KNX DALI Gateway Premium DG/Sx.64.5.1 – RGB(W) and HSV(W)

Practical Learning Session – Competence Center Europe – Smart Buildings
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KNX DALI Gateway Premium DG/Sx.64.5.1 – RGB(W) and HSV(W)

Practical Learning Session
## ABB i-bus® KNX DALI Gateway Premium DG/Sx.64.5.1 – RGB(W) and HSV(W)

Overview of all ABB i-bus® KNX DALI Gateways and Light Controller

### Status

**July 2021**

<table>
<thead>
<tr>
<th>Gateway</th>
<th>Light Controller</th>
<th>Light Controller</th>
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</thead>
<tbody>
<tr>
<td>DG/S 8.1</td>
<td>DLR/S 8.16.1M</td>
<td>DLR/A 4.8.1.1</td>
<td>DG/S 1.64.1.1 Basic</td>
<td>DG/S 2.64.1.1 Basic</td>
<td>DG/S 1.64.5.1 Premium</td>
<td>DG/S 2.64.5.1 Premium</td>
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<tbody>
<tr>
<td>DALI outputs</td>
<td>8 (A…H)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
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<tr>
<td>DALI ballast</td>
<td>128 (max. 16 per output)</td>
<td>64</td>
<td>64</td>
<td>2 x 64 (ballasts and Emerg. Converter)</td>
<td>2 x 64 (ballasts and Emerg. Converter)</td>
<td>2 x 64 (ballasts and Emerg. Converter)</td>
<td></td>
</tr>
<tr>
<td>DALI addressing</td>
<td>not necessary</td>
<td>64 individual</td>
<td>64 individual</td>
<td>64 individual</td>
<td>A: 64 individual</td>
<td>B: 64 individual</td>
<td></td>
</tr>
<tr>
<td>Lighting groups</td>
<td>8 (installation)</td>
<td>16 DALI</td>
<td>16 DALI</td>
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<td>16 DALI</td>
<td>16 DALI</td>
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<tr>
<td>Const. light contr.</td>
<td>-</td>
<td>8 groups</td>
<td>4 groups</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Color temp. T&lt;sub&gt;C&lt;/sub&gt;</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>YES</td>
</tr>
<tr>
<td>Extended funct.: DT8 RGB(W) &amp; HSV, sequencer, operat. duration, ...</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>YES with ETS application V2.x</td>
</tr>
</tbody>
</table>
Overview

- Slides & videos of Webinars, Learning Sessions → T&Q Database
- KNX DALI Gateway Premium DG/S x.64.5.1
  - DG/S 1.64.5.1 (one channel, 64 ballasts)
  - DG/S 2.64.5.1 (two independent channels, 2 x 64 ballasts)
  - Additional functions such as DT8 colour lighting functions (change of colour temperature $T_C$, HCL, Dim2Warm), standby switch-off, …
  - Software update with ETS application V2.x:
    - DT8 color control: RGB, RGB(W), HSV and HSV(W)
    - 4 independent sequences per DALI output
    - Operating duration per ballast/group
    - Enhancements in the ABB i-bus® Tool

→ When updating the parameterization and group addresses can be taken over!!!
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**DALI**

DALI stands for Digital Addressable Lighting Interface and is a protocol set out in the technical standard IEC 62 386

Main important DALI Device Types

- DT0 (part 201): Fluorescent lamps
- DT1 (part 202): Self-contained emergency lighting
- DT6 (part 207): LED-Module
- DT8 (part 209): Colour control/Colour temperature control
  - Colour temperature $T_C$ (tunable white)
  - Colour control RGBWAF $\rightarrow$ RGB(W) and HSV(W)
  - XY-Coordinate
  - Primary N

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**IEC 62386 standard**

IEC 62386 - the international standard for DALI technology

Source: Digital Illumination Interface Alliance

[www.dali-alliance.org](http://www.dali-alliance.org)
DT8 Color control – What is RGB(W)?

- Colors are made of the primary colors **RED, GREEN** and **BLUE**
- The **RGB** color space is based on exactly this model
- So a color is always defined in terms of the primary colors, expressed as the ratio between the color channels
  - Mixing of three primary colors
  - e.g. 100% red, 100% green and 0% blue produces yellow
- If these three colors are added together, the result is theoretically white
- Nowadays there is also the option to add a white component by mixing in an additional channel → **RGB(W)**
- This white component helps produce a lighter light, which brightens the color and only a LED is used (energy saving)
- There are still special variants, **RGBWAF** lights: A = Amber, F = other color
DT8 Color control – What is HSV?

- The HSV color space defines color perception in terms of 3 coordinates:
  - **Hue**: This value determines the color shade and is shown on a 0°...360° wheel.
    0° correspond approximately to the color red, 120° to the color green and 240° to the color blue
  - **Saturation**: This value sets the saturation of the color shade.
    At 100% saturation, the color is fully saturated - this is the pure color. If white is added to the color, the result becomes more pastel - the color is less saturated.
  - **Value**: This value sets the brightness of the color shade.
    If the brightness is high, the color appears bright and if the brightness is low, the color appears dark. If the brightness is 0% this corresponds to black and at 100% to full brightness.
DT8 Color control – What is HSV?

- In color matching, the HSV color space is preferred over the RGB color space because it mimics human color perception.
- When mixing colors you can simply select the required shade and then decide how saturated and how light (or dark) you want it to be, or whether a different shade would be more suitable.
- The RGB and HSV color spaces can be transformed into each other by means of calculations.

Current color level:
RGBW in hex: B1 5B EB 00
RED: 177 / 276°
Green: 91 / 61%
BLUE: 235 / 92%
**DT8 Color control – RGB(W) and HSV(W)**

**Maximum flexibility in lighting design**
- Color control for each group and ballast
- Dim color value and set value
- Color control is also possible using scenes and sequencer
- Color control is performed using
  - RGB(W)
  - HSV(W) – Based on RGBW → RGBW ballast is required
- The following options are available for color control:
  - Single group objects for each color channel (4 x 1-byte)
  - Combined 3-byte group object RGB/HSV
    
  ```
  DPT_Color_RGB 232.600
  ```
  - Combined 6-byte group object RGBW/HSVW
    
  ```
  DPT Color_RGBW 251.600
  ```
Practical exercises with live demonstration: DT8 Color control – RGB(W) and HSV(W)

- ABB RoomTouch® KNX
- ABB IP touch
- Busch-SmartTouch® KNX
- App “Busch-ControlTouch®”
- DALI Gateway Premium DG/S x.64.5.1
- Power adapter
- Device Type 8 RGBW

- 3-byte RGB value (DPT 232.600)
- 4 x 1-byte RGBW value (DPT 5.001)
- 4 x 1-byte value (DPT 5.001)
- 4 x 4-bit dim (DPT 3.007)

Source: Internet
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**Busch-SmartTouch, ABB RoomTouch, …**
- RGB Control x - Switch – output/input
- RGB Control x – …
- RGB Control x - Value RGB (3-byte) – output/input
- …
- RGB Control x - Value Red – output/input
- RGB Control x - Value Green – output/input
- RGB Control x - Value Blue – output/input
- …
- Scene number
- …

**DG/Sx.64.5.1 DALI Gateway Premium V2.0**
- Output - ballast x - Switch
- Output - ballast x - Status Switch
- Output - ballast x - Set RGB value combined (3 bytes)
- Output - ballast x - RGB status combined (3 bytes)
- …
- Output – KNX Scene 1..64
- …

**Color control type:**
- RGB - only color, no brightness and 3 color channels RGB
  - Direct control of color channels
  - The brightness is from the sum of the color components
  - 3-byte combined – DPT_color_RGB_232.600
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**Busch-SmartTouch, ABB RoomTouch, …**

- RGB Control x - Switch – output/input
- RGB Control x - …
- RGB Control x - Value Red – output/input
- RGB Control x - Value Green – output/input
- RGB Control x - Value Blue – output/input
- RGB Control x - Value White – output/input

**Scene number**

**…**

**DG/Sx.64.5.1 DALI Gateway Premium V2.0**

- Output - ballast x - Switch
- Output - ballast x - Status Switch
- Output - ballast x - Set RGB(W) value red/Status
- Output - ballast x - Set RGB(W) value green/Status
- Output - ballast x - Set RGB(W) value blue/Status
- Output - ballast x - Set RGB(W) value white/Status

**…**

**Output – KNX Scene 1..64**

**…**

**Color control type:**

- RGB - *only color, no brightness and 4 color channels RGB(W)*
  - Direct control of color channels
  - The brightness is from the sum of the color components
- 4 x 1-byte – DPT_percentage_5.001
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**DG/Sx.64.5.1 DALI Gateway Premium V2.0**

- Output - ballast x - Set RGB(W) value red/Status
- Output - ballast x - Set RGB(W) value green/Status
- Output - ballast x - Set RGB(W) value blue/Status
- Output - ballast x - Set RGB(W) value white/Status

**Color control type:**
RGB - only color, no brightness and 4 color channels RGB(W)
- Direct control of color channels
- The brightness is from the sum of the color components

4 x 1-byte – DPT_percentage_5.001
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Operating Element …

- R1: Switching
- R1: Relative dimming
- R2: Relative dimming
- R3: Relative dimming
- R4: Relative dimming

DG/Sx.64.5.1 DALI Gateway Premium V2.0

- Output - ballast x - Switch
- Output - ballast x - Relative dimming (brightness)
- Output - ballast x - RGB(W) relative dimming red
- Output - ballast x - RGB(W) relative dimming green
- Output - ballast x - RGB(W) relative dimming blue

Color control type:
RGB - color and brightness
- Separate control of color and brightness
- 4 x 4-bit – DPT_dimming_control_3.007
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Homepage

www.abb.com/KNX

→ Products and Downloads
   → Lighting Control
      → DALI Gateways and Light Controllers
         – ETS5 Application
         – Product Manual
         – Technical Data
         – Operating Instruction
         – ABB i-bus® Tool
         – Installation and Operating Instructions
         – Specification Text
         – …
Software Repository

- Excel list in German and English
- Search for a KNX product and the corresponding software (firmware, ETS application) will be displayed
- A direct download of this software is possible via a link
- Historical ETS applications can also be downloaded (database for ETS App “Reconstruction Tool”)

www.abb.com/KNX
- Additional materials
- Downloads for KNX
- Software Repository
Training Material

Training & Qualification Database
- The database contains extensive training content
  - Webinar, Learning Sessions, … slides and videos
  - Presentations
  - Video tutorials
  - and more …
  - [https://go.abb/ba-training](https://go.abb/ba-training)
  - [www.abb.com/knx](http://www.abb.com/knx) (→ Services & Tools → Training and Qualification → Training Database)

YouTube
- Channel “ABB Home and Building Automation”
  - [https://www.youtube.com/user/ABBibusKNX](https://www.youtube.com/user/ABBibusKNX)
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