Technical Manual

DALI GATEWAY
Art. 119914 14783 003A

TOTAL AUTOMATION GENERAL TRADING CO. LLC
SUITE NO.506, LE SOLARIUM OFFICE TOWER,
SILICON OASIS, DUBAI. UAE.
Tel. +971 4 392 6860, Fax. +971 4 392 6850
www.tacdubai.com, info@tacdubai.com

1. Overview

1.1. Presentation

The ASIN ***DALI GATEWAY*** is a device for controlling and monitoring up to 8 independent DALI ballast.
With its KNX input which is transformed into a DALI signal it is not necessary to have complex electrical installations, and thanks to its decentralized housing it can be installed near the lighting equipment (suspend ceilings) to avoid additional wiring costs. Each lamp may also be controlled manually using the buttons on front of device. Some parts of the monitoring are directly visible on the device itself. This is useful for lamp commissioning and testing the installation, even without KNX Programming. KNX bus Power is sufficient for this purpose.

The DALI GATEWAY is able to drive 8 independent DALI channels

Description:

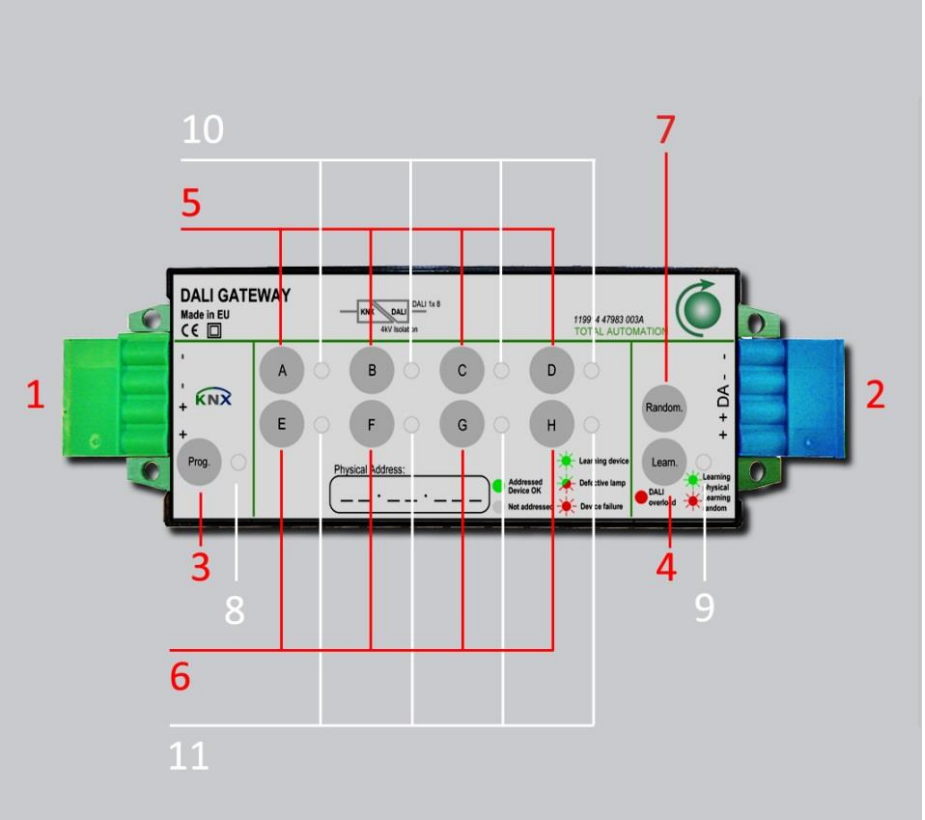
- Each ballast can be set up, controlled and monitored independently.
- ***Handmode*** is available for the individual addressing of each single ballast and to test each single lamp.
- The DALI power supply is included in the DALI GATEWAY, powered only by the KNX bus: No need of external DALI power supply, no need of powering DALI GATEWAY with supplementary supply voltage
- LEDs for status indication of each single lamp signals communication failure, ballast failure or lamp failure
- 1 KNX input / 1 DALI line output.

To configure and operate the DALI GATEWAY, at least ETS version 4 is needed.

The product database is available for download: http://www.tacdubai.com

In case of internal failure of a DALI Ballast high voltage may be present on DALI connector. Thus, device is to be installed by skilled personal only!

1.2. Overall view



Terminals:

1. KNX plug in connector
2. DALI plug in connector

Buttons:

3. KNX programming button
4. DALI learning button
5. Channel A to D button
6. Channel E to H button
7. Random button

LED's:

8. KNX programming LED
9. DALI learning/random/overload LED
10. Channel A to D LED
11. Channel E to H LED

1.3. Connection diagram

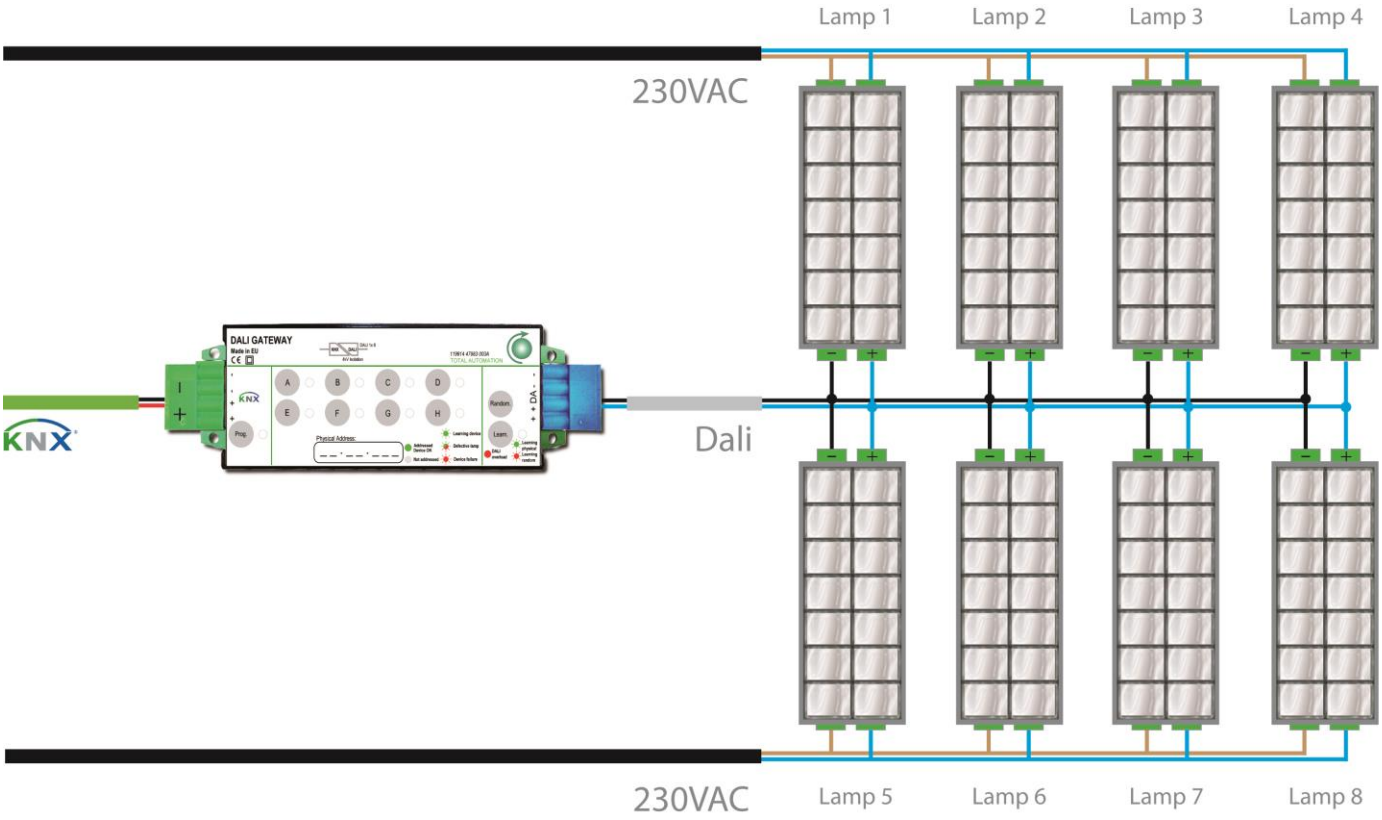


Figure 1: Connection diagram

2. Operating manual

2.1. Inputs / Outputs

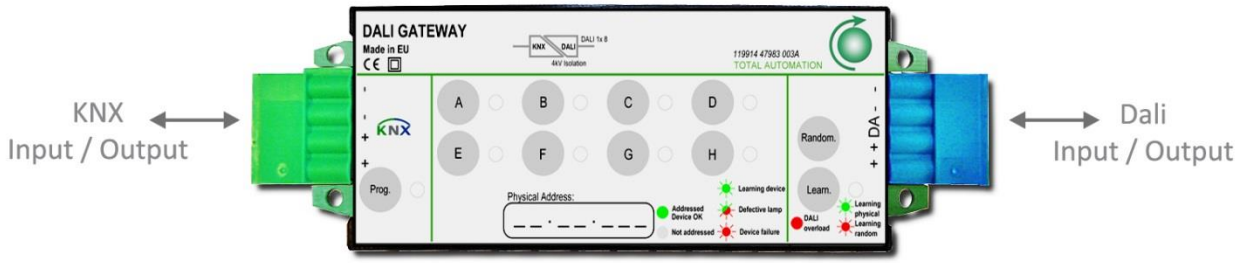


Figure 2: Inputs / Outputs

2.1.1 KNX (input / output)

The DALI GATEWAY is powered from the KNX bus, through a 2-pole plug in connector.
The KNX bus is used for bi-directional communication with other devices. Commands to the lamps are received from KNX, and status information's are sent back to KNX bus.

2.1.2 DALI (input / output)

The device is designed to drive up to 8 independent ballasts connected on DALI bus.
The DALI bus is used for bi-directional communication with other devices.
Commands and settings are sent to ballasts through the DALI bus. Statuses from ballasts are received through the DALI bus.
Each single ballast can be set up, controlled and monitored independently.
The DALI bus power supply is included in the DALI GATEWAY, and is fully powered by the KNX bus.
The internal DALI power supply is able to power up to 8 ballasts, each using max. 2mA, according to DALI standard.
Inside the DALI GATEWAY, KNX and DALI bus are isolated from each other.

The DALI GATEWAY acts as a DALI Master. Only 1 Master is allowed in a DALI system.
In no case, another DALI Master or DALI power supply must to be connected to the DALI GATEWAY.

2.2. Local push-buttons and LED's

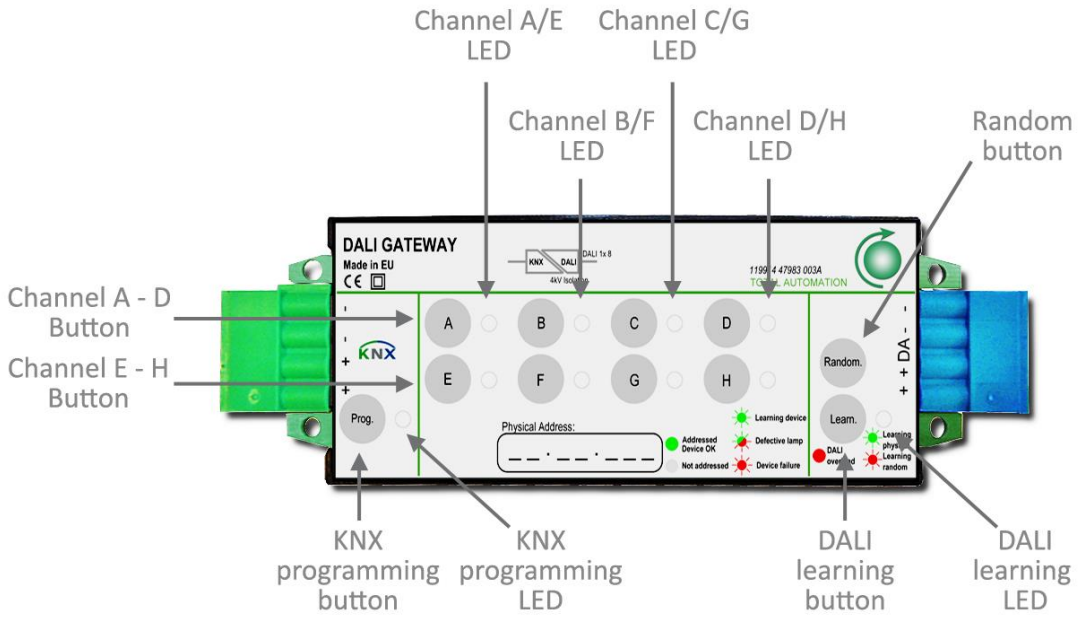


Figure 3: Local push-buttons and LED's

2.2.1 KNX Programming button "Prog." and LED

Pressing the KNX programming button ***"Prog."*** will put the DALI GATEWAY into KNX Programming mode. The KNX programming mode will be exited automatically after successful physical address programming, resetting device or pressing again the ***"Prog."*** button.

The associated LED (KNX Programming LED) is indicating programming mode by red lighting.

2.2.2 DALI Learning button "Learn." and LED

A short press on the DALI Learning button ***"Learn."*** will enter or exit DALI Learning mode.

Once in manual learning mode, a long press on the DALI Learning button ***"Learn."*** will erase **all** short addresses on the DALI Bus. This will not only erase DALI short addresses affected to the channels A…H, but all short addresses from 0 to 63. This is useful if some ballast already have a short address which is not affected to a channel. In this case, even this address can be erased, in order to give a new address according to settings of channels A…H.

The associated LED (DALI learning LED) is indicating the actual DALI learning mode:

- Blinking green: device is actually in physical learning mode
- Blinking red: device is actually in random learning mode
- Red (not blinking): there is an overload on the DALI bus, for ex. too much ballasts connected or short circuit.

2.2.3 Channel A- D, Channel E- H buttons and LED's

If not in addressing mode, a short press on buttons ***"A…H"*** will invert the level of corresponding channel.

- If corresponding channel is off, the ballast will be requested to jump to the maximum level set in parameters
- If corresponding channel is already on, the ballast will be requested to jump to off.

This is useful to check the electrical installation and also the DALI addressing. By this way, electricians can check if the communication between DALI GATEWAY is working, and if the ballasts are associated to the correct channels.
By the same way, the actual status of each channel is displayed on the corresponding LED:

- Off: the associated channel is not used
- Constant green: ballast with corresponding short address is responding, no ballast or bulb failure
- Alternate green-red blinking: ballast with corresponding short address is signalling a lamp failure. Lamp has to be checked. Defective lamps can only be detected when ballast is requested to switch them on.
- Red blinking: no ballast with corresponding short address is responding. Power supply of ballast, addressing of associated short address and wiring have to be checked
- Constant red: ballast with corresponding short address is signalling an internal failure. Ballast has to be checked
- Alternate red-orange blinking: failure on DALI answer. This may be due to bus disturbance, bus overload, multiple ballasts having same short address, … Addressing and wiring of ballasts has to be checked.

If in addressing mode, a short press on buttons ***"A…H"*** will toggle corresponding channel addressing mode On or Off (if channel not already addressed).

- If a ballast with corresponding short address is already detected, short press of button ***"A..H"*** will have no effect
- If no ballast with corresponding short address is detected, a short press of button ***"A..H"*** will invert learning status of associated channel
- A long press of button ***"A..H"*** of already addressed channels will make ballast of corresponding channel jump to minimum level and erase previous short address.

The addressing status of each channel is displayed on corresponding LED ***"A..H"***

- Off: no ballast with corresponding short address is detected, and channel is not in learning mode
- Green blinking: no ballast with corresponding short address is detected, but channel is in learning mode
- Constant green: a ballast with corresponding short address is already detected, so channel is not in learning mode.

2.3 DALI addressing

In order to work, each single ballast has to be associated to a single channel of the DALI GATEWAY.
Each channel must only be associated to 1 ballast, and each ballast must only be associated to 1 channel, else DALI communication failures will occur.

To do this, each DALI GATEWAY channel will be given a unique and single short address number within parameters. Through DALI addressing, each ballast will be programmed a corresponding short address number.

The DALI addressing can be initiated either manually on the DALI GATEWAY, using the push buttons, or it can be initiated through KNX, using according communication objects.

The manual DALI addressing on device is very useful for electricians, thus this can be done **without previous KNX programming**. Only KNX bus power is needed. In this case, the default short address of 0 is used for channel A, 1 for channel B … and 7 for channel H.
The DALI addressing through KNX is very useful once the DALI GATEWAY is mounted, for example in fall-ceiling. In this case, the DALI addressing can be done **without need of manual access** to the DALI GATEWAY.

Furthermore, independently of using the push-buttons or the KNX bus, 2 different addressing methods are possible, using either physical addressing or random addressing.

2.3.1 Start addressing

DALI addressing can be started either manually by short pressing the DALI learning button on DALI GATEWAY, or through KNX, by sending according data's on CO Nr. 10/ *Physical addressing / Addressing status*.

Once in addressing mode, DALI learning LED will blink green and all connected ballasts will jump to minimum level, according to parameters.
All ballast with already affected short address corresponding to a channel of the DALI GATEWAY will then jump to maximum level, according to parameters, respecting order A to H.

- LED's ***"A..H"*** of already addressed channels will light up constant green.
- LED's ***"A..H"*** of not addressed channels being in addressing mode will blink green.
- LED's ***"A..H"*** of not addressed channels not being in addressing mode will not light.
- Short pressing buttons ***"A..H"*** of not addressed channels will toggle corresponding channel addressing mode On or Off.
- Long pressing buttons ***"A..H"*** of already addressed channels will make ballast of corresponding channel jump to minimum level and erase previous short address.
- Long pressing DALI Learning button ***"Learn."*** will erase all short addresses on the DALI Bus: This will not only erase DALI short addresses affected to the channels A…H, but all short addresses from 0 to 63. This is useful if some ballast already have a short address which is not affected to a channel. In this case, even this address can be erased, in order to give a new address according to settings of channels A…H.
- Erasing short address of ballast can also be done through KNX using CO Nr. 12/ *Erase ballast short address*.

Rem.: Erasing short address of ballast using CO Nr. 12/ *Erase ballast short address* will also result in exiting addressing mode.
Rem.: Information about channels in addressing mode is also constantly available on CO Nr. 10/ *Physical addressing / Addressing status*.
Rem.: When entering addressing, all channels are automatically checked for available ballast. For each ballast found, a short sound will be emitted by buzzer. Also, each time a new ballast is successfully addressed, this short sound will be emitted. Theses short sounds will not be emitted if buzzer is already switched On by CO Nr. 2/ *Buzzer switch On-Off / Buzzer status*.

2.3.2 Physical addressing

Physical addressing enables exact commissioning of the ballast, but requires manual access to the lamps.

Once desired channels are in manual addressing mode, the not actually addressed ballasts (recognizable because they are at minimum level) have to be selected physically one by one.
For this, please refer to ballast manufacturer. In most case, it simply needs to turn out and in again the tube.
The selected ballast will be given the short address associated to the first channel (starting A, Ending H) in addressing mode. This channel will then exit addressing mode, and associated ballast switch to maximum level (according to parameters).

Rem.: If selecting an already addressed ballast (recognizable because they are at maximum level), this will lose previous short address, replaced by new one.

Physical addressing can also be achieved without having to access the lamps after mounting. Ballast can be given short address even before mounting into the ceiling. This short address will be stored inside ballast even once power supply is removed. If already addressed ballasts, with short addresses corresponding to channels A..H are connected, the DALI GATEWAY will recognize them even without having to enter DALI addressing mode.

2.3.3 Random addressing

Random addressing enables rapid commissioning of the ballast, without needing manual access to the lamps.
In most cases, the random association of ballast and channels is not predictable and has to be corrected / adjusted in a second step.

Instead of selecting ballasts one by one, randomising can be started by short pressing ***"Random."*** button.
The learning LED on DALI GATEWAY will blink red.
All connected ballasts will first jump to minimum level, and once addressed, jump one after each other, from A to H, to maximum level.
Ballasts without short address will be selected using a random procedure.
The selected ballast will be given the short address associated to the first channel (starting A, Ending H) in addressing mode. This channel will also exit addressing mode, and associated ballast switch to maximum level (according to parameters).
Random procedure will continue until no channels are left in addressing mode or no more ballasts without short addresses are detected.

Rem.: Random addressing can also be started through KNX, by sending according data's on CO Nr. 11/ *Random addressing*.

2.3.4 Exiting addressing

The DALI addressing mode will be exited automatically in different ways, for example:

- After a given time, about 15 minutes after last manual addressing action on push buttons
- If a DALI addressing function started through KNX Bus is accomplished
- When resetting device
- If pressing again shortly the ***"Learn."*** button.
- Within random procedure, once no channels are left in addressing mode or no more ballasts without short addresses are detected anymore.

Rem.: Complete addressing procedure is valid for all channels, even if set as “Not used” within parameters.

Rem.: While addressing, parameters are stored in all detected ballast. Parameters are also stored on restart of DALI GATEWAY.

Avoid pressing ***“DALI learning”*** button while start-up of device: If ***“DALI learning”*** button is pressed while device is starting up, it will execute a **master reset**, erasing all parameters, physical address and group objects. Instead starting normally, device will only show a rapid green blinking of the ***“KNX Programming”*** LED. Even re-starting device will not recover erased data’s. ***Handmode*** is also disabled. Device has first to be re-programmed through KNX-Bus before recovering functionality. Also, after **master reset**, KNX programming mode will be displayed by orange rapid blinking of the ***“KNX Programming”*** LED (instead of standard red lighting).
Rem.: master reset will have no incidence on data’s already stored within ballasts (short address, minimum or maximum value, …).

3. Application description

3.1. Communication objects

In this document are listed different communication objects (CO's). According to the settings done within the parameters, some of the CO's may NOT be visible because not relevant anymore.

Number	Name	Object Function	Description	Group Addresses	Length	C	R	W	T	U	Data Type	Priority
0	Device operating status				1 bit	C	-	-	T	-	state	Low
1	DALI power switch On-Off / DALI power status				1 bit	C	-	W	T	-	on/off	Low
2	Buzzer switch On-Off / Buzzer status				1 bit	C	-	W	T	-	start/stop	Low

Figure 4: Communication object device

3.1.1 *Device operating status*

The object 0 monitors the operating status of the DALI GATEWAY device.

Number	Name	Function	Length	Flags
0	***Device operating status***	Inactive / Active	1 bit	C/T

1: Device is running
0: -
The DALI GATEWAY can send "1" for signalling activity. This CO can be used for monitoring the device if set to be sent cyclically, so failing devices can be detected.
Some special components inside the DALI GATEWAY are temperature monitored. In case of internal overheating, device will switch Off DALI bus supply and stop communicating on KNX. So, no CO Nr. 0/ will be sent anymore. After resuming from overheating, device will restart normal operation and, if selected to do, CO Nr. 0/ can be sent again.

(Red values are default)

3.1.2 *DALI power switch On-Off / DALI power status*

The object 1 is used to switch On-Off and to monitor the internal DALI power supply of the DALI GATEWAY device.

Number	Name	Function	Length	Flags
1	***DALI power switch On-Off / DALI power status***	Off / On Inactive / Active	1 bit	C/W/T

1: Switch On DALI power supply / DALI power supply is On
0: Switch Off DALI power supply / DALI power supply is Off
Sending a "0" on CO Nr. 1/ will switch Off the DALI power supply. All connected and learned ballasts will set output level according to parameter "output level at system failure".
Sending a "1" on CO Nr. 1/ will switch On the DALI power supply.
Also, the actual DALI power status is available on CO Nr. 1/.

Rem.: On restart of device (after KNX bus power recovery, after programming, …), DALI power is automatically switched On.

Rem.: This CO may also be used to save energy in empty rooms. For this, set **System failure level** of all channels to Off, and also switch Off DALI power using CO Nr. 1/ while no presence. So, no energy will be wasted on DALI bus while all lamps are Off, and this will also reduce KNX bus current. Once presence is detected, switch On DALI power using CO Nr. 1/. Some DALI ballasts may need a few 100ms before being able to get DALI telegrams.

Rem.: While DALI power supply is Off, all channels will be considered as missing and Off.

3.1.3 *Buzzer switch On–Off / Buzzer status*

The object 2 is used to switch On-Off and monitor the internal buzzer of the DALI GATEWAY device.

Number	Name	Function	Length	Flags
2	***Buzzer switch On-Off / Buzzer status***	Off / On Inactive / Active	1 bit	C/W/T
1: Switch buzzer On / Buzzer is On 0: Switch buzzer Off / Buzzer is Off Sending a "1" on CO Nr. 2/ will switch On internal buzzer of DALI GATEWAY for a given time, according to parameters. Sending a "0" on CO Nr. 2/ will switch Off internal buzzer of DALI GATEWAY immediately. Also, the actual buzzer status is available on CO Nr. 2/. Rem.: On restart of device (after KNX bus power recovery, after programming, …), buzzer is automatically switched Off.				

3	DALI send single	2 Byte	C	-	W	-	-	2-byte unsigned value	Low
4	DALI send twice	2 Byte	C	-	W	-	-	2-byte unsigned value	Low
5	DALI query	2 Byte	C	-	W	-	-	2-byte unsigned value	Low
6	DALI answer value	1 Byte	C	-	-	T	-	counter pulses (0..255)	Low
7	DALI got answer	1 bit	C	-	-	T	-	boolean	Low
8	DALI answer error	1 bit	C	-	-	T	-	alarm	Low
9	DALI overload status	1 bit	C	-	-	T	-	alarm	Low

Figure 5: Communication object DALI

3.1.4 *DALI send single*

The object 3 is used to send custom specific DALI single forward telegrams through the DALI GATEWAY device.

Number	Name	Function	Length	Flags
3	***DALI send single***	DALI command	2 bytes	C/W

1st byte: DALI address, according to DALI standard:

Encoding: YAAA AAAS

64 short addresses, 0..63	0AAA AAAS
16 group addresses, 0..15	100A AAAS
Broadcast	1111 111S
Special commands	1010 000 … 1111 1101

Y = "0": short address
Y = "1": group address or broadcast
A = address
S = "0": databyte = direct arc power
S = "1": databyte = command

2nd byte: DALI command / direct arc power

Encoding: XXXX XXXX

S = "0": XXXX XXXX = direct arc power: 0 = 0% … 254 = 100% (not linear !), 255 = mask
S = "1": databyte = command

CO Nr. 3/ is not a standard KNX datapoint type.
It can be used to send custom specific DALI single forward telegrams on the DALI line, using the DALI GATEWAY.
Care should be taken, because this may result in undefined behaviour, and shall be reserved to DALI specialists.
The DALI GATEWAY will transmit the command on DALI line like a standard single forward telegram, according to DALI standard, respecting DALI frame format and delay between telegrams, but without any control if data's are valid.

CO Nr. 3 can also be used to switch Off all connected ballasts, even if not addressed. For this, simply send "$FF $00" (Broadcast jump Off) on CO Nr. 3/. This can be very helpful if needed to switch Off lights on building site as long as commissioning is not finished.
The same way, all connected ballasts can be switched to maximum level by sending "$FF $05" (broadcast jump to maximum) on CO Nr. 3/.

For further information, please consult DALI standard, EN 62386-102.

3.1.5 *DALI send twice*

The object 4 is used to send custom specific DALI double forward telegrams through the DALI GATEWAY device.

Number	Name	Function	Length	Flags
4	***DALI send twice***	DALI command	2 bytes	C/W

1st byte: DALI address, according to DALI standard:

Encoding: YAAA AAAS

64 short addresses, 0..63	0AAA AAAS
16 group addresses, 0..15	100A AAAS
Broadcast	1111 111S
Special commands	1010 000 … 1111 1101

Y = "0": short address
Y = "1": group address or broadcast
A = address
S = "0": databyte = direct arc power
S = "1": databyte = command

2nd byte: DALI command / direct arc power

Encoding: XXXX XXXX

S = "0": XXXX XXXX = direct arc power: 0 = 0% … 254 = 100%, 255 = mask
S = "1": databyte = command

CO Nr. 4/ is not a standard KNX datapoint type.
Some DALI telegrams, used for example for configuration, have to be sent twice with an exact delay of 100ms, without any other telegram in between. These are called DALI double forward telegrams.
CO Nr. 4/ can be used to send custom specific DALI double forward telegrams on the DALI line, using the DALI GATEWAY.
Care should be taken, because this may result in undefined behaviour, and shall be reserved to DALI specialists.
The DALI GATEWAY will transmit twice the command on DALI line like a standard double forward telegram, according to DALI standard, respecting DALI frame format and delay between telegrams, but without any control if data's are valid.

For further information, please consult DALI standard, EN 62386-102.

3.1.6 *DALI query*

The object 5 is used to query custom specific DALI answer telegrams through the DALI GATEWAY device.

Number	Name	Function	Length	Flags
5	***DALI query***	DALI query	2 bytes	C/W

1st byte: DALI address, according to DALI standard:

Encoding: YAAA AAAS

64 short addresses, 0..63	0AAA AAAS
16 group addresses, 0..15	100A AAAS
Broadcast	1111 111S
Special commands	1010 000 … 1111 1101

Y = "0": short address
Y = "1": group address or broadcast
A = address
S = "0": databyte = direct arc power
S = "1": databyte = command

2nd byte: DALI command / direct arc power

Encoding: XXXX XXXX

S = "0": XXXX XXXX = direct arc power: 0 = 0% … 254 = 100%, 255 = mask
S = "1": databyte = command

CO Nr. 5/ is not a standard KNX datapoint type.
It can be used to query custom specific DALI answer telegrams on the DALI line, using the DALI GATEWAY.
Care should be taken, because this may result in undefined behaviour, and shall be reserved to DALI specialists.
The DALI GATEWAY will transmit the query command on DALI line like a standard single forward telegram, according to DALI standard, respecting DALI frame format and delay between telegrams, but without any control if data's are valid.

The resulting answer status and value will be given on CO Nr. 6/, CO Nr. 7/ and CO Nr. 8/.

For further information, please consult DALI standard, EN 62386-102.

3.1.7 *DALI answer value*

The object 6 is used to monitor the answer value resulting from a custom specific DALI query on CO Nr. 5/.

Number	Name	Function	Length	Flags
6	***DALI answer value***	DALI answer value	1 byte	C/T

1 byte: DALI answer value, according to DALI standard:
Encoding: XXXX XXXX
Depending on query telegramm:
1111 1111: "Yes"
No data on DALI: "No"
XXXX XXXX: 8-bit information

CO Nr. 6/ is not a standard KNX datapoint type.
It is used to monitor the answer value resulting from a custom specific DALI query on CO Nr. 5/.
Value will only be sent if any data's have been received on bus in the answer time according to DALI standard.
CO Nr. 6/ is useful if expected answer is of type 8-bit information.
It will also monitor a value if data is corrupted, like for example if multiple devices are answering at same moment, so, also check CO Nr. 8/ for data correctness.

For further information, please consult DALI standard, EN 62386-102.

3.1.8 *DALI got answer*

The object 7 is used to monitor if an answer resulting from a custom specific DALI query on CO Nr. 5/ has been received.

Number	Name	Function	Length	Flags
7	***DALI got answer***	False / True	1 bit	C/T

0: No data on DALI have been received on bus in the answer time according to DALI standard.
1: Some data on DALI have been received on bus in the answer time according to DALI standard.

Depending on query telegram:
No data on DALI: "No"
Data on DALI, if answer Value = 1111 1111: "Yes"

CO Nr. 7/ is not a standard KNX datapoint type.
It is used to monitor the answer behaviour resulting from a custom specific DALI query on CO Nr. 5.
Each query will trigger a result on CO Nr. 7/, depending if data's have been received on bus in the answer time according to DALI standard.
CO Nr. 7/ is useful if expected answer is of type "Yes" or "No".

Value of CO Nr. 7/ will also be "1" after receiving corrupted data, like for example if multiple devices are answering at same moment (can happen if multiple "Yes"), so, also check CO Nr. 8/ for data correctness.
This feature is useful for broadcast query, if it is needed to know if "at least" one device is answering "Yes". Devices answering "No" will not create any data corruption, since a "No" answer has no incidence on DALI bus.

For further information, please consult DALI standard, EN 62386-102.

3.1.9 *DALI answer error*

The object 8 is used to monitor if an answer resulting from a custom specific DALI query on CO Nr. 5/ is erroneous.

Number	Name	Function	Length	Flags
8	***DALI answer error***	False / True	1 bit	C/T

0: No error detected on answer.
1: Answer resulting from a custom specific DALI query on CO Nr. 5/ is erroneous

CO Nr. 8/ is used to monitor the correctness of an answer resulting from a custom specific DALI query on CO Nr. 5.
Each query will trigger a result on CO Nr. 8/, depending if data's received on bus are fitting into DALI answer format frame.

Value of CO Nr. 8/ will also be "1" after receiving corrupted data, like for example if multiple devices are answering at same moment (can happen if multiple "Yes", broadcast query, …).

For further information, please consult DALI standard, EN 62386-102.

Rem.: Getting no answer is not considered as erroneous.

For further information, please consult DALI standard, EN 62386-102.

3.1.10 *DALI overload status*

The object 9 is used to monitor if the DALI line is overloaded.

Number	Name	Function	Length	Flags
9	***DALI overload status***	Alarm / No alarm	1 bit	C/T

0: No overload condition detected on DALI line.
1: DALI line is overloaded

The DALI GATEWAY is constantly monitoring the DALI line level. If the level appears to be low for a too long time, DALI line is considered as overloaded, and this can be transmitted on CO Nr. 9/. This may be due to short circuit on the DALI line (by wrong wiring or by defective DALI ballast) or by exceeding the maximum number of DALI ballasts the integrated DALI power supply is able to source.
Once resuming from overload, this will also be detected by the DALI GATEWAY, and can also be transmitted on CO Nr. 9/.

In complex installations, this feature can also be used to detect on which DALI GATEWAY a given DALI ballast or DALI line is connected. For this, simply short circuit the given DALI line, and check which DALI GATEWAY is signalling a DALI overload.

In addition to CO Nr. 9/, the overload condition is also displayed by a red lighting "DALI overload" LED on the DALI GATEWAY.

Rem.: While DALI power supply is switched Off, device will not detect any DALI overload.

10	Physical addressing / Addressing status	1 Byte	C	-	W	T	-	counter pulses (0..255) Low
11	Random addressing	1 Byte	C	-	W	T	-	counter pulses (0..255) Low
12	Erase short address	1 Byte	C	-	W	-	-	counter pulses (0..255) Low

Figure 6: Communication object addressing DALI

3.1.11 *Physical addressing / Addressing status*

The object 10 is used to initiate physical addressing and monitor physical or random addressing of single or multiple DALI ballast.

Number	Name	Function	Length	Flags
10	***Physical addressing / Addressing status***	DALI physical addressing	8 bits	C/W/T

8 bits: Physical addressing / Addressing status

Encoding: XXXX XXXX, corresponding to channels HGFE DCBA
1: Request physical addressing of corresponding channel / Corresponding channel is in addressing mode
0: Exit physical addressing of corresponding channel / Corresponding channel is not in addressing mode

Special case: 0000 0000: Exit physical addressing mode

CO Nr. 10/ can be used to initiate physical addressing of single or multiple DALI channels.
Writing bits to "1" will make the DALI GATEWAY start physical addressing mode of corresponding ballasts.
Writing bits to "0" will make corresponding channels exit physical addressing mode.

The functionality is the same as if physical addressing mode was started manually using buttons on the DALI GATEWAY.
For further details about physical addressing, refer to part "Physical addressing" of this document.

Information about channels in physical addressing mode is constantly available on CO Nr. 10.
Also, information about channels in random addressing mode is constantly available on CO Nr. 10.

Physical addressing will be exited automatically (refer to part "Physical addressing" of this document).
Also, writing on CO Nr. 10 and selecting no single channel will result in exiting physical addressing mode.

CO Nr. 10/ is not a standard KNX datapoint type.

3.1.12 *Random addressing*

The object 11 is used to initiate random addressing of single or multiple DALI ballast.

Number	Name	Function	Length	Flags
11	***Random addressing***	DALI random addressing	8 bits	W/C

8 bits: Random addressing

Encoding: XXXX XXXX, corresponding to channels HGFE DCBA
1: Request random addressing of according channel
0: -
Special case: 0000 0000: Exit random addressing mode

Rem.: an on-going random addressing will not be replaced by a new request with different selections.
Also, starting a random addressing will exit on-going physical addressing.

CO Nr. 11 can be used to initiate random addressing of single or multiple DALI channels.
Writing bits to "1" will make the DALI GATEWAY start random addressing mode of corresponding ballasts.
Writing bits to "0" will have no effect.

The functionality is the same as if random addressing mode was started manually using buttons on the DALI GATEWAY.
For further details about random addressing, refer to part "Random addressing" of this document.

Information about channels in random addressing mode is constantly available on **CO Nr. 10/ *Physical addressing / Addressing status.***

The random addressing mode is exited automatically if ballasts with short addresses corresponding to all channels put into commissioning mode are found or no more ballast without short addresses are left. The "Learning" LED on the DALI GATEWAY will also be switched off.

Rem.: Writing on CO Nr. 11 and selecting no single channel will result in exiting random addressing mode.

CO Nr. 11/ is not a standard KNX datapoint type.

3.1.13 *Erase short address*

The object 12 is used to erase the short address of single or multiple DALI ballast.

Number	Name	Function	Length	Flags
12	***Erase ballast short address***	DALI address erasing	8 bits	W/C

8 bits: Short address erasing

Encoding: XXXX XXXX, corresponding to channels HGFE DCBA
1: Request erasing ballast short address of according channel
0: -
Special case: 1111 1111: Broadcast short address erasing

CO Nr. 12 can be used to erase short addresses of single or multiple ballasts already associated to DALI GATEWAY channels.
Writing bits to "1" will make the DALI GATEWAY erase short addresses of ballast associated to corresponding channels.
Writing bits to "0" will have no effect.

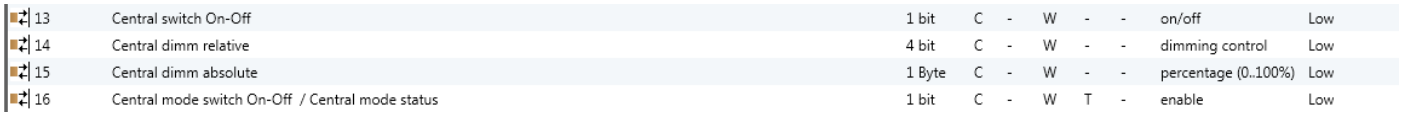
The functionality is the same as if short address erasing was executed manually using buttons on the DALI GATEWAY.
Prior to erasing short addresses, these ballasts will be driven to minimum level.

Rem.: If a random addressing is already in progress when getting CO Nr. 12/, the erase short address will be ignored.
If a physical addressing is already in progress when getting CO Nr. 12/, it will be exited and erase short address executed.

Rem.: For erasing some short addresses, the DALI GATEWAY will be put shortly into addressing mode. If an existing short address has been erased, this will create an update of CO Nr. 10/. Channels not associated with ballast will be displayed as in addressing mode.

Writing on CO Nr. 12 and selecting all channels will result in broadcast short address erasing. This will erase short addresses of all ballasts connected on the DALI line, even if this address is NOT associated to any DALI GATEWAY channel.

CO Nr. 12/ is not a standard KNX datapoint type.



13	Central switch On-Off	1 bit	C	-	W	-	-	on/off	Low
14	Central dimm relative	4 bit	C	-	W	-	-	dimming control	Low
15	Central dimm absolute	1 Byte	C	-	W	-	-	percentage (0..100%)	Low
16	Central mode switch On-Off / Central mode status	1 bit	C	-	W	T	-	enable	Low

Figure 7: Communication object central commands

3.1.14 *Central switch On-Off*

The object 13 is used to switch On-Off all channels in ***central control***.

Number	Name	Function	Length	Flags
13	***Central switch On-Off***	Off / On	1 bit	W/C

0: Switch all channels in ***central control*** off
1: Switch all channels in ***central control*** on
Sending a "1" on CO Nr. 13/ will switch all channels in ***central control*** On.
According to parameters, the single channels will either dim to a target value or jump to min or max level.

Sending a "0" on CO Nr. 13/ will switch all channels in ***central control*** Off.
According to parameters, the single channels will either jump or dim to Off.

Rem.: In order CO Nr. 13/ to be effective, the channels have first to be put into ***central control*** by sending a "1" on CO Nr. 16/.
Also, for each channel, parameter "Listen to central" has to be set accordingly.

Rem.: If corresponding channel is ***forcing***, it will not react on CO Nr. 13/.

3.1.15 *Central dimm relative*

The object 14 is used for relative dimming all channels in ***central control***.

Number	Name	Function	Length	Flags
14	***Central dimm relative***	Decrease / Increase	4 bits	W/C

Encoding: BUUU
B=0: Decrease brightness
B=1: Increase brightness
UUU: Step Code, the amount of intervals into which the range 0…100% is subdivided, or the break indication
UUU = [0 …7]
001 … 111: Step, number of intervals = 2^(stepcode – 1)
000: Break

Sending a value on CO Nr. 14/ will dim all channels in ***central control***.
The actual value of each channel (last value the DALI GATEWAY automatically read out of the channel) will be increased or decreased by according step and new value will be dimmed using the fade time set in parameters.
However, final value is limited by minimum and maximum settings within parameters.
Also, a channel being Off will not be switched On by relative dimming.
If sending "Break", the channel will keep the actual value.

Rem.: In order CO Nr. 14/ to be effective, the channels have first to be put into ***central control*** by sending a "1" on CO Nr. 16/.
Also, for each channel, parameter "Listen to central" has to be set accordingly.

Rem.: If corresponding channel is ***forcing***, it will not react on CO Nr. 14/.

3.1.16 *Central dimm absolute*

The object 15 is used for absolute dimming all channels in ***central control***.

Number	Name	Function	Length	Flags
15	***Central dimm absolute***	Percentage[0…100%]	1 byte	W/C

0: Dimm to 0% brightness
….
255: Dimm to 100% brightness
Sending a value on CO Nr. 15/ will dim all channels in ***central control*** to the corresponding brightness.
However, final value is limited by minimum and maximum settings within parameters.

Rem.: In order CO Nr. 15/ to be effective, the channels have first to be put into ***central control*** by sending a "1" on CO Nr. 16/.
Also, for each channel, parameter "Listen to central" has to be set accordingly.

Rem.: If corresponding channel is ***forcing***, it will not react on CO Nr. 15/.

3.1.17 *Central mode switch On-Off / Central mode status*

The object 16 is used for enabling, disabling and monitoring ***Central control***.

Number	Name	Function	Length	Flags
16	***Central mode switch On-Off / Central mode status***	Disable / Enable Inactive / Active	1 bit	W/C/T

0: Deactivate ***Central control*** / ***Central control*** deactivated
1: Activate ***Central control*** / ***Central control*** activated

Sending a "1" on CO Nr. 16/ will activate ***Central control*** for all channels enabled for ***Central control*** in parameters.
Sending a "0" on CO Nr. 16/ will deactivate **Central control** for all channels.

Once a channel is in ***Central control***, it will only react to central commands CO Nr. 13, Nr. 14 and Nr. 15, and also to channel forcing CO's.

Also, the actual status of ***Central mode*** is available on CO Nr. 16.

Rem.: In order CO Nr. 16/ to be effective, parameter "Listen to central" has to be set accordingly for each channel.
Rem.: ***Forcing*** has higher priority than ***Central control***.
Rem.: ***Central control*** will stop ***Stairlight*** process on according channel.

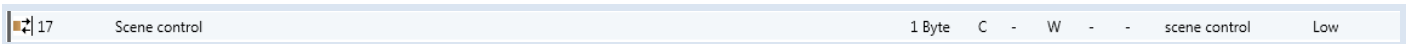


Figure 8: Communication object scene control

3.1.18 *Scene control*

The object 17 is used for scene activating or storing.

Number	Name	Function	Length	Flags
17	***Scene control***	Activate or learn scene	1 byte	W/C

Encoding: M0SSSSSS
M=0: Activate scene
M=1: Learn scene (if permitted)
SSSSSS: Scene number [0…63]
0: Scene 1
1: Scene 2
…
63: Scene 64 (only scenes 1 … 32 are used in DALI GATEWAY)

Sending “Activate scene” on CO Nr. 17/ will cause the different channels to dimm to the target values defined in parameters. For each single channel and each scene a target value can be defined within parameters. It can also be defined for a channel not to react on some scene numbers.
Sending “Learn scene” on CO Nr. 17/ will cause the DALI GATEWAY to store (if permitted) the actual brightness (last value the DALI GATEWAY automatically read out of the channel) of each channel.
Permitting of scene learning has to be set in parameters.

Rem.: Only scenes 1 … 32 can be used within the DALI GATEWAY. Other scenes are ignored.
Rem.: Using CO Nr. 17/ will only store the scene values in volatile memory. After reset of the DALI GATEWAY, the scene will recover values set in parameters.
Rem.: Activating a scene will stop ***Stairlight*** process on according channel.
Rem.: Scene activating is not possible if channel is ***forcing*** or in ***Central Control***.

18	Channel A switch On-Off	1 bit	C	-	W	-	-	on/off	Low
19	Channel A On-Off status	1 bit	C	-	-	T	-	on/off	Low
20	Channel A dimm relative	4 bit	C	-	W	-	-	dimming control	Low
21	Channel A dimm absolute	1 Byte	C	-	W	-	-	percentage (0..100%)	Low
22	Channel A brightness status	1 Byte	C	-	-	T	-	percentage (0..100%)	Low
23	Channel A slave mode switch On-Off / Channel A slave mode status	1 bit	C	-	W	T	-	enable	Low
24	Channel A (re)start Burn in / Channel A Burn in status	1 bit	C	-	W	T	-	start/stop	Low
25	Channel A burning time status	2 Byte	C	-	-	T	-	time (h)	Low
26	Channel A relamping time elapsed status	1 bit	C	-	-	T	-	alarm	Low
27	Channnel A restart burning time	1 bit	C	-	W	-	-	start/stop	Low
28	Channel A (re)start Stairlight	1 bit	C	-	W	-	-	start/stop	Low
29	Channel A Force On-Off / Channel A Force status	2 bit	C	-	W	T	-	switch control	Low
30	Channel A ballast failure status	1 bit	C	-	-	T	-	alarm	Low
31	Channel A ballast missing status	1 bit	C	-	-	T	-	alarm	Low
32	Channel A lamp failure status	1 bit	C	-	-	T	-	alarm	Low

Figure 9: Communication object channel A

All channels A … H have same features. So, only CO's for channel A are described.

3.1.19 *Channel A switch On-Off*

The object 18 is used to switch On-Off Channel A

Numbers	Name	Function	Length	Flags
18	***Channel A switch On-Off***	Off / On	1 bit	W/C

0: Switch Channel A Off
1: Switch Channel A On
Sending a "1" on CO Nr. 18/ will switch channel A On.
According to parameters, channel A will either dim to a target value or jump to minimum or maximum level.
Sending a "0" on CO Nr. 13/ will switch channel A Off.
According to parameters, channel A will either jump or dim to Off.

Rem.: ***Stairlight*** process on channel A will be stopped.
Rem.: If channel A is ***Forcing***, ***Central control*** or ***Slave***, it will not react on CO Nr. 18/.

3.1.20 *Channel A On-Off status*

The object 19 is used to monitor Channel A On-Off status

Numbers	Name	Function	Length	Flags
19	***Channel A On-Off status***	Off / On	1 bit	C/T

0: Channel A is Off
1: Channel A is On
The DALI GATEWAY is constantly monitoring the ballasts.
The real On-Off status send by the ballast associated to Channel A can be monitored on CO Nr. 19/.
If there is no answer from ballast (ballast missing or defective), Channel is considered as Off.

Within parameters it can be set how CO Nr. 19/ has to be updated on KNX bus.

Rem.: the real status may be delayed for a few seconds

3.1.21 *Channel A dimm relative*

The object 20 is used for relative dimming Channel A.

Number	Name	Function	Length	Flags
20	***Channel A dimm relative***	Decrease / Increase	4 bits	W/C

Encoding: BUUU
B=0: Decrease brightness
B=1: Increase brightness
UUU: Step Code, the amount of intervals into which the range 0…100% is subdivided, or the break indication
UUU = [0 …7]
001 … 111: Step, number of intervals = 2^(stepcode – 1)
000: Break

Sending a value on CO Nr. 20/ will dim channel A.
The actual value of channel A (last value the DALI GATEWAY automatically read out) will be increased or decreased by according step and new value will be dimmed using the fade time set in parameters.
However, final value is limited by minimum and maximum settings within parameters.
Also, a channel being Off will not be switched On by relative dimming.
If sending "Break", the channel will keep the actual value.

Rem.: ***Stairlight*** process on channel A will be stopped.
Rem.: If channel A is ***Forcing***, ***Central control*** or ***Slave***, it will not react on CO Nr. 20/.

3.1.22 *Channel A dimm absolute*

The object 21 is used for absolute dimming Channel A.

Number	Name	Function	Length	Flags
21	***Channel A dimm absolute***	Percentage[0…100%]	1 byte	W/C

0: Dimm channel A to 0% brightness
….
255: Dimm channel A to 100% brightness
Sending a value on CO Nr. 21/ will dim channel A to the corresponding brightness.
However, final value is limited by minimum and maximum settings within parameters.
Also, a channel being Off will only be switched On by absolute dimming if permitted within parameters.

Rem.: ***Stairlight*** process on channel A will be stopped.
Rem.: If channel A is ***Forcing*** or ***Central control***, it will not react on CO Nr. 21/.

3.1.23 *Channel A brightness status*

The object 22 is used to monitor actual brightness of channel A

Number	Name	Function	Length	Flags
22	***Channel A brightness status***	Percentage[0…100%]	1 byte	C/T

0: Actual channel A brightness is 0% (Off)
….
255: Actual channel A brightness is 100%
The DALI GATEWAY is constantly monitoring the ballasts.
The real brightness status send by the ballast associated to channel A can be monitored on CO Nr. 22/.
If there is no answer from ballast (ballast missing or defective), channel is considered as Off.

Within parameters it can be set how CO Nr. 22/ has to be updated on KNX bus.

Rem.: the real status may be delayed for a few seconds
Rem.: KNX and DALI dimming curves are different. The DALI GATEWAY considers all brightness values on KNX as linear whereas on the DALI side these values are mapped into a logarithmic curve. Mappings KNX to DALI and DALI to KNX are done by the DALI GATEWAY. So, for example, due to KNX -> DALI -> KNX conversion, sending a brightness value in CO Nr. 21 may result in a slightly different brightness status on CO Nr. 22.

3.1.24 *Channel A Slave mode switch On-Off / Channel A Slave mode status*

The object 23 is used for enabling, disabling and monitoring channel A ***Slave mode.***

Number	Name	Function	Length	Flags
23	***Channel A Slave mode switch On-Off / Channel A Slave mode status***	Disable / Enable Inactive / Active	1 bit	W/C/T

0: Deactivate channel A ***Slave mode*** / Channel A ***Slave mode*** deactivated
1: Activate channel A ***Slave mode*** / Channel A ***Slave mode*** activated

Sending a “1” on CO Nr. 23/ will activate ***Slave mode*** for channel A.
Sending a “0” on CO Nr. 23/ will deactivate ***Slave mode*** for channel A.
Once channel A is in ***Slave mode***, it will not react to channel A commands CO Nr. 18, Nr. 20 and Nr. 28.

Also, the actual status of channel A ***Slave mode*** is available on CO Nr. 23.

Rem.: Channel A ***Slave mode*** will stop ***Stairlight*** on Channel A.

3.1.25 *Channel A (re)start Burn in / Channel A Burn in status*

The object 24 is used for starting, restarting, stopping and monitoring channel A ***Burn in*** status.

Number	Name	Function	Length	Flags
24	***Channel A (re)start Burn in / Channel A Burn in status***	Disable / Enable Inactive / Active	1 bit	W/C/T

0: Deactivate channel A ***Burn in*** / Channel A ***Burn in*** deactivated or elapsed
1: Activate channel A ***Burn in*** / Channel A ***Burn in*** activated

Sending a "1" on CO Nr. 24/ will activate ***Burn in*** for channel A.
Sending a "0" on CO Nr. 24/ will deactivate ***Burn in*** for channel A.
Once channel A is in ***Burn in***, it will not be dimmable, and will only work Off or 100%.
After the ***Burn in*** time set in parameters is elapsed, Channel A will automatically exit ***Burn in***, and will be dimmable again.
Also, the actual status of channel A ***Burn in*** is available on CO Nr. 24.

Burn in consists in avoiding to dim new tubes for a given time. This can expand their life expectancy. Please refer to tube manufacturer.

Rem.: Using ***Burn in*** functionality may result in confusion of end user, since after tube replacement no dimming will work anymore for a given time.
Rem.: For ***Burn in*** to operate, it must also be enabled within parameters.
Rem.: By starting Channel A ***Burn in***, the minimum and maximum value set in ballast will be overwritten with value 100%. Once channel A ***Burn in*** is elapsed or deactivated, the minimum and maximum values out of parameters are written back into ballast.
Rem.: Avoid erasing short address of Channel A while in ***Burn in***: the maximum and minimum values stored in ballast will keep 100%, and this may be confusing in addressing, since the ballast cannot be driven to minimum value.

3.1.26 *Channel A burning time status*

The object 25 is used for monitoring channel A burning time.

Number	Name	Function	Length	Flags
25	***Channel A burning time***	Time period (hours)	2 bytes	C/T

0: Channel A burning time is less than 1 hour
…
65535: Channel A burning time is 65535 hours

The actual elapsed Channel A burning time is available on CO Nr. 25/.
The DALI GATEWAY is constantly monitoring the ballasts.
As long as channel A ballast is read out as On, the burning time counter increases.

Within parameters it can be set how CO Nr. 25/ has to be updated on KNX bus.

Rem.: If there is no answer from ballast (ballast missing or defective), Channel A is considered as Off, and burning time counter is not incremented. Also, if lamp is On without being linked to channel A, Channel A burning time counter will not increase.
Rem.: Even if only complete hours are displayed, the DALI GATEWAY is internally also counting minutes and seconds. In case of KNX power failure or KNX-Programming, these counters are internally saved within the DALI GATEWAY, and restored on KNX power return.
Rem.: Burning time counter is limited to 65535 hours (about 7.4 years). In case of overflow, it will restart from 0.

3.1.27 *Channel A relamping time elapsed status*

The object 26 is used for monitoring if channel A relamping time elapsed.

Number	Name	Function	Length	Flags
26	***Channel A relamping time elapsed status***	No alarm / Alarm	1 bit	C/T

0: Channel A burning time is less than relamping time
1: Channel A burning time is greater or equal to relamping time

CO Nr. 26/ can be used for preventive relamping. Once Channel A burning time reaches parametrised relamping time, a tube replacement can be organized. Thus, by combining multiple lamps, organising preventive mass replacement can decrease maintenance cost. Also, it can avoid inconvenience of defective getting tubes.

The actual Channel A relamping time elapsed status is available on CO Nr. 26/.
Within parameters it can be set how CO Nr. 26/ has to be updated on KNX bus.

Rem.: For setting correct relamping time within parameters, refer to lamp manufacturer
Rem.: In order relamping to be useful, burning time must be handled correctly. So, channel A burning time must be reset to 0 using CO Nr. 27/ at each lamp replacement.

3.1.28 *Channel A restart burning time*

The object 27 is used to restart channel A burning time.

Number	Name	Function	Length	Flags
27	***Channel A restart burning time***	Send / Start	1 bit	W/C

0: Send channel A actual burning time – No incidence on burning time counter
1: Restart channel A burning time

CO Nr. 27/ can be used to restart channel A burning time.
Thus, sending “1” on CO Nr. 27/ set channel A burning time counter back to 0.
Sending “0” on CO Nr. 27/ will have no effect on channel A burning counter, but actual value will be sent out on CO Nr. 25/.

Rem.: In order channel A burning time hours and relamping time elapsed status to work correctly, channel A burning time must be reset to 0 at each lamp replacement (and only at lamp replacement).

3.1.29 *Channel A (re)start Stairlight*

The object 28 is used to start or restart channel A ***Stairlight*** functionality.

Number	Name	Function	Length	Flags
28	***Channel A (re)start Stairlight***	- / Start	1 bit	W/C

0: -
1:Start or restart channel A ***Stairlight***

CO Nr. 28/ can be used to start or to restart channel A ***Stairlight***.

Sending "0" on CO Nr. 28/ will have no effect.
Sending "1" on CO Nr. 28/ will start channel A ***Stairlight*** or restart channel A ***Stairlight*** if it was already running.
If channel A ***Stairlight*** is already On and restart duration set in parameters is greater than time still to run, or if ***Stairlight*** is already in warning, ***Stairlight*** will be restarted for parametrised time.
If time still to run On is greater than parametrised restart duration, restart will be ignored and ***Stairlight*** will continue the usual way.

Rem.: ***Stairlight*** can only be started if neither in ***Slave mode***, ***Forcing***, ***Central*** or ***Learning***.
Rem.: Already running ***Stairlight*** can only be restarted if allowed within parameters

3.1.30 *Channel A Force On-Off / Channel A Force status*

The object 29 is used for starting, stopping and monitoring channel A ***Force*** status.

Number	Name	Function	Length	Flags
29	***Channel A Force On-Off / Channel A Force status***	No ***Forcing*** / ***Forcing*** Inactive / Active	2 bits	W/C/T

00: Stop ***Forcing*** channel A / Channel A is not ***Forcing***
01: Stop ***Forcing*** channel A / Channel A is not ***Forcing***
10: ***Force*** channel A Off / Channel A is ***Forcing*** Off
11: ***Force*** channel A On / Channel A is ***Forcing*** On

Sending corresponding value on CO Nr. 29/ will activate or stop channel A ***Forcing***.
Forcing On will make channel A jump to maximum level.
Forcing Off will make channel A jump to Off.
Also, the actual status of channel A ***Force status*** is available on CO Nr. 29.

Rem.: Channel A ***Forcing*** will stop ***Stairlight*** on Channel A.
Rem.: While ***Forcing***, actual brightness is NO more saved as memory level.
Rem.: While ***Forcing***, all switching / dimming commands (central or channel), ***Stairlight*** or scene activating commands will be ignored.
Rem.: Even while ***Forcing***, ***Central mode*** switch On/Off will be stored (NOT Central switch On-Off).
Rem.: ***Forcing*** will stop any on-going ***Stairlight***.

3.1.31 *Channel A ballast failure status*

The object 30 is used for monitoring if channel A ballast is defective.

Number	Name	Function	Length	Flags
30	***Channel A ballast failure status***	No alarm / Alarm	1 bit	C/T

0: Channel A ballast signals OK
1: Channel A ballast signals not OK

The DALI GATEWAY is constantly monitoring the ballasts.
According to DALI standard, ballasts can be able to signal internal failures. CO Nr. 30/ can be used for monitoring channel A ballast condition.
As long as ballast is answering a brightness value different of 0, ballast is considered as OK.
The On-Off status send by the ballast associated to Channel A can be monitored on CO Nr. 19/.
If there is no answer from ballast (ballast missing or defective), Channel is considered as Off.

Within parameters it can be set how CO Nr. 30/ has to be updated on KNX bus.

Rem.: Ballast failure Status is only read out of device if Lamp is Off (switched Off, lamp defective, …).
So, CO Nr. 30 will NOT be updated while lamp is On.

3.1.32 *Channel A ballast missing status*

The object 31 is used for monitoring if channel A ballast is missing.

Number	Name	Function	Length	Flags
31	***Channel A ballast missing status***	No alarm / Alarm	1 bit	C/T

0: Channel A ballast is answering
1: Channel A ballast is missing

The DALI GATEWAY is constantly monitoring the ballasts.
If no ballast is answering on channel A, it is considered as missing.
The channel A ballast missing status can be monitored on CO Nr. 31/.

Within parameters it can be set how CO Nr. 31/ has to be updated on KNX bus.

Rem.: In order to be detected, the ballast associated to channel A has first to be programmed with the corresponding short address (refer to part "Addressing" of this document).
Rem.: If the answer from channel A ballast is erroneous, ballast is considered as missing. This could be the case if multiple ballast have same short address, which is NOT allowed.

3.1.33 *Channel A lamp failure status*

The object 32 is used for monitoring if channel A lamp is defective.

Number	Name	Function	Length	Flags
32	***Channel A lamp failure status***	No alarm / Alarm	1 bit	C/T

0: Channel A lamp is not defective
1: Channel A lamp is defective

The DALI GATEWAY is constantly monitoring the ballasts.
According to DALI standard, the ballast can be able to signal lamp failure. The actual channel A lamp failure status, read out of channel A ballast, can be monitored on CO Nr. 32/.

Within parameters it can be set how CO Nr. 32/ has to be updated on KNX bus.

Rem.: Only if channel A lamp is requested to be On, channel A lamp failure can be detected. Also, lamp failure recovery can only be detected if requested to be On.

CO's Nr. 18 … 32 are only concerning channel A.

For each single channel B to H, all these CO's are repeated. The corresponding description keeps the same, only the concerned channel is changed.

Overriding	***Manual push buttons***
Highest priority	***Forcing mode***
High priority	***Central mode***
Low priority	***Slave mode***
Lowest priority	***Channel commands***

Figure 10: Priority of different working modes

3.2 Parameter description

3.2.1 General parameters

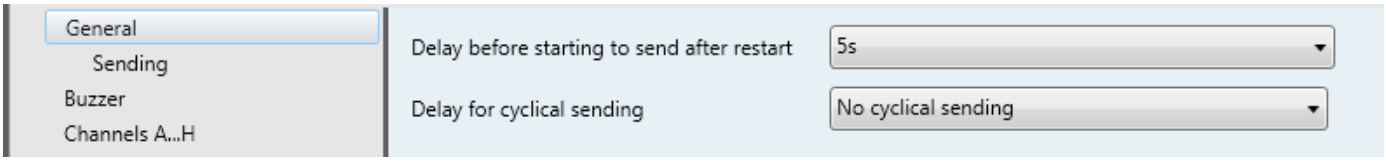


Figure 11: General parameters

Delay before starting to send after restart
In order to avoid bus overload after restart or recovery of a complete system, the *delay before starting to send after restart* can be set individually for each device.
So, the device will not send out any CO's before this delay is elapsed.
This delay is applicable after programming of device or recovery from bus failure.
The delay set in general parameters is concerning all status CO's of device.
The processor also needs about 3 seconds to start.

Delay for cyclical sending
All CO's set by parameters to be sent out cyclically will be sent out together in given time delays. This delay can be set with this parameter. The cyclical sending will only begin after the "Delay before starting to send after restart" is elapsed.
Choosing "No cyclical sending" will deactivate cyclical sending of all CO's.
The delay set in "general parameters" is concerning all status CO's of device.

3.2.2 Buzzer parameters

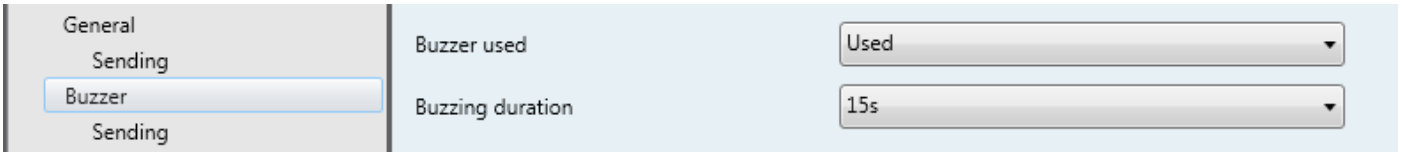


Figure 12: Buzzer parameters

Buzzer used:
The DALI GATEWAY is equipped with an internal buzzer.
Applications for this buzzer can be multiple:

- The sound of this buzzer may be used for example for helping to localize a device within closed false-ceiling, or to identify them if multiple DALI GATEWAY are placed in same room.
- Connecting CO Nr. 2/. Buzzer On/Off to CO Nr. 9/. DALI overload status can be useful within complex installation to identify which DALI GATEWAY is powering a given DALI ballast: it only needs to short-circuit the DALI bus on given ballast, and according DALI GATEWAY will start buzzing as long as the line is short-circuited
- …

With this parameter it can be set if Buzzer is to be used in application or not.

Buzzing duration:
The maximum buzzer duration can be set within parameters, in order to avoid perturbing people if buzzer is forgotten to be switched Off (for example if mistakenly switched On wrong Buzzer trough KNX-Bus).

3.2.3 Channels parameters

The functionality of different channels are exactly the same, so only channel A will be described in detail. Same description will apply for channels B ... H.

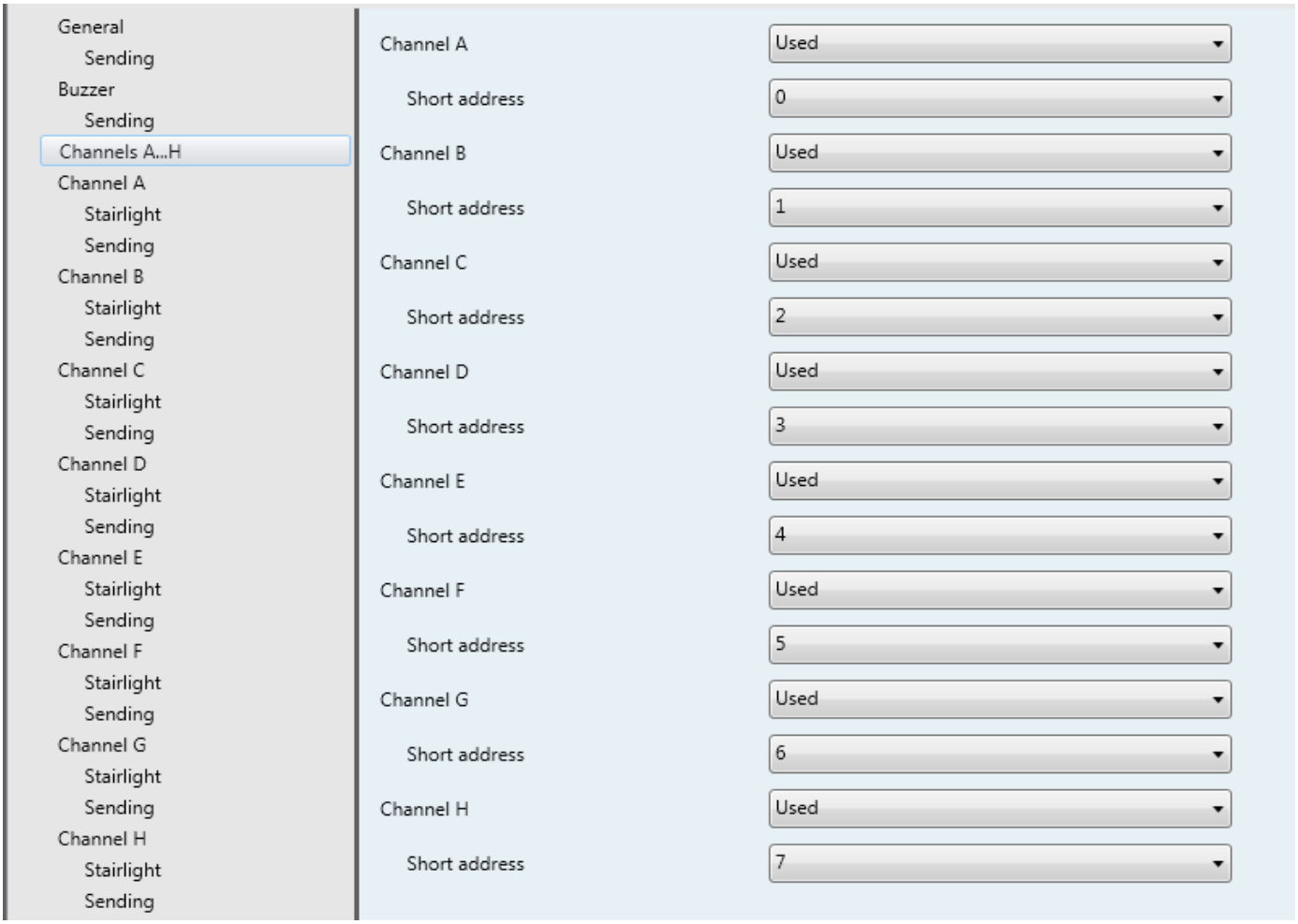


Figure 13: Channel A … H parameters

The DALI GATEWAY can be used to power, control and monitor up to 8 DALI ballasts using 8 independent DALI channels (A … H). The numbering A … H is ONLY used on KNX side of the DALI GATEWAY, and has NO incidence on DALI side.

For each channel, it can be set if it is used or not. Only if a channel is used, corresponding CO's and parameters will be displayed.

For each used channel, a short address (0 … 7) has to be defined. This short address is ONLY used on DALI side of the DALI GATEWAY, and has NO incidence on KNX side.
Because on DALI each short address must be unique, it must NOT be used same short address for different channels.

The DALI GATEWAY will make the KNX channels A…H correspond with the DALI short addresses 0…7, according to this settings.

Setting same short address for different channels, the ETS Application will display a warning message, asking to set the short addresses correctly.

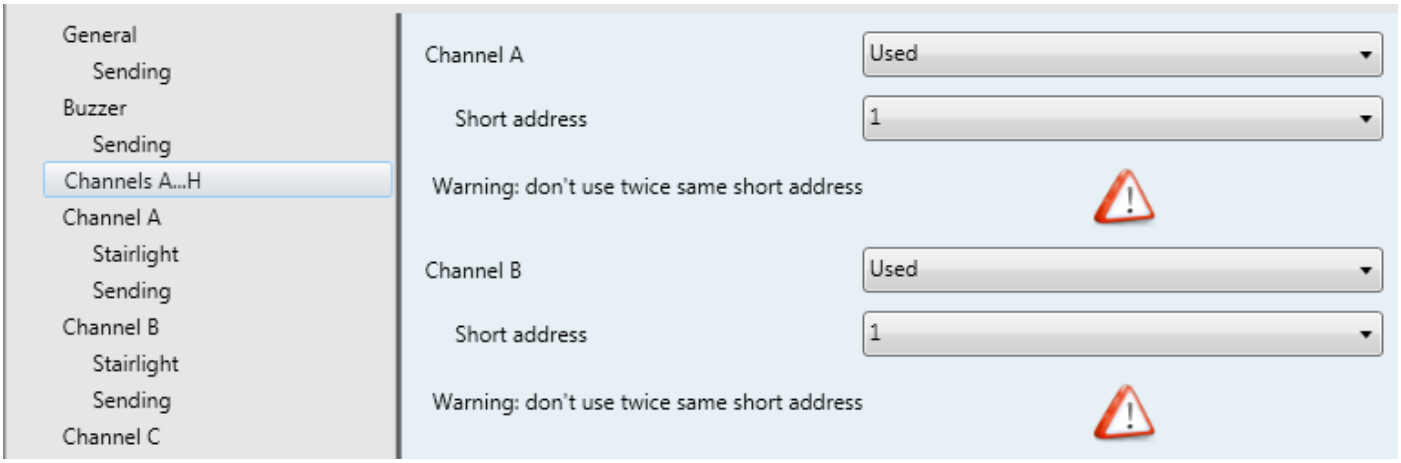


Figure 14: Warning: same short address

Rem.: the short address given to a channel must correspond to the short address learned into the corresponding DALI ballast. Learning this short address into the DALI ballast can be done prior to installation, using some avaible tools on the market, or by using different possible learning modes of the DALI GATEWAY (Physical learning or random learning, in manual mode on device or trough KNX bus).

For addressing DALI ballasts, please refer to section “2.3 DALI addressing” of this manual.

3.2.4 Channel A parameters

The functionality of different channels are exactly the same, so only channel A will be described in detail. Same description will apply for channels B ... H.

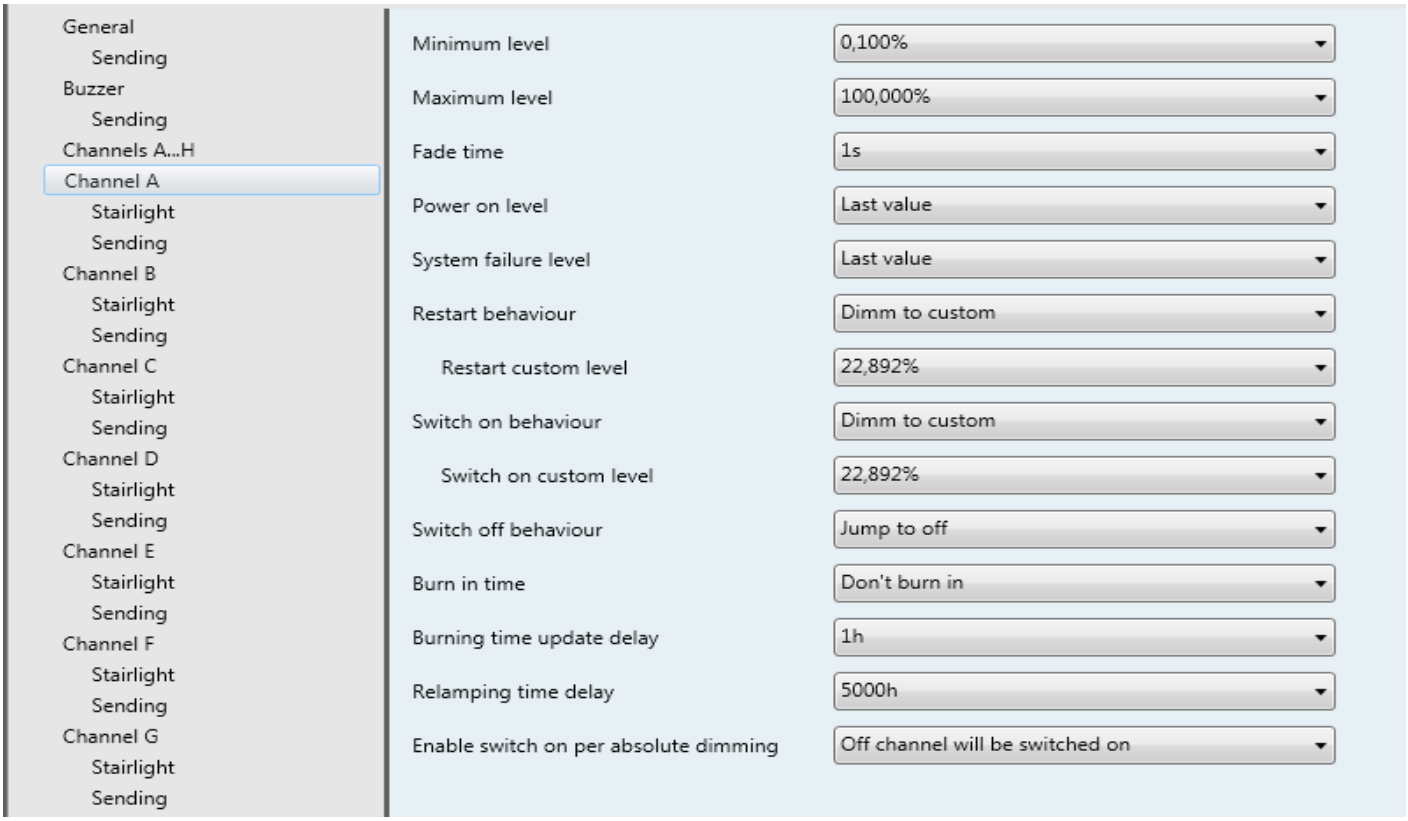


Figure 15: Channel A parameters

If channel A is set as “Used”, multiple parameters can be set within application.

Rem.: For level settings, all available values are issued from DALI standard.
KNX and DALI dimming curves are different. The DALI GATEWAY considers all brightness values on KNX as linear whereas on the DALI side these values are mapped into a logarithmic curve. Mappings KNX to DALI and DALI to KNX are done by the DALI GATEWAY. So, for example, due to KNX -> DALI -> KNX conversion, setting some values within parameters, may result in a slightly different brightness status on CO Nr. 22.

Minimum level:
This parameter sets the minimum level the corresponding channel DALI ballast should be driven (If not Off).
The value set will be stored within the DALI ballast.
Rem.: Also refer to ballast manufacturer. A value set below the physical minimum level of ballast will be ignored (physical minimum level will be used instead).

Maximum level:
This parameter sets the maximum level the corresponding channel DALI ballast should be driven.
The value set will be stored within the DALI ballast.
Rem.: No physical maximum level is defined within DALI standard. So, values up to 100% should be possible in all DALI ballasts.

Setting maximum level lower than minimum level, the ETS Application will display a warning message, asking to correct values.

Fade Time:
This parameter sets the time the DALI ballast will use to dim to a new level. Choosing “No Fading” will result in immediate change of output power.
The value set will be stored within the DALI ballast.

Power on level:
This parameter sets the output level to set at ballast mains power recovery.
The value set will be stored within the DALI ballast.

Setting Power on level lower than minimum level or higher than maximum level, the ETS Application will display a warning message, asking to correct values.

System failure level:
This parameter sets the output level to set at DALI failure. Because DALI is powered by the DALI GATEWAY, this value is also valid for KNX Bus failure or by switching Off DALI bus using CO Nr. 1/. DALI power switch On/Off.
The value set will be stored within the DALI ballast.

Setting System failure level lower than minimum level or higher than maximum level, the ETS Application will display a warning message, asking to correct values.

Restart behaviour:
This parameter sets the level to drive the channel at KNX bus recovery after restart of the DALI GATEWAY.

Restart custom level:
If “Dimm to custom” is selected as Restart behaviour, this parameter sets the custom Restart level.

Setting Switch on custom level lower than minimum level or higher than maximum level, the ETS Application will display a warning message, asking to correct values.

Switch on behaviour:
This parameter sets the level to drive the channel if getting a Switch on command.

If channel is already On with value higher than set in this parameter, Switch On will result in decreasing intensity.

Switch on custom level:
If “Dimm to custom” is selected as Switch on behaviour, this parameter sets the custom On level.

Setting Switch on custom level lower than minimum level or higher than maximum level, the ETS Application will display a warning message, asking to correct values.

Switch off behaviour:
This parameter sets the behaviour when switching off a channel. It can be choosen if level should dim down using fade time, or switch directly off.

Burn in time:
This parameter sets the Burn in time.
Burn in consists in avoiding to dim new tubes for a given time. This can expand their life expectancy.
Please refer to tube manufacturer to set correct time.
If Burn in is not desired, parameter must be set to “Don’t burn in”.

Rem.: Using ***Burn in*** functionality may result in confusion of end user, since after tube replacement no dimming will work anymore for a given time.
Rem.: By starting ***Burn in***, the minimum and maximum value set in ballast will be overwritten with value 100%. Once ***Burn in*** is elapsed or deactivated, the minimum and maximum values out of parameters are written back into ballast.

Burning time update delay:
The channel actual burning time is always available on CO Nr. 25/. Channel A burning time.
If telegram is set to be sent out automatically on change.

Relamping time delay:
This parameter can be used for preventive relamping. Once channel burning time reaches parametrised relamping time, a tube replacement can be organized. Thus, by combining multiple lamps, organising preventive mass replacement can decrease maintenance cost. Also, it can avoid inconvenience of defective getting tubes.

Rem.: For setting correct relamping time, refer to lamp manufacturer
Rem.: In order relamping to be useful, burning time must be handled correctly. So, channel A burning time must be reset to 0 using CO Nr. 27/ at each lamp replacement

Enable switch on per absolute dimming:
This parameter permits to set if a channel being off must switch on to execute absolute dimming commands or not.
If set to “Off channel keeps off”, channel will keep off, whatever value is sent on CO Nr. 21/. Channel A dim absolute.

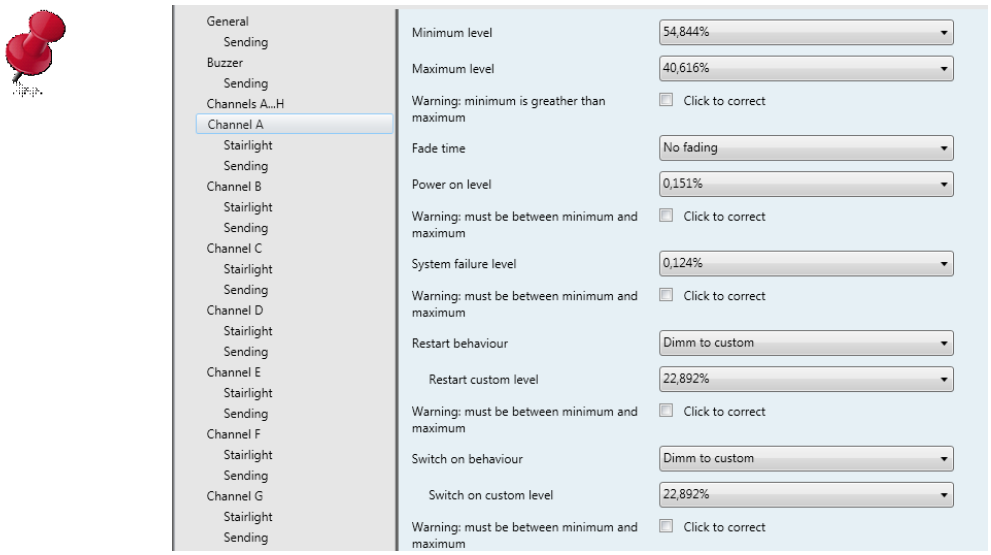


Figure 16: Warning correct values

3.2.5 Stairlight channel A parameters

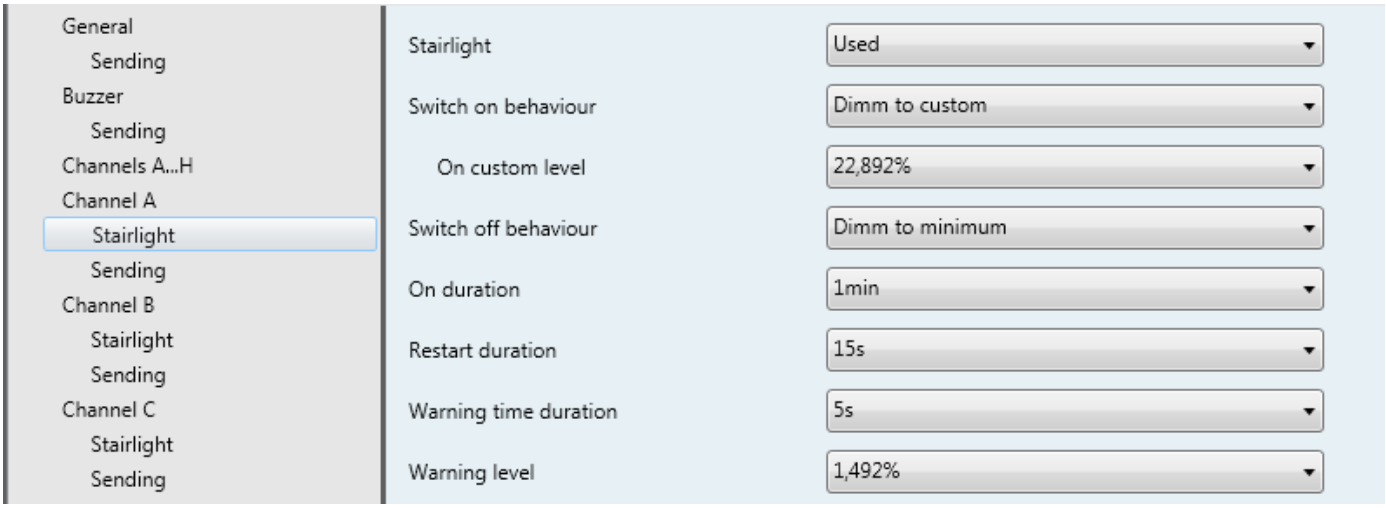


Figure 17: Stairlight parameters

Channel x -> Stairlight

Stairlight:
Each channel can also be used for stairlight functionality. By setting this parameter to "Used", according parameters and CO are made accessible.

Switch on behaviour:
This parameter sets the behaviour at start of stairlight. Also, the level during stairlight is set with this parameter.

On custom level:
If "Dimm to custom" is selected as Switch On behaviour, this parameter sets the custom On level.

Setting On custom level lower than minimum level or higher than maximum level, the ETS Application will display a warning message, asking to correct values.

On duration:
This parameter sets the time the stairlight will be running On.

Rem.: On duration starts an switch On. So, if Switch on behaviour is set to dim to On level, the fade time is part of On duration.

Restart duration:
This parameter sets the behaviour if Switch On is executed again while stairlight is still running.
If parameter is set to "Not restartable", the new switch On command will be ignored.
Else, stairlight may be prolongated.

- If stairlight is still at On level, and remaining time is less than restart duration, remaining on time is expanded to restart duration.
- If stairlight is still at On level, and remaining time is greater than restart duration, restart will be ignored.
- If stairlight is already in warning, on level will be restarted using restart duration as remaining on time.

Warning time duration:
At end of stairlight on time, a warning level can be driven to avoid surprising light switch off.
Setting “No warning”, channel will execute switch Off behaviour once On duration is elapsed.
Setting a warning duration, channel will first dim to warning level for given parametrised time, before executing switch Off behaviour (if no restart is requested in the meantime).

Rem.: Warning duration starts at end of On duration. So, the fade time is part of warning duration.

Warning level:
If warning is used, this parameter sets the level to drive the channel while in warning time.

Setting Warning level lower than minimum level or higher than maximum level, the ETS Application will display a warning message, asking to correct values.

Switch off behaviour: This parameter sets the behaviour at very end of stairlight. For example, it can be set to dim to minimum value, in order to keep a minimum light level within staircase.

Off custom level:
If “Dimm to custom” is selected as Switch Off behaviour, this parameter sets the custom Off level.

Setting Off custom level lower than minimum level or higher than maximum level, the ETS Application will display a warning message, asking to correct values.

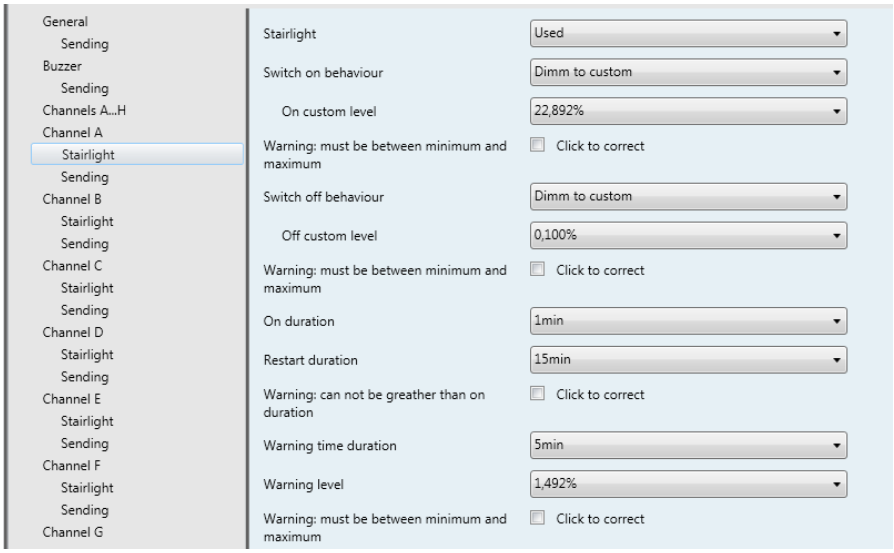


Figure 18: Warning correct values

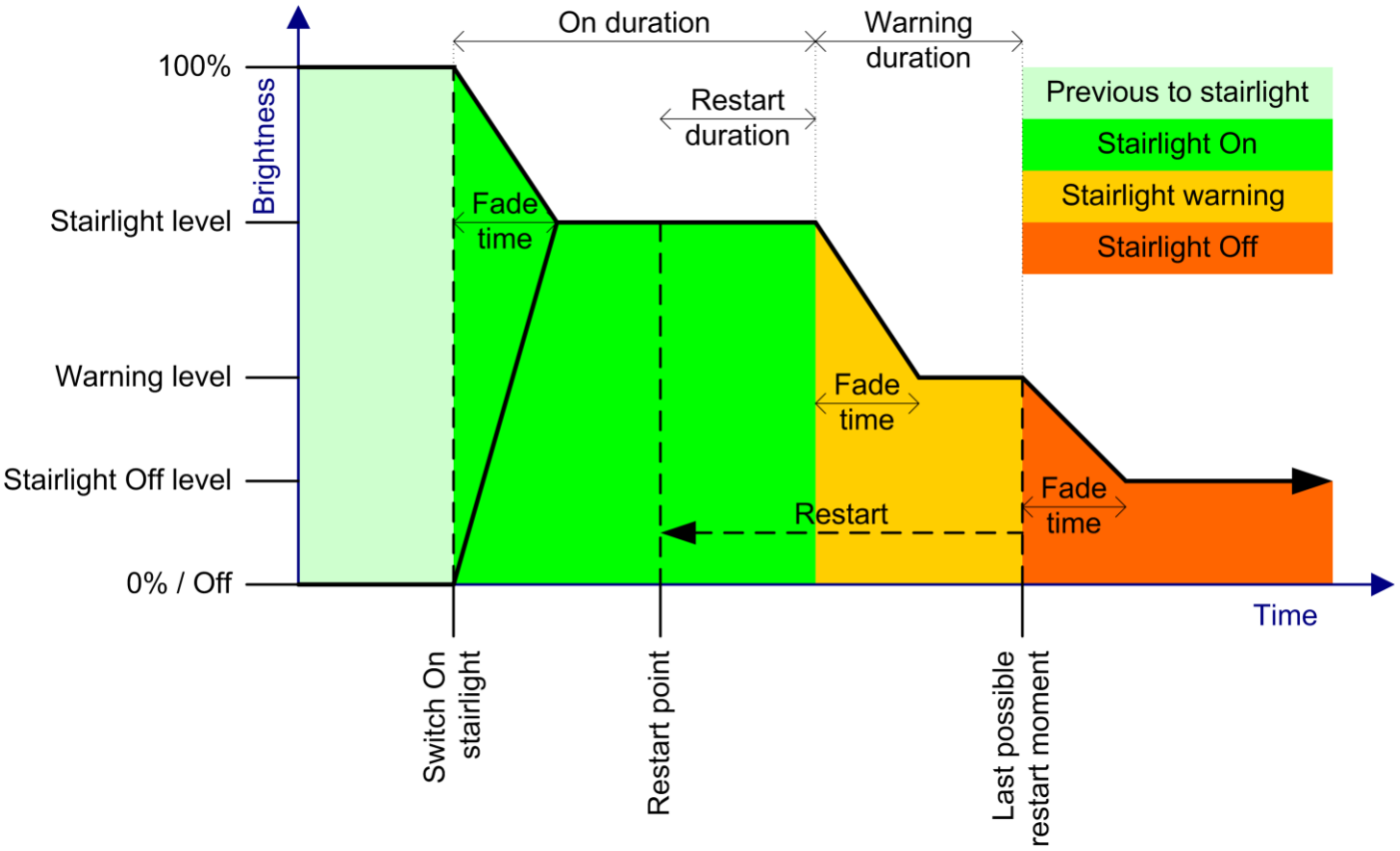


Figure 19: Stairlight

3.2.6 Central control parameters

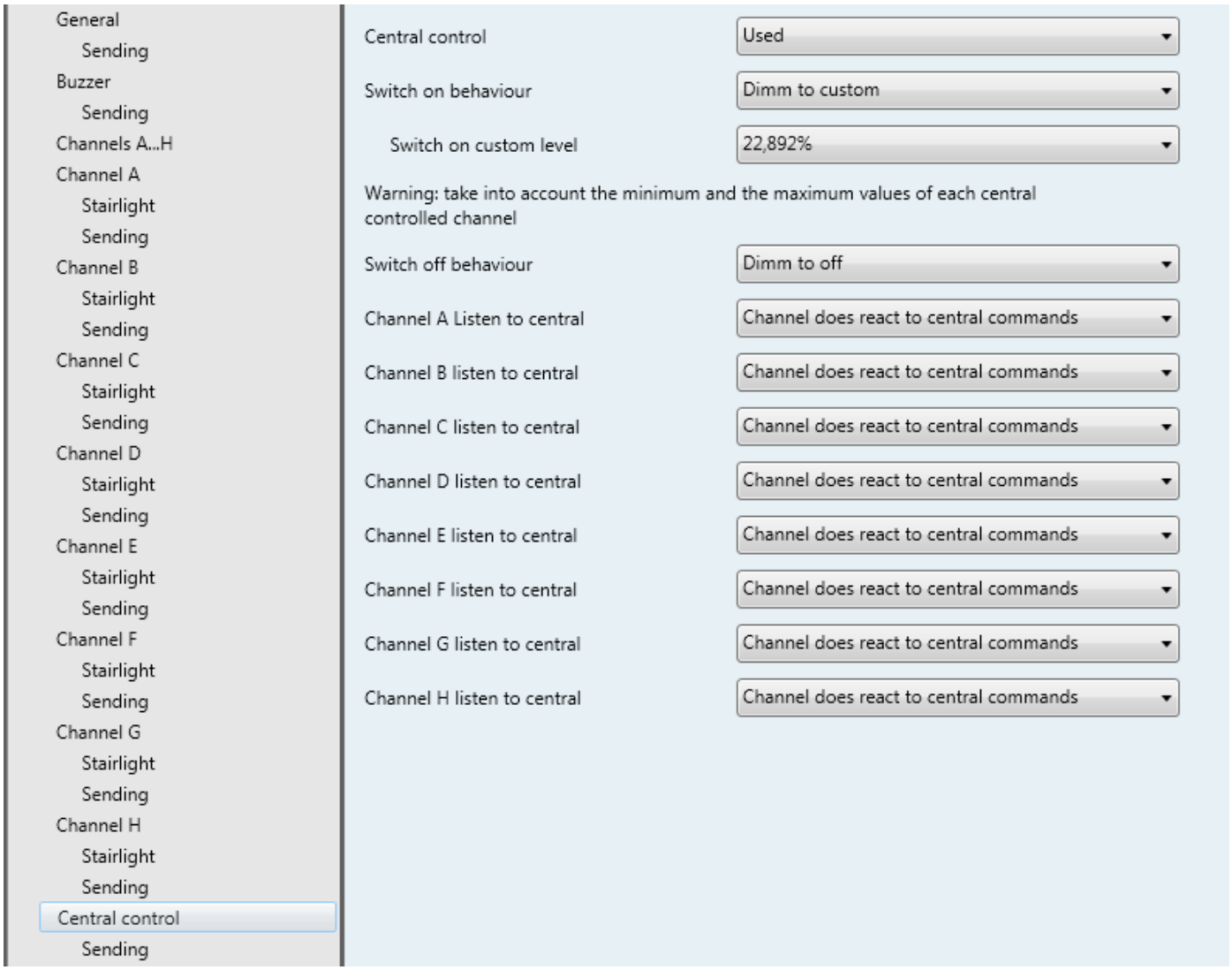


Figure 20: Central control parameters

Central Control parameters:

Central control:
Central control is useful for driving multiple channels together.
While being driven in central control, channels will not react to single channel controls.
By setting this parameter to “Used”, according parameters and CO are made accessible.

Switch on behaviour:
This parameter sets the level to drive channel in central control if getting a central Switch On command.

Switch on custom level:
If “Dimm to custom” is selected as Central switch on behaviour, this parameter sets the central custom On level.

If a channel is already On with value higher than set in this parameter, Switch On will result in decreasing intensity.

Take into account the minimum and maximum values of each central controlled channel. ETS Application will display NO warning message if below minimum or exceeding maximum levels of single channels.

Switch off behaviour:
This parameter sets the behaviour when central switching Off channels. It can be choosen if level should dim down using fade time, or switch directly Off.

Channel x listen to central:
For each single channel, it can be set if it must listen to central commands or not.

Rem.: In order a channel to listen to central commands, it must first be put into central mode by sending “1” on CO Nr. 16 / Central mode switch On/Off.

3.2.7 Scenes 1…32 parameters

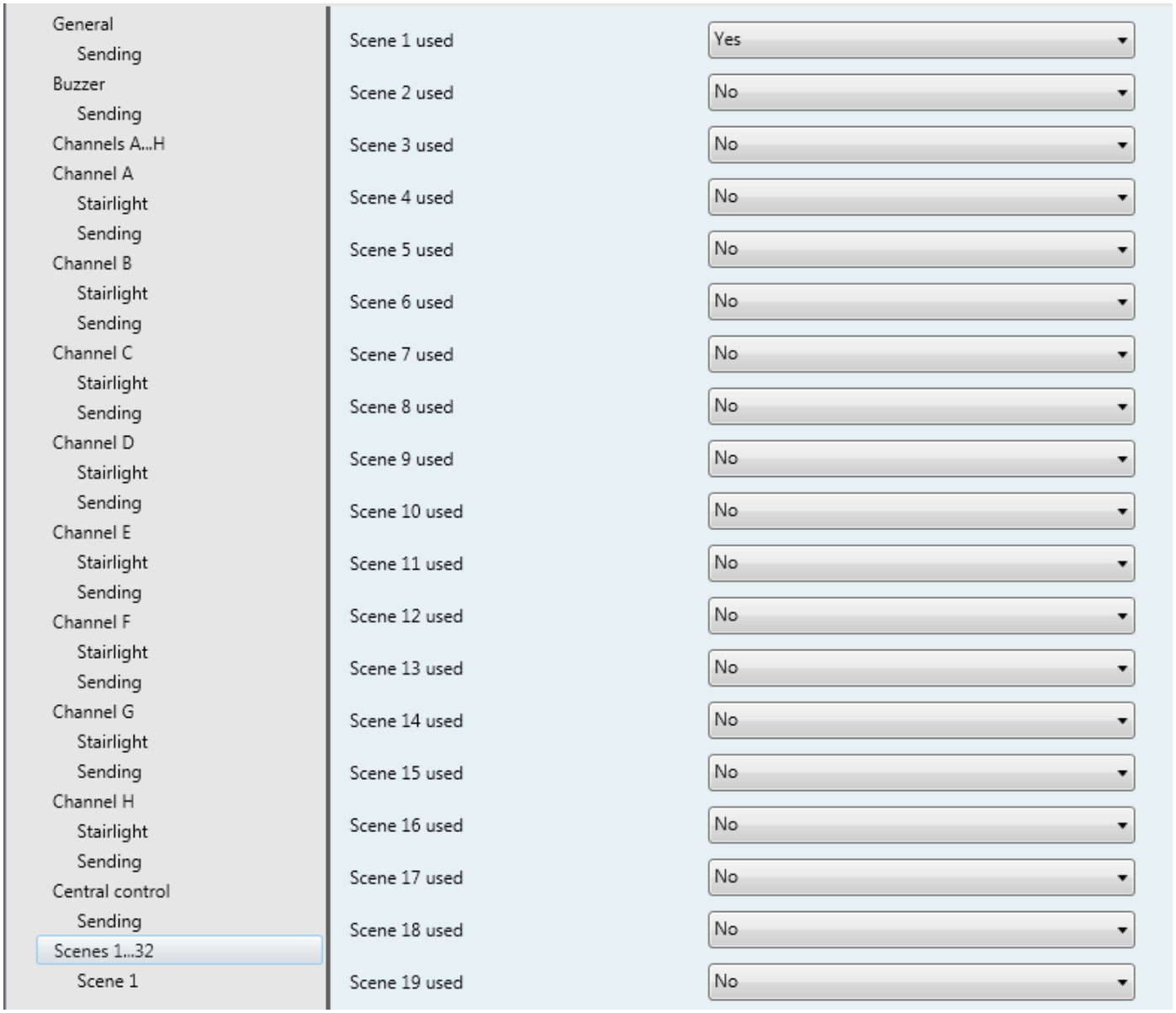


Figure 21: Scenes 1…32 parameters

Scenes 1 … 32
The DALI GATEWAY is able to handle up to 32 scenes.
Each scene permits to dim multiple channels to single defined values.

Scene y used:
By setting this parameter to “Used”, according parameters for scene y are made accessible.

3.2.8 Scene 1 parameters

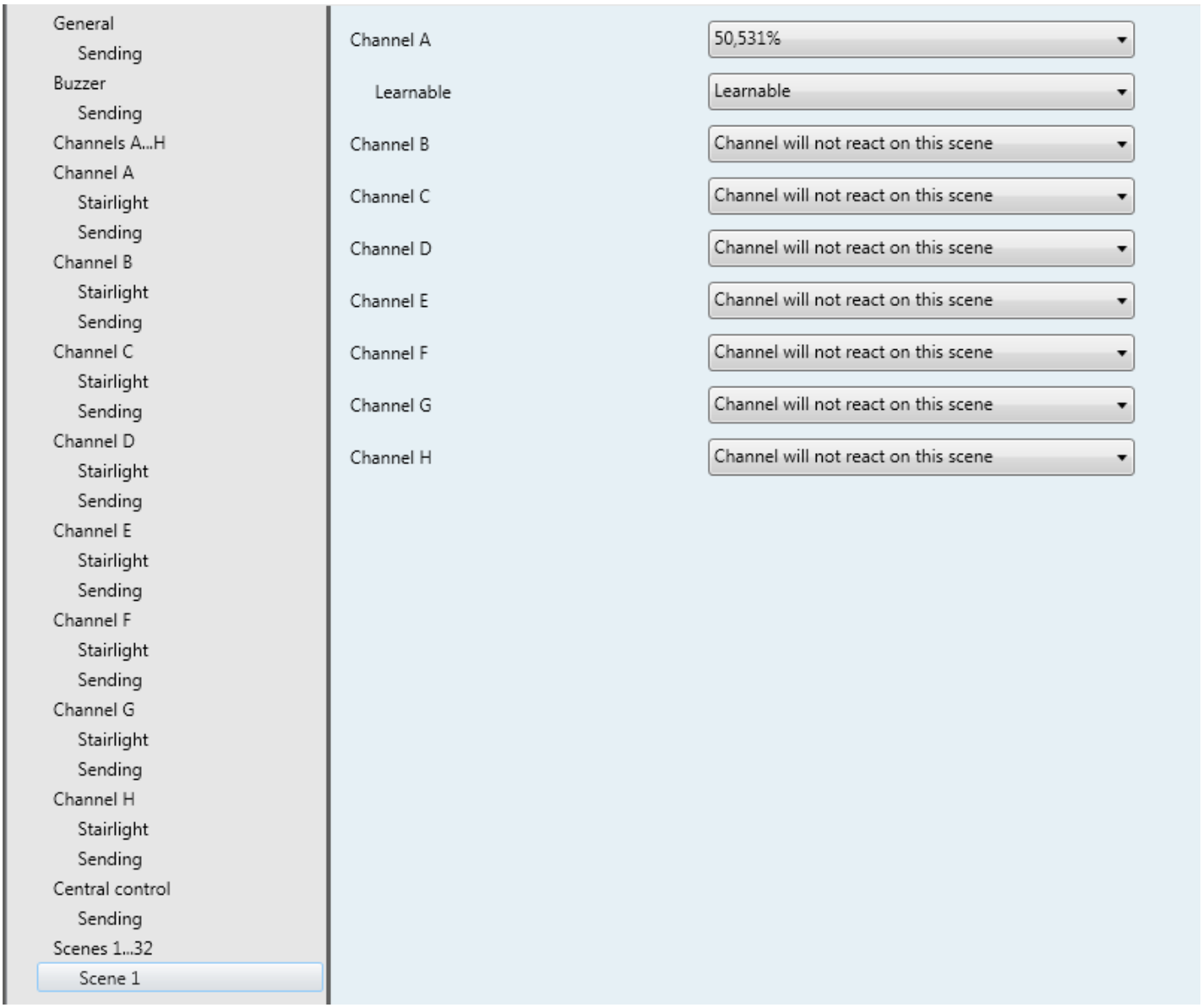


Figure 22: Scene X parameters

Scene y parameters:
For each scene, single channel behaviour can be defined.

Channel x:
Within each scene, the behaviour of each single channel can be set independently. Setting this parameter to “Channel will not react on this scene”, channel will ignore each activating or storing of scene y.

Setting a value, channel will dim to value set within this parameter if scene y is activated.

Setting channel level lower than minimum level or higher than maximum level, the ETS Application will display a warning message, asking to correct values.

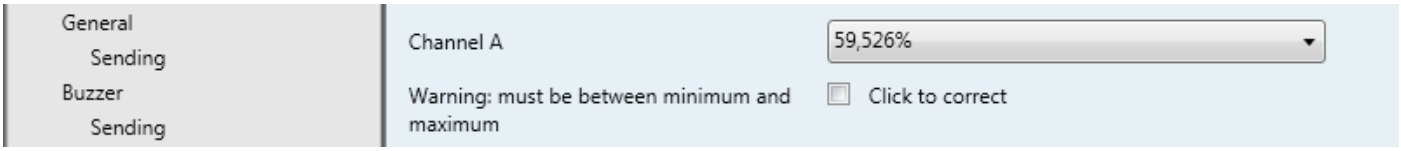


Figure 23: Scene correct values

Rem.: by activating a scene, each concerned channel will use its own fade time set within parameters. So, final values may be time delayed between different channels.

Learnable:
In addition to activating, scenes can also be learned. Setting this parameter to “learnable”, the actual brightness (last value the DALI GATEWAY automatically read out of the channel) will be stored as level by learning scene.

Rem.: learning scenes will only store the scene values in volatile memory. After reset of the DALI GATEWAY, the scene will recover values set in parameters.

3.2.9 General sending parameters

The parameters of the device are separated in different functional parts:
General, Buzzer, Channel A, Channel B, … Channel H, Central Control, Scenes.
For most of these parts, some status CO's exists. The parameters for setting up the status CO's are accessible in nested parameter sets called *Sending*.
The parameters will only be visible if relevant. So, depending on settings, all parameters for status CO's may not be visible.

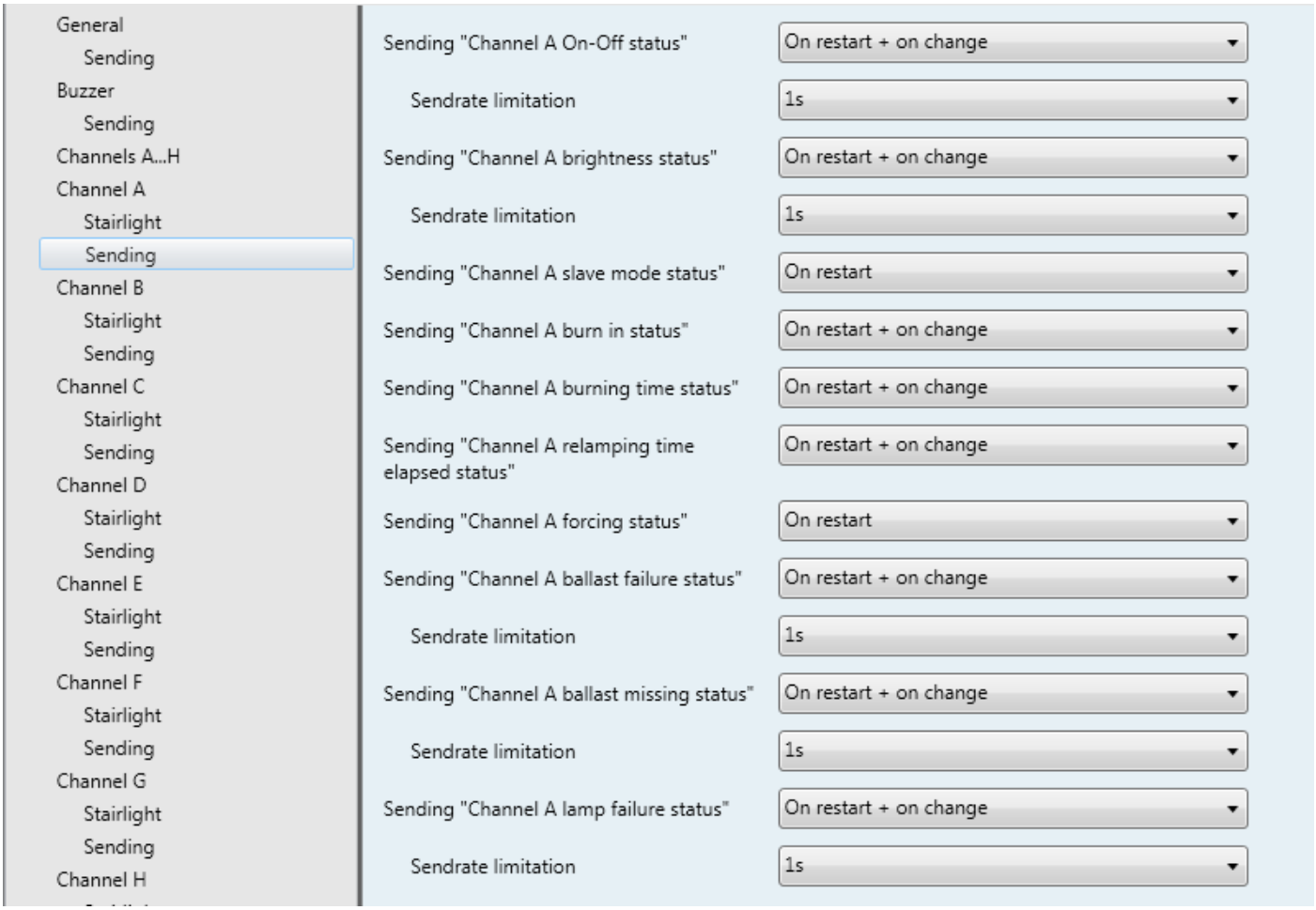


Figure 24: Sending parameters

Status CO's are sent out by the device. In most cases, the status sending mechanism can be set in following way with parameters:

- "Never": this CO will never be sent on bus.
- "On restart": this CO will be updated on bus after each restart of device (and also after bus failure recovery or after reprogramming device). In order to avoid bus overload after restart or recovery of a complete system, the "delay before starting to send after restart" can be set individually for each device within "general" parameters.
- "On restart + cyclic": All CO's set by parameters to be sent out cyclically will be sent out together in given time delays. This delay can be set by parameters. The cyclical sending will only begin after the "Delay before starting to send after restart" is elapsed.
- "On restart + on change": The CO's set by parameter to be sent out by change will be updated on bus individually on change of associated value. In order to avoid bus overloads due to fast changes, most of this CO's have an individual "send rate limitation" set by parameter. Even on change, the CO with new value will not be sent out until this time is elapsed since last sending of same CO. The sending on change will only begin after the "Delay before starting to send after restart" is elapsed.

For more detailed information about the single status CO's refer to the communication object description.

4. Technical data: Art. 119914 14783 003A

Housing	139 x 45 x 19mm
Mounting	To be mounted into fall-ceilings
Housing material	ABS V0
Protection degree	IP20
Weight	70g
Operating temperature	-5°C … +45°C
Terminals	
KNX	Pluggable, polarized, 250V, 10A, green colour
DALI	Pluggable, unpolarized, 250V, 10A, blue colour
Wire section	Solid: 2.5mm2 (12 AWG)/ Stranded: 1.5mm2 (12 AWG)
Screw	M3
Maximum torque	0.6Nm (5.3in.lbs.)
Clamp opening size	2.5 x 2.4mm
Supply	Powered by KNX Bus
KNX	30mA current consumption from bus
DALI	EN 62386-101 EN 62386-102
	DALI bus voltage provided by gateway
Max. DALI current	16mA supplied by gateway, for max. 8 ballast
EMC	EN 61000-4-2 EN 61000-4-3
	EN 61000-4-4 EN 61000-4-5
	EN 61000-4-6 EN 61000-4-11