



DALI BOX Broadcast 6CH/4CH v2

KNX-DALI Interface for up to 6/4 Channel Broadcast Control

ZDIDL6V2

ZDIDL4V2

Application Program Version: [3.0]

Manual Edition: [3.0]_a

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DOCUMENT UPDATES

Version	Modifications
[3.0]_a	Change in the application program: <ul style="list-style-type: none">• New functionality:<ul style="list-style-type: none">- HCL Control.- Power and energy values (DT51) can be obtained.
[2.3]_a	Change in the application program: <p>Code optimisation for:</p> <ul style="list-style-type: none">- DALI BOX Broadcast 6CH v2- DALI BOX Broadcast 4CH v2
[1.1]_a	Change in the application program: <ul style="list-style-type: none">• New parameter: "Allow Switching On via Relative Dimming".• Change in the range of regulation limits

1 INTRODUCTION

Zennio DALI BOX Broadcast v2 devices are gateways that allow the communication of the KNX protocol with the DALI protocol. These devices allow both the configuration and the control and supervision of each DALI channel, through KNX communication and by means of broadcast commands (i.e., destined to all the ballasts present in a channel). Zennio offers two devices for this purpose:

- **DALI BOX Broadcast 6CH v2**
- **DALI BOX Broadcast 4CH v2**

These devices are “*Single Master DALI-2*”, however, there are also “*Multi-Master DALI-2*” devices in the Zennio product range, that enable control at individual and group level, as well as broadcast. These devices are the Interface devices (***DALI BOX Interface 64 X2, DALI BOX Interface 64 v3 and InBOX DALI 16***). For more information, please refer to the DALI section at www.zennio.com.

Their main functions are:

- Output of **DALI channel**. Each channel represents an independent DALI bus.
- Integrated DALI power source.
- Regulation of luminaires based on **DALI standard**.
- Support for **up to 64 ballasts per channel**, and therefore **up to 384 ballasts** (6CH model) or **up to 256 ballasts** (4CH model) in total, although the maximum allowed consumption must be considered; 500 mA in total, adding up the consumption of all channels.

In addition, other advanced functionalities are offered:

- Run and save **KNX scenes**
- **Sequences** execution.
- **Notification** of overload, DALI channel, ballast, lamp and device errors.
- **Standby mode** to reduce ballast consumption by the controlling the power supply of the control points.

- **Burn-in mode** (ECGs heating), required during the beginning of lifetime of some lamps to ensure optimal lifetime.
- **HCL control mode** (Human-Centric Light), available for Colour temperature ECGs (DT8).
- Support of colour ballasts (type DT8) with RGB, RGBW functionality and colour temperature.
- Ability to read **power** and **energy** for DT51 ballasts (DT252 part).
- Possibility to **choose visual perception of dimming** (logarithmic or linear) for any ballast, the **curve applied** by **ECG** for LED (DT6) and **selection curve applied** for **colour** channels RGB/W (DT8).
- **Manual control** by means of push buttons and built-in LED indicators.
- **Heartbeat** or periodical “still-alive” notification.
- **KNX Security**. For detailed information about the functionality and configuration of KNX security, consult the specific user manual “KNX Security”, available in the product section of the Zennio web portal (www.zennio.com).

Note: *certain figures or sections of this manual may refer specifically to DALI BOX Broadcast 6CH v2. However, please bear in mind that everything applies to DALI BOX Broadcast 4CH v2 as well, with the only difference of the available output channels.*

1.1 DALI TECHNOLOGY

DALI (*Digital Addressable Lighting Interface*) is a communication protocol for luminaire control defined in the **IEC 62386 standard**. This standard defines the behaviour of the elements that are part of the system such as power supplies, bus topology, controllers, ballasts (also called ECGs, which stands for ‘Electronic Control Gears’), sensors and other common elements in electrical lighting installations. The standard has several versions, the current version is the 2.0, known as DALI-2. Devices that follow the standard are identified with a logo that refers to the version of the standard they follow.

1.1.1 DALI SYSTEM LIMITS

The maximum elements foreseen in a DALI system are the following:

- Maximum number of ECGs in the bus: 64

- Maximum distance of the bus: 300 m

1.1.2 SINGLE-MASTER DALI-2

DALI communication is usually initiated by a controller by sending commands and queries to the rest of the system elements. **DALI BOX Broadcast v2** is a controller that DALI-2 define as Single Master, that is, the device must be the only one sending commands. The other elements shall only send their statuses, either because of a change or in response to a query, DALI-2 input devices are also not allowed to send events to the DALI bus.

1.1.3 DALI BUS MANAGEMENT

DALI standard foresees some commands to make the configuration and control the bus elements. **DALI BOX Broadcast v2** uses some of these commands to configure and control the facility.

- **Command addressing:** Each command that is addressed to the DALI bus is broadcast, that is, its destination is all ballasts connected to the line.
- **Reset:** Default parameter values of the ballasts can be established by means of the Reset command. To reestablish the address of an ECG, the address 255 must be assigned. This process can be initiated by means of the object, in each channel, intended for this purpose. During the process, after the Reset and address reestablishing, addressing process is done.
- **Addressing:** At the beginning of the process, it is asked if there are any ECG not addressed. In this case, each unaddressed ECG take a random number. Using these random numbers, **DALI BOX Broadcast v2** assigns a not used address to each unaddressed ECG. This process is carried out after a Reset of the installation.
- **Cyclical query:** Connected ECGs are monitored by **DALI BOX Broadcast v2** making queries continuously to all addressed and recognized ECGs. So, if an ECGs does not responses to the queries, it is considered that a presence error is occurring.
- **ECGs configuration:** When an ECG is recognized, **DALI BOX Broadcast v2** configures some parameters, such as maximum and minimum dimming levels,

system failure level, power on level or other specific parameters depending on the ECG type.

- **Dimming commands:** In order to control the lighting level, **DALI BOX Broadcast v2** sends dimming commands to the channel (*broadcast*). The time taken by the ECGs to perform the dimming process is called Fade time. With each dimming command, the Fade time is sent to the ballast.

Note: *the use of only one type of ballast within the same channel is recommended as it will avoid potential control problems.*

1.1.4 COMPATIBLE BALLAST

DALI BOX Broadcast v2 can control ECGs following DALI standard (both DALI and DALI-2). It is particularly foreseen to control the ECG types **DT0**, **DT1**, **DT6**, **DT8** and **DT51**. Correct operation cannot be ensured with other types of ballasts not listed in the following table.

Device type	Particular requirements for control gear	Defined in
DT0	Fluorescent lamps	IEC 62386-201
DT1	Self-contained emergency lighting	IEC 62386-202
DT6	LED modules	IEC 62386-207
DT8	Colour control	IEC 62386-209
DT51	Energy reporting ECGs	IEC 62386-252

Table 1. Classification by DALI device type

Although there are plenty of DALI ECGs in the market (most of them labelled with the DALI logo), it is observed that not all of them follow fully the DALI standard. This causes undesired behaviours in the installations (for example, addressing errors, wrong lighting levels, unexpected switch-on or switch-off or causing errors on other ballasts that do comply the DALI standard). It is recommended to check that the used ballasts are included in the [DiiA](#) database. DIIA is the organization who manages the DALI standard.

1.2 DIMMING POINTS

The control of the different ballasts configured by **DALI BOX Broadcast v2** is based on sending commands to the DALI bus by means of communication objects through the KNX bus, i.e. the user can control the ballasts by means of KNX commands, which the device sends to the DALI bus with **universal or broadcast addresses**, that is, for all

ballasts connected to the channel, whether or not they are addressed. Therefore, no distinction can be made in these devices between individual commands and commands for groups of ballasts. For that kind of control, Zennio offers its **Interface** range.

The commands on the DALI bus are applied to dimming points. A dimming point is any set of ECGs that have a common dimming functionality. Therefore, in this manual, broadcast control points are referred to as **broadcast dimming points**, which can be set uniquely for each channel.

1.3 POWER AND BUS FAILURES

This section refers to the consequences on the installation of power failures and KNX bus failures.

- **KNX bus failure:** When the KNX bus communication is interrupted, the device microcontroller will lose the power and the following values for broadcast dimming point will be saved:

- Dimming value
- Colour
- Lock status and pre-blocking regulation levels
- Alarm status and pre-alarm regulations levels
- Burn-in mode

In addition, it shall save the errors status previous of the bus failure, the operation time counters of each ECG and the list of detected ECGs (whether or not, at the time of the failure, they were connected to the installation). If the device has a display, it shall also save the screen locking status.

- **During the KNX bus failure:**

- It keeps the DALI bus powered even if it does not make periodic status requests, and sends the dimming commands parameterised in ETS '**Dimming Value During KNX Bus Failure**' by the DALI bus. (see section 2.2.1.4).

- **After the KNX bus failure:**

The control levels to be set depend on the initialisation that has been parameterised for the device, as well as the blocking and alarm states. The following objects will be received via the KNX bus:

- Heartbeat
 - Standby object with disabled value
 - Dimming status objects (if you have a custom initialisation value defined)
 - Any object that has changed its value during the bus fault
- **Device auxiliary power failure:** In this case, the device loses the DALI bus, sequences, single timings and flashes are stopped and will be sent via the KNX bus.
- Standby objects with disabled value
 - Power supply error object (with activated value)
 - Dimming status objects in the event of a different DALI bus fault dimming than the current dimming

Lamp dims to the set value for Dimming Value During DALI Bus Failure. (see section 2.2.1.4)

When the power is restored, the DALI bus is re-established and the status before the power failure is restored (provided that other functionalities such as alarms or blocking allow it).

1.4 PRIORITIES

DALI BOX Broadcast v2 has multiple functionalities that cannot always be executed simultaneously. For this reason, the priorities that the device will attend to in the event of overlapping orders have been defined.

In order to help the user understand how the device works, the **order of priority** of the actions is specified below:

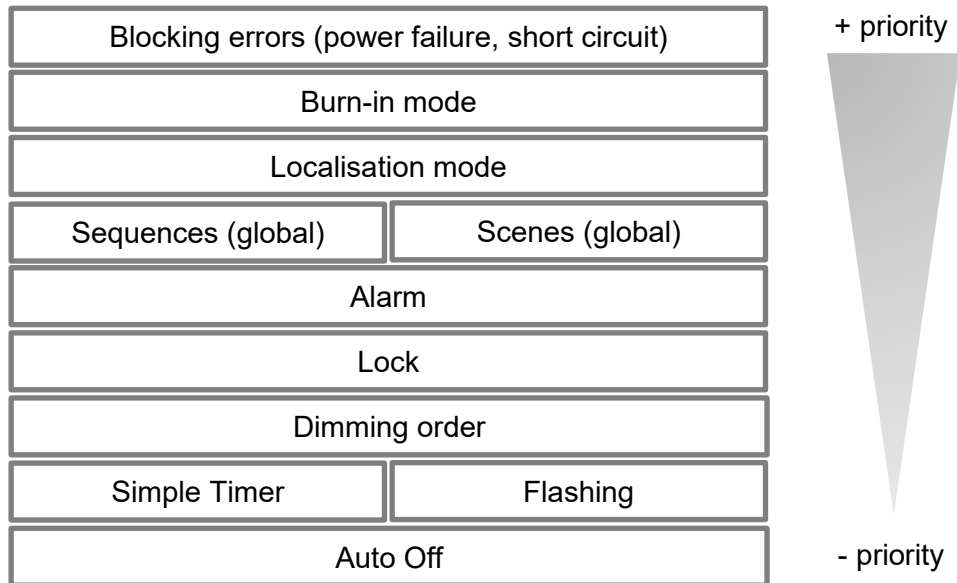


Figure 1. Priority table

On the other hand, the Standby mode priority is not included in the above table. This parameter can operate in parallel with several of the above functionalities.

Note: *the table above details the general prioritisation of functionality, however, it should be noted that there may be specific exceptions which are not further elaborated upon.*

2 CONFIGURATION

The DALI BOX Broadcast v2 allows, as stated in previous sections, controlling DALI ballasts grouped into up to six or four channels. This functionality, therefore, is applied to channels:

- Configuration for each **DALI channel**:
 - **Dimming times** can be set and modified via object. Up to three different dimming times can be defined.
 - **Scenes**: possibility to run and save up to 64 customised Zennio scenes.
 - **Sequences**: up to 16 customised sequences of actions. They allow, among other things, the definition of up to five steps per sequence and the type of regulation of each one.
 - **Standby**: mode that allows an external actuator to interrupt the power supply to the ballasts after the ballasts have been switched off.
 - **Error identification**: distinguishes and reports anomalies that affect the correct functioning of the device.
 - **HCL Control**: Allows setting a colour temperature for tunable white ballasts to mimic natural sunlight.
 - Minimum and maximum brightness and dimming **limits** can be set for each dimming point.
 - For dimming the lamps:
 - One-bit objects for the **on/off switching** of each dimming point.
 - Four-bit objects for **relative regulation** for each regulation point.
 - One-byte objects for **absolute dimming** (in percentage) for dimming point.
 - Customisation of the switching on and off of the dimming points.

- **Configurable dimming:** The dimming curve type (logarithmic or linear) for DT6 ballasts and the visual perception for dimming for any ballast can be selected.
- Different dimming for **day and night mode**.
- **Simple timer and flashing:** succession of timed on/off switching of dimming points.
- **Lock:** possibility of defining actions in the event of blocking and unblocking broadcast channel.
- **Initialisation:** customisable configuration of the initial status (when the voltage returns to the KNX bus or after downloading or restarting from ETS).
- Lectura del **valor de energía y potencia activas** para canales que contengan balastos **DT51**.
- **Special modes:**
 - **Auto Off:** allows automatic shutdown of broadcast if the state of the ballasts remains unchanged below a certain lighting threshold for a longer time than the set time.
 - **Burn-in:** ensures that no dimming actions are performed for a configurable time in order to stabilise the behaviour of the lamp and to optimise its lifetime. This feature may be specific to certain lamp models.
- Send **dimming periodically**, for desired dimming points.
- **General functionality:**
 - **Heartbeat:** object indicating operation periodically. Objects indicating recovery are also available.
 - **Advanced configuration:** allows to control the sending of certain commands via the DALI bus.
 - **Manual control:** allows to configure the manual control mode of the device, in order to test the correct installation.

2.1 GENERAL

After importing the corresponding database into ETS and adding the device to the desired project topology, the configuration process is started by accessing the device parameters tab.

ETS PARAMETERISATION

When accessing the parameters tab, the general configuration screen as well as the channel configuration tab are displayed. From the general configuration screen, all necessary functions can be activated/deactivated.

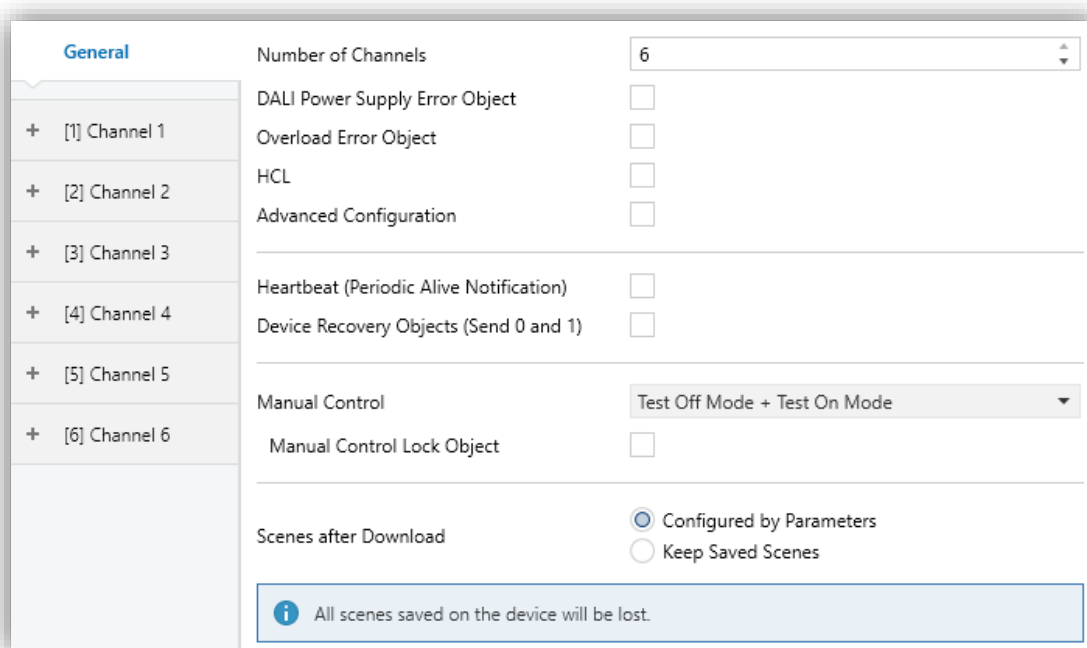


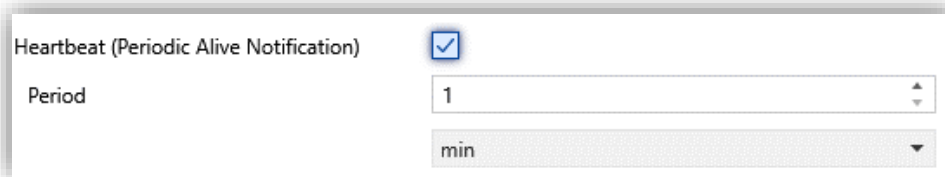
Figure 2. General configuration

Note: The images shown in this document are from DALI BOX Broadcast 6CH v2, which has up to six DALI channels available, for DALI BOX Broadcast 4CH v2 4 channels are shown.

- **Number of Channels [1...6]¹:** checkboxes to enable or disable the required output channels.
- **DALI Power Supply Error Object [enabled / disabled]:** an object to notify the auxiliary power supply error is shown.

¹ The default values of each parameter will be highlighted in blue in this document, as follows: [default / rest of options].

- **Overload Error Object** [*enabled / disabled*]: adds an object that notifies if the maximum current allowed between all channels is exceeded.
- **HCL** [*enabled / disabled*]: Enables biometric lighting control (Human-Centric Light), which will display a specific menu.
- **Advanced Configuration** [*enabled / disabled*]: It creates a specific menu.
- **Heartbeat** [*enabled / disabled*]: One bit object (“**[Heartbeat] Object to Send ‘1’**”) will send an “1” periodically to notify that the device is working.



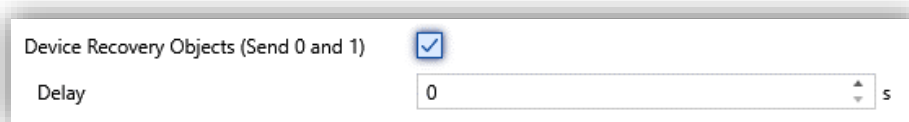
Heartbeat (Periodic Alive Notification)

Period

Figure 3. Heartbeat

Note: After download or after bus failure, first sending is delayed up to 255 seconds, to avoid bus saturation. The following sendings keep the parameterised period.

- **Device Recovery Objects (Send 0 and 1)** [*enabled / disabled*]: Two objects (“**[Heartbeat] Device Recovery**”) are activated and they will be sent with values “0” and “1”, respectively, when the device starts working. It is possible to include a **delay** [*0 ... 255*][s] in the sending.



Device Recovery Objects (Send 0 and 1)

Delay s

Figure 4. Device recovery objects

Note: After download or after bus failure, the sending is delayed up to 6,35 seconds additional to the parameterised delay to avoid bus saturation.

- **Manual control:** The manual control mode of the device is set, as well as the locking of the device. See section 2.1.2.
- **Scenes after Download** [*Configured by Parameters / Keep Saved Scenes*]: It defines if the scenes values considered is taken from parameters or the previous values before download.

Note: With “Keep Saved Scenes”, after the first download or after a download where the version is changed, the values considered will be the parameters’ ones. If in a parameterisation the number of scenes is increased, it is mandatory to select “Configured by Parameters” to ensure the correct working of scenes.

2.1.1 HCL

HCL control (Human-Centric Light), or biometric lighting control, is an advanced function designed for **colour temperature ECGs (DT8)**, enabling the simulation of the natural light rhythm of the sun and its varying colours using artificial light.

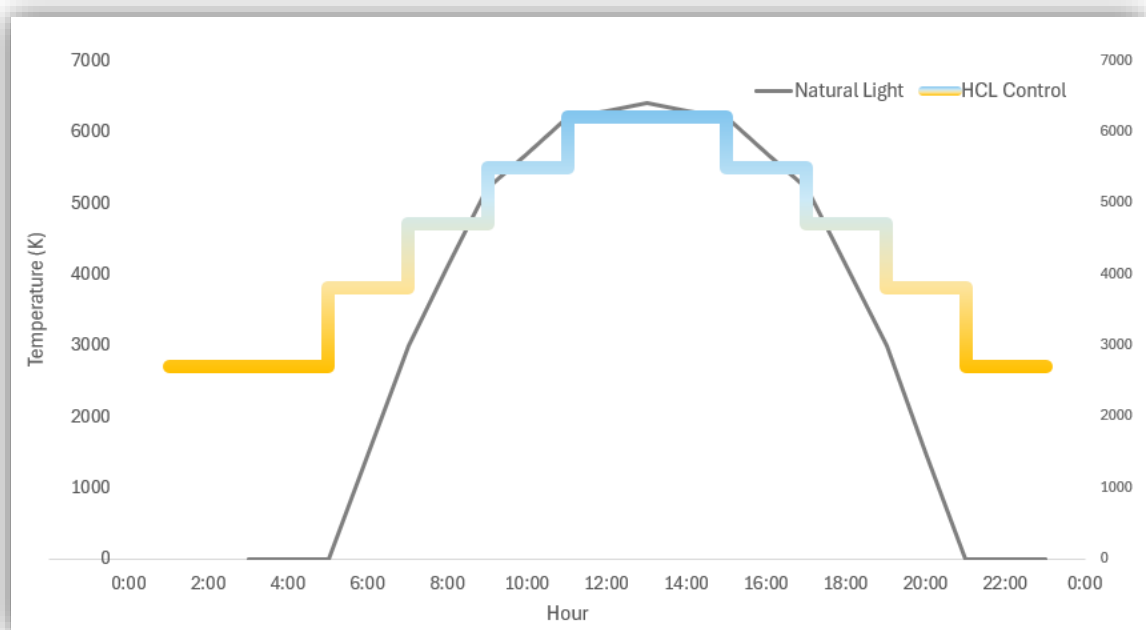


Figure 5. Example of HCL control against natural light.

This HCL control can be implemented in two ways:

- **External control:** Management of colour temperature via the communication object “[HCL]: Colour Temperature”.
- **Automatic control:** Automatic management of colour temperature based on the time of day. This control can operate according to:
 - **Time:** The different points of the colour temperature profile are configured using specific times of the day.

Note: It is recommended to keep the time periodically updated for correct operation.

- **Sunrise and sunset:** The different points of the colour temperature profile are configured using a time relative to sunrise or sunset. This relative time can be set according to the formula “Sunrise/Sunset ± % of day length”, where day length is calculated as “Sunrise time – Sunset time”.

To calculate sunrise and sunset, the device location must be configured using the location parameters described in section **¡Error! No se encuentra el origen de la referencia..**

Note: *Each time the device restarts, up to three read requests will be sent for the objects “[HCL] Time” and “[HCL] Date” to ensure updated values.*

HCL control is activated via the object “[Cx][Broadcast][] HCL” (1-bit) upon receiving a “1” or after the user-defined delay time for activation following deactivation.

Deactivation is performed using the same object upon receiving a “0” or by any change in colour temperature through:

- The relative colour temperature adjustment object.
- The absolute colour temperature adjustment object.

Any of these commands starts the countdown to activate HCL after the defined delay.

Note:

- *If an dimming is in progress, HCL control will not be considered until the adjustment is completed and a new minute begins (automatic control) or a new colour temperature is received via the “[HCL] Colour temperature” object (external control).*
- *If a timed action is in progress when the HCL activation delay ends, the delay will restart and begin counting once the timed action has finished.*
- *For its implementation, it is necessary that the dimming point to which this control is to be applied is of the Colour Temperature type (DT8).*

ETS PARAMETERISATION

After enabling the HCL option from the “General” window, the following parameters will appear:

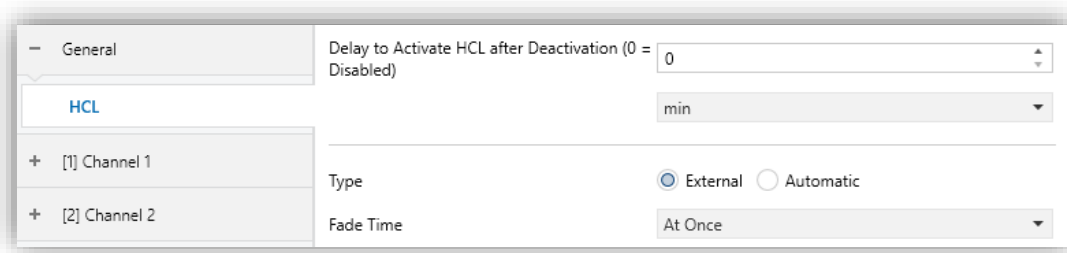


Figure 6. General HCL Configuration.

- **Delay to Activate HCL after Deactivation (0 = Disabled)** $[0...100][s]$ / $[0...100][min]$ / $[0...100][h]$: Sets the maximum time that may elapse without HCL control enabled before it is automatically activated. A value of “0” disables the delay.
- **Type** $[External / Automatic]$: Allows selection of the HCL control mode. HCL control determines the colour temperature, dimming, and the moments at which the dimming values will be modified. For both external and automatic control, the following can be configured:
- **Fade Time** $[At Once / Fade Time 1 / Fade Time 2 / Fade Time 3]$: Determines the time required to reach the target dimming and colour temperature values.

If “Automatic” mode is selected, HCL activation and deactivation will be autonomous, requiring the device to know the date and time. The following parameters can be set:

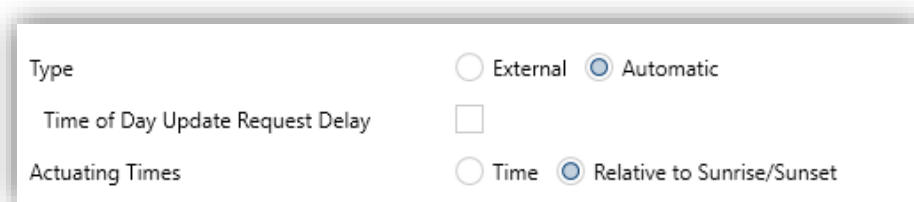


Figure 7. HCL: Automatic.

- **Time of Day Update Request Delay** $[enabled / disabled]$: If this parameter is enabled, read requests for the objects will be sent with a configurable delay:
 - **Delay** $[0...255][s]$ $[0...1...255][min]$ $[0...255][h]$: Request delay time. Up to three requests will be sent; if no response is received, it will be assumed that the date and time are 00:00 on 1 January 2025.

- **Actuating Times** [*Time / Relative to Sunrise/Sunset*]: Defines whether the times determining the intervals are based on hours or on moments relative to sunrise and sunset:

➤ [Hour]:

- **Hour “h”** (Up to 10 times can be configured) [00:00...23:59]:

Time 1	06:00	hh:mm
Dimming Value	<input checked="" type="radio"/> No Change	<input type="radio"/> Defined Value
Colour Temperature	2700	K
Fade Time	At Once	
Time 2	08:00	hh:mm
Dimming Value	<input checked="" type="radio"/> No Change	<input type="radio"/> Defined Value
Colour Temperature	4350	K
Fade Time	At Once	
Time 3	10:00	hh:mm
Dimming Value	<input checked="" type="radio"/> No Change	<input type="radio"/> Defined Value
Colour Temperature	5500	K
Fade Time	At Once	

Figure 8. HCL: Automatic. Time intervals.

- **Dimming Value** [*No change / Defined Value*]: If the defined value [0...100][%] is configured, the brightness percentage can be selected.
 - **Colour Temperature** [1000...2700...20000][K].
 - **Fade Time** [At Once / Fade Time 1 / Fade Time 2 / Fade Time 3].
- [Relative to Sunrise/Sunset]:
- **Hour “h”** (Up to 10 times can be configured) [Sunrise / Sunrise +/- X% of day duration / Sunset / Sunset +/- X% of day duration].

Time 1	Sunrise
Dimming Value	<input checked="" type="radio"/> No Change <input type="radio"/> Defined Value
Colour Temperature	2700 K
Fade Time	At Once
Time 2	Sunrise +20% of Daytime
Dimming Value	<input checked="" type="radio"/> No Change <input type="radio"/> Defined Value
Colour Temperature	4350 K
Fade Time	At Once
Time 3	Sunrise +40% of Daytime
Dimming Value	<input checked="" type="radio"/> No Change <input type="radio"/> Defined Value
Colour Temperature	5500 K
Fade Time	At Once

Figure 9. Automatic. Time intervals relative to sunrise/sunset.

The rest of the parameters are analogous to those for “Hour”.

2.1.1.1 LOCATION

Where control of the “Action Periods” relative to sunrise/sunset is parameterised, the location where HCL control is desired needs to be defined. For this purpose, a new tab is deployed:

General	Latitude	<input checked="" type="radio"/> North <input type="radio"/> South
HCL	Degrees [0 - 90°]	40
Location	Minutes [0 - 59']	25
[1] Channel 1	Longitude	<input type="radio"/> East <input checked="" type="radio"/> West
[2] Channel 2	Degrees [0 - 180°]	3
	Minutes [0 - 59']	42
	Time Zone	(UTC+01:00) Brussels, Copenhagen, Madrid, Paris, West Central Africa
	Daylight Saving Time (DST)	<input type="checkbox"/>

Figure 10. HCL: Location.

First, the coordinates of the location are defined:

- **Latitude** [North / South].

- **Degrees [0-90°]:** [0...40...90][°].
 - **Minutes [0-59']:** [0...25...59]['].
- **Longitude** [East / West].
- **Degrees [0-180°]:** [0...3...90][°].
 - **Minutes [0-59']:** [0...42...59]['].
- **Time Zone** [(UTC-10:00) Hawaii / ... / (UTC+01:00) Brussels, Copenhagen, Madrid, Paris, West Central Africa / ... / (UTC+13:00) Samoa]: Parameter to select the time zone according to the geographical location of the device.
- **Daylight Saving Time** [enabled / disabled]: allows to enable the functionality to activate the summer or winter season. The following parameters will appear to define a customised changeover rule:

Daylight Saving Time (DST)	<input checked="" type="checkbox"/>
Summer time from	
Day	Last
Sunday	Sunday
Month	March
Winter time from	
Day	Last
Sunday	Sunday
Month	October

Figure 11. Configuration of the days that determine the change.

- For summer timetable from:
- **Day** [First ... Fourth, Last] [Sunday, Saturday, Friday, Thursday] [January ... March ... December].
- For winter timetable from:
- **Day** [First ... Fourth, Last] [Sunday, Saturday, Friday, Thursday] [January ... October ... December].

2.1.2 ADVANCED CONFIGURATION

When the parameter **Advanced Configuration**, following window will be shown:

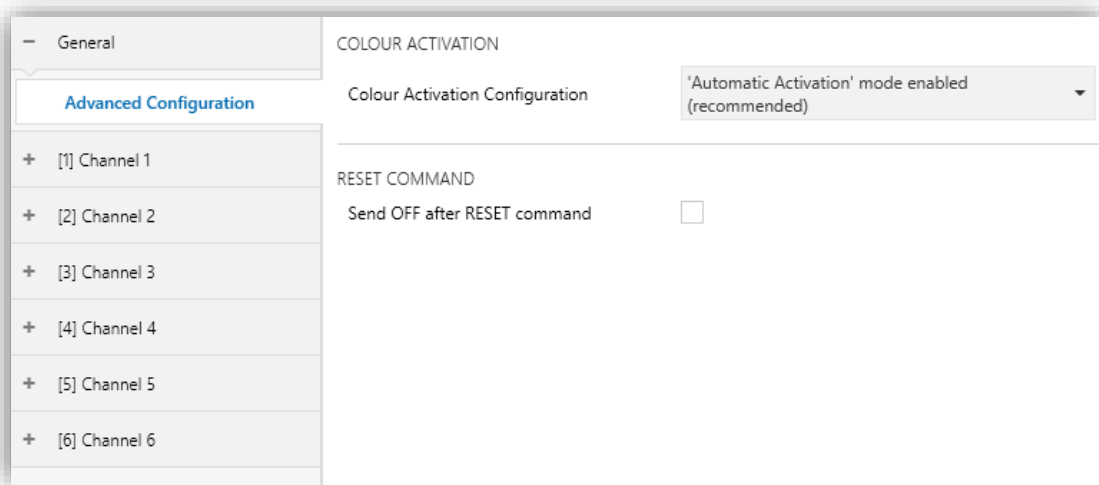


Figure 12. Advanced configuration

Note: *It is recommended not to activate these options, unless having deep knowns of DALI standard.*

These options are configurable:

- **Colour Activation Configuration** [['Automatic Activation' mode enabled \(recommended\)](#) / [Activate colour first, then change light level](#) / [Change the light level first, then activate colour](#)]: In a normal way, **DALI Broadcast v2** operates with colour automatic activation, but this parameter represents a corrective measure for ballasts not working correctly. Some ballasts not supporting properly this DALI Standard characteristic have been found, then it is allowed to perform an advanced control in order to reach a desired behaviour of these ballasts.
- **Send OFF after RESET command** [[enabled](#) / [disabled](#)]: During a facility initialisation, the ballasts are reset to their default values. The DALI standard defines that, after a reset, the ballasts are dimmed at 100%. This parameter allows all ballasts to be switched off after a Reset, so that they are not kept on, when the installation is initialised.

2.1.3 MANUAL CONTROL

In addition to the normal operation of the device, or its control via ETS, the device can be controlled through buttons. The purpose of these controls is to make easier the setup of the DALI installation, but it is not intended to be the usual way of controlling the installation.

ETS PARAMETERISATION

In the general configuration screen itself, the manual control can be configured as shown:

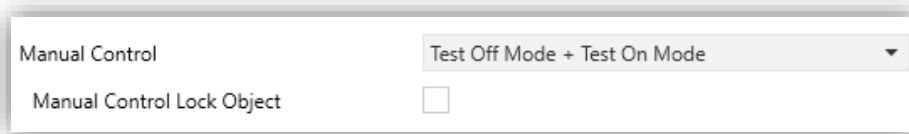


Figure 13. Manual control

- **Manual Control:** [Disable / Only Test Off Mode / Only Test On Mode / Test Off Mode + Test On Mode]: depending on the one selected, the device shall allow the manual control to be used in Test On mode (intended for testing the installation during device configuration), in Test Off mode (intended for use at any other time), or both.
- **Manual Control Lock Object** [enabled / disabled]: unless the above parameter has been disabled, the Lock Manual Control parameter provides an optional procedure for locking the manual control in runtime. When this checkbox is enabled, object “**Manual Control Lock**” turns visible, as well as two more parameters:
 - **Object Polarity** [0 = Unlock; 1 = Lock / 0 = Lock; 1 = Unlock]: it defines if the lock/unlock is done when values of “1”/“0” are received or vice versa.
 - **Initialisation** [Last Value / Locked / Unlocked]: It indicates the status of the manual control lock after bus failure or after configuration. “*Last Value*” after configuration means Unlocked.

Test Off Mode

While the control of the device channels is in this mode, they can be controlled not only by commands sent through the communication objects, but also by using the physical

push buttons on the device. This mode, if so parameterised, is available at all times without the need for specific activation; the buttons will respond to user actions.

When any of these buttons is pressed, the corresponding channel will behave as if an order had been received through the analogous communication object, depending on the channel configuration:

- A **short press** will be equivalent to receiving a switch order (either a switch-on or a switch-off – this will alternate on every short press). The first time, it will always consist in a switch-on, unless the current level is already maximum (in such case, the regulation will be towards 0%). This regulation is subject to the “On/Off Dimming Time” (see section 2.2.3.3) for each channel.
- A **long press** will be equivalent to receiving a relative dimming command (see section 2.2.3.3). The dimming direction will be contrary to that of the previous regulation, although the first time the regulation will always be upwards (unless the current level is already the maximum one – in such case, the regulation will be towards 0%). The dimming speed will correspond to that defined in the parameters for the relative dimming. Once the push button is released, the regulation is interrupted.

Regarding the rest of the functions, the device will behave as usual in the Test Off mode. As stated, button presses during this mode are entirely analogous to the reception of the corresponding orders from the KNX bus, thus the status objects will also be sent normally.

Test On Mode

Once in Test On mode, the output channels can only be controlled by direct action on the manual control buttons. Commands coming through the bus will be ignored, regardless of the channel to which they are addressed. To establish this mode, unless it has not been enabled by parameter, it is necessary to **hold down the Prog./Test button for three seconds**, until the LED turns yellow. At this point, when the button is released, the LED turns green to indicate that the Test Off mode has given way to Test On mode. Pressing the button again will turn the LED back to yellow and then it goes off (after releasing the button). The device will then leave the Test On mode. Please note that this mode will also be exited if a bus fault occurs.

Enabling the Test On mode allows the direct control of every channel with independence of the device parameterisation – the output channels can be controlled in the Test On mode no matter if they have not been enabled in parameters:

- The channel dimming through the on-board pushbuttons will be analogous the that in the Test Off mode, with the following remarks:
 - A **short press** will cause immediate regulations to 0% or to 100% (and not to the maximum level configured).
 - The **long press** dimming period will be 10 seconds (from 0% to 100%).

Any orders received from the KXN bus related to the channel operation will be ignored. Moreover, the device will not send the status objects that may correspond to the manual actions performed by the user. The only exceptions will be **error objects**, which will be sent during test On mode, **and blocking and alarm** objects, which will be sent at the exit of test On (as long as it has not been caused by a bus fault).

Note: *the device is delivered from factory with both manual modes (Test Off and Test On) enabled, although with all channels disabled (thus, the Test Off mode will result functionless).*

2.2 CHANNEL X

DALI BOX Broadcast 6CH/4CH v2 has six or four channels respectively. The individual ballasts are connected to each of these channels via a DALI bus. If one of the channels ('[x] Channel x') is selected in the left-hand tree in ETS, the configuration options for the channel and the broadcast (channel) dimming point are displayed:

2.2.1 CONFIGURATION

Once the configuration option is selected, the following options are displayed:

ETS PARAMETERISATION

The screenshot shows the 'Channel Configuration' tab in ETS. On the left is a tree view with 'General' selected, containing '[1] Channel 1' through '[6] Channel 6'. The 'Configuration' sub-tab is active. The main area is divided into several sections:

- CHANNEL NAME:** A text input field for 'Name'.
- ENABLEMENT:** 'Enable Channel' is checked with a blue checkmark.
- FADE TIMES:** Three dropdown menus for 'Fade Time 1' (2 s), 'Fade Time 2' (4 s), and 'Fade Time 3' (8 s). There is an unchecked checkbox for 'Fade Time Objects'.
- INDEPENDENT FUNCTIONS:** Three unchecked checkboxes for 'Scenes', 'Sequences', and 'Standby'.
- GENERAL FUNCTIONS:**
 - 'Dimming Value During KNX Bus Failure': Radio buttons for 'No Change' (selected) and 'Defined Value'.
 - 'Dimming Value During DALI Bus Failure': Radio buttons for 'No Change' (selected) and 'Defined Value'.
 - 'Error Objects': Checked with a blue checkmark.
 - 'Short Circuit', 'Presence Error', 'ECG Error', 'Lamp Error', and 'ECG Excess': All unchecked checkboxes.
 - 'Diagnostic': A dropdown menu currently showing '-'. A blue information box above it states: 'These times indicate how long a dimming will last from the current level to the target level.'

Figure 14. Channel configuration tab

It can then be configured:

- **Name:** It is the desired name of the channel (12 characters).
- **Enable channel** [[enabled](#) / [disabled](#)]: disables or enables the channel in question. By unchecking this parameter, the “[Cx] Reset ECGs” object will no longer be displayed.
- **Fade Times:** Three fade times can be defined. They will apply to the regulations of the channel.
 - **Fade Time 1** [[Immediate](#) / [0.7](#) ... [2](#) ... [90.5](#)] [s].
 - **Fade Time 2** [[Immediate](#) / [0.7](#) ... [4](#) ... [90.5](#)] [s].
 - **Fade Time 3** [[Immediate](#) / [0.7](#) ... [8](#) ... [90.5](#)] [s].
 - **Fade Time Objects** [[enabled](#) / [disabled](#)]: Three objects “[Cx] Fade Time X” are enabled to make possible to change the parameterized fade times.

Note: *These fade times refer to all regulations, independently of the initial and final values (i.e., it takes the same time a dimming change from 0% to 100% and from 10% to 15%).*

Three independent functions can be configured: “Scenes”, “Sequences” and “Standby”. These functions are detailed in the following sections.

2.2.1.1 SCENES

The scene function makes it possible to define scenes, i.e. specific dimming environments that can be activated by sending their activation values through a 1-byte object.

Up to **64 scenes** can be configured in **DALI BOX Broadcast v2**, which can be assigned to the enabled dimming points.

ETS PARAMETERISATION

Once this function is enabled a new object is shown (“[Cx] Scene Control”) to executed and save a specific scene.

- **Scenes Number** [[0](#) ... [64](#)]: Up to 64 scenes can be enabled and configured.

Figure 15. Scenes enabling parameter

The “Scenes” tab has a secondary tab (“[x] Scene x”) that allows to fix the parameters of a scene.

Dimming Points	Associate	Dimming Value / Channels RGB	Channel W / Colour Temperature	Fade Time
[B] Broadcast	<input type="checkbox"/>			

Figure 16. Scene configuration

- **Scene Number [1 to 64] (0 = Disabled) [0...64]**: It defines the value of the object “[Cx] Scene Control” that will launch or save the scene.
- **Name**: Text of up to 12 characters to identify the scene.
- Available dimming points:
 - **Associate [enabled / disabled]**: enables the scene.
 - **Dimming Value / Channels RGB**: This parameter will have different possible values depending on the dimming point type (Normal, LED, RGBW or Colour Temperature) (see section 2.2.3.1):
 - Normal, LED → **Dimming Value [0...100] [%]**
 - RGBW → **RGB Channels [#000000...#FFFFFF]**
 - Colour Temperature → **Dimming Value [0...100] [%]**
 - **Channel W / Colour Temperature**:
 - RGBW → **Channel W [0...255]**
 - Colour Temperature → **Colour Temperature [1000...3000...20000] [K]**

- **Fade Time** [*Immediate / 0.7 ... 2 ... 90.5*] [s]: It defines the fade time of the dimming point once the scene is launch.

2.2.1.2 SEQUENCES

This function allows to define up to **16 sequences** of dimming broadcast.

When this function is enabled, these objects are shown in ETS:

- “[Cx] **Sequence Control**” : It is used to start or stop the execution of the sequence, as it is shown in the following table.

Sequence number	Stop	Start
1	0	128
2	1	129
...
64	63	191

Table 2. Sequence control

- “[Cx] **Sequence Launcher**” : It is like the scene control object, but it does not allow to save (see section 2.2.1.1).

Sequence number	Start
1	0
2	1
...	...
64	63

Table 3. Sequence control

- “[Cx] **Stop Sequences**” : it is a one bit object to stop all the sequences when any value is received.

ETS PARAMETERISATION

Up to 16 sequences can be enabled by means of the parameter:

- **Sequences Number** [*0 ... 16*]: it allows to enable a quantity of sequences.



Figure 17. Sequence enabling parameter

Each enabled sequence can be configured in the following window:

Actions	Dimming Point	Dimming Value / Channels RGB	Channel W / Colour Temperature	Fade Time	Time to Next Action	Time to Next Action Units
Action 1	-					

Figure 18. Sequence configuration

- **Sequence Number [1 to 64] (0 = Disabled) [0 ... 64]**: It defines the value of the objects “[Cx] Sequence Control”, “[Cx] Stop Sequence” or “[Cx] Sequence Launcher” that will launch the sequence.
- **Name**: Text of up to 12 characters to identify the sequence.
- **Cyclic [enabled / disabled]**: If it is enabled, the sequence will start again after its finish. When it is enabled, the parameter Next Sequence is not shown.
- **Next Sequence [- / Sequence 1 ... Sequence 16]**: After finishing the current sequence, this sequence will start.
- **Send dimming Status during Sequence [enabled / disabled]**: If it is enabled, the status objects will be updated on each action of the sequence.

Up to **five actions** can be configured for the sequence:

- **Dimming Point [Disabled / Broadcast]**: It defines the dimming point affected by the action.
- **Dimming Value / Channels RGB**: This parameter will have different possible values depending on the dimming point type (Normal, LED, RGBW or Colour Temperature) (see section 2.2.3.1):
 - Normal, LED → **Dimming Value [0...100] [%]**
 - RGBW → **RGB Channels [#000000...#FFFFFF]**
 - Colour Temperature → **Dimming Value [0...100] [%]**

- **Channel W / Colour Temperature:**
 - RGBW → Channel W [0...255]
 - Colour Temperature → Colour Temperature [1000...3000...20000] [K]
- **Fade Time** [Immediate / 0.7 ... 2 ... 90.5] [s]: It defines the fade time of the dimming point once the scene is launch.
- **Time to Next Action** [1 ... 10 ... 255]: Time passing between actions starts.
- **Time to Next Action Units** [s/min]: Units of the previous parameter.

2.2.1.3 STANDBY

This is a functionality included in the **DALI BOX Broadcast v2**, which is able to send a KNX object to **interrupt the power supply to the ballasts** after a certain timeout period has elapsed. This allows the use of an external actuator to interrupt the power supply to the ballasts, thereby reducing power consumption. The object will be sent again (with the inverse value) as soon as a switch-on of the dimming points associated with this standby is requested. Note that the use of this function may cause the dimming point switching-on a little longer than expected.

To use this function correctly, **DALI BOX Broadcast v2** must be associated with an actuator. In addition, the output of the actuator must be able to close or open the ballast power supply. This is shown in the following diagram:

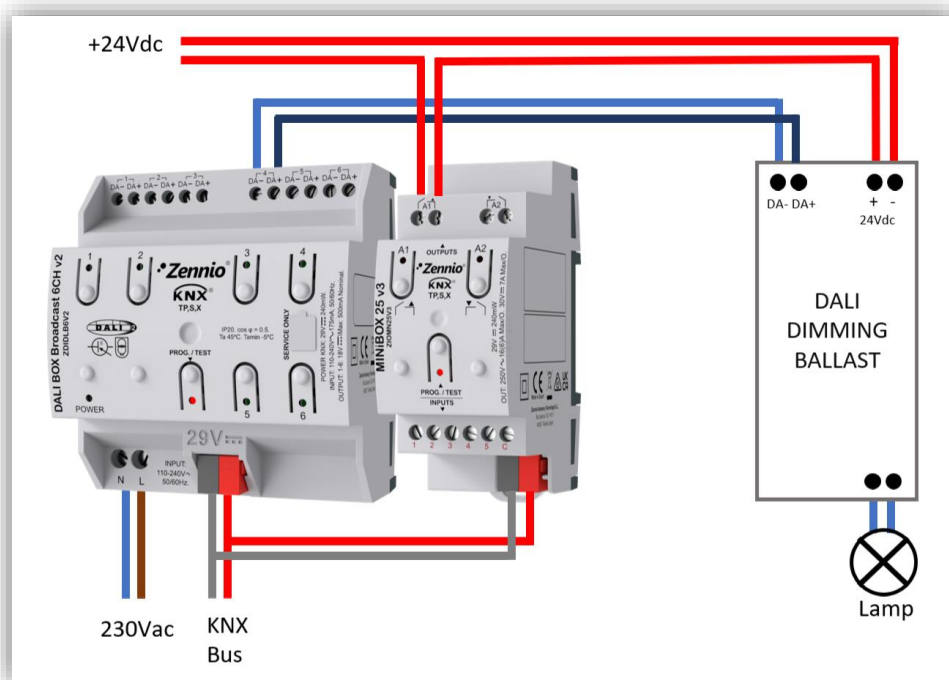


Figure 19. Standby connection diagram

During Standby mode, errors on the DALI ballasts cannot be detected. When the device starts working, Standby is inactive to ensure that ballasts are fed during the initialisation. Other cases of inactivation of Standby are:

- **DALI bus failure** (Auxiliary power supply failure or DALI short-circuit).
- Beginning or ending of **Burn-in Mode** (see section 2.2.3.3.8).
- New **ballast configuration** through DCA or Display (if applicable).

ETS PARAMETERISATION

Once the Standby functionality is enabled, the following window will be shown:



Figure 20. Standby enabling

These parameters can be configured:

- **Standby Number** [0 ... 16]: It defines the quantity of standby objects available.
- **Delay to Send DALI Commands After Standby Off** [10, 11 ... 20] [x 50 ms]: It is the time of the delay between the Standby object sending the beginning of the DALI communication to the associated ballasts.

These parameters can be configured:

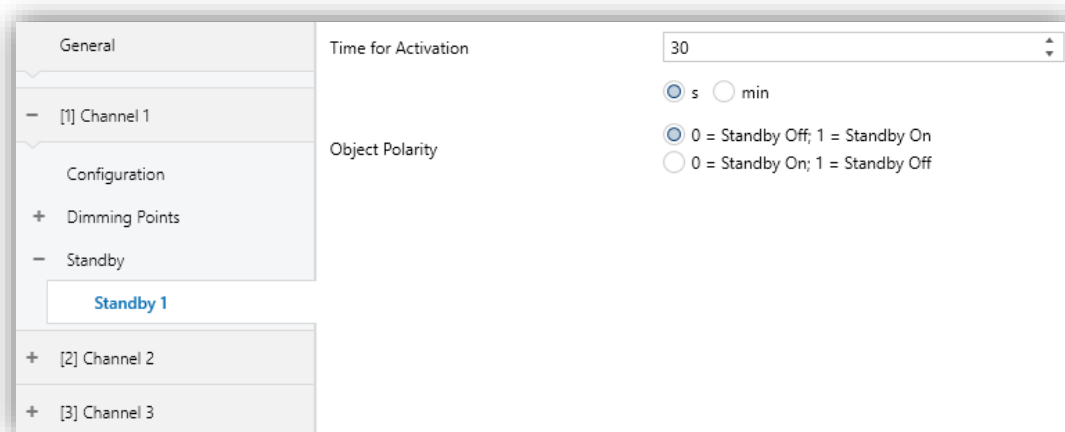


Figure 21. Standby parameters

- **Time for Activation** [1 ... 30 ... 255] [s / min]: It defines the time while all associated dimming points are off before activating the Standby.

- **Object Polarity** [0 = Standby Off; 1 = Standby On / 0 = Standby On; 1 = Standby Off]: It defines the polarity of the object.

2.2.1.4 GENERAL FUNCTIONS

In the lower part of the Configuration tab, some General Functions can be enabled:

GENERAL FUNCTIONS	
Dimming Value During KNX Bus Failure	<input checked="" type="radio"/> No Change <input type="radio"/> Defined Value
Dimming Value During DALI Bus Failure	<input checked="" type="radio"/> No Change <input type="radio"/> Defined Value
Error Objects	<input type="checkbox"/>

Figure 22. General Functions

- **Dimming Value During KNX Bus Failure** [No Change / Defined value]: It defines the dimming value of the ballasts connected to the DALI bus during a KNX bus failure. If “Defined Value” is selected, parameter **value** [0 ... 100] [%] can be configured.
- **Error objects** [enabled / disabled]: **DALI BOX Broadcast v2** allows to enable the objects to be sent to the KNX bus on errors and the use of a diagnostics object (1 or 2 bytes, as defined in the KNX Standard).

Error Objects	<input checked="" type="checkbox"/>
Short Circuit	<input type="checkbox"/>
Presence Error	<input type="checkbox"/>
ECG Error	<input type="checkbox"/>
Lamp Error	<input type="checkbox"/>
Diagnostic	-

Figure 23. Error Objects

- **Short Circuit** [enabled / disabled]: It activates the object “[Cx] Short Circuit” to notify the presence of a short circuit in the DALI bus.
- **ECG Presence** [enabled / disabled]: It activate the object “[Cx] Error: ECG Presence” and the ballasts objects “[Cx] Presence Error” to notify the absence of a recognized ballast.
- **ECG Error** [enabled / disabled]: It activate the object “[Cx] Error: ECG” and the ballast objects “[Cx] ECG Error” that notify the error that each ballast may present in the DALI bus.

- **Lamp Error** [*enabled / disabled*]: It activate the object “[Cx] Error: Lamp” and the ballast objects “[Cx] Lamp Error” which report the failure of the load controlling the ballast.
- **Diagnostics** [*- / ECG Diagnostics (1 byte) / ECG and Group Diagnostics (2 bytes)*]: It allows to use the two types of objects foreseen by the KNX standard to manage the DALI ballast diagnostics. It activates the object “[Cx] ECG Diagnostic” or “[Cx] ECG and Group Diagnostic”.

Note: *DALI BOX Broadcast v2 will perform the necessary status requests to obtain these diagnostic values, however, not all ballasts have the functionality to indicate these types of errors enabled.*

2.2.2 DIMMING POINTS

Once the DALI channel parameters have been configured, the following option is displayed in the dimming points tab:

ETS PARAMETERISATION

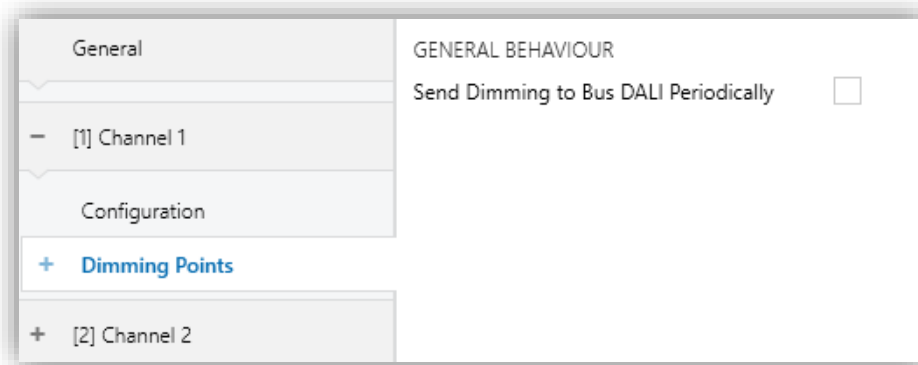


Figure 24. Dimming point tab

- **Send Dimming to bus DALI Periodically** [*enabled / disabled*]: It is possible to send to the **DALI bus** the dimming point regulation periodically so that, in case of ballast power supply lost and recovery, they will recover the correct dimming status.

2.2.3 [B] BROADCAST

As detailed above, for each channel, a **single broadcast dimming point** is considered. In this tab, we find the configuration of the functionality of this regulation point:

ETS PARAMETERISATION

The screenshot shows a web-based configuration interface for ETS parameterisation. On the left is a sidebar with a tree view containing 'General', '[1] Channel 1', 'Configuration', 'Dimming Points', and '[B] Broadcast' (highlighted in blue). Below these are channels [2] through [6]. The main area is divided into sections: 'NAME' with a text input field; 'DIMMING POINT TYPE' with a dropdown menu set to 'Normal' and a checkbox for 'Energy Monitoring (DT51 - part 252)'; 'FUNCTIONALITY' with checkboxes for 'Status Objects' (checked), 'Custom On/Off', 'Day/Night Mode', 'Timers', 'Lock', 'Alarm', 'Custom Initialisation', and 'Modes'; and 'DIMMING' with radio buttons for 'Linear' and 'Logarithmic' (selected).

Figure 25. Dimming point configuration

The parameters:

- **Name:** Text of up to 12 characters to define the name of the dimming point.

2.2.3.1 DIMMING POINT TYPE

- **Dimming Point Type** [[Normal](#) / [LED \(DT6 – part 207\)](#) / [RGB \(DT8 – part 209\)](#) / [RGBW \(DT8 – part 209\)](#) / [Temperature Colour \(DT8 – part 209\)](#)]: select which type of ballast contains the broadcast control point, so that the objects are arranged accordingly. It is desirable to have the same type of ballasts for each broadcast dimming point (and therefore for each channel). Four possible ballast types can be parameterised:

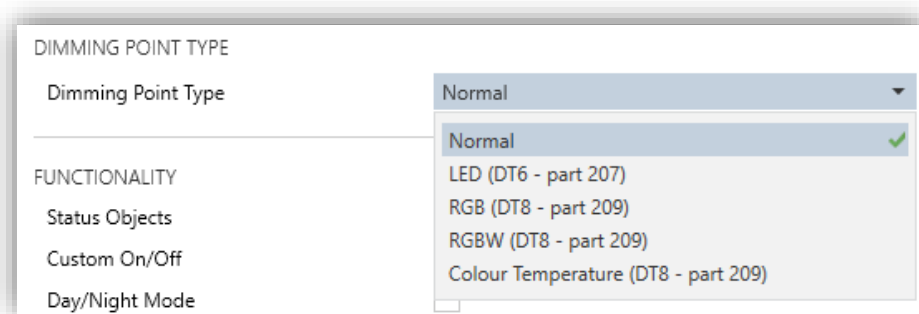


Figure 26. Dimming points type

- **Normal:** It is a generic ballast type (originally DT0 – Part 201 or fluorescent lamp), so it can be controlled with switching and dimming commands, also valid for other ballast types. It is the only ballast type with Burn-In functionality.
- **LED (DT6 – part 207):** It comprises the LED drivers.
- **RGB (DT8 – part 209):** It comprises the RGB type, that allow configure:
 - **Colour Objects** [*RGB Object / R + G + B Object*]: which are selected by ticking one of these two options:



Figure 27. RGB Object

- **RGBW (DT8 – part 209):** They are colour ballasts RGB or RGBW, in case of having also white channel. In this case the control and status objects can be configured.
- **Colour Objects** [*RGBW Object / RGB Object + W Object / R + G + B + W Object*]: In case of RGB/RGBW ballast, it can be selected the type of objects to control and supervise them.

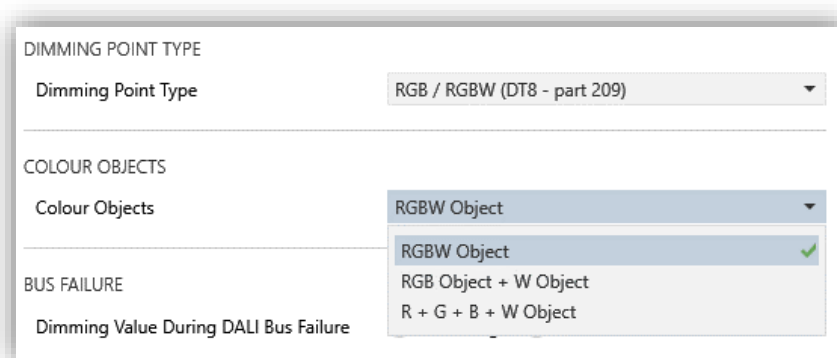


Figure 28. RGB/RGBW objects

- **RGBW Object:** Two 6-byte objects are activated (DPT 251.600), one for control and another for status. It includes the components of each colour component and one bit to consider each component.
 - **RGB + W Objects:** Four objects are activated, two for control and another two for status; in this case, component RGB and component W are split. The RGB object has 3 bytes (DPT 232.600) to define each component and the W object has 1 byte (DPT 5.001).
 - **Objects R + G + B + W:** In this case, 8 communication objects are activated; four of them for regulation and the other four for status. These objects have 1 byte (DPT 5.001) to control each component separately.
- **Colour Temperature (DT8 – part 209):** If ballast of Colour Temperature type, **KNX-DALI BOX Broadcast v2** can control the colour temperature through four objects (three for control and one for status).
- One of the control objects has 2 bytes (DPT 7.600) and it allows to define the colour temperature in Kelvin.

Note: *It must be considered that the regulation values of this object will be restricted by the limits parameterized for the dimming point (see section **¡Error! No se encuentra el origen de la referencia.**).*

- A relative regulation object (4 bits) and an absolute regulation object (1 byte) allow to control the colour temperature. The absolute object can be regulated in a range of 0% to 100% (where 0% is the hottest temperature and 100% is the coolest). It must be considered that lower values belong to warm colours (up to 1000 K) and higher values correspond to cool colours (up to 20000 K), as it is shown in the scale:



Figure 29. Colour temperature scale

- **Energy Monitoring (DT51 – part 252):** for DT51 type ballasts, it will be possible to read the **Active Power** and **Active Energy Consumed** registers. In this way, the power and energy values will be calculated for the broadcast dimming points according to the parameters of the channels.

Note: If an energy ballast is connected to the DALI line, irrespective of the parameterisation, power and energy readings will be taken periodically and will only be displayed on the KNX bus after it has been enabled for this dimming point.

ENERGY AND POWER

Active Energy

Units Wh (DPT 13.010) kWh (DPT 13.013)

Send Period (0 = Disabled) 0 min

Value Change to Send (0 = Disabled) 0 Wh

Active Power

Units W (DPT 14.056) kW (DPT 9.024)

Send Period (0 = Disabled) 0 min

Value Change to Send (0 = Disabled) 0 W

Figure 30. Active Power and Active Energy Consumed.

- **Active Energy** [enabled / disabled]: Will allow the display of active energy data of DT51 ballasts. It will be allowed to parameterise:
 - **Units** [Wh (DPT 13.010) / kWh (DPT 13.013)]: Unit used to display the energy.
 - **Send Period (0 = Disabled)** [0 ... 60] **min**: Period with which the object is sent to the KNX bus (in minutes) after the last sending.
 - **Value Change to Send (0 = Disabled)** [0 ... 255] **(Wh, kWh)**: Value that must be exceeded with respect to the last sending to send the object.

- **Active Power** [enabled / disabled]: Will allow displaying active power data of DT51 ballasts. It will be allowed to parameterise:
 - **Units** [W (DPT 14.056) / kW (DPT 9.024)]: Unit used to display the power.
 - **Send Period (0 = Disabled)** [0 ... 60] **min**: Period with which the object is sent to the KNX bus (in minutes) after the last sending.
 - **Value Change to Send (0 = Disabled)** [0 ... 255] **(W, kW)**: Value that must be exceeded with respect to the last dispatch in order to send the object.

2.2.3.2 LIMITS

Limits configuration can be done on the following tab:

LUMINOSITY LIMITS	
Minimum Luminosity Level	1 x 0.1%
Maximum Luminosity Level	1000 x 0.1%
DIMMING LIMITS	
Minimum Dimming Value	0 %
Maximum Dimming Value	100 %
COLOUR TEMPERATURE LIMITS	
Maximum Physical Value	10000 K
Minimum Physical Value	1000 K
Maximum Dimming Value	10000 K
Minimum Dimming Value	1000 K

Figure 31. Limits

The **Luminosity Limits** are restrictions to the regulation commands sent to the DALI bus. These values do not influence the KNX status objects. They can be configured with the parameters:

- **Minimum Luminosity Level** [1 ... 100] x 0.1%: It is the limit that the ballast is not able to overpass. Normally it is configured with the physical limit of the ballast, i.e. the value below which it could not do correct dimming.
- **Maximum Luminosity Level** [1 ... 1000] x 0.1%: It is an upper limit to the regulations sent to the DALI bus. It can represent a limit to economize the consumption of energy.

The **Dimming Limits** are restrictions to the KNX control objects. So, any value out of limits will be replaced by the limits. They can be configured with the parameters:

- **Minimum Dimming Value** [0 ... 100] %: It is the lowest dimming value considered when a dimming object is received. Any value below this limit will be replaced by the limit, unless it is 0%. Although limit is greater than 0%, the 0% value will be always considered.

- **Maximum Dimming Value** [1 ... 100] %: It is the highest dimming value considered when a dimming object is received. Any value above this limit will be replaced by the limit.

In case of Colour Temperature dimming points, **Colour Temperature Limits** can be parameterised:

- **Maximum Physical Value** [1000...6000 ...20000] [K]: It is the colour temperature of the cold component of the lamp.
- **Minimum Physical Value** [1000...2700 ...20000] [K]: It is the colour temperature of the warm component of the lamp.
- **Maximum Dimming Value** [1000...6000 ...20000] [K]: It is the highest colour temperature considered when object is received. Any value above this limit will be replaced by the limit.
- **Minimum Dimming value** [1000...2700 ...20000] [K]: It is the lowest colour temperature value considered when object is received. Any value below this limit will be replaced by the limit.

2.2.3.3 SWITCH & DIMMING

The parameterisation of the switching and dimming control is done on the following tab:

The screenshot shows the following configuration options:

- ON/OFF (1 bit)**
 - Valor de On: Último valor de encendido Valor definido
 - Alcanzar el máximo tras un On si ya está encendido:
 - Tiempo de atenuación On/Off: Inmediato
- REGULACIÓN RELATIVA (4 bits)**
 - Tiempo de atenuación de regulación relativa: Tiempo de atenuación 1
 - Permitir encendido vía regulación relativa:
 - Permitir apagado vía regulación relativa:
- REGULACIÓN ABSOLUTA (1 byte)**
 - Tiempo de atenuación de regulación absoluta: Tiempo de atenuación 2

Figure 32. Switch and Dimming

The parameters of switching functionality are:

- **On Value** [[Last On Value](#) / [Defined Value](#)]: It defines the dimming value of the dimming point when the object “[Cx][Broadcast][] On/Off” receives a “1”.

With the option “[Last Value](#)”, the parameter **Reach Maximum after a Switch On Order if It Is Already On** [[enabled](#) / [disabled](#)] is shown.

With the option “[Defined Value](#)”, following parameters are shown:

- **Dimming Value** [[0...100](#)] %
 - **Channels RGB** [[#000000...#FFFFFF](#)]: (only for RGB/RGBW type dimming point) They are the RGB components that can be chosen through a colour selection dialog.
 - **Channel W** [[0...255](#)]: (only for RGB/RGBW type dimming point). It is the W component value, and it can be selected through an slider control.
 - **Colour Temperature** [[1000... 3000 ... 20000](#)] K: (only for Colour Temperature type dimming point).
- **On/Off Fade Time** [[At Once](#) / [Fade Time 1](#) / [Fade Time 2](#) / [Fade Time 3](#)]: It allows to define the fade time of these switching operations.

The parameters to define the relative regulation are:

- **Relative dimming Fade Time** [[At Once](#) / [Fade Time 1](#) / [Fade Time 2](#) / [Fade Time 3](#)]: It allows to define the fade time of relative dimming operations.
- **Allow Switching On via Relative Dimming** [[enabled](#) / [disabled](#)]: It allows to switch on a dimming point though relative dimming orders.
- **Allow Switching Off via Relative Dimming** [[enabled](#) / [disabled](#)]: It allows to switch off a dimming point though relative dimming orders. If it is not enabled, the minimum dimming value that can be reached using relative dimming commands is the **Minimum Dimming Value**.

The parameter to define the absolute regulation is:

- **Absolute dimming Fade Time** [[At Once](#) / [Fade Time 1](#) / [Fade Time 2](#) / [Fade Time 3](#)]: It allows to define the fade time of absolute dimming operations.

2.2.3.4 FUNCTIONALITY

In this section, the rest of dimming point functionality is described.

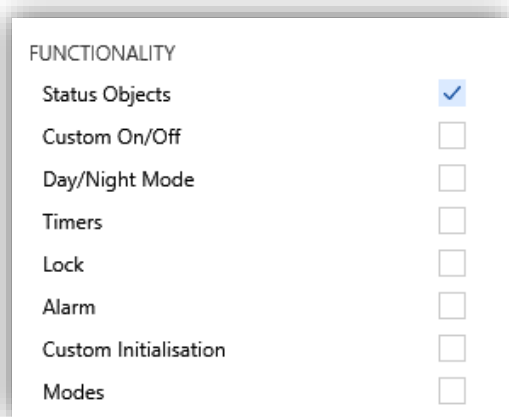


Figure 33. Dimming Point Functionality

2.2.3.4.1 Status objects

- **Status Objects** [enabled / disabled]: DALI BOX Broadcast v2 will allow sending statuses associated with the broadcast dimming point that is being parameterised:
 - A binary object (On/Off)
 - A **1-byte object**, to indicate que dimming value.
 - Objects for RGBW channels and Temperature Control.

ETS PARAMETERISATION

The **Status Objects** tab is shown on ETS:

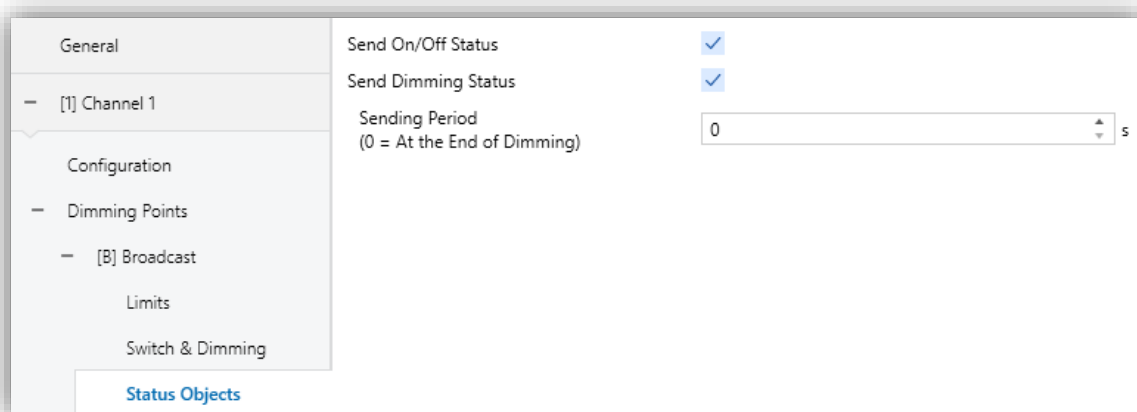


Figure 34. Status Objects

- **Send On/Off Status** [enabled / disabled]: It allows the sending of the object “[Cx][Broadcast][] On/Off (Status)” with value “1” when the dimming value is higher than 0% (for both, a dimming in progress and a stopped dimming) and

“0” when the dimming value is 0%. Each time the On/Off control object is sent, the status object will response.

- **Send Dimming Status** [[enabled](#) / [disabled](#)]: It enables the percentage value status sending, it is sent always a regulation is performed. In case of DT8 ballasts (RGBW / TW), it has associated the specific status objects for RGBW and colour temperature. When this parameter is enabled, the following parameter is shown:
 - **Sending Period (0 = At the End of the Dimming)** [[0](#) ... [90](#)] s: It defines a cyclical sending of the status object during regulations. In case of select “0”, the status object is sent at the end of the regulation.

2.2.3.4.2 Custom On/Off

- **Custom On/Off** [[enabled](#) / [disabled](#)]: It allows to have an additional On/Off control for the broadcast dimming point and, then, an additional control object to switch-on or switch-off the ballasts. The dimming values and fade times can be defined for “On” and “Off”.

This additional control allows to customise the lighting level for the ‘On’ and ‘Off’ states and to set whether the switching should be immediate or with a certain dimming time. **Custom On/Off** can be parameterized in the following tab:

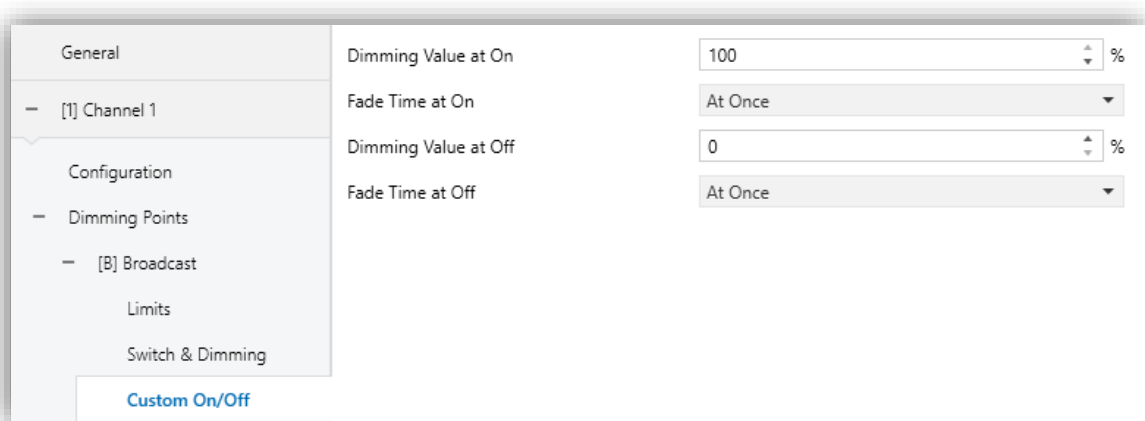


Figure 35. Custom On/Off

Behaviour at the reception of “1” or “0” can be defined with the parameters:

- **Dimming Value at On** [[0](#)...[100](#)]: It represents the dimming value of the dimming point when a “1” is received from the object “[Cx][Broadcast][Custom On/Off]”.

- **Fade Time at On** [[At once](#) / *Fade Time 1* / *Fade Time 2* / *Fade Time 3*]
- **Dimming Value at Off** and **Fade Time at Off** are similar to these but in case of receiving a “0”.

2.2.3.4.3 Day/Night Mode

- **Day/Night Mode** [[enabled](#) / [disabled](#)]: It has a similar behaviour to **Custom On/Off**, but the parameters can be different depending on the Day/Night mode. This functionality allows to switch-on and switch-off the dimming point through a 1-bit object and switch between two lighting modes with a 1-bit object.

When this option is enabled, two 1-bit objects are activated: “[Cx][Broadcast][Day/Night Mode On/Off]” and “[Cx][Broadcast][Day/Night Mode]”. The following tab is activated to configure the functionality:

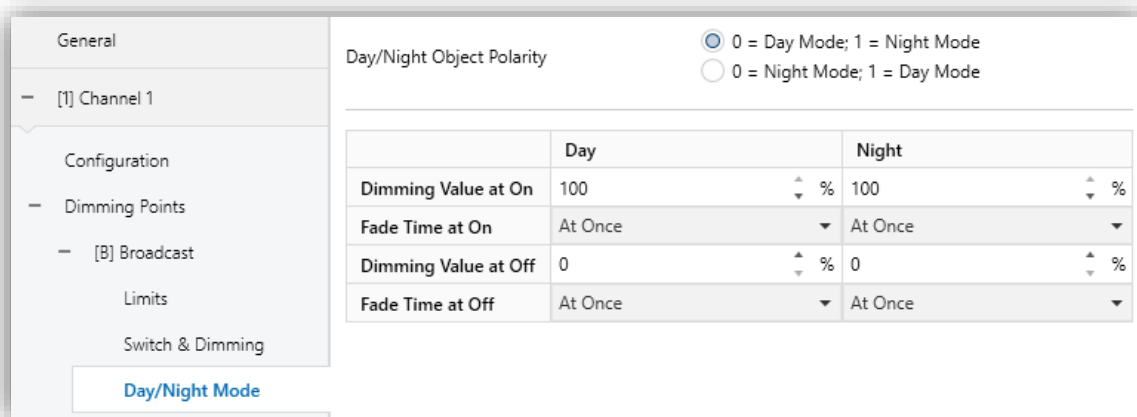


Figure 36. Day/Night

- **Day/Night Object Polarity** [[0 = Day Mode; 1 = Night Mode](#) / [0 = Night Mode; 1 = Day Mode](#)]: It allows to configure the value to activate each mode.
- **Dimming Value at On** [0 ... 100] %: It defines the dimming value when a “1” is received through the “[Cx][Broadcast][Day/Night Mode On/Off]” object for both modes, Day and Night.
- **Fade Time at On** [[At once](#) / *Fade Time 1* / *Fade Time 2* / *Fade Time 3*]
- **Dimming Value at Off** [0 ... 100] %: It defines the dimming value when a “0” is received through the “[Cx][Broadcast][Day/Night Mode On/Off]” object for both modes, Day and Night.

- **Fade Time at Off** [[At once](#) / *Fade Time 1* / *Fade Time 2* / *Fade Time 3*]

2.2.3.4.4 Timers

- **Timers** [[enabled](#) / [disabled](#)]: It enables the configuration of a **Simple Timer** and a **Flashing** in the broadcast dimming point, they can be used in a separated way.
 - **The Simple Timer** consist of a dimming point (optionally delayed) switch-on after receiving the trigger object and the switch-off after a parameterised value or after receiving an object (optionally with a delay).
 - The **Flashing** consist of a switching on and off the dimming point in a undefined way or during a number of repetitions, once an object is received.

ETS PARAMETERISATION

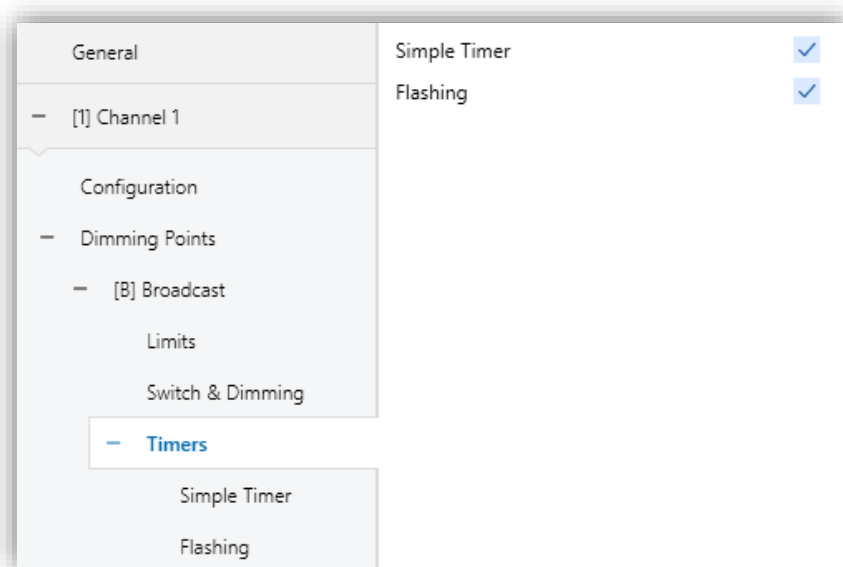


Figure 37. Timers

- **Simple Timer** [[enabled](#) / [disabled](#)]: when enabled, a new tab is shown, with the following options:

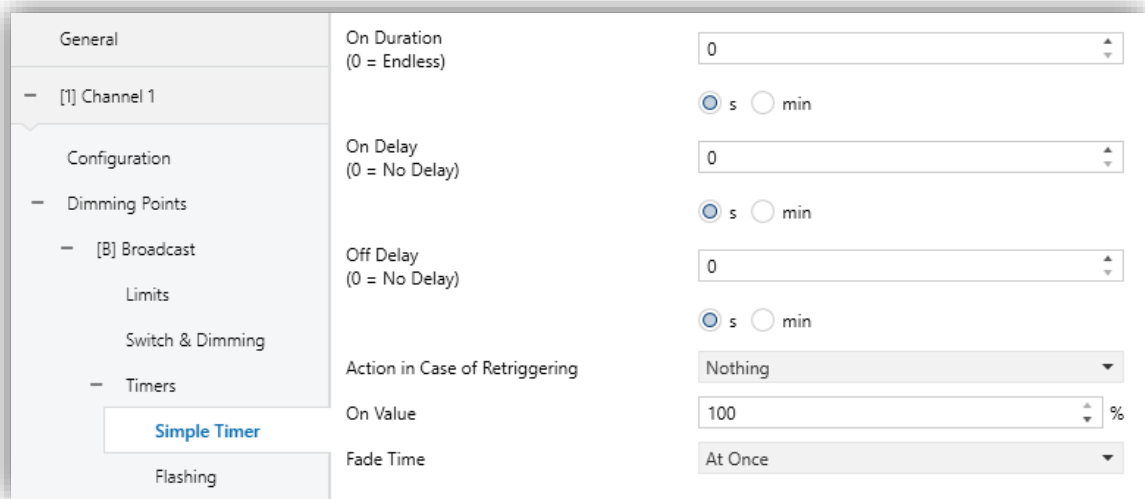


Figure 38. Simple timer

This functionality activates the “[Cx][Broadcast][Simple Timer” object, to activate or to stop the timer. The parameters are:

- **On Duration (0 = Endless)** $[0 \dots 255]$ $[s / min]$: It is the time that the dimming point will be switched-on before deactivating automatically. If “0” is selected, the automatic deactivation will not be done.
- **On Delay (0 = No Delay)** $[0 \dots 255]$ $[s / min]$: It is the time from activation object reception to the dimming point switching-on.
- **Off Delay (0 = No Delay)** $[0 \dots 255]$ $[s / min]$: It is the time from deactivation object reception to the dimming point switching-off.
- **Action in Case of Retriggering** $[Nothing / Restart / Multiply]$: It is the action to be done in case of receiving more than once the activation object.
 - **Nothing**: No action will be done.
 - **Restart**: The part being executed (on delay, on duration or off delay) will restart its timer.
 - **Multiply**: The part being executed will multiply by “n” its timer, where “n” is the number of times the object is received (up to five times).
- **On Value** $[0 \dots 100]$ %: It is the dimming value on the switching-on.
- **Fade Time** $[At Once / Fade Time 1 / Fade Time 2 / Fade Time 3]$

- **Flashing** [*enabled / disabled*]: If enabled, it activates a tab on the right part with the following options:

The screenshot shows the configuration interface for the 'Flashing' feature. On the left, a sidebar lists various configuration options: General, [1] Channel 1, Configuration, Dimming Points, [B] Broadcast, Limits, Switch & Dimming, Timers, and Simple Timer. The 'Flashing' option is selected and highlighted in blue. The main area displays the following settings:

On Duration	1
	<input checked="" type="radio"/> s <input type="radio"/> min
Off Duration	1
	<input checked="" type="radio"/> s <input type="radio"/> min
Repetitions (0 = Endless)	0
On Value	100 %
Final Value	0 %

Figure 39. Flashing

This functionality activates the “[Cx][Broadcast][] Flashing” object, to activate or to stop the flashing. The parameters are:

- **On Duration** [1 ... 255] [s / min]: It is the duration of the “On” period.
- **Off Duration** [1 ... 255] [s / min]: It is the duration of the “Off” period.
- **Repetitions (0 = Endless)** [0 ... 100]: It is the number of repetitions of the sequence. If “0” is selected, the flashing will be repeated up to receiving a “0” value through the flashing object.
- **On Value** [0 ... 100] %: It is the dimming value during the “On” period.
- **Final Value** [0 ... 100] %: It is the dimming value after the last flashing or after receiving a “0” value through the flashing object.

2.2.3.4.5 Lock

- **Lock** [*enabled / disabled*]: If enabled, it activates a binary object (“[Cx][Broadcast][] Lock”) to make possible to locking or unlocking the broadcast dimming point. If the dimming point is locked, regulation orders will be ignored.

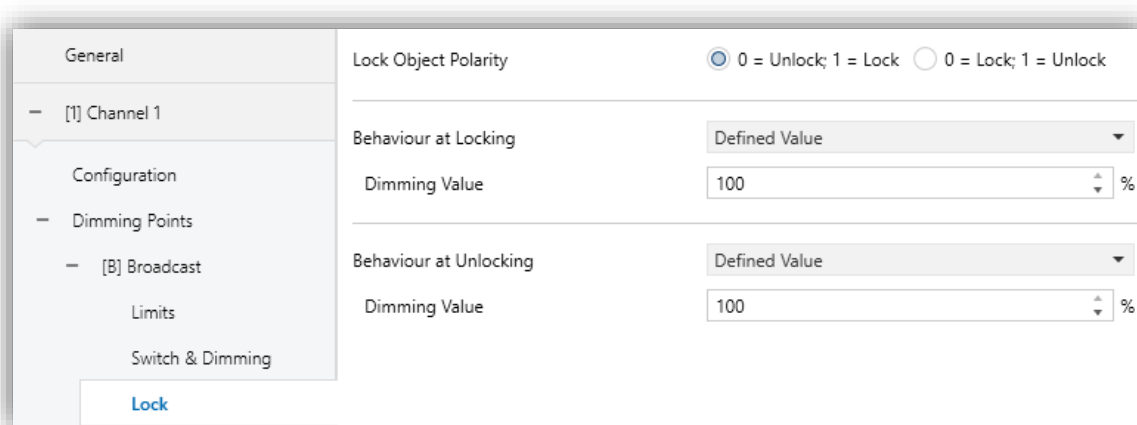


Figure 40. Lock

- **Lock Object Polarity** [0 = Unlock, 1 = Lock / 0 = Lock, 1 = Unlock]: It defines the meaning of the values received from the lock object.
- **Behaviour on Locking** [No change / Off / On / Defined Value]: It defines the action to be done on receiving the lock order. If “Defined Value” is selected, parameter **Dimming Value** [0 ... 100] [%] is shown.
- **Behaviour on Unlocking** [No change / Off / On / Defined Value / Previous Status]: It defines the action to be done on receiving the unlock order. The options are like those of Lock, adding “Previous Status” (it recovers the status before entering the lock)

2.2.3.4.6 Alarm

- **Alarm** [enabled / disabled]: This function allows to define an action of **alarm** in the dimming point that will be executed on receiving a trigger through the object “[Cx][Broadcast][] Alarm”. The alarm action can define actions on activation and deactivation. When it is enabled, a new tab is shown with the following dialog:

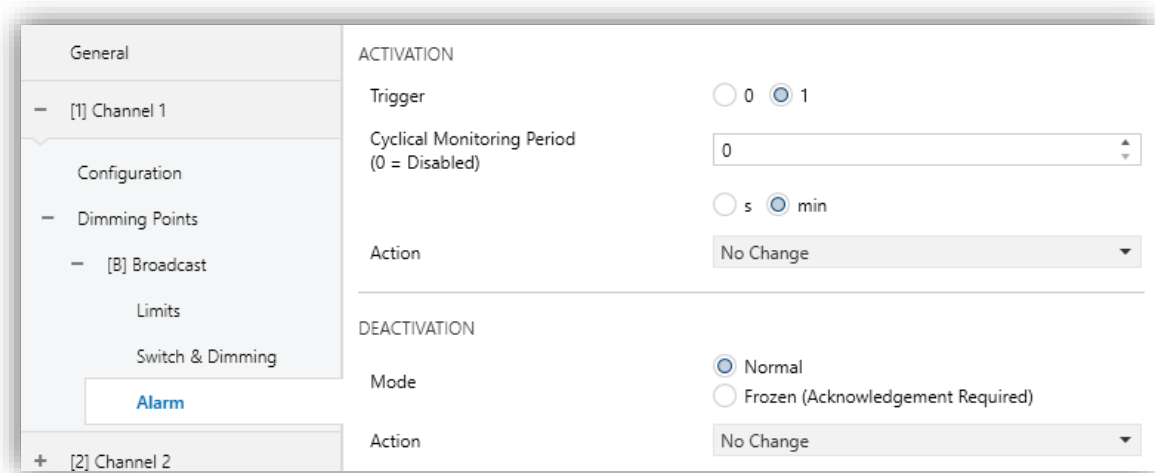


Figure 41. Alarm

The parameters of alarm **activation** are:

- **Trigger** [0 / 1]: It defines which value received from the “[Cx][Broadcast][Alarm]” object will activate the alarm.
- **Cyclical Monitoring Period (0 = Disabled)** [0 ... 1440] [s / min]: It defines the maximum period of time without receiving a “non-alarm” value through the alarm object before activating automatically the alarm. If “0” is selected, the cyclical monitoring is disabled.
- **Action** [No change / Off / On / Defined Value]: It defines the action to be done on activating the alarm. If “Defined Value” is selected, parameter **Dimming Value** [0 ... 100] % is shown to define the dimming value during the alarm.

The parameters of alarm **deactivation** are:

- **Mode** [Normal / Frozen (Acknowledgment Required)]: It selects the deactivation mechanism. With second option, the “[Cx][Broadcast][Unfreeze Alarm]” object, to unfreeze the alarm sending a “1” do deactivate it once the alarm trigger has the “no alarm” value.
- **Action** [No change / Off / On / Defined Value / Previous Status]: It defines the action to be done on deactivating the alarm. If “Defined Value” is selected, parameter **Dimming Value** [0 ... 100] % is shown to define the dimming value after the alarm deactivation.

2.2.3.4.7 Custom Initialisation

- **Custom Initialisation** [*enabled / disabled*]: This function allows to define the initial status of the broadcast dimming point (before receiving any regulating order). It is considered initialization a download, a restart or the recovering after a bus failure. It is considered initialization a download, a restart or the recovering after a bus failure.

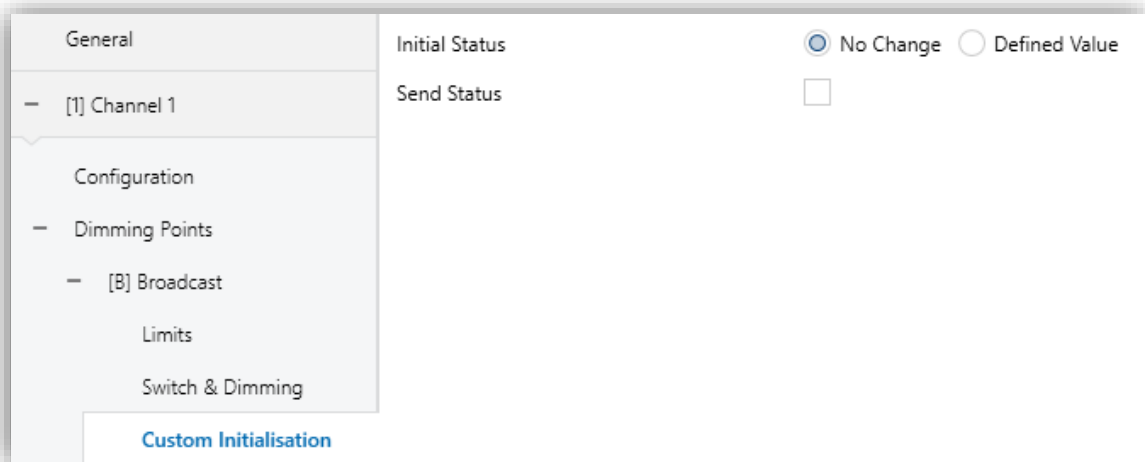


Figure 42. Custom Initialisation

- **Initial Status** [*No Change / Defined Status*]: It defines the initial state after an initialisation:
 - **No change**: After recovering the bus (or reset), the status of the broadcast dimming point is that previous to the bus failure. In case of download, it has no meaning, dimming point will initialise switched-off.
 - **Defined Value**: The dimming point will start with the value defined by the parameter **Dimming Value** [*0 ... 100*] %.
- **Send Status** [*enabled / disabled*]: If enabled, broadcast dimming point status objects will be sent on start (it requires that status objects will be enabled). (See section 2.2.3.4.1). When it is enabled, a parameter is activated:
 - **Delay** [*0 ... 255*] s: It defines the delay of the sending.

2.2.3.4.8 Modes

- **Modes** [*enabled / disabled*]: This function allows to enable two modes on the dimming point parameterisation:

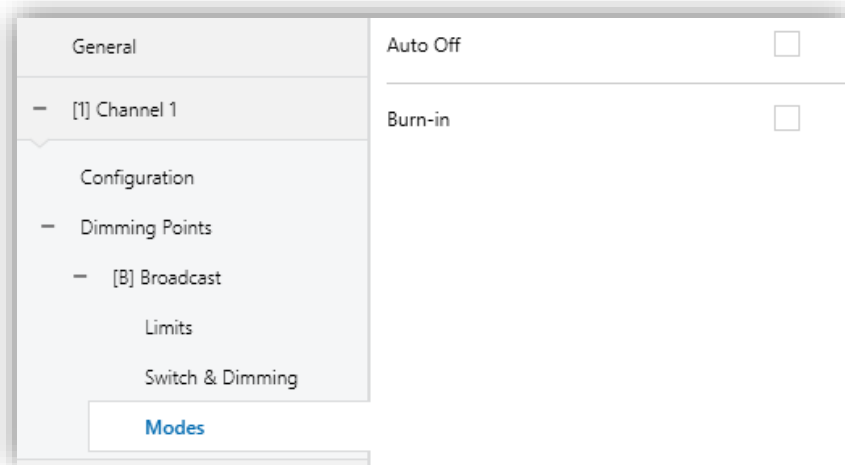


Figure 43. Modes

- **Auto off** [*enabled / disabled*]: The Auto Off mode switches off the dimming point when its dimming value remains during a defined time below a defined dimming value.

Once the functionality **Auto Off** is enabled, following parameters can be configured:

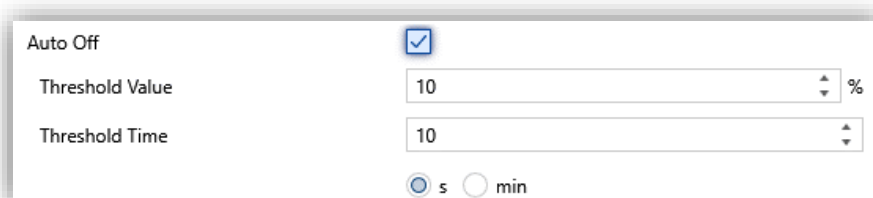


Figure 44. Auto Off

- **Threshold Value** [0 ... 10 ... 100] %: It defines the dimming value below which Auto Off can be executed if the broadcast dimming point remains under it.
- **Threshold Time** [1... 10 ... 255] [s / min]: It defines the time to switch off the broadcast dimming point if it has remained dimmed under the threshold value.
- **Burn-in** [*enabled / disabled*]: This functionality prevents gas lamps from being dimmed during its first hours of working when they are brand new to improve its

lifetime. The duration of the burn-in process must be specified by the lamps manufacturer. Once the burn-in time is expired, the ballast can be regulated in a normal way.

This functionality is controlled by the object “[Cx][Broadcast][Burn-in Mode” and the status is reported by object “[Cx][Broadcast][Burn-in Mode (Status)”. The burn-in time can be modified with the object “[Cx][Broadcast][Burn-in Mode Time”.

Note: *This functionality is useful only with gas lamp facilities, to make an initial start-up that increases the lifetime. Thus, it is only available for “Normal” type dimming points. (See section 2.2.3.4.1).*

Once the functionality **Burn-in** is enabled, following parameters can be configured:

Figure 45. Burn-in

2.2.3.5 DIMMING

The lower part of the dimming point parameterisation window contains functions that are applicable to the dimming point in a general way:

- **Visual Perception of Dimming** [[Linear](#) / [Logarithmic](#)]: **DALI BOX Broadcast v2** offers the possibility of defining the visual perception of the lamp when a dimming is done; it can be linear or logarithmic (default value). The interface sends to DALI bus the suitable values in order to achieve the final visual perception wanted by the user.
- **Curve applied by ECG** [[Standard](#) / [Linear](#)]: (only for DT6 – LED ballast type). In case of DT6, the DALI standard allows that the ballast can provide a logarithmic visual perception although they are receiving the dimming values in a linear way. This parameter allows that the calculation to achieve the logarithmic perception will be done by the ballast (“Linear” value) or by DALI BOX Broadcast v2 (“Standard” value).

- **Colour Channels Curve** [[Standard](#) / [Linear](#)]: (only for DT8 – RGB/RGBW ballast type) When RGB/RGBW ballasts are used, it is possible to perceive that the colour shown by the lamp differs from that chosen through the colour components. For these cases, it is allowed to solve this problem changing the values of the components sent to the DALI bus.

ANNEX I. ERROR INDICATORS

As previously mentioned, DALI BOX Broadcast v2 can detect errors and notify them via the KNX bus or **by using the LEDs indicators** located on the front of the KNX bus.

This section describes the different errors that can be detected, as well as the priority of each one of them. We can distinguish between **general errors**, which affect the device as a whole, or those that are **particular to each DALI channel**.

Note: ECG inherent errors shall be displayed as long as the ballast is able to detect them.

Time	General failures		Failures of DALI channels				
	Power supply	Overload	Short Circuit	ECG Excess	Presence error	ECG Error	Lamp Error
	All LEDs (general error)		LED of the channel concerned (channel error)				
0,5 s	█	█	█	█	█	█	█
1,0 s							
1,5 s	█	█	█	█	█	█	
2,0 s							
2,5 s	█	█	█	█	█		
3,0 s							
3,5 s	█	█	█	█			
4,0 s							
4,5 s	█	█	█				
5,0 s							
5,5 s	█	█					
6,0 s							
6,5 s	█						
7,0 s							
7,5 s							
8,0 s							
8,5 s							
9,0 s							
9,5 s							
10,0 s							
	LED power supply		LED power supply				
0-10 s		[1] █ █ █ █ █ █	█	█	█	█	█

[1] It flashes 6 times, just like the other indicator LEDs.
Priority of errors is from left to right.

Table 4. LEDs indicators

ANNEX II. COMMUNICATION OBJECTS

- “Functional range” shows the values that, with independence of any other values permitted by the bus according to the object size, may be of any use or have a particular meaning because of the specifications or restrictions from both the KNX standard or the application programme itself.

Note: objects related to channels 5 and 6 are only present in DALI BOX Broadcast 6CH v2.

Number	Size	I/O	Flags	Data type (DPT)	Functional Range	Name	Function
1	1 Bit	O	CR-T-	DPT_Trigger	0/1	[Heartbeat] Object to Send '1'	Sending of '1' Periodically
2	1 Bit	O	CR-T-	DPT_Trigger	0/1	[Heartbeat] Device Recovery	Send 0
3	1 Bit	O	CR-T-	DPT_Trigger	0/1	[Heartbeat] Device Recovery	Send 1
4	1 Bit	O	CR-T-	DPT_Alarm	0/1	Error: DALI Power Supply	0 = No Error; 1 = DALI Power Supply Failure
5	1 Bit	O	CR-T-	DPT_Alarm	0/1	Error: Overload	0 = No Error; 1 = Overload
6	1 Bit	I	C-W--	DPT_Enable	0/1	Manual Control Lock	0 = Unlock; 1 = Lock
	1 Bit	I	C-W--	DPT_Enable	0/1	Manual Control Lock	0 = Lock; 1 = Unlock
7	3 Bytes	I	C-W T U	DPT_TimeOfDay	00:00:00 - 23:59:59	[HCL] Time of Day	Time of Day External Reference
	2 Bytes	I	C-W--	DPT_Absolute_Colour_Temperature	0 - 65535	[HCL] Colour Temperature	2-Byte Colour Temperature Dimmer Control
8	3 Bytes	I	C-W T U	DPT_Date	01/01/1990 - 31/12/2089	[HCL] Date	Date External Reference
9, 57, 105, 153, 201, 249	1 Byte	I	C-W--	1.xxx	0/1	[Cx] Fade Time 1	DALI Fade Time
10, 58, 106, 154, 202, 250	1 Byte	I	C-W--	1.xxx	0/1	[Cx] Fade Time 2	DALI Fade Time
11, 59, 107, 155, 203, 251	1 Byte	I	C-W--	1.xxx	0/1	[Cx] Fade Time 3	DALI Fade Time
12, 60, 108, 156, 204, 252	1 Byte	I	C-W--	DPT_SceneControl	0-63; 128-191	[Cx] Scene Control	0 - 63 (Run Scene 1 - 64); 128 - 191 (Save Scene 1 - 64)
13, 61, 109, 157, 205, 253	1 Byte	I	C-W--	DPT_DALI_Efect_1_Byte		[Cx] Sequence Control	Sequence Number + Start/Stop
14, 62, 110, 158, 206, 254	1 Byte	I	C-W--	DPT_SceneNumber	0 - 63	[Cx] Sequence Launcher	Start Sequence Number
15, 63, 111, 159, 207, 255	1 Bit	I	C-W--	DPT_Trigger	0/1	[Cx] Stop Sequences	Stop All Sequences
16, 64, 112, 160, 208, 256	1 Bit	I	C-W--	DPT_Ack	0/1	[Cx] Reset ECGs	1 = Reset ECGs
19, 67, 115, 163, 211,	1 Bit	I	C-W--	DPT_Bool	0/1	[Cx] Ignore ECG Conflicts	0 = Readdress Conflicts; 1 = Ignore

259							Conflicts
20, 68, 116, 164, 212, 260	1 Bit	O	CR-T-	DPT_Alarm	0/1	[Cx] Error: Short Circuit	0 = No Error; 1 = Short Circuit Failure
21, 69, 117, 165, 213, 261	1 Bit	I/O	CRWT-	DPT_Alarm	0/1	[Cx] Error: Presence	0 = No Error; 1 = Presence Error
22, 70, 118, 166, 214, 262	1 Bit	O	CR-T-	DPT_Alarm	0/1	[Cx] Error: ECG	0 = No Error; 1 = ECG Error
23, 71, 119, 167, 215, 263	1 Bit	O	CR-T-	DPT_Alarm	0/1	[Cx] Error: Lamp	0 = No Error; 1 = Lamp Error
24, 72, 120, 168, 216, 264	1 Bit	O	CR-T-	DPT_Alarm	0/1	[Cx] Error: ECG Excess	0 = No Error; 1 = ECG Excess Error
25, 73, 121, 169, 217, 265	1 Bit	O	CR-T-	DPT_Alarm	0/1	[Cx] Error: Input Excess	0 = No Error; 1 = Input Excess Error
26, 74, 122, 170, 218, 266	1 Byte	O	CR-T-	DPT_DALI_Diagnostic		[Cx] ECG Diagnostic	ECG Diagnostic
27, 75, 123, 171, 219, 267	2 Bytes	I	C-WT-	DPT_DALI_Control_Gear_Diagnostics		[Cx] ECG and Group Diagnostic	ECG and Group Diagnostic
28, 76, 124, 172, 220, 268	1 Bit	O	CR-T-	DPT_Switch	0/1	[Cx] Standby x (Status)	0 = Standby Off; 1 = Standby On
	1 Bit	O	CR-T-	DPT_Switch	0/1	[Cx] Standby x (Status)	0 = Standby On; 1 = Standby Off
29, 77, 125, 173, 221, 269	1 Bit	I	C-W--	DPT_Switch	0/1	[Cx][Broadcast][x] On/Off	0 = Off; 1 = On
30, 78, 126, 174, 222, 270	1 Bit	O	CR-T-	DPT_Switch	0/1	[Cx][Broadcast][x] On/Off (Status)	0 = Off; 1 = On
31, 79, 127, 175, 223, 271	1 Byte	I	C-W--	DPT_Scaling	0% - 100%	[Cx][Broadcast][x] Absolute Dimming	1-Byte Dimmer Control
32, 80, 128, 176, 224, 272	4 Bit	I	C-W--	DPT_Control_Dimming	0x0/0x8 (Stop) 0x1...0x7 (Dec.) 0x9...0xF (Inc.)	[Cx][Broadcast][x] Relative Dimming	4-Bit Dimmer Control
33, 81, 129, 177, 225, 273	1 Byte	O	CR-T-	DPT_Scaling	0% - 100%	[Cx][Broadcast][x] Dimming Value (Status)	0% - 100%
34, 82, 130, 178, 226, 274	3 Bytes	I	C-W--	DPT_Colour_RGB	[0 - 255] * 3	[Cx][Broadcast][x] RGB Channels Absolute Dimming	3-Byte RGB Channels Dimmer Control
	6 Bytes	I	C-W--	DPT_Colour_RGBW	[0 - 1] * 4 - [0 - 255] * 4	[Cx][Broadcast][x] RGBW Channels Absolute Dimming	6-Byte RGBW Channels Dimmer Control
	2 Bytes	I	C-W--	DPT_Absolute_Colour_Temperature	0 - 65535	[Cx][Broadcast][x] Colour Temperature	2-Byte Colour Temperature Dimmer Control
	1 Byte	I	C-W--	DPT_Scaling	0% - 100%	[Cx][Broadcast][x] R Channel Absolute Dimming	1-Byte R Channel Dimmer Control
35, 83, 131, 179, 227, 275	3 Bytes	O	CR-T-	DPT_Colour_RGB	[0 - 255] * 3	[Cx][Broadcast][x] RGB Channels Dimming Value (Status)	RGB Channels Dimming Status
	6 Bytes	O	CR-T-	DPT_Colour_RGBW	[0 - 1] * 4 - [0 - 255] * 4	[Cx][Broadcast][x] RGBW Channels Dimming Value (Status)	RGBW Channels Dimming Status
	2 Bytes	O	CR-T-	DPT_Absolute_Colour_Temperature	0 - 65535	[Cx][Broadcast][x] Colour Temperature (Status)	Colour Temperature Dimming Status
	1 Byte	O	CR-T-	DPT_Scaling	0% - 100%	[Cx][Broadcast][x] R Channel	0% - 100%

						Dimming Value (Status)	
36, 84, 132, 180, 228, 276	1 Byte	I	C - W - -	DPT_Scaling	0% - 100%	[Cx][Broadcast][x] G Channel Absolute Dimming	1-Byte G Channel Dimmer Control
37, 85, 133, 181, 229, 277	1 Byte	O	CR - T -	DPT_Scaling	0% - 100%	[Cx][Broadcast][x] G Channel Dimming Value (Status)	0% - 100%
38, 86, 134, 182, 230, 278	1 Byte	I	C - W - -	DPT_Scaling	0% - 100%	[Cx][Broadcast][x] Colour Temperature Absolute Dimming	1-Byte Dimmer Control (0% = Warm, 100% = Cold)
	1 Byte	I	C - W - -	DPT_Scaling	0% - 100%	[Cx][Broadcast][x] B Channel Absolute Dimming	1-Byte B Channel Dimmer Control
39, 87, 135, 183, 231, 279	1 Byte	O	CR - T -	DPT_Scaling	0% - 100%	[Cx][Broadcast][x] B Channel Dimming Value (Status)	0% - 100%
40, 88, 136, 184, 232, 280	1 Byte	I	C - W - -	DPT_Scaling	0% - 100%	[Cx][Broadcast][x] W Channel Absolute Dimming	1-Byte W Channel Dimmer Control
	4 Bit	I	C - W - -	DPT_Control_Dimming	0x0/0x8 (Stop) 0x1...0x7 (Dec.) 0x9...0xF (Inc.)	[Cx][Broadcast][x] Colour Temperature Relative Dimming	4-Bit Dimmer Control (0% = Warm, 100% = Cold)
41, 89, 137, 185, 233, 281	1 Byte	O	CR - T -	DPT_Scaling	0% - 100%	[Cx][Broadcast][x] W Channel Dimming Value (Status)	0% - 100%
42, 90, 138, 186, 234, 282	1 Bit	I	C - W - -	DPT_Switch	0/1	[Cx][Broadcast][x] HCL	0 = Deactivate; 1 = Activate
43, 91, 139, 187, 235, 283	1 Bit	O	CR - T -	DPT_Switch	0/1	[Cx][Broadcast][x] HCL (Status)	0 = Deactivated; 1 = Activated
44, 92, 140, 188, 236, 284	4 Bytes	O	CR - T -	DPT_ActiveEnergy	0 - 2147483647	[Cx][Broadcast][x] Active Energy	Wh
	4 Bytes	O	CR - T -	DPT_ActiveEnergy_kWh	0 - 2147483647	[Cx][Broadcast][x] Active Energy	kWh
45, 93, 141, 189, 237, 285	4 Bytes	O	CR - T -	DPT_Value_Power	-3.4E+38 W - 3.4E+38 W	[Cx][Broadcast][x] Active Power	W
	2 Bytes	O	CR - T -	DPT_Power	-671088.64 - 670433.28 kW	[Cx][Broadcast][x] Active Power	kW
46, 94, 142, 190, 238, 286	1 Bit	I	C - W - -	DPT_Switch	0/1	[Cx][Broadcast][x] Custom On/Off	0 = Off; 1 = On
47, 95, 143, 191, 239, 287	1 Bit	I	C - W - -	DPT_DayNight	0/1	[Cx][Broadcast][x] Day/Night Mode	0 = Day Mode; 1 = Night Mode
	1 Bit	I	C - W - -	DPT_DayNight	0/1	[Cx][Broadcast][x] Day/Night Mode	0 = Night Mode; 1 = Day Mode
48, 96, 144, 192, 240, 288	1 Bit	I	C - W - -	DPT_Switch	0/1	[Cx][Broadcast][x] Day/Night Mode On/Off	0 = Off; 1 = On
49, 97, 145, 193, 241, 289	1 Bit	I	C - W - -	DPT_Start	0/1	[Cx][Broadcast][x] Simple Timer	0 = Deactivate; 1 = Activate
50, 98, 146, 194, 242, 290	1 Bit	I	C - W - -	DPT_Start	0/1	[Cx][Broadcast][x] Flashing	0 = Deactivate; 1 = Activate
51, 99, 147, 195, 243, 291	1 Bit	I	C - W - -	DPT_Enable	0/1	[Cx][Broadcast][x] Lock	0 = Unlock; 1 = Lock
	1 Bit	I	C - W - -	DPT_Enable	0/1	[Cx][Broadcast][x] Lock	0 = Lock; 1 = Unlock
52, 100, 148, 196, 244,	1 Bit	I	C - W - -	DPT_Alarm	0/1	[Cx][Broadcast][x] Alarm	0 = No Alarm; 1 = Alarm

292	1 Bit	I	C - W - -	DPT_Alarm	0/1	[Cx][Broadcast][x] Alarm	0 = Alarm; 1 = No Alarm
53, 101, 149, 197, 245, 293	1 Bit	I	C - W - -	DPT_Ack	0/1	[Cx][Broadcast][x] Unfreeze Alarm	No Alarm + Unfreeze (1) => End Alarm
54, 102, 150, 198, 246, 294	1 Bit	I	C - W - -	DPT_Enable	0/1	[Cx][Broadcast][x] Burn-in Mode	0 = Stop Burn-in; 1 = Start Burn-in
55, 103, 151, 199, 247, 295	1 Bit	O	C R - T -	DPT_Enable	0/1	[Cx][Broadcast][x] Burn-in Mode (Status)	0 = Burn-in Inactive; 1 = Burn-in Active
56, 104, 152, 200, 248, 296	4 Bytes	I/O	C R W - -	DPT_LongDeltaTimeSec	-2147483648 - 2147483647	[Cx][Broadcast][x] Burn-in Mode Time	[0 ... 918000] s (0 = Disabled)

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