



MARS Architectural

INFORMATION
ON SENSORS

OVERVIEW

- The MARS Architectural product family is available with integrated sensors.
- These are available for variants with integrated drivers (type 62) for both Stand-Alone as well as Continuous Row luminaires.
- Stand-alone luminaires have one integrated sensor (on the cable feed end of the luminaire), Continuous Rows have one sensor on each the beginning and end of the light line.
- The sensors can be controlled and included into either a Dali or Casambi network, depending on the chosen type.

Project types and areas where sensors are recommended:

- Offices, conference rooms
- Corridors, lift lobbies, public areas
- staircases
- Atriums, reception areas, entrance halls
- Museums
- Class rooms, seminar rooms
- Retail spaces
- Restrooms, sanitary rooms



WHY USE SENSORS

Sensors play a key role in modern lighting technology and offer numerous advantages that improve both comfort and efficiency. By integrating sensors, lighting can be made more intelligent and adaptable, resulting in a variety of positive effects.

Sustainability

- 80-90% of the CO2 footprint of a luminaire occur during the use phase.
- The amount of energy used can be drastically reduced though when luminaires are connected and only used while their rooms are occupied.
- By utilizing daylight harvesting it can be ensured that users find optimal working conditions, while at the same time saving power when the full output of a luminaire is not required.
- By switching luminaires either off altogether, or at least dimming them down to a low standby level, valuable energy is saved.

Connectivity

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User feelgood

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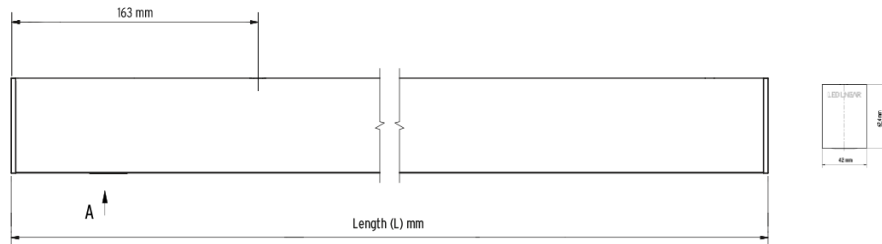
Functionality

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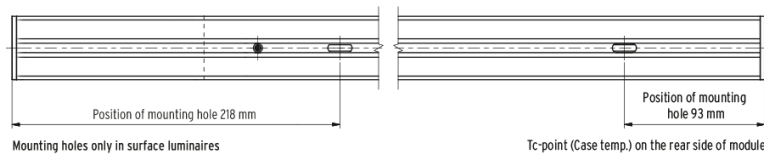
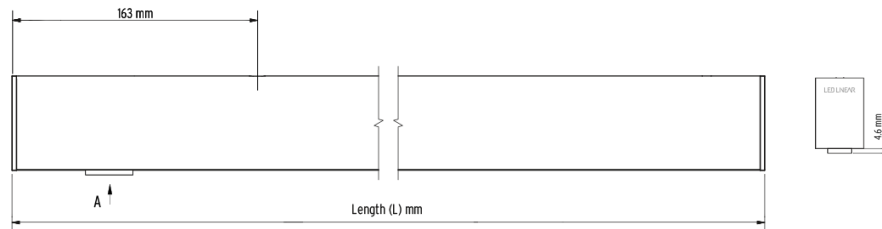
MEASUREMENTS

Stand Alone

with integrated **Dali** Sensor

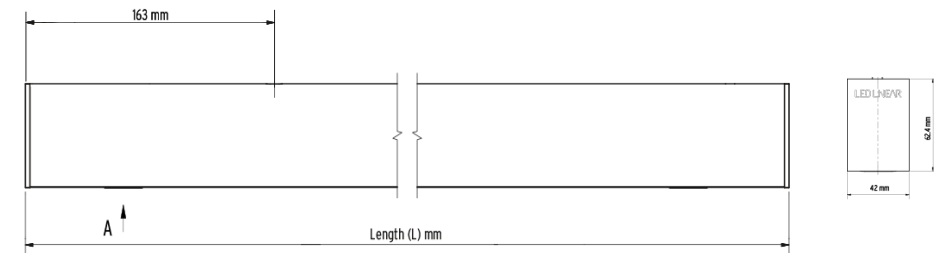


with integrated **Casambi** Sensor

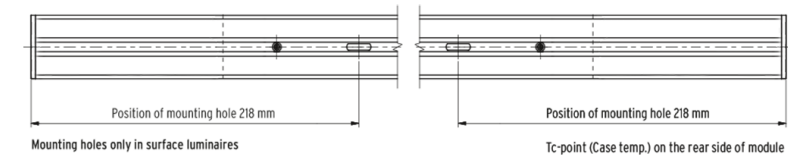
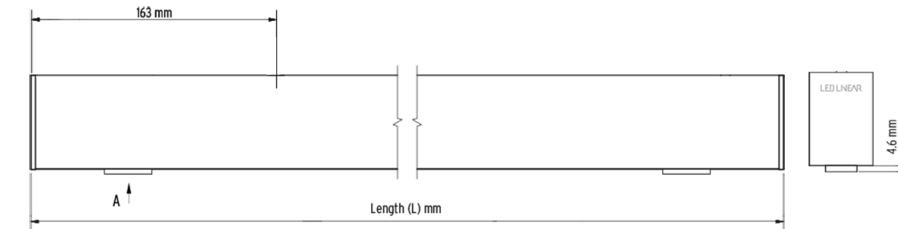


Continuous Row

with integrated **Dali** Sensor



with integrated **Casambi** Sensor



By integrating a sensor, the light outputting length of the luminaire is reduced by the length of the sensor insert (luminaire length - 125 mm). The sensor is placed at the end with the cable entry.

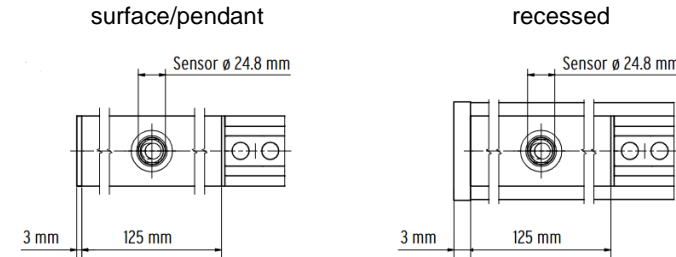
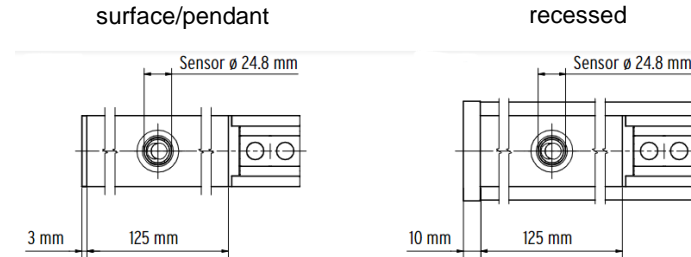
By integrating sensors, the light outputting length of the luminaire is reduced by the length of the two sensor inserts (luminaire length - 250 mm). The sensors are placed at both ends of the light line.

MEASUREMENTS

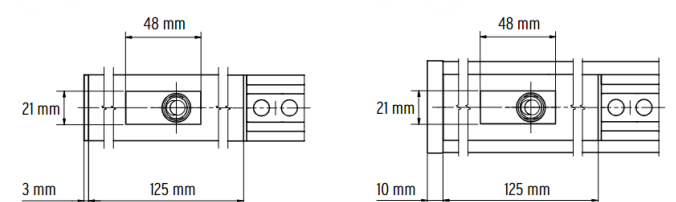
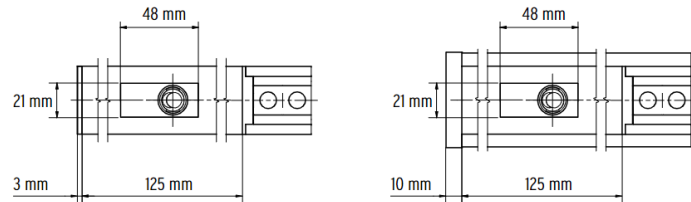
Stand Alone

Continuous Row

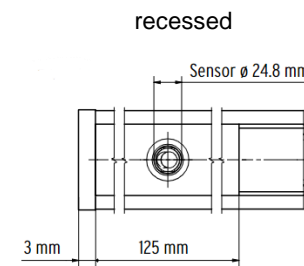
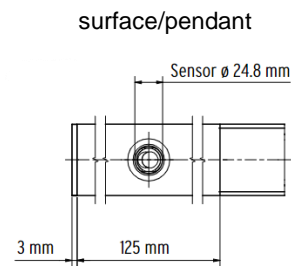
Dali sensor combined with Nano optics



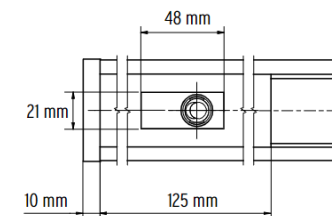
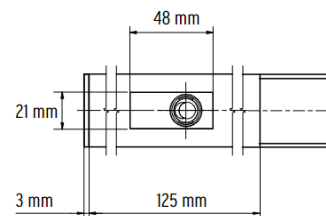
Casambi sensor combined with Nano optics



Dali sensor combined with opal diffusor
Stand-Alone and Continuous Row



Casambi sensor combined with opal diffusor
Stand-Alone and Continuous Row



All sensors offer motion/presence detection and ambient light measurement for daylight harvesting as well as individual configuration options.

DALI-Sensor

- **DALI-2 conformity:** The sensors comply with the latest DALI standard (EN 62386-101 Ed.2), known as DALI-2.
- **Controller required:** An application controller is required for commissioning and use.
- **Operating modes:** Supported operating modes are 0 or 128 (standard).

Casambi-Sensor

- **Bluetooth network:** Use of a 2.4 GHz Bluetooth network.
- **Wireless control:** Control via Android or iOS devices.
- **Automatic network setup:** Up to 250 nodes without manual configuration.
- **Wireless updates:** Firmware updates via Android or iOS devices.
- **Note for MARS CR:** One sensor is the "master" and connected to the internal DALI bus; it is responsible for the direct controlling of the integrated PSUs and effectively acts as a node. The second sensor is a satellite and only supplies sensor data via Casambi.
 - preset Casambi profile for the master sensor:
 - bDW (Lux, Presence - DALI, BC, DIM (ID 31551) für Static white
 - bDW (Lux, Presence - DT8/BC/Dim, TW) (ID 31554) für IQW
 - preset Casambi profile for the satellite sensor:
 - bDW (Lux, Presence) (ID 34525) Static white und IQW

Note on luminaires with dynamic white light engines:

For luminaires with IQW (tunable white), the predefined mode is the so-called "Balance mode". This means that the maximum power consumption of the LED light engine is about half of the maximum specified power consumption depending on the control system. The balance mode is defined by the control system and the dimming curves stored there.

Examples are:

- DALI DT8 Tc Mode
- IN.finite Casambi with appropriate profile for adjustable white
- Casambi sensor and use of profiles with dynamic white
- Others with similar dimming behavior

The balance mode keeps the overall brightness as constant as possible over the adjustable range of the color temperatures. As a result, both channels are never used full extent together, resulting in a roughly halved overall power consumption versus the maximum possible. Other controllers/modes allow individual control of both channels and thus full power consumption.

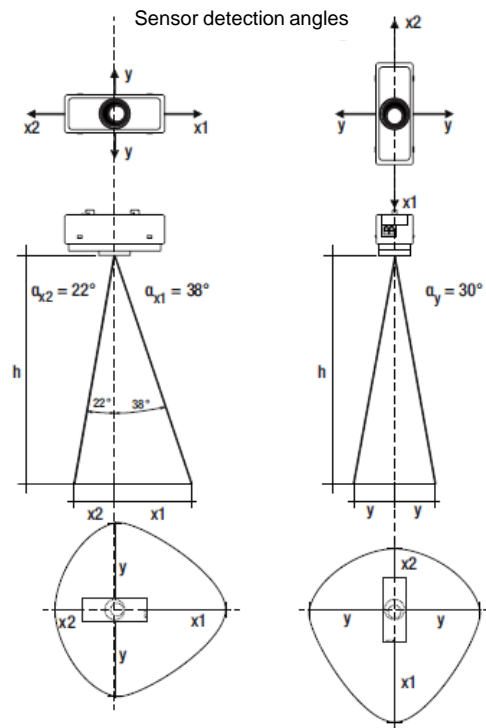
DETECTION CHARACTERISTICS

Light detection

The measuring range is between 0.5 and 2000 lx. (measured at sensor head).

⚠ To ensure that values <5 lx can be measured accurately, the integration time of the light sensor needs to be increased to 800 ms.

The integration period of the light sensor is set to 100 ms as a standard. For values >5 lx, there is no difference between these measurement methods.



h *	x1	x2	y	d
1,7 m	1,3 m	0,7 m	1,0 m	3,0 m
2,0 m	1,6 m	0,8 m	1,2 m	3,6 m
2,3 m	1,8 m	0,9 m	1,3 m	4,1 m
2,5 m	2,0 m	1,0 m	1,4 m	4,5 m
2,7 m	2,1 m	1,1 m	1,6 m	4,9 m
3,0 m	2,3 m	1,2 m	1,7 m	5,4 m
3,5 m	2,7 m	1,4 m	2,0 m	6,3 m
4,0 m	3,1 m	1,6 m	2,3 m	7,2 m

* The recommended maximum installation height in office applications is 3 m and 4 m for hallway applications, for example. Detection of slight movements up to 2 m mounting height and large movements from 2 m.

Calculation of the diameter (light range):

$$x1 = \tan(\alpha_{x1}) \times h$$

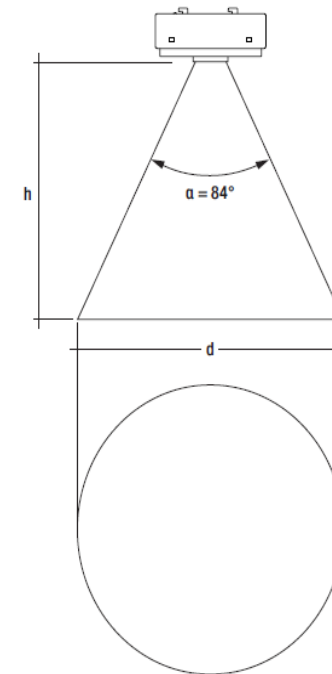
$$x2 = \tan(\alpha_{x2}) \times h$$

$$y = \tan(\alpha_y) \times h$$

Calculation of the diameter (presence range):

$$d = 2 \times \tan(0,5 \times \alpha) \times h$$

Presence and movement detection



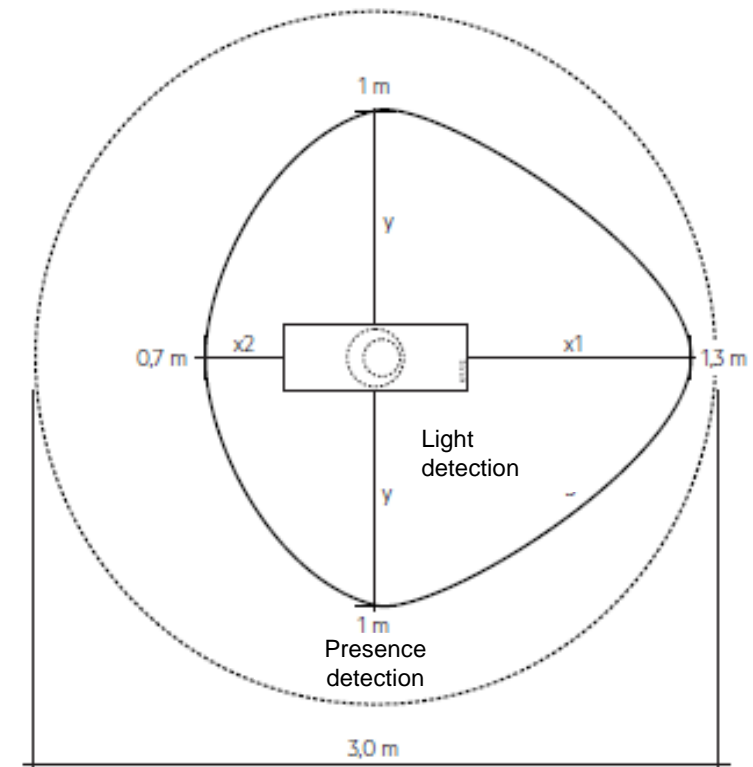
DETECTION CHARACTERISTICS

- PIR technology is used for **presence detection**
- PIR lenses are designed to **detect movement** of people in work areas with the following performance criteria:
 - **Ceiling height** up to 5 m
 - Movement of human bodies:
 - **up to 2 m** mounting height: detection of **weak movements**
 - **from 2 m** installation height: detection of **larger movements**
 - **Movement** 1.0 m/s for installation heights up to 5 m
- **Detection angle** (cone angle) for PIR detection **84°**
- **Detection angle** for light measurement **30° - 60°**
- **Detection range** for light measurement **0.5 - 2,000 lux**
- **Min. temperature difference** between ambient temperature and detected object **± 4 °C**
- **measured value** on the sensor head corresponds to approx. **3 to 6,300 lux** on the measuring surface

Please note:

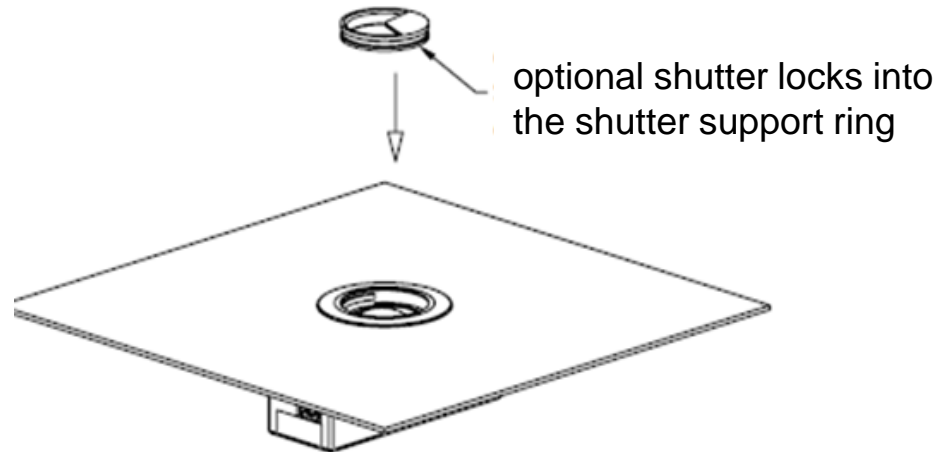
- Other HF signals can cause interference in the sensor communication via Casambi.
- If the sensor is not installed at the recommended height, it may exhibit different characteristics regards detection of presence.
 - If it is mounted higher its sensitivity is reduced.
 - Placing it lower will reduce its range.
- Heaters, fans, printers, copiers or other devices located in the detection area that move or generate heat, can lead to incorrect presence detection.

Example of light and presence detection area at a height of 1.7 m:



OPTIONAL SHUTTER

An optional shutter is included in the delivery. It can be used to prevent motion detection in one direction and blanks out about a third of the detection area.



Area that is covered by the shutter

