

## DALI-2 CS

### Datasheet

#### Combi Sensor Modul

DALI sensor module  
for motion detection,  
light detection  
and lighting control

Master device:  
application controller active

Art. Nr. 86458670

Colour variants: -W16, -B

Installation type variants: -ZD, -AP

Detection range variants: -15, -O, -30, -C, -F

Luminaire integration:  
Art. Nr. 86451485-LA-W16



Datenblatt Deutsch:

[https://www.lunatone.com/wp-content/uploads/2021/07/86458670\\_DALI2\\_CS\\_GER\\_D0097.pdf](https://www.lunatone.com/wp-content/uploads/2021/07/86458670_DALI2_CS_GER_D0097.pdf)

# DALI-2 Combi Sensor - Multifunctional Sensor Module

## Overview

- Sensor Module for DALI and DALI-2 lighting systems
- Movement detection (PIR) instance type 2 (62386-303) and light intensity measurement instance type 3 (62386-304)
- 4 operating modes:
  - Movement triggered
  - Movement triggered with constant light control
  - Constant light control
  - Light control (4 thresholds)
- Operating modes can be changed via scenes and external DALI commands
- Corridor function – second light level before off in case of absence
- Light threshold-controlled regulation for the control of blinds or roller blinds
- The module can be used as a DALI light controller or just as sensor unit for integration in building management systems
- Easy configuration via DALI-Cockpit Software Tool and Lunatone DALI USB interface.
- Multiple sensor modules can be installed within a DALI system.
- Configurable synchronisation of multiple DALI-2 CS modules to control the same effective range
- Supply via the DALI bus, no additional power supply needed
- Double terminals for easy installation
- Optimized types for different applications and detection areas (hall, office, long distance, corridor) available
- Different colour variants: pure white (RAL9010), traffic white (RAL9016), and black.
- Version DALI-2 CS Integration: <https://www.lunatone.com/en/product/dali-2-cs-integration/>



## Specification, Characteristics

| type                           | DALI-2 CS                                              |      |        |      |               |          |
|--------------------------------|--------------------------------------------------------|------|--------|------|---------------|----------|
| article number                 | 86458670                                               | -15  | -O     | -F   | -30           | -C       |
| application                    | standard                                               | hall | office | flat | long distance | corridor |
| <b>electrical data</b>         |                                                        |      |        |      |               |          |
| supply                         | via DALI signal line (DALI-voltage according IEC62386) |      |        |      |               |          |
| marking terminals              | DA, DA                                                 |      |        |      |               |          |
| current consumption DALI 16.5V | 4.5 mA                                                 |      |        |      |               |          |
| current consumption DALI 22.5V | 5 mA                                                   |      |        |      |               |          |
| power consumption              | <100mW                                                 |      |        |      |               |          |
| control                        | DALI                                                   |      |        |      |               |          |

|                |          |     |    |    |     |    |
|----------------|----------|-----|----|----|-----|----|
| article number | 86458670 | -15 | -O | -F | -30 | -C |
|----------------|----------|-----|----|----|-----|----|

**insulation data**

|                                    |                      |
|------------------------------------|----------------------|
| impulse voltage category           | II                   |
| pollution degree                   | 2                    |
| rated insulation voltage           | 250V                 |
| rated impulse withstanding voltage | 4kV                  |
| insulation DALI/housing            | reinforced isolation |
| insulation test voltage            | 3000Vac              |

**environmental conditions**

|                                        |                 |                 |                 |
|----------------------------------------|-----------------|-----------------|-----------------|
| storing and transportation temperature | -20°C ... +70°C |                 |                 |
| operational ambient temperature        | -20°C ... +60°C | -20°C ... +55°C | -20°C ... +60°C |
| rel. humidity, none condensing         | 15% ... 90%     |                 |                 |

**technical data**

|                                                  |                                                                                        |                  |                  |                  |                  |                  |
|--------------------------------------------------|----------------------------------------------------------------------------------------|------------------|------------------|------------------|------------------|------------------|
| Motion Detection (62386 -303)                    | PIR                                                                                    | PIR              | PIR              | PIR              | PIR              | PIR              |
| principle                                        | PIR                                                                                    | PIR              | PIR              | PIR              | PIR              | PIR              |
| detection range (at >8°C temperature difference) | 12m                                                                                    | 15m              | 2.3m / 3m        | 15m              | 30m              | 5m               |
| typical mounting height                          | 8m                                                                                     | 12m              | 3m               | 3m               | 15m              | -                |
| zones                                            | 92                                                                                     | 128              | 36 / 48          | 416              | 188              | 88+16            |
| horizontal                                       | ±51°                                                                                   | ±34,5°           | ±44°/±90°        | ±67,5°           | ±43°             | ±75°             |
| vertical                                         | ±46°                                                                                   | ±34,5°           | ±44°/±90°        | ±68°             | ±22°             | +10°/-25°        |
| min. temperature difference                      | >4°C                                                                                   | >4°C             | >4°C             | >4°C             | >4°C             | >4°C             |
| details                                          | Figure 1, page 7                                                                       | Figure 2, page 7 | Figure 3, page 8 | Figure 6, page 9 | Figure 4, page 8 | Figure 5, page 9 |
| light sensor (62386-304)                         | range: 0-2047lux (11bit), resolution: 1lux<br>event:0-2047lux(10bit), resolution: 2lux |                  |                  |                  |                  |                  |
| function                                         | configurable                                                                           |                  |                  |                  |                  |                  |

**general data**

|                     |                                                                                                                                                                                    |  |  |  |                                          |      |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|------------------------------------------|------|
| protection class    | II in intended use                                                                                                                                                                 |  |  |  |                                          |      |
| Protection degree   | IP20                                                                                                                                                                               |  |  |  | IP20 or IP54 for art.nr. extend: "-IP54" | IP20 |
| mounting            | back box – dimensions see page 4<br>surface mounted (article number extension „-AP“) – dimensions page 5<br>suspended ceiling (article number extension „-ZD“) – dimensions page 5 |  |  |  |                                          |      |
| available colours   | RAL9010<br>RAL9016 (article number extension „-W16“)<br>Black (article number extension „-B“)                                                                                      |  |  |  |                                          |      |
| functional versions | application controller and instances                                                                                                                                               |  |  |  |                                          |      |

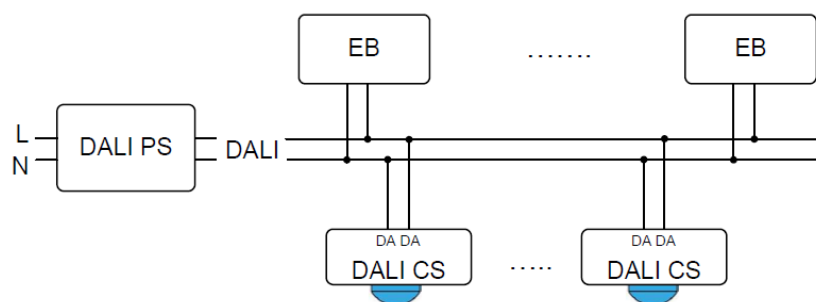
**terminals**

|                      |                                               |
|----------------------|-----------------------------------------------|
| connection type      | spring terminal connector                     |
| wire size solid core | 0,5 ... 1,5 mm <sup>2</sup> (AWG20 ... AWG16) |

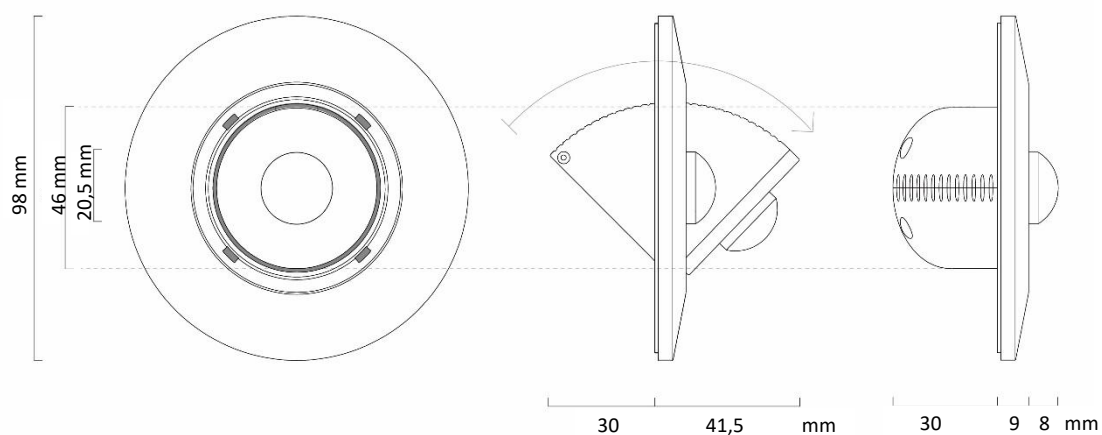
|                                  |                                               |
|----------------------------------|-----------------------------------------------|
| wire size fine wired             | 0,5 ... 1,5 mm <sup>2</sup> (AWG20 ... AWG16) |
| wire size using wire end ferrule | 0,25 ... 1,5 mm <sup>2</sup>                  |
| stripping length                 | 8,5 ... 9,5 mm / 0,33 ... 0,37 inch           |

**standards**

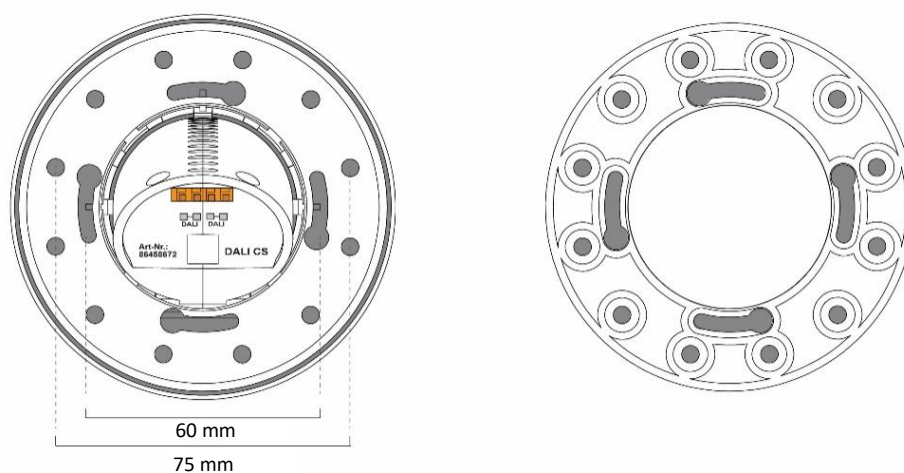
|          |                             |
|----------|-----------------------------|
| EMC      | EN 61547<br>EN 55015        |
| safety   | EN 61347-2-11<br>EN 61347-1 |
| markings | DALI-2, CE                  |



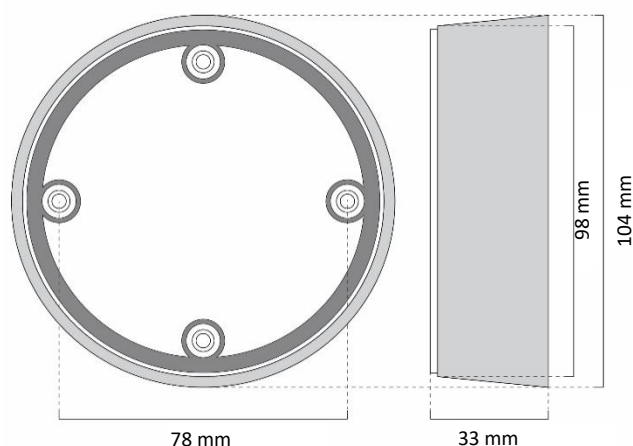
typical application: several sensors on one DALI-line



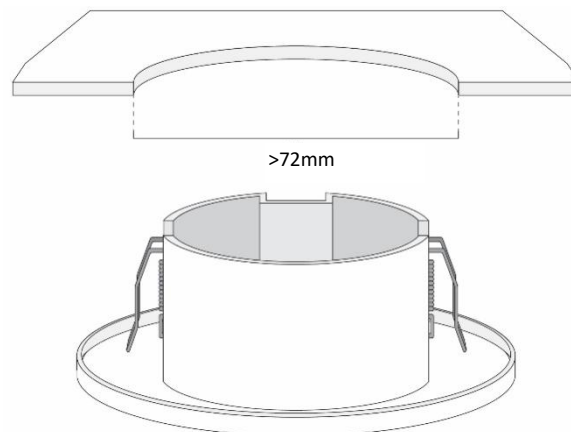
dimensions and space requirements



dimensions mounting ring



surface mounting  
dimensions accessory  
article number addition „-AP“



suspended ceiling  
dimensions mounting hole diameter  
article number addition „-ZD“

## Specification, Characteristics - Version Luminaire installation

|                                        |                                                        |
|----------------------------------------|--------------------------------------------------------|
| <b>type</b>                            | <b>DALI-2 CS 2045</b>                                  |
| article number                         | 86451485-LA                                            |
| <b>electrical data</b>                 |                                                        |
| supply                                 | via DALI signal line (DALI-voltage according IEC62386) |
| marking terminals                      | -                                                      |
| current consumption DALI 16.5V         | 4.3 mA                                                 |
| current consumption DALI 22.5V         | 4.5 mA                                                 |
| power consumption                      | <100mW                                                 |
| control                                | DALI-2                                                 |
| <b>insulation data</b>                 |                                                        |
| impulse voltage category               | II                                                     |
| pollution degree                       | 2                                                      |
| rated insulation voltage               | 250V                                                   |
| rated impulse withstanding voltage     | 4kV                                                    |
| insulation DALI/housing                | reinforced isolation                                   |
| insulation test voltage                | 3000Vac                                                |
| <b>environmental conditions</b>        |                                                        |
| storing and transportation temperature | -20°C ... +70°C                                        |
| operational ambient temperature        | -20°C ... +60°C                                        |
| rel. humidity, none condensing         | 15% ... 90%                                            |
| <b>technical data</b>                  |                                                        |
| Motion Detection (62386 -303)          |                                                        |
| principle                              | PIR                                                    |

|                                                  |                                                                                         |
|--------------------------------------------------|-----------------------------------------------------------------------------------------|
| detection range (at >8°C temperature difference) | 7m                                                                                      |
| typical mounting height                          | 3m                                                                                      |
| detection zones                                  | 32                                                                                      |
| horizontal                                       | ±45°                                                                                    |
| vertical                                         | ±45°                                                                                    |
| min. temperature difference                      | >4°C                                                                                    |
| details                                          | Figure 7, page 10                                                                       |
| light sensor (62386-304)                         | range: 0-2046lux (11bit), resolution: 1lux<br>event: 0-2046lux(10bit), resolution: 2lux |

**general data**

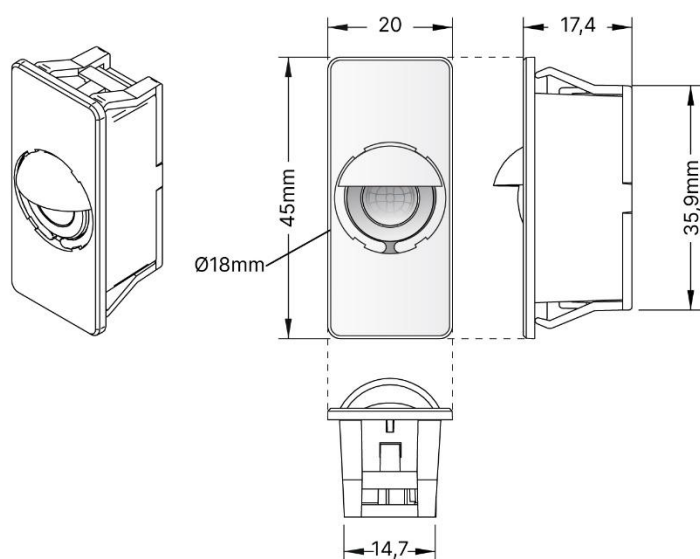
|                            |                                                 |
|----------------------------|-------------------------------------------------|
| protection class           | II in intended use                              |
| protection degree          | IP20                                            |
| mounting                   | Luminaire installation                          |
| dimensions (details below) | 20 x 45 x 17mm                                  |
| available colours          | white RAL9016 (article number extension “-W16”) |
| DALI-2 functionality       | Application Controller und Instanzen            |

**terminals**

|                  |                                                 |
|------------------|-------------------------------------------------|
| connection type  | spring terminal connector                       |
| wire size        | 0.14 ... 0.34 mm <sup>2</sup> (AWG26 ... AWG22) |
| stripping length | 6 mm / 0.24 inch                                |

**standards**

|          |                           |
|----------|---------------------------|
| EMC      | EN 61547, EN 55015        |
| safety   | EN 61347-2-11, EN 61347-1 |
| markings | DALI-2, CE                |



dimensions and space requirements – luminaire installation- **DALI-2 CS 2045** - 86451485-LA-W16

## Sensor types

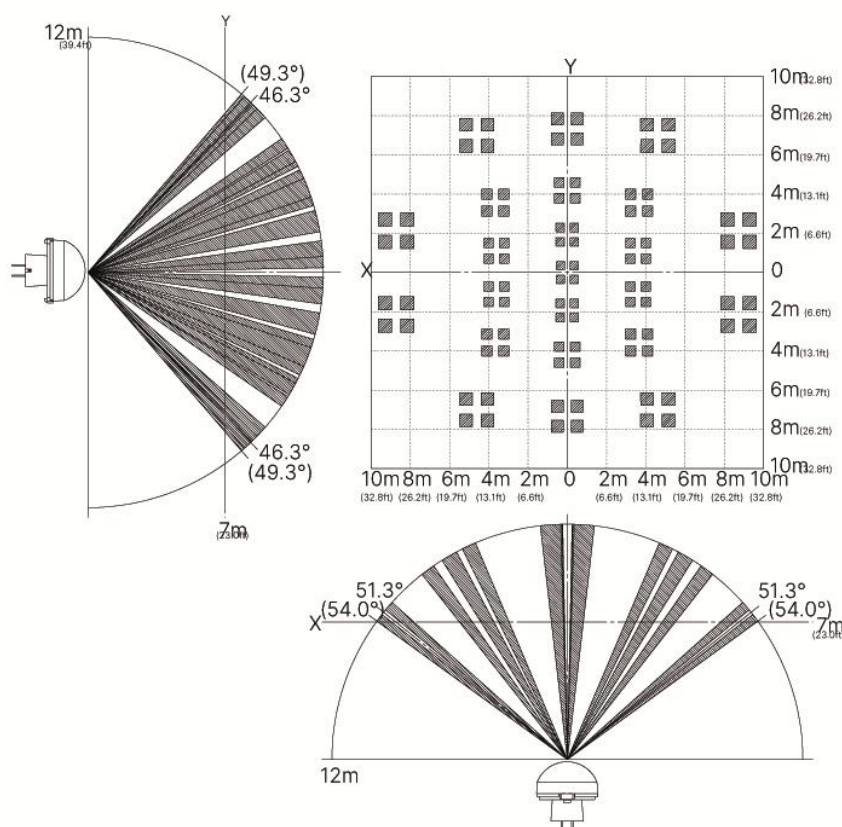


Figure 1 **CS standard** motion detection (Art. Nr.: 86458670)  
Detection area: **X-Y cross section at 7m**

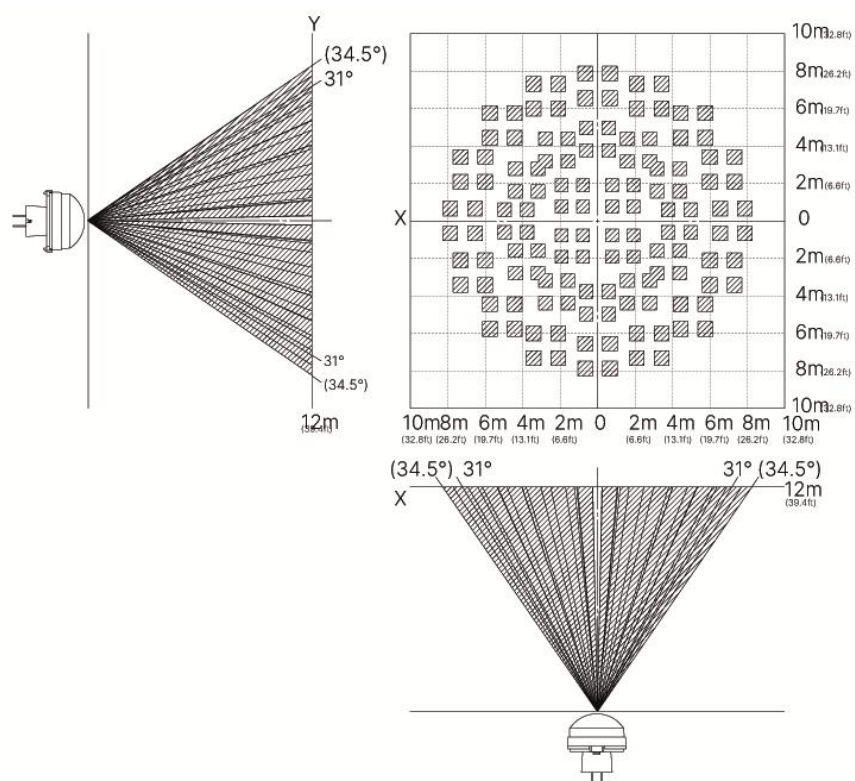


Figure 2 **CS-15 hall** motion detection (article number addition: 86458670-15)  
detection area **X-Y cross section at 12m** - High density long distance detection type

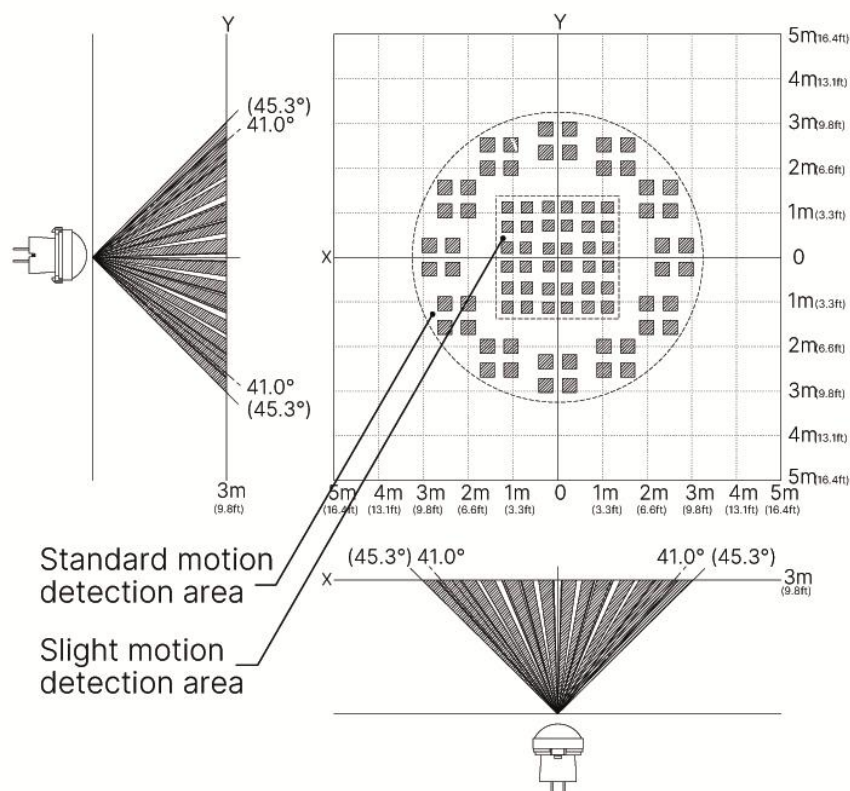


Figure 3 **CS-O Office** motion detection (article number addition: 86458670-O)  
detection area: **X-Y cross section at 3m** - The rectangular centre zone is optimized for detecting smallest movements.

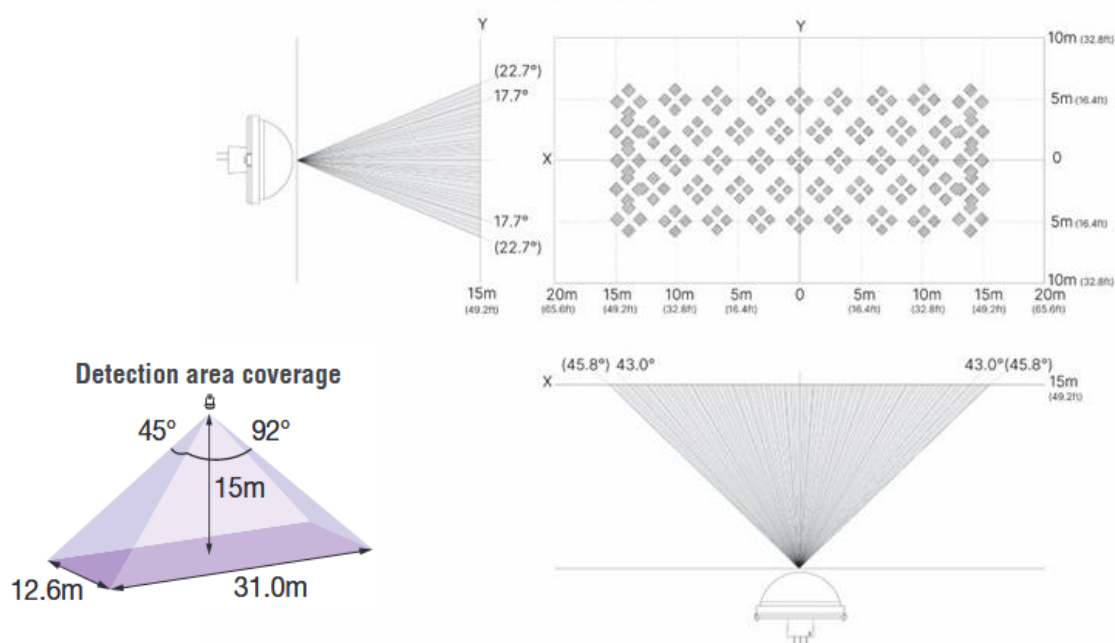


Figure 4 **CS-30 long distance** motion detection (article number addition: 86458670-30)  
detection area: **X-Y cross section at 15m** - High density, wide angle, long distance detection type for high bay applications

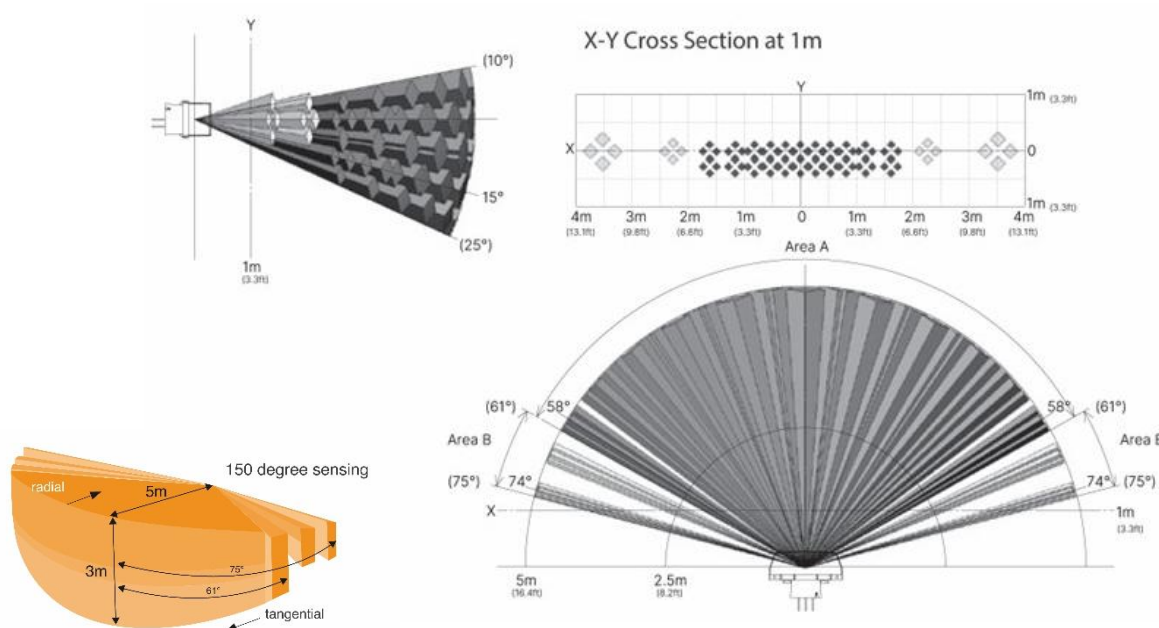


Figure 5 **CS-C Corridor** motion detection (article number addition: 86458670-C)  
Detection area: **X-Y cross section at 1m** - wide angle for corridors.

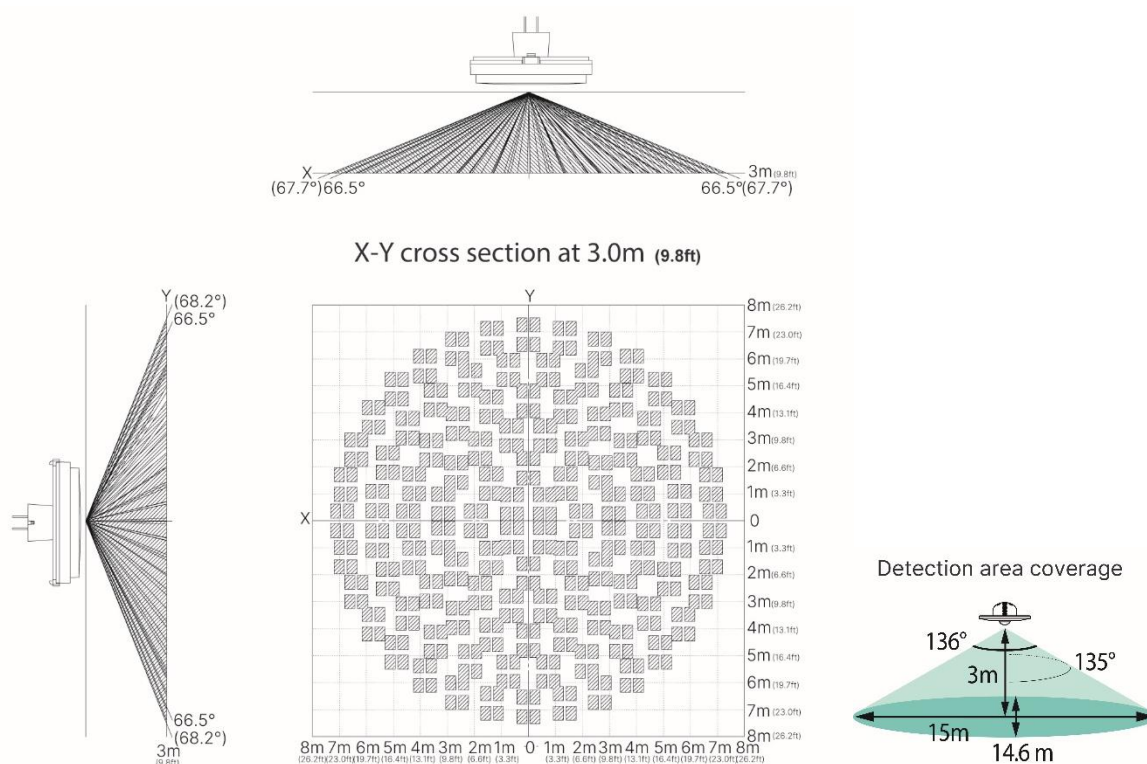


Figure 6 **CS-F** motion detection (article number addition: 86458670-F)  
Detection area: **X-Y cross section at 3m**

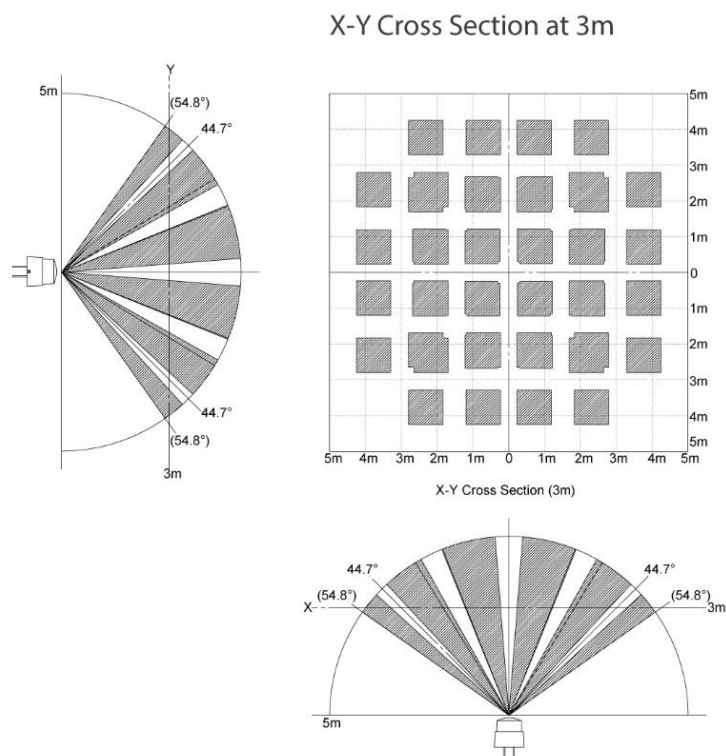


Figure 7 **CS-LE/-LA luminaire installation** motion detection  
(article numbers: 86451485-LA-W16)  
Detection area: **X-Y cross section at 3m**

## Factory Setting

For simple applications the factory settings are sufficient. The device configuration can be changed via the [DALI Cockpit](#) and adapted to the current application.

|                                             | DALI-2 CS                                                                                                                                              |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| DALI-2 Settings                             | Application Controller – Master Mode                                                                                                                   |
| Operating Mode                              | Motion detection without constant light control, an external <i>ON command</i> deactivates motion detection until the next external <i>OFF command</i> |
| Effective range                             | Broadcast                                                                                                                                              |
| ON command (1)                              | Recall Max                                                                                                                                             |
| Hold Time (2)                               | 10min                                                                                                                                                  |
| Absence value (3)                           | none                                                                                                                                                   |
| Hold Time Absence (4)                       | 0s                                                                                                                                                     |
| OFF command (5)                             | Off                                                                                                                                                    |
| OnCMD threshold                             | none                                                                                                                                                   |
| Bright Out threshold                        | none                                                                                                                                                   |
| Power Up behaviour                          | No action                                                                                                                                              |
| Constant light control (CLC)                | inactive                                                                                                                                               |
| Front-LED (motion indication)               | inactive                                                                                                                                               |
| Instance 0 - motion event messages          | inactive                                                                                                                                               |
| Instance 1 – light intensity event messages | inactive                                                                                                                                               |
| Behaviour on DALI Reset command             | reset to delivery default settings                                                                                                                     |

## Instance Default Settings

To use the motion sensor instance or light sensor instance in combination with a DALI-2 CS or DALI-2 LS Master the following instance settings are needed, these are set as delivery default, only event messages need to be enabled this is done by the DALI-2 CS Master automatically (it is also possible to enable event messages manually without the DALI Cockpit via the DALI command ENABLE INSTANCE):

### Instance Nr 0 – Motion:

|              |                    |
|--------------|--------------------|
| Event Schema | device addressing  |
| Event Filter | Occupied<br>Vacant |
| Deat time    | 0.00 sec           |
| Report time  | not applicable     |
| Hold time    | 1 sec              |

### Instance Nr 1 – light:

|                |                   |
|----------------|-------------------|
| Event Schema   | device addressing |
| Event Filter   | illuminance level |
| Deat time      | 0.8 sec           |
| Report time    | unused            |
| Hysteresis Min | 5 Lux             |
| Hysteresis     | 5 %               |

For general information on DALI instances see also the ["DALI-2 Instance guide"](#).

## Installation

- the DALI-2 CS is directly connected and supplied by the DALI bus. A DALI bus power supply is required.
- The connection to the DALI terminals can be made regardless of polarity.
- The terminals are suitable for wire cross-sections ranging from 0.5 mm<sup>2</sup> to 1.5 mm<sup>2</sup>.
- back box mounting: installation of the mounting ring directly on the back box. The housing is then simply plugged onto to the mounting ring. The recessed head has sufficient space within the electrical installation box, enabling a flat installation.
- For mounting the sensor on cavity walls or suspended ceilings a version including additional fixtures with spring-clips is available: article number extension “-ZD”.
- Version for surface mounting is available: article number extension “-AP”.
- The CS Module enables alignment to the desired detection area through 360 ° axial rotation and vertical inclination of up to 40 °.
- The wiring should be carried out as a permanent installation in a dry and clean environment.
- Installation may only be carried out in a voltage-free state of the system and by qualified specialists.
- National regulations for setting up electrical systems must be followed.
- The DALI wiring can be realized with standard low-voltage installation material. No special cables are required.
- Only 1 wire may be connected to each terminal. When using double wire end ferrules, the connection capacity of the terminal must be considered.

**Attention:** The DALI-signal is not classified as SELV circuit (Safety Extra Low Voltage). Therefore, the installation regulations for low voltage apply.

**Note:** The cross section: the voltage drop on the DALI line must not exceed 2V at maximum length (300m) and maximum bus load (250mA).

| h [m] | a [m] | b [m] | A [m <sup>2</sup> ] |
|-------|-------|-------|---------------------|
| 2,50  | 5,2   | 6,2   | 25,1                |
| 2,7   | 5,6   | 6,7   | 29,3                |
| 3,0   | 6,2   | 7,4   | 36,2                |
| 3,5   | 7,2   | 8,6   | 49,2                |
| 4,0   | 8,3   | 9,9   | 64,3                |
| 5,0   | 10,4  | 12,3  | 100,4               |
| 6,0   | 12,4  | 14,8  | 144,6               |
| 8,0   | 16,6  | 19,8  | 257,1               |

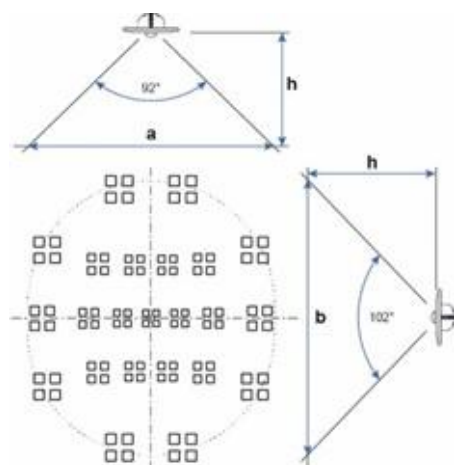
Table 1 relation of mounting height and detection area

## Presence Detection

For movement detection a temperature difference between the moving object and environment of at least 4°C is required. Heat sources such as copiers or heaters may have a negative influence on motion detection.

### Presence Detection (Standard)

The applied PIR method allows coverage of relatively large areas using only one sensor head. With opening angles of 92° and 102° and a sensor mounted at a height of 5 meters the 92° detection zones cover an area of more than 100m<sup>2</sup>. The distance between sensor and the object of interest should be less than 12 meters, which limits the mounting height to about 8m. See Figure 1 on page 7.



### Presence Detection CS-15

The sensor type „-15“ is suitable for high rooms (e.g. halls) with mounting height up to 12m. The detection range is about 15m. See Figure 2 page 7

| h [m] | a [m] | b [m] | A [m <sup>2</sup> ] |
|-------|-------|-------|---------------------|
| 5,0   | 6,9   | 6,9   | 37,1                |
| 7,5   | 10,3  | 10,3  | 83,5                |
| 10,0  | 13,7  | 13,7  | 148,4               |
| 12,0  | 16,5  | 16,5  | 213,7               |

Table 2 relation of mounting height and detection area

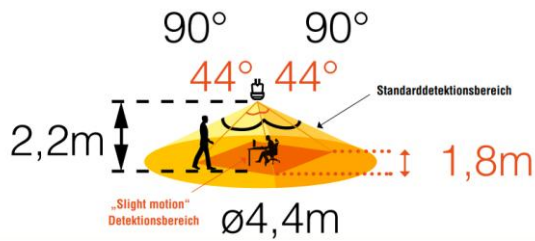
### Presence Detection CS-O

Suitable for office application where detection of slight motion is required e.g. detection of arm movement of a sitting person. The DALI CS-O is tailored to this application and has a sensitive “inner area” and a standard detection “outer area”. The maximum mounting height is about 3m.

See Figure 3 page 8

The rectangular central zone is optimized for detection of the slightest motion. The area has an opening angle of 44° x 44° and 36 detection zones. With a mounting height of e.g. 2.2m, an area of 3.24 m<sup>2</sup> can be covered. (see table 3).

The outer standard motion detection zone has an opening angle of 90° x 90° and 48 detection zones. With a mounting height of e.g. 2.2m, an area of 15.2m<sup>2</sup> can be covered. (see Table 3).



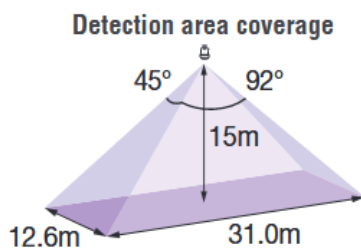
The recommended mounting height is 3m.  
The distance between the sensor and the object to detect should not be greater than 3.1m.

| h<br>[m] | Standard<br>Detektionsbereich |       |         | Slight Motion<br>Detektionsbereich |         |
|----------|-------------------------------|-------|---------|------------------------------------|---------|
|          | a [m]                         | b [m] | A1 [m2] | l [m]                              | A2 [m2] |
| 2,0      | 4                             | 4     | 12,5    | 1,6                                | 2,56    |
| 2,2      | 4,4                           | 4,4   | 15,2    | 1,8                                | 3,24    |
| 2,5      | 5                             | 5     | 19,6    | 2                                  | 4       |
| 3,0      | 6                             | 6     | 28,2    | 2,4                                | 5,76    |

Table 3 relation of mounting height and detection area

### Presence Detection CS-30

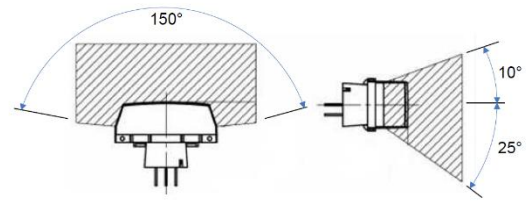
The type -30 has an ultra wide and long distance detection type and is suitable for application in high bay aisles. The maximum mounting height is about 15m. For this installation height of 15m it gains a field of view of approx. 30m x 12m, with 188 detection zones which minimize blind spots, see also Figure 4 page 8.



### Presence Detection CS-C

The DALI-2 CS Corridor has a "hammerhead lens" with a detection range of up to 5m and an asymmetrical alignment. The horizontal detection angle is up to 150°, while the vertical is asymmetrical (+ 10°, -25°). The lens is particularly recommended for wall

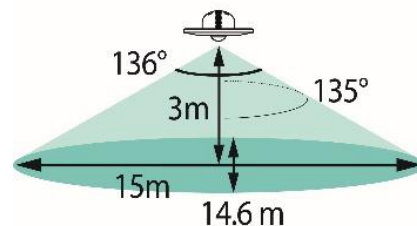
mounting e.g. in corridors. See also Figure 5 page 9.



### Presence Detection CS-F

The DALI-2 CS Flat has a flat lens is ideal for aesthetic sensitive applications. The sensor offers wide detection angles of 135° x 136°, which allow a detection area of approximately 15m diameter at the recommended detection height of 3m. The lens has 416 detection zones, for precise motion sensing. See also Figure 6 page 9.

#### Detection area coverage



### Presence Detection CS-LA

The DALI-2 CS-LA has a PIR lens with opening angles of 110°x 110° und 32 detection zones. With a typical mounting height of 3m, over 25m2 of surface can be covered, see Figure 7 page 10. The distance between the sensor and the object to be detected should be a maximum of 5m.

## Cycle of Motion Detection

The motion detection is always processed according to the following sequence:

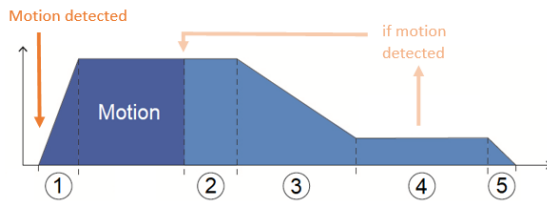


Figure. 8 motion/presence detection sequence

States:

- 1: 1<sup>st</sup> light level** (with defined fade time)
- 2: Hold Time** (for 1<sup>st</sup> light level)
- 3: 2<sup>nd</sup> light level** (with defined fade time)
- 4: 2<sup>nd</sup> Hold Time** (for 2<sup>nd</sup> light level)
- 5: off state** (fade out)

When motion is detected the sensor switches to the configured light level **(1)**. While further motion is detected or the hold time is running **(2)** the light level stays on – either on a fix light level or controlled by a constant light control algorithm.

If no further motion was detected, the count down of the hold time starts **(2)**.

After the hold time elapsed the sensor changes to the 2<sup>nd</sup> light level **(3)** for a defined time **(4)**. This 2<sup>nd</sup> light level is a user defined value (no constant light control). If motion is detected in this state, the sensor switches to the first light level **(1)**. In case no further motion is detected the Off command **(5)** is sent.

HINT: set the “absence level” to a low value, otherwise it could be higher than the light level set by the constant light control.

## Light Sensor

### Light measurement

All DALI-2 CS versions also include a light sensor. The light sensor measures the reflected illuminance in a range from 0 to 2047 lux. The resolution is 2 lux.

The incident light is rated by the spectral sensitivity of the human eye and thus comparable to the subjective visual perception of brightness.

The incident light is accumulated over the area covered by the lens and can be interpreted as average value in the detection area. A reference to the reflecting surface below the sensor can be established with the help of a reference measurement and adjustable offset value.

## Functionality

**It is necessary to distinguish between application controller and DALI-2 instances.**

The **application controller** gives direct DALI control commands that are immediately executed by the DALI drivers.

**DALI-2 instances** generate event messages that are interpreted and processed by higher-level control units with DALI connection (e.g. DALI-2 CS in Master Mode, WAGO, Beckhoff, ...). General information on the DALI-2 instance mode: [https://www.lunatone.com/wp-content/uploads/2021/10/DALI-2\\_Instance-Guide\\_EN\\_M0024.pdf](https://www.lunatone.com/wp-content/uploads/2021/10/DALI-2_Instance-Guide_EN_M0024.pdf)

Configuration of instances is described in section: Instances on page 26.

The **DALI-2 CS** Art. Nr.: 86458670: can be used as either an application controller: *Master Mode*, or in instance mode: *Slave Mode*. For the application controller all

operating modes and setting options described in the document are available.

A version of the DALI-2 CS without application controller is also available, see [DALI CS Integration Art. Nr.: 86458670-INT.](#)

## Operating Modes

The DALI-2 CS module offers 4 different operating modes: motion control, motion control with constant light control, sole constant light control or light control via light thresholds.

External commands can also be used to influence the operating behaviour of the sensor (e.g. when operated via another control device). The reaction to external commands is explained in detail for each operating mode.

### Operating Mode 1 – motion control

- Movement activates a fixed light level

If movement is detected the time sequence is activated with a user defined fixed light level in State 2 (see Figure. 8 "Motion detection: sequence" on page 14). The light level stays active until no more movement is detected and the hold time has elapsed. Then the light level will be switched to the 2<sup>nd</sup> user defined light level.

Additional threshold values can be defined, such that the motion control is only active above or below this defined threshold.

The operating behaviour can be influenced by external on / off / dimming and scene commands. The options for each command are described on page 22.

### Operating Mode 2 – motion control with constant light control

- Movement activates constant light control
- 2<sup>nd</sup> light level is user defined and constant

If movement is detected the time sequence is activated with constant light control in State 2 (see figure "Motion detection: sequence" on page 14). The constant light control stays active until no more movement is detected and the "Hold On Time" has expired. Then the light level will be switched to the 2<sup>nd</sup> light value, which is a fixed user defined value.

Additional threshold values can be defined: such that the motion and light control is only active above or below this defined threshold.

The operating behaviour can be influenced by external on / off / dimming and scene commands. The options for each command are described on page 23

### Operating Mode 3 – constant light control

- Constant light Control
- No motion detection

In this operating mode, only the light sensor is used; motion detection is inactive. The constant light control can be switched on and off with DALI commands (e.g. from a control device such as a DALI light switch).

The operating behaviour can be influenced by external on / off / dimming and scene commands. The options for each command are described on page 25.

### Operating Mode 4 – light threshold control

- Light control via light thresholds
- No motion detection

Only the light sensor is used in this operating mode. Both motion detection and constant light control are inactive. 4 light thresholds

can be defined which trigger a DALI command on either falling below or exceeding the threshold. 2 of the 4 thresholds can be used to send commands repeatedly. The commands are sent at a user-defined interval until the threshold condition is no longer met.

The operating behaviour can be influenced by external scene commands. The options are described on page 26.

## Additional Functionality

### Response to external DALI commands

The behaviour of the control in the event of external commands (e.g. by a switch) can be configured with the DALI cockpit. Depending on the operating mode, different behaviours are possible. The options are described later in the document.

The following commands sent to the external control address are interpreted as an **ON command**:

RECALL MAX  
RECALL MIN  
ON AND STEP UP  
DAP>0%  
GOTO SCENE X (if the command was configured to be interpreted as an ON command for the CS)  
GO TO LAST ACTIVE LEVEL ( $FW \geq 6.0$ )

The following commands sent to the external control address are interpreted as an **OFF command**:

OFF  
DAP=0  
GOTO SCENE X (if configured to be interpreted as an OFF command for the CS)

**Dimming commands:** In addition, it can be specified how the motion control or light control should behave when manual dimming commands (UP/DOWN) to the external control address occurs.

### On and Bright Out threshold

The motion sensor function can be adapted to the ambient light behaviour with the help of the On- and Off-Threshold.

**ON Command threshold:** The motion detection sequence can be started independent from the actual light level (default) or if the light level is above or below the OnCmd-threshold.

For a running motion sequence the presence detection – retriggering the sequence on motion - can either be set independent from the actual light level or only if the light level is below the **Bright out threshold**.

*Bright out- Application example: Car Park lighting, that is set ON during the night (if measured light level < 70lux) but should not be kept ON during the day even though there might be constant detection of motion.*

### Power-On behaviour

It is possible to configure a start-up command to achieve a defined operating state after power on (return of the bus voltage). The start-up command can either be a DALI-command or a fast run of the motion detection sequence.

### Multiple sensors controlling one area

To allow several sensors to control the same effective range (e.g. a corridor with sensors on each end), one of the sensors needs to be defined as master, while the others can be assigned to deliver their sensor values. In the DALI Cockpit software (tab: "Synchronisation")

these sensor addresses can be specified for motion detection and light detection. When setting DALI-2 CS as inputs in the synchronization tab, these device's instances are automatically configured and their event messages are enabled. For a master sensor the application controller is not automatically disabled. If the sensor is not used for a different area, the application controller has to be manually disabled, to turn off conflicting commands. Backward compatibility for older generation CS is made possible by the option "Backward compatibility with eDALI CS". Definition of the same effective range (target address 1) automatically synchronizes older generation sensors. The parameters of the sensors should be coordinated, especially the hold on times.

### Behaviour on DALI Reset

The behaviour in response to a DALI reset command is configurable. The following options are available:

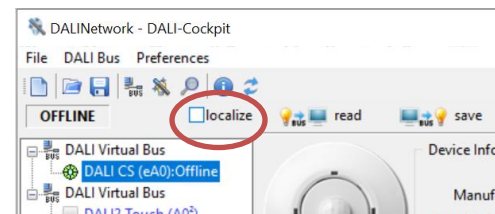
- *Ignore command*: The DALI reset command does not trigger any changes to the device settings.
- *DALI Standard*: DALI-2 instance settings are set to the values defined in the DALI standard. The settings for the Application Controller remain unchanged.
- *Factory settings*: The sensor settings are reset to the Lunatone factory default settings – see the table in the "Factory Setting" section, page 10.

## Configuration in the DALI Cockpit

The addressing and configuration of the DALI CS can be done easily with the help of the [DALI Cockpit](#) software tool and a suitable interface module ([DALI-2 USB](#); [DALI USB](#), [DALI-2 WLAN](#), [DALI-2 Display](#), [DALI-2 IoT](#), [DALI 4Net](#), [DALI SCI RS232](#)).

After an address has been assigned the parameters can be configured to fit the application.

The spatial allocation of each sensor can be done by selection of the "localize" check box in the DALI Cockpit. This will lead to flashing of the red LED of the currently selected sensor.



Configuration of the sensor is possible with the settings of the different tabs, explained in detailed on the following pages.

### Tab: "General" – Sensor mode, Operating Mode:

Selection of the fundamental configuration is made on the "General" tab, see Figure. 9. The sensor can be set to Master or Slave Mode.

In *Master-Mode*, the DALI-2 CS takes over control according to the subsequently selected operating mode. The DALI-2 CS *Master* is an **application controller** and gives direct DALI control commands that are immediately executed by the DALI gears.

In *Slave-Mode*, the DALI-2 CS is in **instance mode** and does not send any control commands. Instead, the DALI-2 instances generate event messages that are interpreted and processed by a DALI-2 CS in *Master mode*

or by higher-level DALI control unit (e.g. WAGO, Beckhoff, ...). General information on the DALI-2 instance mode:

<https://www.lunatone.com/en/dali-2-factsheet/> section: DALI-2 Instancemode )

Configuration of the instances is described in section: Instances on page 26.

The Application controller and instances can be active at the same time.



#### Additional Information: A

deactivated Application Controller is indicated in the DALI Cockpit device tree with: **A**.

A device with active instances is indicated with: **i**

The screenshot shows the 'General' tab of the DALI-2 CS configuration interface. The interface includes sections for 'Device Description', 'Behavior on DALI Reset Command', 'DALI-2 CS General Properties', 'DALI-2 Control Device Parameters', 'Membership in Groups for DALI-2 Controls', 'Sensor Mode', and 'Operating Mode'. Annotations with blue boxes and lines point to specific features:

- Adjustable behaviour on DALI Reset Command:** Points to the 'Behavior on DALI Reset Command' section, which shows 'Parameters are reset to DALI Standard values.' and a 'Change...' button.
- If movement is detected, the red LED on the sensor lights up.** Points to the 'Switch on red LED when moving' checkbox under 'DALI-2 CS General Properties'.
- Backwards compatibility to enable synchronization of motion detection with 1st generation CS.** Points to the 'synchronization with DALI CS (eDALI)' checkbox under 'DALI-2 CS General Properties'.
- Control devices can be assigned to Instance groups. The assignment applies to the light sensor and the motion detector instance simultaneously.** Points to the 'Membership in Groups for DALI-2 Controls' section, which shows a grid of 28 numbered buttons (0-27).
- In master mode – as an application controller, the device takes over the control depending on the operating mode.** Points to the 'Master-Mode: Application Controller enabled' radio button under 'Sensor Mode'.
- In slave mode - instance mode, the DALI-2 CS sends event messages with the measured sensor values, these can be evaluated by a DALI-2 CS master.** Points to the 'Slave-Mode: Event Messages enabled' radio button under 'Sensor Mode'.
- Operating mode: Selection between the four different operating modes of the application controller. - Description of the operating modes see section "Operating modes" on page 15** Points to the 'Operating Mode' section, which shows four radio buttons: 'Motion control' (selected), 'Motion control with constant light control', 'Light threshold sensor control', and 'Constant Light Control'.

Figure. 9 Tab: "General" – sensor mode, operating mode

### Tab: "Effective range" - effective range, external control and power-up behaviour

See Figure. 10. On this tab the effective range of is defined: which DALI-gears are controlled by the CS. In addition, external control addresses can be defined, which the CS also monitors. The behaviour of the CS in case of

other control units sending commands to these addresses can be defined. This way, manual control of lights via a switch can be realised, without interference of the motion detection or constant light control.

**Effective Range:** the CS can send commands to up to four destination addresses at the same time (devices, groups or broadcast). This setting is used in every operating mode

The external control addresses determine which addresses are monitored by the CS. The behaviour of the CS in the case of external commands (e.g. from a light switch) to these addresses can be defined

The behaviour in case of an external on / off and dimming commands (e.g. from a light switch) can be defined. Different options are available depending on the operating mode - see page 22 and page 25.

defines how the CS behaves during power up: no action, sending a defined command or in operating mode with motion detection: triggering a motion sequence

Figure. 10 Tab: "Effective Range" – destination address and external control address

### Tab: "Synchronization" – sensor input and Slaves

See Figure. 11. To include other sensor measurements into the evaluation, additional DALI-2 CS can be selected as sensor inputs. The instance settings of the selected CS are automatically set by the master sensor. If a sensor in master mode is selected as an input,

its application controller is not automatically deactivated.

**Important:** If the sensor is not used to control another area, the application controller should be manually deactivated to prevent interference commands.

Depending on the operating mode, different sensors input for each sensor-functionality can be defined:

for “Motion detection”:

- input for movement,
- input for light thresholds

for “Motion detection with constant light control”:

- input for movement,
- input for light thresholds,
- input for constant light control

for “Constant light control”:

- input for constant light control

for “Light control”:

- input for light thresholds.

The screenshot displays the 'Synchronization' tab of the Lunatone software interface. It is divided into three main sections: 'motion control', 'constant light control', and 'light control'. Each section has a 'slave sensor input' list with checkboxes and dropdown menus for selecting sensors. Below these lists is a 'Sensor Evaluation Mode' dropdown set to 'Average'. A 'Light sensor calibration...' button is located at the bottom of the main interface. A callout box explains that DALI addresses define which sensors are evaluated for motion detection, constant light control, and lighting control, requiring specific instance types (303 or 304) and supporting up to 8 inputs. Another callout explains that the 'Sensor Evaluation Mode' can be set to maximum, minimum, or mean value. A third callout points to the 'Light sensor calibration' dialog, which shows the 'Current Light Level' (183 Lux) and 'light value offset' (0 Lux), with 'Set' and 'Cancel' buttons.

These DALI addresses define which other sensors are evaluated for **motion detection**. In order to detect movement in the room, movement detectors that support instance type 3 (303) are required. Up to 8 inputs can be defined. Nr. 0 is always the current CS itself (*Master*), instances of set input sensors are automatically configured but not set to *Slave Mode*.

These DALI addresses define which of the sensors are evaluated for **constant light control**. In order to measure the brightness in the room, sensors are required that support instance type 4 (304). Up to 8 inputs can be defined. Nr. 0 is always the current CS itself (*Master*), instances of set input sensors are automatically configured but not set to *Slave Mode*.

These DALI addresses define which other sensors are involved in **lighting control**. In order to measure the brightness in the room, sensors are required that support instance type 4 (304). Up to 8 inputs can be defined. Nr. 0 is always the current CS itself (*Master*), instances of set input sensors are automatically configured but not set to *Slave Mode*.

With the “Sensor Evaluation Mode” it can be defined, whether a maximum, minimum or mean value of the various sensor values is used for the evaluation.

via the “light sensor calibration”, the currently measured light value can be read out and if necessary, adjusted with an offset value.

Figure. 11 Tab: “Synchronization” – sensor inputs for measurement evaluation

## Tab: "Motion Control"

See Figure. 12, in this tab, the times and light levels of the motion detection sequence, that is triggered by movement, can be defined. As

well as the light thresholds to activate the motion detection depending on the lighting conditions. (operating mode description see page 15 and page 16)

The screenshot shows the 'Motion Control' tab in the Lunatone configuration software. It includes a 'Sequence' graph, a 'Light thresholds' section, and a 'Variable Operating Behavior' section. Annotations provide detailed explanations of various settings.

**Sequence Graph:** A graph showing the light level sequence over time. The y-axis represents light level (I, II, III) and the x-axis represents time (1, 2, 3, 4, 5). The sequence starts at level I, rises to level II, then to level III, and finally returns to level I.

**Light thresholds:**

- ☒ Commands are independent of light level
- ☐ Only send Commands if light value > threshold value
- ☐ Only send Commands if light value < threshold value
- ☐ Bright Out: retrigger on motion only if light level < Bright out threshold
- Threshold: 800 Lux, Hysteresis: 20 Lux, Bright-Out Threshold: 400 Lux

**Variable Operating Behavior:**

- ☒ Activation of variable operating behavior
- ☒ on Scene Command to same destination address
- ☐ on Scene Command to defined "external control address"

**Annotations:**

- Current Light Level:** Display of the currently measured light values of the defined sensor input as a reference.
- Sequence:** Settings for the motion detection sequence - (light levels, hold times (2) / (4) ) with settings for constant light control depending on the operating mode.
  - The following commands can be selected as **ON commands (1)**: DAP, RECALL MAX, RECALL MIN, GOTO LAST ACTIVE LEVEL, GOTO SCENE X;
  - The following commands are available as commands for the **2nd light value (3)**: no action, DAP, RECALL MAX, RECALL MIN, GOTO SCENE X;
  - The following commands are available for the **OFF command (5)**: DAP, OFF, GOTO SCENE X
- Light thresholds:** Switch-on and switch-off threshold : adjustable whether the motion detection is active above or below a threshold value Adjustable: threshold and width of the hysteresis (value range: 0... 1020Lux (step width 4 Lux)).
- Bright Out:** Bright Out threshold: if this threshold is exceeded the motion sequence is no longer retriggered on movement . Application example: Parking lot - Ending the motion detection at dawn (crossing of threshold), although the sensor is currently in the movement state and movement is detected.
- Variable Operating Behavior:** Via scenes, alternative behaviour to the main configuration can be activated (e.g. alternative destination address). Different options are available depending on the operating mode - see page 22

Figure. 12 Tab: „motion detection control“

When selecting an On-Command for motion control with constant light control, the On-Command should be close to the desired brightness to avoid long control times. Constant light control begins approximately 6 seconds after the On-Command is sent. Since constant light control interrupts the fade process, for dimmers with a longer fade time than 6 seconds, the desired fade time should be set via the On-Command input. This ensures the set fade time is awaited before constant light control starts.

### Motion Control - Behaviour with external commands

The operating behaviour can be influenced by external commands (e.g. from a DALI-switch).

In the Cockpit tab "Effective range", the behaviour of the sensor on ON- / OFF- and dimming commands, sent to the 4 configurable "external control addresses", can be defined.

Additionally, the operating behaviour of the sensor can be changed with scene commands, via the tab "Motion control" -section: Variable Operating Behaviour.

The following settings are available:

#### Operating mode 1 – motion detection

| An external <b>ON</b> command                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>No influence:</b> the ON command is ignored by the CS. The CS continues to carry out the control as configured                                                        |
| <b>External control:</b> motion control is deactivated (The CS does not send any DALI commands), until manually reactivated by an external OFF command (or power-cycle). |
| <b>Simulate movement:</b> start the Motion Detection Sequence (Figure. 8, page 14)                                                                                       |
| An external <b>OFF</b> command                                                                                                                                           |
| <b>No influence:</b> the OFF command is ignored by the CS. The CS continues to carry out the control as configured                                                       |

**Waiting for motion:** change to State 5 and then to OFF state (state 7, Figure. 8), motion detection active - waiting for motion

**Disable sensor control:** change to state 5 and then to OFF state (state 7, Figure. 8), the motion detection is deactivated until reactivated by an ON command (or power-cycle)  
*"Off Only Function": when the CS should only send an Off command after a manual On (simulating movement) and after the hold time has elapsed.*

#### an external **DIMMING** command:

**No influence:** the DIMMING command is ignored by the CS. The CS continues to carry out the control as configured

**External control:** motion control is deactivated (The CS does not send any DALI commands), until manually reactivated by an external OFF command (or power-cycle).

**Change light level until end of sequence:** the On command light level (State 2, Figure. 8) is changed by dimming. The new light level is retained for the current movement detection sequence

#### Variable Operating Behaviour - An external **SCENE** command

**No action:** the SCENE command is ignored by the CS.

**Reset to Default:** The CS is set to the basic configuration, all previously forced changes to the operating behaviour are terminated.

**Alternative destinations:** An alternative destination address (user defined) is used instead of the configured standard destination.

**Alternative ON Command Light Level DAP:** Instead of the currently configured light level DAP command, the alternatively defined DAP value is used in state 2 (Motion Detection Sequence Figure. 8). *Only applicable if a light value command is defined as an ON command in the default settings.*

**Alternative ON Command SCENE:** Instead of the currently configured scene command, the alternatively defined scene is used in state 2 (Motion Detection Sequence Figure. 8). *Only applicable if a scene command is defined as an ON command in the default settings.*

**Waiting for motion:** go to State 5 and then to OFF state (state 7, Figure. 8), motion detection active - waiting for motion

## Operating Mode 2 – motion detection with constant light control

### An external ON command

**No Influence:** the ON command is ignored by the CS. The CS continues to carry out the control as configured

**External control:** Constant light control and motion control are deactivated (The CS does not send any DALI commands). until they are reactivated by an external OFF command (or power-cycle).

**Simulate movement:** start the Motion Detection Sequence (Figure. 8, page 14)

**Simulate movement without constant light control:** Starts the motion detection sequence (State 1, Figure. 8) and deactivates the constant light control. The sent ON command is executed instead of constant light control. The constant light control is temporarily deactivated until the OFF-state (state 7, Figure. 8) is reached.

**Constant Light Control:** The motion detection is deactivated and constant light control is permanently active until it is cancelled by an OFF command (or power-cycle). Standard behaviour is thereby reactivated

### An external OFF command

**No Influence:** the OFF command is ignored by the CS. The CS continues to carry out the control as configured

**Waiting for motion:** Got to OFF state - go to State 5 and then to OFF state (state 7, Figure. 8), motion detection active - waiting for motion

**Disable sensor control:** change to state 5 and then to OFF state (state 7, Figure. 8) , the motion detection is deactivated until reactivated by an ON command (or power-cycle). Enables:  
„Off Only “: if the CS should only send an off command after a manual on (simulate movement) after the hold time has expired

### an external DIMMING command:

**no influence:** the DIMMING command is ignored by the CS. The CS continues to carry out the control as configured

**External control:** Constant light control and motion control are deactivated (the CS does not send any DALI commands) until they are reactivated by an OFF command (or power-cycle).

**Disable constant light control until end of sequence** (end of 1<sup>st</sup> hold time): constant light control is deactivated temporarily during Motion Detection Sequence (State 2). Automatic reactivation of constant light control after end of sequence

**Change constant light control reference light level until end of sequence** (end of 1<sup>st</sup> hold time): the reference light level for constant light control is changed by dimming. If no dimming process is detected for 2 seconds, the current light value is adopted as the new setpoint for the constant light control. The new setpoint is only retained for the current movement detection sequence (as long as movement is detected).

**Change constant light control reference light level:** the reference light level for constant light control is changed by dimming. If no dimming process is detected for 2 seconds, the current light value is adopted as the new setpoint for the constant light control.

## Variable Operating Behaviour -

### An external SCENE command

**No action:** the SCENE command is ignored by the CS

**Reset to defaults:** The CS is set to the basic configuration, all previously forced changes to the operating behaviour are terminated.

**Alternative destinations:** An alternative destination address (user defined) is used instead of the configured standard destination.

**Alternative ON Command Light Level DAP:** Instead of the currently configured light level DAP command, the alternatively defined DAP value is used in state 2 (Motion Detection Sequence Figure. 8). *Only applicable if a light value command is defined as an ON command in the default settings.*

**Alternative ON Command SCENE:** Instead of the currently configured scene command, the alternatively defined scene is used in state 2

|                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (Motion Detection Sequence Figure. 8). <i>Only applicable if a scene command is defined as an ON command in the default settings.</i>                                                                                                                                             |
| <b>Alternative constant light control reference light level:</b> Instead of the current reference value an alternative user defined light level is used                                                                                                                           |
| <b>Disable Constant Light Control until end of sequence</b> (end of 1 <sup>st</sup> hold time): constant light control is deactivated temporarily during Motion Detection Sequence (State 2). Automatic reactivation of constant light control once no more movement is detected. |
| <b>external control:</b> Constant light control and motion control are deactivated. The CS does not send any DALI commands, until reactivated by a respective command (or power cycle).                                                                                           |
| <b>Waiting for motion:</b> Got to OFF state - go to State 5 and then to OFF state (State 7, Figure. 8) motion detection active - waiting for motion                                                                                                                               |

### Tab: „Light Control“

Depending on the selected operating mode:

#### **Operating mode: Constant light control**

See Figure. 13. The tab “light control” contains the settings for constant light control (CLC) if the Operating mode: "constant light control" was selected.

#### **Operating mode: Light threshold control**

See Figure. 14. If the Operating Mode: "Light-controlled" was selected the light sensor control functions as a threshold switch. A maximum of 4 thresholds can be defined. The defined DALI commands will be executed if the values are exceeded or fallen below of.

2 of the 4 available thresholds can also be used to send commands periodically. The commands are sent at a user-defined interval until the threshold condition is no longer met.

General Instances Effective Range Synchronization **Light Control**

Light sensor

Current Light Level ☀

Constant Light Control (CLC)

Reference Light Level:  Lux

Variable Operating Behavior

Activation of variable operating behavior

☒ on Scene Command to same destination address

☐ on Scene Command to defined "external control address"

|         |           |
|---------|-----------|
| Scene 0 | no action |
| Scene 1 | no action |
| Scene 2 | no action |
| Scene 3 | no action |

Display of the currently measured light values of the defined sensor input as a reference.

Setting for constant light control (CLC) desired setpoint (0... 2040Lux, stepsize 8 Lux)

Via scenes, alternative behaviour to the main configuration can be activated (e.g. alternative destination address). Different options are available depending on the operating mode - see page 25.

Figure. 13 Tab: „Light Control“ – Operating Mode : constant light control

The screenshot shows the 'Light Control' configuration page with several callouts:

- Current Light Level:** Display of the currently measured light values of the defined sensor input as a reference.
- Light Control – Thresholds:**
  - ☐ Set thresholds as hysteresis: Predefine the two following two thresholds as hysteresis
  - ☐ Threshold (smaller, 0 Lux, Action: None): Activate / deactivate the respective threshold
  - ☐ Threshold (smaller, 0 Lux, Action: None): Setting the threshold value, the DALI command and whether this should be carried out when the threshold is exceeded or fallen below of. (Threshold (0... 1020 lux, step size 4lux), hysteresis: is the difference between the two set thresholds (0 ... 255 lux))
- Sending Command repeatedly:** time between repetitions: 0 Std., 10 Min., 0 Sek.
- ☒ Set thresholds as hysteresis: 2 of the 4 threshold values can be sent with repetition, by choosing the time between repetitions greater than zero. (With 0h, 0min, 0sec no repetition is carried out). The respective commands are sent with the selected interval until the set condition is no longer met. *Application example: closing blinds when the incidence of light is too strong.*
- ☒ Threshold (greater, 8000 Lux, Action: DOWN, Fade rate: [1] 358 s)
- ☒ Threshold (smaller, 100 Lux, Action: UP, Fade rate: [1] 358 s)
- Variable Operating Behavior:**
  - Activation of variable operating behavior:
    - ☒ on Scene Command to same destination address
    - ☐ on Scene Command to defined "external control address"
  - Scene 0: no action
  - Scene 1: no action
  - Scene 2: no action
  - Scene 3: no action

Via scenes, alternative behaviour to the main configuration can be activated (e.g. alternative destination address). Different options are available depending on the operating mode - see page 26.

Figure. 14 Tab: „Light Control“ -Operating Mode: light threshold control

## Light Control - Behaviour with external commands

The operating behaviour can be influenced by external commands (e.g. from a DALI-switch).

In the Cockpit tab "Effective range", the behaviour of the sensor on ON- / OFF- and dimming commands, sent to the 4 configurable "external control addresses", can be defined.

Additionally, the operating behaviour of the sensor can be changed with scene commands, via the tab "Light control " -section: Variable Operating Behaviour.

The following settings are available:

### Operating Mode 3 – constant light control

| An external ON command                                                                                                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>No influence:</b> the ON command is ignored by the CS. The CS continues to carry out the control as configured                                                            |
| <b>External control:</b> the constant light control is deactivated. (the CS does not send any DALI commands), until reactivated by an external OFF command (or power-cycle). |
| <b>Enable constant light control:</b> The constant light control is activated.                                                                                               |

|                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>An external OFF command</b>                                                                                                                                                                                                                                                                                                                              |
| <b>No influence:</b> the OFF command is ignored by the CS. . The CS continues to carry out the control as configured                                                                                                                                                                                                                                        |
| <b>Disable constant light control:</b> The constant light control is deactivated, until reactivated by an external ON command (or power-cycle).                                                                                                                                                                                                             |
| <b>an external DIMMING command:</b>                                                                                                                                                                                                                                                                                                                         |
| <b>No influence:</b> the DIMMING command is ignored by the CS. The CS continues to carry out the control as configured                                                                                                                                                                                                                                      |
| <b>Disable constant light control temporarily:</b> constant light control is deactivated until the next OFF command (or power-cycle).                                                                                                                                                                                                                       |
| <b>Change constant light control reference light - temporary:</b> the reference light level for constant light control is changed by dimming. If no further dimming process is detected for 2 seconds, the current light value is adopted as the new setpoint for the constant light control. The new setpoint is only retained until the next OFF command. |
| <b>Change constant light control reference light level -general:</b> the reference light level for constant light control is changed by dimming. If no dimming process is detected for 2 seconds, the current light value is adopted as the new setpoint for the constant light control.                                                                    |
| <b>Variable Operating Behaviour -<br/>An external SCENE command</b>                                                                                                                                                                                                                                                                                         |
| <b>No action:</b> the SCENE command is ignored by the CS                                                                                                                                                                                                                                                                                                    |
| <b>Reset to Default:</b> The CS is set to the basic configuration, all previously forced changes to the operating behaviour are terminated.                                                                                                                                                                                                                 |
| <b>Alternative destinations:</b> An alternative destination address (user defined) is used instead of the configured standard destination.                                                                                                                                                                                                                  |
| <b>Alternative constant light control reference light level:</b> Instead of the current reference value an alternative user defined light level is used                                                                                                                                                                                                     |
| <b>Enable constant light control:</b> The constant light control is activated.                                                                                                                                                                                                                                                                              |
| <b>External Control:</b> The constant light control is deactivated (the CS does not send any DALI commands), until reactivated by a respective command (or power cycle).                                                                                                                                                                                    |

### Operating Mode 4 – light threshold control

|                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Variable Operating Behaviour -<br/>An external SCENE command</b>                                                                                                       |
| <b>No action:</b> the SCENE command is ignored by the CS                                                                                                                  |
| <b>Reset to Defaults:</b> The CS is set to the basic configuration, all previously forced changes to the operating behaviour are terminated.                              |
| <b>Alternative Destinations:</b> An alternative destination address (user defined) is used instead of the configured standard destination.                                |
| <b>External control:</b> the light threshold control is deactivated (the CS does not send any DALI commands), until reactivated by a respective command (or power cycle). |

## Instances

The DALI-2 CS and DALI-2 CS Integration support 2 instances standardized according to DALI: motion detector instance (303) for motion detection and light sensor instance (304) for light measurement. In *Slave mode*, the DALI-2 CS is automatically in instance mode. The factory settings are designed for use in conjunction with a DALI-2 CS Master.

- Instance Nr. 0: Type motion detector
- Instance Nr. 1: Type light sensor

### Instances – General

Each instance can be configured individually. Some settings have the same functionality for all sensor instances and are therefore described in this section. Instance specific settings are explained for each individual instances in the following respective sections.

#### *enable/disable*

If instances are not required, they can be deactivated. In this case, event messages are not sent, and the measured values are not updated. They can, however, still be queried via a “Query” command, and the DALI-2

configuration commands and queries are still supported.

#### **Instance group**

Up to three instance groups can be assigned for each instance. Only the "Primary Group" is used for the event.

#### **Instance type**

The instance type defines which DALI-2 standard is valid for this instance. (The different instance types are specified in the DALI-2 standard.)

#### **Instance number**

Each instance in a device has a unique instance number.

#### **Device group**

The device can be assigned to up to 32 device groups (0...31). The lowest device group is used for the event.

#### **Device address**

A device address (or short address) (0..63) can be assigned to each device. With this the device can be clearly addressed. (Identical short addresses should be avoided.)

#### **Event Scheme**

The event scheme determines which information is transferred with the event. This information is required, to enable recognition and / filtering of events on the bus. The following 5 options are available:

- Instance addressing:  
*instance type and instance number*
- Device Addressing:  
*device address and instance type*
- Device/Instance Addressing:  
*device address and instance number*
- Device Group Addressing:  
*Device group and instance type*
- Instance Group Addressing:  
*Instance group and instance type*

#### **Event priority**

The event priority determines the order in which events are sent when they occur simultaneously on the bus. Priority 2 = highest and 5 = lowest.

#### **Dead Time**

The dead time can be set for each instance. It determines the time that must pass before an event can be sent again. This also applies if the event information (measured value) changes. If no dead time is required, it can be deactivated.

#### **Report Time**

If the event information does not change, the event is sent cyclically with the report time. The report time can be set for each instance. It determines the maximum time between a sent event and resending.

#### **Hysteresis**

Not every change in value leads to an event being generated. The hysteresis can be used to set which percentage change is necessary to trigger a new transmission. Attention, the hysteresis band is not arranged symmetrically. The following applies:

Increasing value

The condition for an event is only fulfilled if the next value falls below the previous value minus the hysteresis or if the next value is greater than the previous value.

Decreasing value

the condition for an event is only fulfilled if the next value exceeds the previous value plus the hysteresis or the next value is smaller than the previous value.

#### **Hysteresis Min**

Is the minimal hysteresis value that cannot be fallen below of.

## Instance 0 – Motion

Is an instance standardized by DALI-2 (62386-303), for sensors that detect motion. All settings are implemented according to the standard. The instance is DALI-2 certified.

The sensor switches between the following states:

- People in the room and movement (0xFF)
- People in the room and no movement (0xAA)
- Empty room (0x00)

If the sensor detects movement, it immediately changes to the state: "people in the room and movement". This state is exited after 1 second at the earliest if no further movement is detected. In this case it changes to the state "People in the room and no movement". After the hold time has expired it changes to the state "Empty room"- Vacant.

**Report Time:** can only be set if the event filter "Repeat" is activated and the events: "Still Vacant" and "Still Occupied" are enabled. The time between sending a "Still-Event" again is determined by the Report Time.

**Hold Time:** Is the time that must pass before the state "people in the room and no movement" is changed to the state "empty room". If movement is detected during this time the state is changed back to: "People in the room and movement". (min. 1 second)

**Query:** The current sensor state can be queried using the DALI command "Query input value". The following values are possible: 0x00, 0xAA, 0xFF (see paragraph above for the possible states)

**Event:** the sensor status is transmitted by events. The following event information is available:

Bit0 = 0: No Movement  
 Bit0 = 1: Movement  
 Bit2/Bit1 = 00: Vacant  
 Bit2/Bit1 = 10: Still Vacant  
 Bit2/Bit1 = 01: Occupied  
 Bit2/Bit1 = 11: Still Occupied  
 Bit3 = 1: Movement Sensor  
 Bit5..Bit9 = 0: unused

More details can be found in the standard 62386-303.

**Event filter:** The event filter defines for which status change an event is generated.

Filter arrangement:

Bit0: Occupied Event active  
 Bit1: Vacant Event active  
 Bit2: Still Vacant/Occupied Event active  
 Bit3: Movement Event active  
 Bit4: No Movement Event active  
 Bit5..Bit7: unused

**Example events during the movement sequence:**

**1: Movement detected:**

Event filter "Movement", event filter "Occupied":  
 → Event data: 0x0B

**2: Continued movement:** with set report time, event filter "Still Occupied/Vacant": → Event data: 0x0F

**3: Movement stops:** event filter "No Movement":  
 → Event data: 0x0A

**4. Expiry of set hold time:**

Event filter "Vacant": → Event data: 0x08

**5. Still no movement:** with set report time: event filter "Still Occupied/Vacant"

→ Event data 0x0C

## Instance 1 – Light intensity

is an instance standardized by DALI-2 (62386-304). All settings are implemented according to the standard. The instance is DALI-2 certified.

The current light value (lux) is measured by the sensor and can either be queried using a "Query" command or can be automatically provided by the sensor using an event.

The measuring range is 0Lux ... 2046Lux. The resolution differs between queries and generated events. A query supports a resolution of 1Lux (11Bit) and an event a resolution of 2Lux (10Bit). This means that the values obtained from an event must be multiplied by 2 to determine the light level in lux.

**Query:** the light level can be queried using the commands "Query input value" and "Query Input value latch". 11 bits are taken from the returned data, which correspond to the light level in lux:

Query Input Value → answer: 0x6C

Query Input Value Latch → answer: 0x9B

0x6C = **0110 1100**

0x9B = **1001 1011**

→ **0110 1100 100** = 868 Lux

**Hysteresis:** For information on the hysteresis see section Instances -General: *Hysteresis* page 27.

**Hysteresis Min:** set in lux. For general information on the hysteresis min see section Instances – General: *Hysteresis Min* page 27

**Event Filter:** The light instance generates only one event with 10-bit resolution (0... 2047 lux, step size 2lux). If the filter is deactivated, no events will be sent.

### Cockpit - Instances

The settings for the instances can be made in the Cockpit – tab "Instances".

Example for settings of instance 0 – motion see Figure. 15. Example for settings of instance 1 – light intensity see Figure. 16

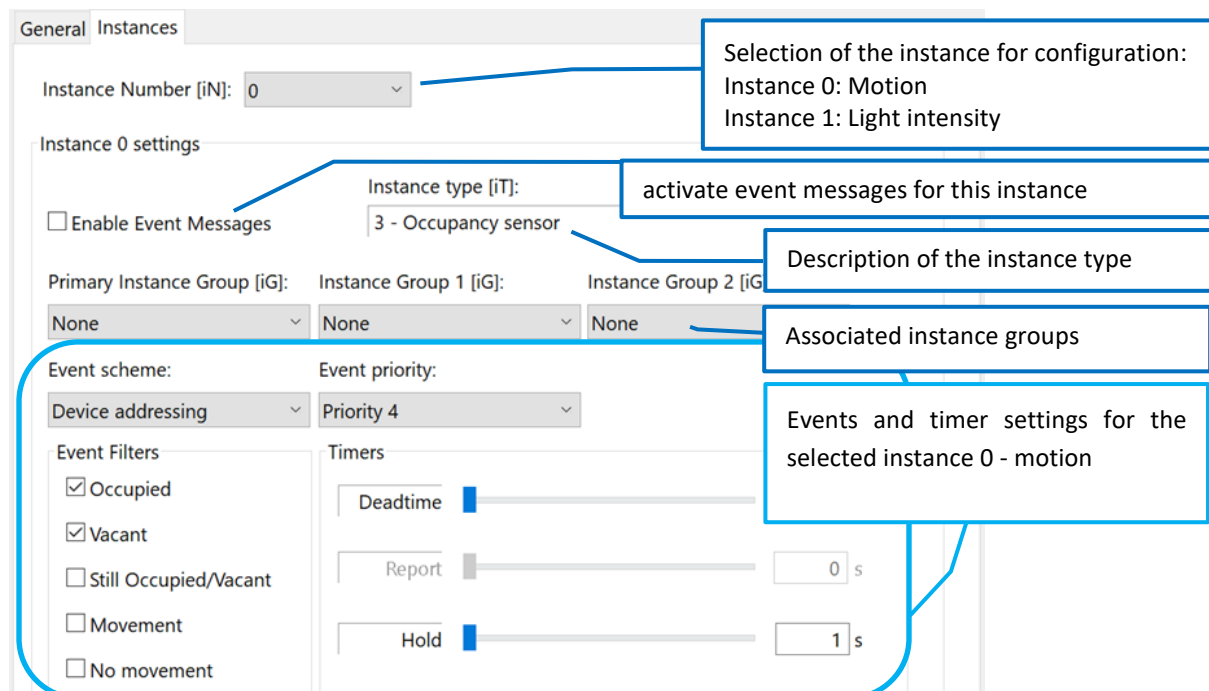


Figure. 15 tab: „Instances“ – motion detector instance

General Instances

Instance Number [iN]: 1

Instance 1 settings

☐ Enable Event Messages

Instance type [iT]: 4 - Light sensor

Primary Instance Group [iG]: None Instance Group 1 [iG]: None Instance Group 2 [iG]: None

Event scheme: Device addressing Event priority: Priority 4

Event Filters

☒ Illuminance level

Timers

Deadtime Report Hysteresis Band Hysteresis Min 5 Lux Hysteresis 5 %

Light sensor calibration...

Selection of the instance for configuration: Instance 0: Motion Instance 1: Light intensity

activate event messages for this instance

Description of the instance type

Associated instance groups

Events and timer settings for the selected instance 1 - light intensity

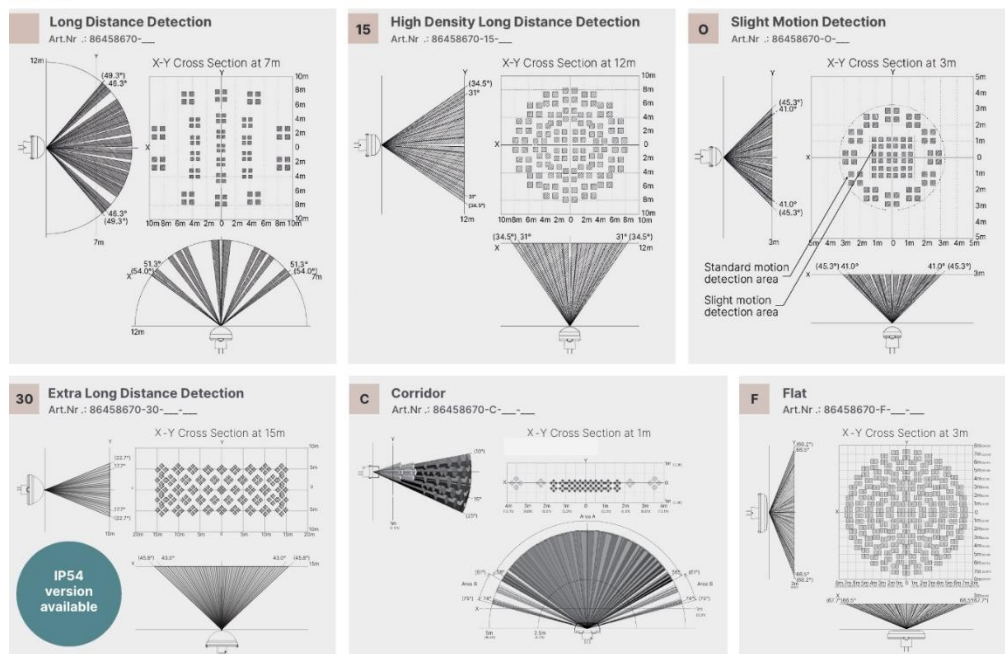
Enables light sensor calibration via an offset value

Figure. 16 tab: "instances" – light sensor instance

## Purchase Order Information

| ARTICLE BASIS                                                         | SENSOR, detection range & mounting height                                                                                                                                                                                                                                              | COLOUR                                                                        | INSTALLATION TYPE                                                                                                                                  |
|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>86458670</b>                                                       |                                                                                                                                                                                                                                                                                        |                                                                               |                                                                                                                                                    |
| <b>DALI-2 FUNCTION</b><br>Application Controller and DALI-2 instances | <p><b>=</b> standard, 12m &amp; 8m</p> <p><b>15</b> = especially for high rooms, 15m &amp; 12m</p> <p><b>O</b> = detection of minor movements, 2.3m / 3m &amp; 3m</p> <p><b>30</b> = especially for high bay 30m x 12m</p> <p><b>C</b> = corridor lens</p> <p><b>F</b> = flat lens</p> | <p><b>=</b> RAL 9010</p> <p><b>W16</b> = RAL 9016</p> <p><b>B</b> = black</p> | <p><b>=</b> for flush-mounted installation boxes</p> <p><b>ZD</b> = suspended ceiling type with clasp</p> <p><b>AP</b> = surface mounting type</p> |

### Lens types:



### Housing colour:



### Installation type:



## Standard Version

**Art.Nr. 86458670:** DALI-2 CS, sensor module (motion/ light), **Application Controller and Instance mode**, pure white (RAL9010), back box installation

**Art.Nr. 86458670-AP** pure white (RAL9010), surface mounting

**Art.Nr. 86458670-ZD** pure white (RAL9010), suspended ceiling (spring)

**Art.Nr. 86458670-W16** traffic white (RAL9016), back box installation

**Art.Nr. 86458670-W16-AP** traffic white (RAL9016), surface mounting

**Art.Nr. 86458670-W16-ZD** traffic white (RAL9016), suspended ceiling (spring)

**Art.Nr. 86458670-B** black, back box installation

**Art.Nr. 86458670-B-AP** black, surface mounting

**Art.Nr. 86458670-B-ZD:** black, suspended ceiling (spring)

**Art.Nr. 86458670-INT:** DALI-2 CS without application controller only **Instance mode for Integration**, versions see <https://www.lunatone.com/en/product/dali-2-cs-integration/> and respective [datasheet](#)

**Hall Version** – for halls / high ceilings: presence detection range 15m

**Art.Nr. 86458670-15:** DALI-2 CS Hall, sensor module (motion/ light), presence detection range 15m, **Application Controller and Instance mode**, pure white (RAL9010), back box installation

**Art.Nr. 86458670-15-AP** pure white (RAL9010), surface mounting

**Art.Nr. 86458670-15-ZD** pure white (RAL9010), suspended ceiling (spring)

**Art.Nr. 86458670-15-W16** traffic white (RAL9016), back box installation

**Art.Nr. 86458670-15-W16-AP** traffic white (RAL9016), surface mounting

**Art.Nr. 86458670-15-W16-ZD:** traffic white (RAL9016), suspended ceiling (spring)

**Art.Nr. 86458670-15-B** black, back box installation

**Art.Nr. 86458670-15-B-AP** black, surface mounting

**Art.Nr. 86458670-15-B-ZD:** black, suspended ceiling (spring)

**Art.Nr. 86458670-INT-15:** DALI-2 CS Hall , without application controller only **Instance mode for Integration**, versions see <https://www.lunatone.com/en/product/dali-2-cs-integration/> and respective [datasheet](#)

**Office Version** - for office applications: detection of small movement / seated people

**Art.Nr. 86458670-O:** DALI-2 CS Office, sensor module (motion/ light), for office applications (detection of arm movement of seated persons), **Application Controller and Instance mode**, pure white (RAL9010), back box installation

**Art.Nr. 86458670-O-AP** pure white (RAL9010), surface mounting

**Art.Nr. 86458670-O-ZD** pure white (RAL9010), suspended ceiling (spring)

**Art.Nr. 86458670-O-W16** traffic white (RAL9016), back box installation

**Art.Nr. 86458670-O-W16-AP** traffic white (RAL9016), surface mounting

**Art.Nr. 86458670-O-W16-ZD** traffic white (RAL9016), suspended ceiling (spring)

**Art.Nr. 86458670-O-B** black, back box installation

**Art.Nr. 86458670-O-B-AP** black, surface mounting

**Art.Nr. 86458670-O-B-ZD** black, suspended ceiling (spring)

**Art.Nr. 86458670-INT-O:** DALI-2 CS Office, without application controller only **Instance mode for Integration**, versions see <https://www.lunatone.com/en/product/dali-2-cs-integration/> and respective [datasheet](#)

**Long Distance Version** - for high bay applications

**Art.Nr. 86458670-30:** DALI-2 CS long distance, sensor module (motion/ light), for high bay applications, **Application Controller and Instance mode**, pure white (RAL9010), back box installation

**Art.Nr. 86458670-30-AP** pure white (RAL9010), surface mounting

**Art.Nr. 86458670-30-AP-IP54** pure white (RAL9010), surface mounting, IP54

**Art.Nr. 86458670-30-ZD** pure white (RAL9010), suspended ceiling (spring)

**Art.Nr. 86458670-30-ZD-IP54** pure white (RAL9010), suspended ceiling (spring), IP54

**Art.Nr. 86458670-30-W16** traffic white (RAL9016), back box installation

**Art.Nr. 86458670-30-W16-IP54** traffic white (RAL9016), back box installation, IP54

**Art.Nr. 86458670-30-W16-AP** traffic white (RAL9016), surface mounting

**Art.Nr. 86458670-30-W16-AP-IP54** traffic white (RAL9016), surface mounting, IP54

**Art.Nr. 86458670-30-W16-ZD** traffic white (RAL9016), suspended ceiling (spring)

**Art.Nr. 86458670-30-W16-ZD-IP54** traffic white (RAL9016), suspended ceiling (spring), IP54

**Art.Nr. 86458670-30-B** black, back box installation

**Art.Nr. 86458670-30-B-IP54** black, back box installation, IP54

**Art.Nr. 86458670-30-B-AP** black, surface mounting

**Art.Nr. 86458670-30-B-AP-IP54** black, surface mounting, IP54

**Art.Nr. 86458670-30-B-ZD** black, suspended ceiling (spring)

**Art.Nr. 86458670-30-B-ZD** black, suspended ceiling (spring), IP54

**Art.Nr. 86458670-INT-30:** DALI-2 CS long distance, without application controller only **Instance mode for Integration**, versions see <https://www.lunatone.com/en/product/dali-2-cs-integration/> and respective [datasheet](#)

**Corridor Version** – for corridors

**Art.Nr. 86458670-C:** DALI-2 CS Corridor, sensor module (motion/ light), corridor applications, **Application Controller and Instance mode**, pure white (RAL9010), back box installation

**Art.Nr. 86458670-C-AP** pure white (RAL9010), surface mounting

**Art.Nr. 86458670-C-ZD** pure white (RAL9010), suspended ceiling (spring)

**Art.Nr. 86458670-C-W16** traffic white (RAL9016), back box installation

**Art.Nr. 86458670-C-W16-AP** traffic white (RAL9016), surface mounting

**Art.Nr. 86458670-C-W16-ZD** traffic white (RAL9016), suspended ceiling (spring)

**Art.Nr. 86458670-C-B** black, back box installation

**Art.Nr. 86458670-C-B-AP** black, surface mounting

**Art.Nr. 86458670-C-B-ZD** black, suspended ceiling (spring)

**Art.Nr. 86458670-INT-C:** DALI-2 CS Corridor without application controller only **Instance mode for Integration**, versions see <https://www.lunatone.com/en/product/dali-2-cs-integration/> and respective [datasheet](#)

**Flat Version** – *for aesthetic sensitive applications*

**Art.Nr. 86458670-F:** DALI-2 CS Flat, sensor module (motion/ light), flat lens application, **Application Controller and Instance mode**, pure white (RAL9010), back box installation

**Art.Nr. 86458670-F-AP** pure white (RAL9010), surface mounting

**Art.Nr. 86458670-F-ZD** pure white (RAL9010), suspended ceiling (spring)

**Art.Nr. 86458670-F-W16** traffic white (RAL9016), back box installation

**Art.Nr. 86458670-F-W16-AP** traffic white (RAL9016), surface mounting

**Art.Nr. 86458670-F-W16-ZD** traffic white (RAL9016), suspended ceiling (spring)

**Art.Nr. 86458670-F-B** black, back box installation

**Art.Nr. 86458670-F-B-AP** black, surface mounting

**Art.Nr. 86458670-F-B-ZD** black, suspended ceiling (spring)

**Art.Nr. 86458670-INT-F:** DALI-2 CS Flat without application controller only **Instance mode for Integration**, versions see <https://www.lunatone.com/en/product/dali-2-cs-integration/> and respective [datasheet](#)

**Versions for luminaire integration:**

**Art. Nr. 86451485-LA-W16:** DALI-2 CS 2045, sensor module (motion/ light), luminaire integration, **Application Controller and Instance mode**, traffic white (RAL9016),

**Version DALI-2 CS THP AQ**

Versions with additional sensors: temperature, humidity, air pressure, air quality:

<https://www.lunatone.com/en/product/dali-2-cs-thp-aq/>

**Version DALI-2 CS THP-AQ Integration**

Versions with additional sensors: temperature, humidity, air pressure, air quality, **without an application controller** – instance mode only: <https://www.lunatone.com/en/product/dali-2-cs-integration-thp-aq/>

## Additional Information and Equipment

DALI-Cockpit – DALI system configuration tool, free when using a Lunatone interface device

<https://www.lunatone.com/en/product/dali-cockpit/>

Lunatone DALI products

<http://www.lunatone.com/en/>

Lunatone datasheets and manuals

<https://www.lunatone.com/en/downloads-a-z/>

Lunatone sensor instance manual

[https://www.lunatone.com/wp-content/uploads/2022/11/Lunatone\\_DALI-2\\_Sensor\\_Instances\\_EN\\_M0026.pdf](https://www.lunatone.com/wp-content/uploads/2022/11/Lunatone_DALI-2_Sensor_Instances_EN_M0026.pdf)

Instance guide

[https://www.lunatone.com/wp-content/uploads/2021/10/DALI-2\\_Instance-Guide\\_EN\\_M0024.pdf](https://www.lunatone.com/wp-content/uploads/2021/10/DALI-2_Instance-Guide_EN_M0024.pdf)

## Contact

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[www.lunatone.com](http://www.lunatone.com)



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Subject to change. Information provided without guarantee.  
The datasheet refers to the current delivery.

The function in installations with other devices must be tested  
for compatibility in advance.