in the pushbutton, but rather in all actuators
- All scene devices are linked by the same group address
- It is sufficient to send a single telegram to call the scene with all outputs involved

Scenes can also be saved with information and group addresses in control elements, panels, … → Telegram multiplier with a limited number of group addresses and higher bus load



KNX DALI Gateway Premium DG/S x.64.5.1

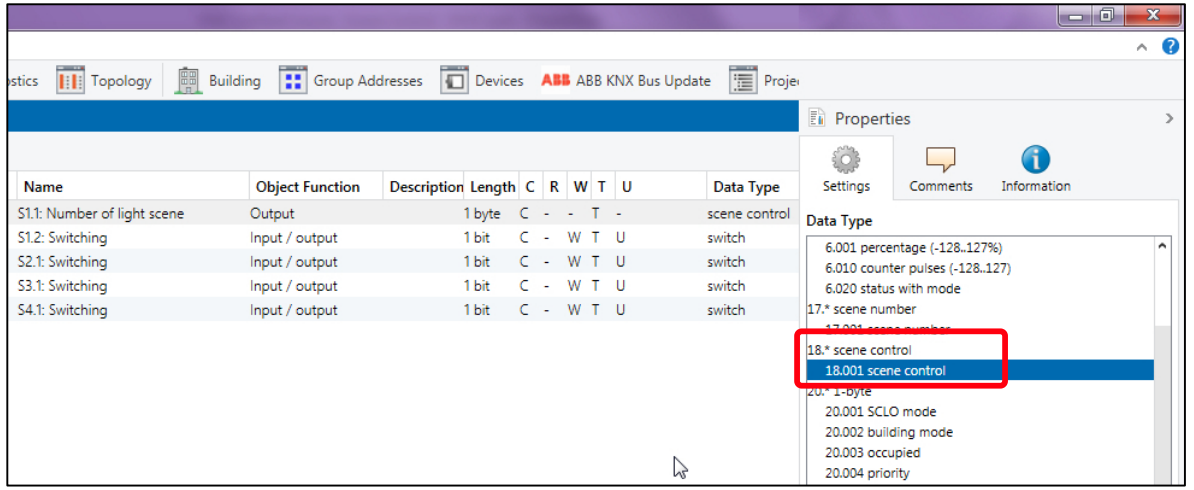
DALI light scenes with individual brightness and colour temperature level

Controlling Scenes – Store scenes in actuators

- 8-bit object for calling and storing up to **64 KNX scenes**
  - Datapoint Type DPT 18.001 “SceneControl” (call and store) (Datapoint Type DPT 17.001 “Scene Number: Only call a scene!)
  - Object value contains scene number 1-64 (bit no. 1-6) and command call or store the scene (bit no. 8)
  - The KNX scenes must be assigned to the DALI scenes

- Additionally in the DALI Gateway Premium DG/S x.64.5.1 : 1-bit objects for calling a **DALI scene**
  - A group object for each scene
  - Datapoint Type DPT 1.017 “Trigger” (only call)

Note: DALI is limited to 16 scenes



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KNX DALI Gateway Premium DG/S x.64.5.1

DALI light scenes with individual brightness and colour temperature level

Short: Calling KNX scene No. 6 “**Good Morning**”

<u>Dim actuator UD/S</u>
Bedroom: A - n.A.
Staircase: B - n.A.
…

<u>Switch actuator SA/S</u>
Kitchen light: A - n.A.
Kitchen socket outlets: B - ON
Corridor light: C - n.A.
Bathroom light: D - n.A.
Children room: E - n.A.
….

<u>Shutter actuator JRA/S</u>
Kitchen: A - 0%
Living room: B - 0%
Bathroom: C - 0%
Bedroom: D - 0%
Children room: E - n.A.
…

<u>Security Module:</u>
Unset

<u>RTC:</u>
Comfort mode

<u>DG/S x.64.5.1:</u>
Livingroom light:
75% and 3,200K
RGB LED strips: -n.A.
…

<u>HUE:</u>
Lights n.A.

<u>SONOS:</u>
Music - PLAY

n.A. – no assignment

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KNX DALI Gateway Premium DG/S x.64.5.1

DALI light scenes with individual brightness and colour temperature level

Commissioning of scenes

Set ETS parameter: DALI Output A → DALI Configuration

– Enable DALI scenes (scene control)

Set ETS parameter: DALI Output A → Scenes

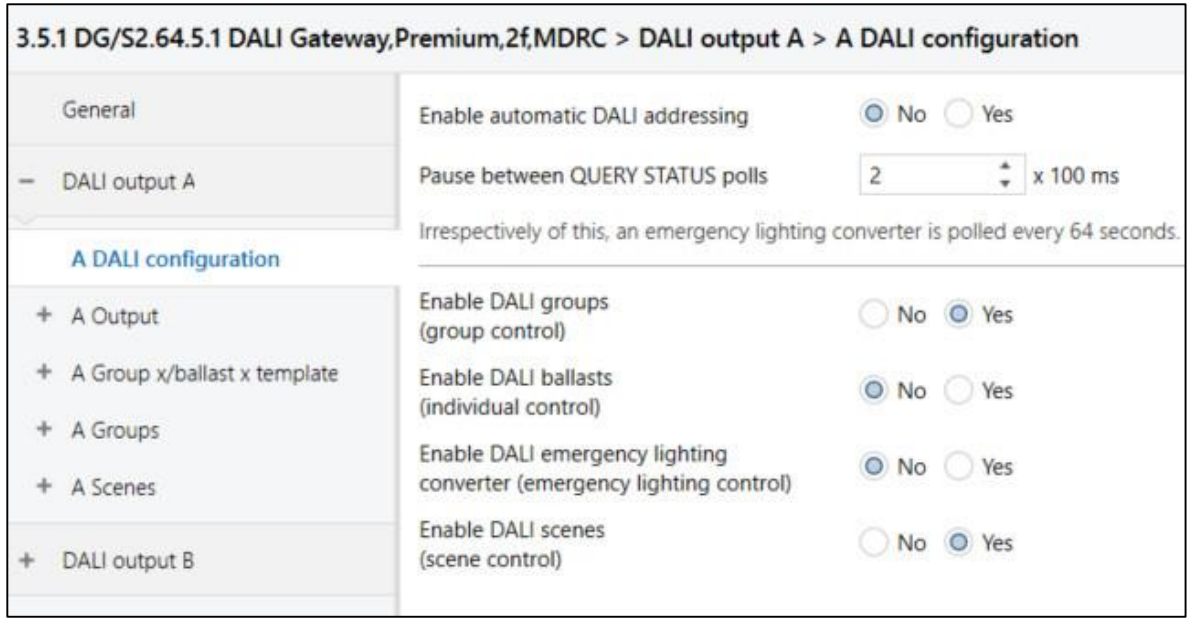
– Linking DALI scenes with KNX scenes

– Enable 1-bit group objects for scene retrieval (when needed)

– Set the transition time, brightness and colour temperature values when the scene is recalled

Link the scenes group object to all involved actuator channels

If the colour function (HCL, Dim2Warm) is activated, the behavior when calling a scene can be set (ignore or deactivate the colour function and adopt the scene value)



KNX DALI Gateway Premium DG/S x.64.5.1

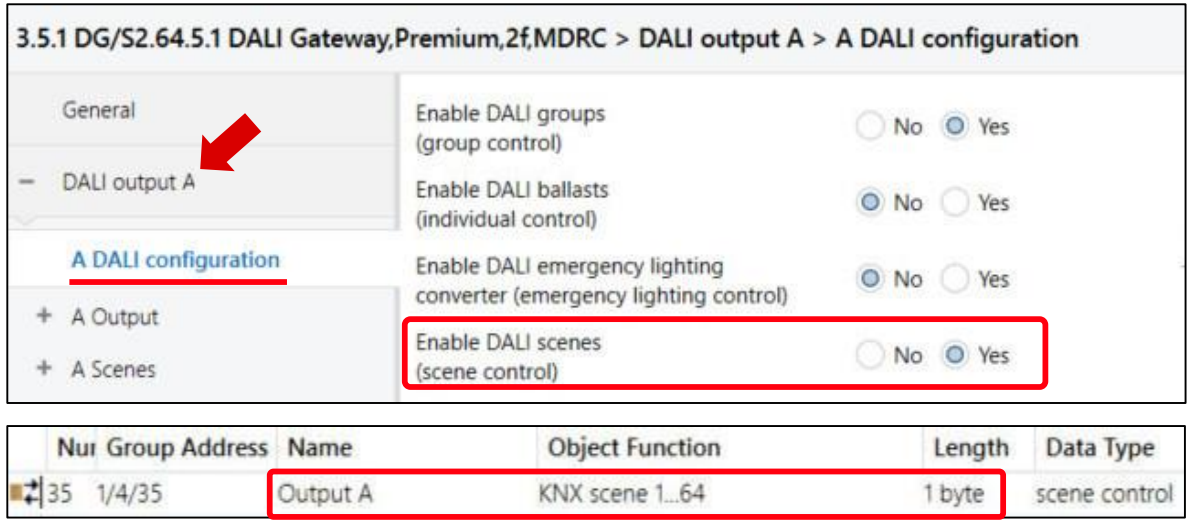
DALI light scenes with individual brightness and colour temperature level

Enable DALI scenes (scene control)

This parameter determines whether scenes are used

– No
  - The DALI output does not support the scenes function
  - No corresponding parameter windows and group objects are enabled, so the ETS parameter structure here is clear

– Yes
  - The DALI output supports control for up to DALI 16 scenes
  - The corresponding parameter window “Scenes” and the “KNX scene 1…64” group object is enabled (8-bit scene control)



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KNX DALI Gateway Premium DG/S x.64.5.1

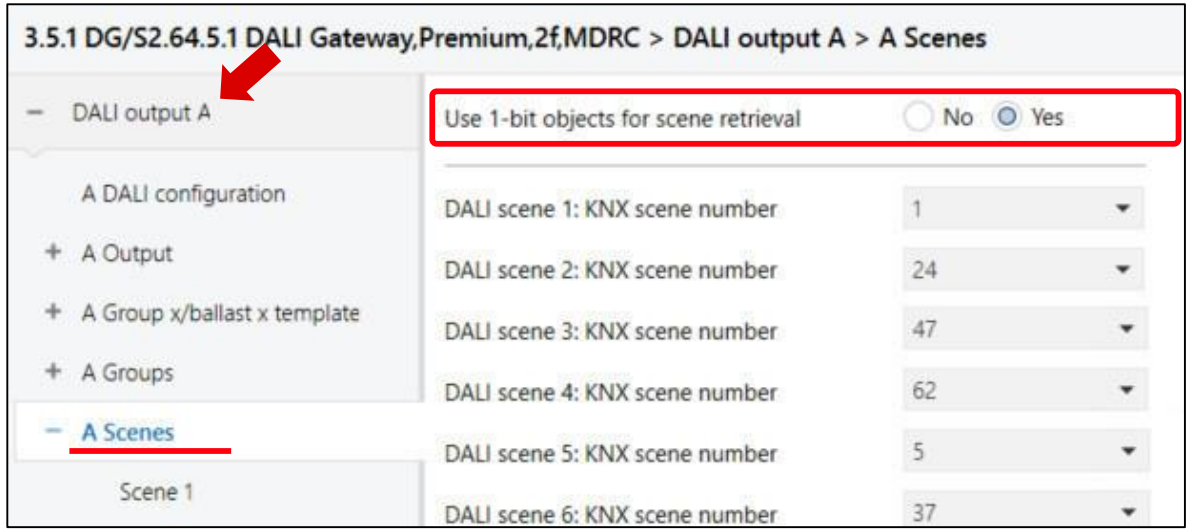
DALI light scenes with individual brightness and colour temperature level

Use 1-bit group objects for scene retrieval

In addition, the scenes can also be called up using a 1-bit telegram

This parameter enables the 1-bit group object “DALI Scene x”, which can be used to retrieve scenes

- No
  - The group objects are not enabled
- Yes
  - The 1-bit group objects are enabled
  - Scenes can be retrieved with a “0” or “1” on these group objects



Nu	Group Address	Name	Object Function	Length	Data Type
35	1/4/35	Output A	KNX scene 1...64	1 byte	scene control
36	1/4/36	Output A	DALI scene 1	1 bit	trigger
37	1/4/37	Output A	DALI scene 2	1 bit	trigger
		Output A	DALI scene ...	1 bit	trigger
51	1/4/51	Output A	DALI scene 16	1 bit	trigger

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KNX DALI Gateway Premium DG/S x.64.5.1

DALI light scenes with individual brightness and colour temperature level

Linking DALI scenes with KNX scenes

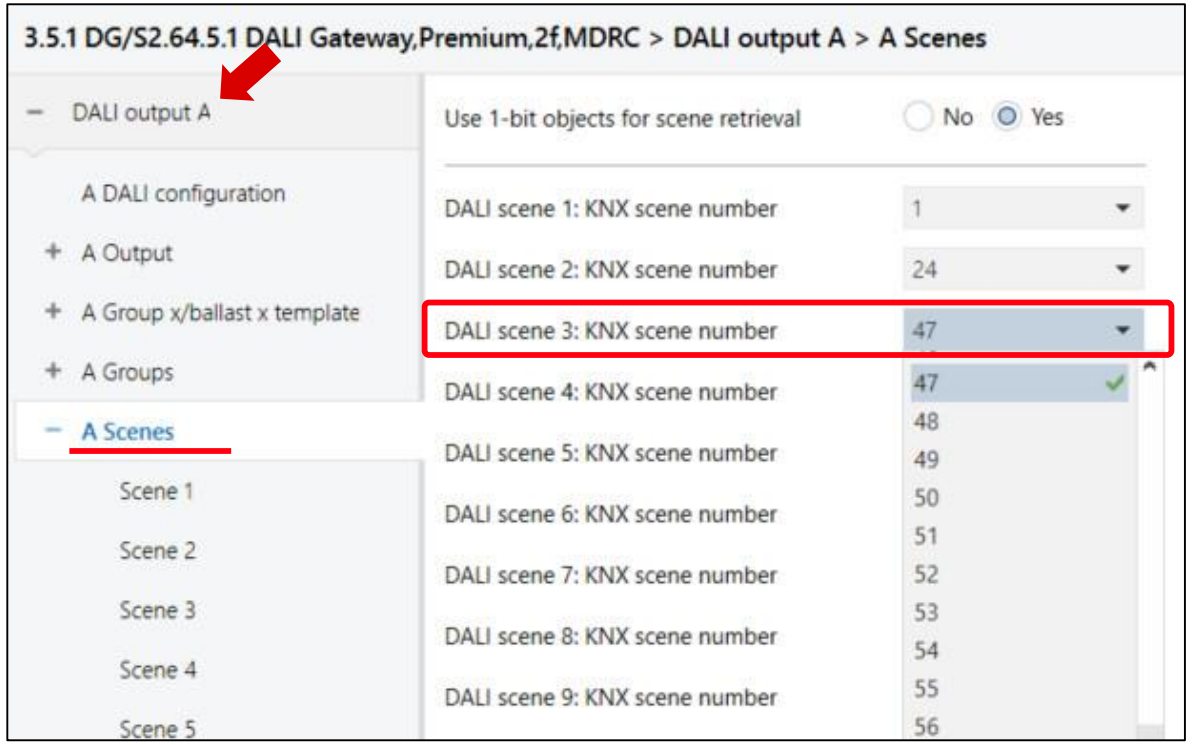
KNX supports up to 64 scenes

A DALI Gateway has 16 DALI scenes per output
→ This corresponds to the DALI scene standards

The DALI scenes (1… 16) can be assigned to the KNX scenes (1… 64)

This makes it possible to integrate any of the 64 KNX scenes into the DALI

– For example, DALI scene 3, which is parametrized in the DALI Gateway, can be assigned to KNX scene 47 and recalled or saved using KNX scene commands for scene 47



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KNX DALI Gateway Premium DG/S x.64.5.1

DALI light scenes with individual brightness and colour temperature level

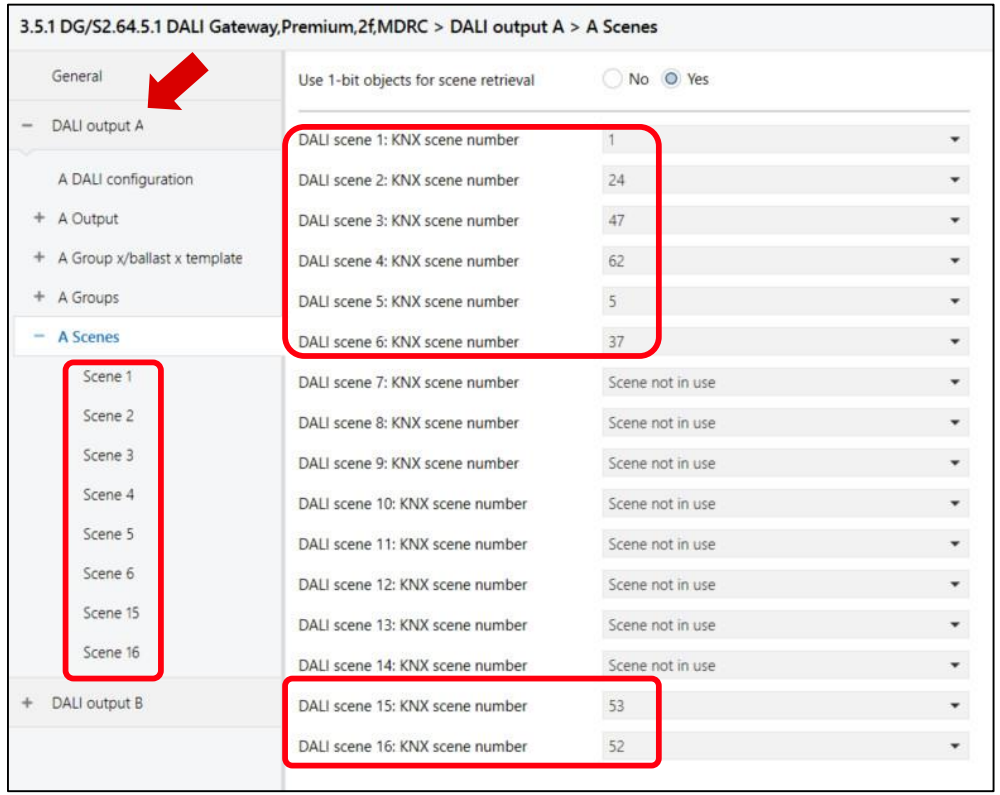
Scenes

Only DALI scenes that are assigned to KNX scenes are displayed, e.g. 1 to 6 and 15-16

The properties of the scenes and their members are parametrized in the “Scene X” window

A scene member can be any ballast or group on the DALI output

A ballasts/group can be a member of several scenes



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DALI light scenes with individual brightness and colour temperature level

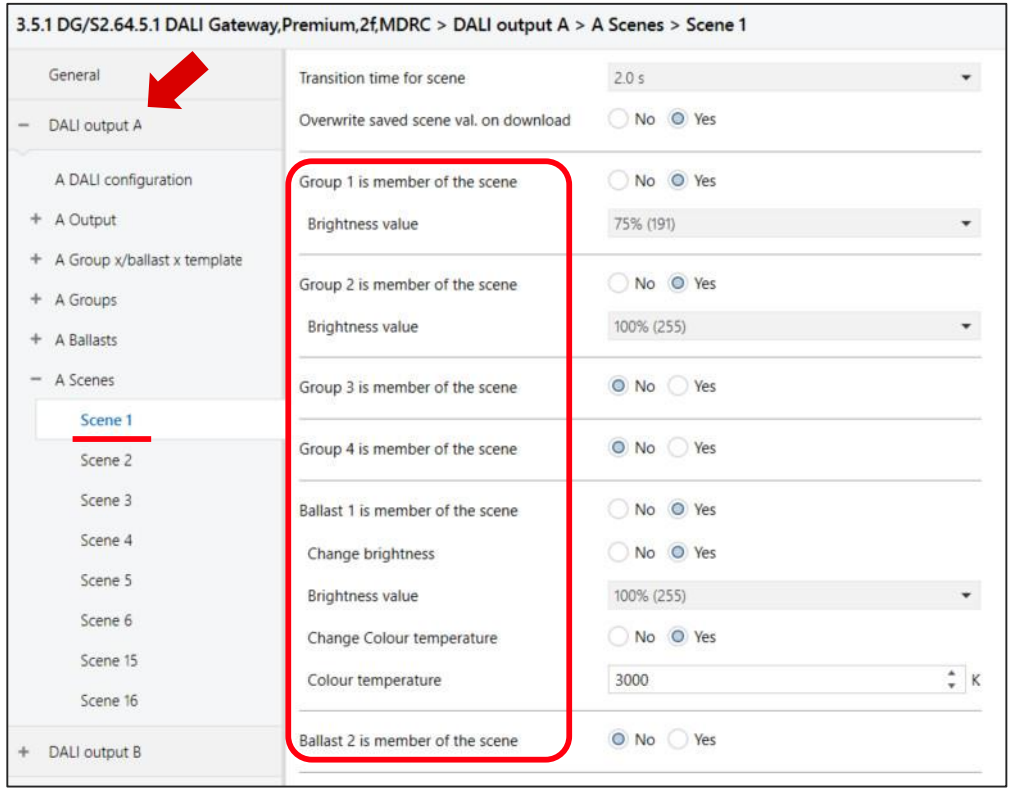
“Scene x” parameter window

This parameter window is visible if “DALI scene x” is assigned to a “KNX scene” in the “Scenes” parameter window

The properties of the scenes and their members are parametrized in this window

A scene member can be any ballast or group on the DALI output

For a better overview, only the groups and ballasts used are displayed



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KNX DALI Gateway Premium DG/S x.64.5.1

DALI light scenes with individual brightness and colour temperature level

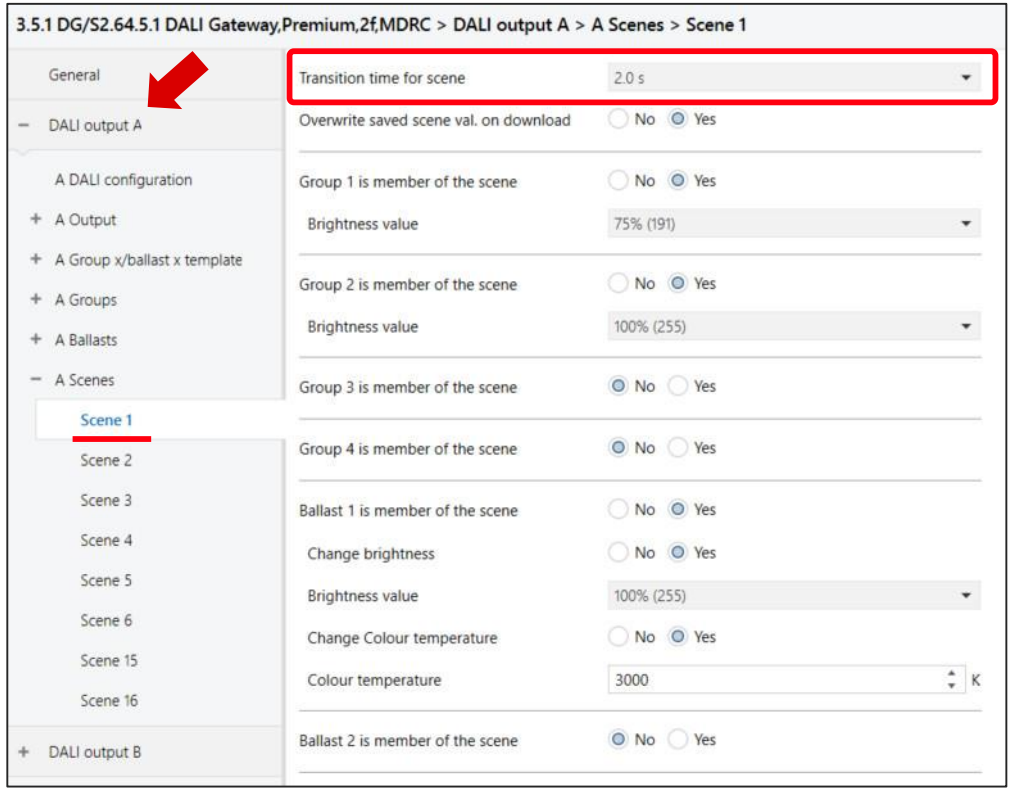
Transition time for “Scene x”

This parameter defines how long it takes for scene members to reach their scene value (brightness/colour temperature value) after a scene is recalled

If the dimming process is complete, the scene members have reached the set brightness/colour temperature for the scene

These times are specified by the DALI standard and are stored in the ballast

- Jump to
- 0.7, 2.0, …, 64.0sec.
- Via group object "Flexible dimming/fade time"

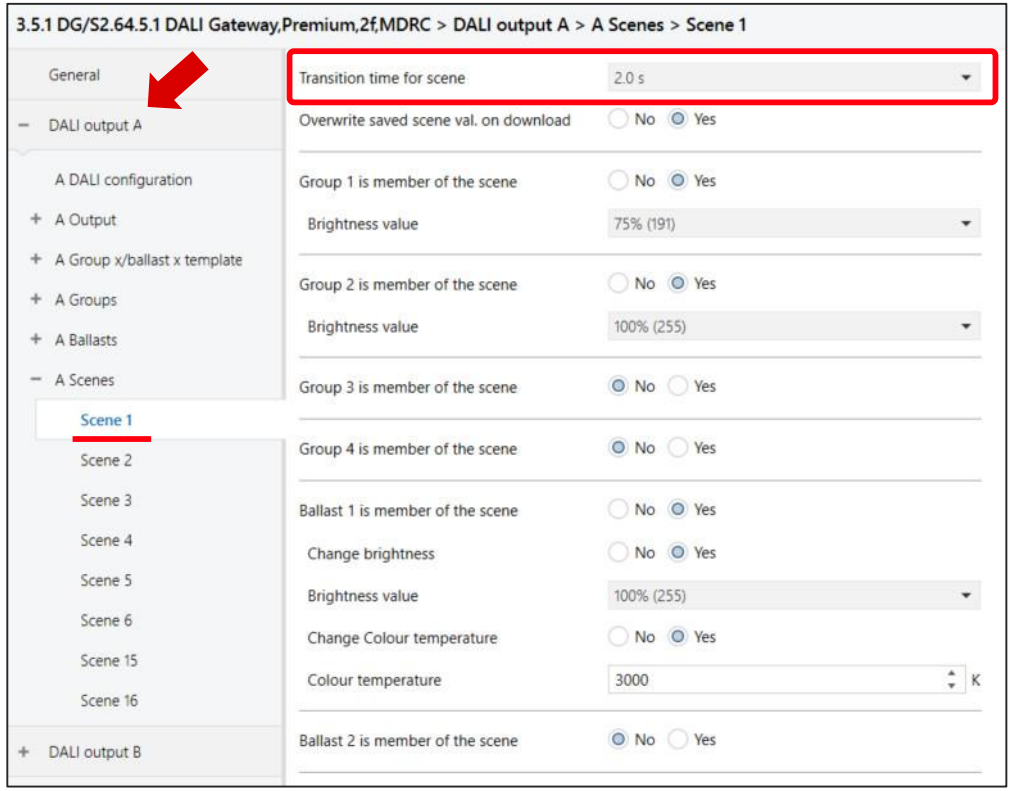


KNX DALI Gateway Premium DG/S x.64.5.1

DALI light scenes with individual brightness and colour temperature level

Transition time for “Scene x”

- Jump to: When a scene is recalled, the scene members are switched on immediately at the set brightness value of the scene
- 0.7 s…64.0sec.: When a scene is recalled, all the lighting scene members are dimmed from their current brightness value to the set brightness value within this time
- Via group object Flexible time for dimming/fade time": When a scene is recalled, all the scene members are dimmed from their current brightness value to the parametrized brightness value using flexible dimming time which can be adjusted via KNX. The value can be changed via the Flexible dimming/fade time (...) group object.



KNX DALI Gateway Premium DG/S x.64.5.1

DALI light scenes with individual brightness and colour temperature level

Transition time for “Scene x”

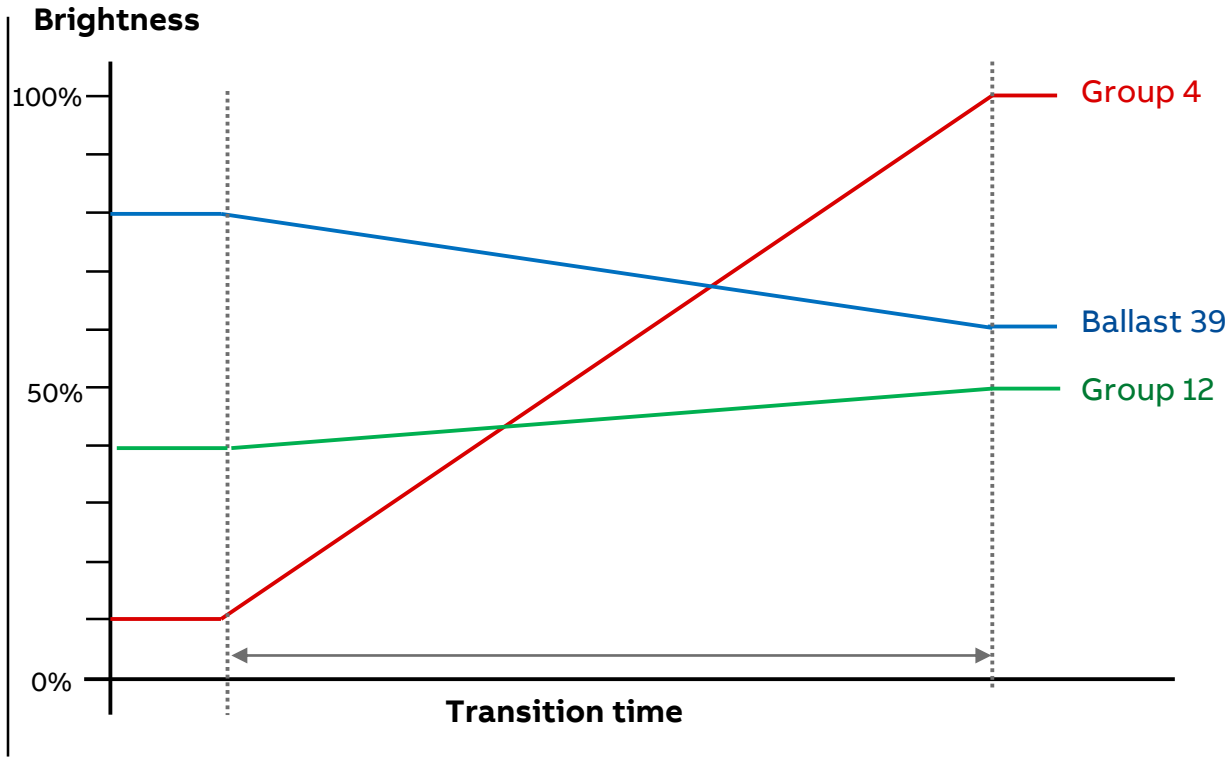
Example:

– Group 4, which is dimmed from 10% to 90%

– Group 12, which is dimmed from 40% to 50%

– ballast 39, which is dimmed from 80% to 60%

reach the set brightness value of the scene simultaneously



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KNX DALI Gateway Premium DG/S x.64.5.1

DALI light scenes with individual brightness and colour temperature level

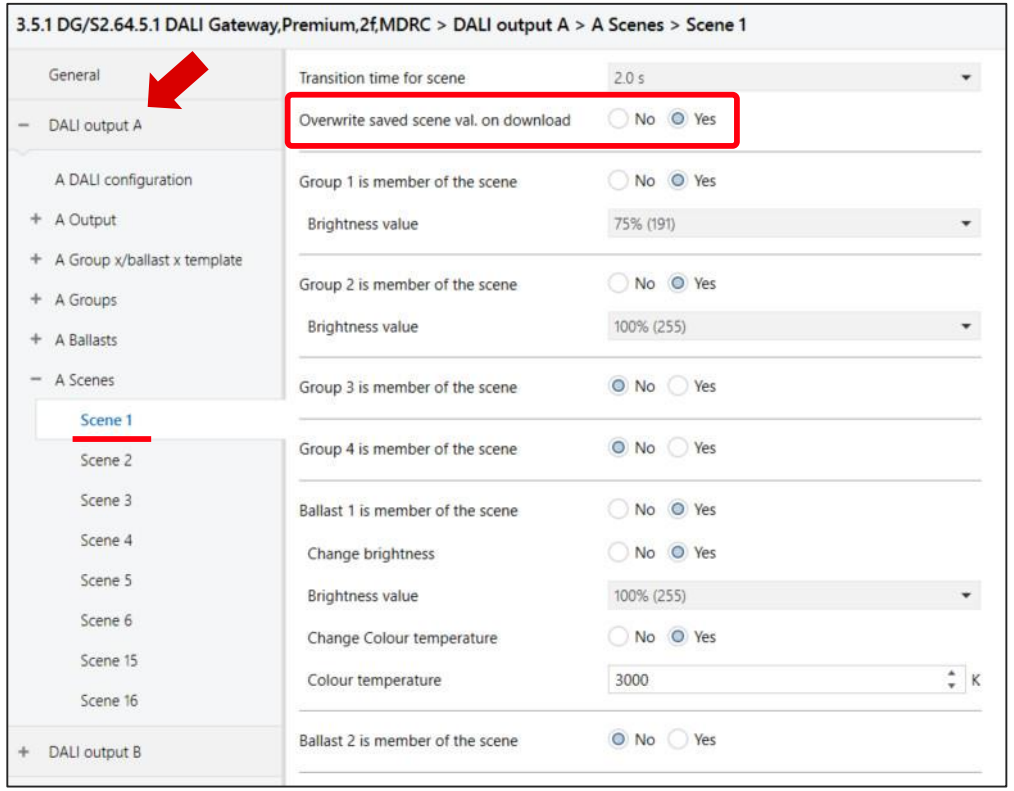
Overwrite scene on download

When a download occurs, the parametrized scene values are usually transferred to the gateway and overwrite customer values

This parameter can prohibit the transfer so as to prevent manually set scene values from being overwritten

– No:
  - After a download the scene values for the scene members are not overwritten with the values set in ETS
  - If no scene values have been stored, the gateway sets them to the maximum brightness

– Yes
  - After a download, the scene values for the scene members are overwritten with the values set in ETS



KNX DALI Gateway Premium DG/S x.64.5.1

DALI light scenes with individual brightness and colour temperature level

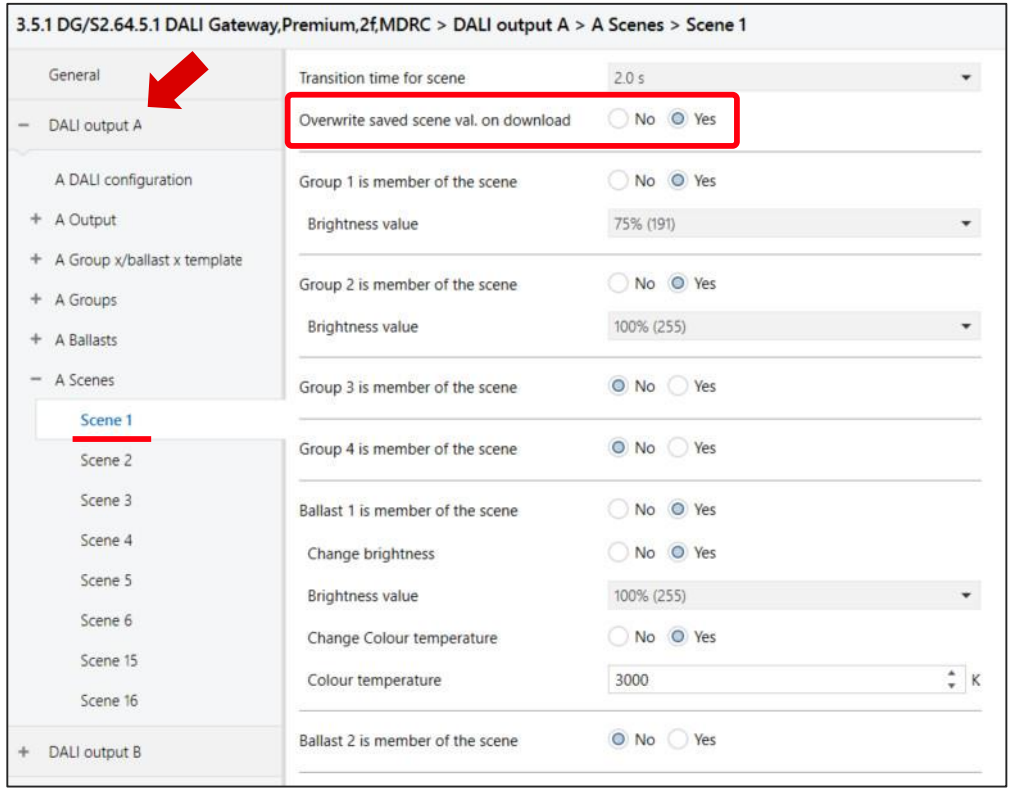
Overwrite scene on download

Note

When a scene is recalled or stored, only the ballasts or groups in that scene are taken into consideration

Even if the scene values are not overwritten after a download, the scene members have to be selected in order to tell the gateway which ballasts or groups are members of the scene

When a download occurs, the parametrized scene values are usually transferred to the gateway
If no change has been made in the ETS application, ETS does not transfer these values again when a partial ETS download occurs
To transfer the values to the gateway even when no parameters have been changed, run a normal download using “Download application”



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DALI light scenes with individual brightness and colour temperature level

“Group/Ballast x” is member of the scene

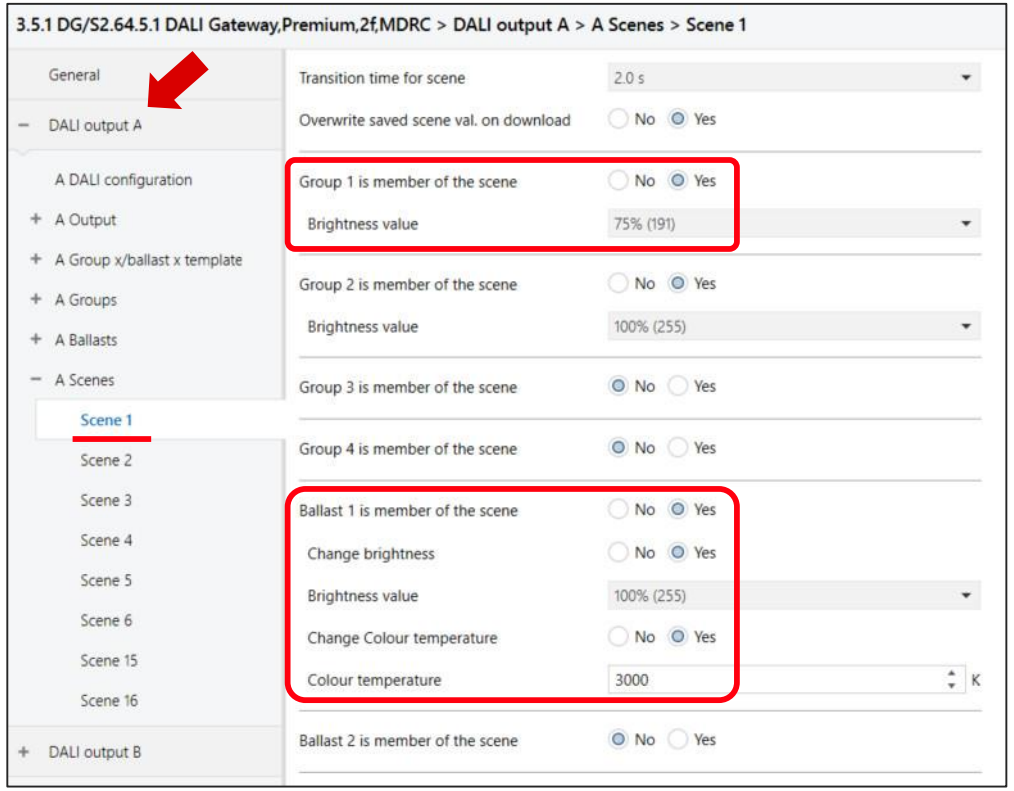
This parameter defines which ballasts/groups are members of the scene

Only enabled groups and ballasts will appear

This keeps the parameter window more clearly organized

– No
  - The group/ballast is not in the scene

– Yes
  - The group/ballast is in the scene
  - Additional parameters are shown in order to make settings for the scene member



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DALI light scenes with individual brightness and colour temperature level

“Group/Ballast x” is member of the scene: Change brightness

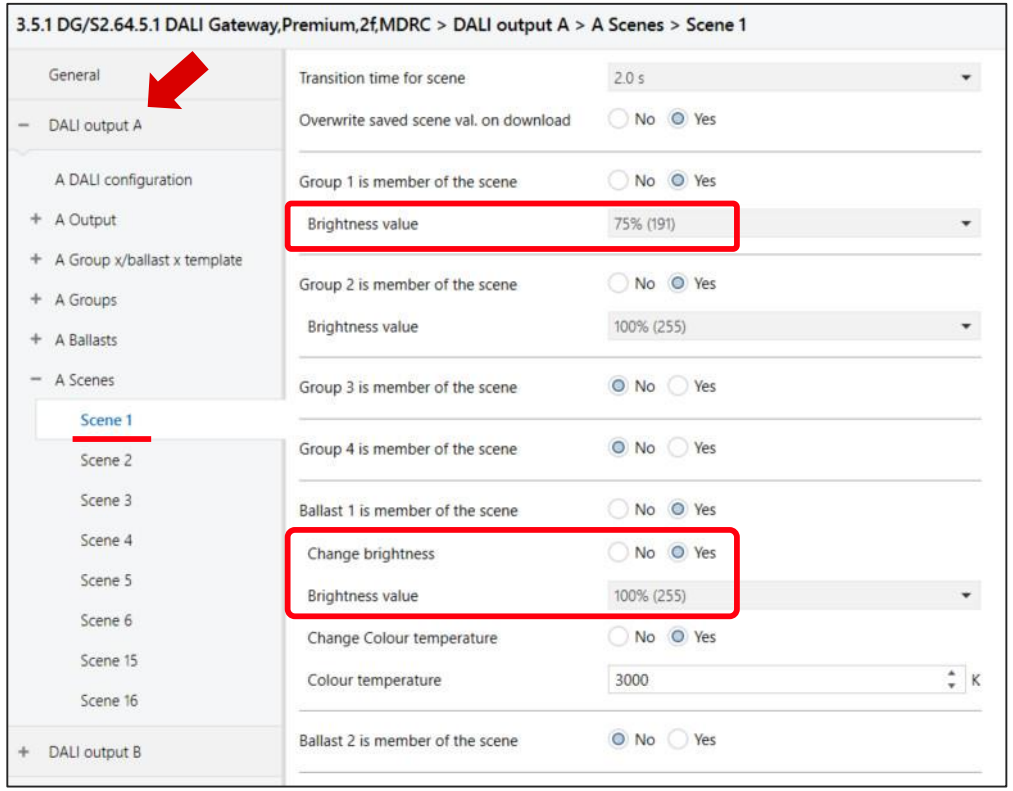
This parameter determines whether the brightness of the group/ballast changes in the scene

– No:
  - The member's brightness does not change in the scene
  - The “Brightness” and “Change colour temperature” parameters are hidden

– Yes
  - The member's brightness changes when the scene is recalled
  - The brightness value is set using the parameters below

Note:

If no colour control is selected for the group/ballast (e.g. group 1) in the “Colour control type” parameter in the “X groups/Group x” or “X ballasts/Ballast x2 window, the "Change brightness", "Change colour temperature" and "Colour temperature" parameters are hidden



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DALI light scenes with individual brightness and colour temperature level

“Group/Ballast x” is member of the scene: Brightness value

This parameter defines the brightness value to which scene members are set when a scene is recalled

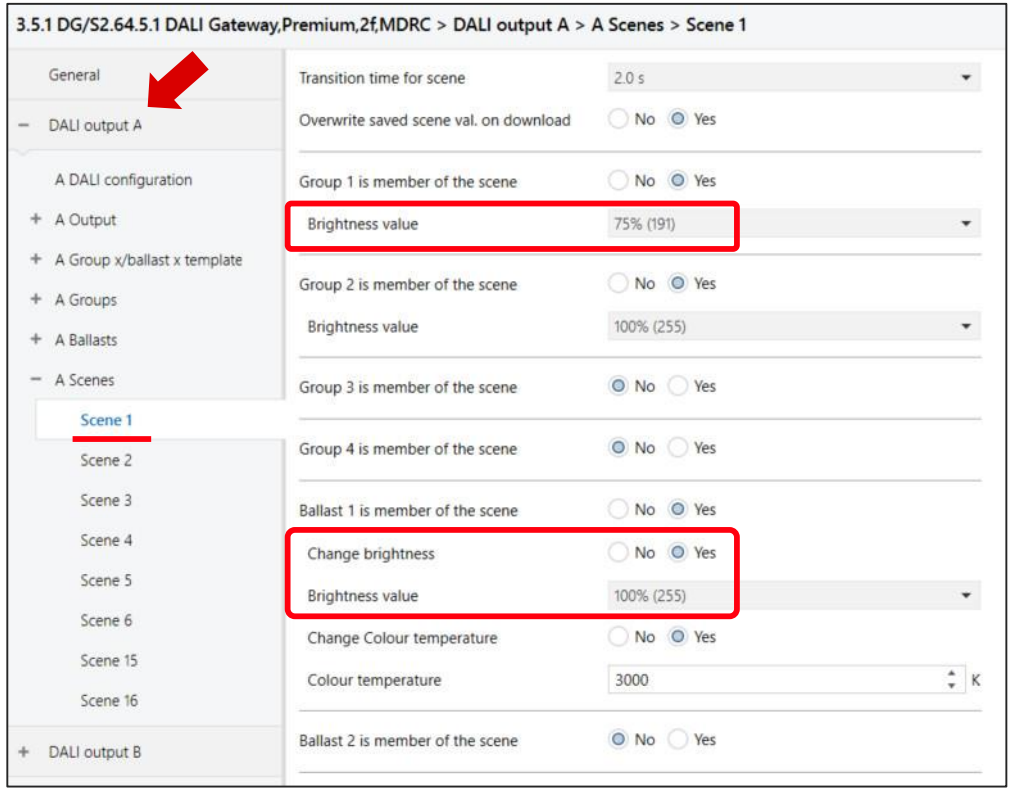
Options:

– 100 % (255), 99 % (252), …, 0.4 % (1), 0 % (OFF)

The ballast or group is part of the scene

During a scene recall, the scene member is set to the brightness value set here

If the set brightness value is above or below the maximum brightness or minimum dimming value of the scene member, the corresponding dimming value is stored in the scene



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DALI light scenes with individual brightness and colour temperature level

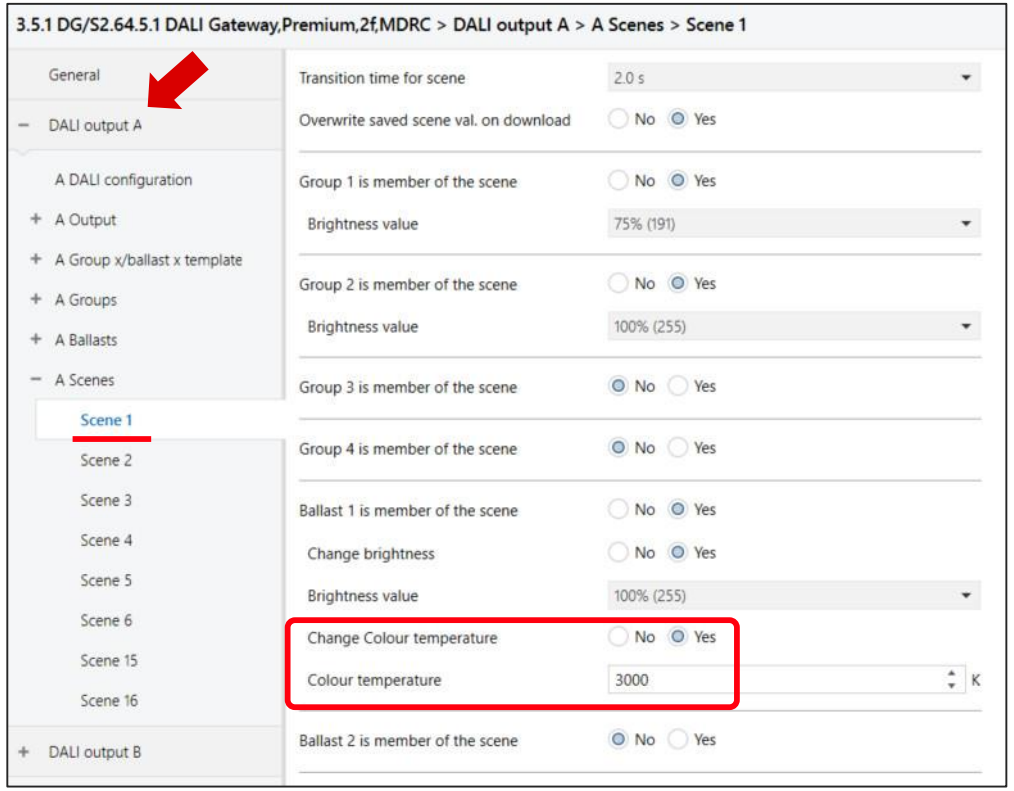
“Group/Ballast x” is member of the scene: Colour temperature

This parameter sets the colour temperature for the member's scene

– Options
  - 1,000…3,000…20,000 Kelvin

Note:

The parameter is only available if colour control is selected for the group/ballast (e.g. ballast 1) in the “Colour control type” parameter in the “X groups/Group x” or “X ballasts/Ballast x” window



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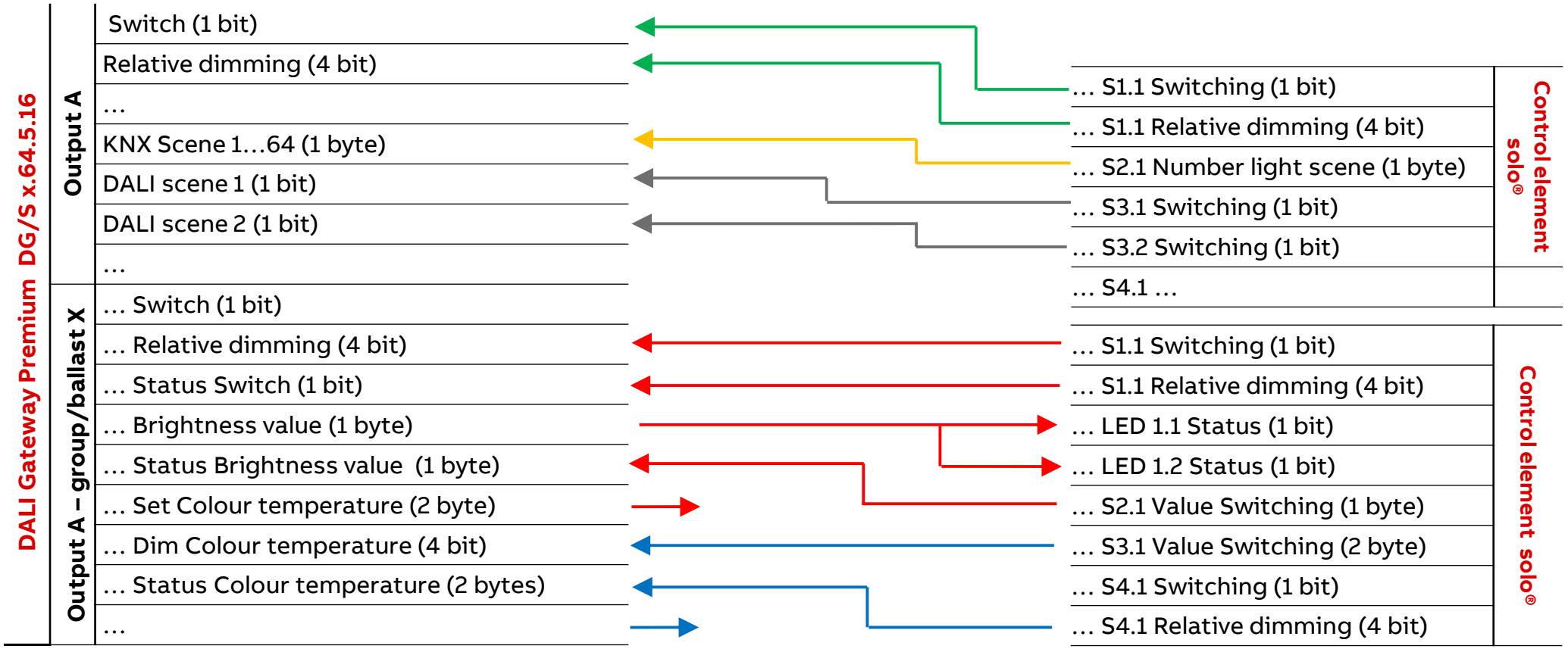
DALI light scenes with individual brightness and colour temperature level
Example: Assignment of Group Addresses



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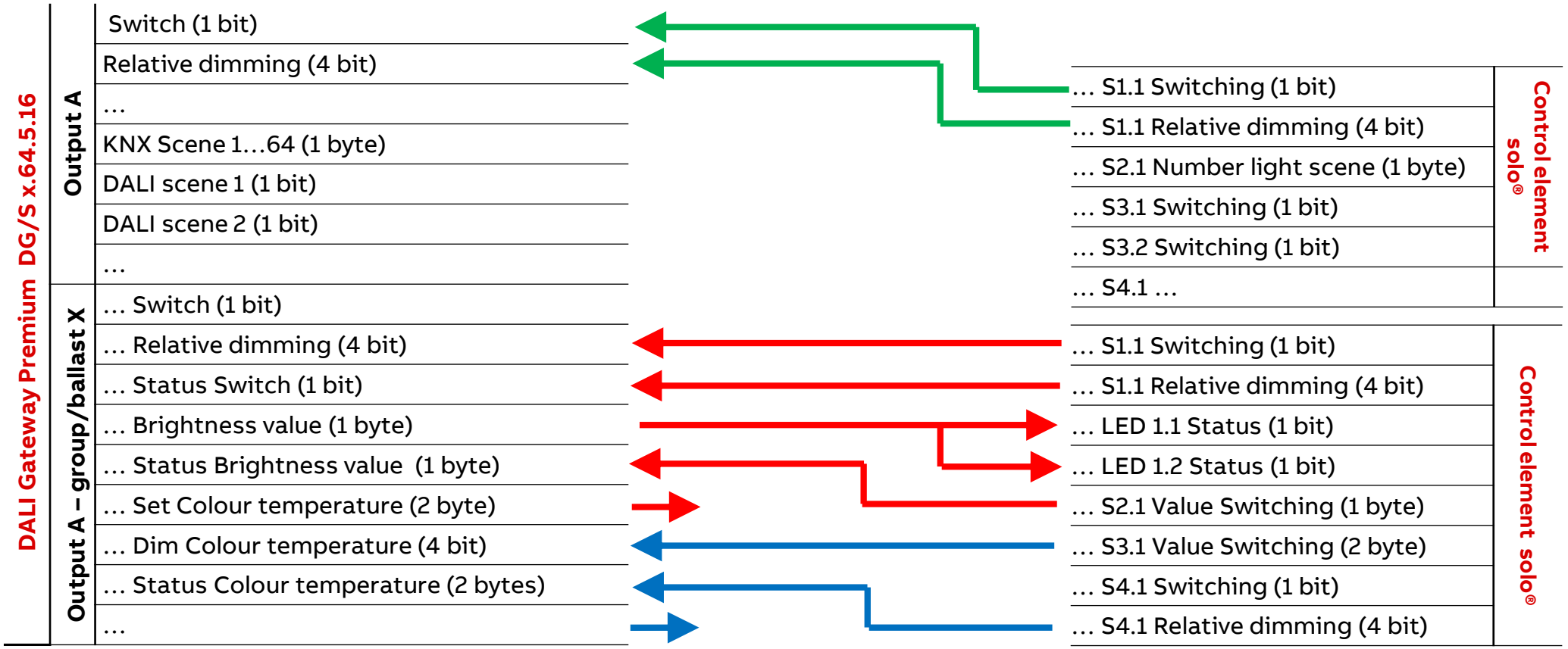
DALI light scenes with individual brightness and colour temperature level
Example: Assignment of Group Addresses



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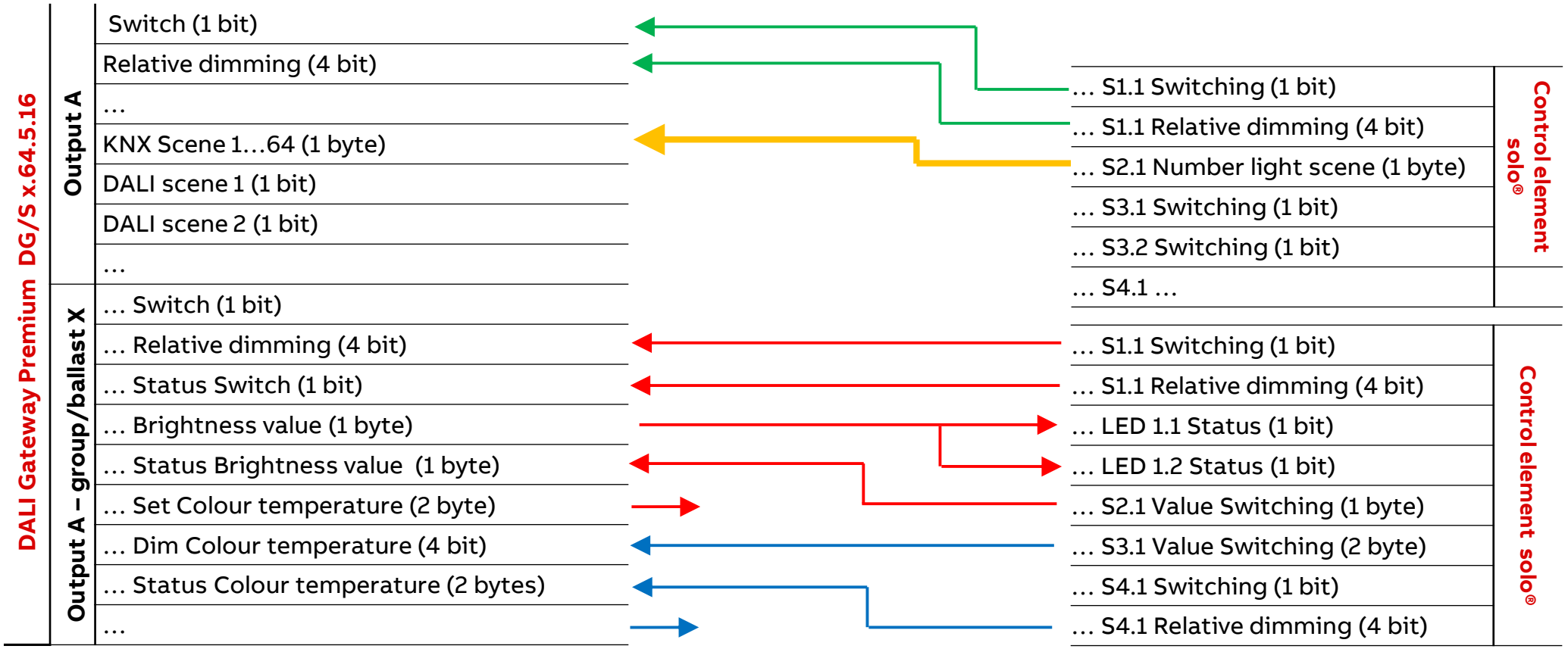
DALI light scenes with individual brightness and colour temperature level
Example: Assignment of Group Addresses



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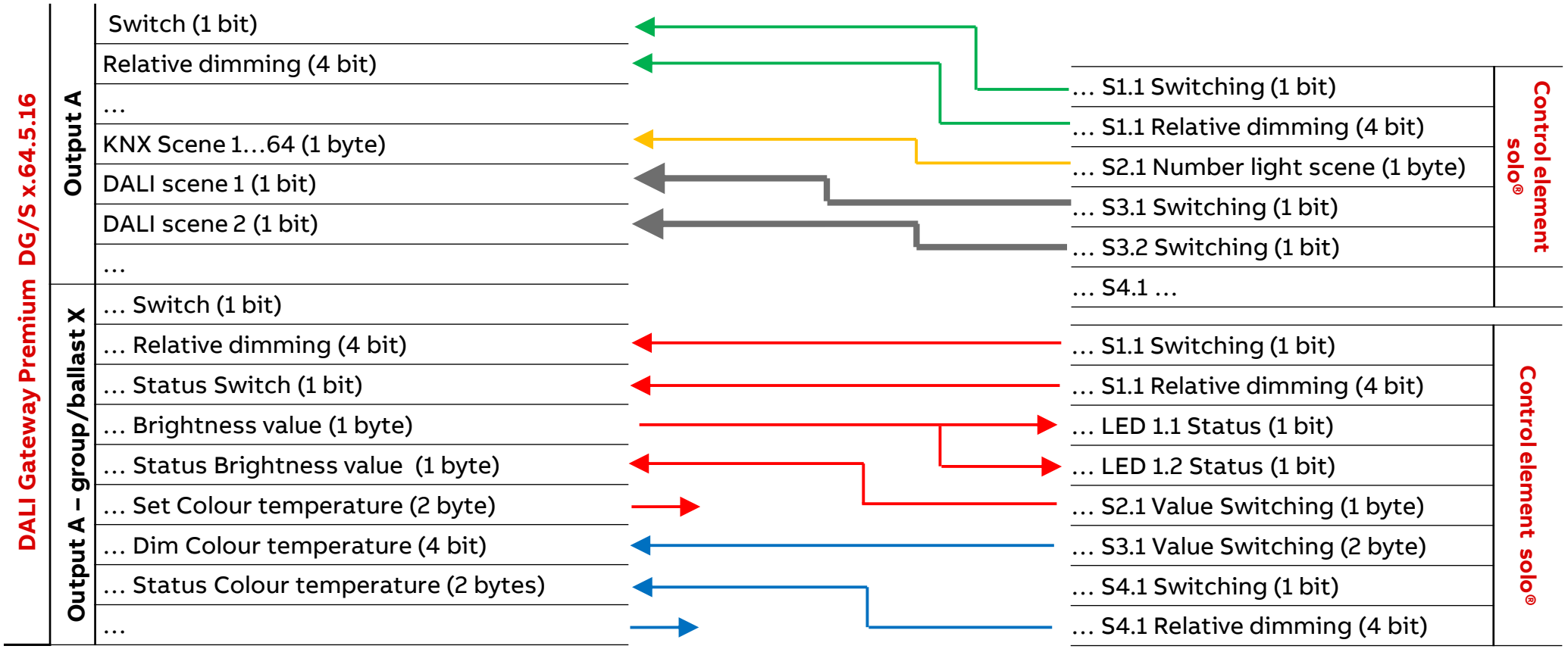
DALI light scenes with individual brightness and colour temperature level
Example: Assignment of Group Addresses



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KNX DALI Gateway Premium DG/S x.64.5.1

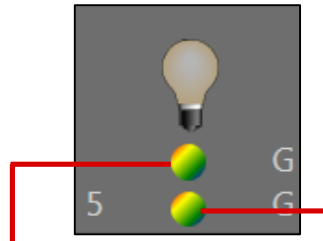
ABB i-bus® Tool

KNX DALI Gateway Premium DG/S x.64.5.1

ABB i-bus® Tool

ABB i-bus® Tool – *menu* "DALI"

- Integration of colour functions
- Shows a detected and in ETS enabled colour ballast
- Broadcast on/off
- Indicates whether there are unaddressed DALI devices
- Acknowledgment of fault notifications
- Conflict in device type
- Standby switch-off active yes/no
- Search ballasts function



Displayed if colour ballast detected in runtime

Displayed if colour ballast enabled in ETS

KNX DALI Gateway Premium DG/S x.64.5.1

ABB i-bus® Tool

ABB i-bus® Tool – *menu* "Detail"

- Read/write operating hours
- Status actual colour temperature T_c
- Adjustment of colour temperature T_c
- Status information
  - Selected colour function (Dim2 Warm, HCL)
  - Colour function active/inactive
  - Supported colour type of selected ballast/group (right now colour temperature T_c)
  - Colour temperature range of connected ballast

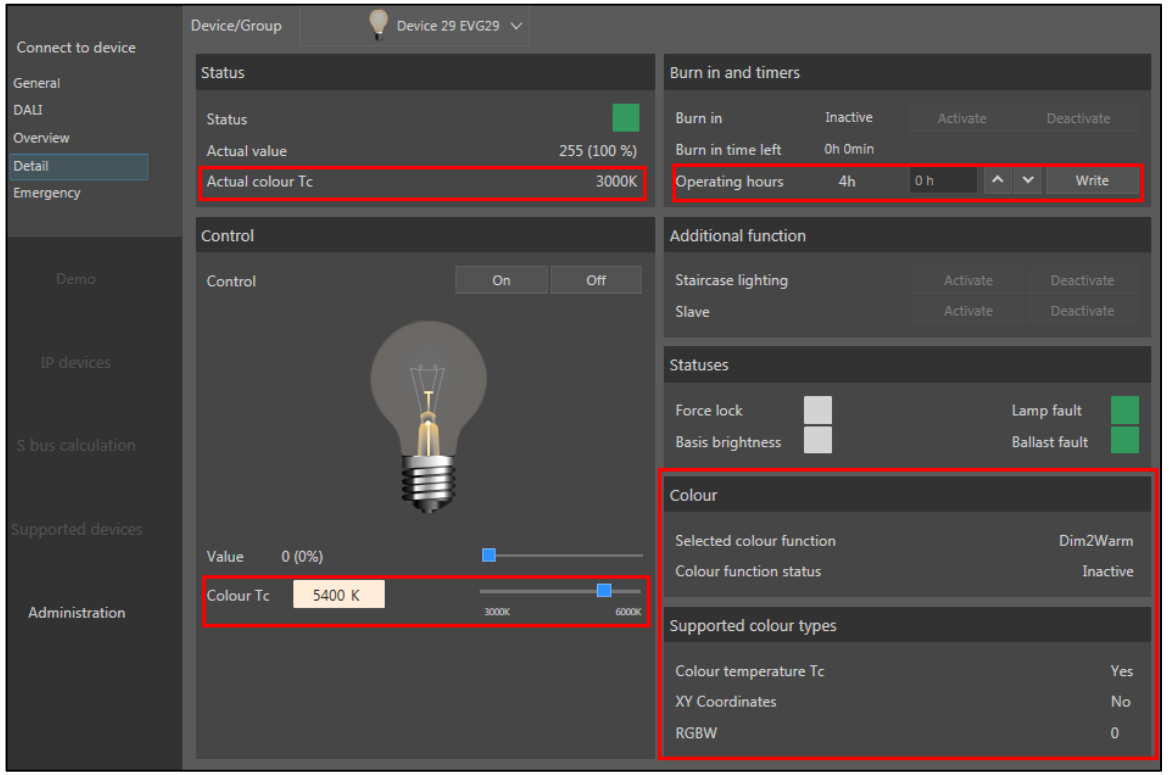


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ABB i-bus® Tool

ABB i-bus® Tool – Search Ballast Function

- Search menu for a ballast with unknown address
- Current situation:
  In the worst case, up to 64 address buttons must be pressed to identify the address of a ballast
- Search ballast function reduces it to max. 6 clicks!
- Press “Start” button and answer yes/no upon the ballast´s ON/OFF status
- Emergency devices are not supported

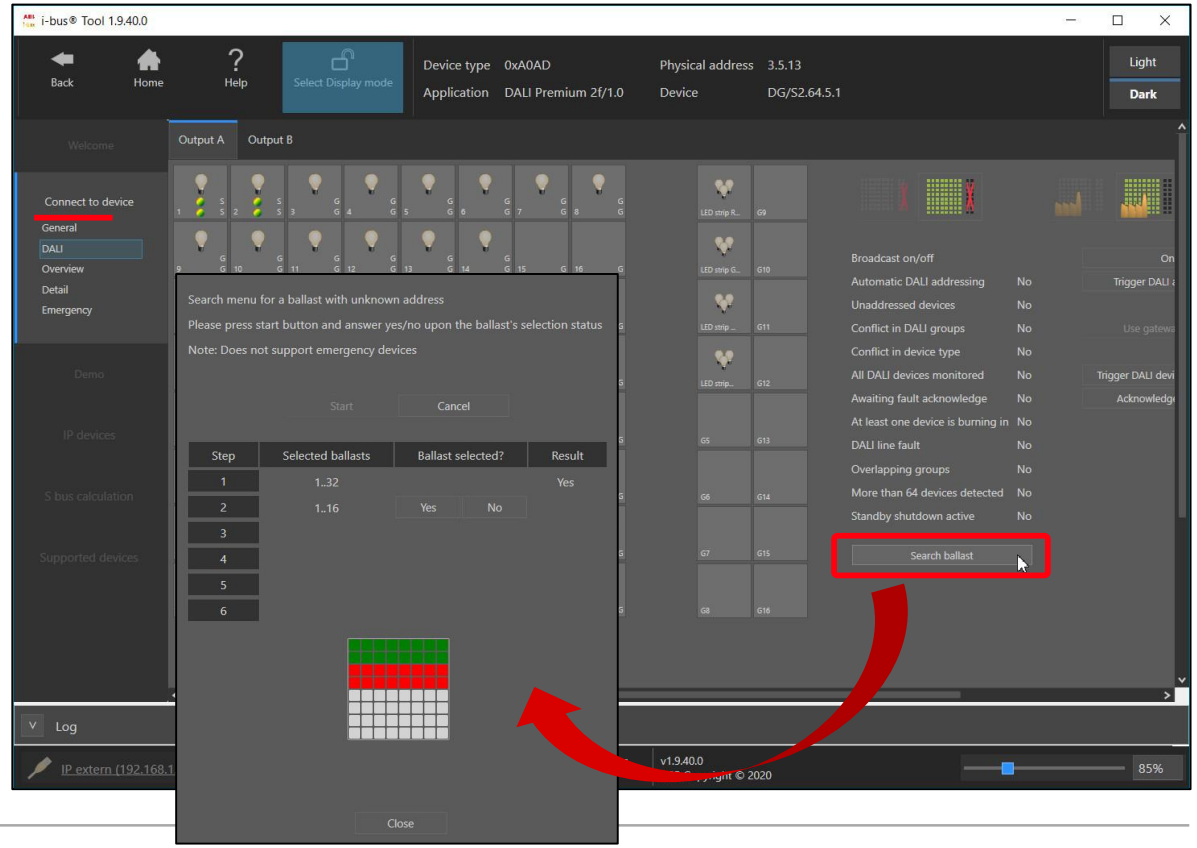

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ABB i-bus® Tool

ABB i-bus® Tool – Search Ballast Function

– Press “Start” button

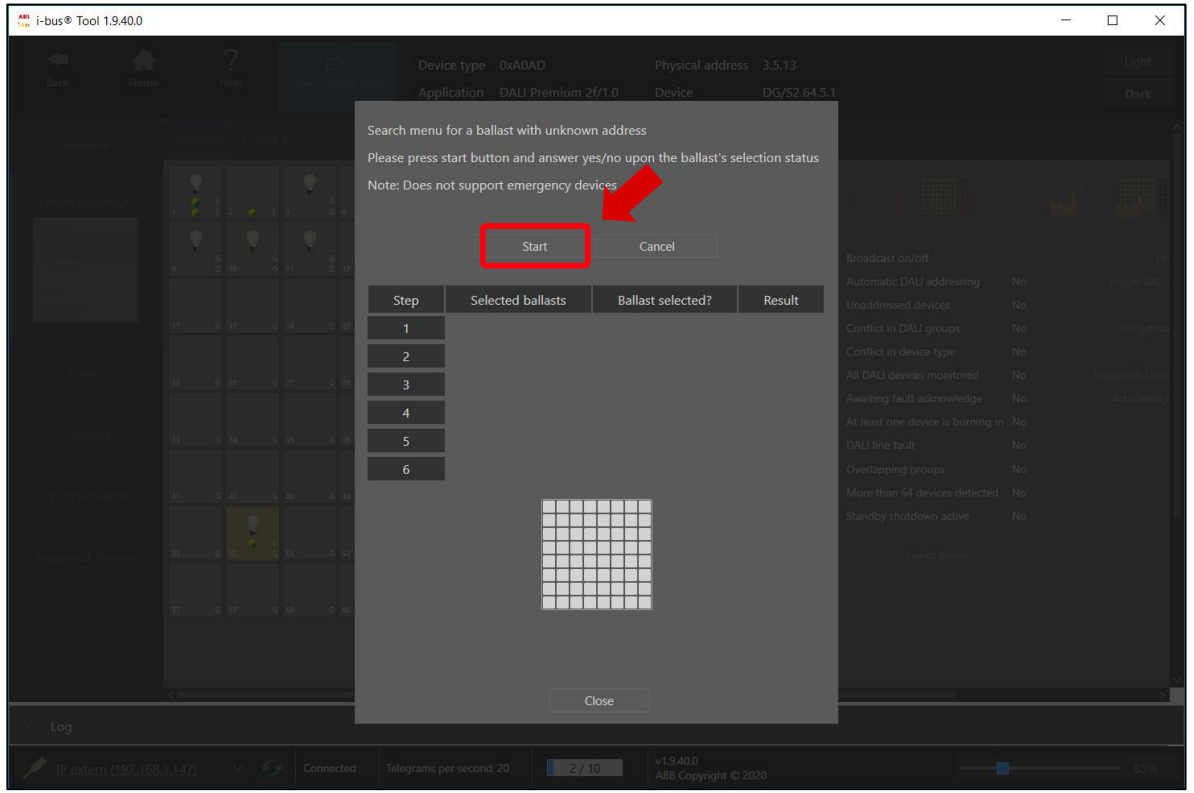

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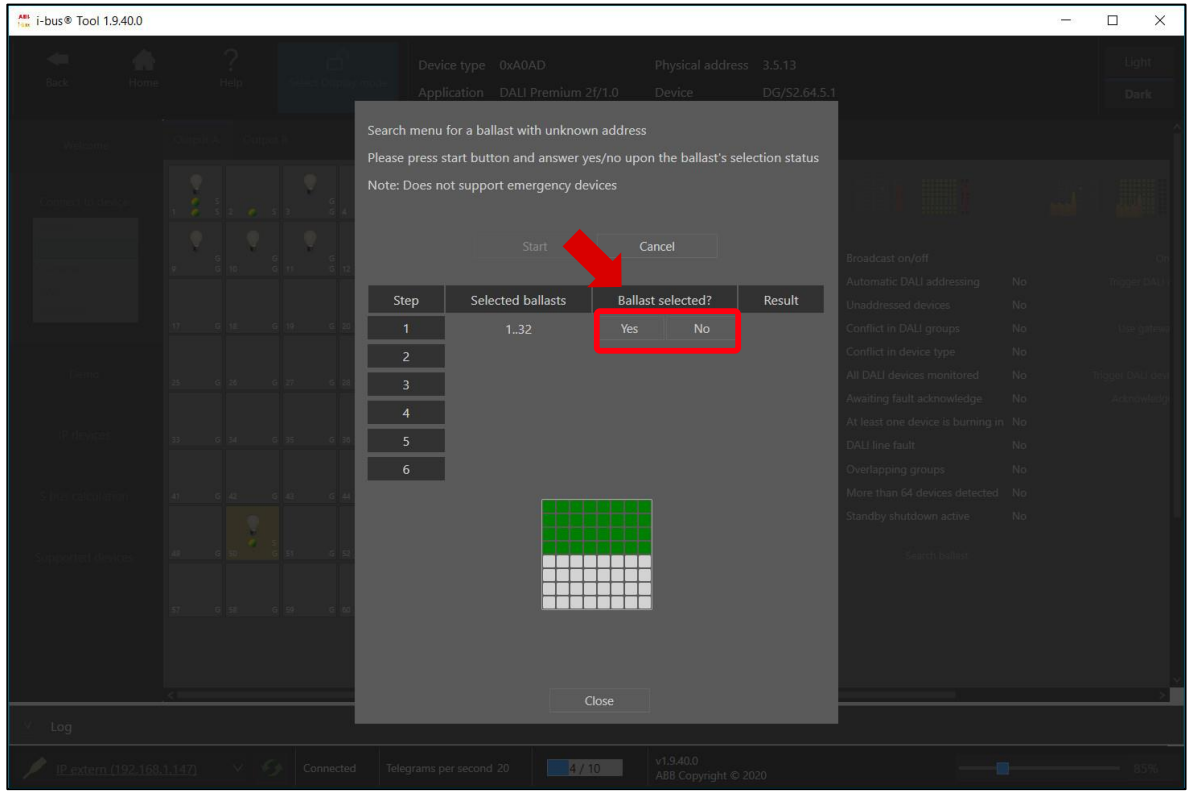
ABB i-bus® Tool

ABB i-bus® Tool – Search Ballast Function

Is the light of the ballast to be searched on?

– Press the “Yes” or “No” button → 1st click
e.g. “No” (no address between 1…32)



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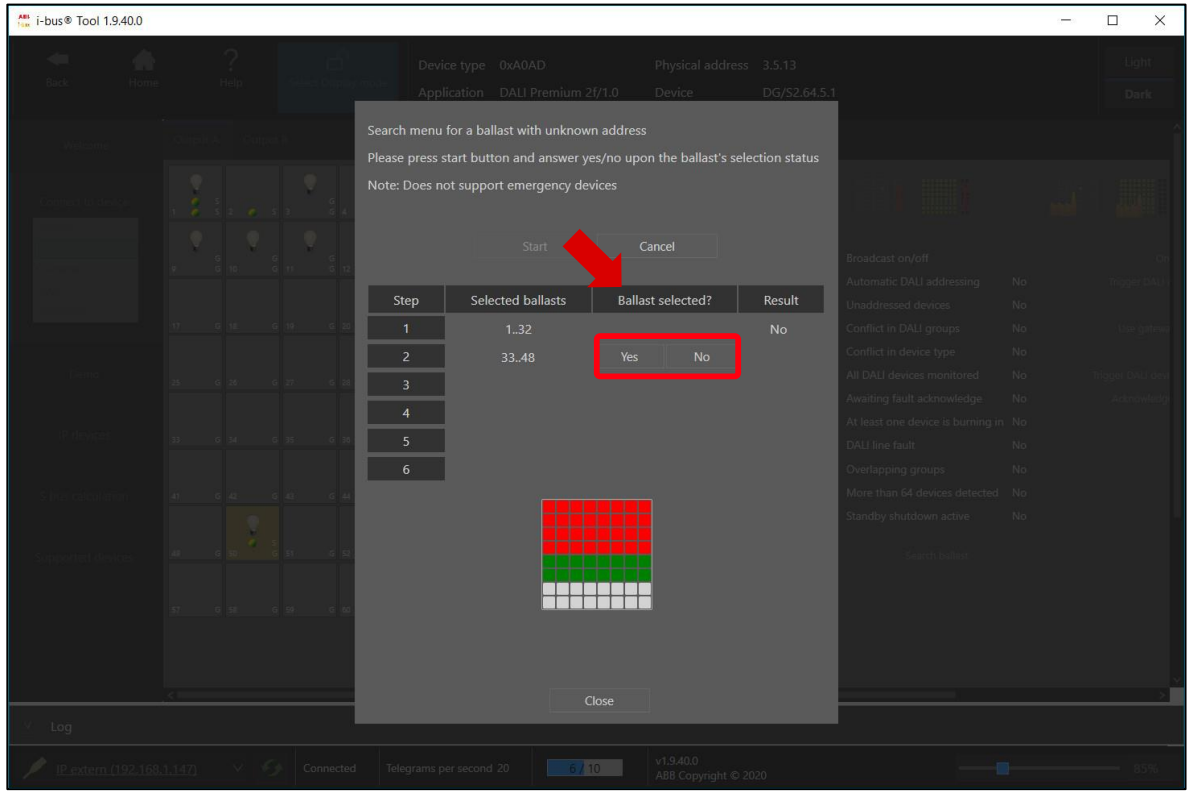
- Press the “Yes” or “No” button → 2nd click
  e.g. “No” (no address between 33…48)



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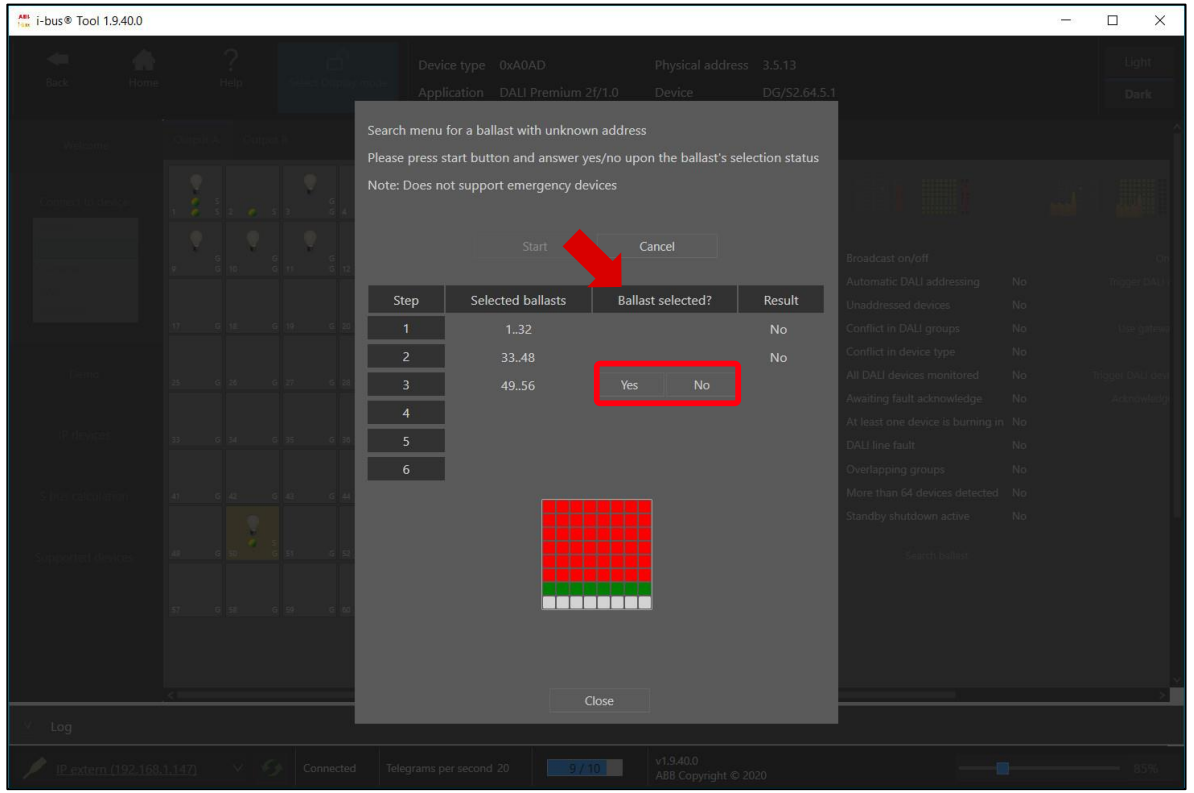
  e.g. “No” (no address between 33…48)
- Press the “Yes” or “No” button → 3rd click
  e.g. “YES” (no address between 49…56)



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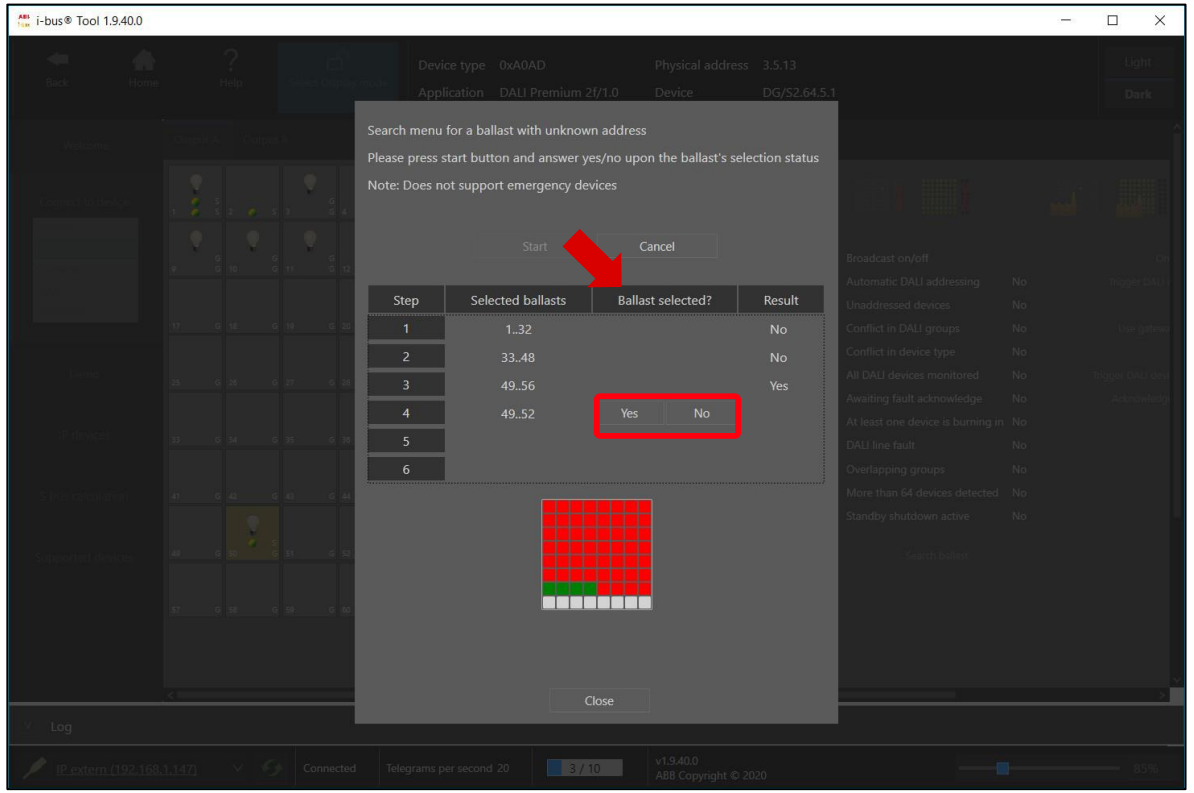
- Press the “Yes” or “No” button → 3rd click
  e.g. “YES” (no address between 49…56)
- Press the “Yes” or “No” button → 4th click
  e.g. “YES” (address between 49…52)



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  e.g. “No” (no address between 33…48)
- Press the “Yes” or “No” button → 3rd click
  e.g. “YES” (no address between 49…56)
- Press the “Yes” or “No” button → 4th click
  e.g. “YES” (address between 49…52)
- Press the “Yes” or “No” button → 5th click
  e.g. “YES” (address between 49…50)

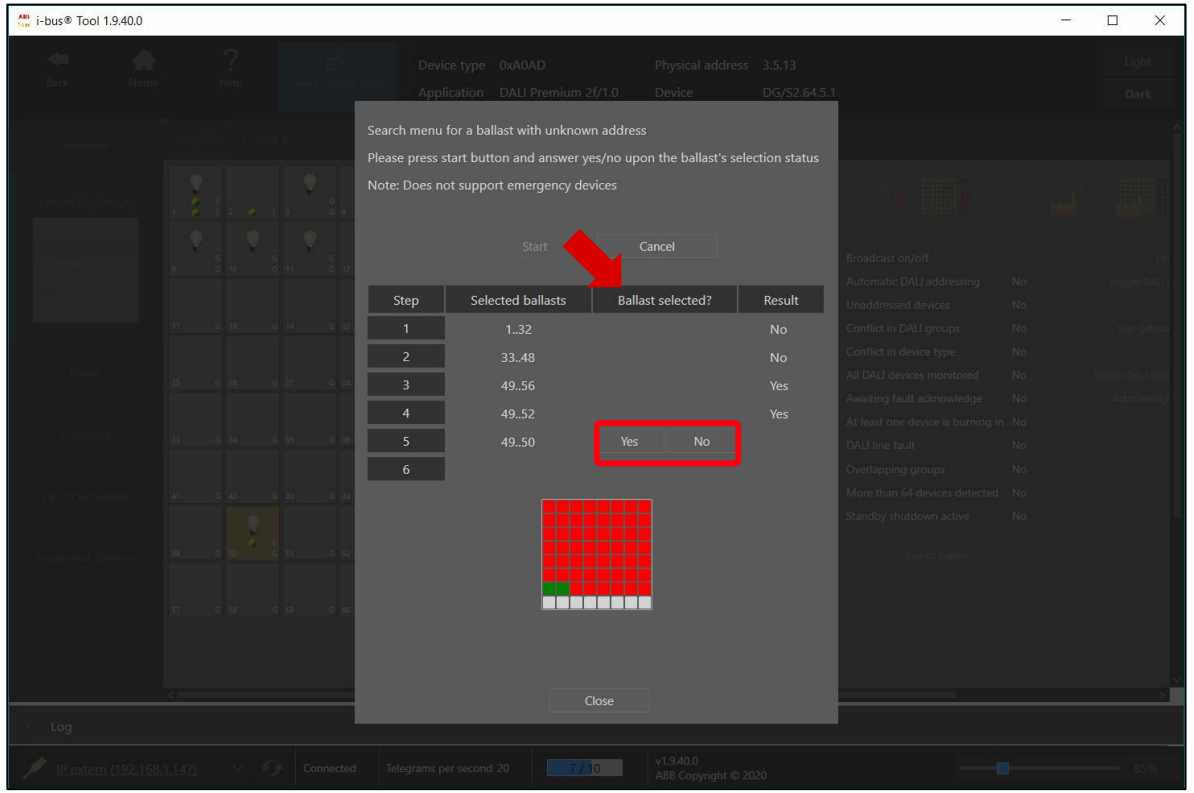

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ABB i-bus® Tool

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  e.g. “YES” (no address between 49…56)
- Press the “Yes” or “No” button → 4th click
  e.g. “YES” (address between 49…52)
- Press the “Yes” or “No” button → 5th click
  e.g. “YES” (address between 49…50)
- Press the “Yes” or “No” button → 6th click
  e.g. “No” (address 49?)

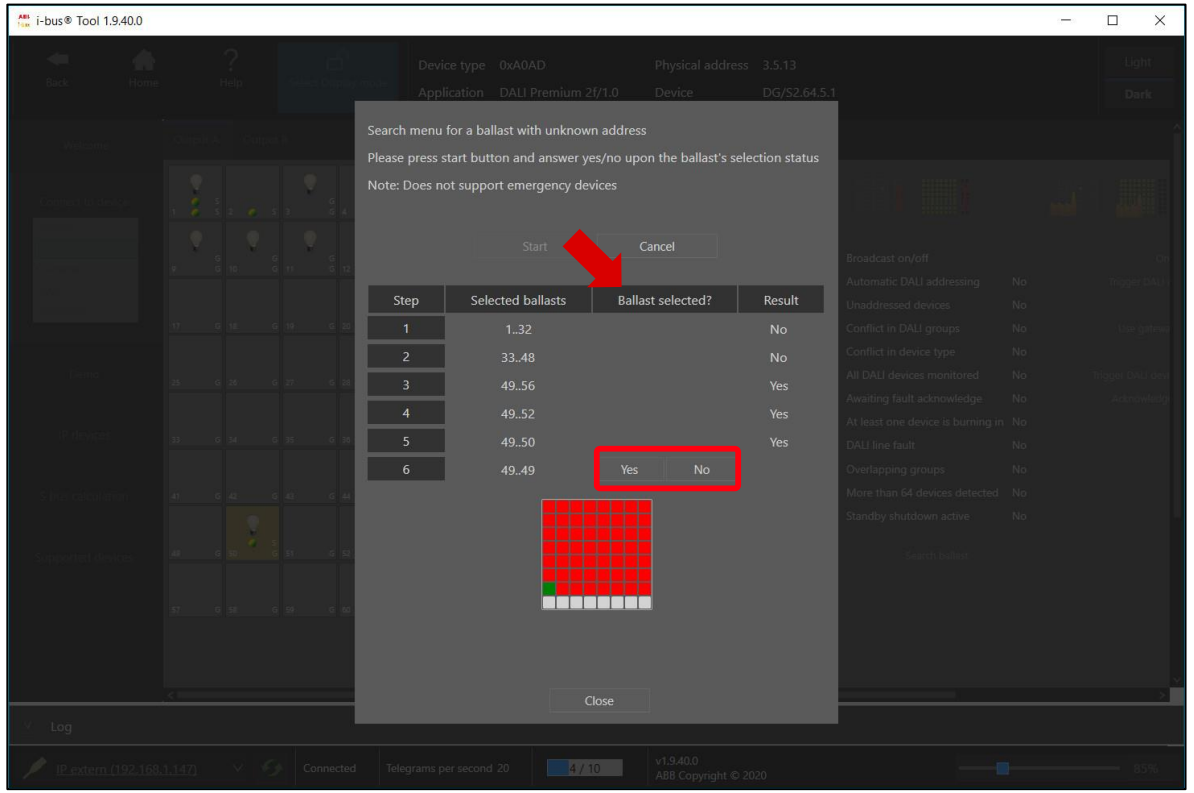

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ABB i-bus® Tool

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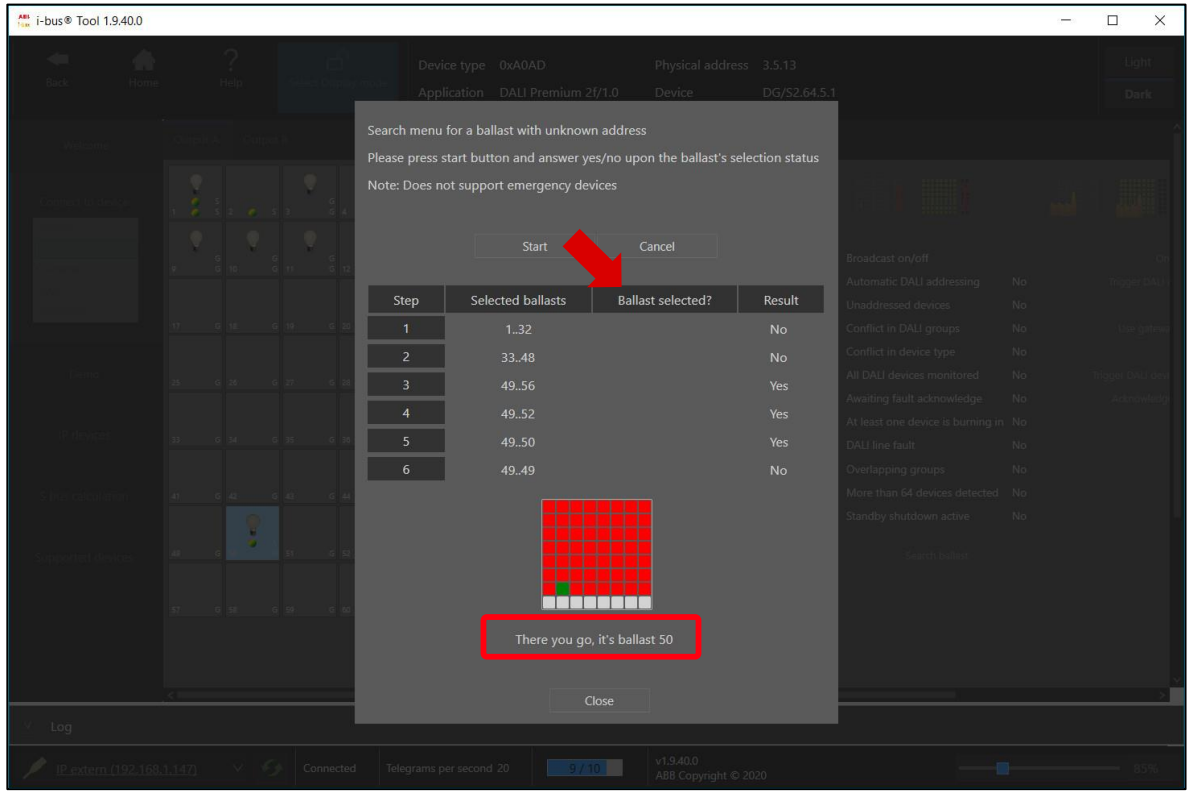
  e.g. “No” (no address between 33…48)
- Press the “Yes” or “No” button → 3rd click
  e.g. “YES” (no address between 49…56)
- Press the “Yes” or “No” button → 4th click
  e.g. “YES” (address between 49…52)
- Press the “Yes” or “No” button → 5th click
  e.g. “YES” (address between 49…50)
- Press the “Yes” or “No” button → 6th click
  e.g. “No” (address 49?)

→ Result, e.g. address 50



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