PHILIPS

Sensors

EasyAir

SNH210 MC
SNHB210 MC

SNH210 MC

SNHB210 MC

Design-in Guide

Single, cost-effective luminaire control

Philips EasyAir SNH210 MC, SNHB210 MC

June 2023

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Philips EasyAir SNH210 MC

Philips EasyAir SNHB210 MC

Thank you for choosing the Philips EasyAir SNH210 MC / SNHB 210 MC. This document provides necessary information to design in this product into a luminaire and configure it to suit specific applications. This design-in guide covers sensor functionality, mechanical mounting, wiring details, application notes and frequently asked questions. For sensor specifications, please see the datasheet available at
http://www.lighting.philips.co.uk/oem-emea/support/technical-downloads

More information or support

For more information or support, please consult your local Philips sales representative or visit
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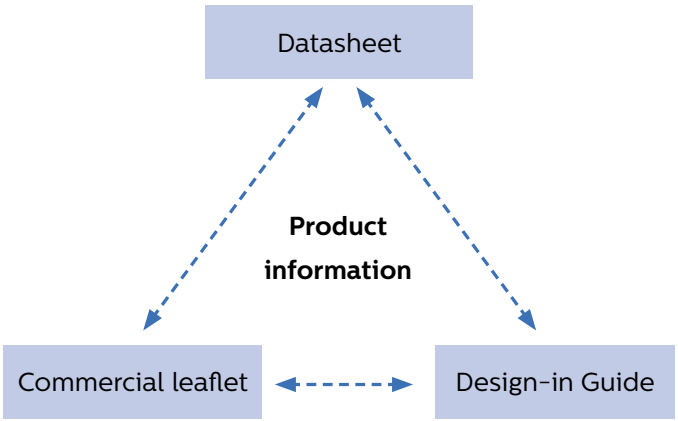


Warnings and instructions

- The EasyAir SNH(B)210 MC is a Sensor Ready (SR) industry sensor and therefore must be used together with a Philips Xitanium SR LED driver or Xitanium SR Bridge.
- Do not apply mains power directly to the sensor.
- Do not cover the sensor during operation or mount the sensor recessed.
- External infrared sources can have a negative impact on occupancy detection.
- Ensure that the sensor area defined for occupancy detection is not blocked by any obstacles. Misalignment of sensor might influence occupancy detection and daylight regulation.
- Make sure that the sensor, especially the occupancy detection lens, is not damaged during shipment and handling.
- The application area of EasyAir SNH(B)210 MC is an indoor industrial environment such as warehouses, assembly sites or cold storage areas. Such application areas should be normally ventilated. The EasyAir SNH(B)210 MC has no protection against aggressive chemicals.
- Make sure the EasyAir SNH(B)210 MC Zigbee/Bluetooth antenna is not covered by metal for proper RF communication.

Introduction of EasyAir

Philips EasyAir SNH210 MC

Philips EasyAir SNHB210 MC

The Philips EasyAir SNH(B)210 MC is the ideal solution for per-luminaire control of smart luminaires. It combines occupancy sensing, daylight harvesting and task tuning in a single package for easy OEM luminaire assembly. EasyAir SNH(B)210 MC operates with the established D4i open standard digital interface to make a simple two-wire connection between sensor and driver, thus eliminating the need for multiple components and auxiliary devices. The result is a cost-effective and easy-to-design-in solution ideal for energy-savings. An intuitive app called Philips MasterConnect allows for quick and easy commissioning via Bluetooth along with configuration during and after installation.

EasyAir SNH(B)210 MC allows luminaires to be grouped with each other for occupancy sharing (i.e., luminaires within a group can be programmed to remain at prescribed light levels so long as occupancy is detected anywhere in the group) and daylight depending light regulation.

All the features are described in detail in the subsequent sections.

Product characteristics

EasyAir overview

EasyAir contains multiple functions in one housing and uses two wires to connect with an SR driver. (See wiring diagram in the **Mechanical design-in** section of the datasheet.)

The following image shows the primary functions included in the sensor:

EasyAir is designed for an indoor industrial environment (warehouses, assembly areas, cold storage areas etc.) in normally ventilated areas, the temperature range being -30 ˚C to 65 ˚C. EasyAir has no protection against aggressive chemicals. The sensor is normally mounted to a luminaire and can go up to mounting height of 16 m.

Zigbee and Bluetooth Low Energy (BLE)

The RF antenna allows luminaire to luminaire wireless communication via IEEE 802.15.4 wireless protocol with radio frequency: 2400-2483.5MHz. The antenna area as shown above (also in figure 12) should not be covered by metal and should be exposed to free air to ensure there is sufficient range.

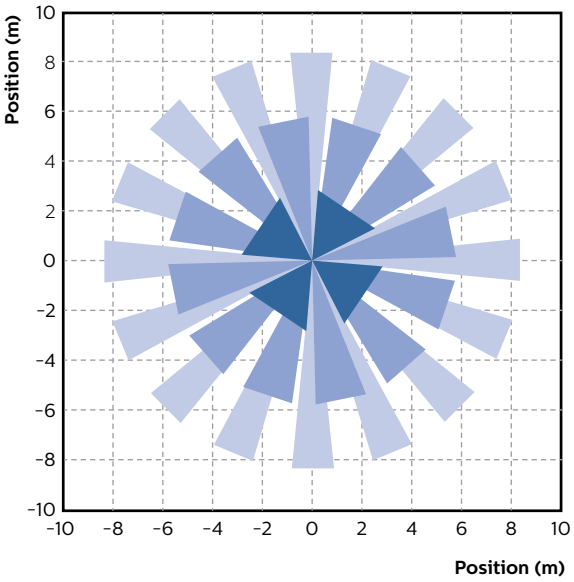


Figure 1 - Top coverage pattern of EasyAir SNH200.

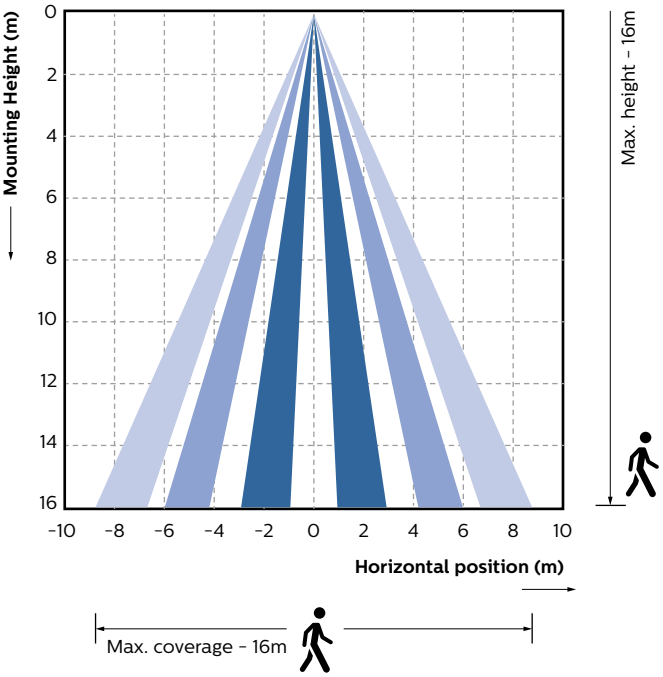


Figure 2 - Side coverage pattern of EasyAir SNH210 at height of 16m

Motion detector

The occupancy sensor is a PIR (Passive Infrared) sensor that detects movement with a circular cross-area under an angle of X = 30° and Y = 30°. This PIR sensor has 3 concentric rings to help detect movement – the innermost with 4 facets, the middle with 12 facets and the outermost with 16 facets.

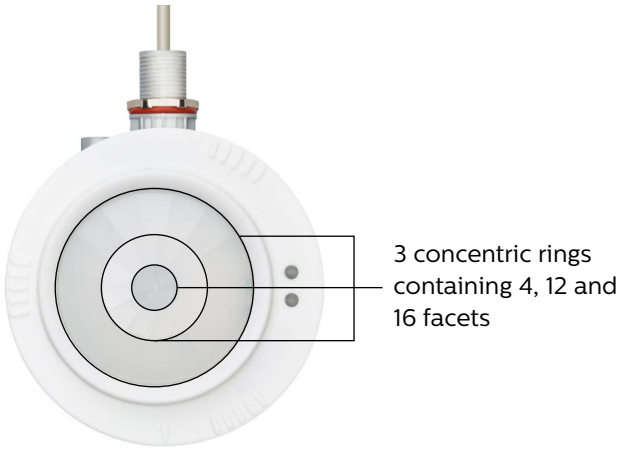


Figure 1 and Figure 2 show the top and side view of the occupancy coverage based on NEMA test, an industry standard.
In the side view, it is visible that coverage ratio of mounting height: diameter at ground level is at maximum 1:1. For example if the mounting height is 12m, the maximum diameter coverage is 12m.

Disclaimer:

1. In these plots, the white areas are blind spots and the detection is based on subject's motion. An idle subject may not continue to trigger occupancy detection once the hold time expires.
2. As PIR based sensing works on temperature difference between the subject and the ground level, the occupancy detection could vary due to clothing and size of subject.

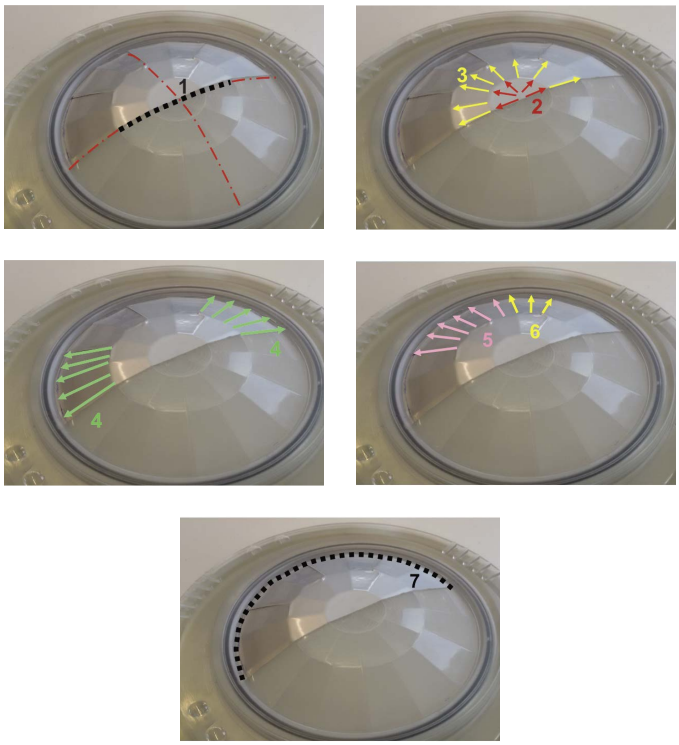


Figure 3 - Placement of light shield

Lens Shield

An adhesive shield (half circle) is available with the product to minimize the occupancy coverage of EasyAir SNH(B)210 MC. To work with the shield, first determine the area on PIR lens that you would like to cover with the lens shield. Cut the shield, if needed.

Remove the carrier and align the center of the shield with the center point of the lens. To minimize air bubbles, only the black dotted line must contact the PIR lens (1). Start sticking from center and then move outwards; follow the sequence as shown by red (2), yellow (3), green (4), pink (5) and yellow (6) arrows. Finally, rub the outer edge of the shield according the black dotted line (7).

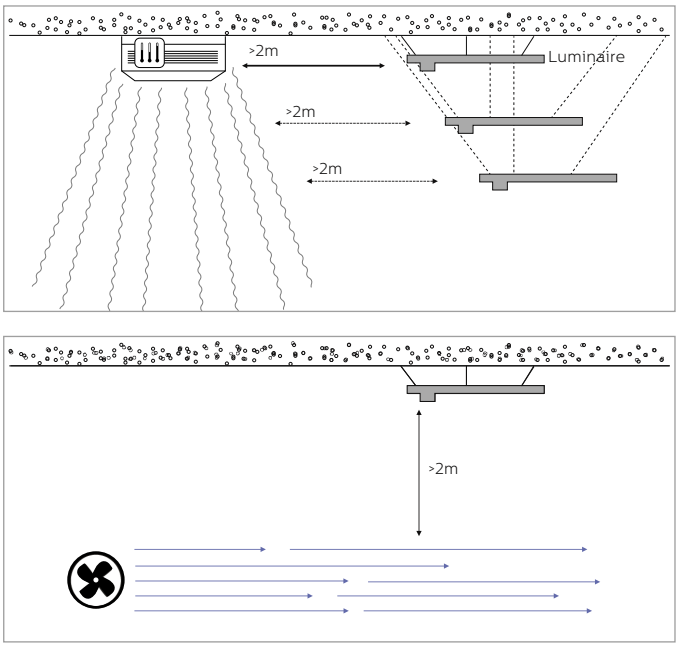


Figure 4 - Required distances to air vents

Warning:

To avoid false triggers, place heat radiating devices outside of the monitoring cone and avoid drafts (e.g. from ventilators or heating systems).
EasyAir SNH(B)210 with motion detector enabled must be mounted more than 2 meters away from air vents in all directions, see figures on the left.

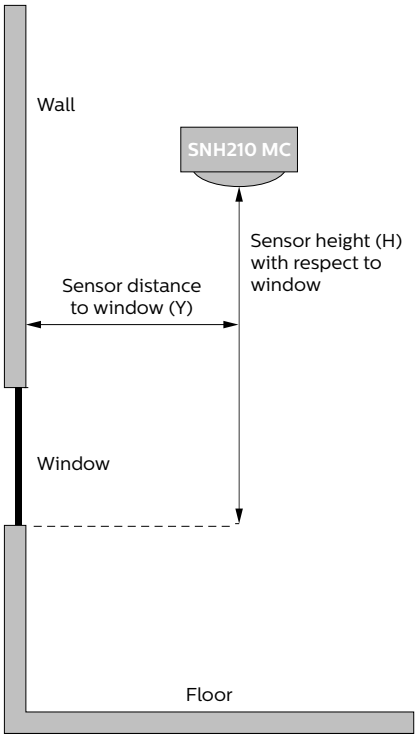


Figure 5 - Sensor placement.

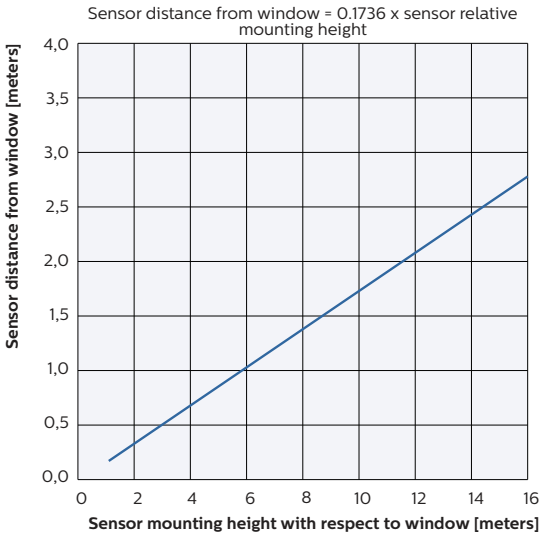


Figure 6 - Sensor horizontal distance from window vs. vertical sensor mounting height from window sill

Light sensor

The light sensor measures the total amount of light with an opening angle of 10° whereas PIR has 27°, all calculated from normal. The following aspects should be observed during installation:

- Minimum distance from the window - refer below graph
- Prevent light reflections from outside entering the sensor (for example sunlight reflection from a car/truck bonnet) as this will lead to incorrect light regulation.

As a guideline the formula 0.174 x H can be used to calculate the minimum distance between the window and sensor whereby H is the height measured from the bottom of the window to the sensor.

Luminaire light that directly hits the sensor (like in figure 7) can compromise its function. Therefore the SNH(B)210 MC should be placed outside of the light cone emitted by the luminaire.

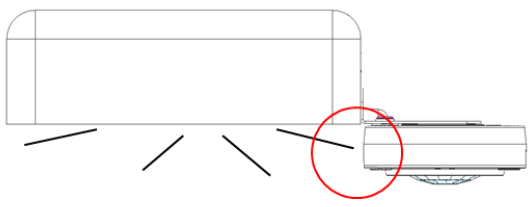


Figure 7 - Luminaire light hitting the sensor

Daylight regulation and calibration

When daylight-based light regulation is enabled, the light output of a luminaire is dimmed in the presence of daylight. For full control of light levels in the working area it is recommended to calibrate the lighting in the application.

Daylight regulation without calibration

When daylight-based control is switched on and no calibration is performed, the light output adjusts approximately to 150 lux times the value set for the Eco-on level. If the Eco-on level is set to 80% for example, the light output from the luminaire adjusts to approximately 120 lux in the working area.
The sensor doesn't read lux levels in the working area directly but measures the amount of reflected light that it captures. In the presence of daylight the sensor keeps the detected level constant by adjusting the light output of the luminaire.
The reflective properties of the surfaces in the field of view of the sensor, e.g. light or dark floors, impact the amount of light that is directed towards the sensor and consequently influence the luminaires light output and actual lux levels in the working area.
In case the reflective properties of objects below the luminaires of a room vary, the luminaires can show different light output, even in absence of daylight. Luminaires above dark surface areas emit more light than those above light areas.

How to set the light level:

- In a dark environment adjust the output current of the luminaire and the Eco-on value for the required lux value in the working area. It is recommended to measure the value with a lux meter.

Daylight regulation with calibration

Any time after configuration a calibration routine can be initiated. When the calibration routine is run the light level adjusts to the full light output (given by the operating current of the luminaire) times the percentage value set for the Eco-on level.
In a dark environment all luminaires configured with the same Eco-on level show the same light output, independent of the reflective properties of surfaces below the luminaires.
The individual sensors store the dark reading of the daylight sensor and keep the value constant in the presence of daylight by adjusting the light output of the luminaires.
All luminaires react individually on the amount of daylight in the field of view of their sensor.

How to set the light level:

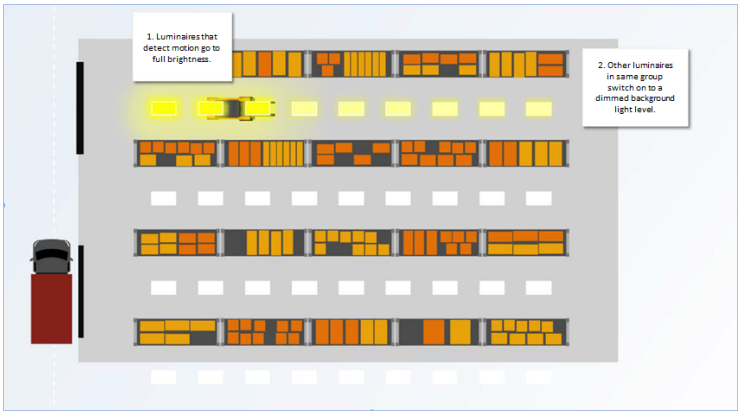
- Disable daylight regulation in the MasterConnect app.
- In a dark environment adjust the output current of the luminaire and the Eco-on value for the required lux value in the working area. It is recommended to measure the value with a lux meter.
- Place the smartphone at the center of the working area. Enable daylight regulation in the app again and press "Calibrate Daylight Sensor". Leave the room.
- To calibrate, the light output of the luminaires first goes to a low level and to a high level before it regulates to the set light level.

Warning:

Make sure no objects are blocking the sensor's view and no surface reflection changes occur in the sensor's view during calibration. For example, do not position a forklift truck in the sensor view area during calibration.

Lighting control

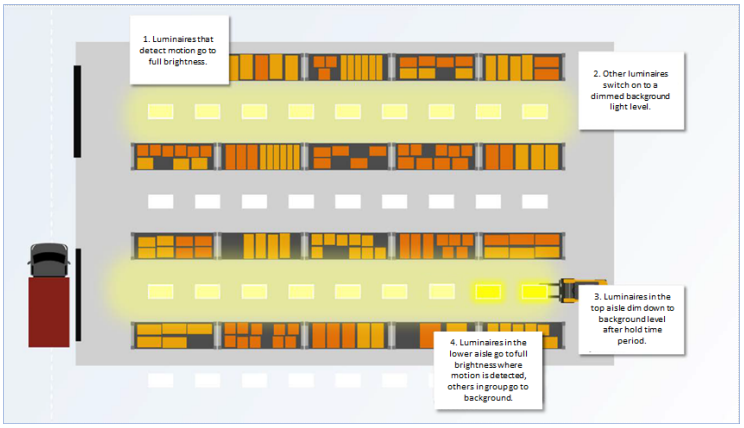
The lighting parameters that can be configured for SNH(B) 210 MC are described in the Philips MasterConnect installer manual available in the technical download section at www.lighting.philips.co.uk/oem-emea/support/technical-downloads.

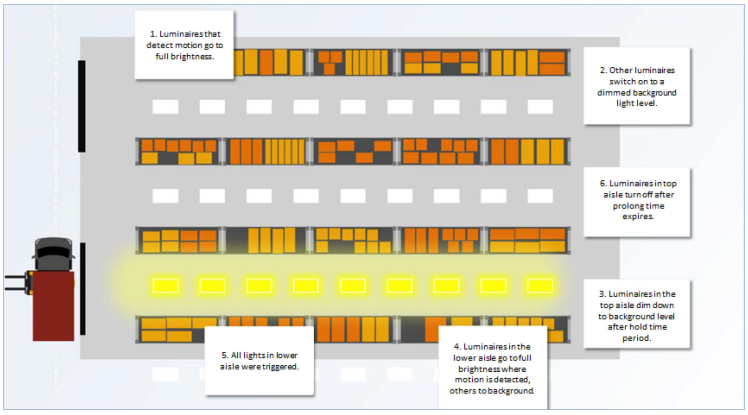


Two warehouse aisle example applications

Warehouse with aisles with entrances on both sides
Here is an example of the group occupancy sharing in a warehouse application:

- Each aisle is a group of lights
- Group occupancy sharing: enabled
- Group light behavior: background light level

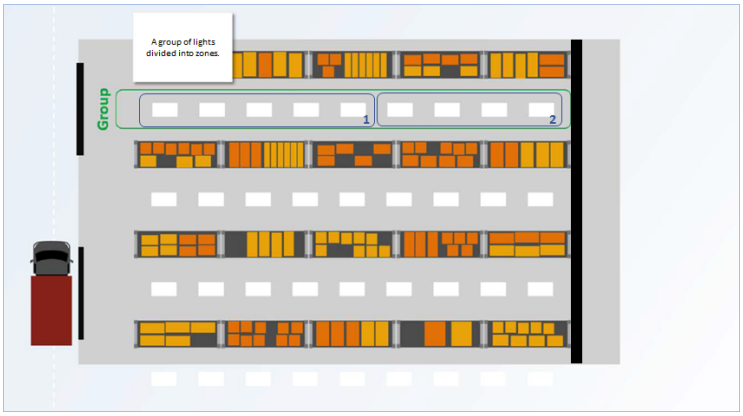


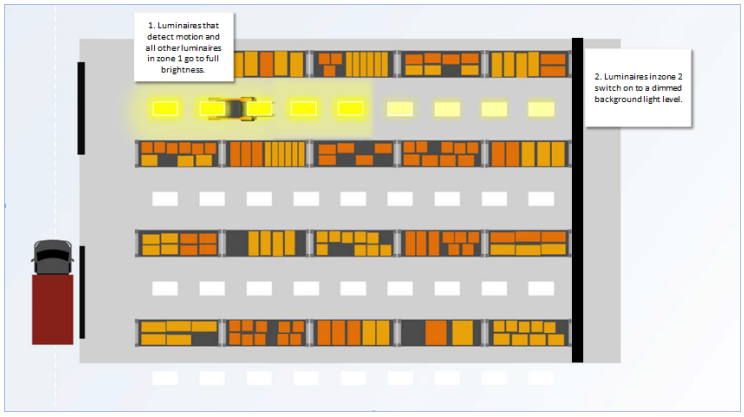


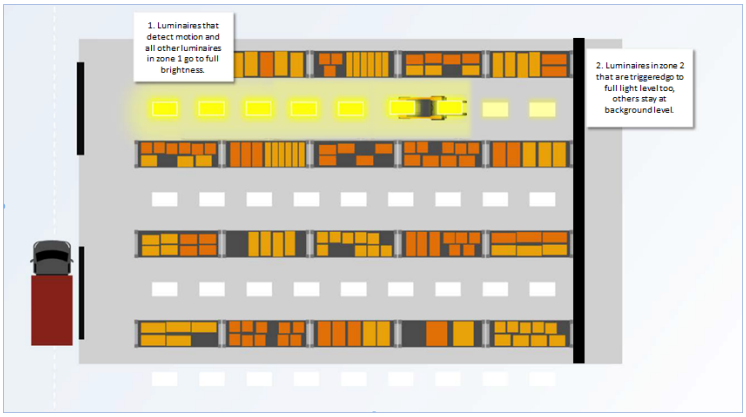
Warehouse with dead end aisles

Here is an example for an alternative light setting in aisles with dead end:

- Each aisle is a group of lights
- Groups are divided in two zones
- Group occupancy sharing: enabled
- Shared light behavior of zone 1 (entrance of aisle): Eco-on light level
- Shared light behavior of zone 2 (dead end): Background light level







Mechanical design-in

How to install the sensors

EasyAir SNH210 MC is intended to be mounted to a standard M20x1.5 knockout available on the luminaire itself or a junction box. A nut is included with the sensor for this purpose. An OEM can develop customized brackets to attach to the top surface of the sensor in case the sensor needs to be mounted at a curved/non-flat surface. Mounting screws are provided with the sensor for this purpose. It is strongly recommended to use these screws for perfect mechanical design-in of the sensor as these screws are matched to the thickness of the plastic sensor housing.
EasyAir SNHB210 MC always needs to be mounted with a bracket.
Also make sure that the view of the sensor is not blocked anywhere by the luminaire or the bracket to avoid loss of functionality.

Installing SNH210 MC on a flat surface of the luminaire

If a luminaire has a flat surface at the mounting location as shown in below, the sensor can be installed without the need for an extra bracket; a knock-out must be available in such cases.

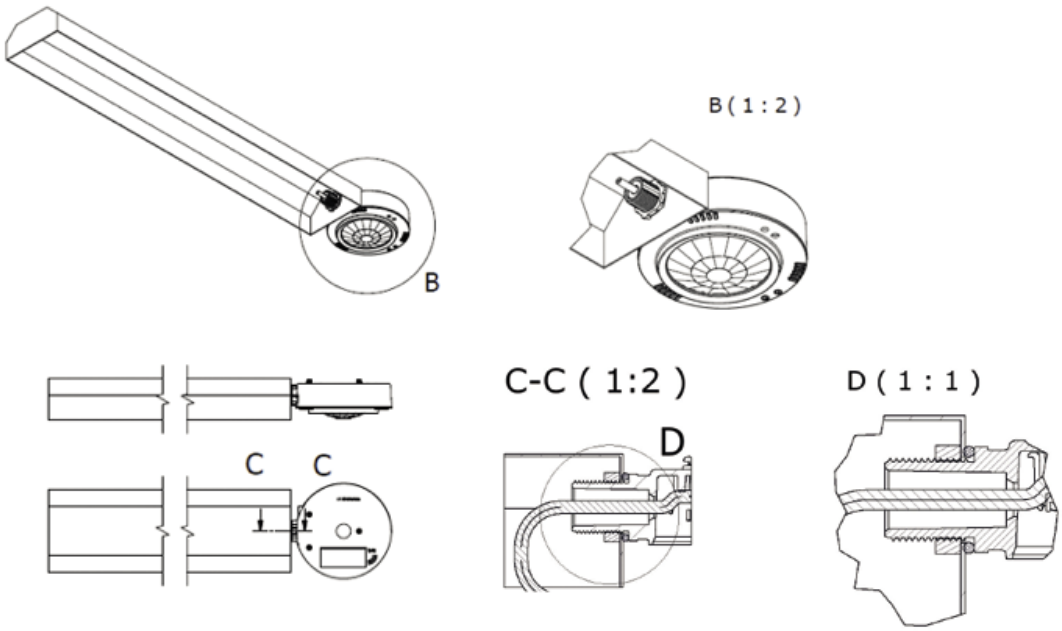


Figure 8 - Installing sensor via a knockout”

Remark: torque to fix the screws should be 2 Nm.

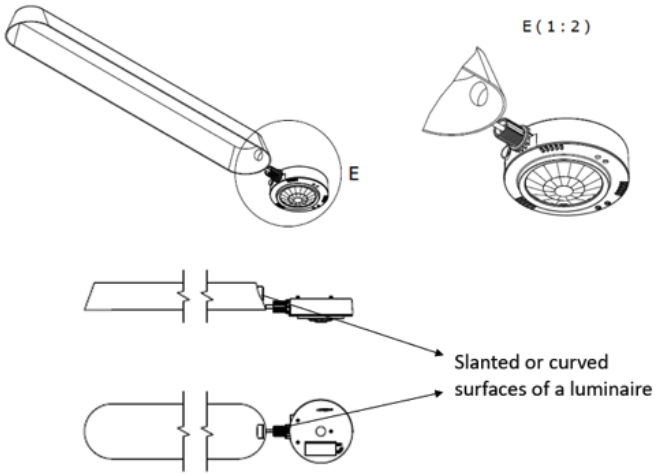


Figure 9 - Installing EasyAir SNH210 MC on a non-flat surface. The label E point to zoomed in view.

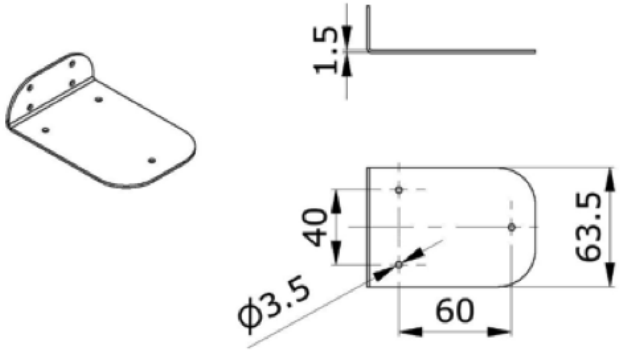


Figure 10 - Proposal for bracket design along with dimensions

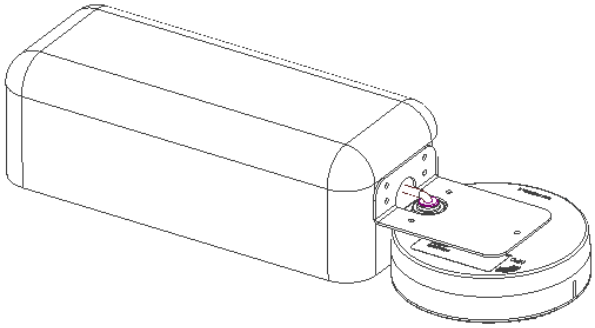


Figure 11 - Proposal for installing SNHB210 MC

Installing SNH210 MC with a bracket

If the luminaire has a curved or sloped surface at the mounting location as shown in Figure 9, the sensor needs to be fixed with a bracket. This bracket should be developed by the OEMs themselves. A drawing of a potential bracket is shown in figure 10.

Installing SNHB210 MC

SNHB210 MC needs to be fixed to the luminaire using a bracket. This bracket should be developed by the OEMs themselves. An example is shown in figure 11.

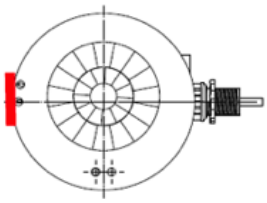


Figure 12 - Position of RF Antenna on EasyAir SNH210 MC

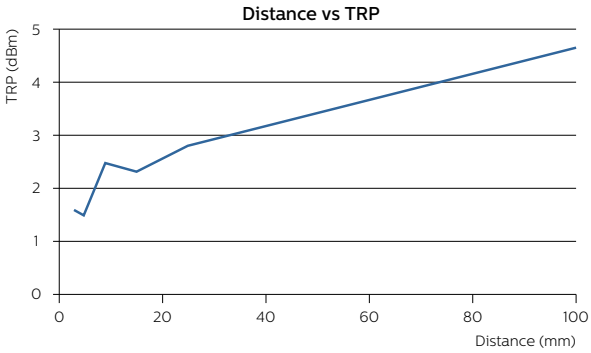


Figure 13 - TRP as a function of distance

Recommendations to maintain good Zigbee RF signal performance

For good RF signal communication between luminaires, it is recommended to maintain a 100mm distance between EasyAir antenna and any metal wall. This would allow a luminaire to luminaire distance to be greater than 10 meters. Figure 12 shows the approximate location (marked in red) of RF antenna on the PCB board inside the sensor.

Figure 13 gives one reference measurement for Total Radiated Power (TRP) vs. distance from one side metal wall. In general, every dB drop reduces luminaire to luminaire distance by 1 meter.

Wiring

Wire to wire connection

A wire to wire connection can be made with connectors suitable for wires with thickness range including 0.5mm^2. The possible connectors types are as follows:

- Pluggable Terminal blocks
- Lever nuts

The wire strip length in case of a wire to wire connection is connector dependent.

Wire to driver connection

A connection between the sensor and the driver should be made according to regional installation guidelines. The SR input wires of the EasyAir SNH210 MC are unipolar, and therefore can be connected, without taking care of polarity, to the SR output of the driver - SR+ and SR- terminals. It is recommended to keep wire distance from sensor to driver less than 15 meters. Polarity must be maintained when connecting multiple drivers to one sensor.

The wire strip length in case of sensor to driver connection is approximately 8mm, this is already available in the cable attached to the sensor.

EasyAir with multiple Philips Xitanium SR LED drivers (1:N application)

When multiple drivers are used in a single luminaire, they can be controlled with a single sensor.

It is also possible to use one sensor to control multiple luminaires that need to be operated at the same level. In this case DALI drivers need to be connected to the sensor via an SR-bridge.

If a single sensor is connected to drivers in different luminaires without an SR bridge, the total cable length must not exceed 15m. 2-4 of the drivers must have SR power supply enabled.

EasyAir sends commands to all connected drivers (using DALI broadcast command); it does not have capabilities for addressing individual drivers. The light commands are sent as a broadcast commands, so occupancy-/daylight-based lighting control and task tuning operate the same on all connected drivers. The readout of energy information from the driver will not function. Energy readout of multiple drivers via an SR-bridge is planned for future sensor generations.

FAQ

Is EasyAir a DALI sensor?	EasyAir is an SR device and not a DALI sensor. EasyAir works with Philips SR drivers, which use DALI SR protocol to communicate between driver and sensor. The SR driver also supplies the sensor with power. This is the same principle as for other SR-certified devices.
Can I use one sensor with multiple luminaires?	Yes, it is possible. Please refer EasyAir with multiple SR drivers (1:N application) section.
Can I use multiple sensors with a single driver?	No, EasyAir SNH210 MC is not intended to be used in a multi-master mode. In the typical 1:1 sensor to driver connection, a (single) SNH210 MC is the master and an SR Driver is the slave. Adding multiple sensors on SR bus can lead to bus conflict and undesired functioning of the sensors.
Does EasyAir make sense if I only want to do occupancy sensing?	Yes. Most occupancy sensors run on high voltage or require an extra power pack, adding cost and complexity. Typical wallplate-style occupancy sensors — while mass produced and inexpensive —vary in performance by use case since the viewing angle from a wall is less than ideal. Also, the relay-free operation of EasyAir makes it inherently more reliable.
Is EasyAir "failsafe"?	Unlike traditional occupancy sensors, EasyAir does not have a mechanical relay. This is a benefit of Philips SR LED drivers, as on/off is done relay-free within the driver. Devices with mechanical relays should be designed so that relay failure results in "lights on." If an SR driver does not see a digital signal from a device for a long period of time (e.g., loose connection, sensor failure), the driver goes to full programmed output.
What are the differences between SNH(B)210 MC and the predecessor SNH200?	SNH(B)210 MC is commissioned via Bluetooth using Philips MasterConnect app, while SNH200 is commissioned via infrared with a dongle and Philips Field Apps. SNH(B)210 MC does not have zone linking like SNH200 but shares occupancy between individual lights like SNS210 MC. SNH210 MC does not provide the features "daylight depending switching" and "daylight dependent overwrite". Configuration via MultiOne is not possible. In contrast to SNH200, during commissioning lights don't dim down until the group is closed.

Contact details

Philips EasyAir

Product information:
www.lighting.philips.co.uk/oem-emea/products/connected-lighting

Or contact your local Philips sales representative.

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