

DALI-2 CS Integration



Datasheet

Combi Sensor Modul for Integration

DALI-2 sensor module for
measurement of: motion
and light intensity



Art. Nr. 86458670-INT

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

Colour variants: -W16, -B

Installation type variants: -ZD,-AP,-LE

DALI-2 Combi Sensor Integration

Multifunctional Sensor Modul for Integration

Overview

- Sensor module for Integration in systems with a central control or in combination with a DALI-2 CS Master (Art. Nr. 86458670) – www.lunatone.com/en/product/dali-2-cs/
- **DALI-2 CS Integration** (Art. Nr. 86458670-INT) for measurement of motion and light intensity
- Easy configuration via DALI-Cockpit Software Tool and Lunatone DALI USB interface.
- Several sensor modules can be installed within a DALI system.
- Supply via the DALI bus, no additional power supply needed.
- Doubled terminals for easy installation.
- DALI -2 Instance types motion detection (PIR), instance type 3 (62386-303) light intensity measurement, instance type 4 (62386-304)
- Optimized variants for different applications and detection areas (hall, office, long distance, corridor) available
- Versions with additional sensors: temperature, air-pressure, humidity: Art. Nr.: 86457786-INT <https://www.lunatone.com/en/product/dali-2-cs-integration-thp/> as well as additional air quality: Art. Nr.: 86457786-INT-AQ <https://www.lunatone.com/en/product/dali-2-cs-integration-thp-aq/>



DALI-2 CS Integration: measurement of movement and light – version overview:



Specification, Characteristics

type	DALI-2 CS Integration				
application	standard	hall	office	Long distance	Corridor
article number	86458670-INT	86458670-INT-15	86458670-INT-O	86458670-INT-30	86458670-INT-C

electrical data:

supply	via DALI signal line (DALI-voltage according IEC62386)				
marking terminals	DA, DA				
typical current consumption DALI	3.5 mA				
power consumption	<100mW				
control	DALI-2				

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	-20°C ... +60°C	-20°C ... +60°C
rel. humidity, none condensing	15% ... 90%				

technical data:

Motion Detection (62386 - 303)	PIR	PIR	PIR	PIR	PIR
principle	PIR	PIR	PIR	PIR	PIR
detection range (at >8°C temperature difference)	12m	15m	3m /2.3m	30m	5m
typical mounting height	8m	12m	3m	15m	-
zones	92	128	36 / 48	188	88+16
horizontal	±51°	±34,5°	±44°/±90°	±43°	±75°
vertical	±46°	±34,5°	±44°/±90°	±22°	+10°/-25°
min. temperature difference	>4°C	>4°C	>4°C	>4°C	>4°C
details	Figure. 1, page 5	Figure. 2, page 6	Figure. 3, page 6	Figure 4, page7	Figure 5, page7
light sensor (62386-304)	range: 0-2046lux (11bit), resolution: 1lux events: 0-2046lux(10bit), resolution: 2lux				

general data:

protection class	II in intended use				
protection degree	IP20				
mounting	back box – dimensions see below surface mounted (article number extension „-AP“) – dimensions below				

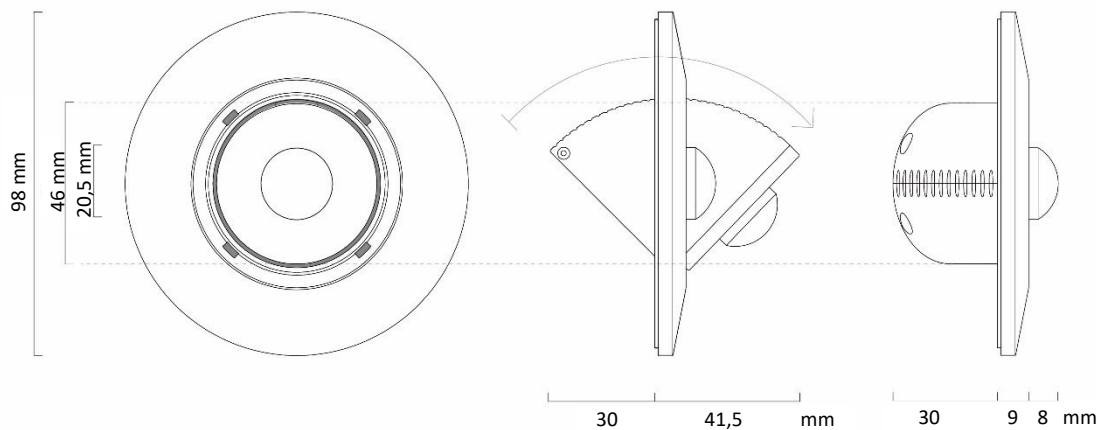
	suspended ceiling (article number extension „-ZD“) – dimensions below
available colours	RAL9010 RAL9016 (article number extension “-W16“) Black (article number extension “-B“)
DALI-2 functionality	Integration – instance mode

terminals

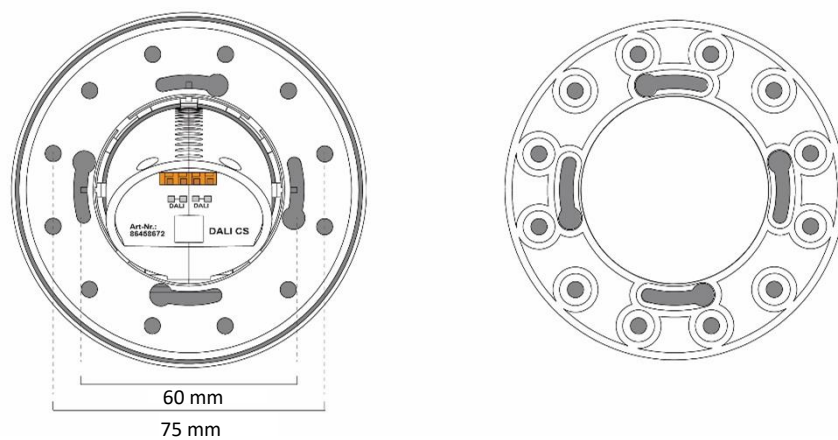
connection type	spring terminal connector
wire size solid core	0,5 ... 1,5 mm ² (AWG20 ... AWG16)
wire size fine wired	0,5 ... 1,5 mm ² (AWG20 ... AWG16)
wire size using wire end ferrule	0,25 ... 1,5 mm ²
stripping length	8,5 ... 9,5 mm / 0,33 ... 0,37 inch

standards

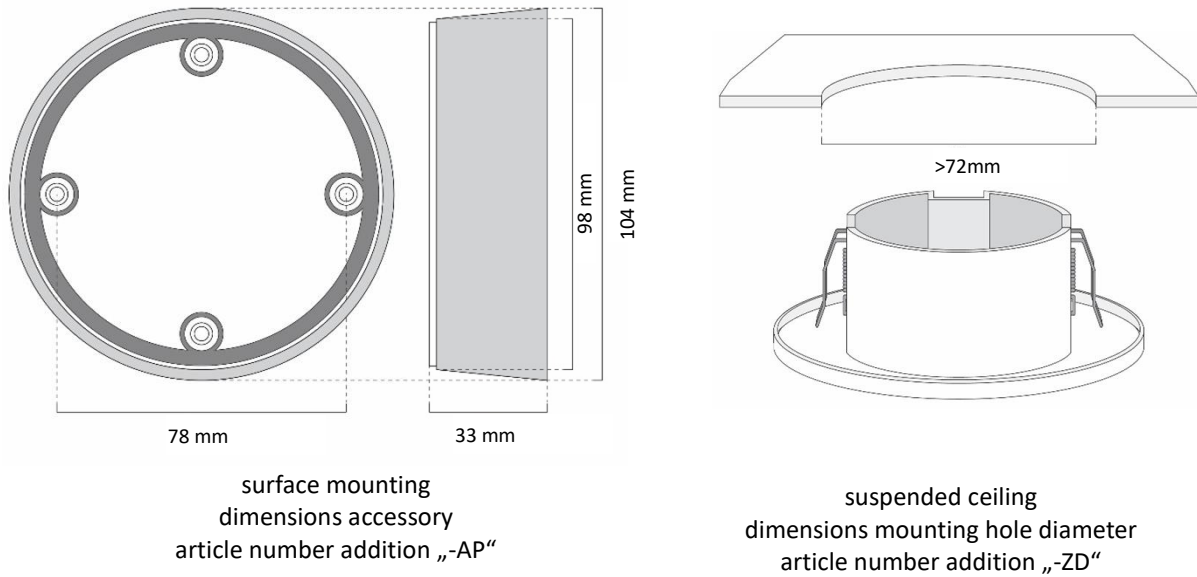
EMC	EN 61547 EN 55015
safety	EN 61347-2-11 EN 61347-1
markings	DALI-2, CE



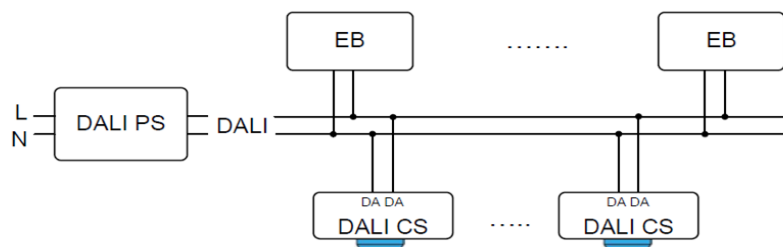
dimensions and space requirements



dimensions mounting ring



Application example



typical application: several sensors on one DALI-line

Sensor types

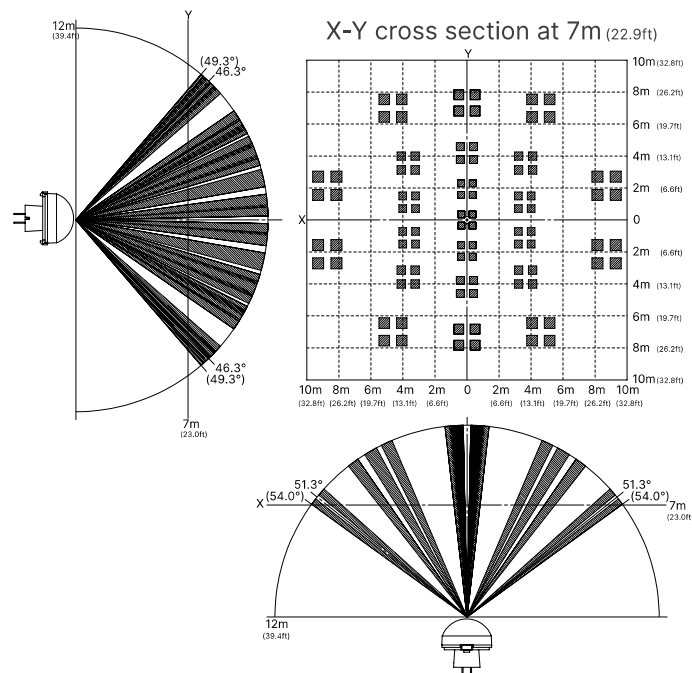


Figure. 1 CS: Standard motion detection (Art.Nr. 86458670-INT) Detection area: X-Y cross section at 7m

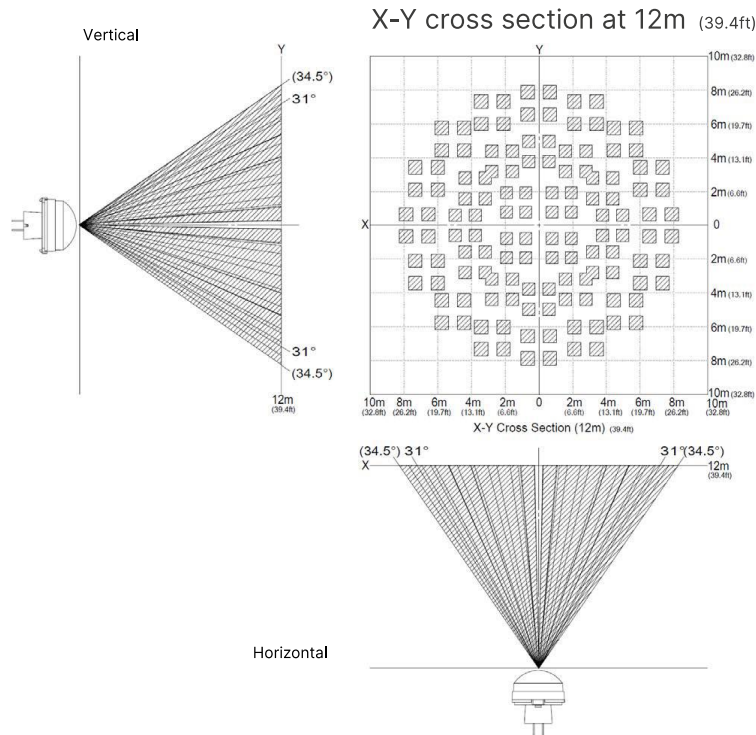


Figure. 2 CS-15: Hall motion detection (Art.Nr. 86458670-INT-15) High density long distance detection type

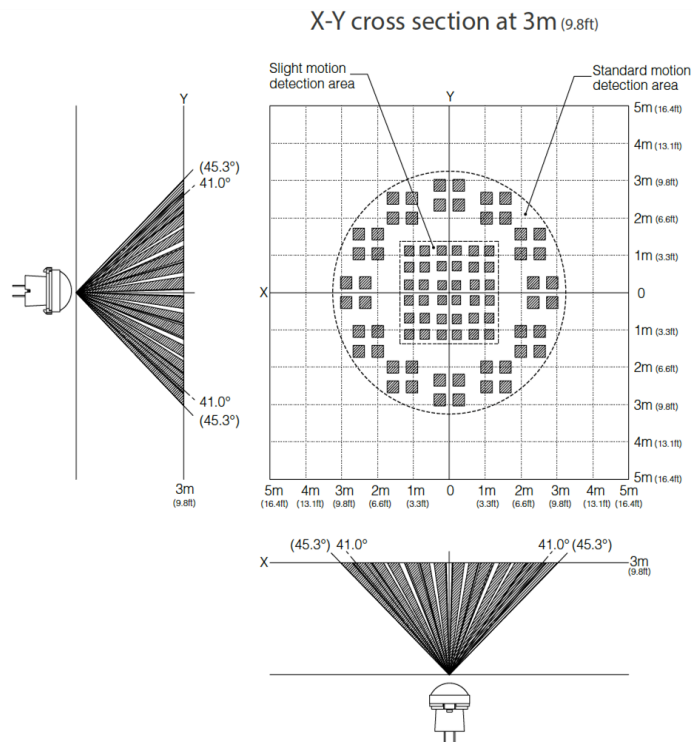


Figure. 3 CS-O: Office motion detection (Art. Nr.: 86458670-INT-O) Detection area: X-Y cross section at 3m - The rectangular centre zone is optimized for detecting smallest movements.

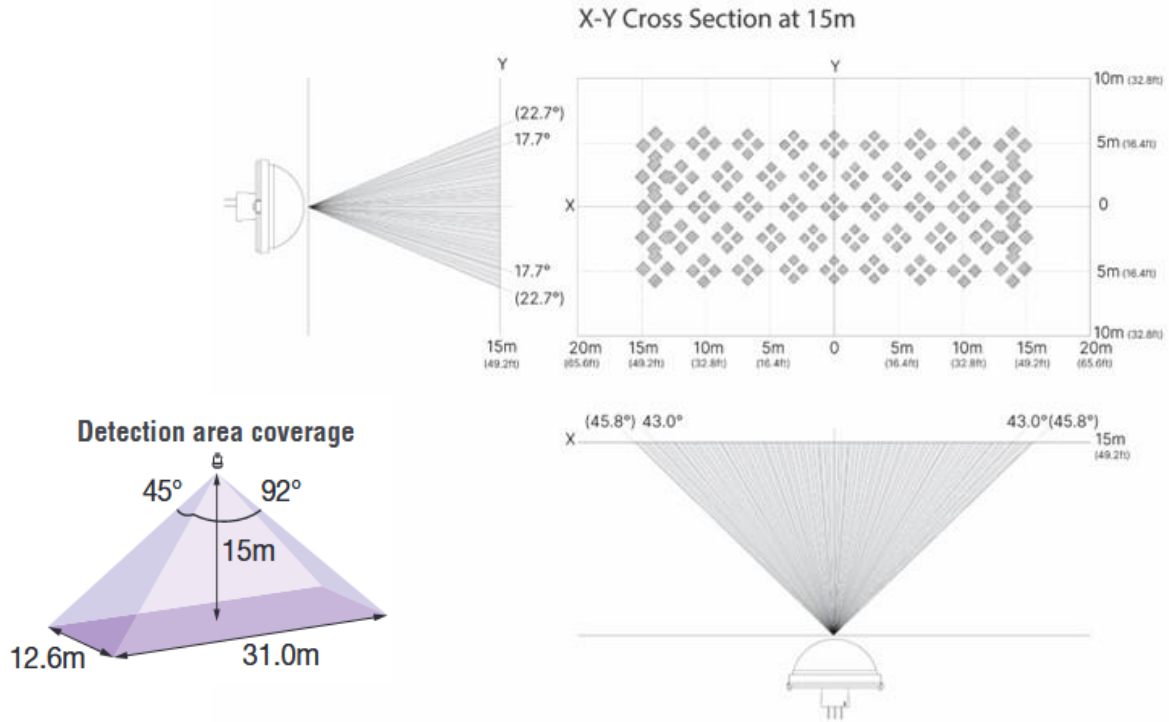


Figure 4 CS-30 long distance motion detection (article number addition: 86458670-30)
High density, wide angle, long distance detection type for high bay applications

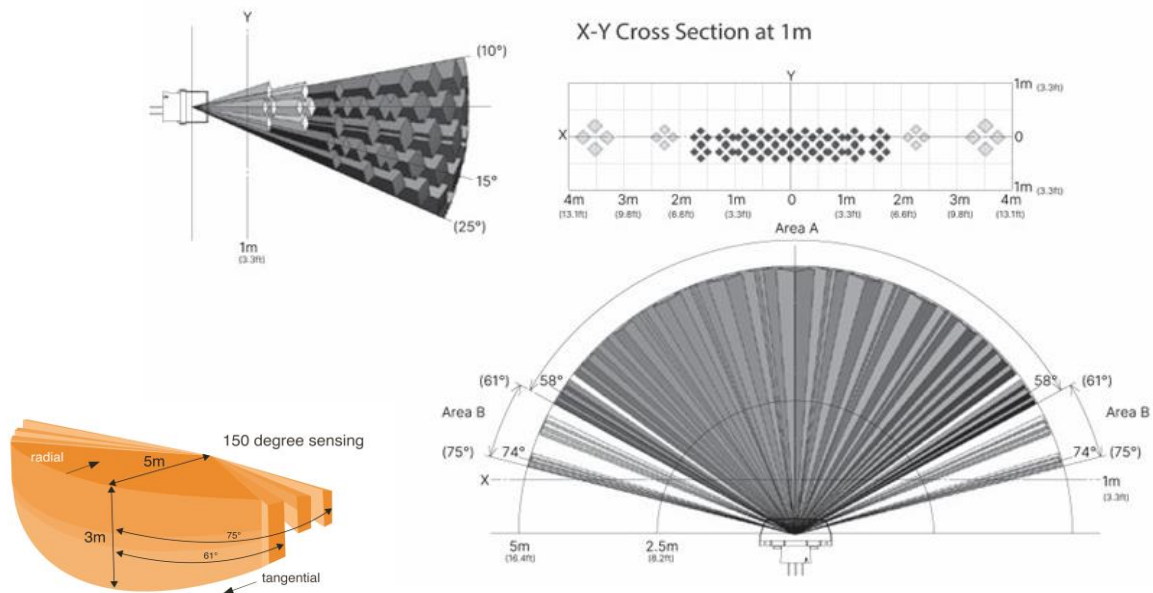


Figure 5 CS-C Corridor motion detection (article number addition: 86458670-C)
Detection area: X-Y cross section at 1m - wide angle for corridors.

Factory Setting

For combination with the DALI-2 CS as Master the factory settings are sufficient. The device configuration can be changed via the [DALI Cockpit](#) and adapted to the current application.

Front-LED (motion indication)	inactive
Event messages:	
Motion	active
Light	active

The following instance settings are the delivery default and are necessary in combination with a DALI-2 CS Master. In combination with a central control unit, the specifications of the central control unit need to be followed (especially with regard to the event schema). For general information on DALI instances see also the ["DALI-2 Instance guide"](#).

Instance No. 0 – Motion:

Event messages	active
Event Schema	device addressing
Event Filter	Occupied Vacant
Deat time	0.00 sec
Report time	not applicable
Hold time	1 sec

Instance No. 1– light:

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

Installation

- the DALI-2 CS is directly connected and supplied by the DALI bus. A general 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 mm² to 1.5 mm².
- 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 completely flat installation.
- The CS Module enables alignment to the desired detection area through 360 ° axial rotation and vertical inclination of up to 40°.
- 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 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).

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 100m². 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, page 5 und table 1 below.

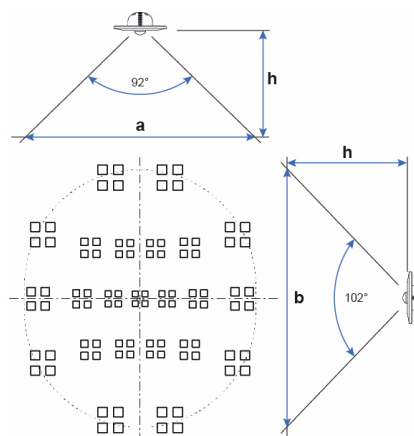


table. 1 CS-Standard: relation of mounting height and detection area

h [m]	a [m]	b [m]	A [m ²]
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

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 6 and table 2 below.

table. 2 CS- hall (15): relation of mounting height and detection area

h [m]	a [m]	b [m]	A [m ²]
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

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 6.

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 m² can be covered, see Figure. 6 and 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 15.2m² can be covered. (see table 3).

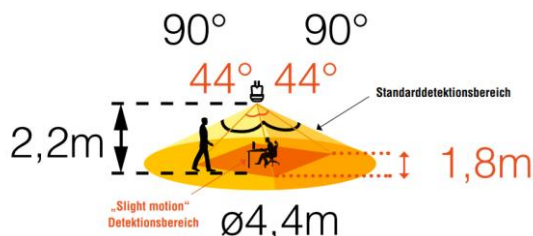


Figure. 6 CS-Office detection range

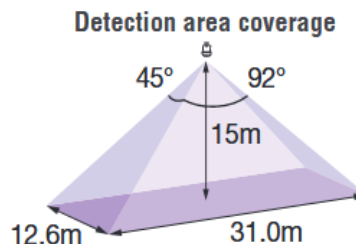
table. 3 CS-Office: relation of mounting height and detection area

h [m]	Standard Detection area			Slight motion detection area	
	a [m]	b [m]	A1 [m ²]	l [m]	A2 [m ²]
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

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

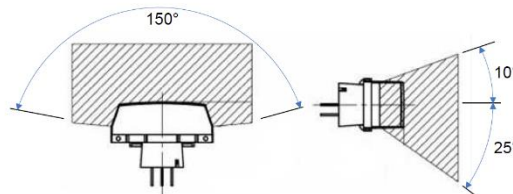
Presence Detection CS-30

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 7.



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 5page 7.



Functionality

The *DALI-2 CS Integration* is for use in systems with higher-level controls, such as for example DALI-2 CS, WAGO, Beckhoff, LUNATONE DALI-2 KNX gateway, etc.. The measured values can either be queried or they can automatically trigger events. This functionality is implemented via DALI-2 instances.

The DALI-2 CS (Art. Nr.: 86458670-INT) has a motion sensor and a light intensity sensor. Similar to this device, the DALI-2 CS THP (Art. Nr.: 86457786-INT) and DALI-2 CS THP-AQ (Art. Nr.: 86457786-INT-AQ) can also measure: temperature, humidity, air pressure and in case of the -AQ version also air quality, refer to:

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

For each detectable sensor value a separate DALI-2 instance is implemented in the device. All instances are DALI-2 certified and comply with the DALI-2 standard.

The measured sensor instance values can either be queried via a "Query" command or sent as a DALI-2 event message.

Each instance can be activated or deactivated (independent of the other instances).

It is possible to assign all instances to one or several instance groups.

Die Eventpriorität ist für jede Instanz einzeln einstellbar, ebenso der Eventfilter, Deadtime und Reporttime.

The event priority can be set individually for each instance, as can the event filter, dead-time and report-time.

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

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 for motion detection (62386-303). 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".

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".

Query Input Value: The current sensor state can be queried using this DALI command. 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

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).

Hysteresis: see chapter "Instances General" – "Hysteresis" page 12.

Hysteresis Min: set in lux. For general information see chapter "Instances General" - "Hysteresis Min" page 12.

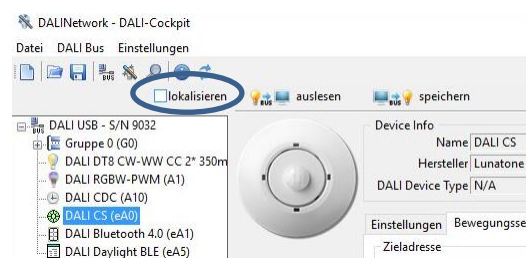
Event Filter: if the filter is deactivated, no events will be sent.

Configuration in the DALI-Cockpit

The DALI CS can be addressed and configured using the DALI-Cockpit PC software tool and a suitable interface to the DALI bus (e.g. DALI USB, DALI SCI RS232 or DALI4Net).

After the device has been addressed, the parameters can be adjusted to the user application.

The localisation of the sensor can be carried out by visual means. To do this, the checkbox "localize" must be selected in the DALI cockpit in order to make the red LED integrated in the sensor flash.



The settings are distributed on different tabs, see Figure. 7 and Figure. 8

tab: „General“

see Figure. 7, page 14

The basic configuration can be made on the "General" tab.

tab: „Instances“

See Figure. 8, page 14

Depending on the version up to 6 instances are available:

- Instance 0, motion detection
- Instance 1, light intensity

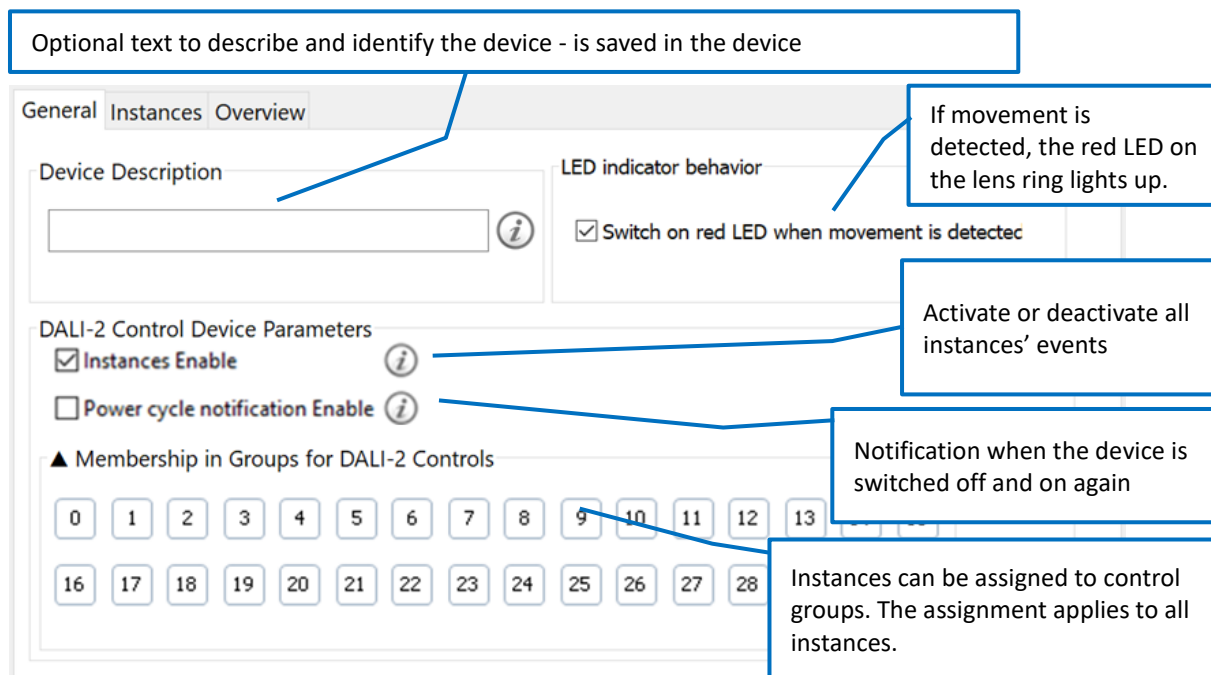


Figure. 7 Cockpit tab General - general settings

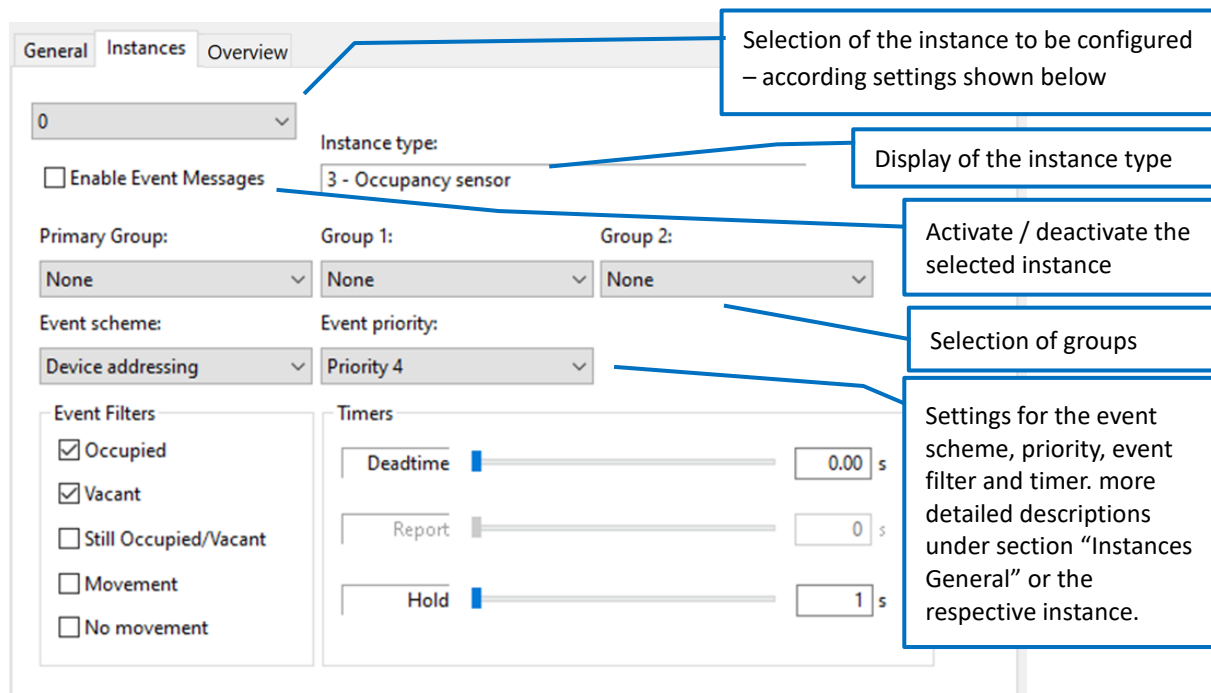
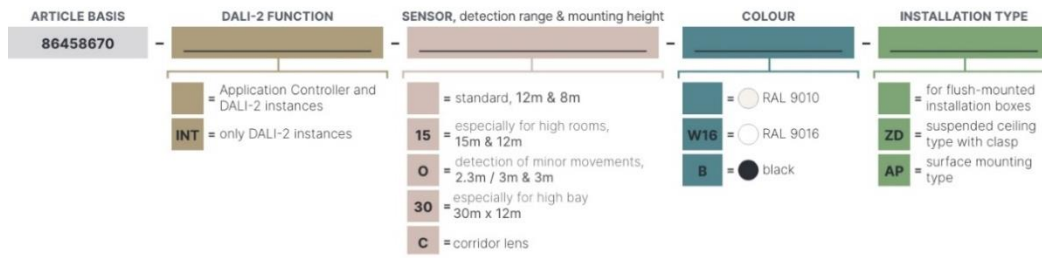
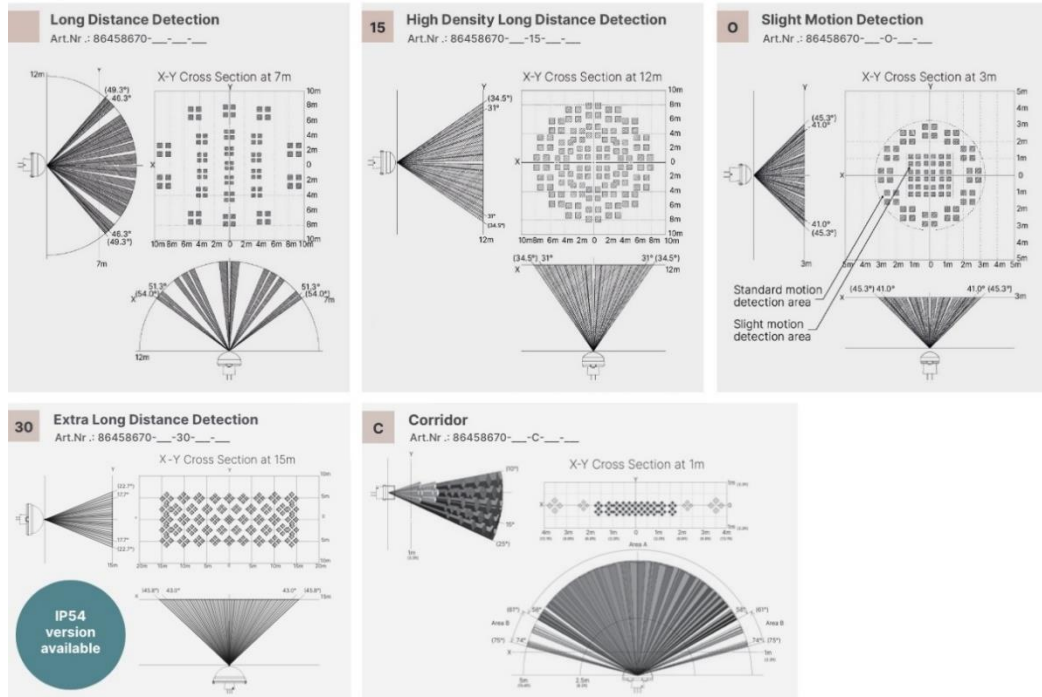


Figure. 8 Cockpit tab Instances - settings for each instance

Purchase Order Information



Lens types:



Housing colour:



Installation type:



Standard Version

Art.Nr. 86458670-INT: DALI-2 CS Integration Sensor module: motion and light intensity;

Instance mode for Integration pure white (RAL9010), back box installation

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

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

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

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

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

Art.Nr. 86458670-INT-B: black, back box installation

Art.Nr. 86458670-INT-B-AP: black, surface mounting

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

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

Art.Nr. 86458670-INT: DALI-2 CS Integration, presence detection range 15m, Sensor module: motion and light intensity, Instance mode for Integration, pure white (RAL9010), back box installation

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

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

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

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

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

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

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

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

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

Art.Nr. 86458670-INT: DALI-2 CS Integration, for office applications (detection of seated persons), Sensor module: motion and light intensity, Instance mode for Integration, pure white (RAL9010), back box installation

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

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

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

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

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

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

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

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

Long Distance Version - for high bay applications

Art.Nr. 86458670-INT-30: DALI-2 CS Integration, high bay applications, Sensor module: motion and light intensity, Instance mode for Integration, pure white (RAL9010), back box installation

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Corridor Version – for corridors

Art.Nr. 86458670-INT-C: DALI-2 CS Integration, corridor application, Sensor module: motion and light intensity, Instance mode for Integration, pure white (RAL9010), back box installation

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

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

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

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

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

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

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

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

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

DALI-2 CS Integration THP Art. Nr. 86457786-INT : <https://www.lunatone.com/en/product/dali-2-cs-integration-thp/>

DALI-2 CS Integration THP AQ Art.Nr.: 86457786-INT-AQ: <https://www.lunatone.com/en/product/dali-2-cs-integration-thp-aq/>

Version with Application Controller

DALI-2 Combi Sensor: www.lunatone.com/en/product/dali-2-cs/

Additional Information and Equipment

DALI-Cockpit – free configuration tool from Lunatone for DALI systems

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

Lunatone sensor instance manual

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

Lunatone DALI products

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

Lunatone datasheets and manuals

<http://lunatone.at/en/downloads/>

Contact

Technical Support: support@lunatone.com

Requests: sales@lunatone.com

www.lunatone.com



Disclaimer

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.