GB CE

33 000 031 - **1**

Eltako

DALI-2 motion/brightness sensor office

DL2-BH98B-pm

Only skilled electricians may install this electrical equipment otherwise there is the risk of fire or electric shock!

Transport and storage temperature: -20°C ... +70°C
Operating temperature: -20°C ... +60°C
rel. humidity, non-condensing: 15% ... 90%

DALI-2 motion/brightness sensor office. Application controllers and instances. Protection class: IP 20.

Installation and assembly

- The DL2-BH98 is connected directly to the DALI bus and powered by it. A DALI bus power supply is required; no additional power supply is required.
- The connection to the DALI terminals can be made without paying attention to the polarity.
- The terminals are suitable for wires with cross sections from 0.5 mm^2 to 1.5 mm^2.
- Mounting box: Attach the mounting ring directly to the electrical installation box, the housing can then simply be plugged onto the mounting ring, the recessed sensor head fits into the electrical installation box.
- Installation on hollow walls and false ceilings with spring clip in the housing GZD-BH98-pm Item number: 33000032
- Surface mounting in the GAP-BH98-pm housing Article number: 33000033
- Alignment to the desired detection area through a 40° vertical tilt 360° rotation axially
- Installation may only be carried out when the system is in a de-energised state and by qualified specialist personnel
- National regulations for the construction of electrical systems must be observed.
- The DALI cables can be designed with standard low-voltage installation material. No special cables are required.

Attention:
Cable cross section, the voltage drop on the DALI cable must not exceed 2 V at maximum length (300 m) and maximum bus load (250 mA).

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 value for dimming down before switching off. Optional use as an active DALI lighting control unit or as a sensor unit for integration into building management systems. Bidirectional integration via the FD2G71L-230V into the EnOcean building radio or FD2G14 into the 14 series. Multiple sensor modules can be installed within a DALI system. Automatic synchronisation of multiple sensors with the same effective range.

Dimensions: 98x47 mm
Installation depth: 30 mm
Colour: polar white mat (similar to RAL9010).

Specification, characteristics

Type	DL2-BH98B-pm
Article number	33000031
Application standard	office

Electrical data

Supply	from DALI bus (DALI voltage according to IEC62386)
Terminal designation	DA, DA
Max. current consumption	3.5 mA
Power consumption max.	<100 mW
Control	DALI

Technical data

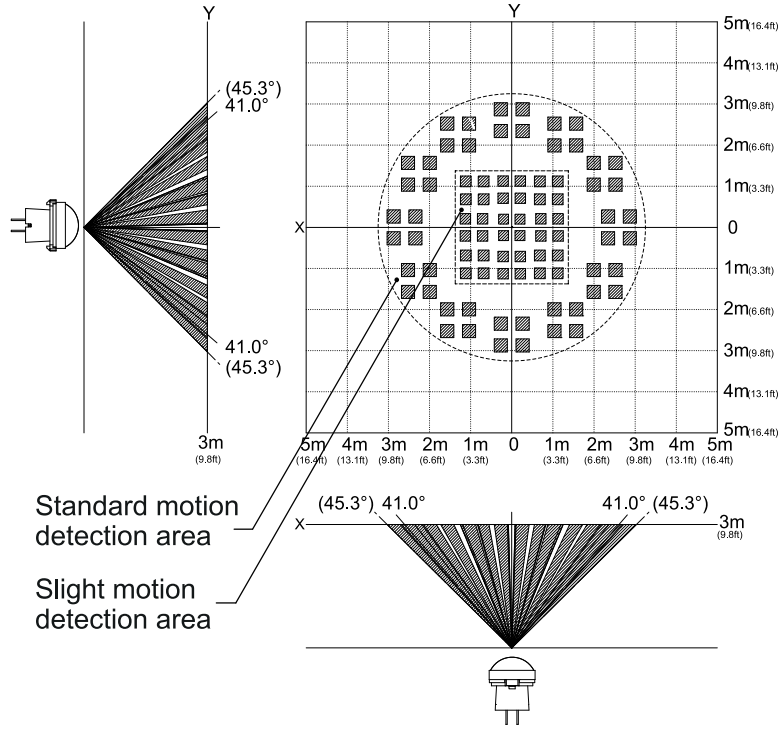
Motion detector principle	PIR
Detection range (at >8°C temperature difference)	2.3 m/3 m
Installation height	3 m
Zones	36/48
Horizontal	±44°/±90°
Vertical	±44°/±90°
Min. temperature difference	>4°C
Details	Fig. 1
Light sensor (62386-304)	range: 0-2047 lux (11bit), resolution: 1 lux Event:0-2047 lux(10bit), resolution: 2 lux
Function	programmable

Terminals

Connection type	spring-loaded terminal
Connection capacity solid	0.5 ... 1.5 mm^2 (AWG20 ... AWG16)
Connection capacity fine-wire	0.5 ... 1.5 mm^2 (AWG20 ... AWG16)
Connection capacity with wire end sleeves	0.25 ... 1.5 mm^2
Stripping length of connecting wires	8.5 ... 9.5 mm

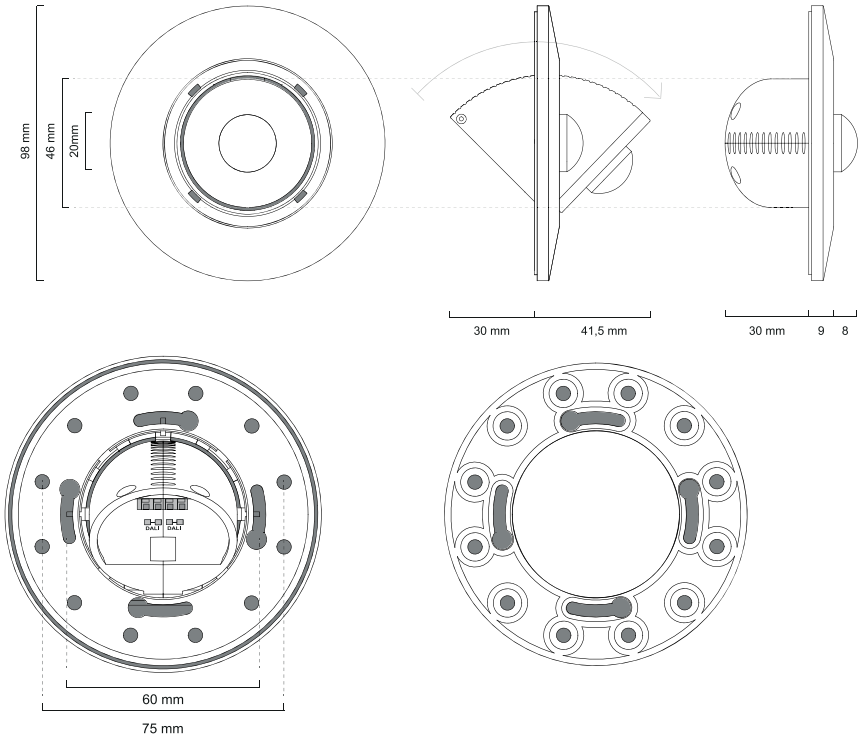
Standards

EMV	EN 61547 EN 55015
Electrical safety	EN 61347-2-11 EN 61347-1
Markings	ENEC-11, CE



Motion detection (Art. No.: 33000031)

Detection range: X-Y cross section at 3 m



Dimensions of mounting ring

Factory setting
The factory setting is sufficient for simple applications. Device settings can be changed via the DALI Cockpit and adapted to the current application.

DALI-2 Setting	Application Controller – Master Mode
Operating mode	Motion controlled without constant light control, an external on command deactivates motion detection until the next external off command
Effective range	Broadcast
Switch-on command	Recall Max
Holding time	10 min
Absence value	None
Absence holding time	0 s
Switch-off command	Off
Switch-on threshold	None
Switch-off threshold	None
Power Up Verhalten	No action
Light control (CLC)	inactive
Front LED (motion indicator)	active
Motion detector instance event messages	inactive
Light sensor instance event messages	inactive

Instance basic settings
In order to use the motion sensor instance or light sensor instance in combination with a master, the following instance settings are required, these are set in the delivery state, only event messages need to be activated, this is done automatically by the DALI-2 master (it is also possible to activate event messages manually without the DALI Cockpit via the DALI command ENABLE INSTANCE):

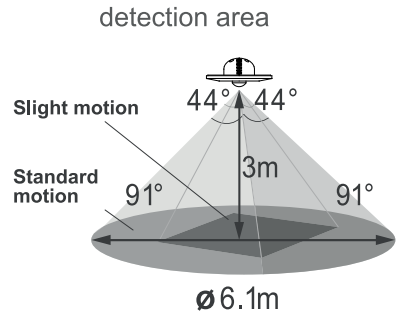
Instance #0 – Motion:

Event messages	active
Event schema	device addressing
Event filter	Occupied Unoccupied
Dead time	0.00 sec
Report time	not applicable
Holding time	1 sec

Instance #1 – Light:

Event messages	active
Event schema	device addressing
Event filter	lighting level
Dead time	0.8 sec
Report time	unused
Hysteresis Min	5 Lux
Hysteresis	5 %

Motion detection
In order to detect motion, there is a need for a temperature difference of at least 4°C between the moving object and the environment. Heat sources such as printers, radiant heaters, etc. can have a negative influence on motion detection.
Relatively large areas can be covered with just one sensor head. With opening angles of 92° and 102° and 92 detection zones, over 100 m² of area can be covered at an installation height of 5 m. The distance between the sensor and the object to be detected should be less than 12 m, which corresponds to an installation height of around 8 m. See Fig. 1.

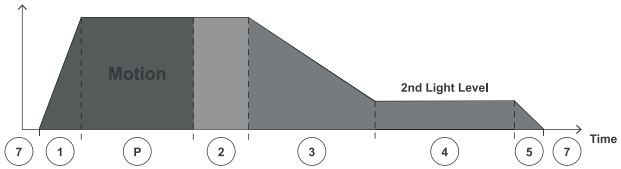


	Standard detection area			Slight motion detection area	
h [m]	a [m]	b [m]	A1 [m²]	l [m]	A2 [m²]
2.0	4	4	12.5	1.6	2.56
2.2	4.4	4.4	15.2	1.8	3.24
2.5	5	5	19.6	2	4
3.0	6	6	28.2	2.4	5.76

Correspondence between mounting height and area

Timing motion detection

The motion report is always processed according to the following time schedule:



Process when motion is detected

States:

1: Fade In Time – Dim up to 1st light level

2: Hold Time / Hold Time

3: Fade Time – dimming to 2nd light level

4: 2nd Hold Time (2nd Light Level) / Hold Time

5: Fade Out Time – dim to off

P: Ongoing motion detection (retrigger)

7: Off

If motion is detected, the sensor module switches the area to be controlled to an adjustable brightness value. As long as motion is detected (P) or the hold time is running (2), this area remains switched on at a fixed brightness value or the brightness is regulated when the constant light control is activated.

If no motion is detected during this time, it is not switched off directly, but rather the absence value (2nd light level) is called up for a defined time (4). The absence value is a fixed brightness value (without constant light control). If motion is detected during this absence time, the sensor switches back on to the predefined brightness value (1, P).

Recommendation: low to avoid it being higher than the value set by the constant lighting control.

Areas 1, 3 and 5 regulate the transitions between states 7/P/2/4/7.

Light sensor

Light intensity measurement

All DL2-BH98 versions have a light sensor. This measures the reflected illuminance in a range from 0 to 2047 lux, the resolution is 2 lux.

The incident light is evaluated using the spectral light sensitivity curve of the human eye and is therefore a measure of the subjective perception of brightness.

The incident light is measured in the area of the lens area covered and can be viewed as the average value in this area. A relative reference to the reflective surface below the sensor can be established using a reference measurement and adjustable offset.

Function

In principle, a distinction is made between an application controller and the DALI-2 instances.

The **Application Controller** leads to direct DALI control commands that are immediately executed by the DALI drivers.

The **DALI-2 instances** generate event messages that are interpreted and further processed by higher-level control units (e.g. DL2-BH98 in master mode, FD2G14 or FD2G71L gateway).

Configuration of the instances is described in the 'Instances' section.

DL2-BH98 can be used both as an application controller, as a *master*, and in instance mode, as a *slave*. All operating modes and setting options described in the document are available for the Application Controller.

Operating modes

The sensor supports 4 operating modes. Motion control, motion control with constant light control, constant light control only or light threshold control. The operating behavior of the sensor can also be influenced using external commands (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

■ When there is motion, the light value is switched on to a fixed value

When motiont is detected, the sensor switches the light on to a fixed value and starts the time sequence. After switching on, the light value remains active until no more motion is detected and the hold time has expired. The system then switches to the fixed 2nd light value.

It can also be set that the process only starts above or below a defined threshold.

The operating behavior can be influenced by external on/off/dimming and scene commands.

Operating mode 2 – motion control with constant light control

■ Constant light control is activated when there is motion

■ Second light value is a user-defined fixed value.

When there is motion, the timing is activated. After switching on, the constant light control is active until no more motion is detected and the holding time has expired. The system then switches to the fixed 2nd light value (no constant light control).

It can also be set that the motion and light control is only active above or below a defined threshold.

The operating behavior can be influenced by external on/off/dimming and scene commands.

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 lighting control can be switched on and off using DALI commands (e.g. from an operating device).

The operating behavior can be influenced by external on/off/dimming and scene commands.

Operating mode 4 – light threshold control

- Light control via light threshold values
- No motion detection

In this operating mode only the light sensor is used. Both motion detection and constant light control are inactive. 4 light thresholds can be defined which, if exceeded, trigger the sending of DALI commands to the effective range.

2 of the 4 adjustable thresholds can be used to send repeated commands. The commands are sent at a user-defined interval until the threshold condition is no longer fulfilled.

The operating behavior can be influenced by external scene commands.

Additional functions

Behavior when receiving external DALI commands

The behavior of the control system for external commands can be adjusted via the DALI Cockpit. Depending on the operating mode, the behaviors described in the following document are available to choose from.

The following commands to the effective range (1st target address) are interpreted as an **on command:**

- RECALL MAX
- RECALL MIN
- ON AND STEP UP
- DAP>0%
- GOTO SCENE X (if the command was defined as a switch-on command for the motion detector)

The following commands to the effective range are interpreted as **off commands:**

- OFF
- DAP=0
- GOTO SCENE X (if the command was defined as a switch-off command or a command to call up the 2nd light value for the motion detector)

Dimming commands: You can also specify how the motion or light control should behave when manual dimming commands (UP/DOWN) occur in the effective range (1st target address.

Switch-on and Bright Out threshold

In order to adapt the motion detector to the ambient lighting conditions, there are two threshold values for brightness.

Switch-on threshold: Depending on the setting, the time sequence is started when motion is detected regardless of the light value (default) or only below or above the switch-on threshold.

For a running time sequence, you can also specify whether detected motion is only triggered below the bright-out threshold.

Bright Out - Application example: The lighting in a parking lot should switch off during the day (only ON if the measured light value < 70Lux), even if motion is detected during the transition period.

Power-on behavior

In order to achieve a defined operating state after a power-on (switching the bus voltage back on), either an adjustable DALI command or a quick run-through of the motion detector's time sequence can be activated as behavior.

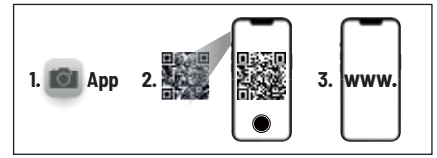
Multiple sensors in the same group

Several sensors can have the same effective range, e.g. to cover the detection area with several sensors.

The sensor addresses for motion detection and for recording the light value can be set in the DALI Cockpit software (, Synchronisation' tab). The parameters of the sensors should be coordinated, especially the follow-up times.

Manuals and documents in further languages:

https://eltako.com/redirect/DL2-BH98B-pm



Must be kept for later use!

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