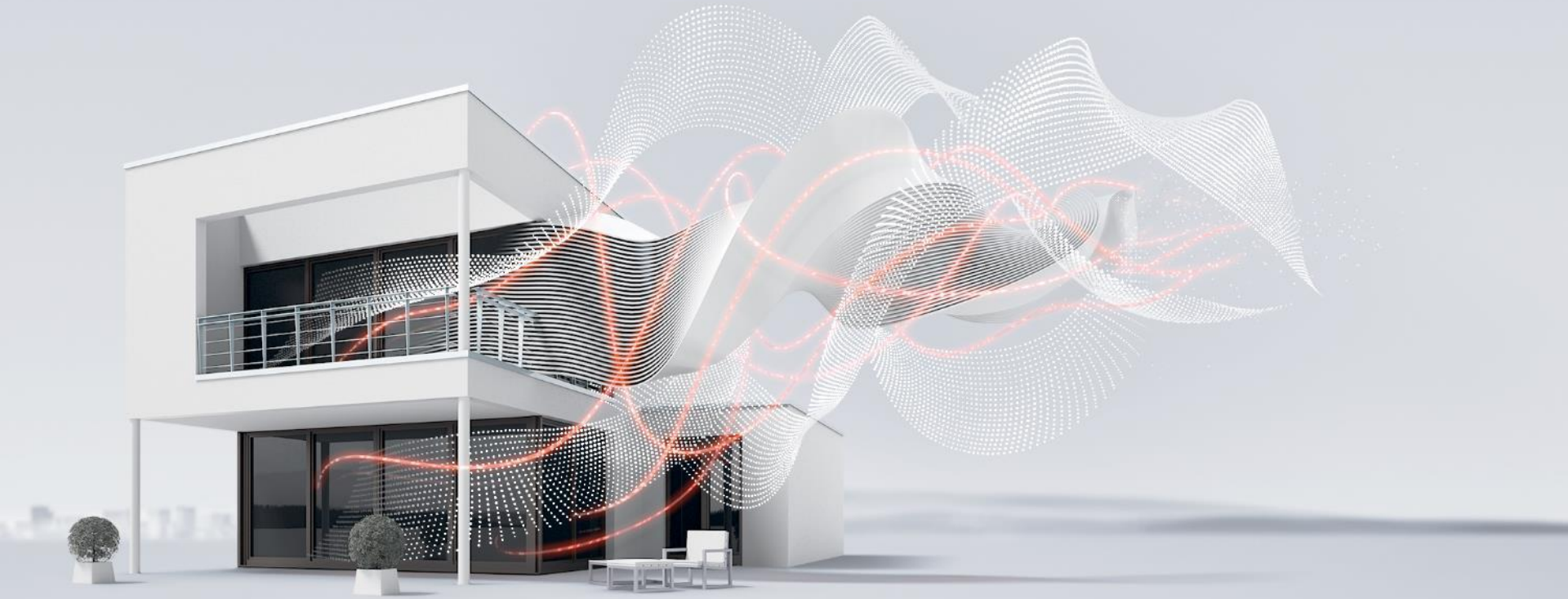

MAY 2017

Webinar DG/S x.64.1.1 – Part 2

BU EPBP GPG Building Automation

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Global Application and Solution Team

Agenda

New Generation DALI-Gateways DG/S x.64.1.1 – **Part 2**

- Summary of the main features of the new DALI-Gateways
- DG/S **2**.64.1.1 (2-fold) – benefits
- Installation
- Selected functions in ETS
- DG/S x.64.1.1 and emergency lighting
- Telegram communication on DALI (DALI Query)
- New functions in i-bus® Tool with demonstration
- Firmware Update tool in ETS with DG/S x.64.1.1

KNX DALI-Gateways DG/S x.64.1.1

Overview Devices

DG/S x.64.1.1

KNX DALI-Gateways 1-fold and 2-fold

- Supply voltage 100 - 240V AC/DC, 50/60Hz
  → **Suitable for worldwide use**
- Integrated DALI power supply
  → **No additional power supply required**
- DALI Outputs 230V secure
  → **Incorrect connection with mains voltage does not destroy the device**
- Manual operation with broadcast function
  → **Test of installation and lighting**
- 2 LEDs for device ON and DALI fault
  → **Quick and easy diagnostics**
- Fast application download via IPS/S 3.1.1 or IPR/S 3.1.1 (support long frames)
  → **Time saving**

KNX DALI-Gateways DG/S x.64.1.1

Overview Devices

DG/S x.64.1.1

KNX DALI-Gateways 1-fold and 2-fold

- Extended fault and status information via ETS and i-bus® Tool
  → **Additional diagnostic options during operation and commissioning**
- Flexible combination of DALI groups, KNX single control or KNX groups
  → **DG/S 1.1 and DG/S 1.16.1 in one device, no longer the risk to select the wrong one**
- Support DALI emergency lighting converter (DALI type 1)
  → **General and emergency lighting in one system, with more functions and less investment**

KNX DALI-Gateways DG/S x.64.1.1

Overview Devices

DG/S x.64.1.1

KNX DALI-Gateways 1-fold and 2-fold

- Current functions* DG/S 1.1, DG/S 1.16.1 and DGN/S 1.16.1 are covered
  → **Downward compatibility**
- Special functions like turn off brightness, basic brightness, partial failure or templates
  → **new unique features**
- DALI commissioning via i-bus® tool
  → **unique support during commissioning and fault detection**
- Huge amount of group addresses (2000/4000) and group objects (1119/2233)
  → **no more problems with limited number and assignments of group addresses**

* Except sequence and overlapping DALI Groups

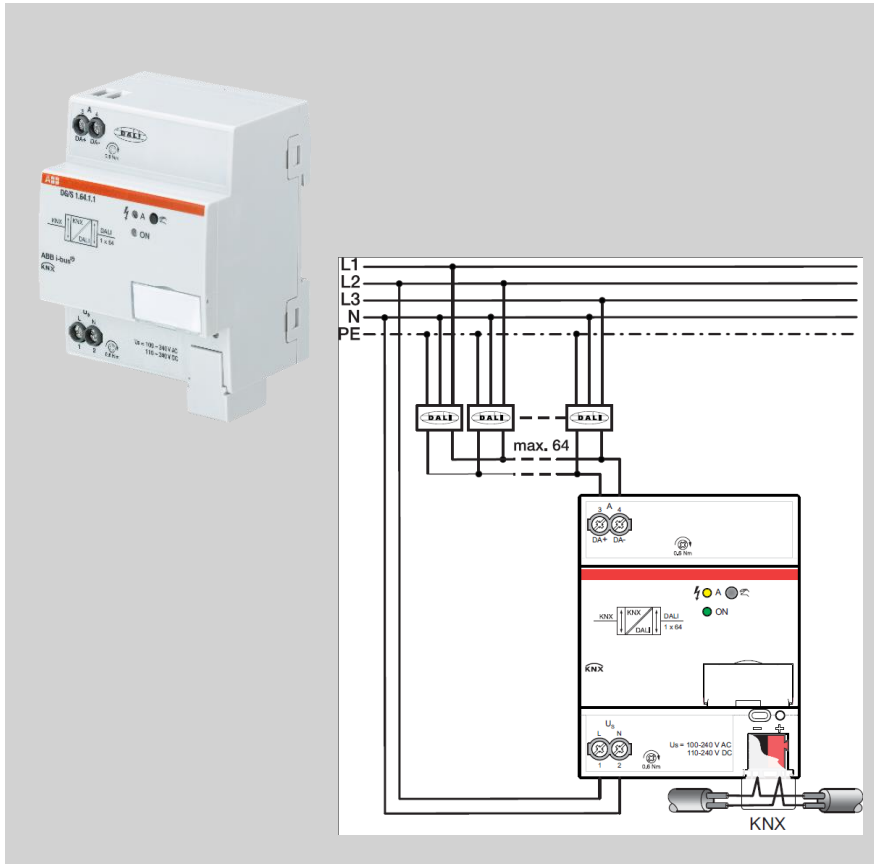
KNX DALI-Gateways DG/S x.64.1.1

Overview Devices

DG/S 1.64.1.1

KNX DALI-Gateway **1-fold**

- **One** output for up to 64 DALI devices
- 16 DALI groups and 16 scenes
- …



KNX DALI-Gateways DG/S x.64.1.1

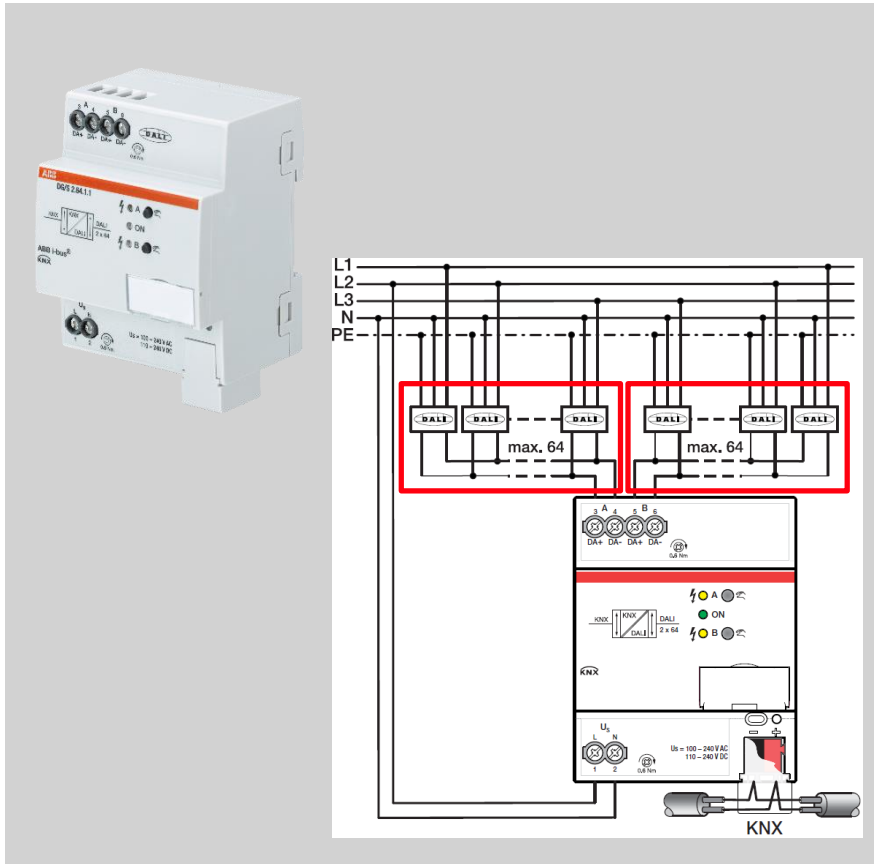
Overview Devices

DG/S 2.64.1.1

KNX DALI-Gateway **2-fold**

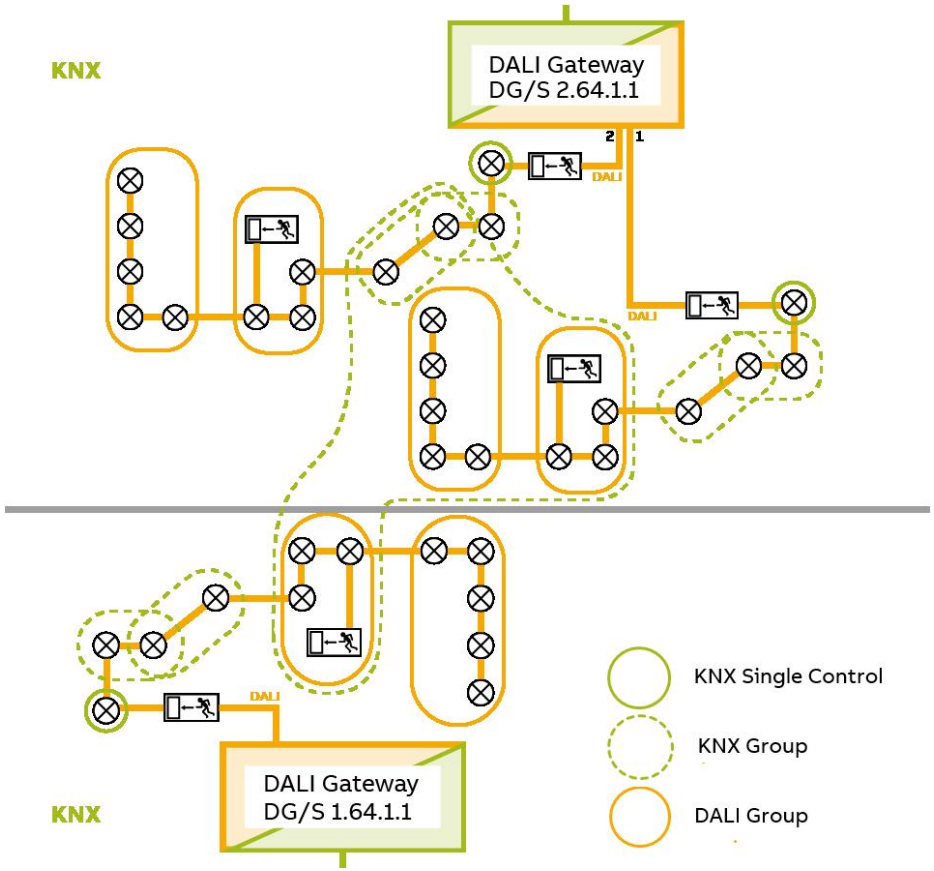
- **Two independent** outputs for up to 128 DALI devices (2 x 64)
- Two independent DALI outputs
- Manual operation per channel with two buttons
- 16 DALI groups and 16 scenes each output, means in total 32 DALI groups and 32 scenes
- Thanks to comprehensive KNX groups no limits in combining all connected ballasts in any groups, even from further gateways

  → **Two separate ‚DALI worlds' in one component, very economical solution with reduced costs per channel, competitive solution, less competitors**



KNX DALI-Gateways DG/S x.64.1.1

Single and Group Control



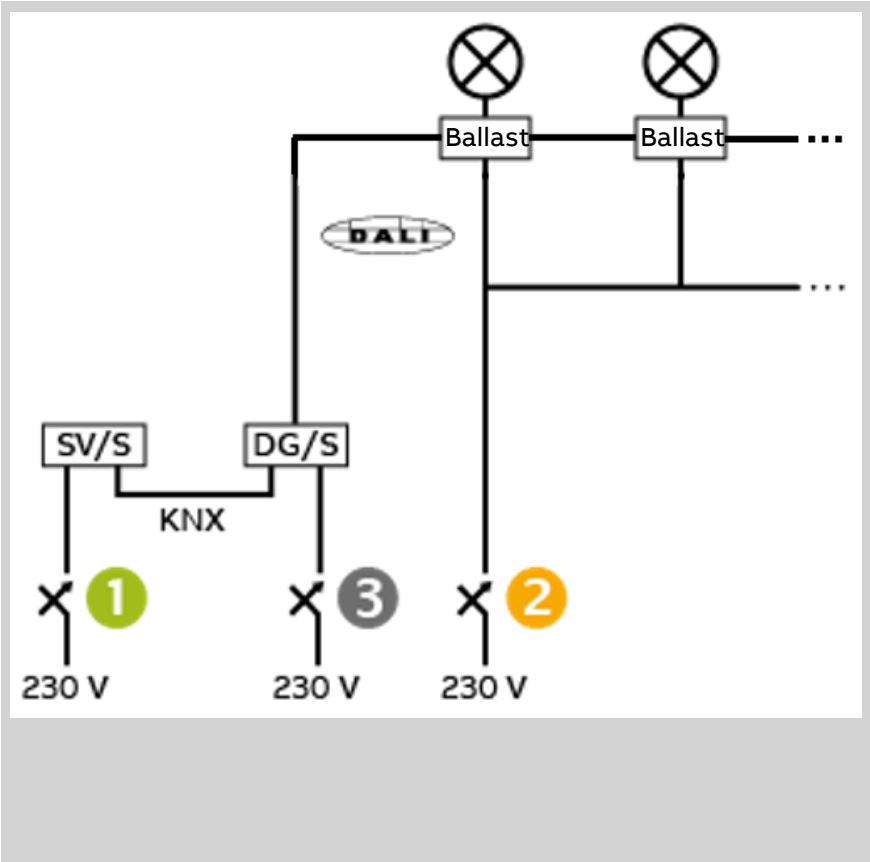
KNX DALI-Gateways DG/S x.64.1.1

Installation

Steps (1)

- Connecting the KNX power supply and bus cable, supply voltage at the KNX DALI-Gateway and the DALI line.
  Connection of all DALI lamps (power supply and DALI control cable)
- Switch on
  - 1. KNX power supply,
  - 2. Power supply for the DALI ballasts, then wait a few seconds until the ballasts are ready for operation
  - 3. Mains voltage of the DALI-Gateway, yellow LED at the gateway flashes
- DG/S starts the initialization phase
  - Allocation of DALI addresses*, or
  - Trigger addressing via i-bus® tool*

* Depends on ETS parameter 'Enable automatic DALI addressing' Yes/No

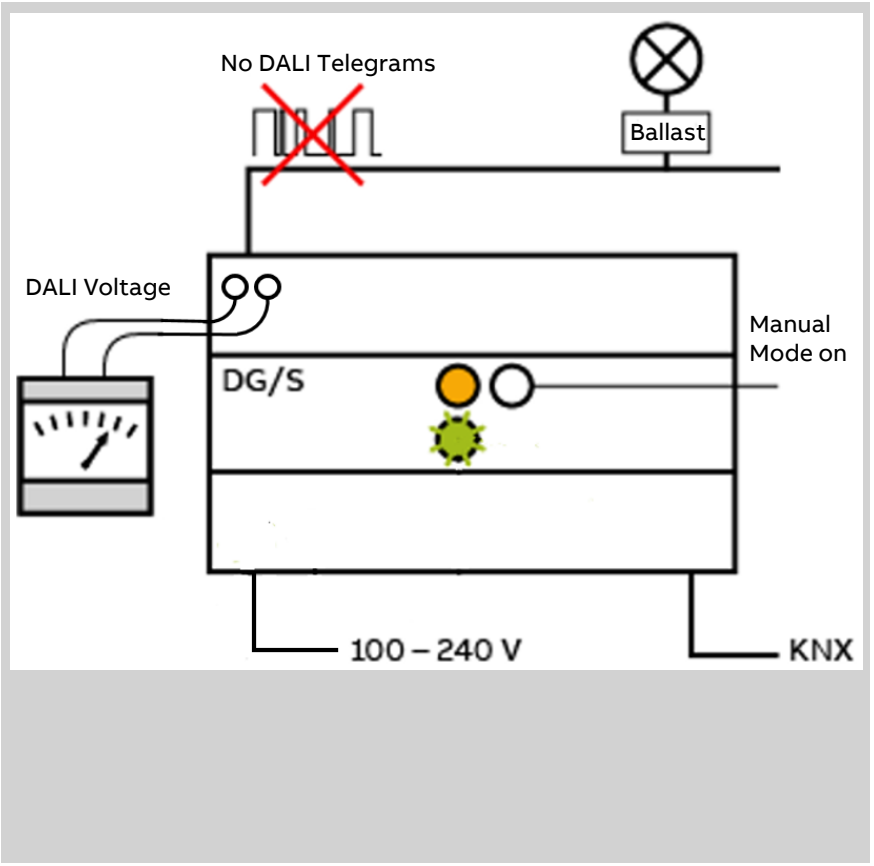


KNX DALI-Gateways DG/S x.64.1.1

Installation

Steps (2)

- Checking the DALI voltage:
  - Enable manual operation
    No DALI QUERY commands (cyclical requests of the DALI ballasts) are sent in manual mode. This means that no new DALI devices will be detected in manual operation and only the manual control buttons triggering switching commands will be sent to DALI. The actual DALI voltage can now be measured due to the absence of DALI telegrams.
- Measuring the DALI voltage (9.5 … 21V DC)
  - DALI disconnected (Open circuit voltage)
  - DALI connected, at the end of each string with ballasts
    → between 9.5 and 21 V DC → OK

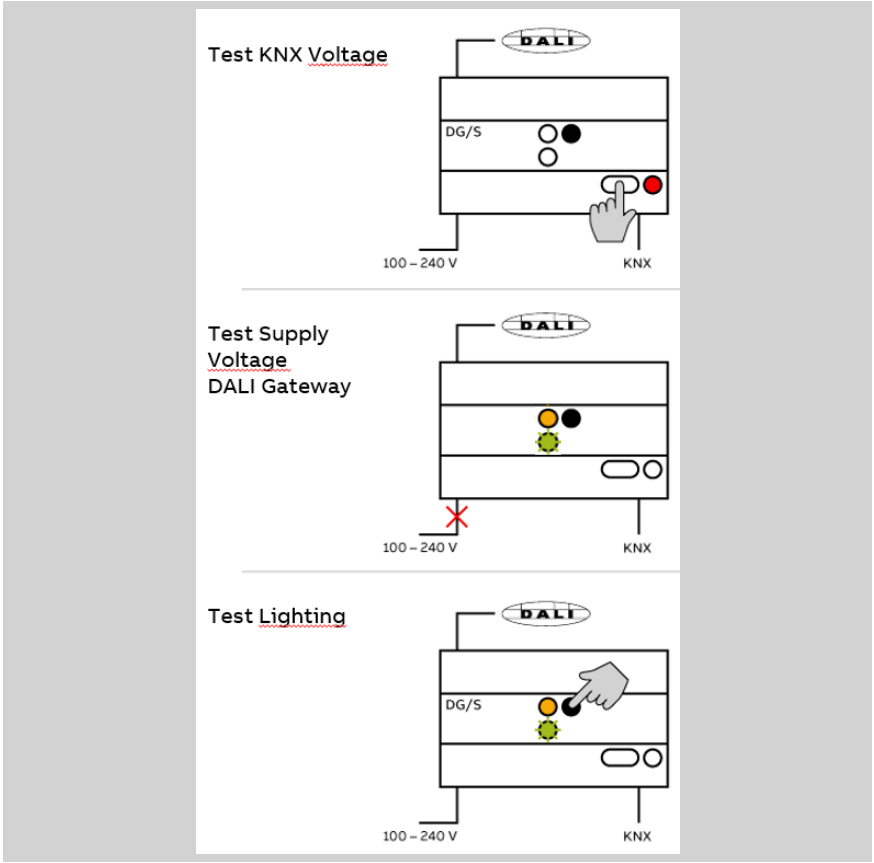


KNX DALI-Gateways DG/S x.64.1.1

Installation

Steps (3)

- Testing the KNX bus voltage:
  - Press programming button → LED on → KNX Bus ok → Press programming button → LED off
- Checking the supply voltage at the DALI Gateway:
  - Switch on the voltage
  - Green LED on and yellow LED flashes
  - After a few seconds, the yellow LED goes off
  - Voltage not available: Green LED flashes (5 Hz)
- Testing the lighting:
  - By manually switching all the lights via control button on the device

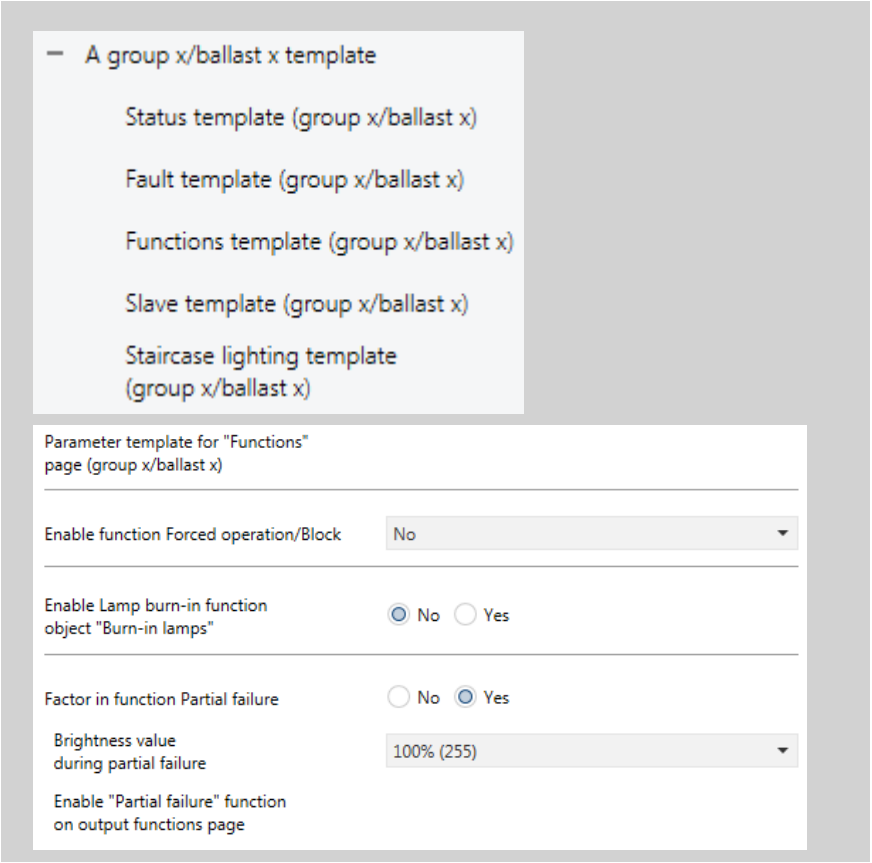


KNX DALI-Gateways DG/S x.64.1.1

ETS

Template

- In the ETS application of the gateways, up to 64 individual ballasts or up to 16 DALI groups can be parameterized per channel, with the following parameter blocks:
  - Standard parameter e.g. dimming time
  - Status and fault messages
  - Functions (Forced operation, Block, burn-in, partial failure)
  - Slave function
  - Staircase
- 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

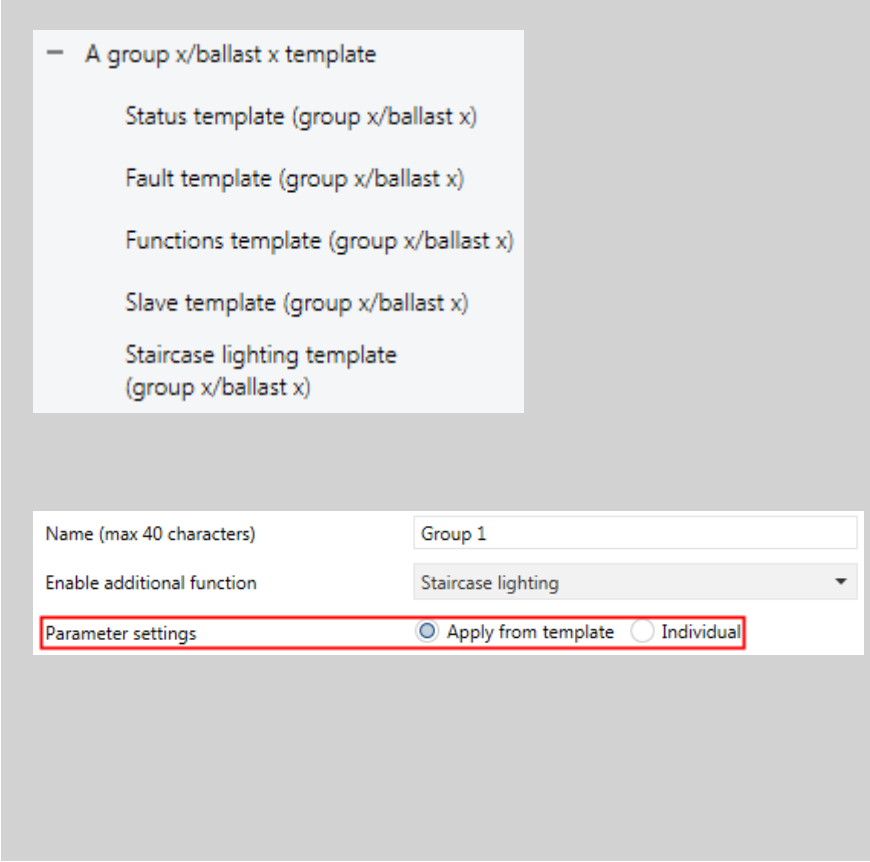


KNX DALI-Gateways DG/S x.64.1.1

ETS

Template

- The template is used in the ETS application of the KNX DALI-Gateways divided into the five parameter blocks mentioned plus general parameter
- For the individual ballasts, DALI groups and for output A or B (Broadcast) you have the choice between transferring the template or individual parameter settings
- Channels A/B of DG/S 2.64.1.1 are independent of each other

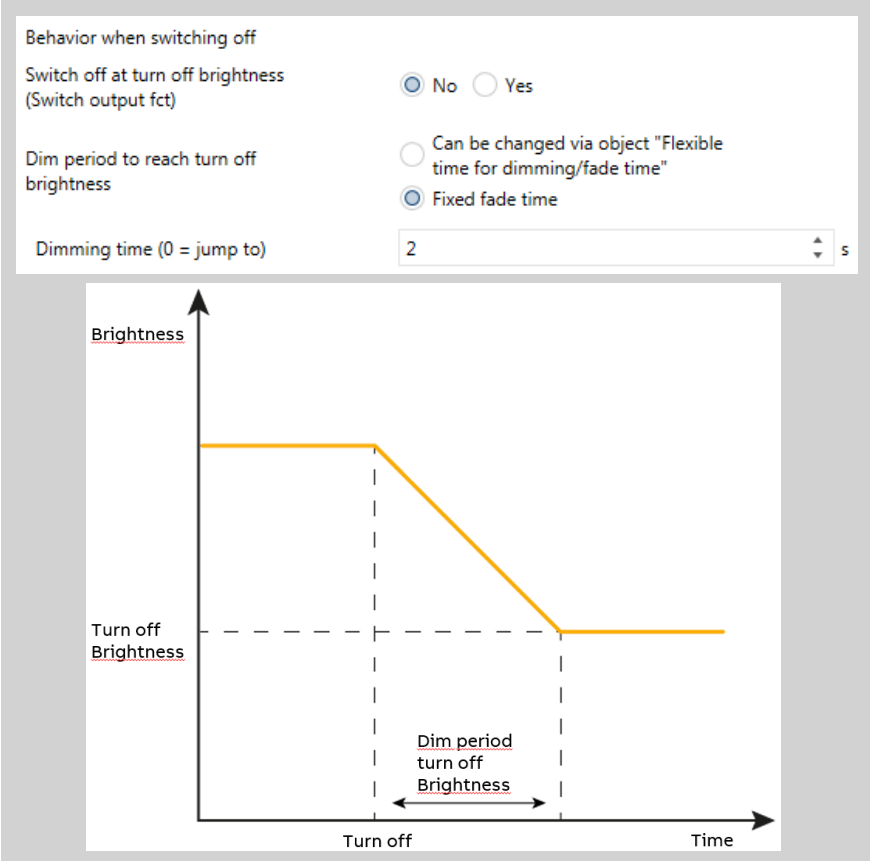


KNX DALI-Gateways DG/S x.64.1.1

ETS

Turn off Brightness

- The turn-off brightness can be parameterized for:
  - Output A / B
  - DALI Group
  - Ballast
  - Parameter template for individual ballasts, DALI groups and output A / B
- Turn off brightness means that, when sending a switch-off command, the lighting does not switch off completely, but goes to a selectable brightness value between 1 and 100%
- The function can be used with "normal" switching off as well as "automatic switching off" (staircase lighting function)

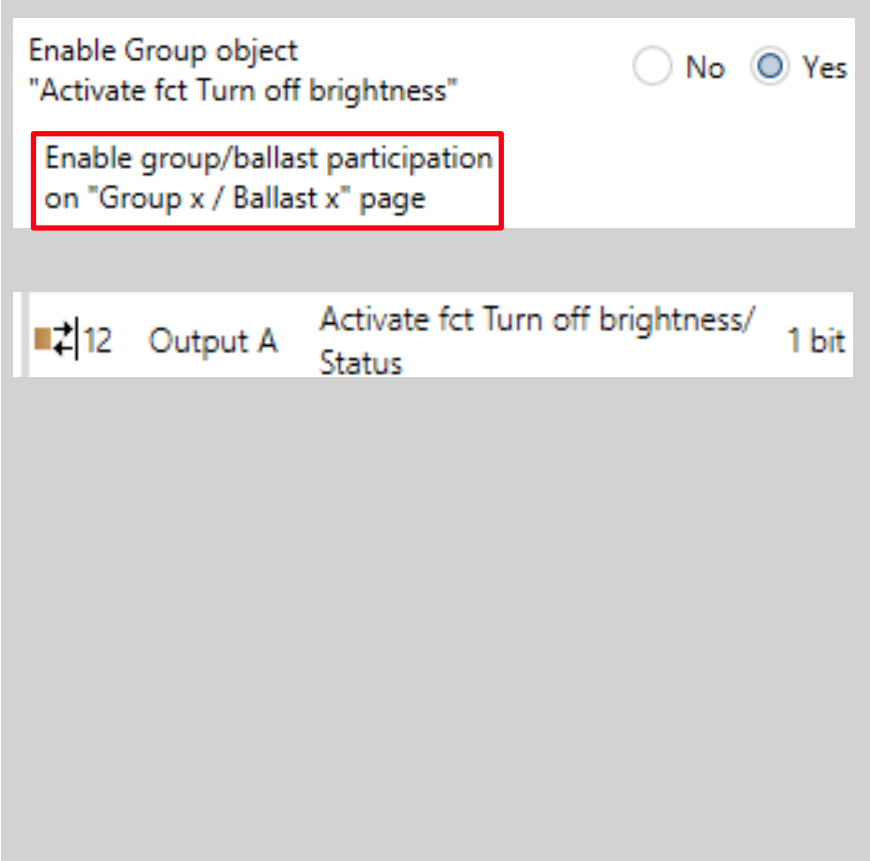


KNX DALI Gateways DG/S x.64.1.1

ETS

Turn off Brightness

- Time to reach the turn off brightness can be fixed or variable via communication object ‘Flexible time for dimming/fade time’
- The turn off brightness can be activated and deactivated via a telegram
- The corresponding communication object must be enabled under the parameter page *Output /Functions*
- Important: To enable a function it is often necessary to adjust parameters on two different pages. In such a case a help text informs about it
- Application: For security reasons darkness in corridors of hospitals or homes for elderly people is not accepted during the night

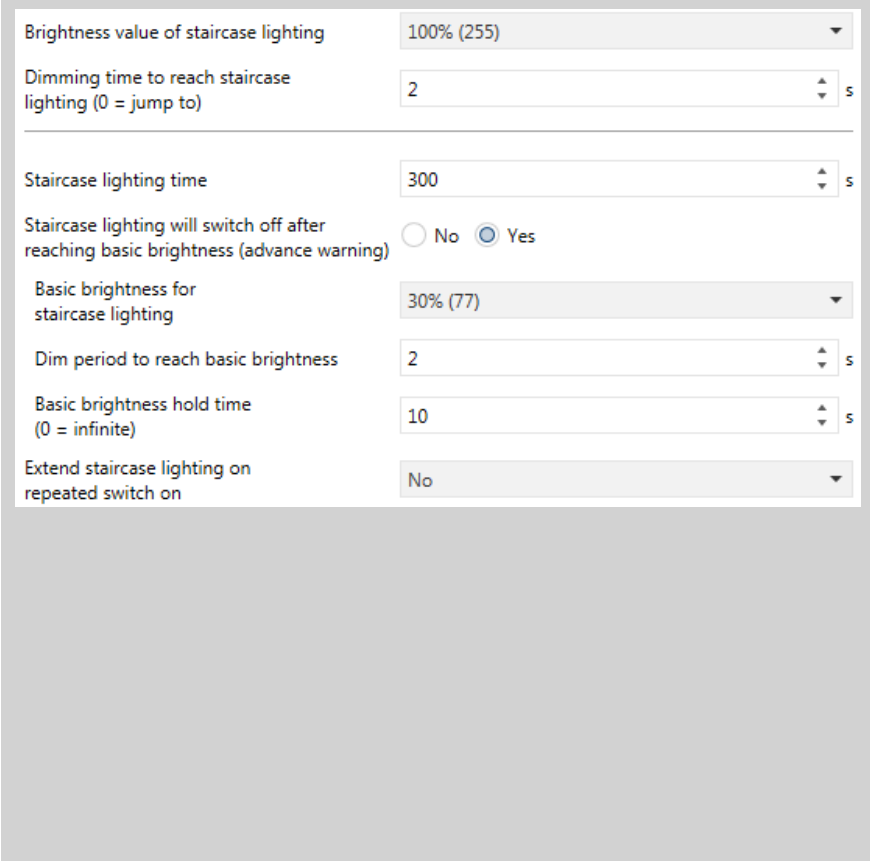


KNX DALI Gateways DG/S x.64.1.1

ETS

Basic Brightness

- The Basic Brightness function is the part of the staircase lighting function and represents a further switch-off stage before the turn off brightness
- Parameter for staircase lighting:
  - Brightness value and dimming time of staircase lighting
  - Staircase lighting time
  - Staircase lighting will switch off after reaching basic brightness
  - Basic brightness for staircase lighting
  - Dim period to reach basic brightness
  - Basic brightness hold time
  - Increase staircase lighting by switching on several times

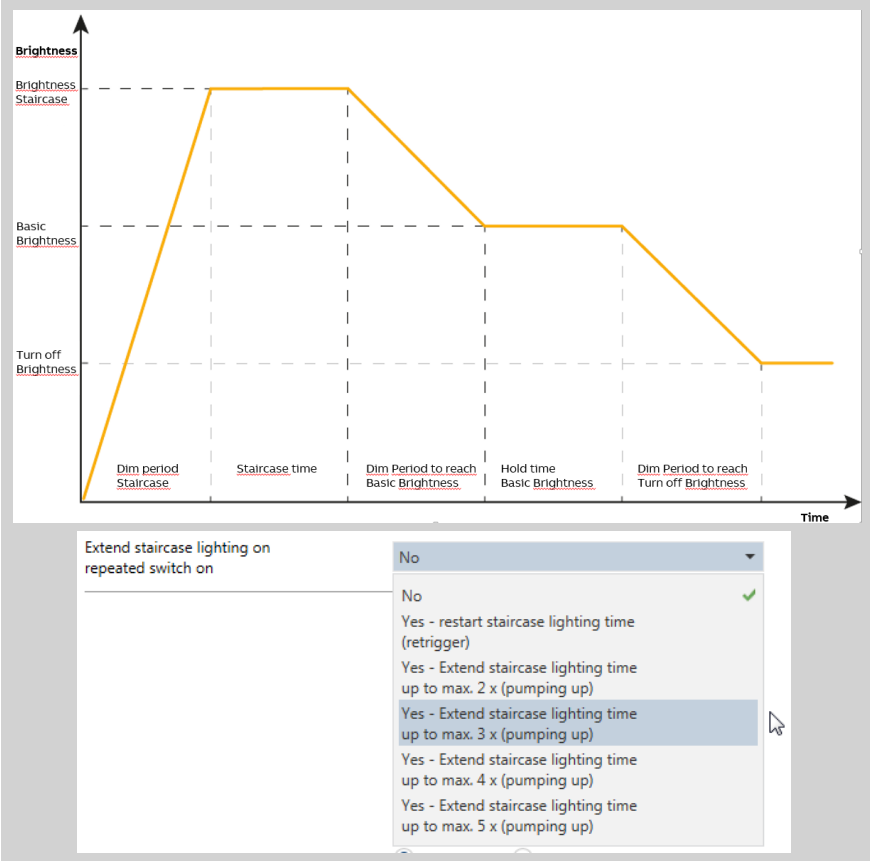


KNX DALI Gateways DG/S x.64.1.1

ETS

Basic Brightness

- The right diagram shows the sequence of a staircase lighting function with the adjustable values and times
- Dimming to basic brightness is used as a pre-warning
- If the push button is pressed again before the staircase lights or switches off, the time is restarted
- It is very easy to extend the staircase lighting time by the user, up to a 5 times by pressing several times

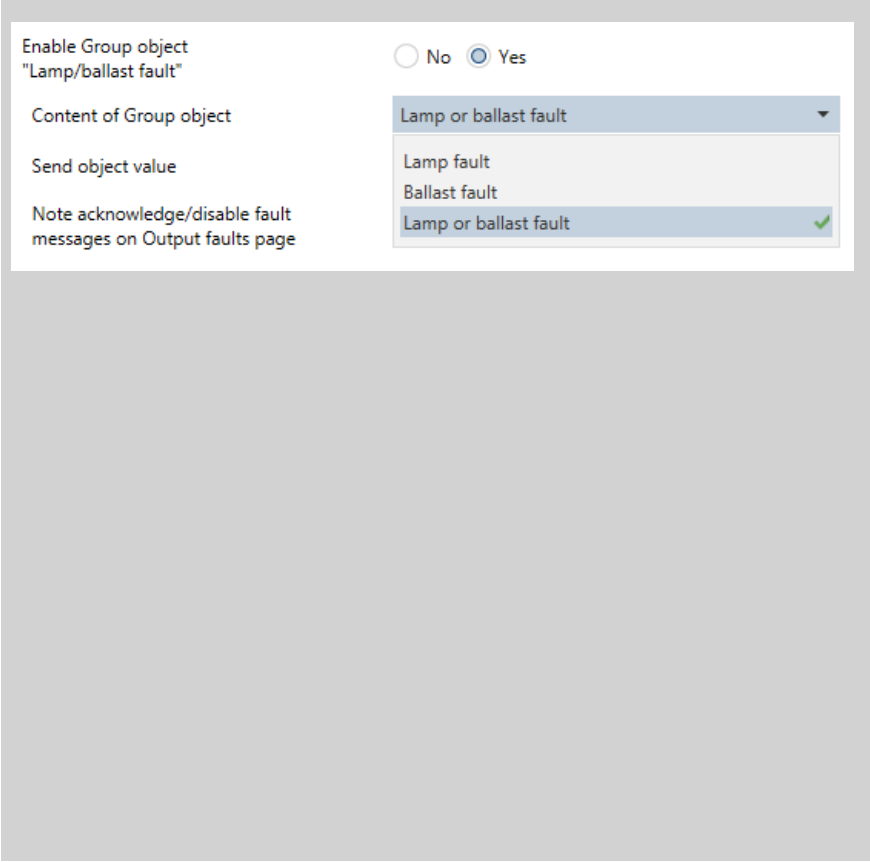


KNX DALI Gateways DG/S x.64.1.1

ETS

Fault Lamp/Ballast

- An important fault message is the missing function of a luminaire or the DALI ballast
- The information in the message (1 bit telegram with value 1) is either lamp fault or ballast fault or as a group signal lamp or ballast fault
- The error message can be parameterized for:
  - Output A / B
  - DALI Group
  - **New: Individual ballasts**
  - Parameter template for individual ballasts, DALI groups and output A / B

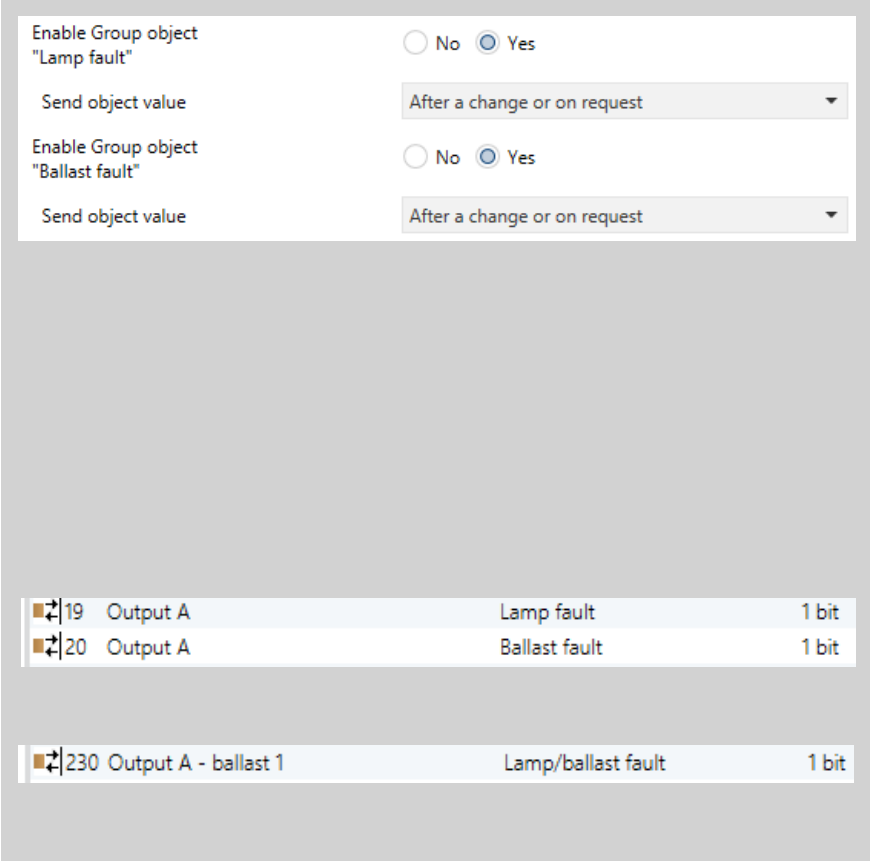


KNX DALI Gateways DG/S x.64.1.1

ETS

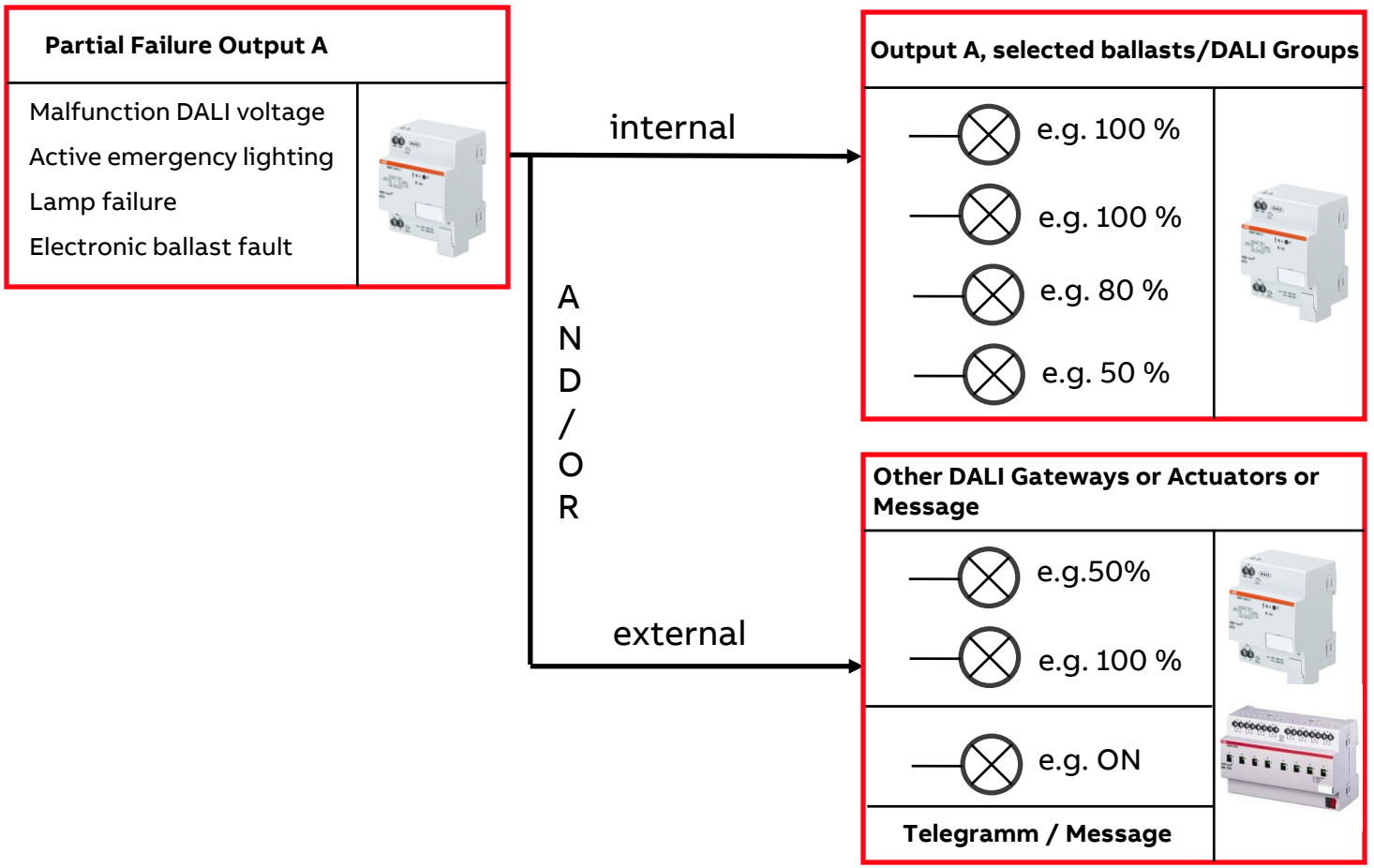
Fault Lamp/Ballast

- Separate fault messages for lamp faults and ballast faults can be parameterized for the entire output A or B
- Example: As a collective fault signal, information should be sent to the technical building service if either a luminaire or a ballast fails in the lighting system. If the corresponding message is displayed on the smart phone, the visualization of the building is then checked where exactly the error is.
  - The collective fault message (lamp or ballast) is generated from the fault message per channel mentioned above
  - In addition, the messages of the individual ballasts or DALI groups are displayed in the visualization



KNX DALI-Gateways DG/S x.64.1.1

ETS – Partial Failure



KNX DALI Gateways DG/S x.64.1.1

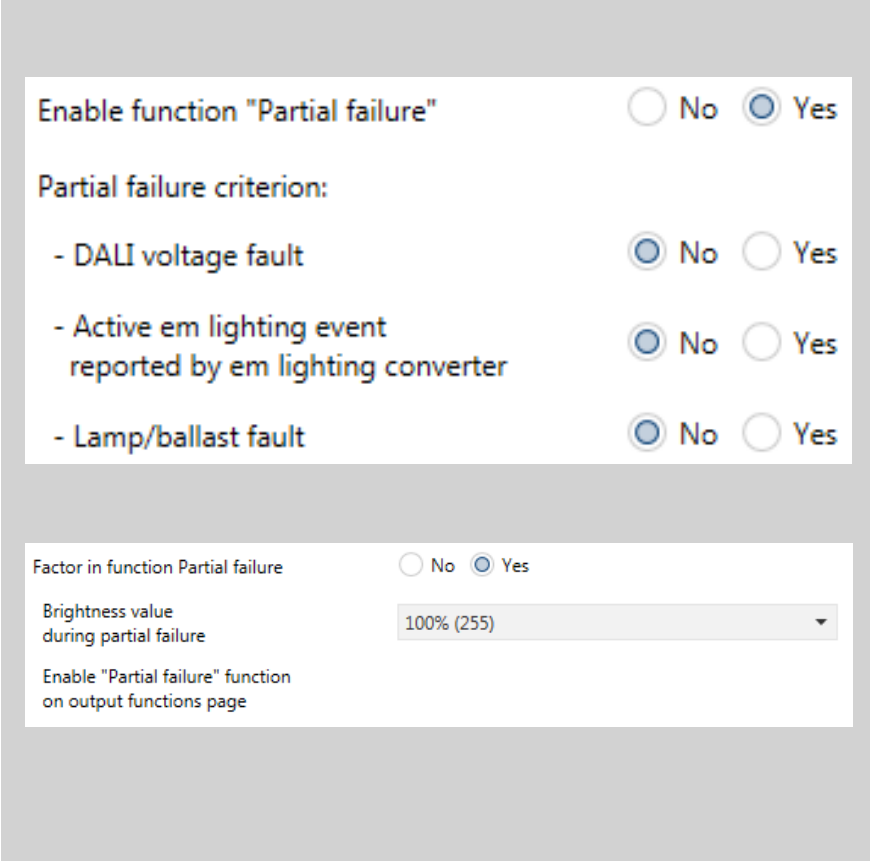
ETS

Partial Failure

- A partial failure of the lighting is defined as
  - Malfunction DALI voltage
  - Active emergency lighting
  - Lamp failure
  - Electronic ballast fault

  and can be choosen in the parameters (Parameter page Output/Functions)

- Selected ballasts or DALI groups can have an adjustable brightness level in case of a partial failure (Parameter page ballast x/group x functions)

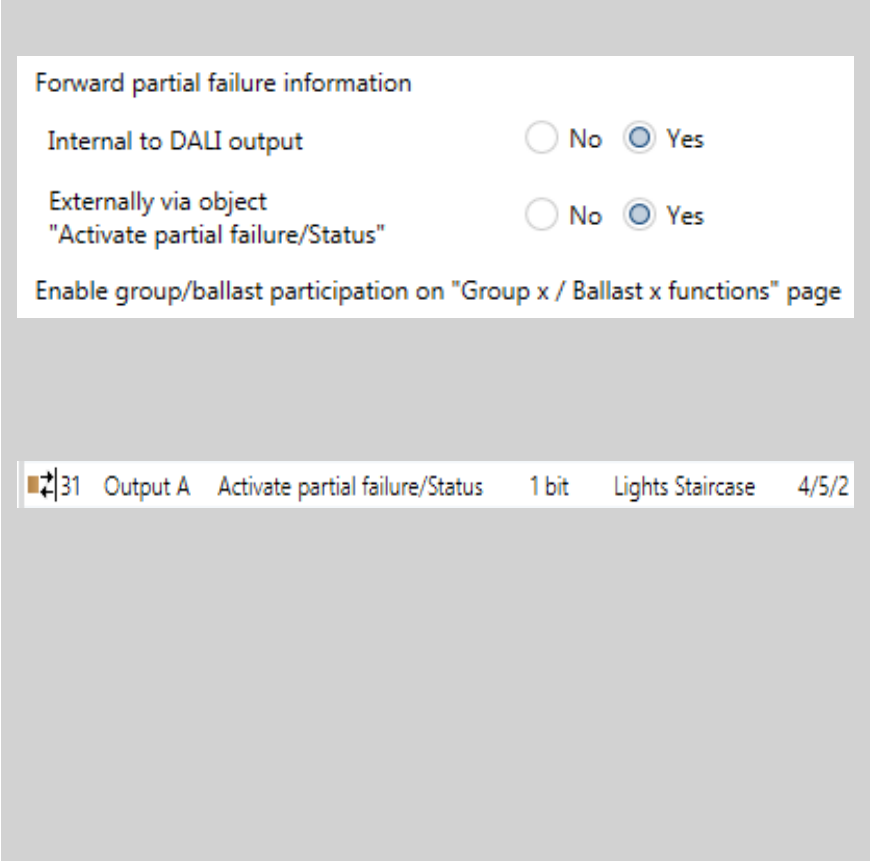


KNX DALI Gateways DG/S x.64.1.1

ETS

Partial Failure

- Forward partial failure **internally to DALI output**:
  - All DALI groups and ballasts, which are to consider the partial failure function, go to the parameterized brightness value
- Forward partial failure **externally via object** "Activate partial failure / status":
  - A telegram with the value 1 is sent via this communication object, e.g. to switch further lighting circuits of other DALI-Gateways or to transmit a message
- Example: In case of partial failure (defined as lamp or ballast failure) all corridor and staircase lighting in an office building is turned on with maximum brightness

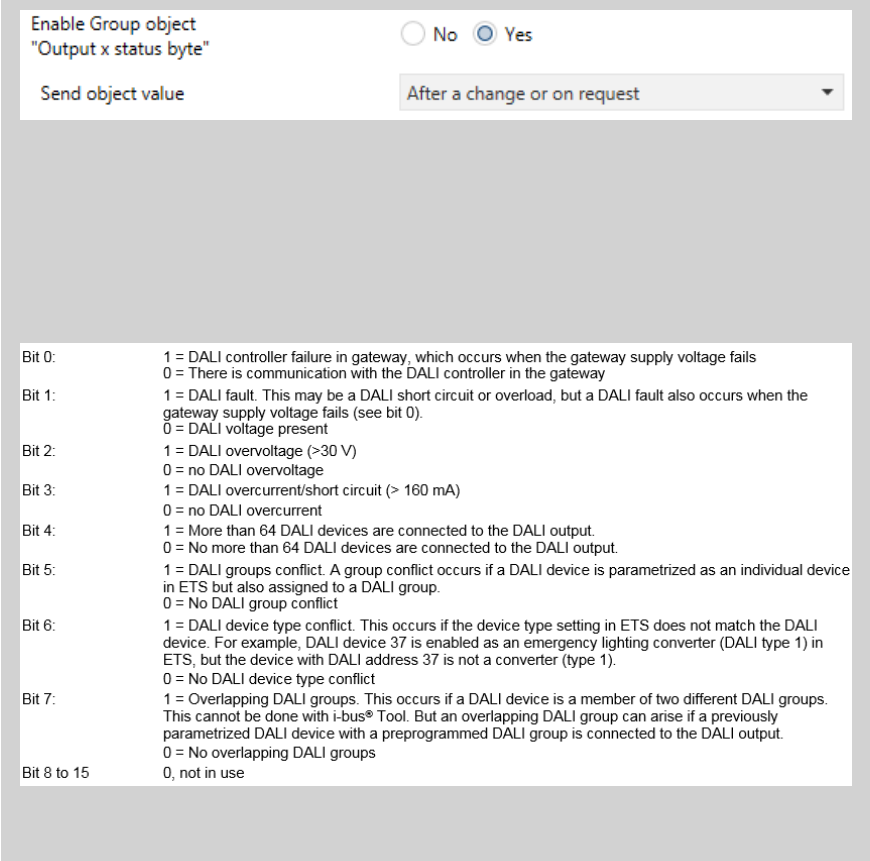


KNX DALI Gateways DG/S x.64.1.1

ETS

Statusbyte Output A/B

- For each channel of the KNX DALI Gateways, a status byte is available in the application after enabling
- The status byte indicates different states of the DALI output, which can be helpful for fault diagnosis during commissioning.
- Each individual bit represents a status information according to the table



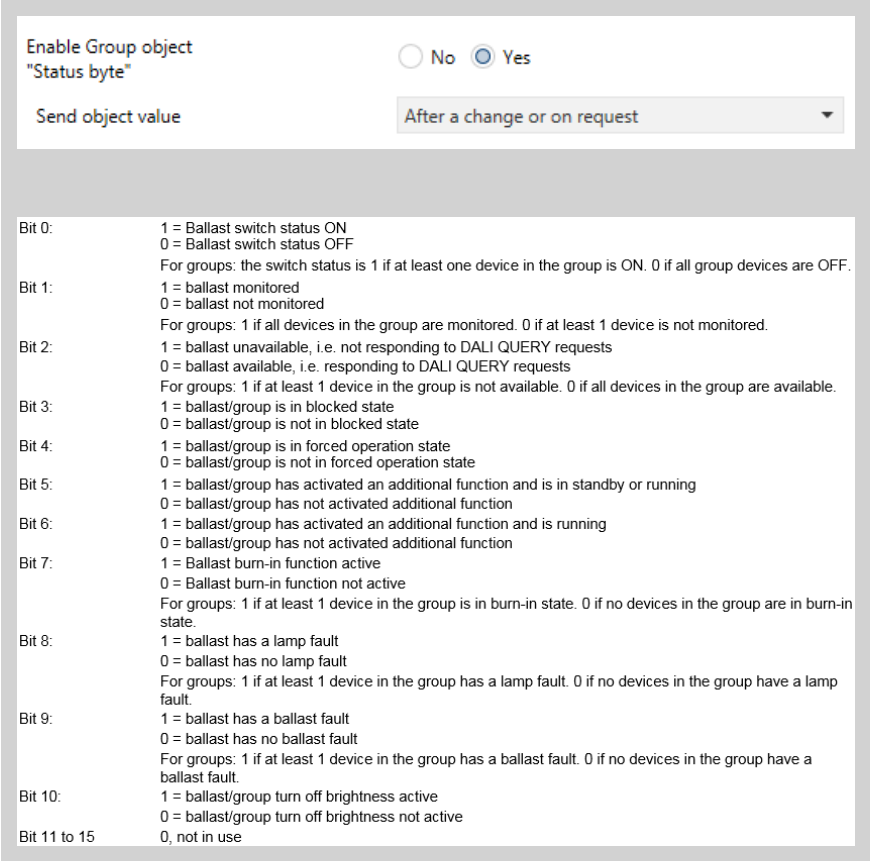
KNX DALI Gateways DG/S x.64.1.1

ETS

Statusbyte Ballast/DALI Group

- The status byte is available after enabling for:
  - DALI Group
  - Ballast
  - Parameter template for individual ballasts and DALI groups

- Example: The status byte indicates the states of the DALI output which are to be displayed in a visualization:
  - DALI group blocked (Bit 3)
  - Ballast 10 in burn-in mode (Bit 7)



KNX DALI-Gateways DG/S x.64.1.1

Emergency Lighting

Introduction

Emergency Lighting is defined as lighting which will be active in case of malfunction of the general artificial lighting in the building

- Task:
  - Minimum brightness to avoid panic
  - Illumination of emergency escape route
  - Orientation guide for exits
  - Secured light for special working areas
  - Light for security staff (e.g. fire brigade)

- In case of power failure on ballasts emergency light will be switched on automatically
- Essential: Monitoring of the system

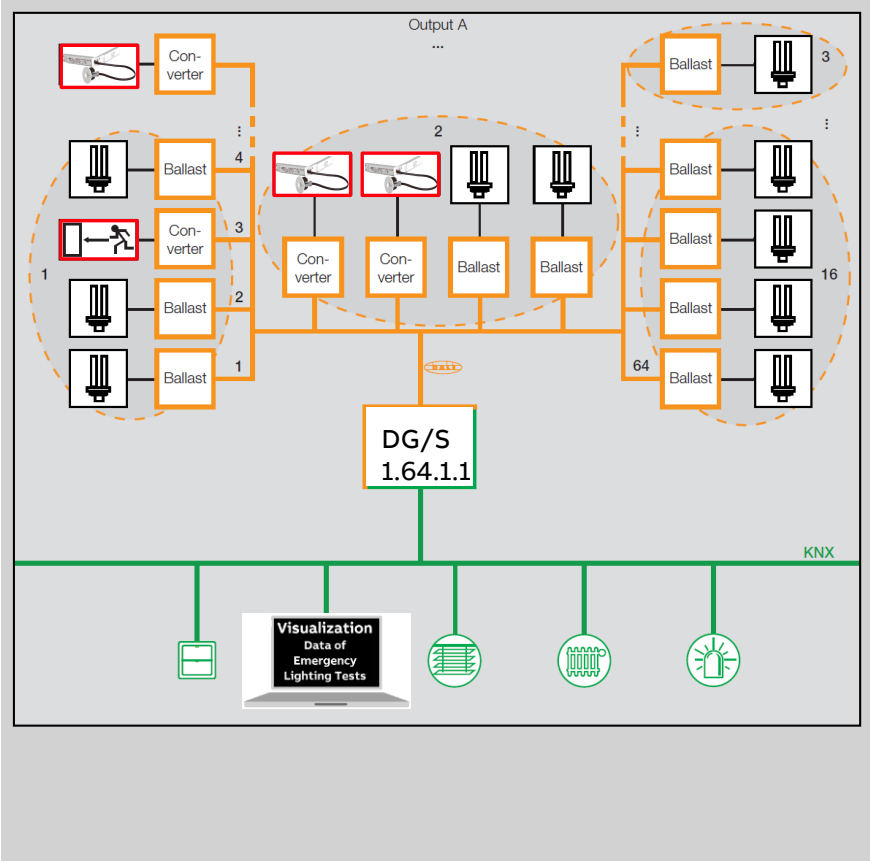
KNX DALI-Gateways DG/S x.64.1.1

Emergency Lighting

DG/S 1.64.1.1

- Supported are DALI emergency converter according to IEC 62 386 type 1 (single battery emergency lights)
- It monitors an emergency lighting system with single battery and provides the information (test results) on standardized DALI telegrams according to IEC 62 386-202
- The DALI-Gateway evaluates this information and transfer the test results to the KNX
- Brightness value of emergency light adjustable in ETS Application, some converter are parametrisable, normally 100 %

  → **General and emergency lighting in one system, with more functions and less investment**

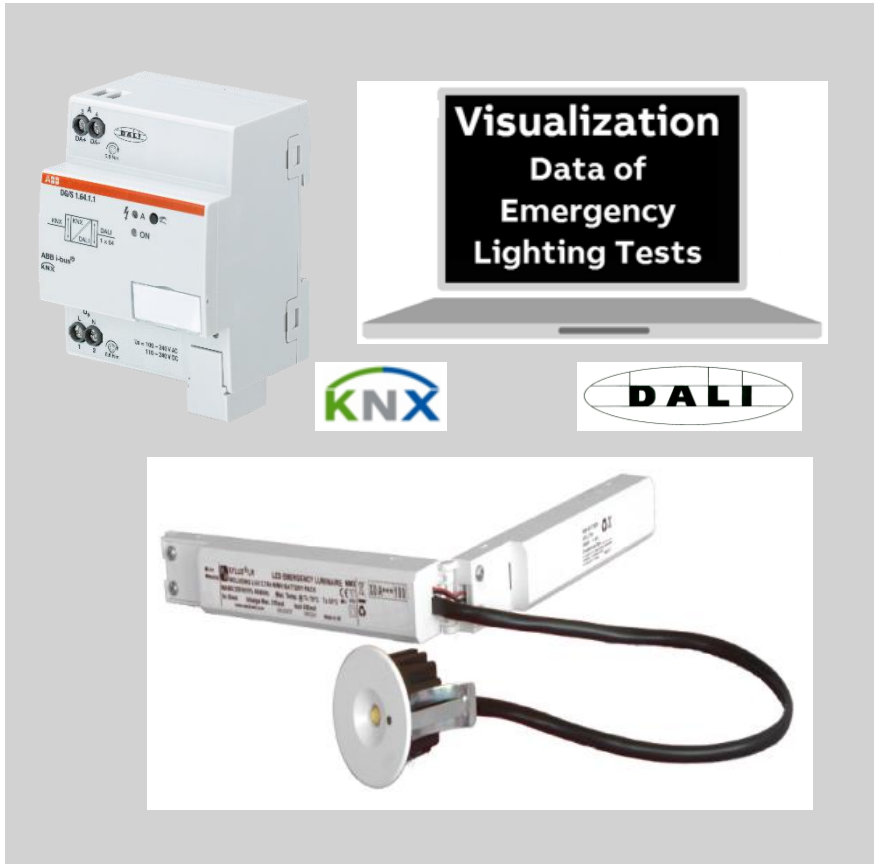


KNX DALI-Gateways DG/S x.64.1.1

Emergency Lighting

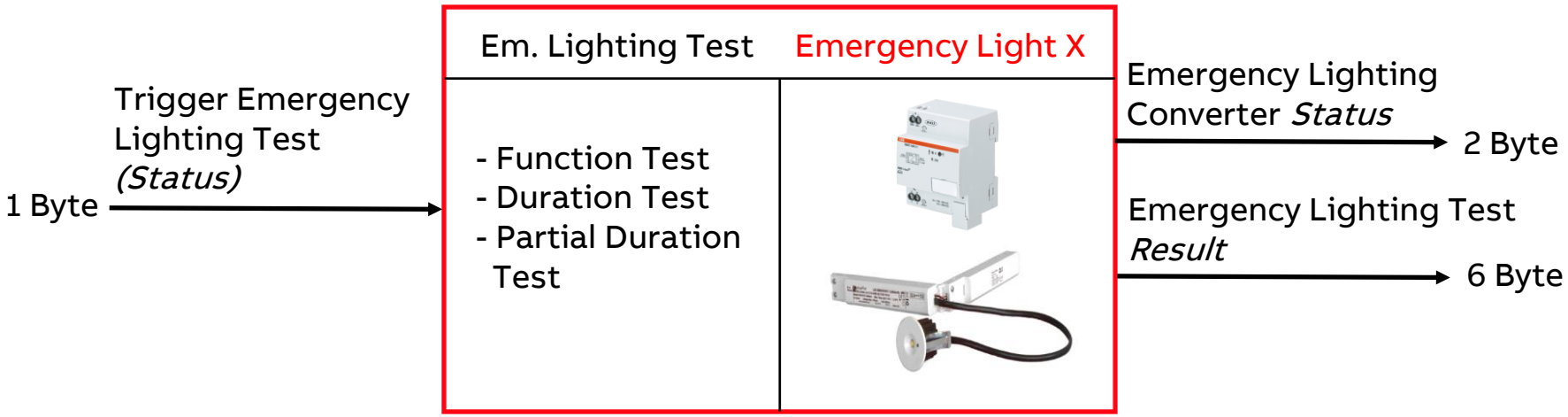
Type of Emergency Lighting Test

- Function Test:
  - The functional safety of the electronics of the emergency lighting converter and the correct operation of the lamp and the switching device for a single battery are checked
- Duration Test
  - The test is used to determine whether the single battery supplies the system within the limits of the rated operating time in emergency lighting mode.
- Partial Duration Test
  - A duration test which is interrupted by the gateway after the parametrized period



KNX DALI-Gateways DG/S x.64.1.1

Emergency Lighting Test – Group Objects **per Emergency Light**



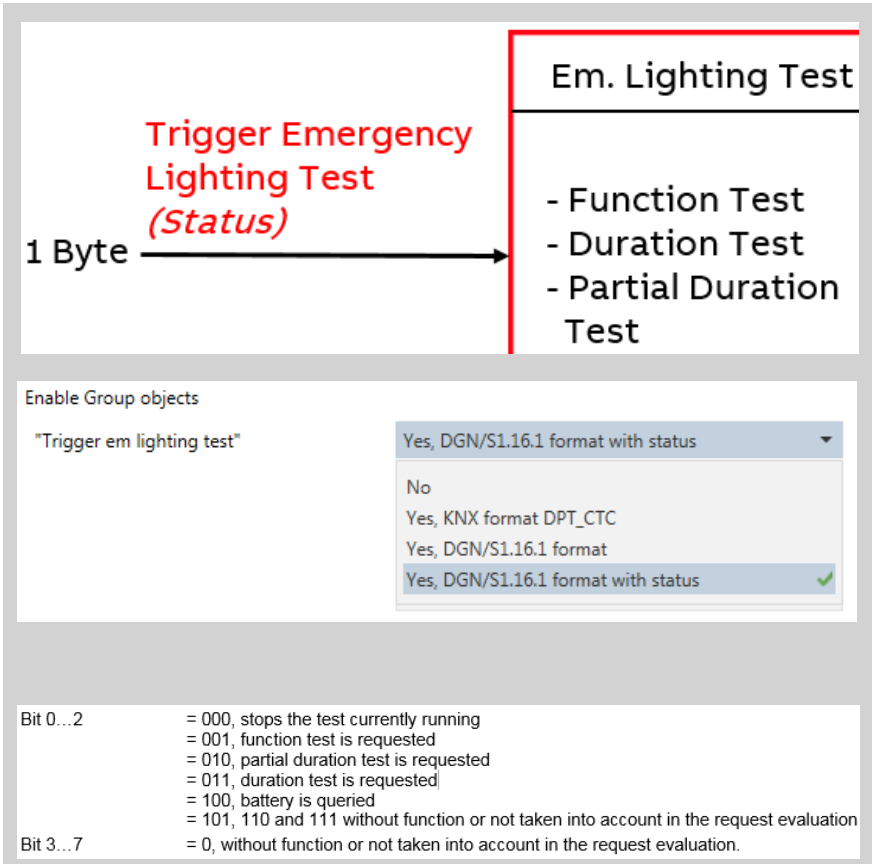
KNX DALI-Gateways DG/S x.64.1.1

Emergency Lighting Test

Group Objects Em. Light X

- Trigger Emergency Lighting Test (1 Byte):
  - Depending on Value (0-6) different tests (duration, partial duration or function) for the assigned emergency converter will be triggered or stopped
  - Data format can be either KNX format DPT_CTC or DGN/S 1.16.1 format to be compatible with former device DGN/S

- Option: Trigger Emergency Lighting Test **Status** (1 Byte, for DGN/S format only):
  - Additional status information in group object available (Bit 3…7)

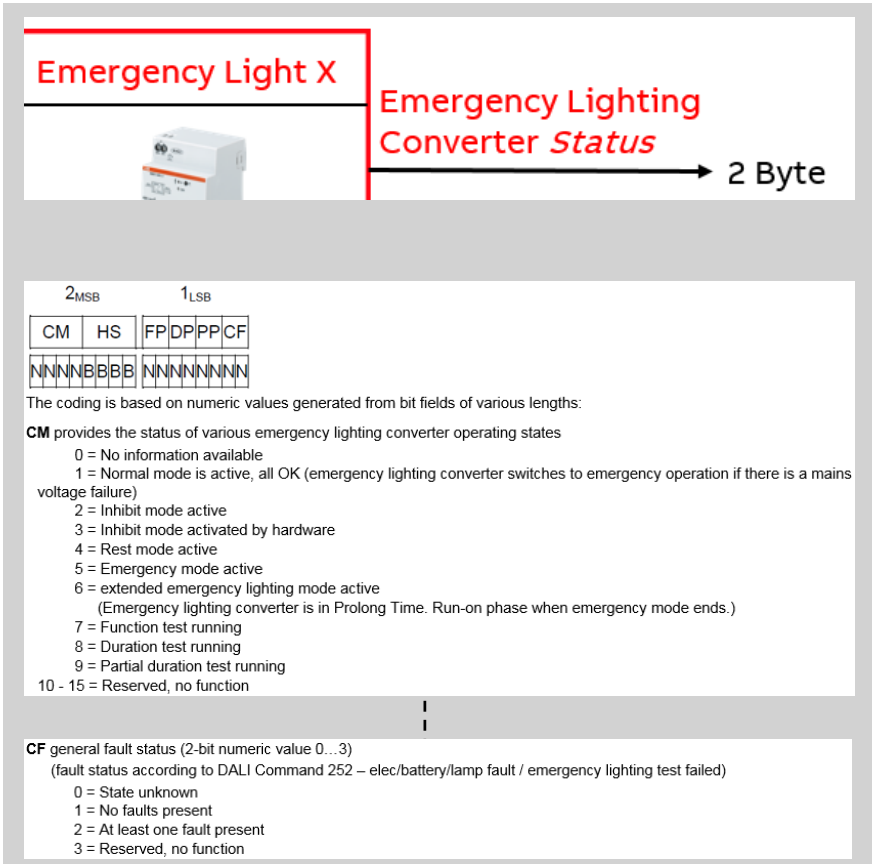


KNX DALI-Gateways DG/S x.64.1.1

Emergency Lighting

Group Objects Em. Light X

– Emergency Lighting Converter *Status* (2 Byte):
  - Status information of the Converter, e.g.
  - Normal or Emergency mode active
  - Inhibit or Rest mode active
  - Any test running
  - Which test is running
  - Any fault status detected
  - …

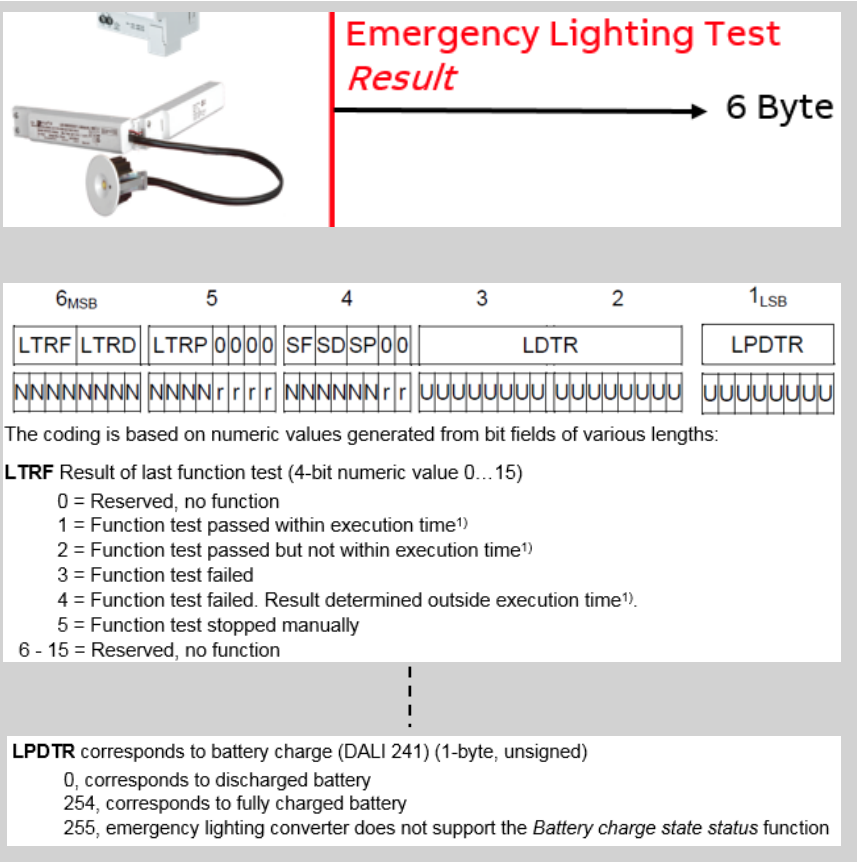


KNX DALI-Gateways DG/S x.64.1.1

Emergency Lighting

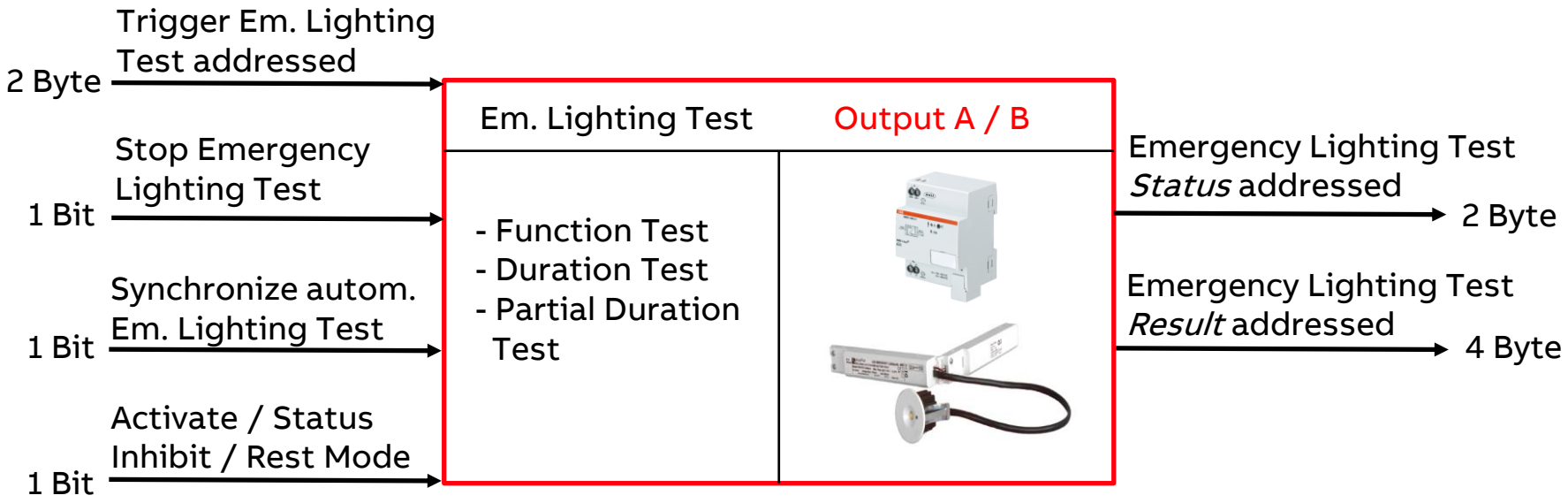
Group Objects Em. Light X

- Emergency Lighting Test *Result* (6 Byte):
  - Result depending on type of Emergency Lighting Test triggered, e.g.
  - Test successful or not
  - Way of triggering
  - Battery Capacity
  - Battery Discharging time
  - …



KNX DALI-Gateways DG/S x.64.1.1

Emergency Lighting Test – Group Objects **per Output A/B**

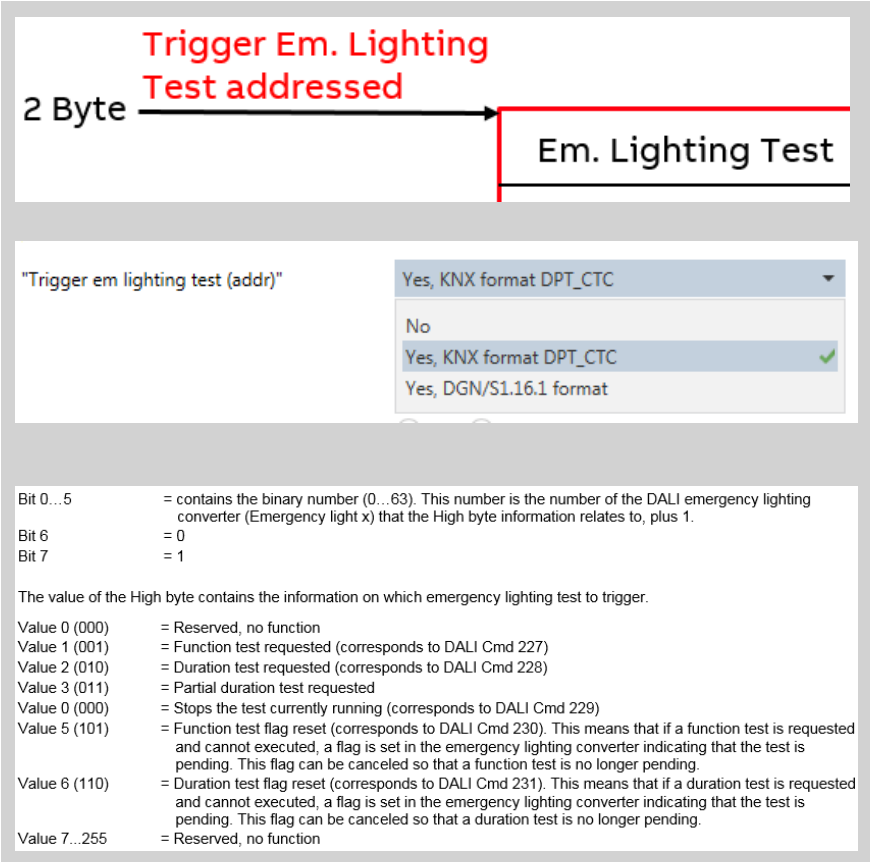


KNX DALI-Gateways DG/S x.64.1.1

Emergency Lighting

Group Objects Output A/B

- Trigger Emergency Lighting Test addressed:
  - Data format can be either KNX format DPT_CTC or DGN/S 1.16.1 format to be compatible with former device DGN/S
  - High Byte:
    Contains a number which determines the type of emergency light test to be started
  - Low Byte:
    Contains a number (0…63) which represents DALI device to be tested

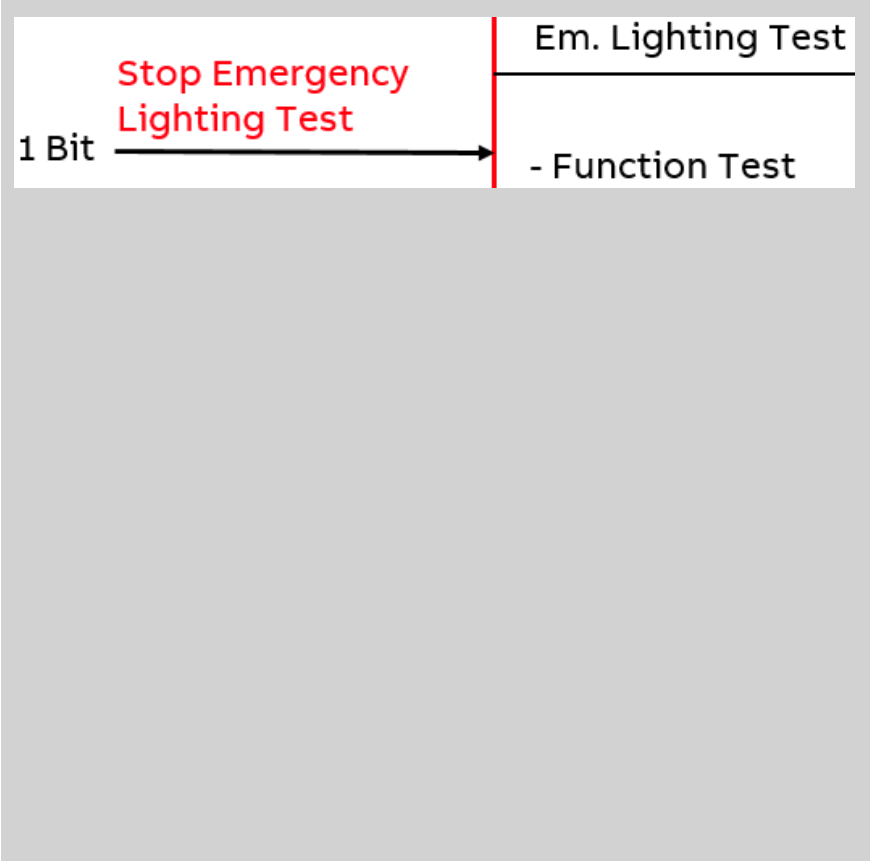


KNX DALI-Gateways DG/S x.64.1.1

Emergency Lighting

Group Objects Output A/B

- Stop Emergency Lighting Test:
  - All running emergency lighting tests in the channel will be stopped

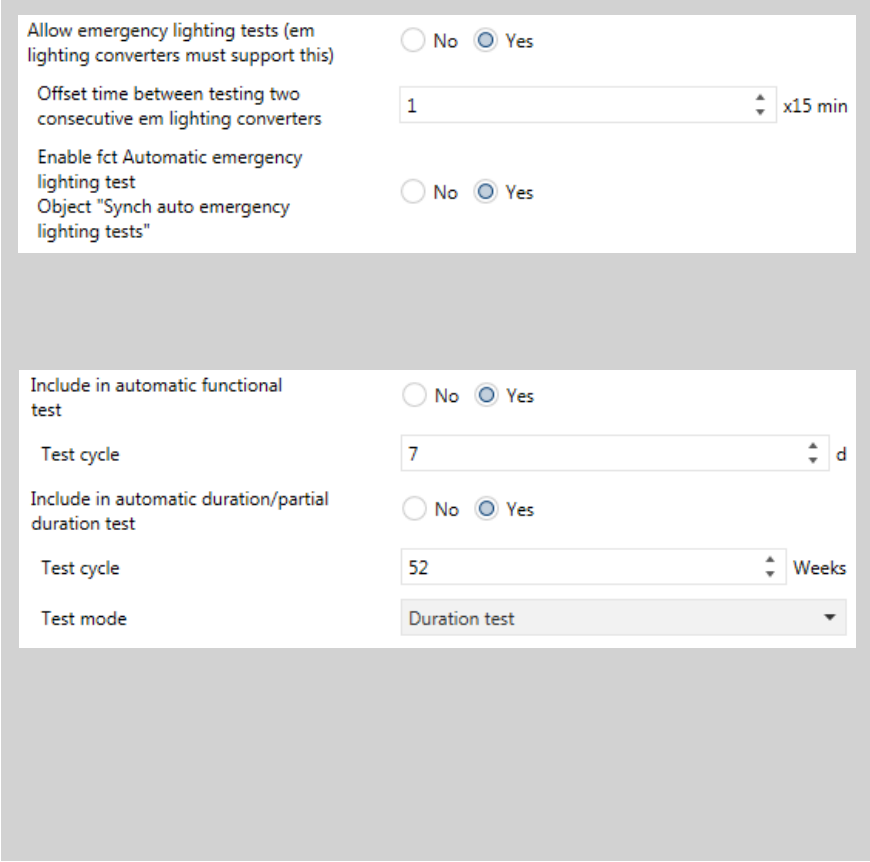


KNX DALI-Gateways DG/S x.64.1.1

Emergency Lighting

Automatic Emergency Lighting Test

- The automatic emergency lighting test is an optional function of the DALI standard for emergency lighting converters according to DIN EN 62 386-202.
- Condition: Converter supports automatic test
- The automatic emergency lighting test is an independent function of an emergency lighting converter. The converter performs the tests cyclically according to its own time adjustments, no external trigger required
- In principle all type of tests can be performed
- Test cycle to be parametrized in the application (Value x 15 min)

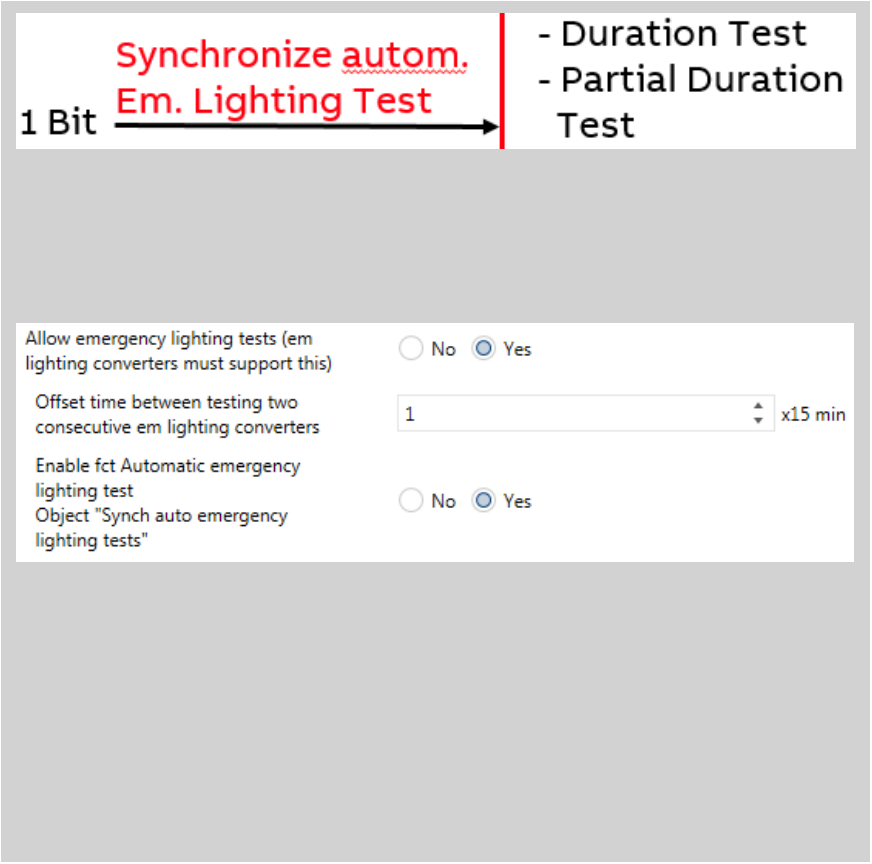


KNX DALI-Gateways DG/S x.64.1.1

Emergency Lighting

Group Objects Output A/B

– Synchronize automatic Emergency Lighting Test:
  - This communication object is used to transfer the start request for the automatic emergency lighting tests from the gateway to the emergency lighting converters. The start itself is carried out by the emergency lighting converter when it is ready
  - To be parametrized whether a dedicated emergency converter uses this mode
  - Offset time between converters to run automatic test adjustable

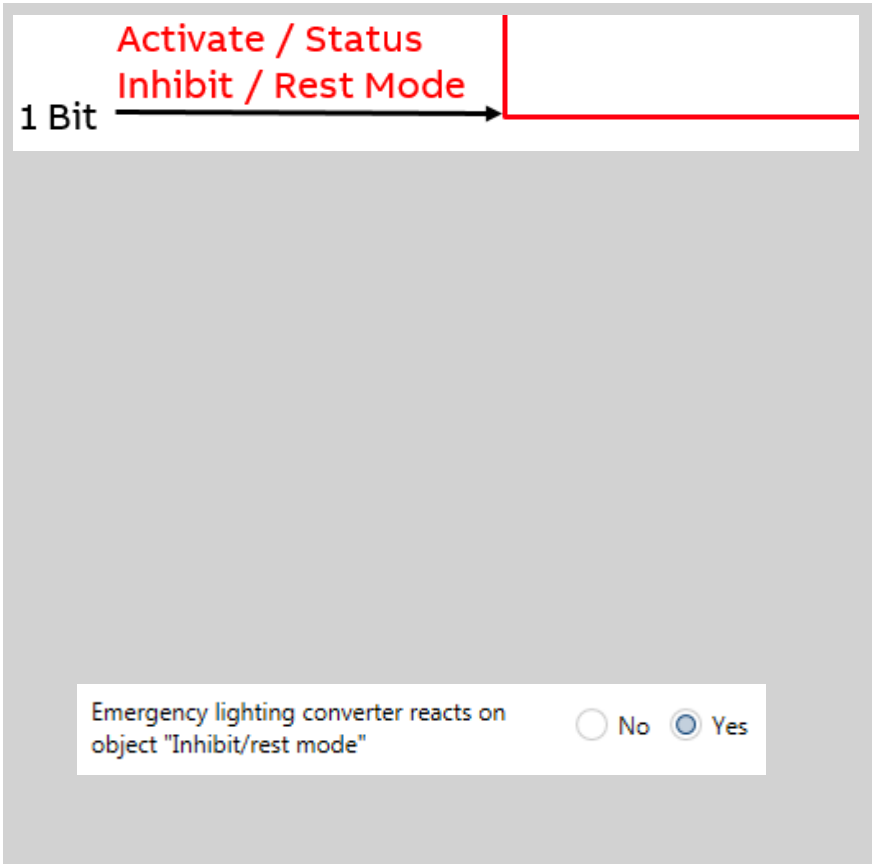


KNX DALI-Gateways DG/S x.64.1.1

Emergency Lighting

Group Objects Output A/B

- Inhibit Mode (Emergency light **not active**):
  - The inhibit mode is a time-limited state (15 min) of the emergency light converter, in which the emergency light does not go into the emergency lighting mode in the event of mains voltage failure.
- Rest Mode (Emergency light **active**):
  - The Rest Mode is a state in which the emergency light is switched off during emergency lighting operation. The Rest Mode is automatically deactivated after voltage recovery
- Only one group object
- To be parametrized whether a dedicated emergency converter uses these modes



KNX DALI-Gateways DG/S x.64.1.1

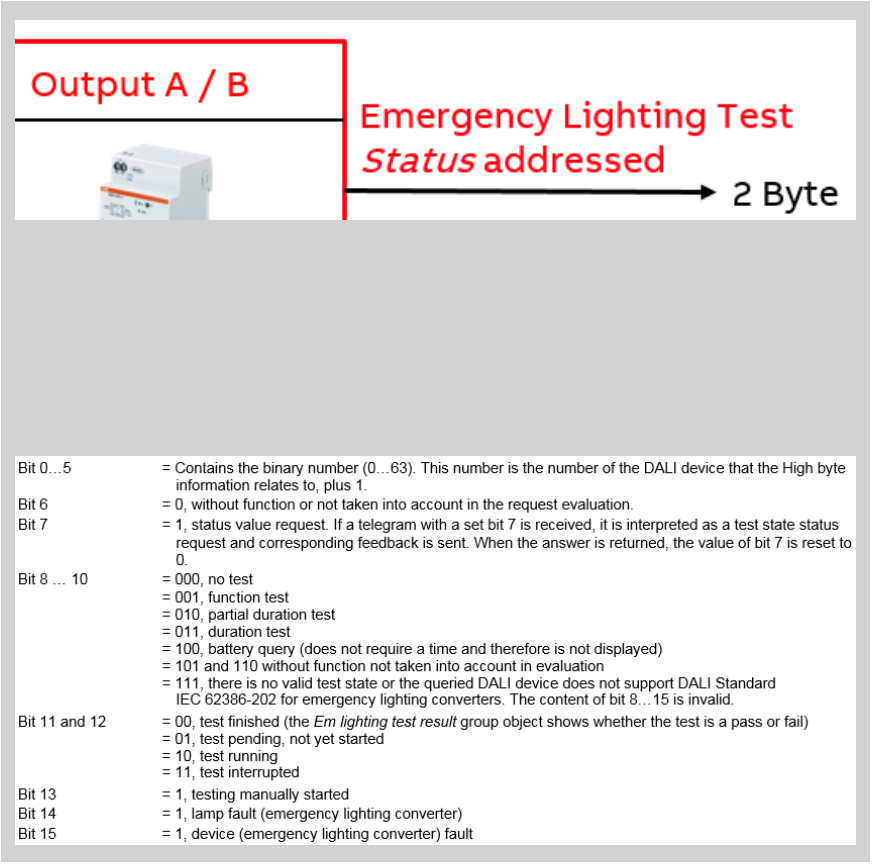
Emergency Lighting

Group Objects Output A/B

– Emergency Lighting Test **Status** addressed:

- <u>High Byte:</u>
  Contains in coded form the test result of the emergency light converter
- Status information of the Converter, e.g. any test running
- Which test is running
- Test is running or stopped
- Lamp/Converter fault detected

- <u>Low Byte:</u>
  Contains a number (0…63) which represents the tested DALI device



Bit 0…5	= Contains the binary number (0…63). This number is the number of the DALI device that the High byte information relates to, plus 1.
Bit 6	= 0, without function or not taken into account in the request evaluation.
Bit 7	= 1, status value request. If a telegram with a set bit 7 is received, it is interpreted as a test state status request and corresponding feedback is sent. When the answer is returned, the value of bit 7 is reset to 0.
Bit 8 … 10	= 000, no test = 001, function test = 010, partial duration test = 011, duration test = 100, battery query (does not require a time and therefore is not displayed) = 101 and 110 without function not taken into account in evaluation = 111, there is no valid test state or the queried DALI device does not support DALI Standard IEC 62386-202 for emergency lighting converters. The content of bit 8…15 is invalid.
Bit 11 and 12	= 00, test finished (the *Em lighting test result* group object shows whether the test is a pass or fail) = 01, test pending, not yet started = 10, test running = 11, test interrupted
Bit 13	= 1, testing manually started
Bit 14	= 1, lamp fault (emergency lighting converter)
Bit 15	= 1, device (emergency lighting converter) fault

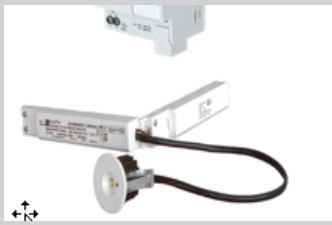
KNX DALI-Gateways DG/S x.64.1.1

Emergency Lighting

Group Objects Output A/B

– Emergency Lighting Test **Result** addressed:
  - Kind of last test
  - Test successful
  - Battery Fault
  - Battery Capacity
  - Discharge Time
  - Lamp or Converter failure

<u>Low Byte:</u>
Contains a number (0…63) which represents the tested DALI device



Emergency Lighting Test
Result addressed → 4 Byte

Bit 0…5	= contains the binary number (0…63). This number is the number of the DALI device that the High byte information relates to, plus 1.
Bit 6	= 0 indicates that the information concerns an individual emergency lighting converter
Bit 7	= 1, status value request. If a telegram with a set bit 7 is received, it is interpreted as a request for various status messages about the DALI device and corresponding feedback is sent. When the answer is returned, the value of bit 7 is set to 0.
Bit 8	= 1, last test was a function test
Bit 9	= 1, last test was a partial duration test
Bit 10	= 1, last test was duration test
Bit 11	= 1, if there is at least one fault in bit 16…23 or it is not possible to poll the emergency lighting converter battery
Bit 12	= 1, battery query finished (must be supported by the converter, optional only in DALI standard)
Bit 13…14	= 0, without function
Bit 15	= 1, there is no valid test state or the queried DALI device does not support DALI Standard IEC 62386-202 for emergency lighting converters. The content of the other bits is invalid.
Bit 16…23	= correspond to DALI telegram 252 ("query failure status")
Bit 16	= 1, switching defective. The emergency lighting converter did not respond during the test.
Bit 17	= 1, battery fault (battery fully discharged before rated operating time completed)
Bit 18	= 1, battery defective, battery fault
Bit 19	= 1, emergency lighting lamp fault
Bit 20	= 1, function test was triggered but could not be started in the predefined time
Bit 21	= 1, duration test was triggered but could not be started in the predefined time
Bit 22	= 1, function test fault, fail
Bit 23	= 1, duration test fault, fail
Bit 24…31	= Depending which test has been undertaken, this highest byte contains the battery charge state (0…255 = 0…100%) or the duration of the test until the battery was discharged. The value corresponds to the time in 2 x min.

KNX DALI-Gateways DG/S x.64.1.1

Emergency Lighting

Test: Emergency lighting converter

1. Trigger em lighting test (CTC): “01” *Function test requested*
2. Em lighting test status - addressed Output A: “29 10h → 0-0-1-01-001-0-0-010000”
   Device 17, function test, test pending, testing manually started, no lamp or ballast fault
3. Em lighting test status - addressed Output A: “31 10h → 0-0-1-10-001-0-0-010000”
   Device 17, function test, test running, testing manually started, no lamp or ballast fault
4. Em converter status - Output A Emergency light 17: “70 55h → 0111-0000-01-01-01-01”
   Function test running, inhibit mode not active, no test pending, no faults present

#	Time	Source A	Source Name	Desti	Destination Name	Rout	Type	DPT	Info
	24.05.2017 11:29:37,486								Recording was started,
1	24.05.2017 11:30:05,905	1.1.255	USB/S1.1 USB-Interface,MDRC	976	Trigger em lighting test (CTC) - Output A Emergency light 17	6	GroupValueW...	5.010 cou...	$01 | 1
2	24.05.2017 11:30:05,977	1.1.53	DG/S1.64.1.1 DALI Gateway, Basic,...	41	Em lighting test status - addressed Output A	6	GroupValueW...	7.001 pulses	29 10 | 10512 pulses
3	24.05.2017 11:30:08,303	1.1.53	DG/S1.64.1.1 DALI Gateway, Basic,...	41	Em lighting test status - addressed Output A	6	GroupValueW...	7.001 pulses	31 10 | 12560 pulses
4	24.05.2017 11:30:08,327	1.1.53	DG/S1.64.1.1 DALI Gateway, Basic,...	978	Emergency lighting converter status - Output A Emergency light 17	6	GroupValueW...	7.001 pulses	70 55 | 28757 pulses
5	24.05.2017 11:31:20,173	1.1.53	DG/S1.64.1.1 DALI Gateway, Basic,...	978	Emergency lighting converter status - Output A Emergency light 17	6	GroupValueW...	7.001 pulses	10 55 | 4181 pulses
6	24.05.2017 11:31:20,250	1.1.53	DG/S1.64.1.1 DALI Gateway, Basic,...	41	Em lighting test status - addressed Output A	6	GroupValueW...	7.001 pulses	01 10 | 272 pulses
7	24.05.2017 11:31:20,278	1.1.53	DG/S1.64.1.1 DALI Gateway, Basic,...	42	Em lighting test result - addressed Output A	6	GroupValueW...	12.001 cou...	00 00 01 10 | 272 counte
8	24.05.2017 11:31:20,306	1.1.53	DG/S1.64.1.1 DALI Gateway, Basic,...	977	Em lighting test result - Output A Emergency light 17	6	GroupValueW...	219.001 al...	10 00 80 00 00 00
9	24.05.2017 11:31:32,778								Recording was stopped

KNX DALI-Gateways DG/S x.64.1.1

Emergency Lighting

Test: Emergency lighting converter

5. Em converter status - Output A Emergency light 17: “10 55h → 0001-0000-01-01-01-01”
   Function test passed within execution time, inhibit mode not active, no test pending, no faults
6. Em lighting test status - addressed Output A: “01 10h → 0-0-0-00-001-0-0-010000”
   Device 17, function test, test finished, no lamp or ballast fault
7. Em lighting test result - addressed Output A: “00 00 01 10 → …. 0-00-0-0-0-0-1-0-0-010000”
   Device 17, last test was a function test, no function test fault (not failed)
8. Em lighting test result - Output A Emergency light 17: “ 10 00 80 00 00 00 → 0001- … 1000 - ….”
   Last function test passed within execution time, triggered by gateway,

#	Time	Source A	Source Name	Desti	Destination Name	Rout	Type	DPT	Info
	24.05.2017 11:29:37,486								Recording was started,
1	24.05.2017 11:30:05,905	1.1.255	USB/S1.1 USB-Interface,MDRC	976	Trigger em lighting test (CTC) - Output A Emergency light 17	6	GroupValueW...	5.010 cou...	$01 | 1
2	24.05.2017 11:30:05,977	1.1.53	DG/S1.64.1.1 DALI Gateway, Basic,...	41	Em lighting test status - addressed Output A	6	GroupValueW...	7.001 pulses	29 10 | 10512 pulses
3	24.05.2017 11:30:08,303	1.1.53	DG/S1.64.1.1 DALI Gateway, Basic,...	41	Em lighting test status - addressed Output A	6	GroupValueW...	7.001 pulses	31 10 | 12560 pulses
4	24.05.2017 11:30:08,327	1.1.53	DG/S1.64.1.1 DALI Gateway, Basic,...	978	Emergency lighting converter status - Output A Emergency light 17	6	GroupValueW...	7.001 pulses	70 55 | 28757 pulses
5	24.05.2017 11:31:20,173	1.1.53	DG/S1.64.1.1 DALI Gateway, Basic,...	978	Emergency lighting converter status - Output A Emergency light 17	6	GroupValueW...	7.001 pulses	10 55 | 4181 pulses
6	24.05.2017 11:31:20,250	1.1.53	DG/S1.64.1.1 DALI Gateway, Basic,...	41	Em lighting test status - addressed Output A	6	GroupValueW...	7.001 pulses	01 10 | 272 pulses
7	24.05.2017 11:31:20,278	1.1.53	DG/S1.64.1.1 DALI Gateway, Basic,...	42	Em lighting test result - addressed Output A	6	GroupValueW...	12.001 cou...	00 00 01 10 | 272 counte
8	24.05.2017 11:31:20,306	1.1.53	DG/S1.64.1.1 DALI Gateway, Basic,...	977	Em lighting test result - Output A Emergency light 17	6	GroupValueW...	219.001 al...	10 00 80 00 00 00
9	24.05.2017 11:31:32,778								Recording was stopped

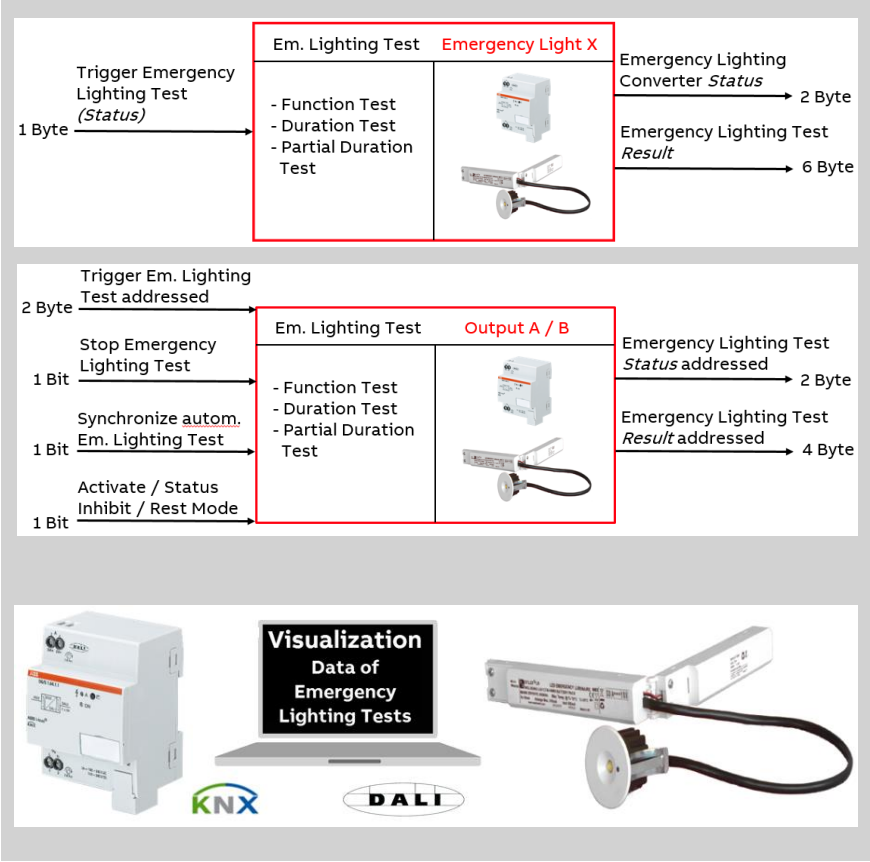
KNX DALI-Gateways DG/S x.64.1.1

Emergency Lighting

Summary

- Comprehensive and powerful solution to integrate emergency and conventional lighting in one DALI/KNX system
- Application in the new gateways is optimized compared with DGN/S 1.16.1
- General and emergency lighting combined in one system with all benefits of less wiring and installation
- Fulfills international standard IEC 62 386-202
- Visualization required to log the test results

→ **In any commercial project with KNX, DALI and emergency lighting it's a must to discuss this solution**

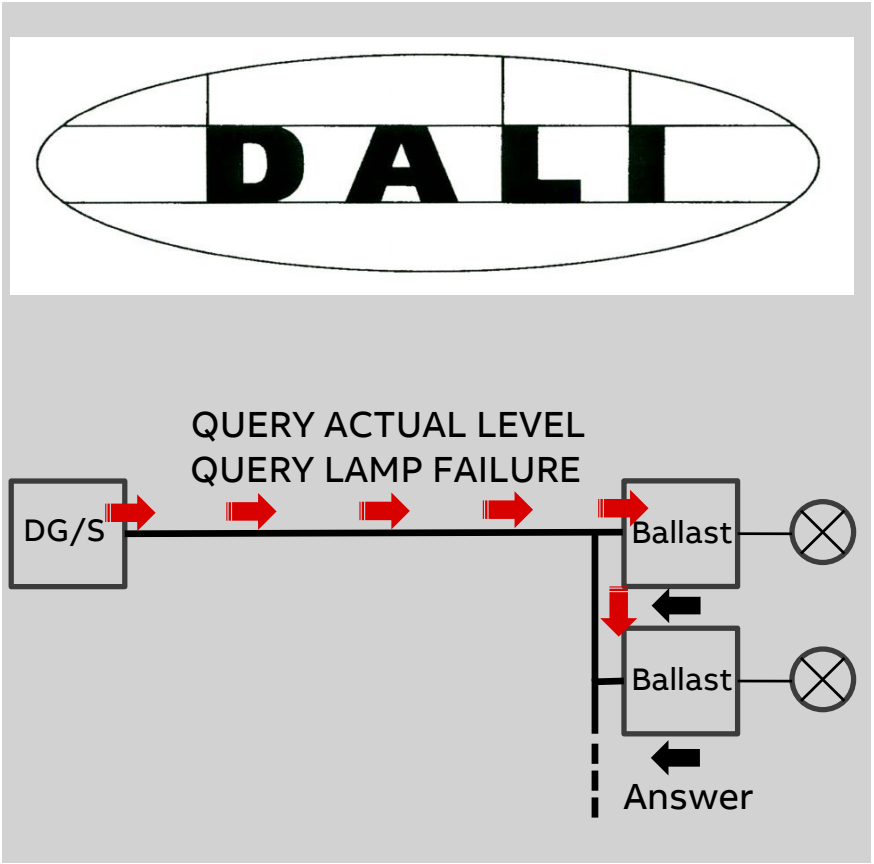


KNX DALI-Gateways DG/S x.64.1.1

DALI Communication

Principle

- DALI Protocol is standardized, transferred with 1200 Baud on a 2 wires cable
- The DALI-Gateway as the Master queries all DALI addresses (0-63) for brightness level/lamp failure. (QUERY ACTUAL LEVEL, QUERY LAMP FAILURE) This is a continuous process for all possible addresses, called DALI Query. Time between each query is up to 40-50 msec.
- DALI commands:
  - DIRECT ARC POWER (on or value)
  - Dim up/down
  - Set fade time

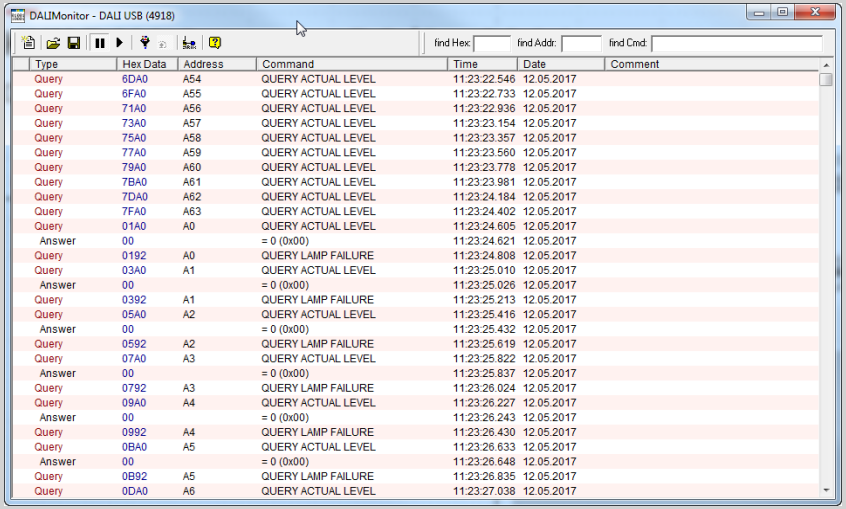


KNX DALI-Gateways DG/S x.64.1.1

DALI Communication

Access to DALI telegrams

- DALI USB Interface
- Software “DALI Monitor”



Type	Hex Data	Address	Command	Time	Date	Comment
Query	6DA0	A54	QUERY ACTUAL LEVEL	11:23:22.546	12.05.2017	
Query	6FA0	A55	QUERY ACTUAL LEVEL	11:23:22.733	12.05.2017	
Query	71A0	A56	QUERY ACTUAL LEVEL	11:23:22.936	12.05.2017	
Query	73A0	A57	QUERY ACTUAL LEVEL	11:23:23.154	12.05.2017	
Query	75A0	A58	QUERY ACTUAL LEVEL	11:23:23.357	12.05.2017	
Query	77A0	A59	QUERY ACTUAL LEVEL	11:23:23.560	12.05.2017	
Query	79A0	A60	QUERY ACTUAL LEVEL	11:23:23.778	12.05.2017	
Query	7BA0	A61	QUERY ACTUAL LEVEL	11:23:23.981	12.05.2017	
Query	7DA0	A62	QUERY ACTUAL LEVEL	11:23:24.184	12.05.2017	
Query	7FA0	A63	QUERY ACTUAL LEVEL	11:23:24.402	12.05.2017	
Query	01A0	A0	QUERY ACTUAL LEVEL	11:23:24.605	12.05.2017	
Answer	00		= 0 (0x00)	11:23:24.621	12.05.2017	
Query	0192	A0	QUERY LAMP FAILURE	11:23:24.808	12.05.2017	
Query	03A0	A1	QUERY ACTUAL LEVEL	11:23:25.010	12.05.2017	
Answer	00		= 0 (0x00)	11:23:25.026	12.05.2017	
Query	0392	A1	QUERY LAMP FAILURE	11:23:25.213	12.05.2017	
Query	05A0	A2	QUERY ACTUAL LEVEL	11:23:25.416	12.05.2017	
Answer	00		= 0 (0x00)	11:23:25.432	12.05.2017	
Query	0592	A2	QUERY LAMP FAILURE	11:23:25.619	12.05.2017	
Query	07A0	A3	QUERY ACTUAL LEVEL	11:23:25.822	12.05.2017	
Answer	00		= 0 (0x00)	11:23:25.837	12.05.2017	
Query	0792	A3	QUERY LAMP FAILURE	11:23:26.024	12.05.2017	
Query	09A0	A4	QUERY ACTUAL LEVEL	11:23:26.227	12.05.2017	
Answer	00		= 0 (0x00)	11:23:26.243	12.05.2017	
Query	0992	A4	QUERY LAMP FAILURE	11:23:26.430	12.05.2017	
Query	0BA0	A5	QUERY ACTUAL LEVEL	11:23:26.633	12.05.2017	
Answer	00		= 0 (0x00)	11:23:26.648	12.05.2017	
Query	0B92	A5	QUERY LAMP FAILURE	11:23:26.835	12.05.2017	
Query	0DA0	A6	QUERY ACTUAL LEVEL	11:23:27.038	12.05.2017	

KNX DALI-Gateways DG/S x.64.1.1

DALI Communication

DALI QUERY

- DG/S 1.64.1.1, 6 ballasts are connected
  - QUERY ACTUAL LEVEL A0 (Ballast No. 1)
  - Answer: 254 (100 % Brightness)
  - QUERY LAMP FAILURE A0
  - → no answer from A0 as it is ok
  - The same for ballast No. 2 – 5
  - QUERY ACTUAL LEVEL A6 (Ballast No. 7)
  - → no answer from A6 as it does not exist, therefore no QUERY LAMP FAILURE necessary
  - The same for ballast No. 8 – 64
  - QUERY ACTUAL LEVEL A0 (Ballast No. 1)
  - …

Query	01A0	A0	QUERY ACTUAL LEVEL	11:29:49.391	12.05.2017
Answer	FE		= 254 (0xFE)	11:29:49.405	12.05.2017
Query	0192	A0	QUERY LAMP FAILURE	11:29:49.435	12.05.2017
Query	03A0	A1	QUERY ACTUAL LEVEL	11:29:49.471	12.05.2017
Answer	54		= 84 (0x54)	11:29:49.485	12.05.2017
Query	0392	A1	QUERY LAMP FAILURE	11:29:49.515	12.05.2017
Query	05A0	A2	QUERY ACTUAL LEVEL	11:29:49.549	12.05.2017
Answer	FE		= 254 (0xFE)	11:29:49.563	12.05.2017
Query	0592	A2	QUERY LAMP FAILURE	11:29:49.593	12.05.2017
Query	07A0	A3	QUERY ACTUAL LEVEL	11:29:49.627	12.05.2017
Answer	00		= 0 (0x00)	11:29:49.641	12.05.2017
Query	0792	A3	QUERY LAMP FAILURE	11:29:49.671	12.05.2017
Query	09A0	A4	QUERY ACTUAL LEVEL	11:29:49.706	12.05.2017
Answer	00		= 0 (0x00)	11:29:49.719	12.05.2017
Query	0992	A4	QUERY LAMP FAILURE	11:29:49.749	12.05.2017
Query	0BA0	A5	QUERY ACTUAL LEVEL	11:29:49.786	12.05.2017
Answer	00		= 0 (0x00)	11:29:49.800	12.05.2017
Query	0B92	A5	QUERY LAMP FAILURE	11:29:49.830	12.05.2017
Query	0DA0	A6	QUERY ACTUAL LEVEL	11:29:49.865	12.05.2017
Query	0FA0	A7	QUERY ACTUAL LEVEL	11:29:49.904	12.05.2017
Query	11A0	A8	QUERY ACTUAL LEVEL	11:29:49.941	12.05.2017
Query	13A0	A9	QUERY ACTUAL LEVEL	11:29:50.069	12.05.2017
Query	15A0	A10	QUERY ACTUAL LEVEL	11:29:50.073	12.05.2017
Query	17A0	A11	QUERY ACTUAL LEVEL	11:29:50.079	12.05.2017
Query	19A0	A12	QUERY ACTUAL LEVEL	11:29:50.093	12.05.2017
Query	1BA0	A13	QUERY ACTUAL LEVEL	11:29:50.132	12.05.2017
Query	1DA0	A14	QUERY ACTUAL LEVEL	11:29:50.169	12.05.2017
Query	1FA0	A15	QUERY ACTUAL LEVEL	11:29:50.207	12.05.2017
Query	21A0	A16	QUERY ACTUAL LEVEL	11:29:50.246	12.05.2017
Query	23A0	A17	QUERY ACTUAL LEVEL	11:29:50.284	12.05.2017
Query	25A0	A18	QUERY ACTUAL LEVEL	11:29:50.323	12.05.2017
Query	27A0	A19	QUERY ACTUAL LEVEL	11:29:50.362	12.05.2017
Query	29A0	A20	QUERY ACTUAL LEVEL	11:29:50.400	12.05.2017

KNX DALI-Gateways DG/S x.64.1.1

DALI Communication

DALI QUERY

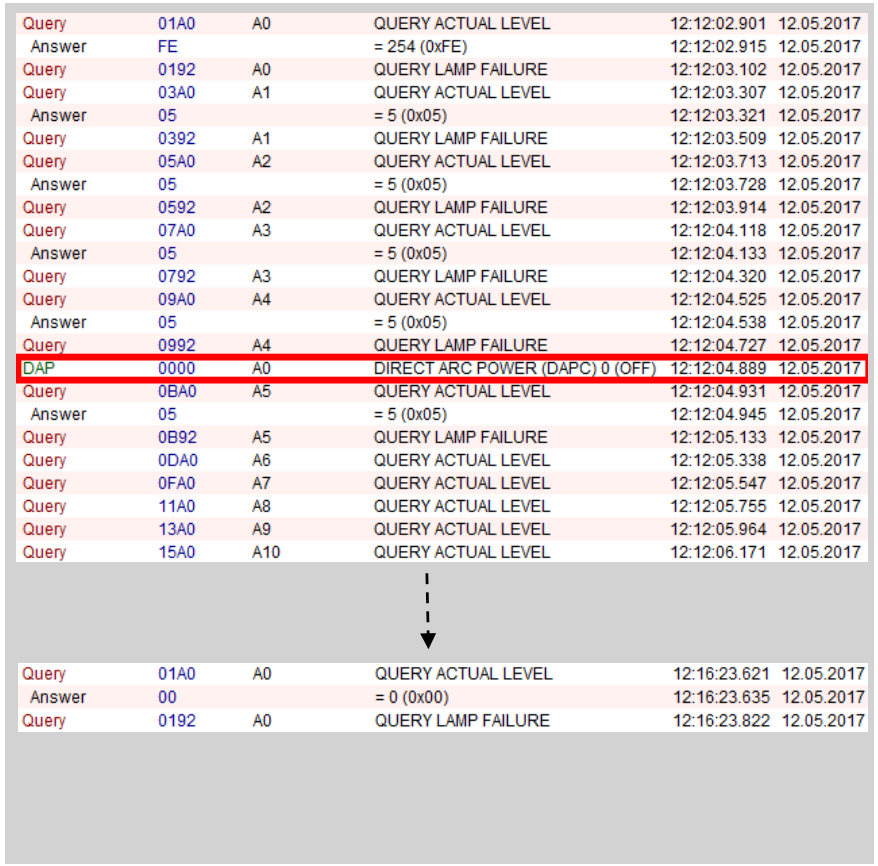
- Via the parameter in ETS it's feasible to extend the time each query, starting from 100 ms to 25,5 s. This might be necessary for some ballasts where the queries with standard time are too fast, e.g. emergency lighting converter
- With Parameter adjustment 3 x 100 ms the time between each query is around 300 ms
- Please note:
  - i-bus® tool connected to DALI Gateway results in ignoring additional pause, standard time 40-50 ms is valid
  - With manual mode active, DALI QUERY is disabled in order to measure the DALI voltage correctly

KNX DALI-Gateways DG/S x.64.1.1

DALI Communication

DALI Command

- Any command to take action is processed immediately
  - DIRECT ARC POWER A0 (Switch off ballast No. 1)
  - Later cycle DALI QUERY ACTUAL LEVEL A0: Answer 0 (off)



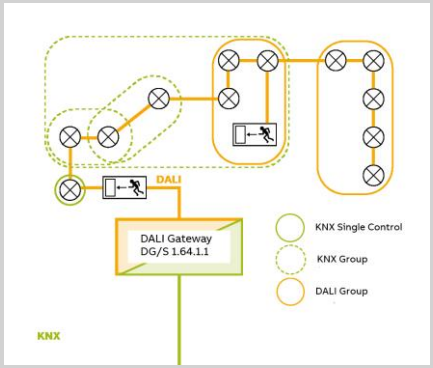
Query	01A0	A0	QUERY ACTUAL LEVEL	12:12:02.901	12.05.2017
Answer	FE		= 254 (0xFE)	12:12:02.915	12.05.2017
Query	0192	A0	QUERY LAMP FAILURE	12:12:03.102	12.05.2017
Query	03A0	A1	QUERY ACTUAL LEVEL	12:12:03.307	12.05.2017
Answer	05		= 5 (0x05)	12:12:03.321	12.05.2017
Query	0392	A1	QUERY LAMP FAILURE	12:12:03.509	12.05.2017
Query	05A0	A2	QUERY ACTUAL LEVEL	12:12:03.713	12.05.2017
Answer	05		= 5 (0x05)	12:12:03.728	12.05.2017
Query	0592	A2	QUERY LAMP FAILURE	12:12:03.914	12.05.2017
Query	07A0	A3	QUERY ACTUAL LEVEL	12:12:04.118	12.05.2017
Answer	05		= 5 (0x05)	12:12:04.133	12.05.2017
Query	0792	A3	QUERY LAMP FAILURE	12:12:04.320	12.05.2017
Query	09A0	A4	QUERY ACTUAL LEVEL	12:12:04.525	12.05.2017
Answer	05		= 5 (0x05)	12:12:04.538	12.05.2017
Query	0992	A4	QUERY LAMP FAILURE	12:12:04.727	12.05.2017
DAP	0000	A0	DIRECT ARC POWER (DAPC) 0 (OFF)	12:12:04.889	12.05.2017
Query	0BA0	A5	QUERY ACTUAL LEVEL	12:12:04.931	12.05.2017
Answer	05		= 5 (0x05)	12:12:04.945	12.05.2017
Query	0B92	A5	QUERY LAMP FAILURE	12:12:05.133	12.05.2017
Query	0DA0	A6	QUERY ACTUAL LEVEL	12:12:05.338	12.05.2017
Query	0FA0	A7	QUERY ACTUAL LEVEL	12:12:05.547	12.05.2017
Query	11A0	A8	QUERY ACTUAL LEVEL	12:12:05.755	12.05.2017
Query	13A0	A9	QUERY ACTUAL LEVEL	12:12:05.964	12.05.2017
Query	15A0	A10	QUERY ACTUAL LEVEL	12:12:06.171	12.05.2017
Query	01A0	A0	QUERY ACTUAL LEVEL	12:16:23.621	12.05.2017
Answer	00		= 0 (0x00)	12:16:23.635	12.05.2017
Query	0192	A0	QUERY LAMP FAILURE	12:16:23.822	12.05.2017

KNX DALI-Gateways DG/S x.64.1.1

DALI Communication

DALI Groups versus KNX Groups

- DALI Group:
  - Only one telegram to be sent on DALI as the DALI system knows about the group
  - In huge groups no delay in operation
- KNX Group:
  - For each ballast in a group one DALI telegram to be transmitted with a delay of 30 ms
  - In huge groups (e.g. 60 participants) almost 2 s delay, means a visible ‚running light‘



DALI Group with 5 ballasts:

DAP	80FE	G0	DIRECT ARC POWER (DAPC) 254 (100%)	18:27:03.722 17.05.2017

KNX Group with 5 ballasts:

DAP	0000	A0	DIRECT ARC POWER (DAPC) 0 (OFF)	16:07:58.726 12.05.2017
DAP	0200	A1	DIRECT ARC POWER (DAPC) 0 (OFF)	16:07:58.756 12.05.2017
DAP	0400	A2	DIRECT ARC POWER (DAPC) 0 (OFF)	16:07:58.785 12.05.2017
DAP	0600	A3	DIRECT ARC POWER (DAPC) 0 (OFF)	16:07:58.815 12.05.2017
DAP	0800	A4	DIRECT ARC POWER (DAPC) 0 (OFF)	16:07:58.845 12.05.2017

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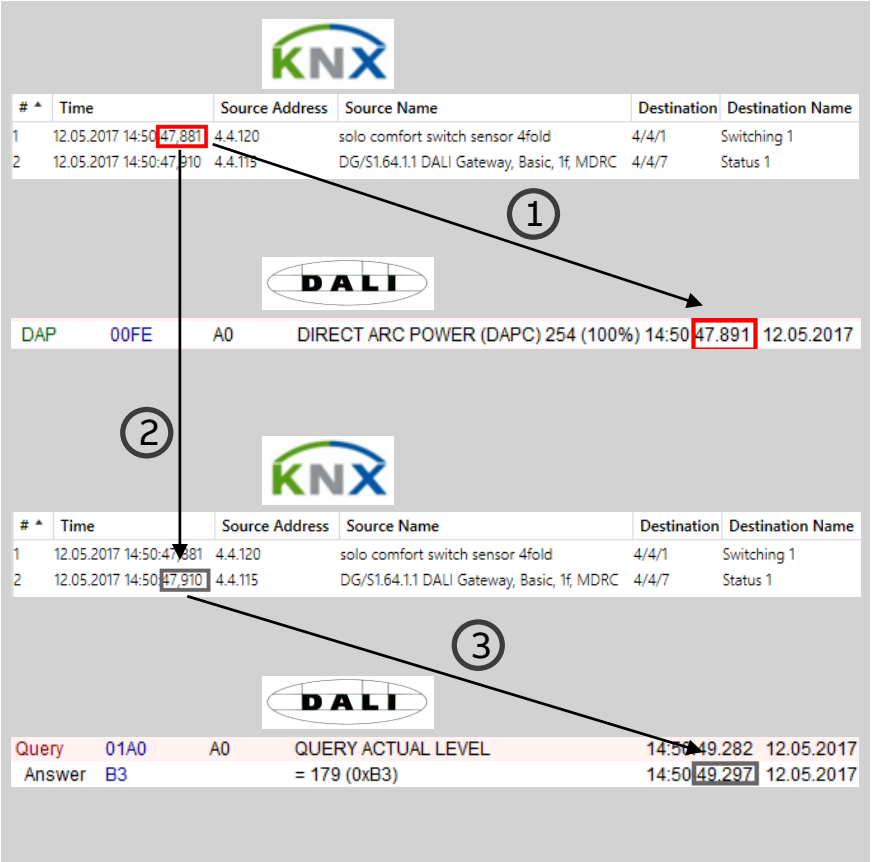
DALI Communication

Status Feedback

- As mentioned a command on DALI is carried out at once (1), on DALI the actual brightness level is updated latest in the next query cycle, which can take some time
- The DALI Gateway sends immediately after execution of a command the status on the KNX bus (2). It is a kind of simulation as the gateway assumes that the light is really on, which is most probably correct. During the DALI Query process finally the gateway achieves the real status from the ballast (3). Assumed the DALI Query time is not extended in the ETS application the maximum time to get the real status from the DALI ballast is up to 6 s. (worst case)



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DALI Communication

Conclusion

- DALI as a Master (Gateway) – Slave (Ballasts) System allows with DALI QUERY to achieve the brightness level and to detect lamp failure
- Commands (e.g. light on) are sent directly on DALI to take action
- Status information of the lamps are thanks to (simulated) feedback quickly on KNX available
- In the event of big KNX groups delay in sending the commands on DALI (each ballast one DALI command) has to be considered
- In addition individual status information can cause higher traffic on KNX and delay in status information

KNX DALI-Gateways DG/S x.64.1.1

DALI-Gateways and i-bus® Tool

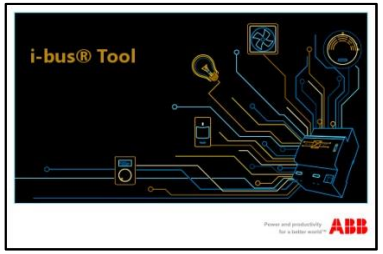
Webinar “i-bus® Tool – benefit in practice” from March 2017

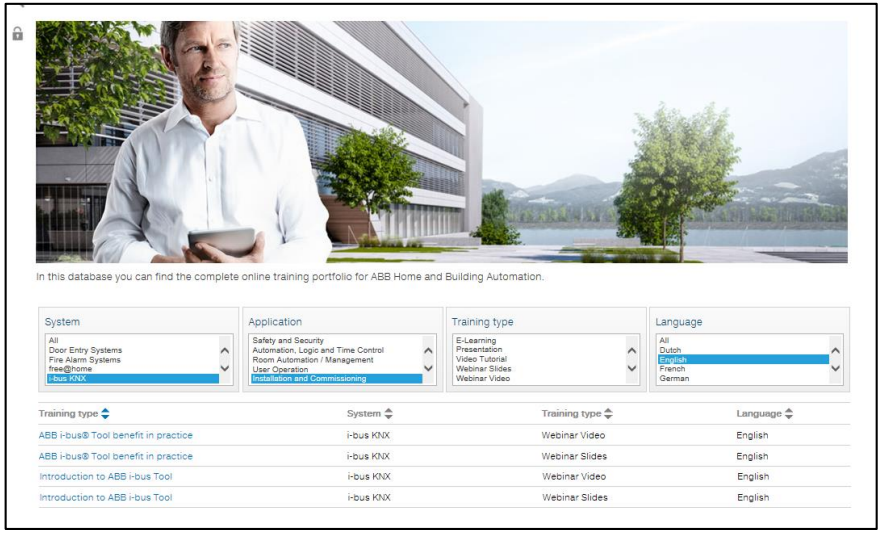
Webinar “i-bus® Tool – a professional Service Tool” from March 2014

Videos and slides are available on Training & Qualification Database

→ Application “Installation and Commissioning”

→Link





KNX DALI-Gateways DG/S x.64.1.1

Overview i-bus® Tool

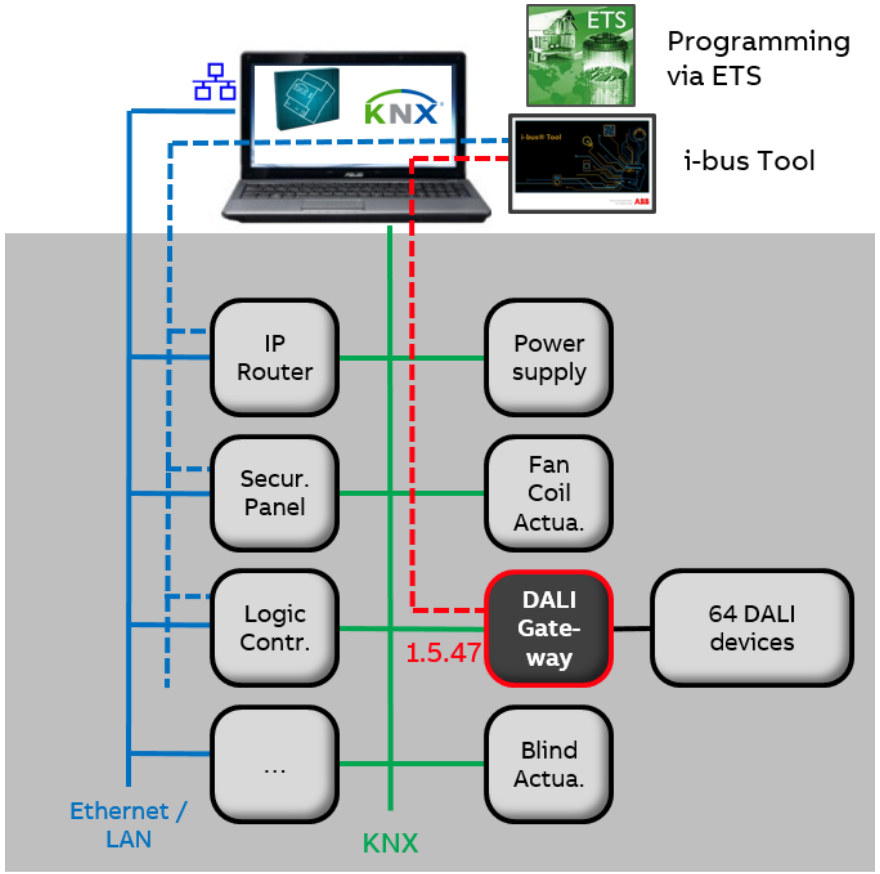
It supports system integrators during commissioning and service

Internal information and states of the device hardware and software applications are now available in a transparent manner

The i-bus® Tool is optional, i.e. the ABB i-bus® KNX devices must still be commissioned using just the ETS

An important principle is that no divergences to the ETS project can result through the i-bus® Tool

Download: www.abb.com/knx
> Services & Tools
> Engineering Tools

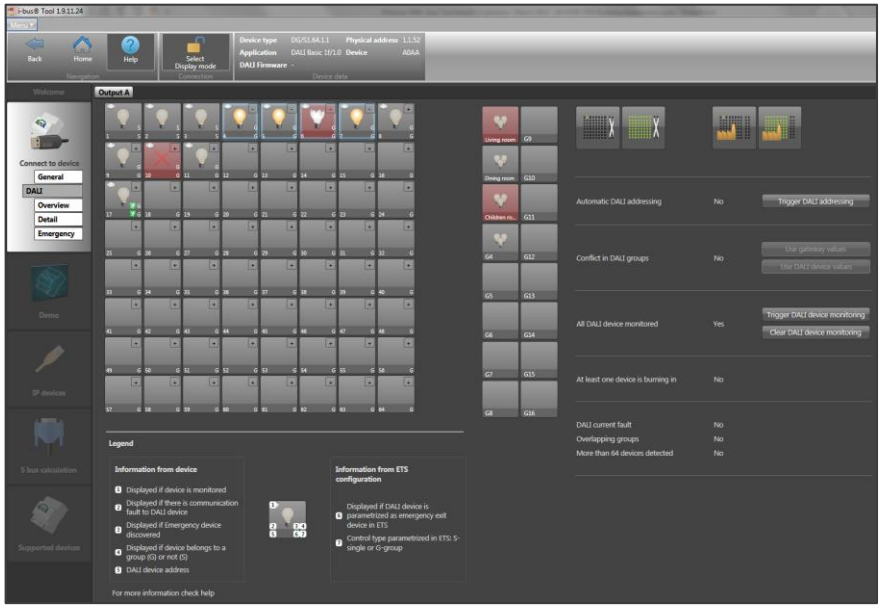


KNX DALI-Gateways DG/S x.64.1.1

DALI-Gateways and i-bus® Tool

The DALI Tool is mandatory for setting up the KNX DALI devices

- The status of the DALI outputs and gateways is displayed in compact form
- Faults (lamp, ballast or communication) in the DALI system or in the gateway are highlighted by red lettering or red fields
- DALI addresses can be assigned
- Assignment of the DALI devices into DALI groups
- Commissioning of constant light control (DALI Light Controller)
- …



Ballast OK and monitored | Ballast failure | Lamp failure | Emer-gency converter | Group | Framing error

KNX DALI-Gateways DG/S x.64.1.1

i-bus® Tool: New functions for DALI

Pages

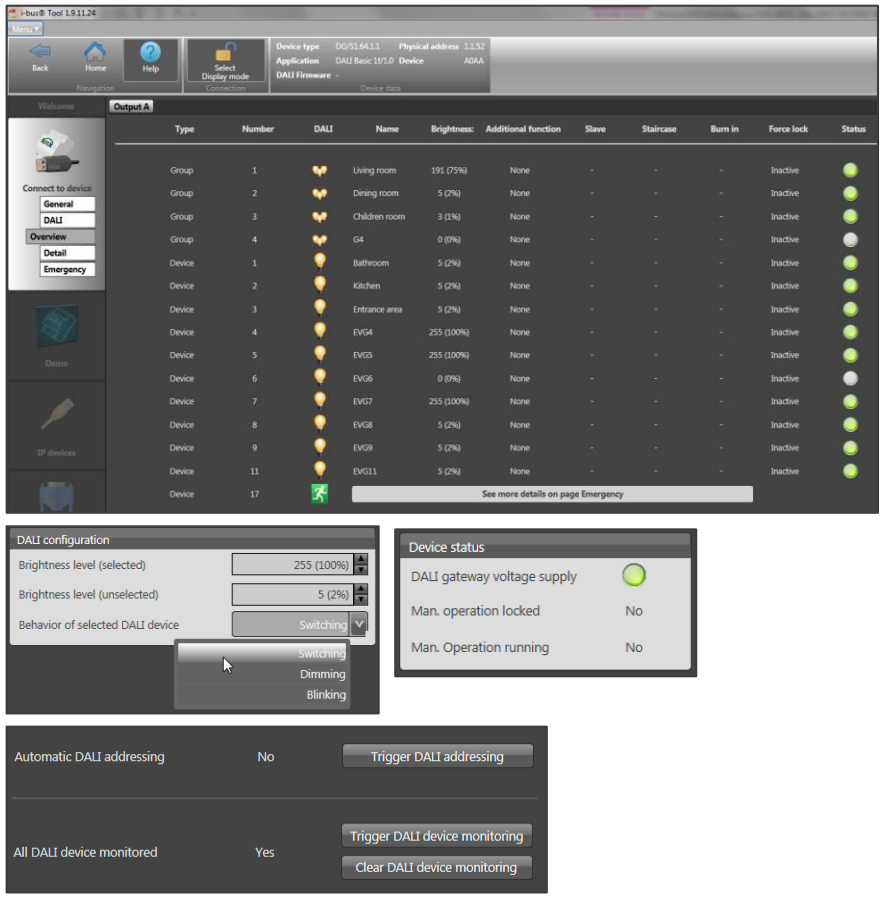
- Overview
  All connected DALI devices are displayed
- Detail
  Individual devices or groups can be tested
- Emergency converter
  Only the emergency lighting converters (DALI type 1 according to EN 62386-202) are displayed and can be tested

Manual operation blocked or running

Finding and testing of individual ballasts and groups (switching, dimming or blinking of selected DALI devices)

Trigger DALI addressing (only when ETS no)

Trigger and clear DALI monitoring



KNX DALI-Gateways DG/S x.64.1.1

i-bus® Tool: New functions for DALI

Information about overlapping groups, more than 64 devices, …

Display operating states ballasts/ groups (staircase lighting / slave light controller / forced operation / blocked, ...)

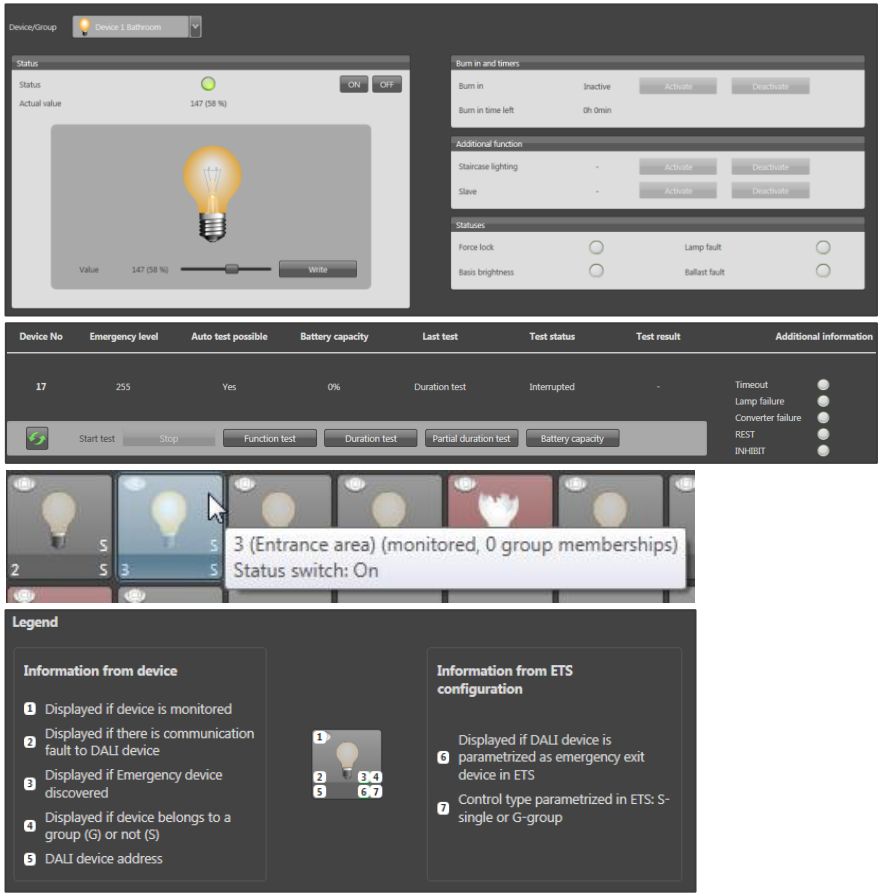
Display DALI Telegram errors (framing errors)

Legend with information from devices and ETS configuration → Comparison of information from ballast and ETS programming

Display and monitoring of burn-in mode

Start and display different tests of an emergency lighting converter (function, duration, partial duration and battery capacity test)

…



KNX DALI-Gateways DG/S x.64.1.1

Update of KNX devices

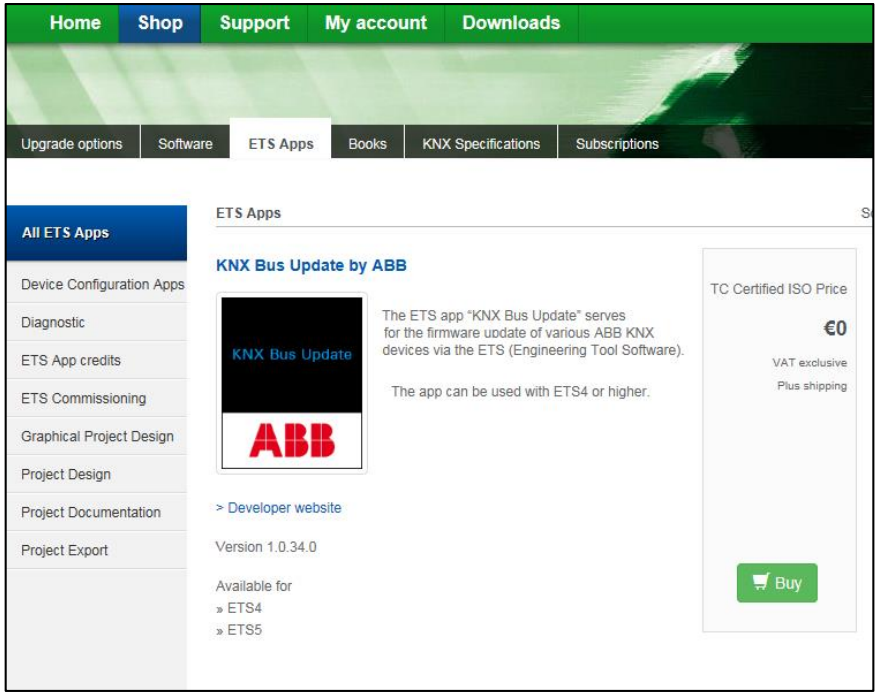
The ETS app “KNX Bus Update” serves for the firmware update of various ABB KNX devices (e.g. DALI-Gateways, presence detecors) via the ETS (Engineering Tool Software)

The app can be used with ETS4 or ETS5

Free of charge!

Download the app (https://my.knx.org) and install the product license on your ETS dongle

Download the current firmware files of the KNX devices (*.fwupd)



KNX DALI-Gateways DG/S x.64.1.1

Update of KNX devices

Start ETS and build up a communication to the KNX installation (USB or IP)

Download individual address and application

Open app (Extras → ABB → …)

Import update file (*.fwupd)

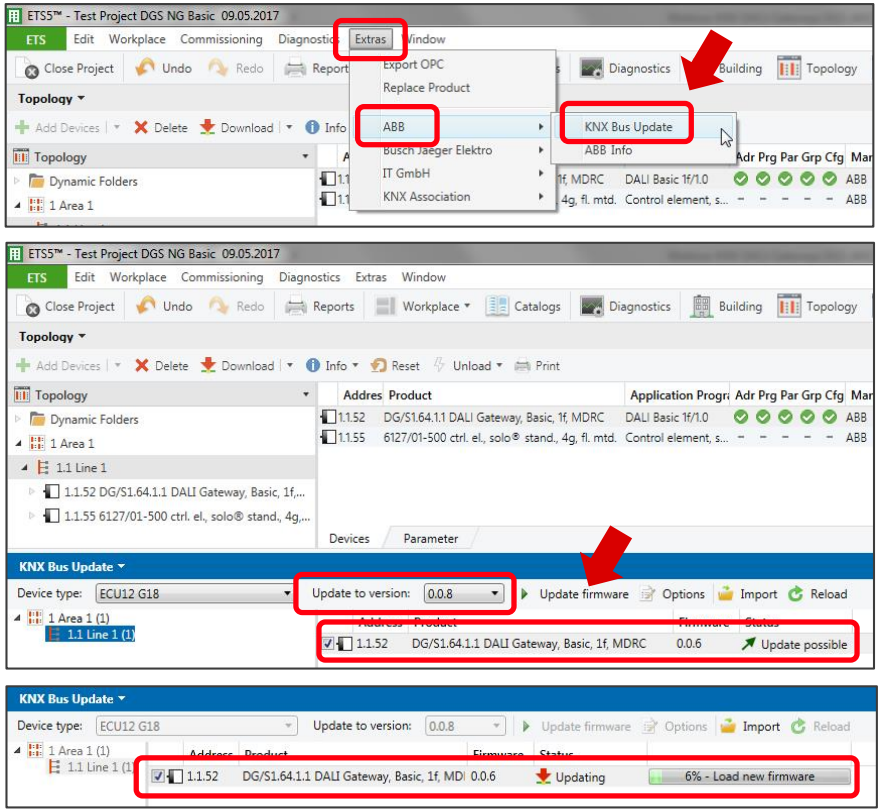
Select device type (e.g. DG/S) and press “Reload” button

Possible updates of devices will be displayed

Choose the latest version of the update file

Select device(s) and start firmware update

All parameters and group addresses will not be deleted from the device while updating the firmware!!!



KNX DALI-Gateways DG/S x.64.1.1

Training & Qualification

KNX Certified Training

Certified KNX Courses in Heidelberg

- Advanced Course 17th to 21st July
- Tutor Course 09th to 13th October

And many more training courses in the calendar “International Training Dates 2017”

KNX DALI-Gateways DG/S x.64.1.1

Next Webinar

KNX Sensors for commercial Buildings

Wednesday 21st June 2017

- Morning 09:00 am Europe Time (Berlin, UTC + 2h)
- Afternoon 03:00 pm Europe Time (Berlin, UTC + 2h)

- Push buttons with integrated temperature sensor
- Push button coupler for ocean
- RTC with integrated inputs, CO_2 and humidity sensor and controller
- Motion sensor

* Topic is subjected to change

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