ESYLUX

OPERATING INSTRUCTIONS
COMPACT

- **PD-C 360/8 BMS DALI-2**
- **PD-C 360/24 BMS DALI-2**
- **PD-C 360/32 BMS DALI-2**

Version	Date	Comment
1.0	01/03/2023	First edition

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Inhaltsverzeichnis

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1. Information about the document

1.1 Introduction

These operating instructions contain detailed information on the installation, commissioning and setting options of the product described.
The current version of this document is available on the respective product page at www.esylux.com and can be printed out in A4 format. Read the operating instructions carefully and observe all safety instructions and warnings.

Navigating on screen

Reading the digital document is supported by the following functions:

- **Linked table of contents:** Clicking on the chapter title opens the corresponding chapter.

- **Linked references:** Clicking on → **Reference** 🖑 opens the specified location.

- **List of bookmarks:** An overview of all chapters can be found in the list of bookmarks 🔖 in the PDF document.

1.2 Highlighted information within the text

Formatting

To make these operating instructions easier to read, certain information is highlighted using different formatting.
The meaning of this formatting is explained below:

- ➢ Calls to action

- ✓ Results and outcomes of actions

- **< >** Menu items in the app

- → Text references

- **i** Important and useful additional information

- ⚠ **Warns of dangerous electrical voltage**

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1.3   Manufacturer's address

ESYLUX GmbH
An der Strusbek 40
22926 Ahrensburg I Germany
info@esylux.com
www.esylux.com

1.4   Product identification

These instructions apply to the following products:

Item number	Product name
EP10428203	PD-C 360/8 BMS DALI-2
EP10428210	PD-C 360/24 BMS DALI-2
EP10424885	PD-C 360/32 BMS DALI-2

The item number and product name are located on the product nameplate.

The product name contains essential information about the product:

Element	Meaning
PD	Presence detector
C	COMPACT series
360	Detection angle [°]
8 / 24 / 32	Detection range width [m] Ø
BMS	Building Management System
DALI-2	Control system

1.5   Warnings

Warnings are listed at the start of the relevant chapter if there is a risk of a hazardous situation occurring.

The preceding signal words have the following meanings:

⚠ **DANGER!**

This signal word denotes a hazard involving a high level of risk. Failure to observe the warning will result in death or serious injury.

⚠ **WARNING!**

This signal word denotes a hazard involving a moderate level of risk. Failure to observe the warning may result in death or serious injury.

⚠ **CAUTION!**

This signal word denotes a hazard involving a low level of risk. Failure to observe the warning may result in minor or moderate injury.

CAUTION!

This signal word warns against situations in which failure to observe the notice may result in damage to property.

2.   Basic safety information

2.1   Safety instructions

Specialist person-
nel

Electrical devices connected to a 230 V mains supply may only be assembled and commissioned by electrical installation technicians or trained electricians, taking country-specific regulations into account.

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Basic safety information

⚠	**DANGER!**

⚡ **Risk of fatal injury from electric shock!**

➢ Observe the five safety rules:

1. Disconnect the power supply
2. Secure the power supply from being switched on again
3. Check that the relevant components have been de-energised
4. Set up the earthing and short-circuiting mechanisms as required
5. Cover or isolate
neighbouring live parts

➢ Protect the device with a 10 A circuit breaker.
➢ Protect the circuit with a residual current device (RCD).
➢ Observe the contact opening width ($\mu = < 1.2$ mm).

2.2 Intended use

Place of use

COMPACT series DALI-2 BMS presence detectors are designed for integration into a DALI-2 bus system in indoor applications. The presence detector uses passive infrared technology (PIR). It requires a clear view of people and reacts to even the smallest movements, such as the movements of a person sitting at a desk. The presence detector is particularly suitable for rooms with daylight that are used for extended periods of time, such as classrooms, offices, meeting and conference rooms, sports halls, fitness rooms, warehouses and exhibition halls. Any other use beyond this is considered improper and can lead to personal injury and damage to property. Only use this product in accordance with the information provided in these instructions.

2.3 Liability and damages

Warranty

The device must not be changed, modified or painted – doing so will render any warranty claims void.
The manufacturer accepts no liability for damage caused due to **improper** use.
Check the device for damage after unpacking. If the device is damaged, return it to the place of sale.

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3.   Product description

3.1   Introduction

The COMPACT series DALI-2 BMS presence detector has been developed for intelligently controlling lighting groups in accordance with the DALI-2 standard. It has been designed for integration into a DALI-2 bus system in indoor applications.
The DALI-2 BMS presence detector detects movement, light values or push button actuations and converts them into DALI-2 information. The control unit (e.g. an APC presence detector) manages all the information and automatically controls the DALI-2 groups based on the information from the DALI-2 BMS presence detector.

Properties   Main product features:

- Certified in accordance with the DALI-2 standard

- Only suitable for lighting control using a DALI-2-enabled application controller

- Integrated motion and light sensor based on the IEC 62386-303/-304 standard

- Two non-floating inputs for connecting push buttons based on the IEC 62386-301 + IEC 62386-302 standard

> ### *CAUTION!*
>
> **Do not use external voltage.**

- Supply voltage on the DALI-2 bus system

3.2   Included in delivery

1 x presence detector
1 x lens mask
1 x quick-reference guide

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4. Installation

The following types of installation are possible:

with accessory   **with accessory**

Installation using the
surface-mounted box*

Installation in
suspended ceilings and
flush-mounted boxes

Installation
using the ceiling
installation set*
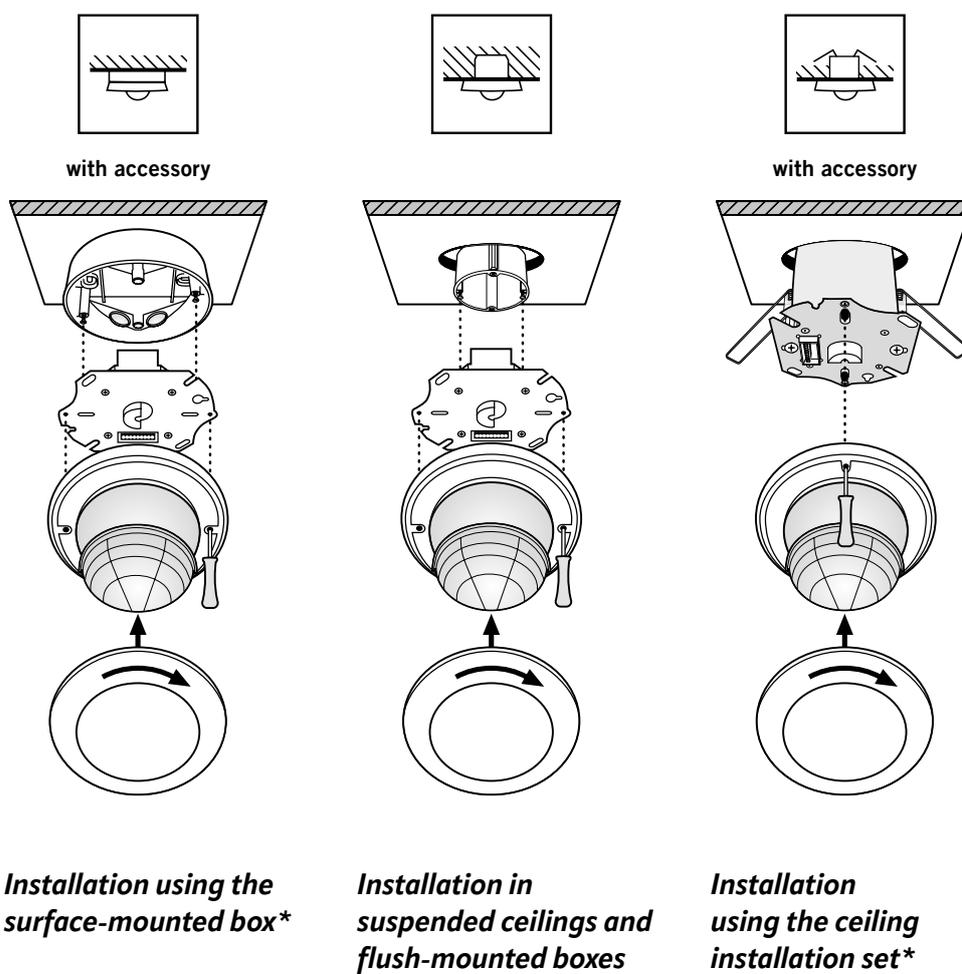
*Required accessories are not included in the scope of delivery.

5.   Connection

> ⚠️ **DANGER!**
>
> ⚡ **Risk of fatal injury from electric shock!**
>
> ➢   Before connecting, disconnect the bus voltage supply (e.g. APC) at the mains.
>
> ➢   Check that the relevant components have been de-energised.

Connect the DALI-2 BMS presence detector:

➢   Observe the following wiring diagram and terminal assignment:

Terminal assignment

DA	DALI-2 bus
S2	Push button 2
S1	Push button 1
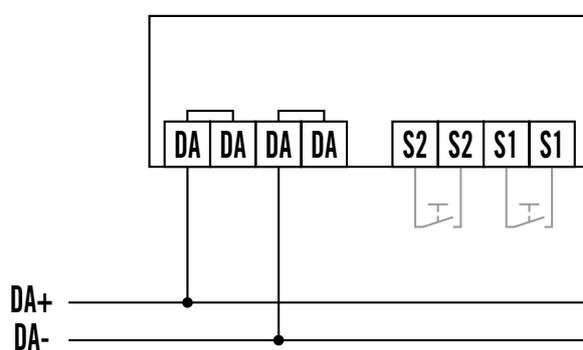
Standard operation with optional control via a closing button. The maximum cable length from the push button to the presence detector is 30 m.

> ℹ️ The length of the installation cable with a wire cross-section of 1.5 mm² must not exceed 300 m.

6. Initial operation

Initial operation is carried out in accordance with the applicable DALI-2 standard.

> ➢ Connect the DALI bus voltage.

> ✓ A warm-up phase of approx. 25 seconds is initiated.
> ✓ When the green sensor LED briefly flashes three times, the warm-up phase is complete.

The signals from the sensor LEDs indicate the following:

- Blue and red sensor LEDs flash alternately

    ✓ No DALI-2 short address assigned.
       (Factory setting in delivery state)

- Purple sensor LED flashes

    ✓ DALI-2 localisation and identification of the detector.

- Blue LED flashes

    ✓ DALI-2 short address assigned.

The presence detector provides the application controller with the following instances in their entirety:

Instance no. 0   Push button input S1 (instance type 1 in accordance with IEC 62386-301)
Instance no. 1   Push button input S2 (instance type 1 in accordance with IEC 62386-301)
Instance no. 2   Presence detector (instance type 3 in accordance with IEC 62386-303)
Instance no. 3   Ambient light sensor (instance type 4 in accordance with IEC 62386-304)
Instance no. 4   Switch input S1 (instance type 2 in accordance with IEC 62386-302)
Instance no. 5   Switch input S2 (instance type 2 in accordance with IEC 62386-302)

7. Settings

The presence detector is parameterised and controlled only via the application controller (APC).

7.1 Memory bank 2

The DALI-2 BMS presence detector offers configuration/setting elements that have not yet been defined by the IEC-62386 standards.

The following settings can be defined in memory bank 2:

- Sensor LED on/off and sensor LED brightness

- Ambient light sensor (ALS) correction factor

- Sensitivity of the motion sensor (PIR)

The memory bank (memory bank 2) is written or read via standard DALI-2 commands.

7.1.1 Sensor LED mode

Value (decimal)	Value bits*	Description
0	0000 0000	Sensor LEDs are deactivated. Deactivating the sensor LEDs will hide all sensor LED signals for normal operation. The following events are not hidden: - DALI identification procedure started by the IDENTIFY DEVICE command - The LED sequence displayed during the warm-up phase immediately after switching on - PIR test modes
1	0000 0001	Sensor LEDs are activated. All events are signalled by the sensor LEDs.

Value (decimal)	Value bits*	Description
2	0000 0010	(Like value = 1)
3	0000 0011	Sensor LEDs are activated. All events are signalled by the sensor LEDs.
		Deactivating the 303 instance deactivates the signalling of events in the "Motion detection suppressed" category. This is applied if the sensor does not need to indicate any detected movement.

*The sensor LED mode settings provide the setting options listed below, which can be set independently to 1 or 0:

Bit [0] set: LEDs activated.

Bit [1] set: Deactivating the 303 instance also deactivates the signalling of events in the "Motion detection suppressed" category.

7.1.2   Sensor LED brightness

The sensor LED brightness can be configured from 5 – 100 % with values from 5 … 100. If sensor LEDs are to be deactivated, set the sensor LED mode value to 0.

7.1.3   ALS correction factor

The ALS correction factor of the ambient light sensor indicates the ratio between the measured value from the ceiling and the value sent to the APC by the DALI-2 BMS presence detector.
Different reflection behaviour indoors leads to differences in the brightness values from the ceiling and floor. The ALS correction factor is designed to compensate for these differences and can be set between 0.1 … 5.0.

- 0.1 corresponds to value 1 in memory bank 2

- 5.0 corresponds to value 50 in memory bank 2

Factory setting: ALS correction factor = 1

The DALI-2 BMS presence detector does **not** perform an ALS correction. The light value reported via the DALI-2 bus corresponds to the measured light value from the ceiling.
The light value reported by the DALI-2 BMS presence detector is limited to 819.0 lux. The reason for this is the 13 bit resolution reported by the DALI 304 instance.

7.1.4   Determining the ALS correction factor

The ALS correction factor of a single ambient light sensor is measured and determined using a lux meter at two points on the ground floor (100 lux and 500 lux).

- ➢   Dim the lighting until the lux meter indicates a value of 100 lux.
- ➢   Read the lux value measured by the DALI-2 BMS sensors
- ➢   Determine the correction factor for each DALI-2 BMS presence detector and apply to "ALS 0 correction factor 100 lux" and "ALS 1 correction factor 100 lux".
- ➢   Repeat these steps for 500 lux.

- ✓   The ALS correction factor is determined

Example:

Brightness value measured using a lux meter on the floor: 100 lx
Brightness value measured by DALI-2 BMS presence detector from the ceiling: 54 lx

Correction factor = (100 / 54) = 1.851 → value = 1.9 → memory bank = 19

7.1.5   Memory bank 2

To configure settings in memory bank 2, use standard DALI commands for reading/writing to memory banks.

Settings

Location	Description	Memory type (reference 1)	Value range	Default value[1]	RESET value (reference 2)
0x04	LED mode, e.g. LEDs activated, "Motion detection suppressed" signalling deactivated 0 = LEDs deactivated 1 = LEDs activated 3 = LEDs activated, but the "Motion detection suppressed" event is not displayed if the 303 instance is deactivated	NVM	0 … 3	3	No change
0x05	LED brightness in the range 5 %…100 %	NVM	5 … 100	50	No change
0x08, 0x09	ALS 0 - correction factor 100 lux in 1/10 of the measured value	NVM	1 … 50	10	No change
0x0A, 0x0B	ALS 0 - correction factor 500 lux in 1/10 of the measured value	NVM	1 … 50	10	No change
0x0C, 0x0D	ALS 1 - correction factor 100 lux in 1/10 of the measured value	NVM	1 … 50	10	No change
0x0E, 0x0F	LS 1 - correction factor 500 lux in 1/10 of the measured value	NVM	1 … 50	10	No change
0x10	PIR sensitivity as in the range 1 % …100 % (reference 3)	NVM	1 … 100, 254, 255	95	Firmware < V2.1.0: No change Firmware >= V2.1.0: Set to default value due to the implementation of the DALI-2 command

Reference 1:
ROM = Read-only memory, cannot be changed by the user.
NVM = Non-volatile memory, can be changed by the user.

Reference 2:
Value is reset to this default value by the "0xFE 0x10 RESET" DALI command.

Reference 3:
Although some DALI-2 BMS presence detector models use more than one PIR sensor, the sensitivity of all sensors for the device can only be set to the same value once.

7.1.6   PIR sensitivity

Memory location 0x10 allows the PIR sensitivity to be read and set from 1 %…100 % — the higher the value, the higher the sensitivity of the sensor.

Special memory location values:

- **254:** This value resets the PIR sensitivity to the factory setting. Subsequent reading operations then report the factory setting until this value is overwritten.

- **255:** This measured value indicates that adjustment of the PIR sensitivity is not supported.

> **i**   The DiiA has proposed new DALI commands for adjusting the sensitivity of the sensors. As soon as they become available, memory bank 2 will reflect the adjustments made using the new commands.

Any value between 101 and 254 will reset the PIR sensitivity to the factory setting.

8.   Maintenance

The device is maintenance-free. In the event of damage, the entire device must be replaced.

8.1   Cleaning

Using the wrong cleaning products will damage the device. Do not use corrosive cleaning agents or solvents to clean or maintain the device.

➢   Use a lint-free cloth that is either dry or dampened with water.

9.   Technical data

Mounting

Installation type	Flush-mounted / device box Ø 68 mm
Installation position	Ceiling
Installation dimensions	Installation depth: 24 mm, Ø 60 mm
Connection type	Plug terminal
Connectable wire cross-section	1.5 – 2.5 mm²

Housing

Dimensions	PD-C …/8	Height/depth 62 mm, Ø 108 mm
	PD-C …/24	Height/depth 70 mm, Ø 108 mm
	PD-C …/32	Height/depth 70 mm, Ø 108 mm
Weight	PD-C …/8	130 g
	PD-C …/24	134 g
	PD-C …/32	134 g
Material	UV-stabilised polycarbonate	
Protection type	IP20	

Protection type with accessories	IP54 with surface-mounted box (not included in the scope of delivery)
Permissible ambient temperature	0 °C…+50 °C
Relative humidity	5 – 93 %, non-condensing
Colour	White, similar to RAL 9010

Electrical design

Control system	DALI-2	
Protection class	II	
Nominal voltage	9.5 – 22.5 V ⎓	
Power consumption	Peak current DALI	10 mA
	No load current DALI	6 mA
Standby consumption	< 0.1 W	

Sensor

Detection angle	360°	
Detection range diagonally	PD-C …/8	Ø 8 m
	PD-C …/24	Ø 24 m
	PD-C …/32	Ø 32 m
Detection range head-on	PD-C …/8	Ø 6 m
	PD-C …/24	Ø 11 m
	PD-C …/32	Ø 11 m
Presence detection range	PD-C …/8	Ø 4 m
	PD-C …/24	Ø 8 m
	PD-C …/32	Ø 8 m
Field of detection	PD-C …/8	Up to 50 m²
	PD-C …/24	Up to 453 m²
	PD-C …/32	Up to 805 m²
Rec. Installation height	3 m	
Max. installation height	PD-C …/8	5 m
	PD-C …/24	10 m
	PD-C …/32	10 m
Light measurement	Mixed light	
Level of brightness	5 – 2000 lx	

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Channels (lighting / HVAC)

Lighting push button input	2
DALI-2 device type	Input device in accordance with -301 (push button), input device in accordance with -302 (switch, absolute values), input device in accordance with -303 (presence and motion detectors), input device in accordance with -304 (light sensor)
Switch-on time	600 ms
Field of detection	PD-C …/8 C1 lighting PD-C …/24 C1 lighting PD-C …/32 C1 - C16 lighting
Function	Sending values
Push button input	Yes

10. Disposal

This product must not be disposed of with unsorted residual waste. Owners and operators of the product are legally obliged to dispose of all parts of the product properly and according to type. Contact your local town council for more information.

11. EU Declaration of Conformity

CE declaration

The product complies with the following directives:

EMC 2014 / 30 / EU
LVD 2014 / 35 / EU

RoHS 2011 / 65 / EU
Ecodesign 2009 / 125 / EG

12.   ESYLUX manufacturer's warranty

ESYLUX manufacturer's warranty at www.esylux.com.
Technical and design features may be subject to change.