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Technical application guide

EINSTONE basic

Light is OSRAM

OSRAM

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Please note:

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1 Introduction

1.1 System overview

OSRAM EINSTONE connects the real and the digital world using transmitter units known as beacons. Intelligent EINSTONE beacons provide the basis for implementing a whole range of location-based services in indoor facilities, such as navigation, customer loyalty programs and more.

OSRAM EINSTONE combines beacon technology with lighting infrastructures. Permanently supplied with power, EINSTONE beacon modules provide a stable and secure solution. This also ensures an ideal placement of the beacons and reduces maintenance (and the associated costs) to an absolute minimum.

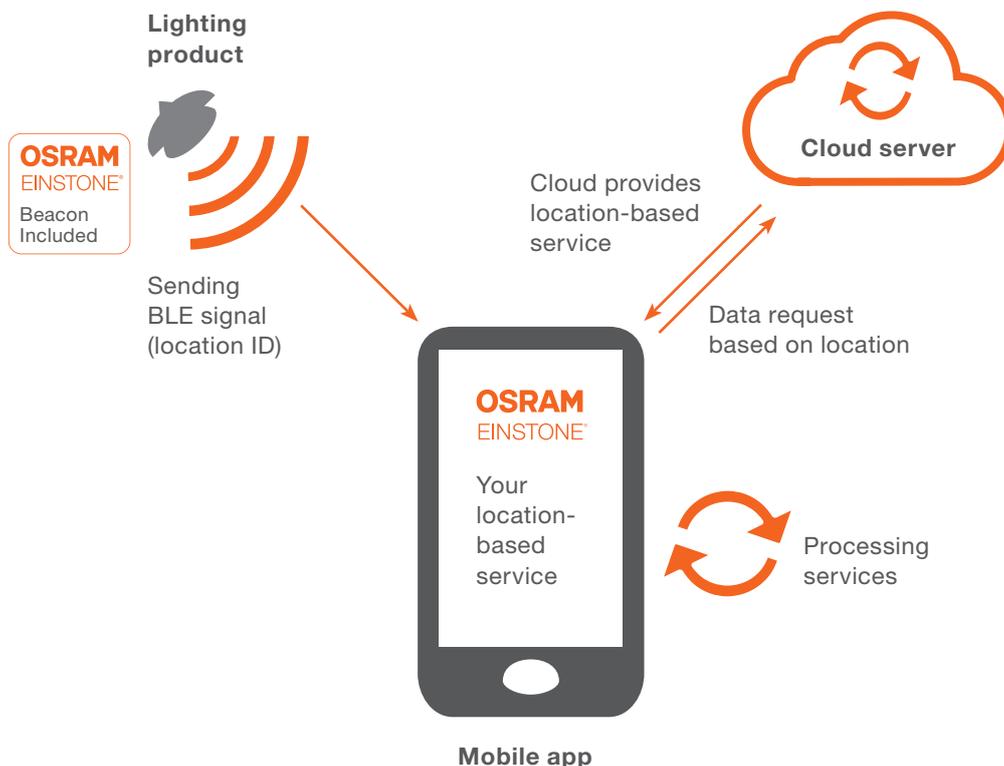
There are three different form factors to fulfill the requirements of different applications with the same functionality:

- EINSTONE track for easy plug-and-play integration into 230V track systems,
- EINSTONE basic for connection to the 230V mains grid and
- EINSTONE module with 5–60V DC input for operation in SELV areas.

Beacons work with Bluetooth low energy (BLE). This technology is used for transmitting data over short distances. Furthermore, it is designed for low energy consumption and costs. BLE communication consists of small packets of data, so-called “advertisements”. These packets can be collected by mobile devices such as smartphones or tablets and used for a variety of digital services.

Functional overview:

- The lighting system transmits signals that are used to determine the location
- Mobile devices determine the user’s exact position using an app
- The information related to the location is available in the app



1.2 Versions

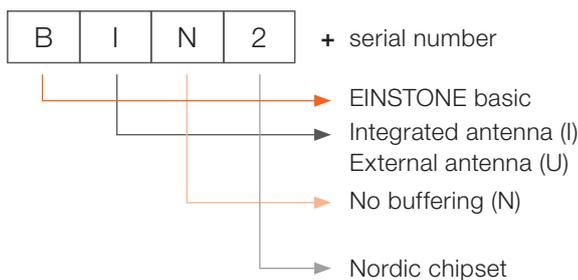
There are two versions of the EINSTONE basic. One with an integrated antenna on board for easy installation, e.g. in parallel to a downlight behind a recessed ceiling, and one with a connector for external antennas. This is needed for luminaire integration where the signal has to be led out of a metal housing. As the EINSTONE basic is meant to be connected to the mains grid, no energy buffer is provided.



1.3 Nomenclature

Each product has a unique product identifier consisting of four characters, followed by a serial number with eight digits.

Depending on the antenna, there are two options of the product code.



1.4 Features

The device can be configured with the EINSTONE Configurator app, which is available for Android smartphones. Please send us an e-mail to einstone_support@osram.com if you would like to use the EINSTONE Configurator app and the corresponding user guide. You can configure up to five non-connectable beacon signals with independent settings such as advertising interval and transmitting power. These beacon signals can be set as different standards:

- iBeacon
- Eddystone URL (Physical Web™)
- Eddystone UID
- AltBeacon

Thus, the EINSTONE basic can be configured optimally to meet your needs. With a powerful microcontroller on board, the EINSTONE basic is compliant with Bluetooth 5.0 and ready for Mesh 1.0 according to Bluetooth S.I.G.



2 Mechanical considerations

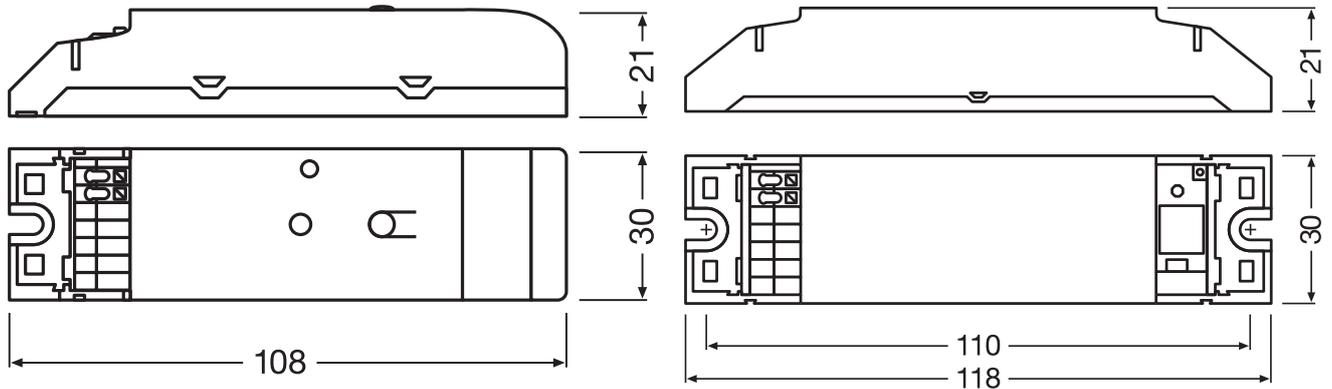
2.1 Housings

The following images show the two different housings for the EINSTONE basic with integrated (left) and external antenna (right).



2.2 Dimensions

The dimensions of the EINSTONE basic with integrated antenna (left) and connector for external antennas (right) are depicted in the following drawings.



All figures in mm

2.3 Mounting instructions

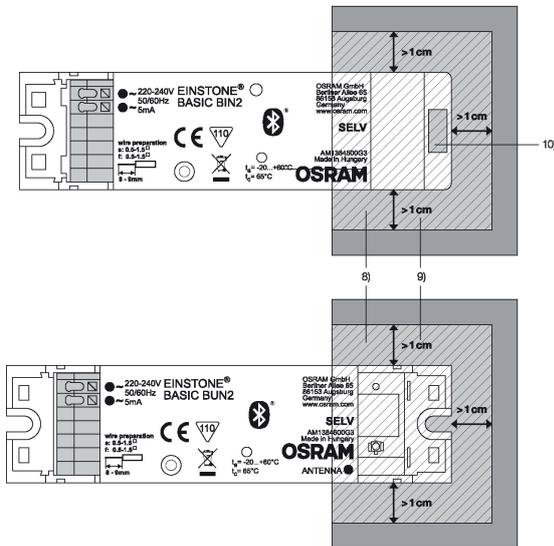
Please read the following notes before mounting the device:

- For optimal results, the EINSTONE basic should not be mounted at heights exceeding 3 meters.
- The service is strongly influenced by human bodies as the spectrum of Bluetooth is the same as the resonance frequency of water. Thus, an installation at a height lower than 2 meters can lead to deterioration of the signal.
- The areas surrounding the EINSTONE basic should be free of metal parts as these can limit the performance of the antenna. Please mind the keep-out zones of the antenna in the following drawing. No metal parts should be placed in this area.

- A closed metal housing can totally disable transmission. Do not place the external antenna directly on metal.
- The best results for indoor navigation are achieved when the devices are distributed widely across the room or building.
- The mounting of EINSTONE basic devices for applications such as proximity marketing depends on the particular local conditions.
- The antenna is located next to the LED and radiates in the same direction. It achieves the best performance when it is installed pointing down from a ceiling.
- An optional strain-relief ensures an accurate installation for independent operation. This can be ordered with EAN10: 4008321392091.

For further information and support for installation planning, please contact the EINSTONE team at einstone_support@osram.com.

Attention: The integration of the EINSTONE basic into a luminaire requires a new certification. This includes, for example, an electromagnetic compatibility test.



3 Electrical considerations

3.1 Basics

The EINSTONE basic is equipped with clamping connectors for solid wires with a lead diameter of 0.5–1.5 mm². It is recommended to use terminations for stranded wires.

The device is designed to be connected to the mains grid. Do not connect it to a switched power cable as it does not have an integrated energy buffer. The device is not suitable for being connected to a dimmable power source.

An LED on the device indicates the following states:

- Connected: permanently on
- Boot: blinking four times
- DFU mode: blinking until firmware update is finished

3.2 Power supply

Nominal input voltage	220–240V AC with 50Hz
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3.3 Bluetooth low energy

The physical layer of the EINSTONE basic is based on Bluetooth low energy (BLE) technology. Within a spectrum of 2402 to 2480 MHz, the EINSTONE basic transmits its data in a range of -24 to +4 dBm.

The interval of the advertising packets can be set from 50 to 2000 ms.

The typical line-of-sight range is 5 to 30 m, depending on the set transmitting power.

3.4 External antennas

The versions for external antennas have a micro coaxial connector (e.g. IPEX, AMC, MHF) on board. To connect the antenna, apply light pressure to the center of the connector to avoid damage due to skew.

Special tools, e.g. Hirose U.FL-LP-IN, can be used for insertion while U.FL-LP-N-2 can be applied to carefully remove the antenna.

To reorder a Taoglas FXP74, please contact einstone_support@osram.com.

Attention: The connector is designed for a few couplings only.

3.5 Tested antennas

- Taoglas FXP74
- Taoglas FXP75
- Antenova SR4W030

The external antennas from Taoglas are designed to be mounted on acrylonitrile butadiene styrene (ABS) with a minimum thickness of 2 mm. The Antenova SR4W030 can be directly placed on metal. Please contact OSRAM for further information.

4 Environmental considerations

4.1 Ingress protection

The housing of the EINSTONE basic provides an ingress protection of IP20, which means that it is protected against the intrusion of foreign solid objects with a diameter of over 12.5mm.

4.2 Temperature

Maximum case temperature (t_c): 65 °C

Storage temperature (t_s): -20...65 °C

Ambient temperature (t_a): -20...60 °C

4.3 Humidity

The module is resistant to a relative humidity between 5 % and 85 %.

5 Norms and standards

Electrical safety:	Class III
Ingress protection:	EN 60529: Degrees of protection provided by enclosures (IP Code): <ul style="list-style-type: none">– Integrated antenna: IP20– External antenna: IP20
Flammability of plastics:	UL 8750 Class 2/UL 94 850 °C glow wire test
CE guidelines:	<ul style="list-style-type: none">– 2014/30/EU– 2014/53/EU (RED)– 2011/65/EU (RoHS)
List of regulations	<ul style="list-style-type: none">– EN 61547: Equipment for general lighting purposes – EMC immunity requirements– EN 60950: Information technology equipment– CISPR 15: Limits and methods of measurements of radio disturbance– EN 61000-6-2: Generic Immunity (Industrial)– EN 61000-6-3: Generic Emission– EN 61000-3-2: Limits – Limits for harmonic current emissions– EN 61000-3-3: Limits – Limitation of voltage changes– ETSI 301-489-1 – Part 1: Common technical requirements– ETSI 301-489-17 – Part 17: Specific conditions for Broadband Data Transmission Systems
Additional approvals:	VDE is not required

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