Single, compact, cost-effective luminaire control

Philips EasyAir SNS300

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Introduction to this guide

Thank you for choosing the Philips EasyAir SNS300. In this guide, luminaire manufacturers will find the information required to design this product into a luminaire and configure it to suit specific applications. This design-in guide covers sensor functionality, mechanical mounting and wiring details. For sensor specifications, please see the datasheet available at www.lighting.philips.co.uk/oem-emea/products/connected-lighting.

More information or support
For further information or support, please consult your local Philips sales representative or visit www.lighting.philips.co.uk/oem-emea/support/technical-downloads.
Warnings and instructions

- EasyAir SNS300 must be used only with a Philips Xitanium SR LED driver.
- Do not apply mains power directly to the sensor.
- Do not cover the sensor during operation or mount the sensor recessed.
- External infrared light source in the space might have influence on occupancy detection.
- Incorrect location of sensor (e.g., outside the view angle of the occupancy sensor) will result in occupancy detection not functioning correctly.
- Make sure the sensor, especially the occupancy detection lens, is protected from damage during shipment and handling.
- The application area of EasyAir SNS300 is designed for a typical indoor environment (open/private offices, conference rooms, classrooms, corridors, etc.) in normally heated and ventilated areas. EasyAir SNS300 has no protection against aggressive chemicals or water.
- Make sure the the EasyAir SNS300 RF antenna is not covered by metal for proper RF communication.
Introduction of EasyAir SNS300

EasyAir SNS300 for networks is based on Zigbee technology for use in wireless systems for indoor connected lighting. It provides a simple solution to actively manage and control energy usage, while remotely adjusting light settings and determining service needs. With the added Zigbee functionality, EasyAir SNS300 can now be an integral part of networks also based on the Zigbee standard.

A program is under development by Philips to qualify third-party network systems for use with EasyAir SNS300.

EasyAir SNS300 is renowned for its compact size and ability to easily integrate into luminaires. In addition, the sensors are compatible with Philips Xitanium SR LED drivers, eliminating the need for auxiliary devices and alleviating time-consuming configuration issues. The simple two-wire connection from driver to sensor reduces design-in complexity and eliminates additional components that add to overall costs. Now, SNS300 can provide luminaire-specific information into networks for centralized control and enable functionality such as energy monitoring, scheduling and load shedding.
Product characteristics

**EasyAir SNS300 overview**
The Philips EasyAir SNS300 contains multiple functions in one housing and uses two wires to connect with an SR driver. (See wiring diagram in the Mechanical design section.) Functions include:

- **RF antenna**
- **NFC antenna**
- **Occupancy sensor (PIR)**
- **Light sensor**
- **Infrared receiver**
- **LED indicator**

EasyAir SNS300 is designed for a typical indoor environment (open/private offices, conference rooms, classrooms, corridors, etc.) in normally heated and ventilated areas. EasyAir SNS300 has no protection against aggressive chemicals or water. The sensor is normally mounted to a luminaire and is optimized for a sensor mounting height of 2.5m to 3m.

**NFC antenna**
Device model/version information and MAC address can be read out using the Philips Field Apps (EasyAir SNS300 NFC). NFC is the set of protocols that enables electronic devices to establish radio communication with each other by touching the devices together or bringing them into proximity to a distance of typically 1cm or less.

**RF antenna**
The RF antenna allows communication via RF technology. It should not be covered by metal and should be exposed to free air to ensure there is sufficient range.

**Infared (IR) receiver**
The infrared receiver serves as a communication portal for the commissioning tools. Network settings for an individual sensor can be reset with the Philips Field Apps (IR).

Philips Field apps is available for free on Google PlayStore. The user needs to download the app on an Android phone, register and sign-in. Once logged into the app, go to “EasyAir Office IR → SNS200 → Maintenance → Reset Network Settings” to reset the devices.
**Motion detector**

The occupancy sensor is a PIR (Passive Infrared) sensor that detects movement with an X-Y cross-area under an angle of \( X = 72^\circ \) and \( Y = 86^\circ \). Two types of movements are defined in NEMA WD7 as follows:

- **Major movement**: movement of a person walking into or through an area.
- **Minor movement**: movement of a person sitting at an office desk reaching for a telephone, turning the pages in a book, opening a file folder, picking up a coffee cup, etc.

When installed in a typical office ceiling at \( H \), the sensor is sensitive to minor movements within \( X_1 \) by \( Y_1 \) area. It will respond to minor movements down to a few centimeters at the task area of a desk and is sensitive to major movements within a range of \( X_2 \) by \( Y_2 \). The maximum recommended height to place the sensor in the ceiling is 10ft/3m to assure movement coverage and detection. The PIR sensor reacts on movement by means of a temperature difference, such as the human body temperature versus its surrounding temperature. A car that just starts its engine is not seen by the PIR nor does the PIR see people sitting within the car or a forklift truck. Therefore, it is recommended not to use EasyAir SNS300 in outdoor, parking or industrial applications. Please refer to the EasyAir SNS300 datasheet for coverage area details.
Sensor view shield

The sensor comes with an occupancy view shield that can be used to block the movement detection by the sensor in a certain area. The shield comes inverted. (See Figure 2.) This view shield can be pulled out, flipped and inserted back in the sensor and then rotated so the correct area is shielded off from the detection area. If such shield is not needed in the application, it can be easily pulled out from the sensor or left inverted.

Figure 2. Sensor view shield.
**Light sensor**

The light sensor is a photo diode that reads average light level captured under an angle of approximately 40°. The intensity of the illuminance depends on the amount of artificial and/or natural light supplied in the office, as well as how this light is reflected toward the ceiling/sensor. SNS300 sends the illuminance signal to the gateway and the network lighting control system controls the light accordingly.

The sensor should be installed with a minimum distance of 0.6m to the window to avoid the sensor looking outside. When the sensor is mounted too close to the window it will look partly outside. Sun reflection from cars or snow can reflect directly into the sensor. The sensor will then measure such high illumination levels that it will drive the artificial light to its minimal level or even switch off the artificial lights. The optimum distance \([Y]\) from the window to EasyAir SNS300 can be obtained from Figure 4. This graph shows the relation between the distance from the window to the sensor \([Y]\) and the height \([H]\) of the sensor (H, height of the sensor measured from ceiling to bottom of window sill).

**LED indicator**

The product contains an LED indicator to help comply with California Title 20 requirements. The LED indicator is enabled by default. The behavior of the LED is as follows:

Yellow LED on: vacancy & light sensor are functional.

Red LED on: motion is detected and hold time is not expired yet.

**Lighting control**

Calibration and lighting control is done by the coordinating network system.
Limited functions of Philips Field Apps

The EasyAir SNS300 NFC App can be used to read out model/version information of SNS300 and the MAC address. The EasyAir SNS300 IR App can be used to reset the network settings of individual sensor.

Phone requirements: The EasyAir SNS300 app works only on Android-based smartphones. Check the EasyAir SNS300 website for the latest list of compatible phones and their NFC reader locations.

The app can be downloaded from the Google Play Store. This is a B2B app which requires authentication with user ID and password. Please register at www.componentcloud.philips.com/appregistration/ to obtain a user id and password.

Please check the latest user’s manual at www.lighting.philips.co.uk/oem-emea/products/easy-to-integrate-wireless-sensors.html for information on using the app with EasyAir SNS300.
Mechanical design-in

Mounting to a luminaire
EasyAir SNS300 is a luminaire-mount sensor that is directly powered by a Philips Advance Xitanium SR LED driver. It can be mounted to a slot or a cut-out in sheet metal.

1. Mounting in a U-shaped slot in the luminaire sheet metal
EasyAir SNS300 can be assembled into an open-ended slot with dimensions following the cut-out dimensions shown in the data sheet. Max sheet metal thickness is 1mm.

Note: Please make sure the the EasyAir SNS300 RF antenna is not covered by metal.
Wiring diagram with Philips Xitanium SR LED driver

Use 18AWG solid copper wire, rated >=600V/90°C. Strip wire to 3/8”.

Applicable wires

<table>
<thead>
<tr>
<th>Wire Range</th>
<th>Number of Conductors / Diameter of a Conductor (Number of Conductors / mm)</th>
<th>Insulation Diameter (mm)</th>
<th>Conductor Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>1 / 0.51 (0.2mm²)</td>
<td>3.5</td>
<td>Solid</td>
</tr>
<tr>
<td>22</td>
<td>1 / 0.64 (0.3mm²)</td>
<td>4.8</td>
<td>Solid</td>
</tr>
<tr>
<td>20</td>
<td>1 / 0.81 (0.5mm²)</td>
<td>6.5</td>
<td>Solid</td>
</tr>
<tr>
<td>18</td>
<td>1 / 1.02 (0.8mm²)</td>
<td>8.6</td>
<td>Strand</td>
</tr>
<tr>
<td>22</td>
<td>17 / 0.76 (Reference) After Soldering: ≤0.9mm Max.</td>
<td>1.60</td>
<td>Strand</td>
</tr>
<tr>
<td>20</td>
<td>21 / 0.95 (Reference) After Soldering: ≤0.9mm Max.</td>
<td>1.78</td>
<td>Strand</td>
</tr>
</tbody>
</table>

Wire strip length

Strip length 8.0 ± 0.5 mm

Figure 5. Wiring diagram with Philips Xitanium SR driver.

Figure 6. Sensor in a luminaire.

Figure 7. Wire strip length.
### Wire insertion

#### Figure 8. Wire insertion.

- Inserting solid conductors via push-in terminal

### Wire separation from the connector

#### Figure 9. Wire separation from the connector.

#### Wire distance for remote mounting

It is recommended to keep the wire distance from sensor to Philips Xitanium SR LED driver less than 50 feet and meet the wire gauge requirement to guarantee the performance.
Labeling for field installation and commissioning

Each SNS300 product bag will include two extra sticker labels containing unique network addressing information (example shown in Figure 10). This address information is critical for the network commissioning process after the installation.

One label is typically applied to the luminaire (should be visible after installation) and the other is placed on the floor plan document during commissioning.

Be sure to include these labels along with the luminaire packaging as per the instructions provided by the network partner for the specific project.

Also be sure to include instructions to the installer for proper handling of these labels during luminaire installation.

Figure 10. Example of label for installation and commissioning.
Recommendations to design a luminaire around EasyAir SNS300 with good RF signal

It is recommended to have one side metal wall distance from EasyAir SNS300 antenna side wall > 100mm (assuming other metal walls are far away, see figure 11, then luminaire to luminaire distance can be > 10 meters.

In general, every dB drop reduces luminaire to luminaire distance by one meter. The chart below gives one reference measurement for radiated RF power (TRP) vs. distance from one side metal wall.

Sensor position

If multiple luminaires are used in the same area, the distance between the different sensors should be at least 1.5m. This distance will minimize a sensor from “seeing” the light variation of other luminaires and reacting.

Figure 11. Reference luminaire design for TRP measurement.

Figure 12. Distance between sensors should be at least 1.5m apart.
Sensor spacing recommendations

If it is critical to minimize or avoid occupancy detection blind spots between two sensors, the sensors must be spaced appropriately.

The type of movement that needs to be detected in the overlapping area also impacts the spacing between sensors.

The occupancy detection area is determined by the following aspects:
- Orientation of the sensors
- Height at which the sensors are mounted

See below a snippet from EasyAir SNS300 datasheet describing occupancy sensing:

For example:

If
- the sensors are mounted at 8 feet
- an occupancy detection overlap on the Y direction for major movement is desired for the application
- sensors must be placed no farther than 15 feet apart

Reliable RF communication

If overlap is not critical, then spacing is dictated by the allowable distance for reliable RF communication between sensors. Maximum allowable distance is 40 feet line-of-sight.
Installing EasyAir SNS300 with ceiling mount bracket (SNS300CMP)
The ceiling mount bracket SNS300CMP is premounted with the EasyAir SNS300 and the cable. The strain relief is already part of the CMP300.

Drill 63.5 mm hole in the ceiling for installation of the SNS300CMP bracket. For more details on cut-out and mounting, refer the figures below. All dimensions are in mm.

Connect the wires from the sensor to the LED Driver in the luminaire. Connect the white wire from the sensor to the SR- terminal and the red wire from the sensor to the SR+ terminal of the SR driver. Follow luminaire manufacturer’s instructions for accessing the SR driver.

The EasyAir SNS300 operates upon energization with no further commissioning. See the chapter “Lighting Control” for configuring parameters during or after installation. Refer EasyAir SNS300 App Manual to configure the sensor using the Philips Field Apps.
EasyAir SNS300 with multiple Philips Xitanium SR LED drivers (1:N application)

When a group of luminaires is in the same daylight condition and needs to be operated at the same level, it is possible to use one sensor to control multiple luminaires.

The best way to work in such a scenario is to use an SR bridge. An SR bridge can connect to multiple DALI drivers on one end and to the sensor on one end. For more details, please refer the datasheet and design-in guide of SR Bridge available on our website.

EasyAir SNS300 sends commands to all connected drivers (using broadcast command); it does not have capabilities to address individual drivers. The light commands are sent as a broadcast command, so occupancy-/daylight-based lighting control and task tuning operate the same on all connected drivers.

⚠️ **Warning:**

The regular DALI drivers have basic insulation on the DALI interface as safety barrier. The SR drivers / bridge have double insulation on the SR interface. As EasyAir SNS300 devices do not have additional insulation barriers, it means that using DALI drivers via SR bridge maintains the double insulation level.
Contact details

Philips EasyAir SNS300

Product information:
www.lighting.philips.co.uk/oem-emea/products/easy-to-integrate-wireless-sensors.html

Or contact your local Philips sales representative.
Disclaimer

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