Casambi Specification

Casambi technology tender texts for project specification.

CASAMBI

Revision History

Date	Version	Description
May 2016	1.0	First version of the Casambi Specification

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v1.0 Casambi Specification SG

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Content

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1. Casambi

Casambi is an advanced lighting control solution based on Bluetooth Low Energy (BLE). BLE is a state-of-the-art wireless technology and the only low power wireless technology in all modern smartphones, tablets and even smart watches, making it the only mainstream and future proof low power radio technology in the world.

Bluetooth Low Energy was developed at Nokia Research Center where the founders of Casambi Technology Oy worked. That's why Casambi has had the unique advantage in realising the potential of Bluetooth Low Energy early on. Casambi started the development of the solution before there were any Bluetooth Low Energy devices on the market. Casambi now has the most advanced BLE based lighting control solution in the market, including a robust, high performance mesh networking technology.

Casambi technology can be integrated into luminaires, LED-drivers and even within LED-modules or bulbs, creating an optimal solution in terms of ease of installation and functionality with minimal additional hardware and deployment costs.

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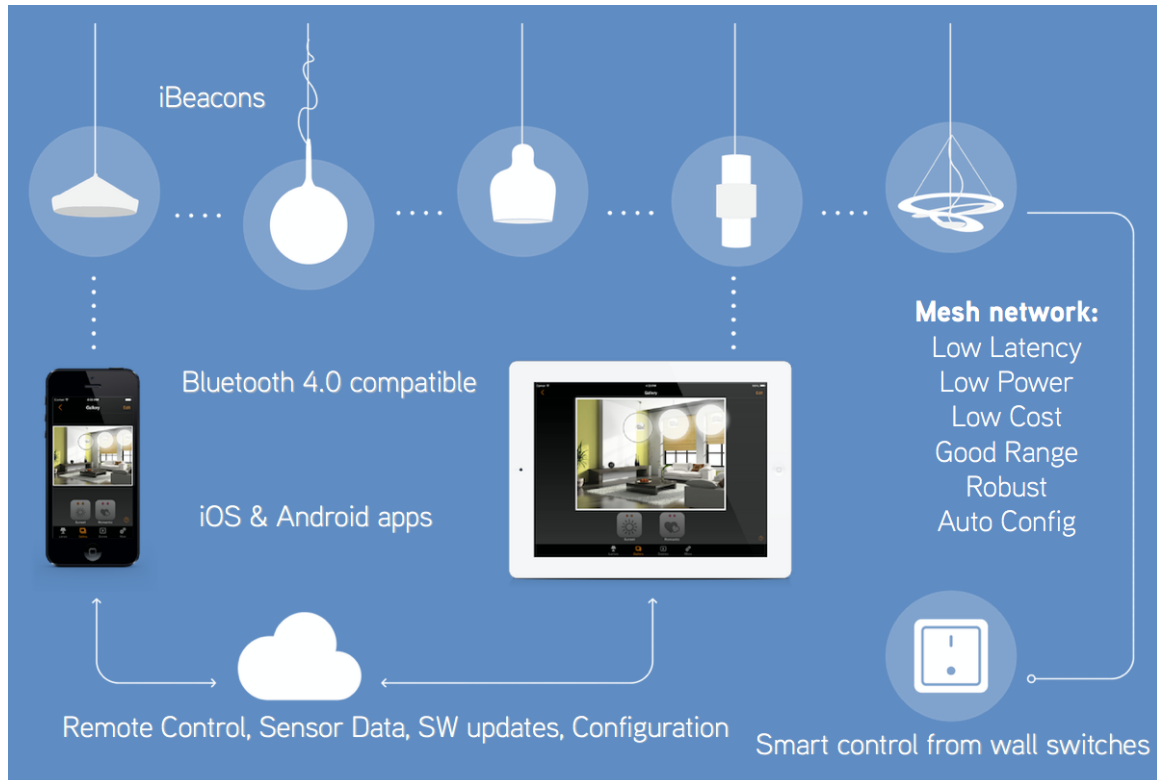
1.1 Smart

The Casambi devices are smart on their own. All the intelligence is replicated in each node leaving no single point of failure. The system itself is in constant consensus based synchronisation.

1.2 Connected

The Casambi devices are connected when needed. An Internet connection is not necessary for general operation and day to day functionality. Bluetooth Low Energy is already implemented in smartphones and tablets, so communication can be done without any additional gateways. The speed of connectivity from a smart device and the Casambi devices are fast and seamless, open the App and you are connected to the system.

1.3 User friendly

The system is intuitive. When connecting for the first time nodes are automatically pairing. The system can be used and modified by anyone, no commissioning experts are needed.

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1.4 Wireless

The Casambi network is based on the Bluetooth Low Energy protocol, which is the most energy efficient and future proof of wireless technologies.

2. Bluetooth Low Energy

Bluetooth Low Energy, also called Bluetooth 4.0+, Bluetooth Smart or simply BLE, was originally designed by Nokia as Wibree before being adopted by the Bluetooth Special Interest Group (SIG) and published in 2010. The low energy functionality of BLE allows developers to make products that run on small coin-cell batteries or energy-harvesting devices, making BLE the best protocol to be used in wireless lighting control applications.

2.1 No Gateways

BLE was built for Internet of Things (IoT) and has been implemented in all modern smartphones, tablets and even smart watches since the beginning of 2012. This means that **no gateway modules or any kind of dongle is needed to control lighting via BLE**, which makes a BLE - based lighting control solution more cost effective than solutions built on other wireless technologies. Other technologies, like WiFi and Zigbee, require a gateway module between the control device and the network as well as additional power supplies, ethernet cabling and all the considerations around the infrastructure requirements of such solutions.

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3. The Casambi Solution

3.1 Networks

The Casambi solution is based on a network structure. Casambi units (which are installed next to or integrated into luminaires, drivers or switches) are paired to networks. **127 units can be paired to one network.** The amount of network per Casambi solution does not have to be considered.

3.2 Network Structure

All the units that are physically in the same area, that the user want to access at the same time or that should have the same functionality at the same time should be paired to the same network. A network should cover an area that all the users in that area are allowed to control as the access rights are defined per whole network.
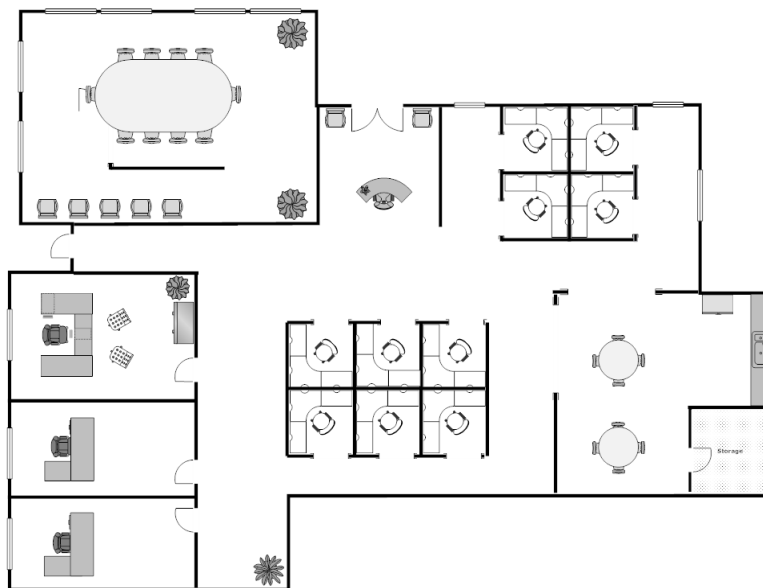
Example. Office floor plan

In the picture of the office floor plan 3 individual offices can be seen as well as a meeting room, 2 office cubicle areas, a kitchen, a reception area as well as some corridors.

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If all users of the small office area are allowed to control all spaces, one network would be sufficient enough. With one network the 3 office rooms as well as the meeting room and the kitchen would all have separate lighting groups. For the rest of the area with cubicles, reception and corridors fixtures many options could be considered. All cubicles and the reception could have their own groups if the lighting is designed to be individually controlled. If the space again is equipped with general lighting for the big space only one group could be sufficient enough.

The Casambi lighting scenes are formed by choosing every single luminaire that should belong to that particular scene, so grouping and networking does not need to be taken into account for scene setting. Scenes can consist of fixtures from different groups.

If the small example office would be separately controlled and by different people, who should not have access rights to each other's lighting spaces, the recommendation would be to create individual networks for all 3 office rooms. Also the meeting room and the kitchen should be respectively in their own networks since they are their own areas with own lighting situations.

Network security can be an important consideration so different sharing settings can be set for each network with different administrator passwords. Since the network structure is part of the app functionality there is no extra cost for making many networks- the network structure is purely based on usability.

3.3 App

To access all the functionality of the Casambi networks an app is needed. The app can be downloaded for free from Apple App Store or Google Play Store with the name ***Casambi***. The Casambi app is compatible with following devices; iPhone 4S or later, iPad 3 or later, iPod touch 5th generation or later as well as Android 4.4 KitKat or later devices with full Bluetooth 4.0 support. The support for Apple Watch requires iOS9 and watchOS2.

The app is intuitive and self explanatory. Each user screen and setup screen in the app has "in screen" help without any interruption to the setup process or the user's interaction. For tips and tricks on app usage please see the App User Guide (A separate document).

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3.4 Communication

All Casambi units form a wireless mesh network. The mesh network contains an algorithm that drives towards a consensus state between each participant. Once consensus is reached the communication will stop. If a unit goes offline it is no longer considered to be part of the consensus group but once it comes back online it will join the group again and catch up with others. **In this way the casambi network is more like a consensus based syncronisation engine**, rather than a classic mesh network.

The communication range between two Casambi units is highly dependant on the surrounding and obstacles, such as walls and building materials. In indoor environments the range can be up to 30 m and in outdoor conditions up to 50 m. It is recommended to make communication tests in environments with a lot of signal disturbing materials. Longer ranges can be achieved by using multiple Casambi units. **It is also important to consider that in the majority of applications either the user with a smart device or adjacent luminaires containing Casambi units are only ever 5 to 6 meters away from each other to provide excellent reliability in the communication network.**

3.5 Network Sharing Options

As a consideration of the system setup, the network sharing is a decision that is to be made at the beginning of the process, to ensure a straightforward commissioning phase and the best possible network security.

A Casambi network has 4 different sharing options, that can be chosen and modified directly from the app. The 4 different options are:

Not Shared: The Network is only stored on the device the network has been created with. Other devices cannot access the network.

Administrator Only: The Network is discovered and accessed only with an administrator e-mail and password (chosen at the stage of creating the network).

Password Protected: Other devices can access the network with a visitor password. Modifications require an administrator password.

Open: Other devices can access the network without any password. Modifications require an administrator password.

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4. Casambi functionalities

With Casambi, lighting can be controlled via smartphones, tablets, smart watches, push buttons, switches or Casambi's wireless switch called Xpress. Smart control can even be achieved from old wall switches. With Casambi you can:

- Turn on and off your luminaires
- Dim the lighting
- Group luminaires and turn on, off and dim the group as one
- Configure, save and recall scenes
- Configure, save and recall animations
- Fade time adjustments for scenes and animations
- Use the Timer to turn on and off scenes or animations based on time and date
- Adjust colours
- Adjust colour temperatures
- Use motion sensors
- Bluetooth signal strength for geo locationing
- Take pictures from your spaces or upload your lighting layout drawings and add lighting control directly to your picture
- Take sunrise and sunset into account while defining timers
- Get status information from the system
- Update the firmware over-the-air
- System functionality updates over-the-air
- Commissioning support within the app

4.1 Basic Gestures

Turn on a luminaire: tap once on the lamp icon

Turn off a luminaire: tap once again on the lamp icon

Dim the luminaire: place your finger on the lamp icon of the luminaire you would like to dim. Slide it to your right hand side for dimming up and left hand side for dimming down (pan).

Change the colour temperature: place your finger on the lamp icon of the luminaire you would like to change the colour temperature on. Slide your finger up on the screen to change the colour temperature to a warmer shade and down to change it to a cooler shade (pan).

Change the colour: hold your finger on a lamp icon of a luminaire you want to change the colour of. A colour when will appear in the screen.

4.2 Gallery

The Gallery functionality in the Casambi app is the most intuitive way of controlling your luminaires. Take a picture of the room where your luminaires are situated and place lamp controls over them in the picture.

The picture can be a real live photograph of the area in question, a rendered picture of the space or a ground plan. To add a picture into the Casambi lighting control app the picture itself needs to be saved on the device where the Casambi app installed.

Use the basic gestures, tap, pan and hold the lamp control circles to control the luminaires in the picture.

4.3 Scenes

A scene is a lighting situation that has been saved as a 'scene'. A scene can be recalled at any time from a user interface or it can be programmed to start at a certain time thanks to the Casambi Timer. Multiple scenes can be active at the same time. A Scene in the Casambi solution is consedered to be in ON-state as long as at least one fixture remains to be controlled via it.

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A scene can be a certain dimming level, or a combination of a dimming level and a colour, a combination of a dimming level and a colour temperature or a preset adjustment of the indirect/direct lighting ratio- depending on what kind of luminaire is being controlled.
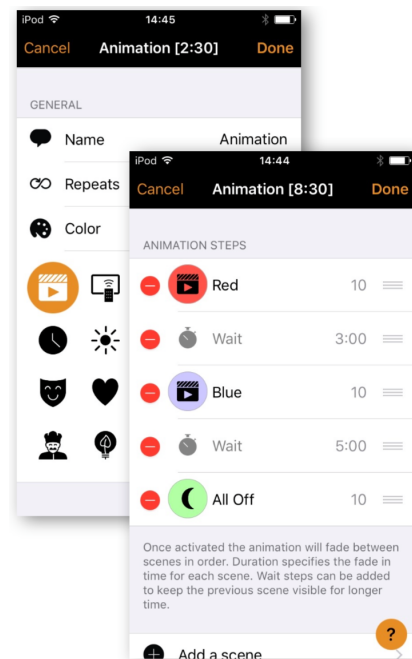
4.4 Animations

An animation is a dynamic scene or a sequence of different scenes. An animation is built by choosing the fade times to fade into a scene, what scene should be active and for how long time. An animation can be saved as an 'animation' and it can be recalled at any time from a user interface or it can be programmed to start at a certain time thanks to the Casambi Timer. An animation can be set to be one-off or to be on repeat.

Example of an animation:

Add Scene Red, fade time 10 sec
Add wait 3 min
Add Scene Blue, fade time 10 sec
Add wait 5 min
Add Scene All Off, fade time 10 sec

This animation setting will fade in to scene Red in 10 seconds and Red will be active for 3 minutes.
Then the scene Red will fade into scene Blue in 10 seconds and Blue will be active for 5 minutes and fade out in 10 seconds.

4.5 Timer

With the Casambi Timer-feature scenes and animations can be turned on and turned off based on a certain time and date. The options are to either choose a certain weekday or several weekdays or a specific date. After this the exact time can be chosen or also according to local sunrise and sunset times. To use sunrise/sunset the network location needs to be set.

It is also possible to set the fade time for the scene. This means that when the scene is turned on the lights will slowly reach the light level in the scene. The fader will start when the timer is turned on. This means that if you set the scene to be recalled at

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14:05 and you set a fader for 30 seconds then the scene is fully on at 14:05:30. A fade time can also be set for turning luminiares OFF.

Casambi units will keep track of time automatically. In case of power loss time needs to be re-syncronized.

4.6 Smart Switching With A Standard Switch

Casambi enabled luminaires can also be controlled from standard wall switches without the Casambi app. The switch needs to be connected to either CBU-ASD or CBU-TED. A standard wall switch can be used for dimming, controlling a scene or to cycle through several scenes. In this way there is no need to install additional dimmers.

The settings for the switch need to be configured from the Casambi app.

Dim and save — controls one luminaire
With the Dim and Save functionality a dimming level can be set with a standard wall switch. To start the dimming process, a quick OFF and ON push has to be made. After this "flicking" the dimming process will start. Once the lighting has reached the desired brightness level a new "flick" (a quick OFF/ON push) has to be made to save the current level as a new max dim level for the fixture.

Cycle through modes — controls one luminaire
Different modes can be saved for luminaires in the Casambi app. A mode could be compared like luminaire specific scenes. Modes can be different dimming levels, colours or colour temperatures. **4 modes can be saved per luminaire**. By "flicking" the switch quickly between OFF and ON the cycle between the different modes and an off- mode will start. The luminaire will go through Default, Mode1, Mode2, Mode3, Off.

Control scenes — controls one or multiple luminaires
Instead of alternating between ON and OFF a standard wall switch can be configured to control a scene, so the ON/OFF is substituted with SCENE ON/OFF.

Cycle scenes — controls one or multiple luminaires
A standard wall switch can control multiple scenes with this option. By "flicking" the switch quickly between OFF and ON the cycle between the different scenes and an off- mode will start. How many scenes and which scenes can be configured from the Casambi app.

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Active / Standby — controls one or multiple luminaires

With the Active/Standby Smart Switching mode 2 scenes that have the same luminaires in them can be controlled. For this option 2 scenes need to be created; one active that should turn on when the switch is pushed ON and one standby scene that is turned on when the switch is pushed OFF.

This mode can be used for example with motion sensors. When motion is detected the luminaires go to full light level and when there is no motion the luminaires are dimmed to 30% for such applications as corridor or stairwell linking .

4.7 Smart Switching With A Momentary Action Switch

Casambi enabled luminaires can also be controlled from momentary action switches. The momentary action switch needs to be connected to a CBM-001. In this way there is no need to install additional dimmers. The settings for the switch need to be configured from the Casambi app.

Controls This Lamp — controls one luminaire

This is the default setting. The light can be turned on and turned off with a normal click and dimmed by pressing down and holding the momentary action switch.

Cycle through modes — controls one luminaire

Different modes can be saved for luminaires in the Casambi app. A mode could be compared like luminaire specific scenes. Modes can be different dimming levels, colours or colour temperatures. **4 modes can be saved per luminaire**. By "flicking" the momentary action switch the cycle between the different modes and an off- mode will start. The luminaire will go through Default, Mode1, Mode2, Mode3, Off.

Control scenes — controls one or multiple luminaires

Instead of alternating between ON and OFF a momentary action switch can be configured to control a scene, so the ON/OFF is substituted with SCENE/OFF.

Cycle scenes — controls one or multiple luminaires

A momentary action switch can control multiple scenes with this option. By "flicking" the switch the cycle between the different scenes and an off- mode will start. How many scenes and which scenes can be configured from the Casambi app.

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4.8 Apple Watch

Casambi enables lighting control via Apple Watches. From an Apple Watch luminaires can be turned on and turned off, a scene or an animation can be recalled and dimming can be done by rotating the digital crown. In the watch window 'all lamps' and 3 first scenes can be seen.

4.9 Movement Sensors

Casambi CBU-ASD and CBU-TED units can be used with movement sensors that have mains switching contacts. When CBU-ASD or CBU-TED is powered on by the movement sensor, it can through the Smart Switching feature (see chapter 5.6 Smart Switching with a standard switch) either alternate between a standby state and an active state (If "Active/Standby" is chosen in the Smart Switching configuration interface) or by two different scenes (If "Control Scenes is chosen in the Smart Switching configuration interface).

The motion sensor is connected to the Casambi unit on the mains side.
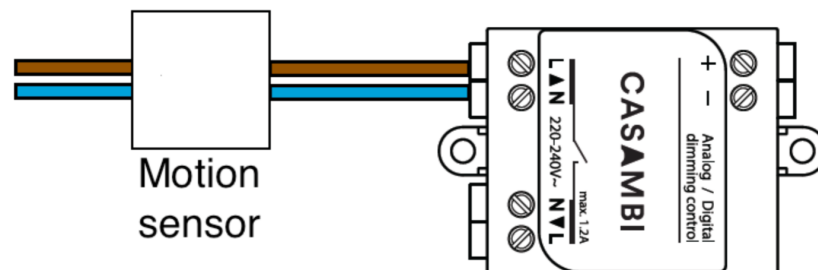
4.10 Remote Access Via Gateway

A network can have a (single) iOS/Android device working as a gateway. Other devices having access privileges to the same network can connect via the cloud to the network when not on the same physical location of the network.

One iOS device can be the gateway for 8 networks and one Android device can be the gateway for 1 network.

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4.11 iBeacons

Introduced in iOS 7, iBeacon is a technology enabling location awareness possibilities for apps. Leveraging Bluetooth Low Energy (BLE), a device with iBeacon technology can be used to establish a region around an object. This allows an iOS device to determine when it has entered or left the region, along with an estimation of proximity to a beacon.

Beacon transmitters could be placed basically anywhere, but it is quite logical to place them inside luminaires. Luminaires already cover the whole area people move around in and they already have their power installed in the building. Luminaires also tend to light up some kind of object and whether the object is a piece of art in an art gallery or a car at a car retailer, a beacon receiver can trigger an app to display information about the object in question. If beacon technology is already integrated in lighting modules, no additional investment needs to be done for these services.

Casambi integrates iBeacon technology within all Casambi units. No additional iBeacon senders need to be implemented. Casambi however does not provide for diverse apps that would act on iBeacon information.

Example of usage of iBeacon technology:

Instead of using an audio guide in a museum, the museum visitor can download a museum app that is able to receive information from beacon transmitters. Beacon transmitters are already installed within luminaires/drivers and the luminaire would obviously be lighting up a piece of art. When the museum visitor is in the proximity of the art piece his/her app will display the information on the piece that has been sent by beacon technology over BLE from the Casambi unit.

Similar cases could be executed in retail (information on discounts, guidance within the shop), car parks (to find your car), in coffee shops and kiosks for ordering processes, at airports for gate navigation, in zoos to provide information on animals or at bus stops to tell the timetable for buses at that particular bus stop. As the technology enables location awareness and knows when a user enters or leaves a certain area there are an enormous amount of benefits from.

4.12 Extension Interface

Casambi, as a technology enabler, has created a firmware extension interface to make it possible to send sensor data through the Casambi network to the cloud and

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back as well as to read fixture parameters directly from the app, however, without being able to actively change any lighting states based on the cumulated data.

For this functionality it is assumed that the sensor or sensors are integrated into a luminaire.

The extension interface data is divided into 2 groups:

1. Fixture Parameters

2. Sensor Values

Fixture parameters are manufacture specific data about the luminaire in question. Examples of parameters could be LED versions, current consumption, driver version, dimming curve or temperatures. These parameters can be read on demand and also changed from the app by simply writing a new value and sending it. This data is not sent to the cloud.

Sensor values could be anything measurable like illuminance, humidity, carbon dioxide, wind, colour temperature, how many people have passed a certain place, a specific status or an amount of time that has passed after an occurrence. Sensor values can be read from the app. They refresh based on a chosen interval or they can be refreshed on demand. The sensor values can not be overwritten from the app. The data is also sent to the cloud and back from the cloud.

Sensor values are displayed by double tapping on a lamp icon in the 'Lamps' tab of the app. Fixture parameters can be displayed by double tapping on a lamp icon in the 'Lamps' tab of the app, by choosing 'Lamp settings' and then 'Parameters'.

The extension interface allows bidirectional communication between CBM-001 running the Casambi firmware and a secondary MCU of a Casambi-partner's choice. In this way a partner can provide customer specific functionality that cannot be provided by default functionality by the Casambi firmware.

5. Products

Casambi's core product is the software, the actual firmware, that is called "Casambi technology". Casambi technology can be integrated into drivers, LED engines and LED bulbs via a bluetooth chip CBM-001 and directly into luminaires or installed behind switches via the control module CBU-ASD. Casambi also provides for a trailing edge dimmer, CBU-TED, for dimming of retrofit LED bulbs, incandescent lamps as well as LED control gear.

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5.1 CBU-TED

CBU-TED is a Bluetooth controllable, Casambi enabled trailing-edge dimmer for operation of incandescent lamps, dimmable LED lamps and dimmable LED control gear. It can be installed behind a traditional wall switch, inside a luminaire or into a ceiling outlet box. Maximum allowable ambient temperature must be observed.

CBU-TED is able to control up to 150 W. The maximum permissible load varies according to different load types.

Load suitability

Type of load	Max. load
Incandescent and high voltage halogens (R)	150 W
High quality dimmable LED bulbs (C) [1]	50 W
High quality dimmable CFL bulbs (C) [1]	50 W
Trailing edge dimmable LED drivers (C) [1] [2]	50 W
Low voltage halogens with electronic transformers (C) [1] [2]	50 W
High voltage AC LED modules (R) [3]	150 W
Luminescent lamps, non-dimmable LED and CFL bulbs (C)	Not allowed
Wire wound transformers, electric motors and other inductive loads (I)	Not allowed

Never connect inductive loads, such as iron core transformers. This could cause permanent damage to the dimmer. Do not mix different types of loads.
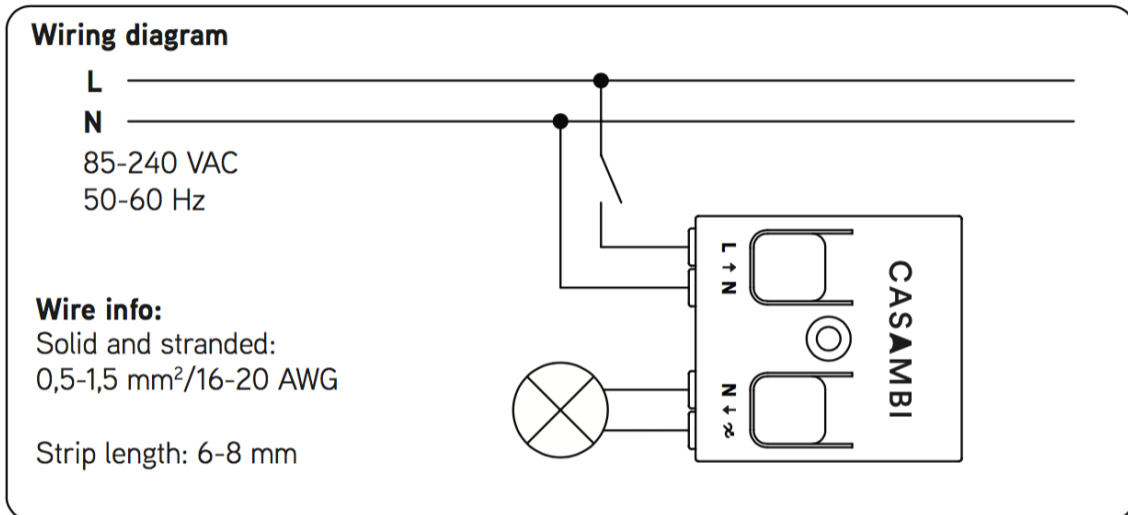
[1] Dimming quality depends solely on the load electronics.
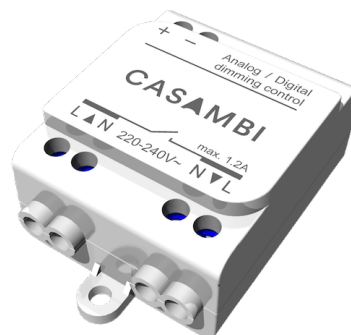[2] Do not connect more than two electronic transformers to one CBU-TED.
[3] Some LED modules may flicker at low dimming levels.

CBU-TED is 40,4 x 36,3 x 14,0 mm in size, is IP20 and operates in an ambient temperature between -20...+45 °C. Using the dimmer in a heat sensitive environment may limit the maximum output power.

For installation a 0,5-1,5 mm^2 solid or stranded conductor electrical wires can be used. Please see the wiring schematic for more details.

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5.2 CBU-ASD

CBU-ASD is a wireless control unit for LED and halogen drivers with 0-10V, 1-10V or DALI dimming interface. The control output can be configured either as analog 0-10V (and 1-10V) or digital Standalone DALI control interface.

When the output is configured as Standalone DALI, CBU-ASD acts both as a controller and as a power supply making it possible to connect directly to an LED driver with DALI interface without the need for an external DALI power supply. This so called Standalone DALI makes it possible to implement multi-channel lighting systems with adjustable colour (RGB) or colour temperature, while keeping the wiring and number of components at their minimum.
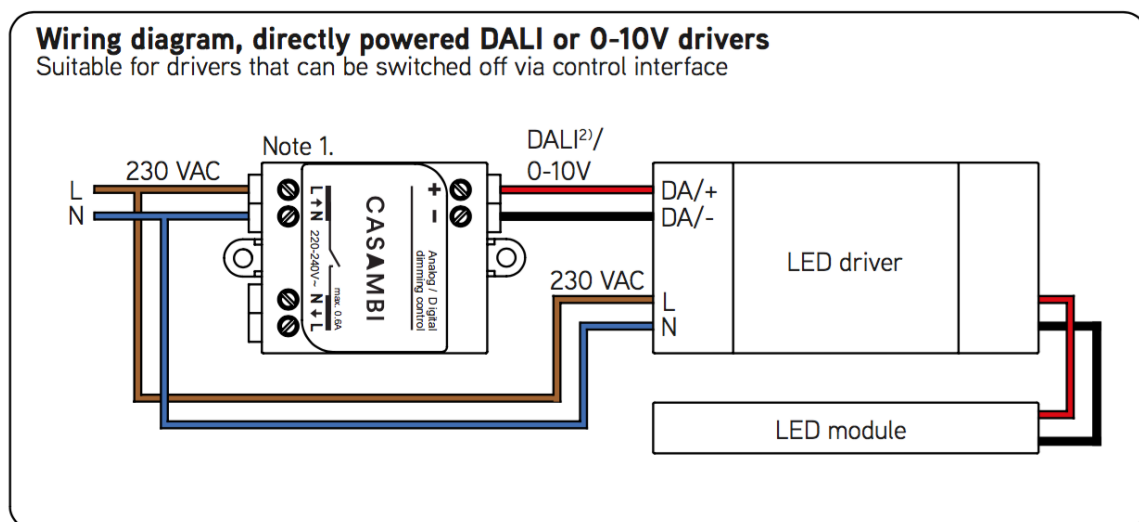
CBU-ASD does not comply with IEC 60929 and therefore is not designed to be connected to an existing DALI network. The module can be used only in a closed system, i.e. as a part of a lighting system which is not connected to an external DALI network.

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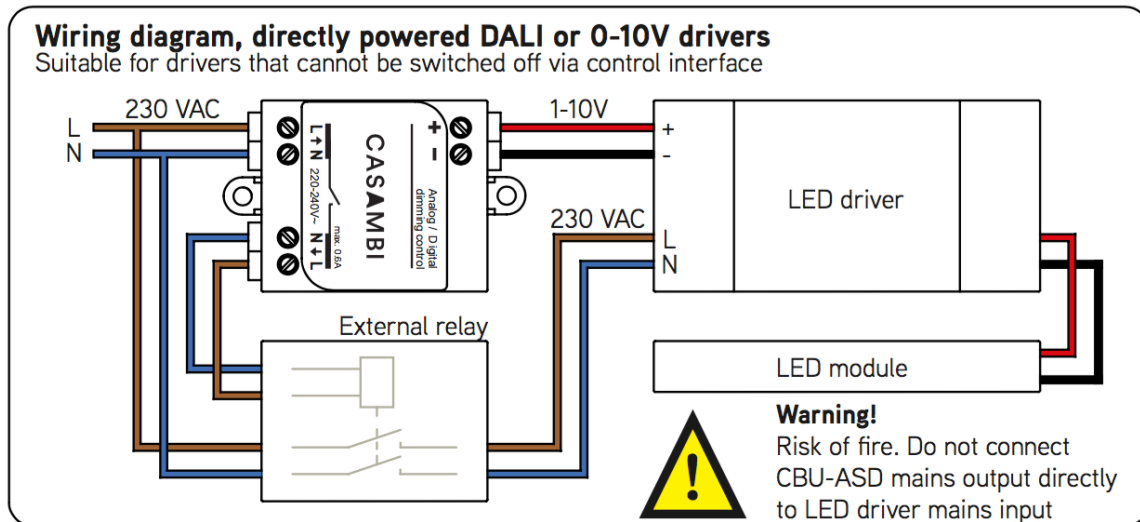
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Features

- Wirelessly controllable
- No need for an external gateway device
- Forms automatically a fast wireless mesh network
- Very small form factor for luminaire installation
- Configurable analog/digital output
- Analog output: 0-10V sinking/sourcing
- Digital output: Standalone DALI
- Easily implemented RGB and colour temperature controls
- Controllable switched mains output
- Single 2,3 and 4 channel control
- Dimming from standard on/off wall switches
- Device firmware can be updated over-the-air
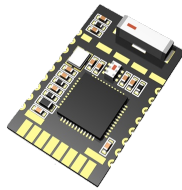- Casambi cloud service enhances user experience

CBU-ASD is 56,5 x 35,8 x 22,3 mm in size, is IP20 and operates in an ambient temperature between -20...+40 °C (when Iout is 0,6 A) and between -20...+50 °C (when Iout is 0 A). It is important that the ambient temperature does not exceed the specified maximum value.

For installation a 0,75-1,5 mm^2 solid or stranded conductor electrical wires can be used. Please see the wiring schematic for more details.

Wiring diagram, directly powered DALI or 0-10V drivers
Suitable for drivers that can be switched off via control interface

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Wiring diagram, directly powered DALI or 0-10V drivers
Suitable for drivers that cannot be switched off via control interface
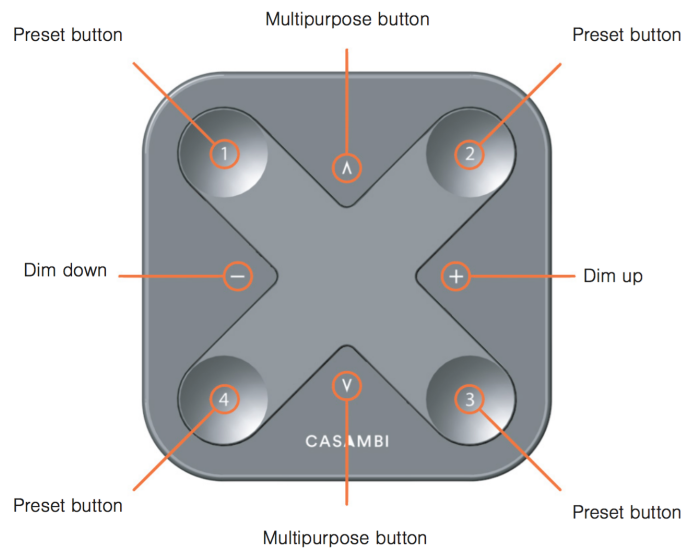
5.3 CBM-001

CBM-001 is a Class 2 embedded Bluetooth 4.0 module designed to be integrated into LED drivers, different lighting control applications, behind momentary action switches, light fixtures and LED bulbs. It is pre-programmed with Casambi's proprietary firmware making it completely compatible with other Casambi enable devices.

CBM-001 contains a powerful 32 bit ARM® Cortex™-M0 CPU and a 2.4 GHz transceiver with on-board antenna and optional matching circuitry. Different external components, such as motion detectors, ambient light sensors and PWM circuits, can be interfaced with the module by using its 12 general purpose I/O pins.
CBM-001 can be mounted both in horizontal and vertical position making it very versatile for projects with different form-factors.

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5.4 Xpress

Xpress is a wireless switch that can be configured via the Casambi app. A light indicates the selected preset.

Dim up, Dim down:
- Smooth dimming of last chosen preset

Multipurpose buttons:
- Change of colour temperature in steps of 25 Kelvin
- Change of the indirect/direct ratio

Preset Buttons:
- Individual luminaire control
- Group control
- Control of all lamps
- Recall scenes
- Recall animations

Xpress communicates directly to the Casambi system. It comes with a wall mounting plate and can be attached to the plate with magnets. Xpress is 90 x 90 x 12 mm in size and works with a CR 2430 Lithium-ion battery.

5.5 Casambi Ready Products

Casambi's business model is to be a technology and solution provider for Casambi's partners. Casambi technology can be integrated into fixtures, LED-drivers and even

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within LED-modules, creating an optimal solution in terms of ease of installation and functionality with minimal additional hardware and deployment costs.

Casambi ready products are produced by Casambi's partners and are 100% compatible with Casambi's native products. A list of Casambi's partners and Casambi Ready products is kept on casambi.com.

6. To project with Casambi

The most seamless way to start projecting with Casambi is to check with the chosen luminaire manufacturers that Casambi technology is integrated within the fixtures. In this way no additional lighting control points need to be projected.

If however some of the fixtures are not *Casambi Ready,* suitable Casambi units have to be chosen. Please read more about Casambi products in chapter 5. A good rule of thumb is to use 1 Casambi unit per fixture.
When the modules are chosen, their placement need to be decided considering the communication range. The communication range between two Casambi units is highly dependant on the surrounding and obstacles, such as walls and building materials. In indoor environments the range can be up to 40 m and in outdoor conditions up to 50 m. It is recommended to test the communication at the test lighting phase, if unsure about the possible disturbances. Longer ranges can be achieved by using multiple Casambi units.

As Casambi is a wireless system based on Bluetooth Low Energy no wiring, gateways, routers, servers, power supplies, converters, relay modules, other automation units or input or output modules needs to be planned. Casambi technology is simple, robust and straightforward- the functionality is in the software is all wireless.

After the Casambi products are chosen and their placement is set the functionality can be planned. A recommendation would be to start thinking of who should have access rights to the network/networks and plan the amount of networks accordingly. More information about networks an be found in chapter 3.

Within a network fixtures can be grouped. Grouping makes the usability of the system faster and easier as the fixtures that execute the same function at the same time can be controlled at once.

When networks and groups are planned the system functionality can be set. All the Casambi features are explained in chapter 3.

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7. Commissioning

The Casambi solution is made both for the consumer market as well as the professional market. The user interface is made in a way that anyone - regardless of technical proficiency- can use the system. The system is intuitive. Professional technicians are not needed.

7.1 The Casambi App - First Time In Use

The Casambi app is easy to use. Follow these simple steps.

1. Download the Casambi app from Apple App Store or Google Play Store.
2. Switch on your Casambi enabled luminaires.
3. Open the app.
4. The Casambi app will automatically find all Casambi enabled luminaires that are switched on.
5. Tap on the 'Take all lamps into use'
6. The Casambi app will automatically add all the found luminaires to one network and open the 'Lamps' tab.

7.2 Creating Networks

When taking all luminaires into use for the first time the Casambi app will automatically create a network. All the luminaires are added to the same network so that they can be easily controlled from 'Lamps' tab. One luminaire can only be in one network at a time. When a luminaire is part of a network it is in 'paired' state and cannot be added to any other network before 'unpairing' i.e. removing it from the network. New networks are created by simply tapping 'Create A New Nework' in the Casambi app.

7.3 Unpairing

To unpair a Casambi unit from a network one of the following steps have to be made:

1. If the user has modification rights to the network, the Casambi unit can be unpaired by tapping on the wanted unit either in 'Lamps' tab or in the 'Nearby devices' tab and choosing simply the 'Unpair lamp' option.
2. If the user does not have modification rights to the network, he/she would need to have access to the lamp's power switch for the unpairing. fter tapping on 'Unpair lamp' the app will open an 'Unpair' screen. By tapping the 'Start' button a time

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bar appears. Now the user needs to quickly flick the power switch off and back on to unpair the lamp. If unpairing succeeded a message will pop up in the app screen and tell that lamp has been unpaired.

3. With a Casambi account and the Casambi Utility App it is possible to perform an administrative unpairing of a fixture (Internet access required)

7.4 Nearby Devices

The Casambi app has a functionality called 'Nearby Devices' where a list of all Casambi enabled luminaires and Philips HUE Gateways that are in the vicinity can be seen.

In the list the name, vendor, firmware version and signal strength of the luminaire are shown. If the luminaire is in paired or unpaired state can also be seen. If the user has access rights to the network that the luminaire is paired to, the network name will also be displayed.

By tapping on a luminaire it can be taken into use (added to a network), unpaired (removed from network), ignored or the firmware of the luminaire can be updated.

7.5 Sharing settings

The network that is automatically created is always a "Not shared" network. This means that the network is only stored in the device that has created it and is not shared with other devices. If you would like to share the network you need to change the network sharing. Go to 'More' tab and select 'Network Setup' and 'Sharing Settings'. Tap on the 'Sharing' to change the sharing mode. There are four different sharing modes: Not Shared, Administrator only, Password protected and Open. Please read more about these option in Chapter 4.5 Network Sharing Options.