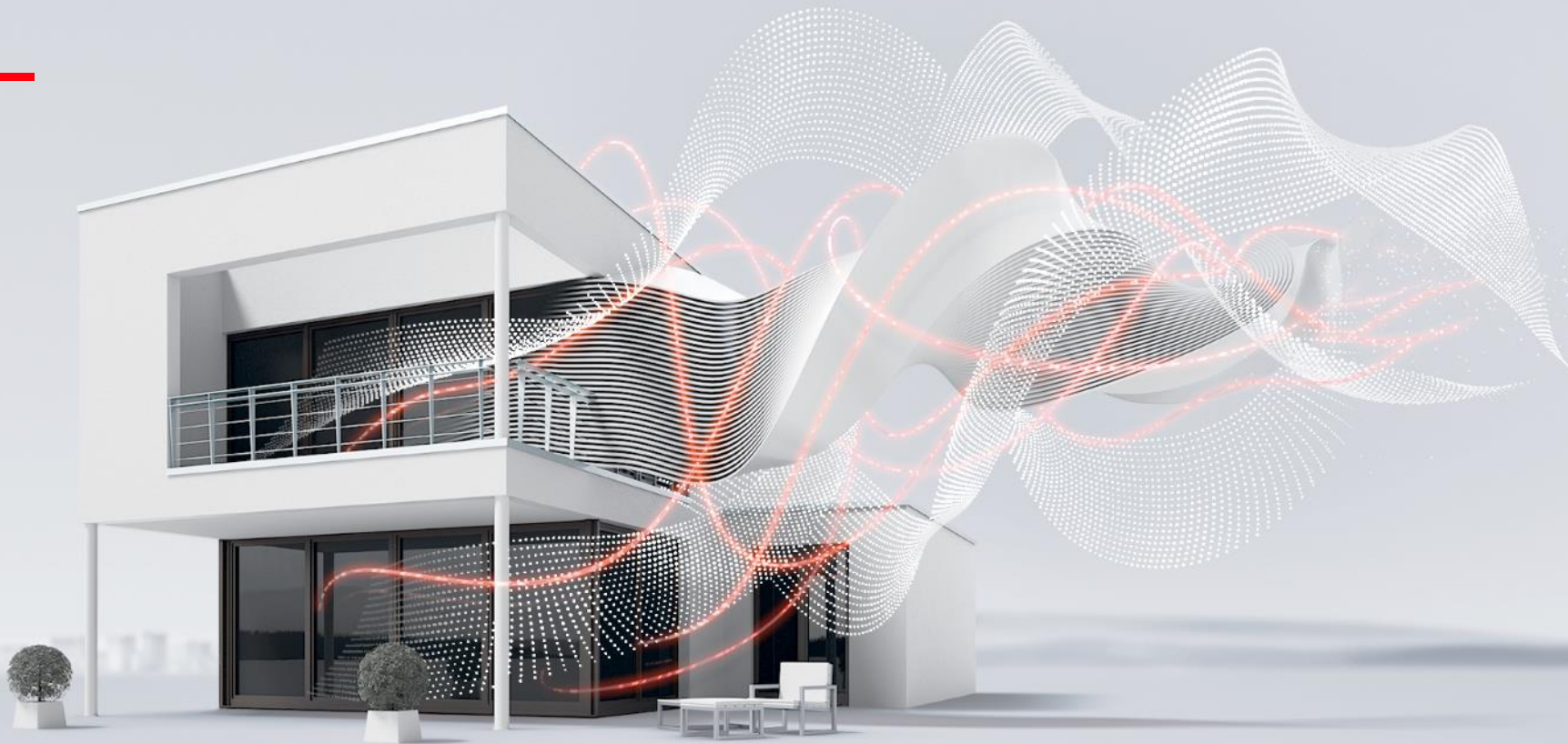




HEIDELBERG, NOVEMBER 2021

# KNX DALI Gateways – Practical knowledge about DALI – Part 1

Online Learning Session – Competence Center Europe – Smart Buildings

Juergen Schilder, Thorsten Reibel, Marc-Andre Hahn, Michael Rall, Stefan Grosse & Olaf Stutzenberger

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# **KNX DALI Gateways – Practical knowledge about DALI – Part 1**

Online Learning Session

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# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## **Part 1: Today** (Online Learning Session)

DALI Technology

KNX DALI Gateways DG/S

Manual Operation

DALI Communication (DALI Monitor)

Commands

Cyclical queries

... and with live demonstration on Thursday  
this week (Practical Learning Session)

## **Part 2: Tuesday next week** (Online Learning S.)

Diagnostic

DALI Monitor (more details)

DALI Telegrams

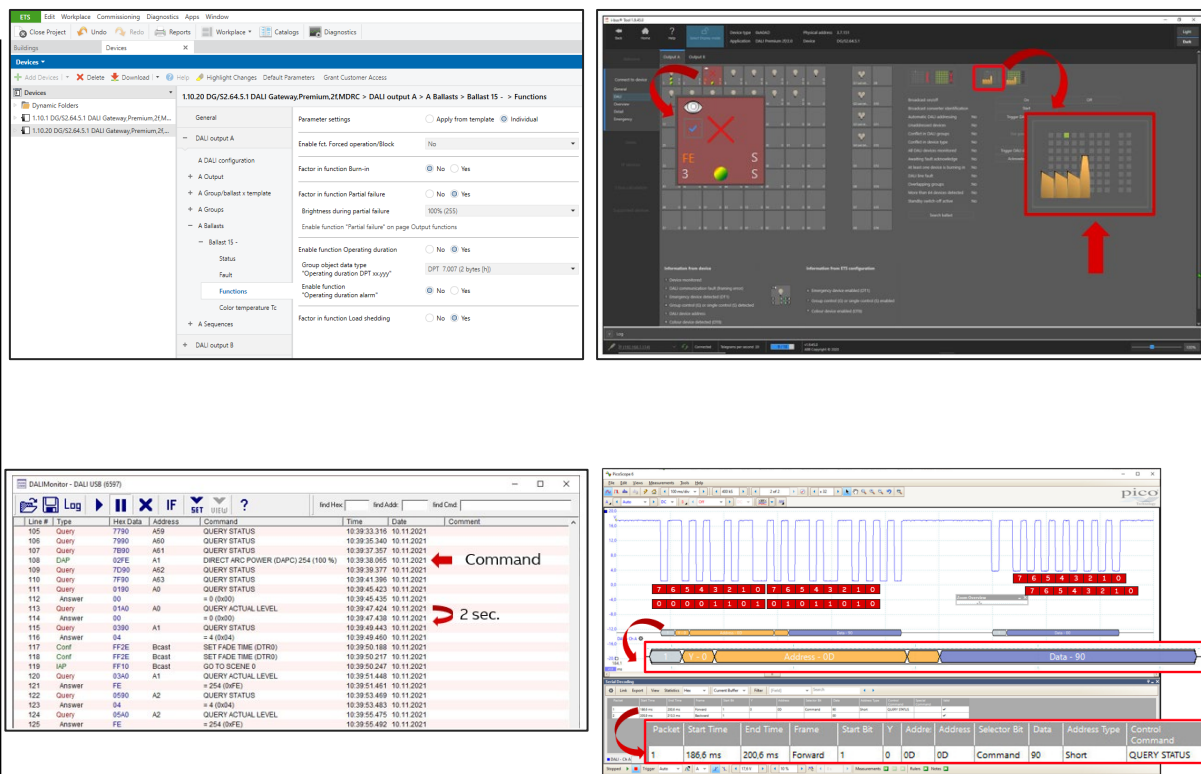
... and with live demonstration on Thursday  
next week (Practical Learning Session)

# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### Why going in more Details with DALI?

- DALI as a worldwide standard with a huge number of existing installations and even more light circuits has proven its value in commercial projects, a real success story together with KNX
- In most of the cases DALI installation and commissioning with ABB i-bus® KNX DALI Gateways works well thanks to long term experiences, standardization and also adaptations in the last years
- At the beginning only DALI-1 standard was existing, causing in some cases challenges to deliver a proper solution
- DALI-2 with a test procedure for the products helps in this regard
- With ABB i-bus® KNX Gateways, the powerful ETS application and support with ABB i-bus® Tool a smooth implementation is feasible
- Nevertheless there are still some challenges in projects, caused by demanding installations or DALI-1 devices
- With these learning sessions we want to provide additional content, partly more complex than normal, but very helpful if required
- Few customers need this support, ABB can deliver in such a case



# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### DALI technology

- The DALI protocol is standardized (IEC 62 386) and transmits at 1,200 bit per second
- DALI-1: Single-Master-Slave System without collision control, max. 64 devices (slaves) per DALI line
- DALI-2: Single/Multi-Master-Slave System with collision control, max. 64 devices (slaves) and max. 64 controllers (masters) per DALI line
- Installation is easy due to the free wiring topology up to 300 m and non-polarity sensitive 2 wire cable (1.5 mm<sup>2</sup>)
- No SELV – no specific cable required  
The DALI control line can be installed together with mains cable (e.g. by using a 5 wires standard cable)
- Interface voltage  $U_N$  16 V (12 V to 20.5 V)
- DALI Power supply: Max current of 250 mA
- A device may consume a maximum of 2 mA
- DALI allows up to 16 groups and 16 scenes

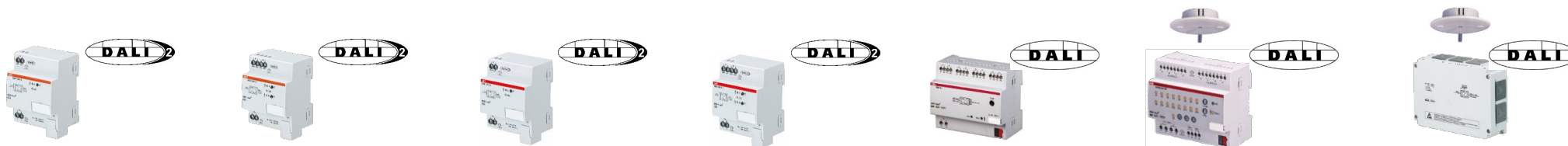


[www.dali-alliance.org](http://www.dali-alliance.org)



# KNX DALI Gateways – Practical knowledge about DALI – Part 1

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



|                                                                                 | Gateway<br>DG/S 1.64.1.1<br>Basic | Gateway<br>DG/S 2.64.1.1<br>Basic    | Gateway<br>DG/S 1.64.5.1<br>Premium | Gateway<br>DG/S 2.64.5.1<br>Premium  | Gateway<br>DG/S 8.1      | Light Controller<br>DLR/S 8.16.1M | Light Controller<br>DLR/A 4.8.1.1 |
|---------------------------------------------------------------------------------|-----------------------------------|--------------------------------------|-------------------------------------|--------------------------------------|--------------------------|-----------------------------------|-----------------------------------|
| <b>Controlled</b>                                                               | Single/Group control              | Single/Group control                 | Single/Group control                | Single/Group control                 | Broadcast                | Group control                     | Group control                     |
| <b>DALI outputs</b>                                                             | 1                                 | 2                                    | 1                                   | 2                                    | 8 (A...H)                | 1                                 | 1                                 |
| <b>DALI devices</b>                                                             | 64 (ballasts and Em.Conv.)        | 2 x 64 (ballasts and Em.Conv.)       | 64 (ballasts and Em.Conv.)          | 2 x 64 (ballasts and Em.Conv.)       | 128 (max. 16 per output) | 64                                | 64                                |
| <b>DALI addressing</b>                                                          | 64 individual                     | A: 64 individual<br>B: 64 individual | 64 individual                       | A: 64 individual<br>B: 64 individual | not necessary            | 64 individual                     | 64 individual                     |
| <b>Lighting groups</b>                                                          | 16 DALI                           | 2 x 16 DALI                          | 16 DALI                             | 2 x 16 DALI                          | cable installation       | 16 DALI                           | 8 DALI                            |
| <b>Emerg. Light. con.</b>                                                       | Yes                               | Yes                                  | Yes                                 | Yes                                  | -                        | -                                 | -                                 |
| <b>DT8 Color temp. Tunable White T<sub>C</sub></b>                              | -                                 | -                                    | Yes                                 | Yes                                  | -                        | -                                 | -                                 |
| <b>Application V2.0, e.g. DT8 RGB(W), HSV(W), load shedding, sequencer, ...</b> | -                                 | -                                    | Yes                                 | Yes                                  | -                        | -                                 | -                                 |

# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

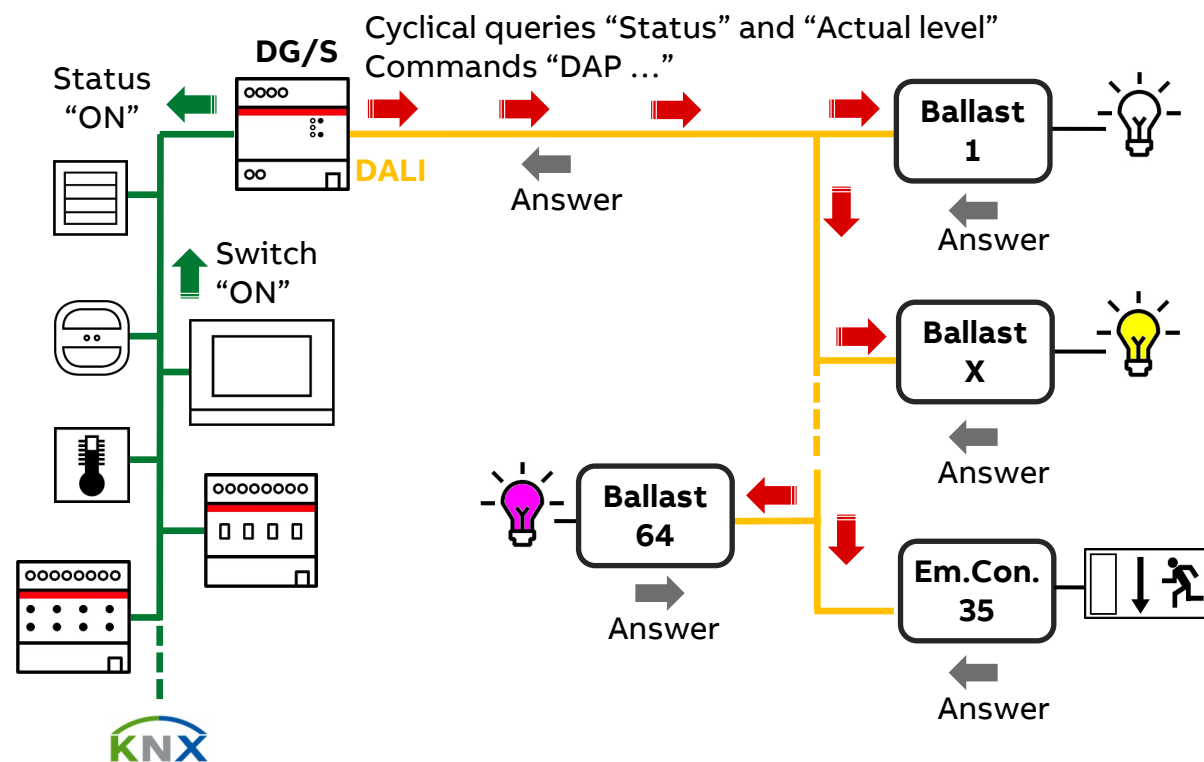
### DALI technology and KNX DALI Gateways

#### The DALI Gateway as the Master

- Transfers commands from KNX to DALI and sent back status messages to KNX
- Sends cyclical queries to all DALI devices (slaves)
  - Status
  - Actual level
  - Only the addressed device replies with information
  - This is a continuous process (24/7)
  - The time between each query can be set in the ETS parameters (default 2 sec.)

#### DALI device:

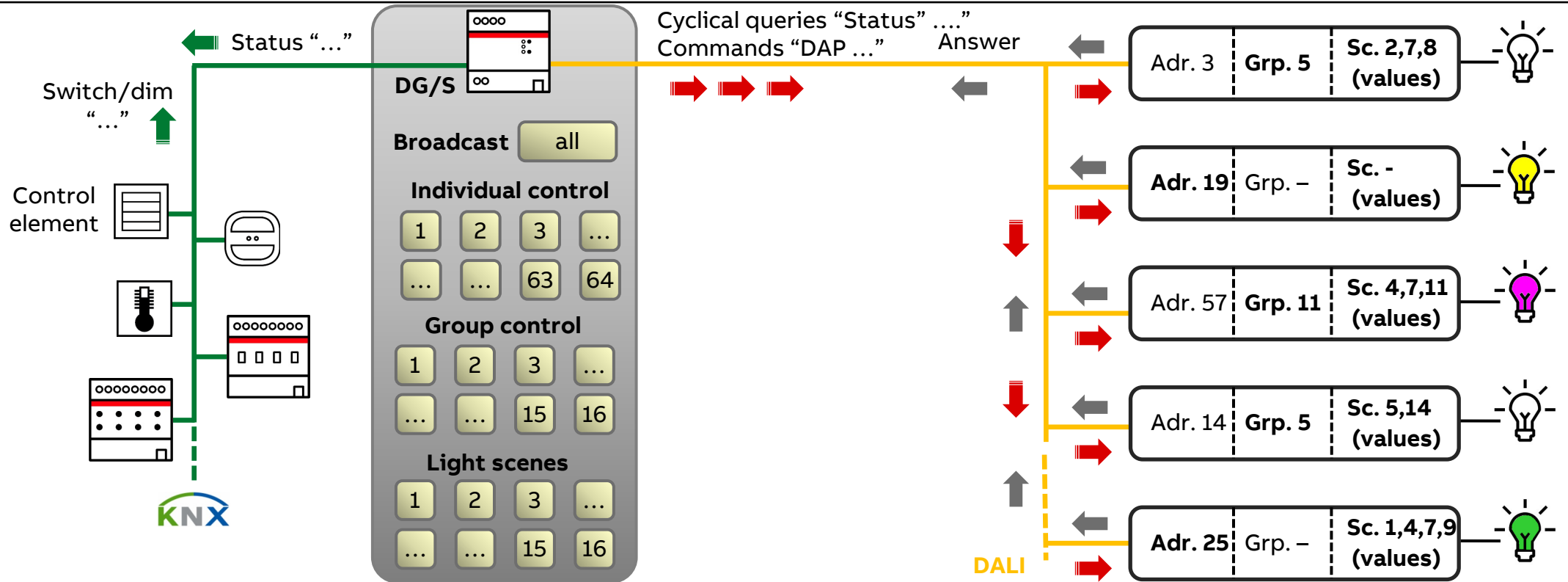
Ballast (DT0, DT6, DT8,...) or emergency lighting converter (DT1)



# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### DALI technology and KNX DALI Gateways

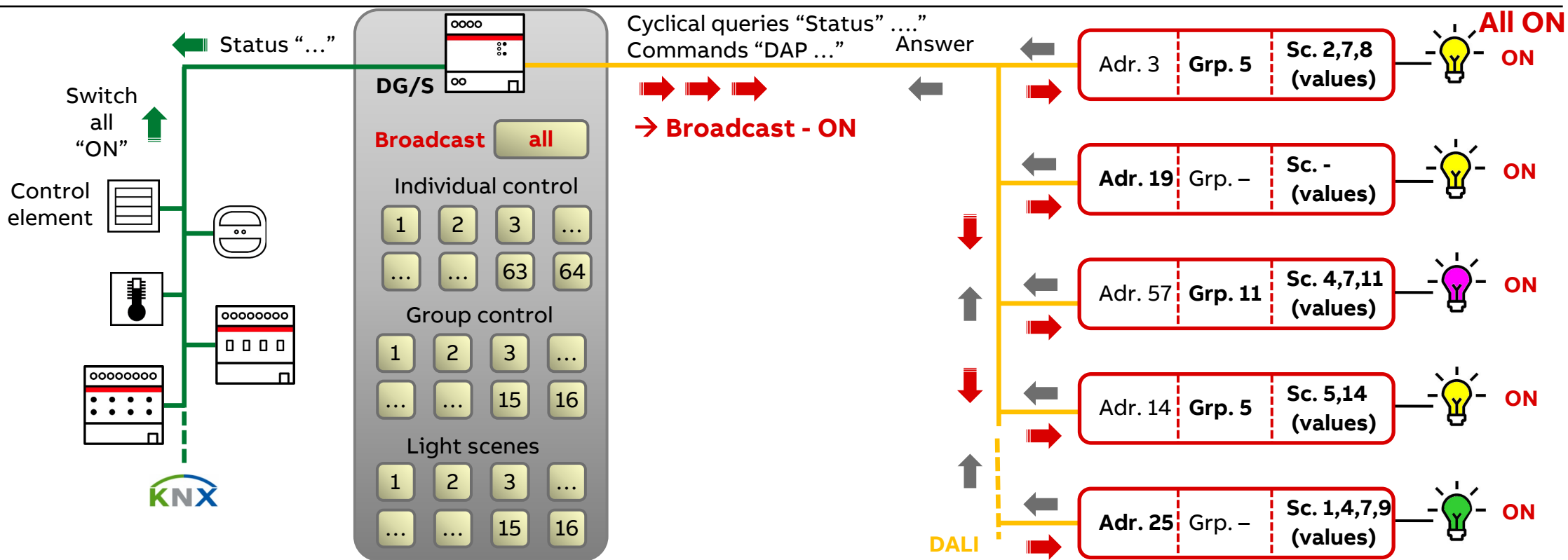




# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

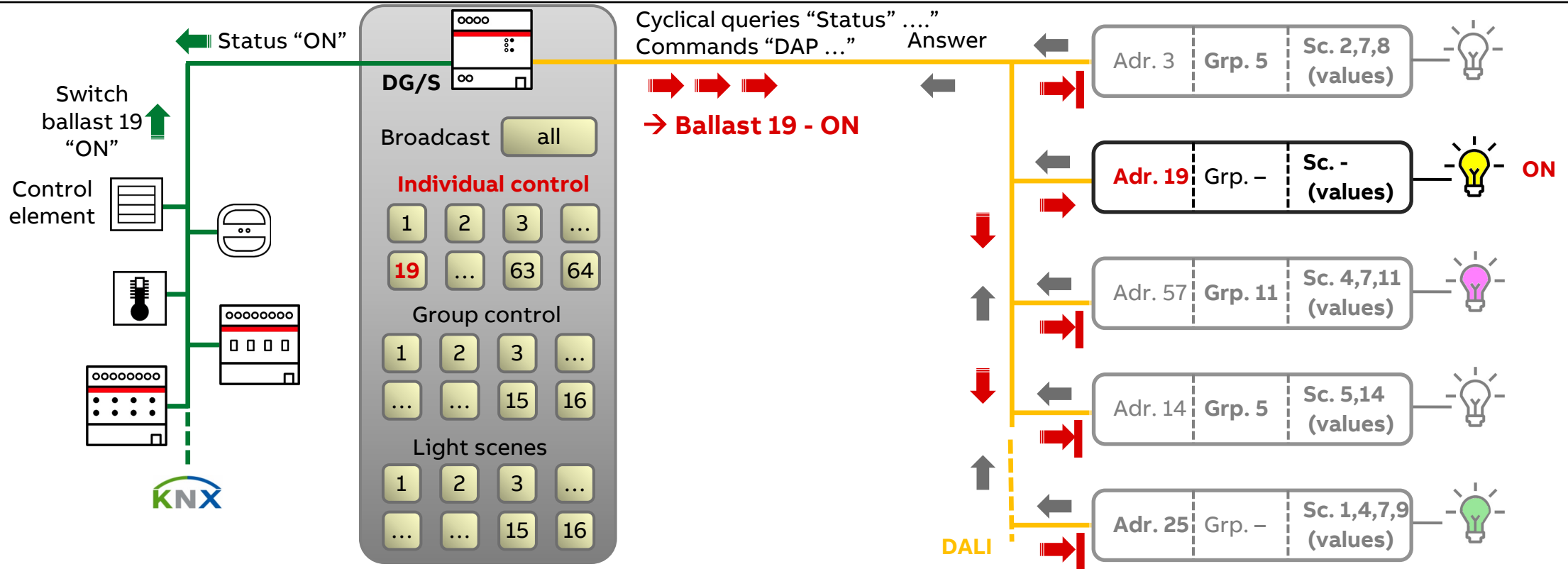
### DALI technology and KNX DALI Gateways: Switch Output ON → Command “Broadcast (all) - ON”



# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

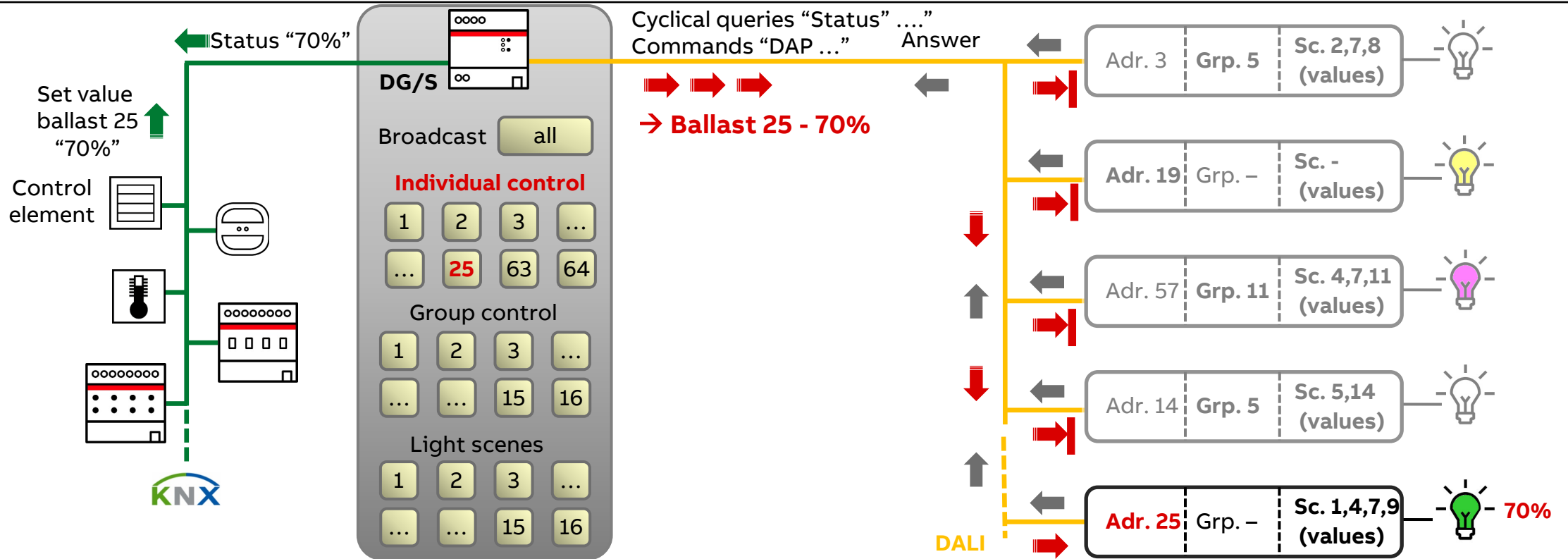
### DALI technology and KNX DALI Gateways: Switch Ballast 19 (individual controlled) ON → Command “Ballast 19 - ON”



# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

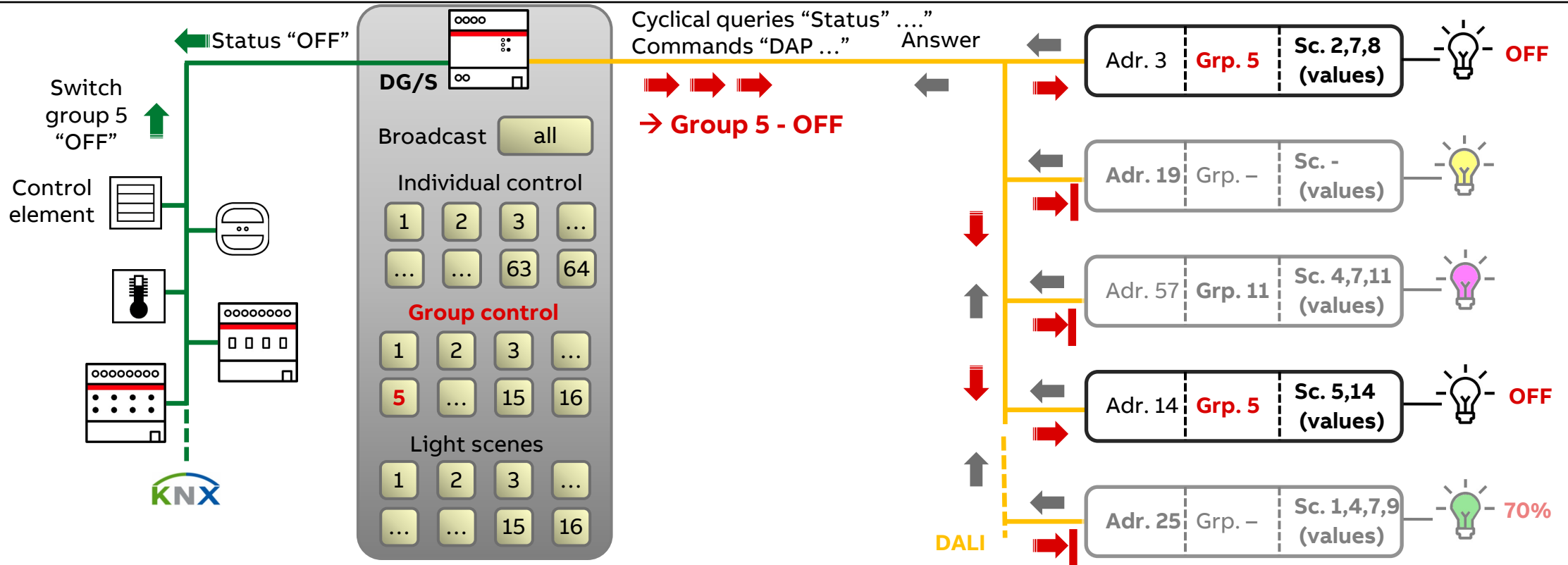
**DALI technology and KNX DALI Gateways: Set Value Ballast 25 (individual controlled) 70% → Command “Ballast 25 - 70%”**



# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

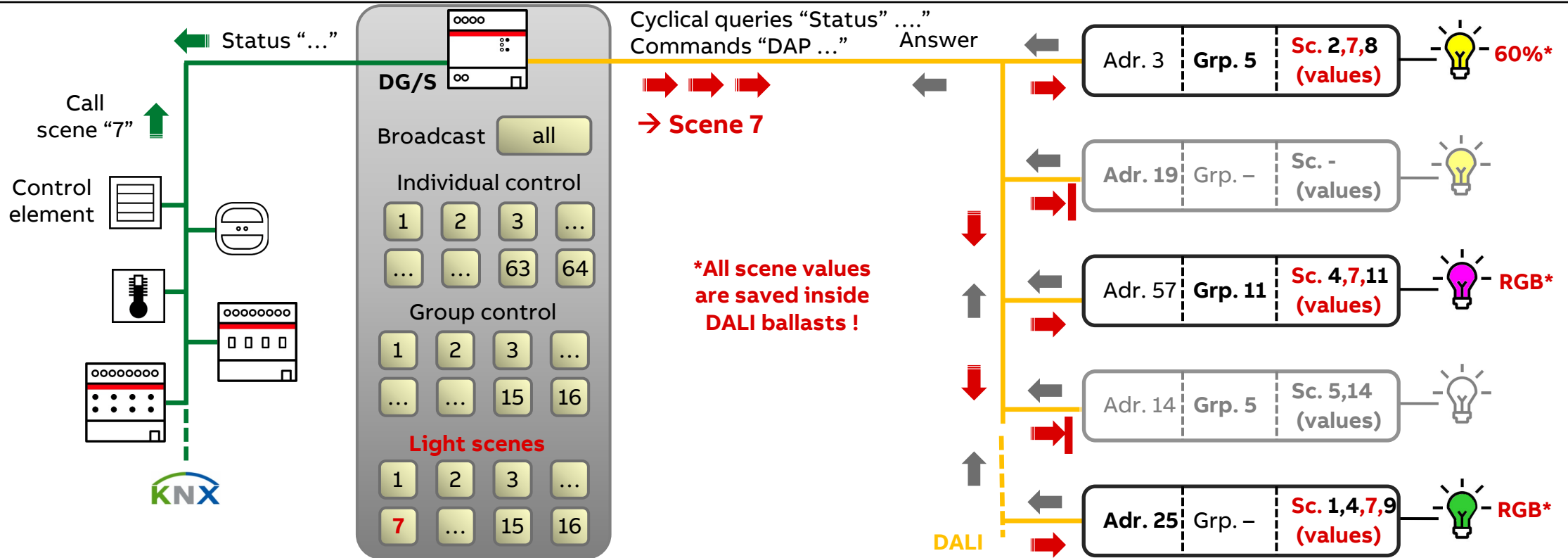
### DALI technology and KNX DALI Gateways: Switch Group 5 (group controlled) OFF → Command “Group 5 - OFF”



# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### DALI technology and KNX DALI Gateways: Call Scene 7 → Command “Call Scene 7”



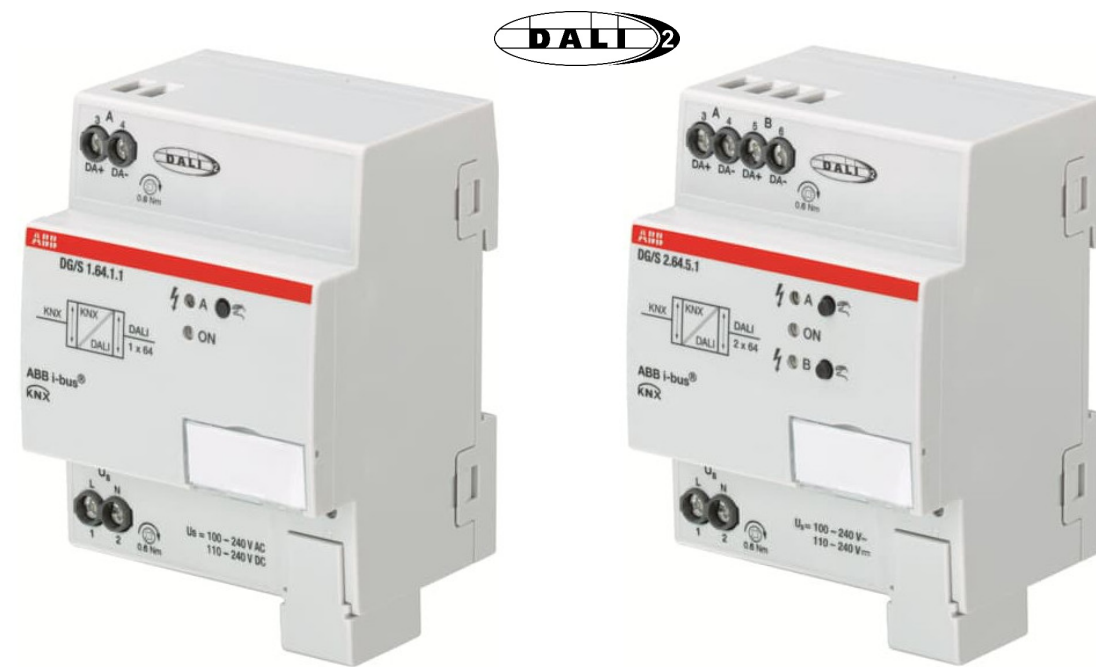
# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### KNX DALI Gateways DG/S – device overview

#### KNX DALI Basic and Premium / 1-fold and 2-fold

- Supply voltage 100 – 240 V AC/DC, 50/60 Hz → suitable for worldwide use
- Integrated DALI power supply  
→ No additional DALI power supply is required and not allowed
- DALI Outputs 230V secure  
→ Incorrect connection with mains voltage does not destroy the DALI Gateway
- LEDs for device operation “ON” and “DALI status”  
→ Quick and easy diagnostics
- Button for manual switching of DALI output with broadcast function → Test of installation and lighting



DG/S 1.64.1.1  
Basic, 1-fold

DG/S 2.64.5.1  
Premium, 2-fold



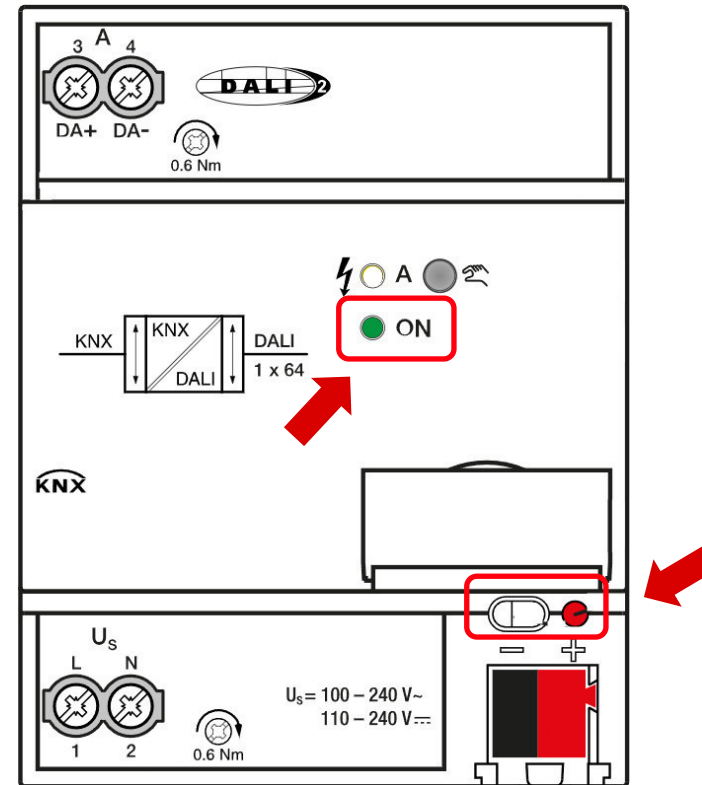
# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### KNX DALI Gateways DG/S – operation LED “ON” (green)

#### KNX DALI Basic and Premium / 1-fold and 2-fold

- Lights up when operating voltage and KNX voltage are available and the device is functional (system is initialized after booting)
  - Flashes quickly (5 Hz) if KNX voltage is available but operating voltage is not
  - Slowly flashes (1 Hz) in manual operation mode
  - Off
    - If no KNX voltage is available
    - KNX voltage is available and DALI Gateways address and application program have been unloaded
- If KNX is available, the programming LED lights up when the programming button is pressed



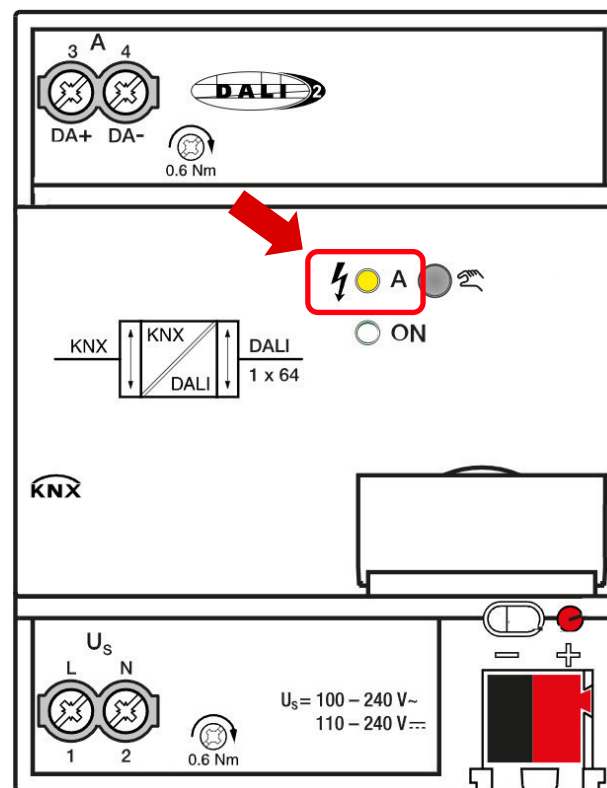
# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### KNX DALI Gateways DG/S – DALI status LED A/B (yellow)

#### KNX DALI Basic and Premium / 1-fold and 2-fold

- Off: DALI Gateway is in normal mode
- Lights up if a DALI fault occurs, e.g.
  - Lamp fault
  - Ballast fault
  - Function “Acknowledge fault messages” is enabled and a fault has not yet been acknowledged
  - Short circuit on the DALI line
  - Overvoltage (230 V) on the DALI line
- Switch status of the output is indicated during manual operation mode
- Flashes quickly (5 Hz) during DALI address assignment and initialization of a DALI device



# KNX DALI Gateways – Practical knowledge about DALI – Part 1

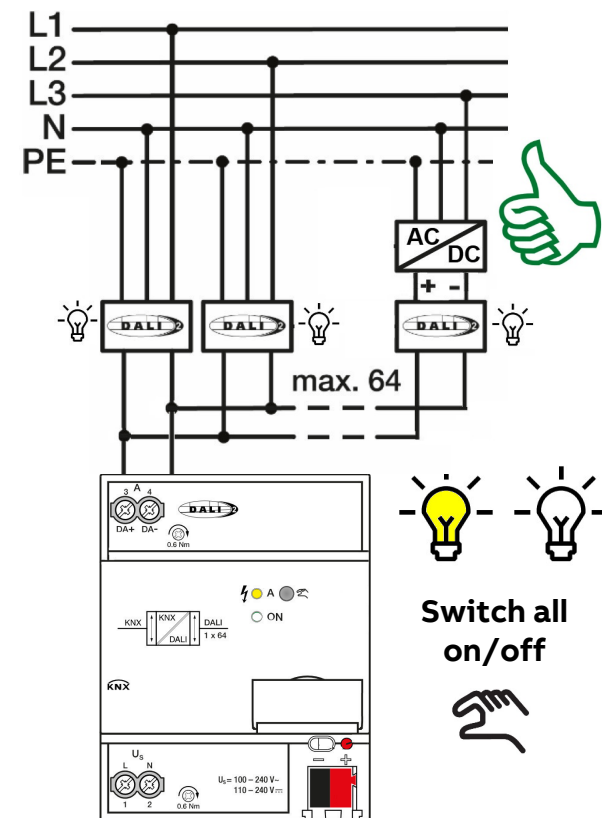
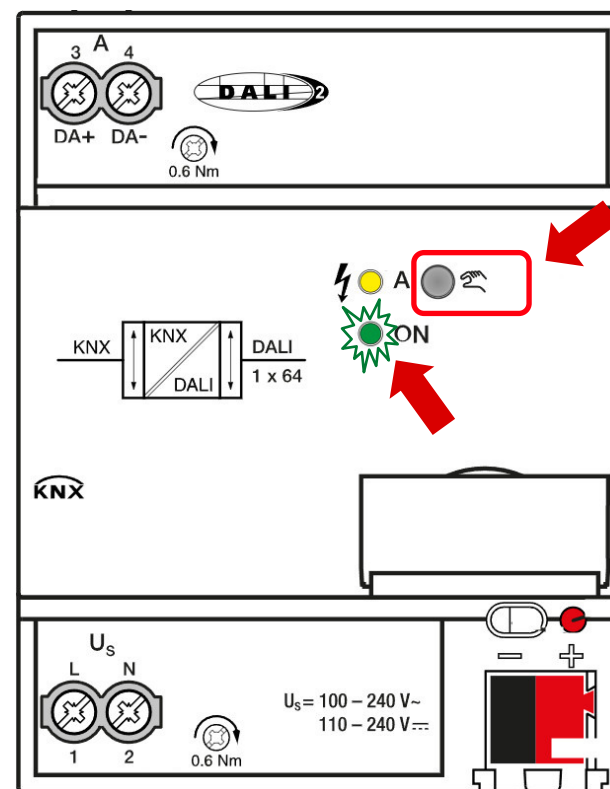
## Online Learning Session

### KNX DALI Gateways DG/S – manual button

#### KNX DALI Basic and Premium / 1-fold and 2-fold

(1) For manual switching of DALI output A / B 

- Pressing button A or B for > 2 sec. < 5 sec. puts the DALI Gateway (outputs A and B) into manual operation mode
  - Green LED flashes
  - After release, the brightness value of the DALI devices initially stays unchanged
  - By pressing (< 2 sec.) button A or B, each DALI output can be switched independently
  - Switch status of the output is displayed by yellow LED
- Testing the wiring, installation, lighting and supply voltage of the ballasts and lamps
- All lamps at the output switch on and off
- Broadcast command:  
Ballasts that are not addressed also react to this!



# KNX DALI Gateways – Practical knowledge about DALI – Part 1

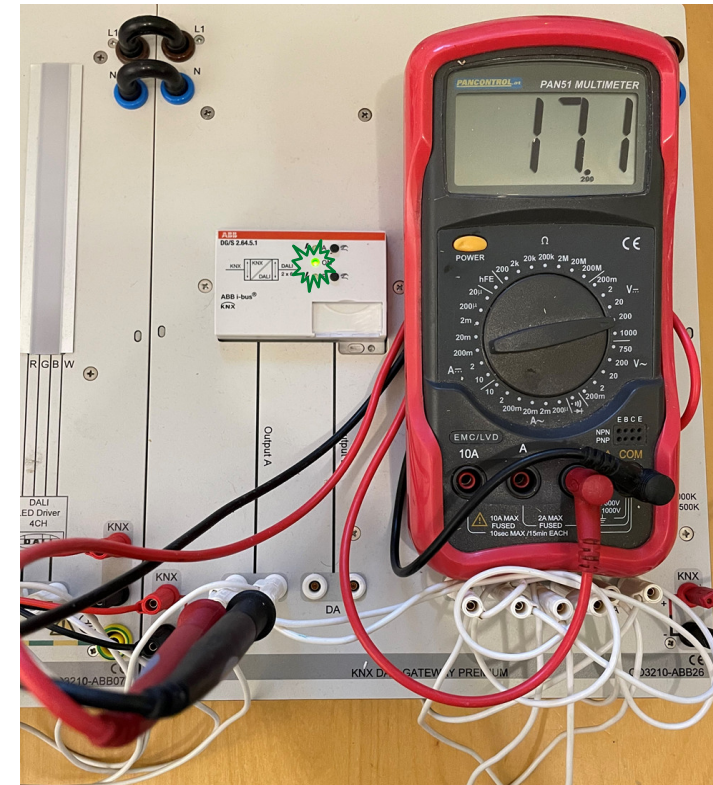
## Online Learning Session

### KNX DALI Gateways DG/S – manual button

#### KNX DALI Basic and Premium / 1-fold and 2-fold

##### – During manual operation mode

- No communication at the DALI output  
→ no commands and no queries are sent!
- The supply voltage is present at the output and can be measured with a voltmeter
- Nominal system voltage  $U_N$  16 V (12 V...20.5 V)
- Minimum voltage  $U_{min}$  10 V (at receiver)
- When the DALI Gateway is disconnected, 0V is measured on the DALI line
- If a voltage is measured, there is another DALI power supply in the line (not permitted) or a ballast has a device fault



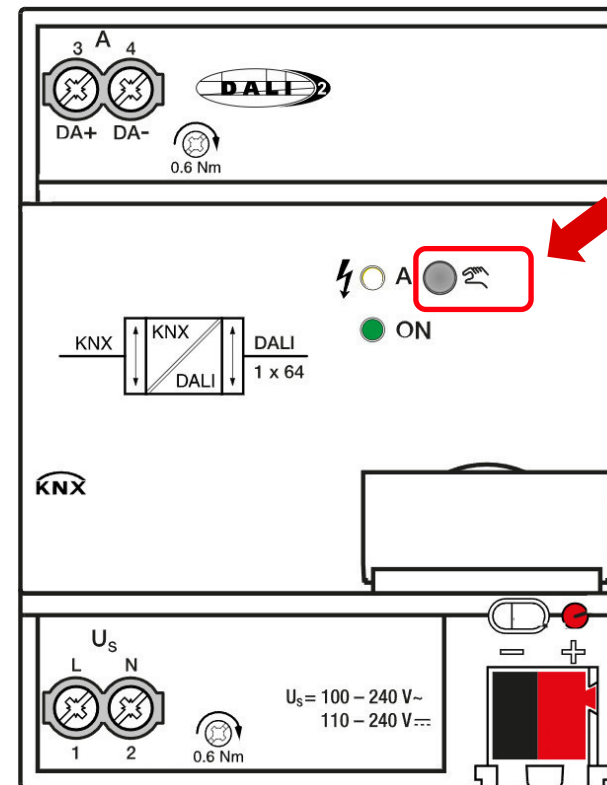
# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### KNX DALI Gateways DG/S – manual button

#### KNX DALI Basic and Premium / 1-fold and 2-fold

- If button “A” or “B” is pressed for > 2 sec., manual operation mode is left
- The green LED switches back on
- The devices receive the brightness value parameterized via the ETS application program (“Brightness value on exiting manual operation”)

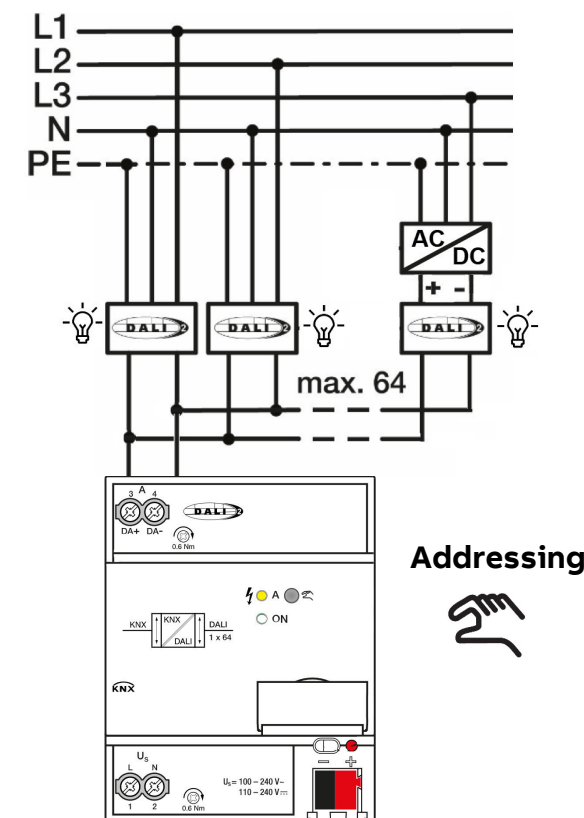
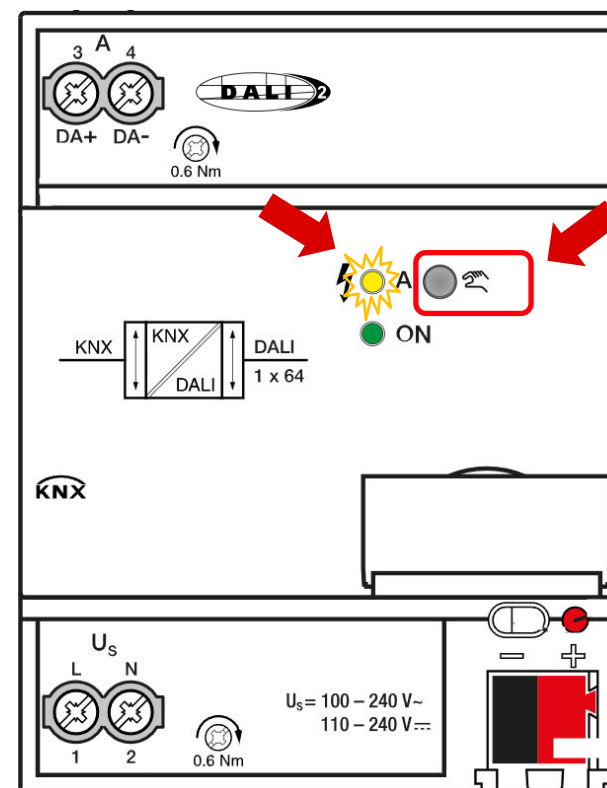


# Online Learning Session

## KNX DALI Basic and Premium / 1-fold and 2-fold

(2) Trigger DALI addressing output A / B 

- The “Automatic DALI addressing” is disabled (default) and can be triggered via ABB i-bus Tool®, KNX group telegram or manual button
- If the button is pressed for longer than 5 sec., then DALI devices without a DALI address will receive one
- If the DALI Gateway is in manual operation mode, it is left and no addressing is initiated





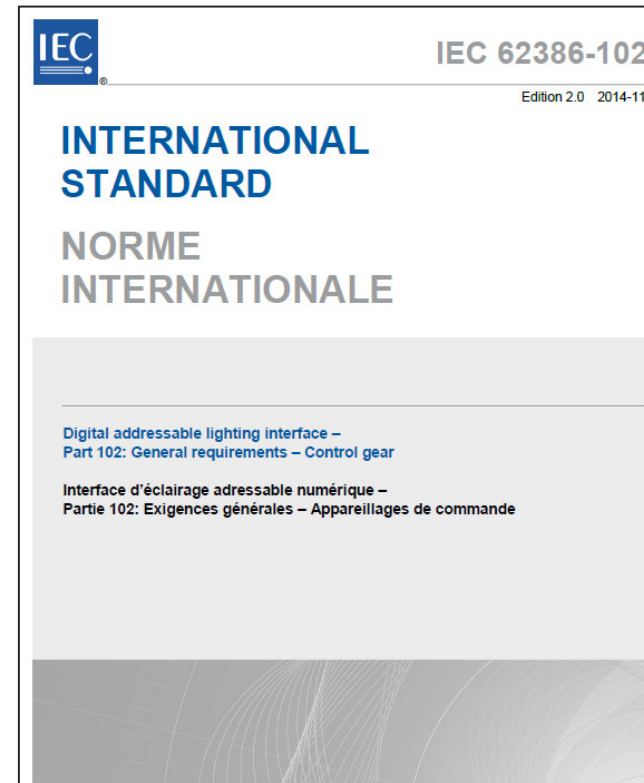
# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### DALI commands and cyclical queries

- The DALI commands are specified in the International Standard IEC 62386 Part 102 “General requirements – Control gear”
- The DALI Gateway as the Master sends commands
  - Level instructions (direct arc power, go to scene, ...)
  - Special commands (program short address, write memory location, initialize, ping, ...)
  - Configuration instructions (set min/max level, set fade time, store actual level, add to group, ...)

and cyclical queries to all DALI devices (slaves), e.g. status, actual level



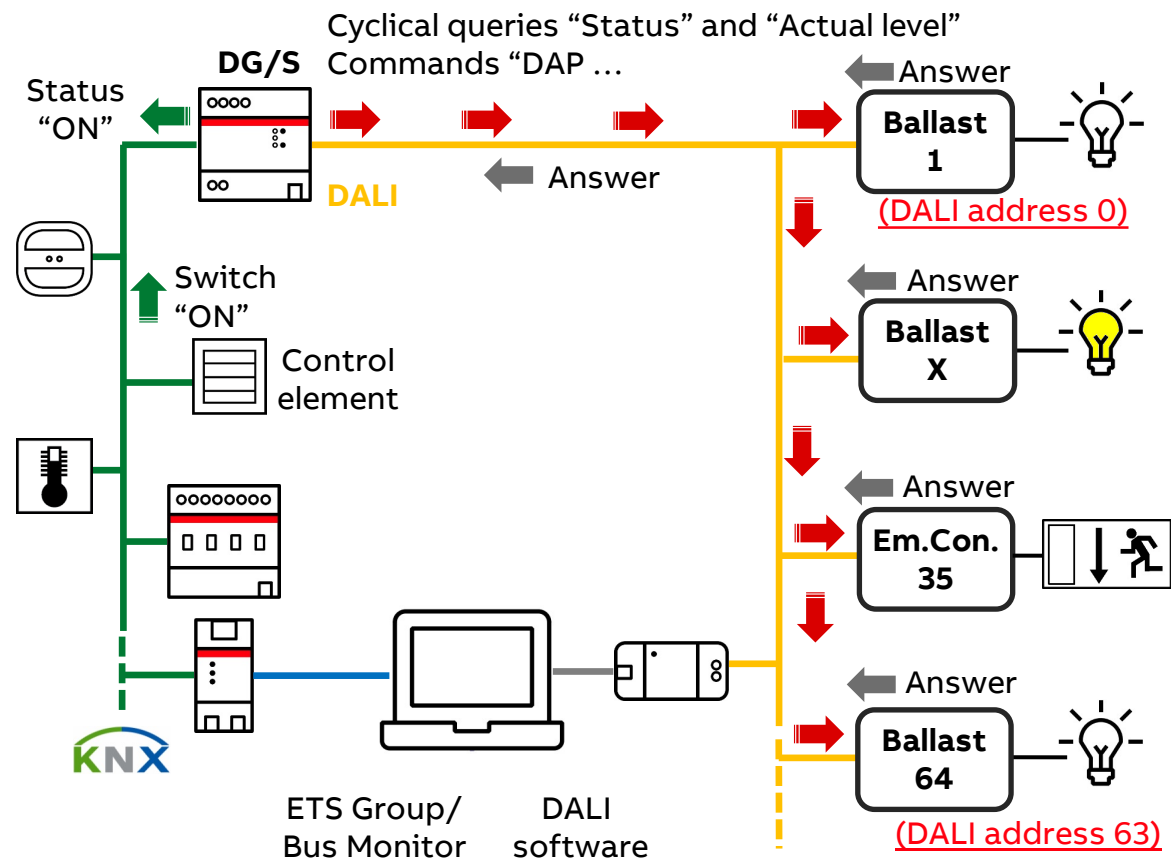


# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### DALI commands and cyclical queries

- ETS: The group- /bus monitor records the KNX telegrams
- DALI software: Records the queries and commands sent by the DALI Gateway and answers from the devices
- Note: All DALI addresses are shifted by the value “1”
  - Address range KNX 1...64 → DALI 0...63
  - KNX DALI device 1 → DALI address 0
  - ...
  - KNX DALI device 64 → DALI address 63
  - KNX DALI group 1 → DALI group 0
  - ...
  - KNX DALI group 16 → DALI group 15
  - KNX DALI scene 1 → DALI scene 0
  - ...
  - KNX DALI scene 16 → DALI scene 15



# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### DALI commands and cyclical queries

The most common DALI commands

- Direct Arc Power Control (ballast or group)
  - When “DAP (/eve/)” is received, the ballast starts fading to the desired level
  - The transition begins with the corresponding fade time

| Line # | Type   | Hex Data | Address | Command                             | Time         | Date       | Comment |
|--------|--------|----------|---------|-------------------------------------|--------------|------------|---------|
| 29     | Query  | 0990     | A4      | QUERY STATUS                        | 09:35:50.320 | 09.11.2021 |         |
| 30     | Answer | 00       |         | = 0 (0x00)                          | 09:35:50.333 | 09.11.2021 |         |
| 31     | Query  | 09A0     | A4      | QUERY ACTUAL LEVEL                  | 09:35:52.328 | 09.11.2021 |         |
| 32     | Answer | 00       |         | = 0 (0x00)                          | 09:35:52.340 | 09.11.2021 |         |
| 33     | Query  | 0B90     | A5      | QUERY STATUS                        | 09:35:54.349 | 09.11.2021 |         |
| 34     | Answer | 00       |         | = 0 (0x00)                          | 09:35:54.364 | 09.11.2021 |         |
| 35     | DAP    | 02FE     | A1      | DIRECT ARC POWER (DAPC) 254 (100 %) | 09:35:55.920 | 09.11.2021 |         |
| 36     | Query  | 0B90     | A5      | QUERY STATUS                        | 09:35:56.349 | 09.11.2021 |         |
| 37     | Answer | FF       |         | = 255 (0xFF)                        | 09:35:56.362 | 09.11.2021 |         |
| 38     | Query  | 0D90     | A6      | QUERY STATUS                        | 09:35:58.371 | 09.11.2021 |         |
| 39     | Answer | 00       |         | = 0 (0x00)                          | 09:35:58.383 | 09.11.2021 |         |
| 40     | Query  | 0DA0     | A6      | QUERY ACTUAL LEVEL                  | 09:36:00.378 | 09.11.2021 |         |
| 41     | Answer | 00       |         | = 0 (0x00)                          | 09:36:00.391 | 09.11.2021 |         |
| 42     | Query  | 0E90     | A7      | QUERY STATUS                        | 09:36:02.380 | 09.11.2021 |         |
| 43     | Answer | 00       |         | = 0 (0x00)                          | 09:36:02.393 | 09.11.2021 |         |
| 44     | Query  | 0F90     | A8      | QUERY STATUS                        | 09:36:04.380 | 09.11.2021 |         |
| 45     | Answer | 00       |         | = 0 (0x00)                          | 09:36:04.393 | 09.11.2021 |         |
| 46     | Query  | 10A0     | A8      | QUERY ACTUAL LEVEL                  | 09:36:06.441 | 09.11.2021 |         |
| 47     | Answer | 00       |         | = 0 (0x00)                          | 09:36:06.454 | 09.11.2021 |         |
| 48     | Query  | 11A0     | A8      | QUERY ACTUAL LEVEL                  | 09:36:08.436 | 09.11.2021 |         |
| 49     | Answer | 00       |         | = 0 (0x00)                          | 09:36:08.449 | 09.11.2021 |         |
| 50     | Query  | 12A0     | A8      | QUERY ACTUAL LEVEL                  | 09:36:10.436 | 09.11.2021 |         |
| 51     | Answer | 00       |         | = 0 (0x00)                          | 09:36:10.449 | 09.11.2021 |         |
| 52     | Query  | 13A0     | A8      | QUERY ACTUAL LEVEL                  | 09:36:12.436 | 09.11.2021 |         |
| 53     | Answer | 00       |         | = 0 (0x00)                          | 09:36:12.449 | 09.11.2021 |         |
| 54     | Query  | 14A0     | A8      | QUERY ACTUAL LEVEL                  | 09:36:14.436 | 09.11.2021 |         |

Level instruction “Direct Arc Power Control” – DALI ballast 1: 254 level (100% light output)  
→ KNX ballast 2 !

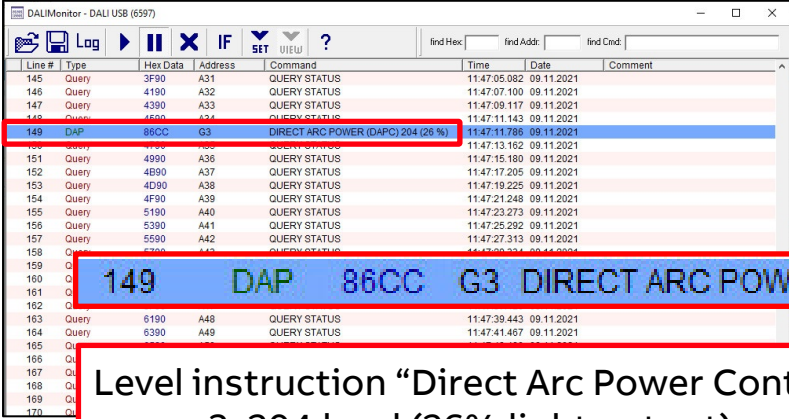
# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### DALI commands and cyclical queries

The most common DALI commands

- Direct Arc Power Control (ballast or group)
  - When “DAP (/eve/)” is received, the group starts fading to the desired level
  - The transition begins with the corresponding fade time



| Line # | Type  | Hex Data | Address | Command                            | Time         | Date       | Comment |
|--------|-------|----------|---------|------------------------------------|--------------|------------|---------|
| 145    | Query | 3F90     | A31     | QUERY STATUS                       | 11:47:05.082 | 09.11.2021 |         |
| 146    | Query | 4190     | A32     | QUERY STATUS                       | 11:47:07.100 | 09.11.2021 |         |
| 147    | Query | 4390     | A33     | QUERY STATUS                       | 11:47:09.117 | 09.11.2021 |         |
| 148    | Query | 4590     | A34     | QUERY STATUS                       | 11:47:11.143 | 09.11.2021 |         |
| 149    | DAP   | 86CC     | G3      | DIRECT ARC POWER (DAPC) 204 (26 %) | 11:47:11.786 | 09.11.2021 |         |
| 150    | Query | 4790     | A35     | QUERY STATUS                       | 11:47:13.162 | 09.11.2021 |         |
| 151    | Query | 4990     | A36     | QUERY STATUS                       | 11:47:15.180 | 09.11.2021 |         |
| 152    | Query | 4B90     | A37     | QUERY STATUS                       | 11:47:17.205 | 09.11.2021 |         |
| 153    | Query | 4D90     | A38     | QUERY STATUS                       | 11:47:19.225 | 09.11.2021 |         |
| 154    | Query | 4F90     | A39     | QUERY STATUS                       | 11:47:21.248 | 09.11.2021 |         |
| 155    | Query | 5190     | A40     | QUERY STATUS                       | 11:47:23.273 | 09.11.2021 |         |
| 156    | Query | 5390     | A41     | QUERY STATUS                       | 11:47:25.292 | 09.11.2021 |         |
| 157    | Query | 5590     | A42     | QUERY STATUS                       | 11:47:27.313 | 09.11.2021 |         |
| 158    | Query | 5790     | A43     | QUERY STATUS                       | 11:47:29.334 | 09.11.2021 |         |
| 159    | Query | 5990     | A44     | QUERY STATUS                       | 11:47:31.355 | 09.11.2021 |         |
| 160    | Query | 5B90     | A45     | QUERY STATUS                       | 11:47:33.376 | 09.11.2021 |         |
| 161    | Query | 5D90     | A46     | QUERY STATUS                       | 11:47:35.397 | 09.11.2021 |         |
| 162    | Query | 5F90     | A47     | QUERY STATUS                       | 11:47:37.418 | 09.11.2021 |         |
| 163    | Query | 6190     | A48     | QUERY STATUS                       | 11:47:39.443 | 09.11.2021 |         |
| 164    | Query | 6390     | A49     | QUERY STATUS                       | 11:47:41.467 | 09.11.2021 |         |
| 165    | Query | 6590     | A50     | QUERY STATUS                       | 11:47:43.488 | 09.11.2021 |         |
| 166    | Query | 6790     | A51     | QUERY STATUS                       | 11:47:45.509 | 09.11.2021 |         |
| 167    | Query | 6990     | A52     | QUERY STATUS                       | 11:47:47.530 | 09.11.2021 |         |
| 168    | Query | 6B90     | A53     | QUERY STATUS                       | 11:47:49.551 | 09.11.2021 |         |
| 169    | Query | 6D90     | A54     | QUERY STATUS                       | 11:47:51.572 | 09.11.2021 |         |
| 170    | Query | 6F90     | A55     | QUERY STATUS                       | 11:47:53.593 | 09.11.2021 |         |

149 DAP 86CC G3 DIRECT ARC POWER (DAPC) 204 (26 %)

Level instruction “Direct Arc Power Control” – DALI group 3: 204 level (26% light output)  
→ KNX group 4 !

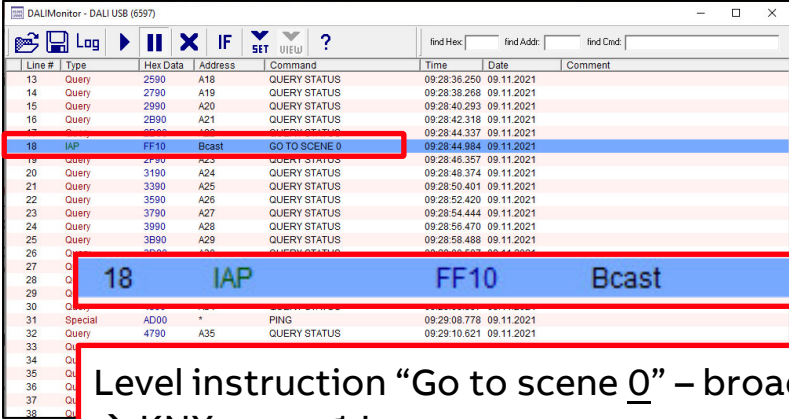
# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### DALI commands and cyclical queries

The most common DALI commands

- Go To Scene
  - The scene value stored in the ballast is recalled



| Line # | Type    | Hex Data | Address | Command       | Time         | Date       | Comment |
|--------|---------|----------|---------|---------------|--------------|------------|---------|
| 13     | Query   | 2590     | A18     | QUERY STATUS  | 09:28:36.250 | 09.11.2021 |         |
| 14     | Query   | 2790     | A19     | QUERY STATUS  | 09:28:38.268 | 09.11.2021 |         |
| 15     | Query   | 2990     | A20     | QUERY STATUS  | 09:28:40.293 | 09.11.2021 |         |
| 16     | Query   | 2B90     | A21     | QUERY STATUS  | 09:28:42.318 | 09.11.2021 |         |
| 17     | Query   | 2D90     | A22     | QUERY STATUS  | 09:28:44.337 | 09.11.2021 |         |
| 18     | IAP     | FF10     | Bcast   | GO TO SCENE 0 | 09:28:44.984 | 09.11.2021 |         |
| 19     | Query   | 2F90     | A23     | QUERY STATUS  | 09:28:46.357 | 09.11.2021 |         |
| 20     | Query   | 3190     | A24     | QUERY STATUS  | 09:28:48.374 | 09.11.2021 |         |
| 21     | Query   | 3390     | A25     | QUERY STATUS  | 09:28:50.401 | 09.11.2021 |         |
| 22     | Query   | 3590     | A26     | QUERY STATUS  | 09:28:52.420 | 09.11.2021 |         |
| 23     | Query   | 3790     | A27     | QUERY STATUS  | 09:28:54.444 | 09.11.2021 |         |
| 24     | Query   | 3990     | A28     | QUERY STATUS  | 09:28:56.470 | 09.11.2021 |         |
| 25     | Query   | 3B90     | A29     | QUERY STATUS  | 09:28:58.488 | 09.11.2021 |         |
| 26     | Query   | 3D90     | A2A     | QUERY STATUS  | 09:28:59.503 | 09.11.2021 |         |
| 27     | Query   | 3F90     | A2B     | QUERY STATUS  | 09:29:01.521 | 09.11.2021 |         |
| 28     | Query   | 4190     | A2C     | QUERY STATUS  | 09:29:03.540 | 09.11.2021 |         |
| 29     | Query   | 4390     | A2D     | QUERY STATUS  | 09:29:05.558 | 09.11.2021 |         |
| 30     | Query   | 4590     | A2E     | QUERY STATUS  | 09:29:07.577 | 09.11.2021 |         |
| 31     | Special | AD00     | *       | PING          | 09:29:08.778 | 09.11.2021 |         |
| 32     | Query   | 4790     | A35     | QUERY STATUS  | 09:29:10.621 | 09.11.2021 |         |
| 33     | Query   | 4990     | A36     | QUERY STATUS  | 09:29:12.640 | 09.11.2021 |         |
| 34     | Query   | 4B90     | A37     | QUERY STATUS  | 09:29:14.658 | 09.11.2021 |         |
| 35     | Query   | 4D90     | A38     | QUERY STATUS  | 09:29:16.677 | 09.11.2021 |         |
| 36     | Query   | 4F90     | A39     | QUERY STATUS  | 09:29:18.696 | 09.11.2021 |         |
| 37     | Query   | 5190     | A3A     | QUERY STATUS  | 09:29:20.714 | 09.11.2021 |         |
| 38     | Query   | 5390     | A3B     | QUERY STATUS  | 09:29:22.733 | 09.11.2021 |         |

18 IAP FF10 Bcast GO TO SCENE 0

Level instruction "Go to scene 0" – broadcast  
→ KNX scene 1 !

# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### DALI commands and cyclical queries

The most common DALI commands

#### – Set Fade Time (ballast/group)

- To store a new fade time
- The ballast only has a fade time. If the times are different (ON 4 sec. and OFF 2 sec.) it is sent again to DTR0 (data transfer register 0) and stored (set fade time G2) before a command (e.g. direct arc power) follows
- DTR0=0: 0.0 sec.  
DTR0=1: 0.7 sec.  
DTR0=2: 1.0 sec  
DTR0=3: 1.4 sec  
DTR0=4: 2.0 sec.  
DTR0=6: 4.0 sec  
DTR0=12: 32.0 sec.  
...  
DTR0=15: 90.5 sec

| Line # | Type    | Hex Data | Address | Command                             | Time         | Date       | Comment |
|--------|---------|----------|---------|-------------------------------------|--------------|------------|---------|
| 436    | Query   | 3B90     | A29     | QUERY STATUS                        | 10:09:17.761 | 09.11.2021 |         |
| 437    | Query   | 3D90     | A30     | QUERY STATUS                        | 10:09:19.785 | 09.11.2021 |         |
| 438    | Query   | 3F90     | A31     | QUERY STATUS                        | 10:09:21.801 | 09.11.2021 |         |
| 439    | Query   | 4190     | A32     | QUERY STATUS                        | 10:09:23.824 | 09.11.2021 |         |
| 440    | Query   | 4390     | A33     | QUERY STATUS                        | 10:09:25.850 | 09.11.2021 |         |
| 441    | Special | A306     | *       | DTR0= 6 (0x06)                      | 10:09:27.313 | 09.11.2021 |         |
| 442    | Conf    | 852E     | G2      | SET FADE TIME (DTR0)                | 10:09:27.343 | 09.11.2021 |         |
| 443    | Conf    | 852E     | G2      | SET FADE TIME (DTR0)                | 10:09:27.373 | 09.11.2021 |         |
| 444    | DNP     | 84FE     | G2      | DIRECT ARC POWER (DAPC) 254 (100 %) | 10:09:27.401 | 09.11.2021 |         |
| 445    | Query   | 4590     | A34     | QUERY STATUS                        | 10:09:27.858 | 09.11.2021 |         |
| 446    | Query   | 4790     | A35     | QUERY STATUS                        | 10:09:29.894 | 09.11.2021 |         |
| 447    | Query   | 4990     | A36     | QUERY STATUS                        | 10:09:31.918 | 09.11.2021 |         |
| 448    | Query   | 4B90     | A37     | QUERY STATUS                        | 10:09:33.940 | 09.11.2021 |         |
| 449    | Query   | 4D90     | A38     | QUERY STATUS                        | 10:09:35.965 | 09.11.2021 |         |
| 450    | Query   | 4F90     | A39     | QUERY STATUS                        | 10:09:37.989 | 09.11.2021 |         |
| 451    | Query   | 5190     | A40     | QUERY STATUS                        | 10:09:39.999 | 09.11.2021 |         |
| 452    | Query   | 5390     | A41     | QUERY STATUS                        | 10:09:42.000 | 09.11.2021 |         |
| 453    | Query   | 5590     | A42     | QUERY STATUS                        | 10:09:44.000 | 09.11.2021 |         |
| 454    | Query   | 5790     | A43     | QUERY STATUS                        | 10:09:46.000 | 09.11.2021 |         |
| 455    | Query   | 5990     | A44     | QUERY STATUS                        | 10:09:48.000 | 09.11.2021 |         |
| 456    | Query   | 5B90     | A45     | QUERY STATUS                        | 10:09:50.000 | 09.11.2021 |         |
| 457    | Query   | 5D90     | A46     | QUERY STATUS                        | 10:09:52.000 | 09.11.2021 |         |
| 458    | Query   | 5F90     | A47     | QUERY STATUS                        | 10:09:54.000 | 09.11.2021 |         |
| 459    | Query   | 6190     | A48     | QUERY STATUS                        | 10:09:56.000 | 09.11.2021 |         |
| 460    | Query   | 6390     | A49     | QUERY STATUS                        | 10:09:58.000 | 09.11.2021 |         |
| 461    | Query   | 6590     | A50     | QUERY STATUS                        | 10:10:00.000 | 09.11.2021 |         |

|     |         |      |    |                      |  |  |  |
|-----|---------|------|----|----------------------|--|--|--|
| 441 | Special | A306 | *  | DTR0= 6 (0x06)       |  |  |  |
| 442 | Conf    | 852E | G2 | SET FADE TIME (DTR0) |  |  |  |
| 443 | Conf    | 852E | G2 | SET FADE TIME (DTR0) |  |  |  |

|     |         |      |    |                      |  |  |  |
|-----|---------|------|----|----------------------|--|--|--|
| 428 | Special | A304 | *  | DTR0= 4 (0x04)       |  |  |  |
| 429 | Conf    | 852E | G2 | SET FADE TIME (DTR0) |  |  |  |
| 430 | Conf    | 852E | G2 | SET FADE TIME (DTR0) |  |  |  |

Switch ON:  
Fade time of  
4 sec.

Switch OFF:  
Fade time of  
2 sec.

Configuration instruction “Set fade time” – DALI  
group 2: ON 4 sec. and OFF 2 sec.  
→ KNX group 3 !

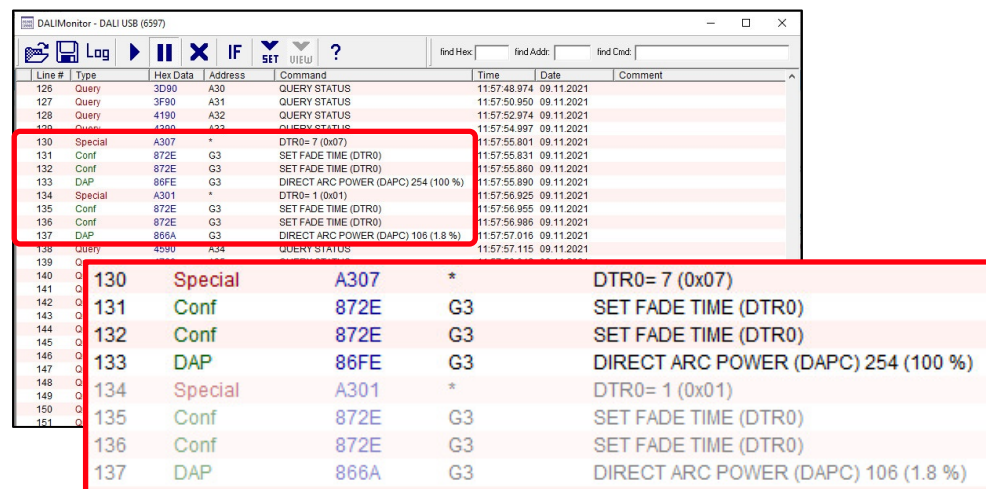
# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### DALI commands and cyclical queries

The most common DALI commands

- DALI there is no start/stop dimming as specified for KNX
- Therefore, dimming is implemented as follows:
  - Start dim:  
Send fade time to DTR0 (e.g. 7=5.7 sec)  
Set fade time (ballast/group)  
Send direct arc power to max level (dim up) or min level (dim down)  
→ Ballast/group starts dim up/down
  - Stop dim:  
Send fade time to DTR0=1 (0.7 sec), fastest possible time  
Set fade time (ballast/group)  
The DALI Gateway calculates the dim stop value and sends direct arc power level to synchronize all ballasts of the group  
→ Ballast/group stops dim and adopts the sent value



|     |         |      |    |                                     |
|-----|---------|------|----|-------------------------------------|
| 130 | Special | A307 | *  | DTR0= 7 (0x07)                      |
| 131 | Conf    | 872E | G3 | SET FADE TIME (DTR0)                |
| 132 | Conf    | 872E | G3 | SET FADE TIME (DTR0)                |
| 133 | DAP     | 86FE | G3 | DIRECT ARC POWER (DAPC) 254 (100 %) |
| 134 | Special | A301 | *  | DTR0= 1 (0x01)                      |
| 135 | Conf    | 872E | G3 | SET FADE TIME (DTR0)                |
| 136 | Conf    | 872E | G3 | SET FADE TIME (DTR0)                |
| 137 | DAP     | 866A | G3 | DIRECT ARC POWER (DAPC) 106 (1.8 %) |

#### Start dim:

- Special command “DTR0 – Send fade time” – 5.7 sec.
- Configuration instruction “Set fade time” – DALI group 3: 5.7 sec.
- Level instruction “Direct Arc Power Control” – DALI group 3: 254 level (100% light output)

# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### DALI commands and cyclical queries

The most common DALI commands

- DALI there is no start/stop dimming as specified for KNX
- Therefore, dimming is implemented as follows:
  - Start dim:  
Send fade time to DTR0 (e.g. 7=5.7 sec)  
Set fade time (ballast/group)  
Send direct arc power to max level (dim up) or min level (dim down)  
→ Ballast/group starts dim up/down
  - Stop dim:  
Send fade time to DTR0=1 (0.7 sec), fastest possible time  
Set fade time (ballast/group)  
The DALI Gateway calculates the dim stop value and sends direct arc power level to synchronize all ballasts of the group  
→ Ballast/group stops dim and adopts the sent value

|        |         |          |         |                                     |              |            |         |
|--------|---------|----------|---------|-------------------------------------|--------------|------------|---------|
| Line # | Type    | Hex Data | Address | Command                             | Time         | Date       | Comment |
| 126    | Query   | 3D00     | A30     | QUERY STATUS                        | 11:57:48.974 | 09.11.2021 |         |
| 127    | Query   | 3F90     | A31     | QUERY STATUS                        | 11:57:50.950 | 09.11.2021 |         |
| 128    | Query   | 4190     | A32     | QUERY STATUS                        | 11:57:52.974 | 09.11.2021 |         |
| 129    | Query   | 4390     | A33     | QUERY STATUS                        | 11:57:54.997 | 09.11.2021 |         |
| 130    | Special | A307     | *       | DTR0= 7 (0x07)                      | 11:57:55.801 | 09.11.2021 |         |
| 131    | Conf    | 872E     | G3      | SET FADE TIME (DTR0)                | 11:57:55.831 | 09.11.2021 |         |
| 132    | Conf    | 872E     | G3      | SET FADE TIME (DTR0)                | 11:57:55.860 | 09.11.2021 |         |
| 133    | DAP     | 86FE     | G3      | DIRECT ARC POWER (DAPC) 254 (100 %) | 11:57:55.890 | 09.11.2021 |         |
| 134    | Special | A301     | *       | DTR0= 1 (0x01)                      | 11:57:56.925 | 09.11.2021 |         |
| 135    | Conf    | 872E     | G3      | SET FADE TIME (DTR0)                | 11:57:56.955 | 09.11.2021 |         |
| 136    | Conf    | 872E     | G3      | SET FADE TIME (DTR0)                | 11:57:56.986 | 09.11.2021 |         |
| 137    | DAP     | 866A     | G3      | DIRECT ARC POWER (DAPC) 106 (1.8 %) | 11:57:57.016 | 09.11.2021 |         |
| 138    | Query   | 4590     | A34     | QUERY STATUS                        | 11:57:57.115 | 09.11.2021 |         |
| 139    | Q       |          |         |                                     |              |            |         |
| 140    | Q       |          |         |                                     |              |            |         |
| 141    | Q       |          |         |                                     |              |            |         |
| 142    | Q       |          |         |                                     |              |            |         |
| 143    | Q       |          |         |                                     |              |            |         |
| 144    | Q       |          |         |                                     |              |            |         |
| 145    | Q       |          |         |                                     |              |            |         |
| 146    | Q       |          |         |                                     |              |            |         |
| 147    | Q       |          |         |                                     |              |            |         |
| 148    | Q       |          |         |                                     |              |            |         |
| 149    | Q       |          |         |                                     |              |            |         |
| 150    | Q       |          |         |                                     |              |            |         |
| 151    | Q       |          |         |                                     |              |            |         |

|     |         |      |    |                                     |  |  |  |
|-----|---------|------|----|-------------------------------------|--|--|--|
| 130 | Special | A307 | *  | DTR0= 7 (0x07)                      |  |  |  |
| 131 | Conf    | 872E | G3 | SET FADE TIME (DTR0)                |  |  |  |
| 132 | Conf    | 872E | G3 | SET FADE TIME (DTR0)                |  |  |  |
| 133 | DAP     | 86FE | G3 | DIRECT ARC POWER (DAPC) 254 (100 %) |  |  |  |
| 134 | Special | A301 | *  | DTR0= 1 (0x01)                      |  |  |  |
| 135 | Conf    | 872E | G3 | SET FADE TIME (DTR0)                |  |  |  |
| 136 | Conf    | 872E | G3 | SET FADE TIME (DTR0)                |  |  |  |
| 137 | DAP     | 866A | G3 | DIRECT ARC POWER (DAPC) 106 (1.8 %) |  |  |  |

#### Stop dim:

- Special command “DTR0 – Send fade time” – 0.7 sec.
- Configuration instruction “Set fade time” – DALI group 3: 0.7 sec.
- Level instruction “Direct Arc Power Control” – DALI group 3: 106 level (1.8% light output)



# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### DALI commands and cyclical queries

DALI cyclical queries (DALI address 0...63)

- Queries are used to retrieve property values from a device
- The addressed device returns the queried property value in a backward frame
  - Query status
  - Query actual level
  - Query power on level
  - Query lamp fault
  - Query missing short address
  - Query control gear present
  - Query device type
  - ....

|                               |                                   |       |
|-------------------------------|-----------------------------------|-------|
| IEC 62386-102:2014 © IEC 2014 |                                   | – 5 – |
| 11.5                          | Queries .....                     | 63    |
| 11.5.1                        | General .....                     | 63    |
| 11.5.2                        | QUERY STATUS .....                | 63    |
| 11.5.3                        | QUERY CONTROL GEAR PRESENT .....  | 63    |
| 11.5.4                        | QUERY CONTROL GEAR FAILURE .....  | 63    |
| 11.5.5                        | QUERY LAMP FAILURE .....          | 63    |
| 11.5.6                        | QUERY LAMP POWER ON .....         | 63    |
| 11.5.7                        | QUERY LIMIT ERROR .....           | 63    |
| 11.5.8                        | QUERY RESET STATE .....           | 63    |
| 11.5.9                        | QUERY MISSING SHORT ADDRESS ..... | 63    |
| 11.5.10                       | QUERY VERSION NUMBER .....        | 64    |
| 11.5.11                       | QUERY CONTENT DTR0 .....          | 64    |
| 11.5.12                       | QUERY DEVICE TYPE .....           | 64    |
| 11.5.13                       | QUERY NEXT DEVICE TYPE .....      | 64    |
| 11.5.14                       | QUERY PHYSICAL MINIMUM .....      | 64    |
| 11.5.15                       | QUERY POWER FAILURE .....         | 64    |
| 11.5.16                       | QUERY CONTENT DTR1 .....          | 64    |
| 11.5.17                       | QUERY CONTENT DTR2 .....          | 64    |
| 11.5.18                       | QUERY OPERATING MODE .....        | 65    |
| 11.5.19                       | QUERY LIGHT SOURCE TYPE .....     | 65    |
| 11.5.20                       | QUERY ACTUAL LEVEL .....          | 65    |
| 11.5.21                       | QUERY MAX LEVEL .....             | 65    |

|     |        |      |    |              |
|-----|--------|------|----|--------------|
| 606 | Query  | 0B90 | A5 | QUERY STATUS |
| 607 | Answer | 02   |    | = 2 (0x02)   |



# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### DALI commands and cyclical queries

DALI cyclical queries (DALI address 0...63)

- The DALI Gateway automatically and cyclically sends queries on the DALI line
- The commands are sent between the queries
- These queries are used to determine whether there is a DALI device with a DALI address, lamp fault, ...
- The pause between DALI queries can be parameterized
  - Options: 0...20...255 x 100 msec.
  - When accessing with the ABB i-bus® Tool or “0” setting runs the query poll as quickly as possible (pause of 30...40 msec.)
  - This parameter setting has an impact on the DALI telegram load
  - A long interval reduces the load significantly
    - However, a fault on a DALI device may not be detected straight away
    - Pause of 2 sec and 2 queries per device → a fault is detected after 126 seconds at the latest

3.7.151 DALI DG/S > DALI output A > A DALI configuration

– DALI output A

Enable automatic DALI addressing ☒ No ☐ Yes

A DALI configuration

Pause between QUERY STATUS polls 20 x 100 ms

+ A Output

Irrespectively of this, an emergency lighting converter is polled every 64 seconds.

DALIMonitor - DALI USB (6597)

Log | IF | SET | VIEW | ?

find Hex: find Addr: find Cmd:

| Line # | Type   | Hex Data | Address | Command                             | Time         | Date       | Comment   |
|--------|--------|----------|---------|-------------------------------------|--------------|------------|-----------|
| 105    | Query  | 7790     | A59     | QUERY STATUS                        | 10:39:33.316 | 10.11.2021 |           |
| 106    | Query  | 7990     | A60     | QUERY STATUS                        | 10:39:35.340 | 10.11.2021 |           |
| 107    | Query  | 7B90     | A61     | QUERY STATUS                        | 10:39:37.357 | 10.11.2021 |           |
| 108    | DAP    | 02FE     | A1      | DIRECT ARC POWER (DAPC) 254 (100 %) | 10:39:38.065 | 10.11.2021 | ← Command |
| 109    | Query  | 7D90     | A62     | QUERY STATUS                        | 10:39:39.377 | 10.11.2021 |           |
| 110    | Query  | 7F90     | A63     | QUERY STATUS                        | 10:39:41.396 | 10.11.2021 |           |
| 111    | Query  | 0190     | A0      | QUERY STATUS                        | 10:39:45.423 | 10.11.2021 |           |
| 112    | Answer | 00       |         | = 0 (0x00)                          | 10:39:45.435 | 10.11.2021 |           |
| 113    | Query  | 01A0     | A0      | QUERY ACTUAL LEVEL                  | 10:39:47.424 | 10.11.2021 |           |
| 114    | Answer | 00       |         | = 0 (0x00)                          | 10:39:47.438 | 10.11.2021 | ↻ 2 sec.  |
| 115    | Query  | 0390     | A1      | QUERY STATUS                        | 10:39:49.443 | 10.11.2021 |           |
| 116    | Answer | 04       |         | = 4 (0x04)                          | 10:39:49.460 | 10.11.2021 |           |
| 117    | Conf   | FF2E     | Bcast   | SET FADE TIME (DTR0)                | 10:39:50.188 | 10.11.2021 |           |
| 118    | Conf   | FF2E     | Bcast   | SET FADE TIME (DTR0)                | 10:39:50.217 | 10.11.2021 |           |
| 119    | IAP    | FF10     | Bcast   | GO TO SCENE 0                       | 10:39:50.247 | 10.11.2021 |           |
| 120    | Query  | 03A0     | A1      | QUERY ACTUAL LEVEL                  | 10:39:51.448 | 10.11.2021 |           |
| 121    | Answer | FE       |         | = 254 (0xFE)                        | 10:39:51.461 | 10.11.2021 |           |
| 122    | Query  | 0590     | A2      | QUERY STATUS                        | 10:39:53.469 | 10.11.2021 |           |
| 123    | Answer | 04       |         | = 4 (0x04)                          | 10:39:53.483 | 10.11.2021 |           |
| 124    | Query  | 05A0     | A2      | QUERY ACTUAL LEVEL                  | 10:39:55.475 | 10.11.2021 |           |
| 125    | Answer | FE       |         | = 254 (0xFE)                        | 10:39:55.492 | 10.11.2021 |           |

# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

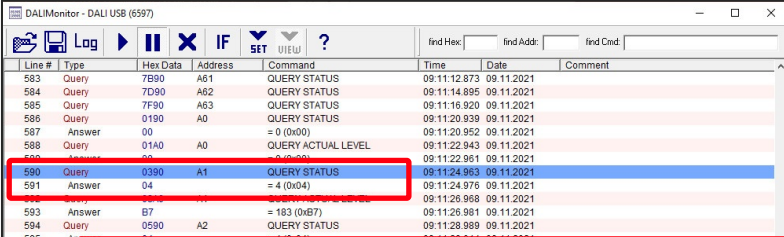
### DALI commands and cyclical queries

DALI cyclical queries (DALI address 0...63)

- The DALI Gateway DG/S Basic and Premium as the Master sends
  - Query “Status” (8-bit, combination of device properties)
    - Bit 0: Ballast fault
    - Bit 1: Lamp fault
    - Bit 2: Lamp on
    - Bit 3: Limit error
    - Bit 4: Fade running
    - Bit 5: Reset state
    - Bit 6: Short address is masked
    - Bit 7: Power cycle seen

→ The answer is transferred and sent to KNX, e.g. lamp fault
  - Query “Actual level” (8-bit)

The answer is not evaluated and can be used for diagnosis with DALI monitor tool



| Line # | Type   | Hex Data | Address | Command            | Time         | Date       | Comment |
|--------|--------|----------|---------|--------------------|--------------|------------|---------|
| 583    | Query  | 7B90     | A61     | QUERY STATUS       | 09:11:12.873 | 09.11.2021 |         |
| 584    | Query  | 7D90     | A62     | QUERY STATUS       | 09:11:14.895 | 09.11.2021 |         |
| 585    | Query  | 7F90     | A63     | QUERY STATUS       | 09:11:16.920 | 09.11.2021 |         |
| 586    | Query  | 0190     | A0      | QUERY STATUS       | 09:11:20.939 | 09.11.2021 |         |
| 587    | Answer | 00       |         | = 0 (0x00)         | 09:11:20.952 | 09.11.2021 |         |
| 588    | Query  | 01A0     | A0      | QUERY ACTUAL LEVEL | 09:11:22.943 | 09.11.2021 |         |
| 589    | Answer | 00       |         | = 0 (0x00)         | 09:11:22.961 | 09.11.2021 |         |
| 590    | Query  | 0390     | A1      | QUERY STATUS       | 09:11:24.963 | 09.11.2021 |         |
| 591    | Answer | 04       |         | = 4 (0x04)         | 09:11:24.976 | 09.11.2021 |         |
| 593    | Answer | B7       |         | = 183 (0xB7)       | 09:11:26.968 | 09.11.2021 |         |
| 594    | Query  | 0590     | A2      | QUERY STATUS       | 09:11:28.989 | 09.11.2021 |         |
| 595    | Answer |          |         |                    |              |            |         |
| 596    | Query  |          |         |                    |              |            |         |
| 597    | Answer |          |         |                    |              |            |         |
| 598    | Query  |          |         |                    |              |            |         |
| 599    | Answer |          |         |                    |              |            |         |
| 600    | Query  |          |         |                    |              |            |         |
| 601    | Answer |          |         |                    |              |            |         |
| 602    | Query  | 0990     | A4      | QUERY STATUS       | 09:11:37.045 | 09.11.2021 |         |
| 603    | Answer |          |         |                    |              |            |         |
| 604    | Query  |          |         |                    |              |            |         |
| 605    | Answer |          |         |                    |              |            |         |
| 606    | Query  |          |         |                    |              |            |         |
| 607    | Answer |          |         |                    |              |            |         |
| 608    | Query  |          |         |                    |              |            |         |
| 609    | Answer |          |         |                    |              |            |         |
| 610    | Query  |          |         |                    |              |            |         |
| 611    | Answer |          |         |                    |              |            |         |
| 612    | Query  |          |         |                    |              |            |         |
| 613    | Answer |          |         |                    |              |            |         |
| 614    | Query  |          |         |                    |              |            |         |
| 615    | Answer |          |         |                    |              |            |         |
| 616    | Query  |          |         |                    |              |            |         |
| 617    | Answer |          |         |                    |              |            |         |
| 618    | Query  |          |         |                    |              |            |         |

Query “Status” to DALI device 1 (A1)  
Answer from addressed device: 04hex → 00000100

Bit 0: No ballast fault  
Bit 1: No lamp fault  
**Bit 2: Lamp on**  
Bit 3: No limit error  
Bit 4: No fade running  
Bit 5: No reset state  
Bit 6: No short address is masked  
Bit 7: No power cycle seen

# KNX DALI Gateways – Practical knowledge about DALI – Part 1

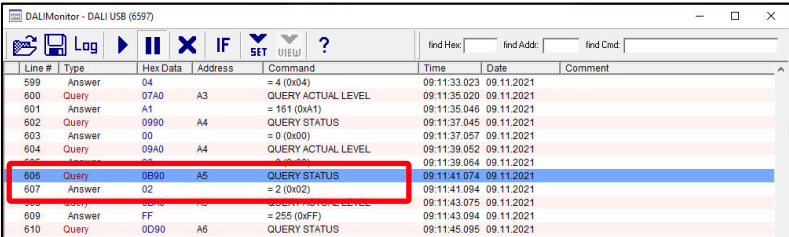
## Online Learning Session

### DALI commands and cyclical queries

DALI cyclical queries (DALI address 0...63)

– The DALI Gateway DG/S Basic and Premium as the Master sends

- Query “Status” (8-bit, combination of device properties)
  - Bit 0: Ballast fault
  - Bit 1: Lamp fault
  - Bit 2: Lamp on
  - Bit 3: Limit error
  - Bit 4: Fade running
  - Bit 5: Reset state
  - Bit 6: Short address is masked
  - Bit 7: Power cycle seen→ The answer is transferred and sent to KNX, e.g. lamp fault
- Query “Actual level” (8-bit)  
The answer is not evaluated and can be used for diagnosis with DALI monitor tool



| Line # | Type   | Hex Data | Address | Command            | Time         | Date       | Comment |
|--------|--------|----------|---------|--------------------|--------------|------------|---------|
| 599    | Answer | 04       |         | = 4 (0x04)         | 09:11:33.023 | 09.11.2021 |         |
| 600    | Query  | 07A0     | A3      | QUERY ACTUAL LEVEL | 09:11:35.020 | 09.11.2021 |         |
| 601    | Answer | A1       |         | = 161 (0xA1)       | 09:11:35.046 | 09.11.2021 |         |
| 602    | Query  | 0990     | A4      | QUERY STATUS       | 09:11:37.045 | 09.11.2021 |         |
| 603    | Answer | 00       |         | = 0 (0x00)         | 09:11:37.057 | 09.11.2021 |         |
| 604    | Query  | 09A0     | A4      | QUERY ACTUAL LEVEL | 09:11:39.052 | 09.11.2021 |         |
| 605    | Query  | 0B90     | A5      | QUERY STATUS       | 09:11:41.074 | 09.11.2021 |         |
| 607    | Answer | 02       |         | = 2 (0x02)         | 09:11:41.094 | 09.11.2021 |         |
| 609    | Answer | FF       |         | = 255 (0xFF)       | 09:11:43.075 | 09.11.2021 |         |
| 610    | Query  | 0D90     | A6      | QUERY STATUS       | 09:11:43.094 | 09.11.2021 |         |
| 618    | Query  | 1190     | A8      | QUERY STATUS       | 09:11:53.154 | 09.11.2021 |         |

| Line # | Type   | Hex Data | Address | Command      |
|--------|--------|----------|---------|--------------|
| 606    | Query  | 0B90     | A5      | QUERY STATUS |
| 607    | Answer | 02       |         | = 2 (0x02)   |

Query “Status” to DALI device 5 (A5)  
Answer from addressed ballast: 02hex → 00000010

Bit 0: No ballast fault  
**Bit 1: Lamp fault**  
Bit 2: No lamp on  
Bit 3: No limit error  
Bit 4: No fade running  
Bit 5: No reset state  
Bit 6: No short address is masked  
Bit 7: No power cycle seen

# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### Diagnostic with “DALI Monitor” and DALI USB Interface

- Manufacturers offer interfaces between USB and DALI, e.g. Tridonic, Lunatone
- Together with software, the telegrams can be recorded and analyzed on the DALI line
  - Commands and queries sent by the DALI Gateway
  - Answers from the devices
- It can also be used to address, program DALI devices and set parameters (e.g. Tridonic “masterCONFIGURATOR” software)  
→ With the KNX DALI Gateway DG/S, however, this is done via the i-bus® Tool and the ETS
- The DALI USB interface has no DALI address



| DALIMonitor - DALI USB (6597) |        |          |         |                    |              |            |         |
|-------------------------------|--------|----------|---------|--------------------|--------------|------------|---------|
| Log                           |        |          |         |                    |              |            |         |
| Line #                        | Type   | Hex Data | Address | Command            | Time         | Date       | Comment |
| 493                           | Query  | 7990     | A60     | QUERY STATUS       | 08:57:43.390 | 09.11.2021 |         |
| 494                           | Query  | 7B90     | A61     | QUERY STATUS       | 08:57:45.412 | 09.11.2021 |         |
| 495                           | Query  | 7D90     | A62     | QUERY STATUS       | 08:57:47.429 | 09.11.2021 |         |
| 496                           | Query  | 7F90     | A63     | QUERY STATUS       | 08:57:49.454 | 09.11.2021 |         |
| 497                           | Query  | 0190     | A0      | QUERY STATUS       | 08:57:53.479 | 09.11.2021 |         |
| 498                           | Answer | 00       |         | = 0 (0x00)         | 08:57:53.492 | 09.11.2021 |         |
| 499                           | Query  | 01A0     | A0      | QUERY ACTUAL LEVEL | 08:57:55.483 | 09.11.2021 |         |
| 500                           | Answer | 00       |         | = 0 (0x00)         | 08:57:55.497 | 09.11.2021 |         |
| 501                           | Query  | 0390     | A1      | QUERY STATUS       | 08:57:57.504 | 09.11.2021 |         |
| 502                           | Answer | 04       |         | = 4 (0x04)         | 08:57:57.542 | 09.11.2021 |         |
| 503                           | Query  | 03A0     | A1      | QUERY ACTUAL LEVEL | 08:57:59.509 | 09.11.2021 |         |
| 504                           | Answer | B7       |         | = 183 (0xB7)       | 08:57:59.521 | 09.11.2021 |         |
| 505                           | Query  | 0590     | A2      | QUERY STATUS       | 08:58:01.536 | 09.11.2021 |         |
| 506                           | Answer | 04       |         | = 4 (0x04)         | 08:58:01.546 | 09.11.2021 |         |
| 507                           | Query  | 05A0     | A2      | QUERY ACTUAL LEVEL | 08:58:03.539 | 09.11.2021 |         |
| 508                           | Answer | FE       |         | = 254 (0xFE)       | 08:58:03.552 | 09.11.2021 |         |
| 509                           | Query  | 0790     | A3      | QUERY STATUS       | 08:58:05.561 | 09.11.2021 |         |
| 510                           | Answer | 04       |         | = 4 (0x04)         | 08:58:05.574 | 09.11.2021 |         |
| 511                           | Query  | 07A0     | A3      | QUERY ACTUAL LEVEL | 08:58:07.567 | 09.11.2021 |         |



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# **KNX DALI Gateways – Practical knowledge about DALI – Part 1**

Online Learning Session

# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### Homepage

[www.abb.com/KNX](http://www.abb.com/KNX)

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

- ETS Application
- ABB i-bus® Tool
- Product Manual
- Engineering Guides
- Installation and Operating Instructions
- Specification Text
- ...

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## Lighting Control

Modern light management

ABB i-bus® KNX ensures optimum lighting of industrial and office buildings as well as private dwellings. The lighting requirement is monitored and controlled. In addition, subsystems (such as 1 - 10 V lighting control, DALI) and their interfaces are supported.

**Main benefits**

- Increases energy efficiency by constant lighting and presence dependent control
- Improves comfort with light scenes
- More flexibility through reprogramming or adding devices while in operation to meet changing needs

**Main features**

- Universal dimming actuators for controlling loads of 210 VA up to 2400 VA
- Switch/dim actuators for switching and dimming electronic ballasts with 1-10 V control interfaces
- DALI Gateways for integration of DALI ballasts into KNX bus



### Products and Downloads

|              |                                     |                                                    |                         |             |                     |
|--------------|-------------------------------------|----------------------------------------------------|-------------------------|-------------|---------------------|
| All products | DALI Gateways and Light Controllers | 1-10V Switch / Dim Actuators and Light Controllers | Universal Dim Actuators | LED Dimmers | Light Level Sensors |
|--------------|-------------------------------------|----------------------------------------------------|-------------------------|-------------|---------------------|

Filters ▼

Search options ▼



# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### Software Repository

- Excel list in German and English
- Link to general product information
- Search for a KNX product and the corresponding software (firmware, ETS application) will be displayed
- Current firmware of Welcome IP and free@home devices
- 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](http://www.abb.com/KNX)
  - Additional materials
  - Downloads for KNX
  - Software Repository



NEW!!!

**ABB** HOME -> OFFERINGS -> LOW VOLTAGE

### Software Repository

Are you looking for a particular piece of software for your structured list of all current and older software versions.

We recommend ensuring that devices are always installed and operating using the latest firmware and software versions. Claims for defects or damages due to the use of software or firmware versions that have not been kept up to date will not be accepted. All information in this repository is supplied without guarantee.

**Find a product**

**Search**

**Product Search**

Enter either product type, product ID or device type of the product you are searching.

Select your language: English

Search Criterion: DG/S1.1

**Search** **Cancel**

are searching for. You will immediately receive a download the individual software files.

**Complete ETS Databases**

[ABB ETS5 Application Database](#)

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With the subscription to our News-Ticker you will be able to receive a short message informing you of the latest software releases.

[To the News-Ticker](#)

| General Product Information |           |                                    |             |                              |                      |
|-----------------------------|-----------|------------------------------------|-------------|------------------------------|----------------------|
| Product ID                  | Product T | Product Name                       | Device Type | History                      | Website              |
| 2CDG110026R0011             | DG/S1.1   | DG/S1.1 DALI Gateway, 1-fold, MDRC | A019        | <a href="#">Release Note</a> | <a href="#">Link</a> |

| Current Software Versions |         |                                        |              |                      |
|---------------------------|---------|----------------------------------------|--------------|----------------------|
| Software                  | Version | Application Name                       | Release Date | Download             |
| ETS3                      | 1.1c    | Dim Slave Light Scenes Dynamic 1f/1.1c | 01.01.2014   | <a href="#">Link</a> |
| ETS4 / ETS5               | 1.1c    | Dim Slave Light Scenes Dynamic 1f/1.1c | 01.01.2014   | <a href="#">Link</a> |
| Firmware                  | 1.3     | Software Tool                          | 29.06.2009   | <a href="#">Link</a> |
| I-bus® Tool               | 19.45.0 | ABB I-bus® Tool                        | 01.06.2021   | <a href="#">Link</a> |

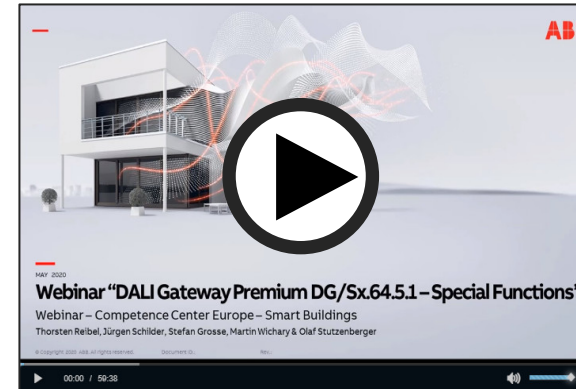
| Obsolete Software Versions |         |                                   |              |                      |
|----------------------------|---------|-----------------------------------|--------------|----------------------|
| Software                   | Version | Application Name                  | Release Date | Download             |
| ETS3                       | 1.0     | Dim Slave Light Scenes Dynamic 1f | 04.07.2006   | <a href="#">Link</a> |
| ETS3                       | 1.0a    | Dim Slave Light Scenes Dynamic 1f | 01.05.2007   | <a href="#">Link</a> |
| ETS4 / ETS5                | 1.0a    | Dim Slave Light Scenes Dynamic 1f | 01.05.2007   | <a href="#">Link</a> |
| ETS3                       | 1.1     | Dim Slave Light Scenes Dynamic 1f | 16.03.2011   | <a href="#">Link</a> |
| ETS4 / ETS5                | 1.1     | Dim Slave Light Scenes Dynamic 1f | 16.03.2011   | <a href="#">Link</a> |
| ETS3                       | 1.1a    | Dim Slave Light Scenes Dynamic 1f | 08.06.2011   | <a href="#">Link</a> |
| ETS4 / ETS5                | 1.1a    | Dim Slave Light Scenes Dynamic 1f | 08.06.2011   | <a href="#">Link</a> |
| ETS3                       | 1.1b    | Dim Slave Light Scenes Dynamic 1f | 01.03.2013   | <a href="#">Link</a> |
| ETS4 / ETS5                | 1.1b    | Dim Slave Light Scenes Dynamic 1f | 01.03.2013   | <a href="#">Link</a> |

# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### Training content

- This training mainly relates to the DALI basics and properties
- Extensive training content is available online for the DALI Gateway and ABB i-bus® Tool, e.g. emergency lighting, constant light control, human centric lighting, Dim2Warm, RGBW/HSVW, sequencer, load management, operating duration, standby switch-off, partial failure, ...
- Slides, tutorials and video recordings of webinars, online and practical learning sessions
  - [Training & Qualification Database](#)
  - YouTube, Channel “ABB Home and Building Automation”  
<https://www.youtube.com/user/ABBibusKNX>
- Function descriptions, application guides, video tutorials, step-by-step guides:
  - [Engineering Guide Database](#)



### DALI Gateways

#### Replacing a DALI Gateway

|                         |                    |          |                           |
|-------------------------|--------------------|----------|---------------------------|
| GPG BUILDING AUTOMATION |                    |          |                           |
| Doc. Type               | Step-by-Step Guide | Doc. Nr. | 9AKK027492A6668           |
| Department              | BA Engineering     | Author   | Engineering Team BA/DESTO |
| System                  | i-bus® KNX         | Product  | DG/S x.64.5.1             |
| Page                    | 1/5                | Date     | 29 July 2019              |

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This document serves the sole purpose of providing additional, technical information and possible application and use cases for the contained products and solutions. It **does not** replace the necessary technical documentation required for planning, installation and commissioning of the product. Technical details are subject to change without notice.

Despite checking that the contents of this document are consistent with the current versions of the related hard and software of the products mentioned within, deviations cannot be completely excluded. We therefore assume no liability for correctness. Necessary corrections will be introduced as and when new versions of the document are generated.

# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

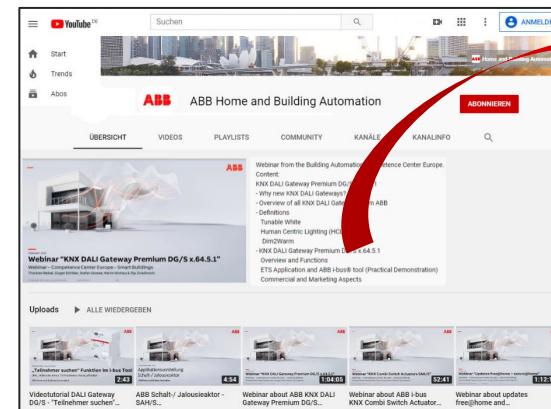
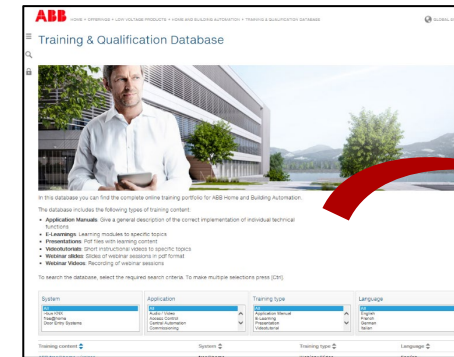
### Training Material

#### 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>
  - [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>



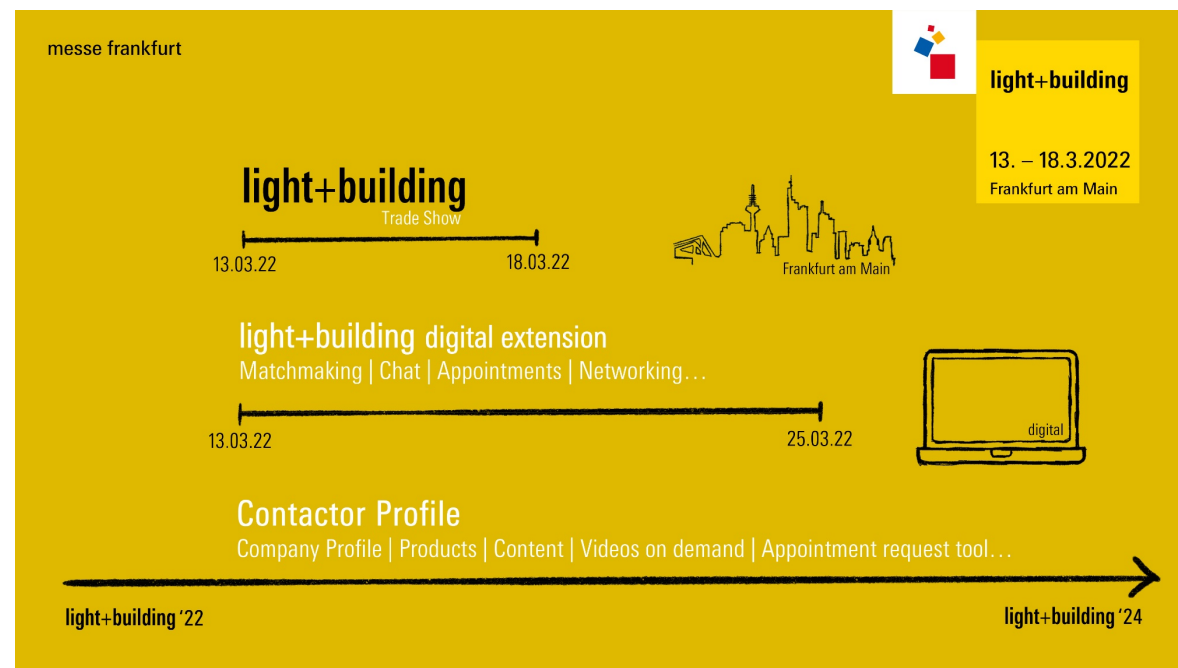
# KNX DALI Gateways – Practical knowledge about DALI – Part 1

## Online Learning Session

### Light + Building will take place in March 2022

#### Onsite + digital: here we go

- At Light+Building the industry presents every two years the latest products for the fields of lighting, electrical engineering and home and building automation
- Light+Building opens in Frankfurt from 13<sup>th</sup> to 18<sup>th</sup> March 2022
- The new Light+Building digital additions functions will also be available at the same time and beyond
- We plan our participation in general as a hybrid event, so that customers can join remotely
- You will find ABB and BUSCH-JAEGER booth in the NEW hall 12.0
- More information to come before the end of this year



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