Murata Bluetooth mesh Node

OEM Design-in Guide

Caution

- Read this design-in guide completely before installing the Murata Bluetooth mesh Node.
- Installation and maintenance must be done in accordance with local, state and national electrical codes (NEC) and requirements.
- For indoor use only.
- Note that the dimming terminals (D+/D-) and 12VDC terminals (12V/GND) are not electrically isolated.
- DO NOT open the plastic enclosure.
- DO NOT connect mains power to the terminals of the Murata Bluetooth mesh Node.
- DO NOT install if product has any visible damage.

Disclaimer

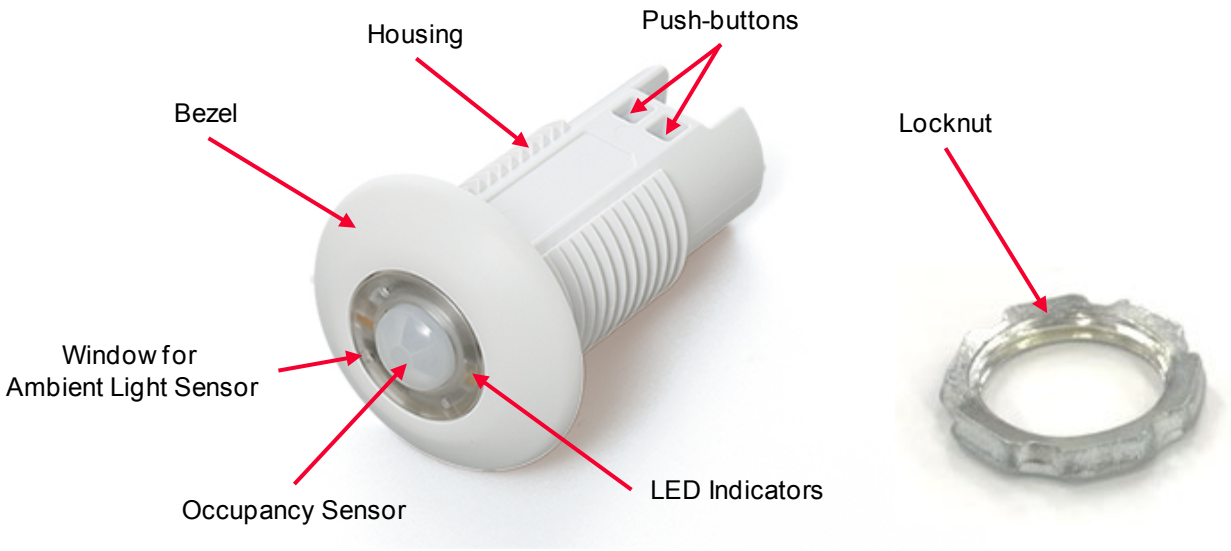
Murata disclaims all responsibility for any loss, injury, claim, liability or damage of any kind resulting from, arising out of or any way related to any errors in or omissions from this document and its content, including but not limited to technical inaccuracies and typographical errors. We do not vouch for the goods being fit for the use intended by the purchaser, not even if that use should have been mentioned to us, unless we have so committed ourselves in writing.

Table of Contents

1. Introduction

Murata's Bluetooth mesh Sensor Controller Node combines occupancy sensing, daylight harvesting, 0-10V dimming and Bluetooth mesh radio circuits into a small package that fits into various luminaires. The Sensor-less Controller Node is a variant without the sensors. When used with 0-10V dim-to-off LED drivers, it enables any lighting manufacturer to deliver wirelessly-controllable and sensor-equipped fixtures with minimal engineering effort. Murata's Node-equipped luminaires just need to be connected to mains power and can be simply configured using an intuitive mobile app. The result is increased occupant comfort and significant energy savings that meet the most demanding building energy codes. By leveraging Bluetooth mesh, the first wireless standard for professional lighting applications which ensures unmatched scalability and reliability, the wireless lighting control system can be seamlessly expanded with Bluetooth mesh-certified products and/or compatible Bluetooth switches as needed.

2. Bluetooth mesh Node Overview



3. Shipped Components

- Murata Bluetooth mesh Sensor Controller Node (LBCC2ZZ1PR / LBCC2ZZ1PR-280) OR
  Murata Bluetooth mesh Sensor-less Controller Node (LBCC2ZZ1UY / LBCC2ZZ1UY-408)
- Locknut

4. Tools Required

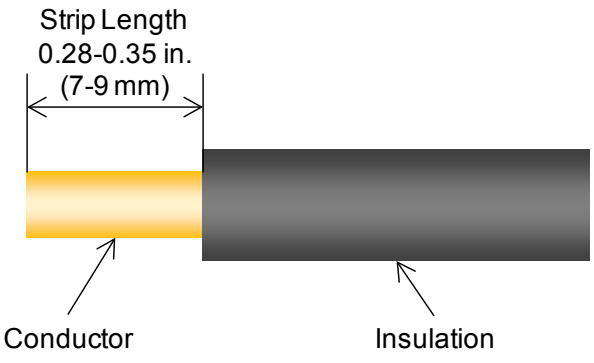
- Bluetooth mesh Node / Locknut
- Compatible LED driver
- Luminaire with LED modules
- 24 to 18 AWG (0.2-0.75mm^2) solid or stranded wires
- Hole saw
- Neodymium magnet for factory reset (See Section 14)
- Provisioning mobile app (See Section 15)

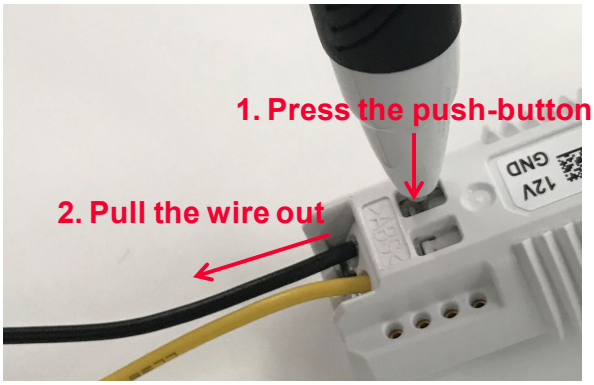
5. Compatible LED Drivers

The Bluetooth mesh Node works best with LED drivers that have 0-10V dimming, dim-to-off and 12VDC auxiliary power features. Please contact your Murata sales representative to check the compatibility.

6. Wire Specifications

Wire Type	Wire Gauge	Inserting Wire	Removing Wire
Solid	24 to 18 AWG (0.2-0.75 mm^2)	Direct push-in	Press the push-button to remove wire
Stranded	24 to 18 AWG (0.2-0.75 mm^2)	Press the push-button while inserting wire	Press the push-button to remove wire

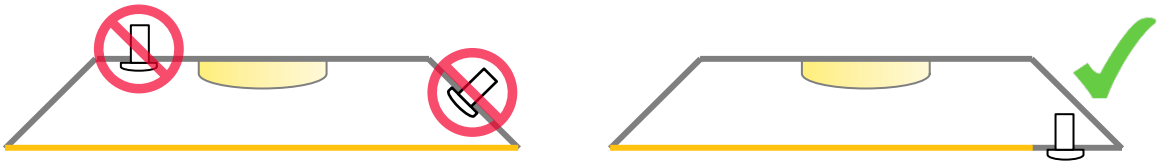




7. Not Recommended Practice

Sensor Controller Node

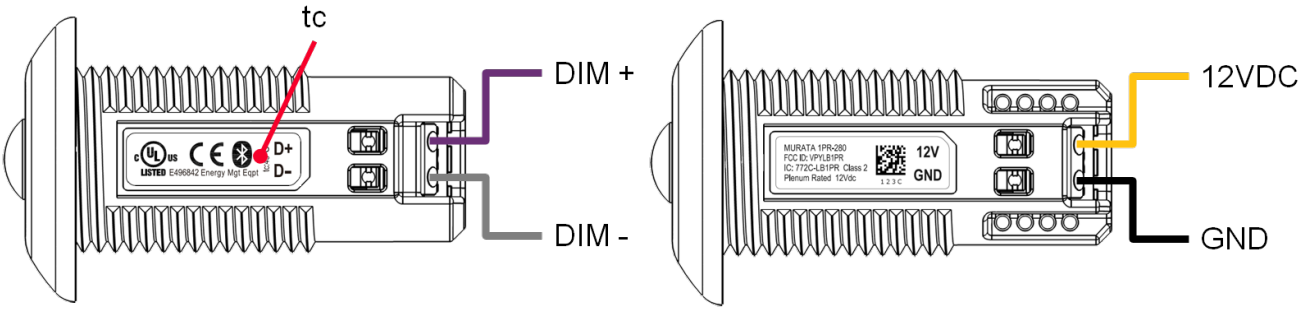
- DO NOT install the Sensor Controller Node where the direct light can be detected.
- Install in a location that the sensor can be exposed outside and be faced directly below to the floor.
- Install away from the light source and LED driver to avoid radiated heat.

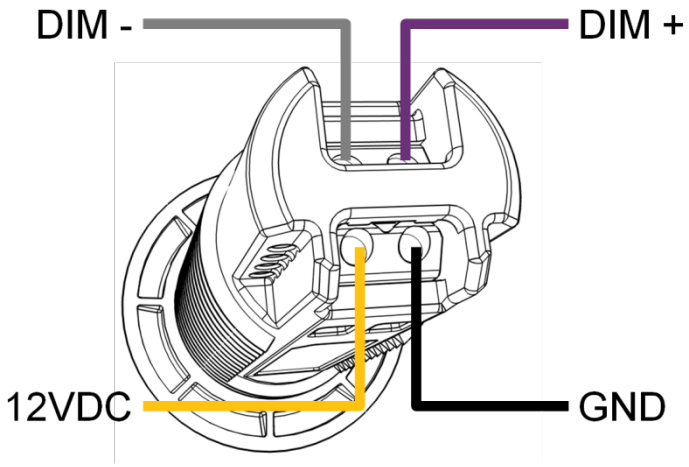


Sensor-less Controller Node

- DO NOT embed the bezel of the Sensor-less Node in a location surrounded by metallic boards.

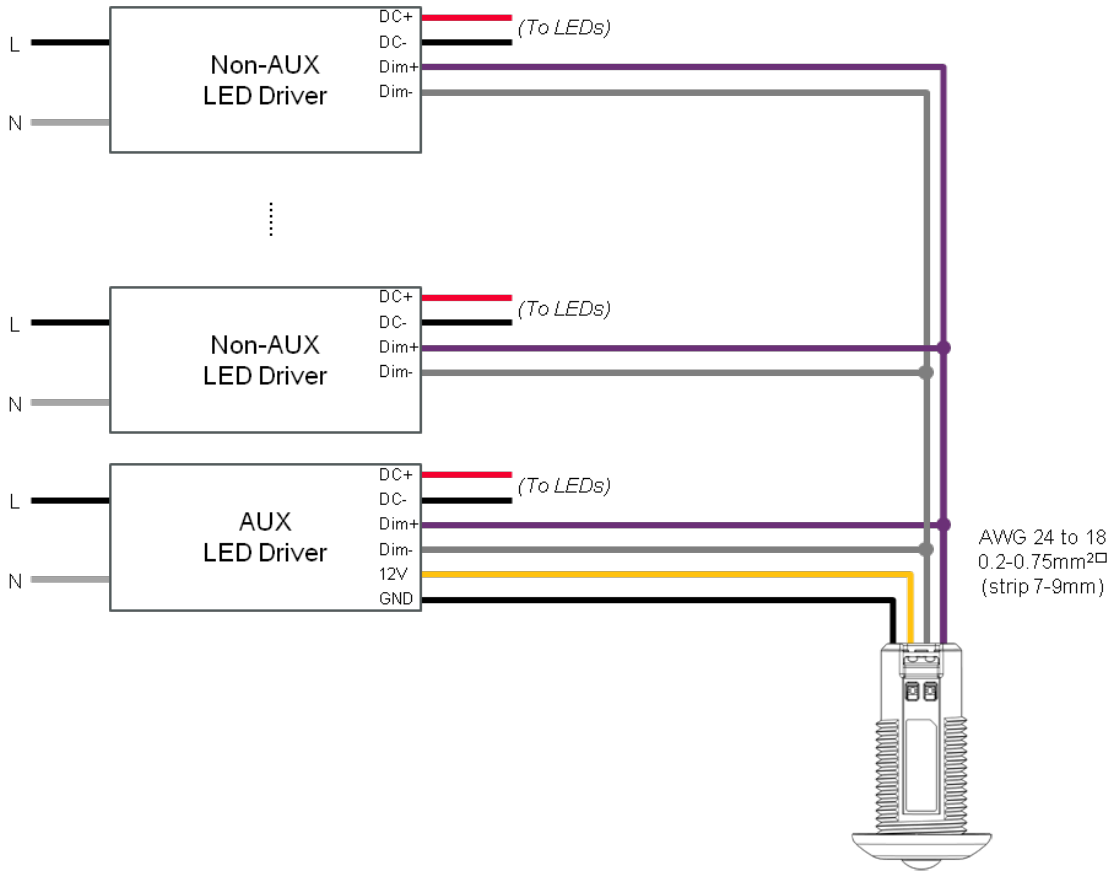
8. Terminal Assignment and Temperature Measurement Point Tc





9. Wiring Diagram

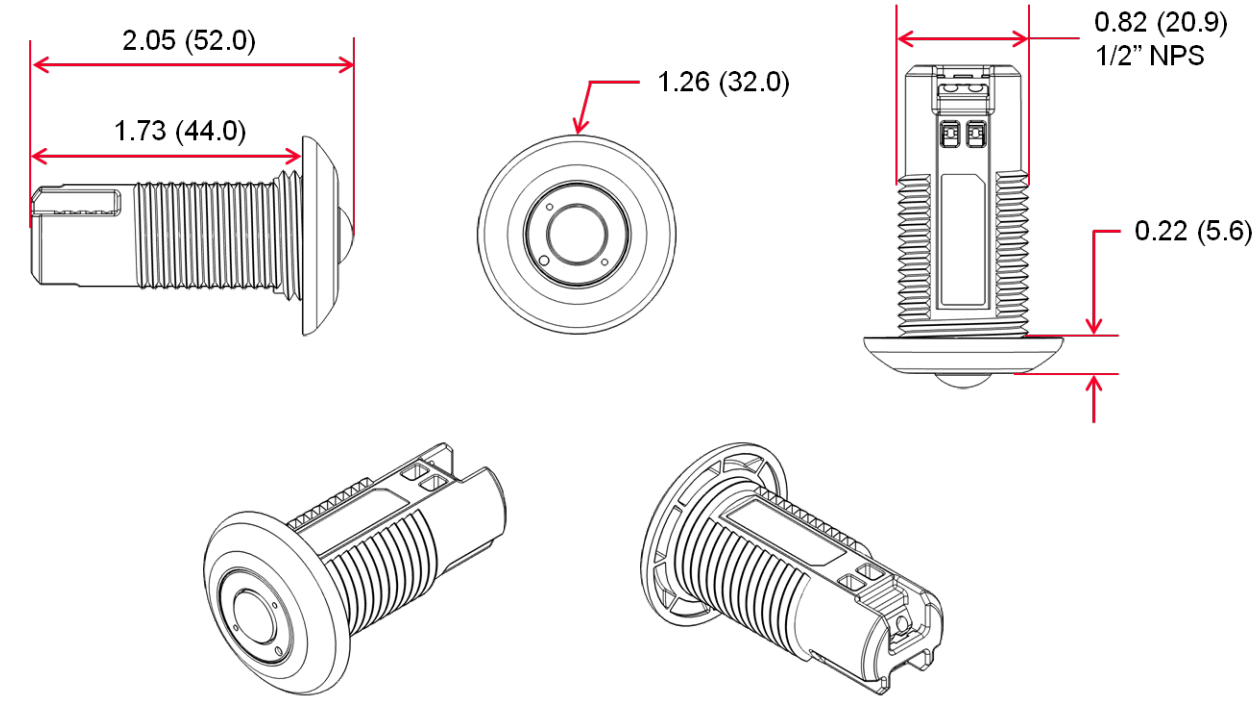
Auxiliary 12 VDC supply from LED Driver



External Power Supply

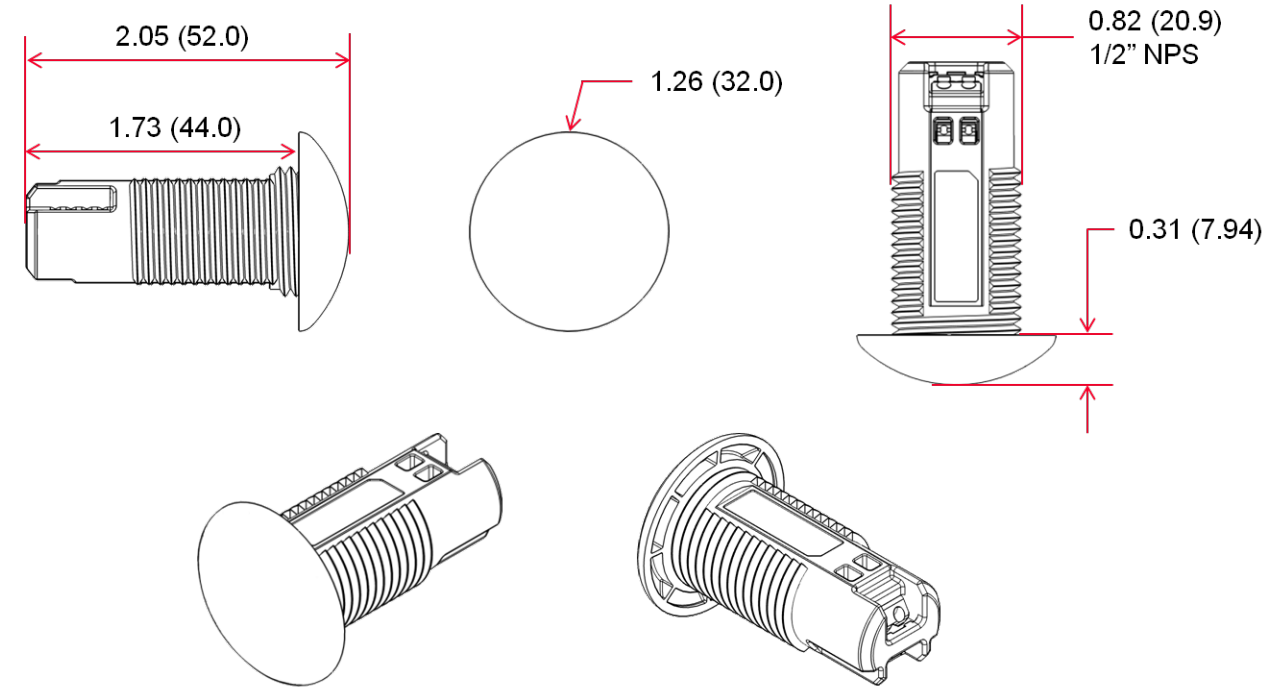
10. Dimensions

Sensor Controller Node



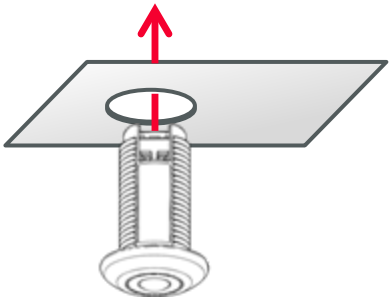
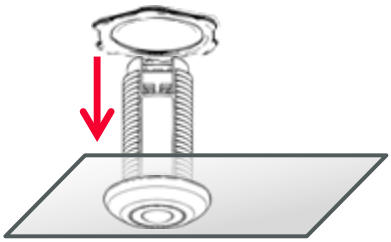
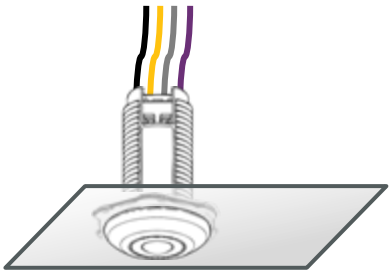
* in (mm)

Sensor-less Controller Node



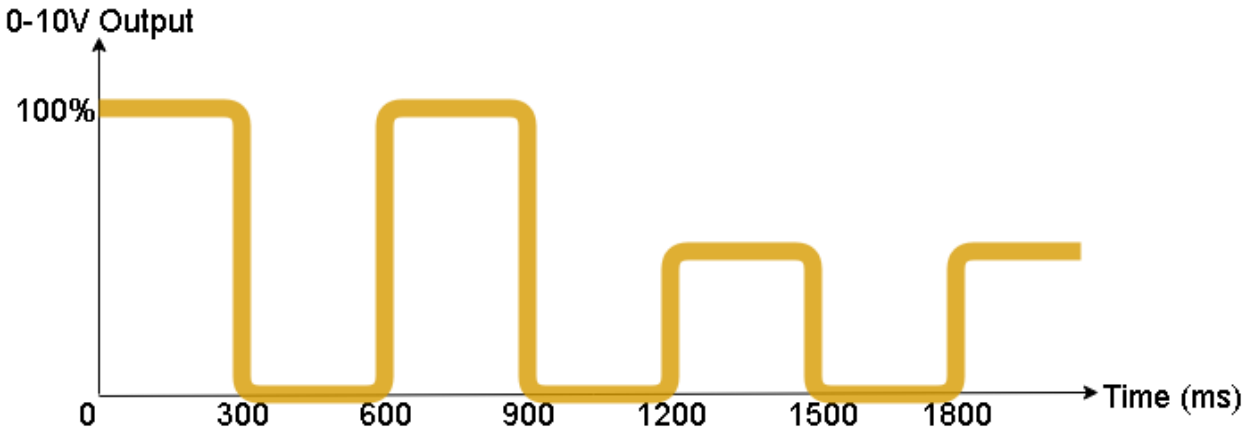
* in (mm)

11. Installation

Step	Description	Figure
1	Make sure the luminaire is de-energized.	
2	Determine the location for the Bluetooth mesh Node in the luminaire and make a 7/8 inch (22.2-23.2 mm or 1/2" trade size) diameter hole.	
3	Insert the Bluetooth mesh Node through the hole.	
4	Use the locknut from the rear of the Bluetooth mesh Node to fix it.	
5	Connect the Bluetooth mesh Node with a compatible LED driver in accordance with Wiring Diagram and Terminal Assignment.	
6	Install the luminaire in the ceiling and energize it.	

12. Recommended End-of-Line Test

When the luminaire is powered on before provisioning, it starts dimming up and down in the following sequence automatically. Make sure the wiring and LED driver settings (if programmable) in case that the luminaire behaves differently or it is not turned on.



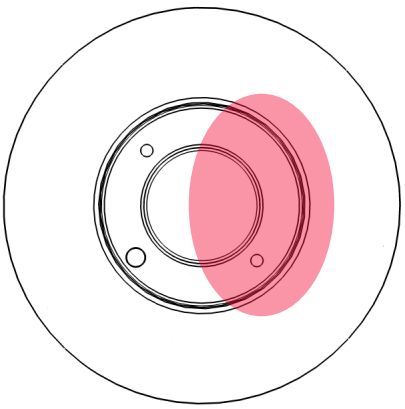
13. LED Indicators

Green LED (Network Status)	
Fast blink (300 ms cycle)	Unprovisioned
Slow blink (2000 ms cycle)	Provisioned
Blink twice	Mesh packet received
Long blink	Factory reset
Red LED (Motion Sensor Status)	
Blink once	Motion detected

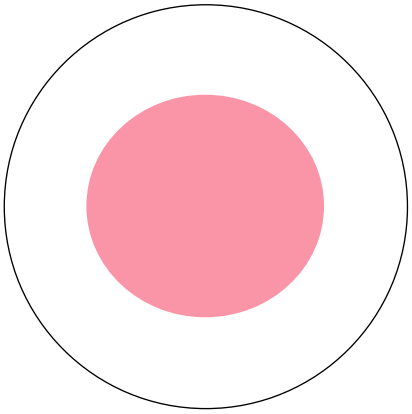
Note: LED indicators are not available in the Sensor-less Controller Node.

14. Factory Reset

The Bluetooth mesh Node can be reset to the Unprovisioned Mode by placing a strong magnet (e.g. neodymium magnet) near the center of the bezel for 5 seconds. See below for the magnet-sensitive areas. Once the factory reset is done successfully, the luminaire behaves as described in Section 12.



Sensor Controller Node



Sensor-less Controller Node

15. Provisioning / Configurations

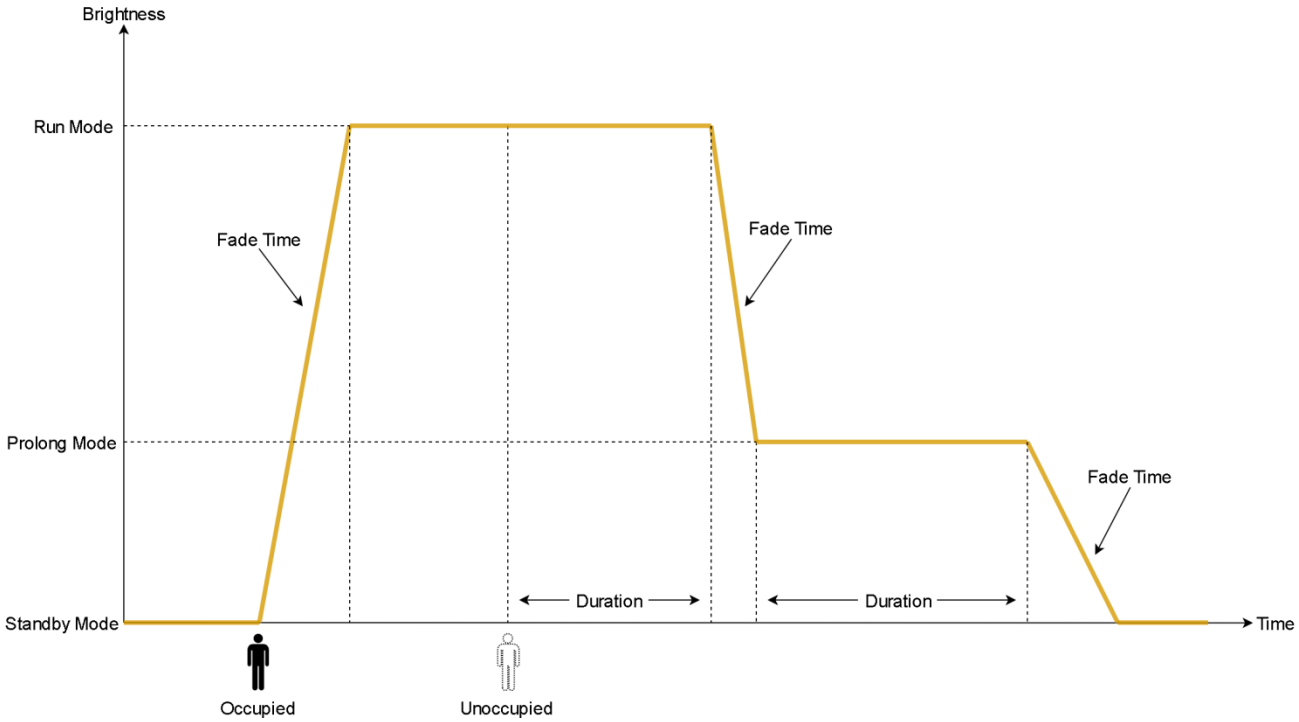
The Bluetooth mesh Node is in the Unprovisioned Mode until it is provisioned by a “Provisioner”, which typically is a smart phone with a Bluetooth mesh compatible app. It is highly recommended to use the Silvair iOS app (https://silvair.com/en/) to make the Bluetooth mesh Node fully work. Please contact Silvair at business@silvair.com about how to get and use the app.

16. Lighting Control Scenarios

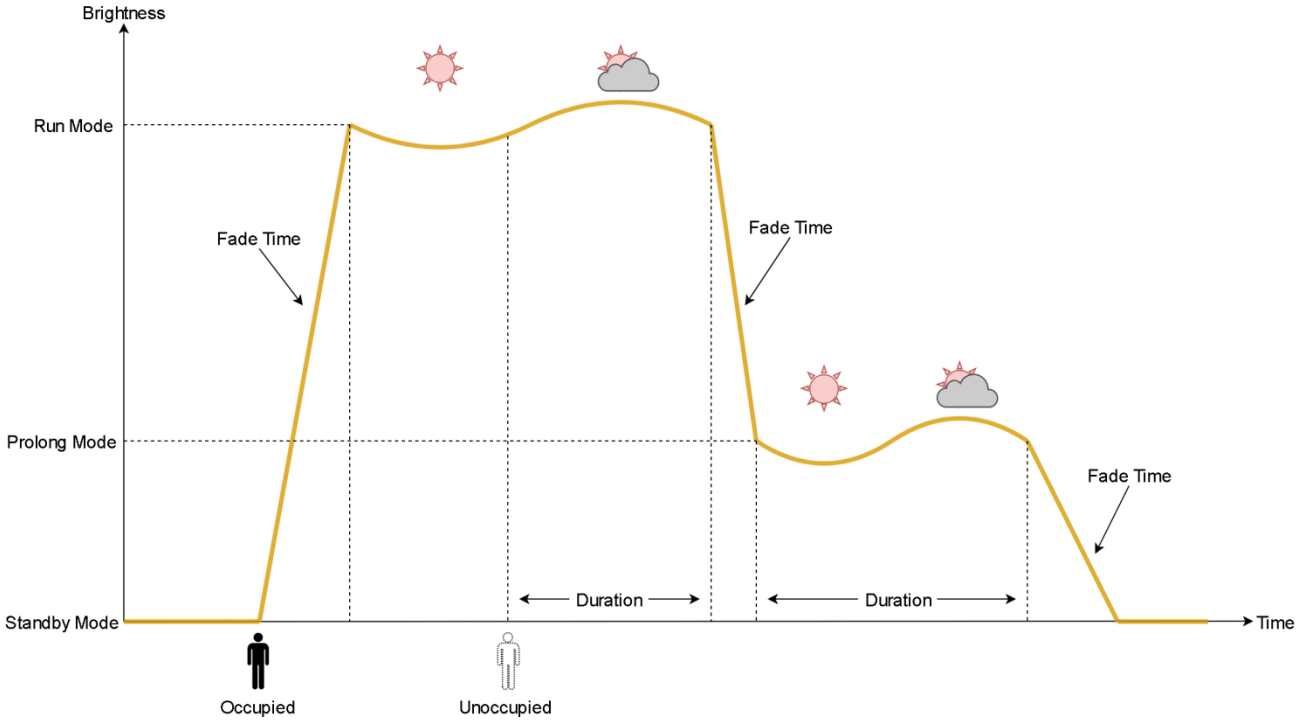
Multiple lighting control scenarios are available once the Bluetooth mesh Node is provisioned. At each scenario, duration, fade time and target brightness can be configured at any time with the Silvair iOS app.

Mode / Scenario	Wireless Switch	Occupancy Sensor	Ambient Light Sensor
Unprovisioned Mode	-	-	-
Switch	On / Off / Scenes	-	-
Occupancy	On / Off / Scenes	Auto On / Off	-
Vacancy	On / Off / Scenes	Auto Off	-
Occupancy with Daylight Harvesting	On / Off / Scenes	Auto On / Off	Enabled
Vacancy with Daylight Harvesting	On / Off / Scenes	Auto Off	Enabled

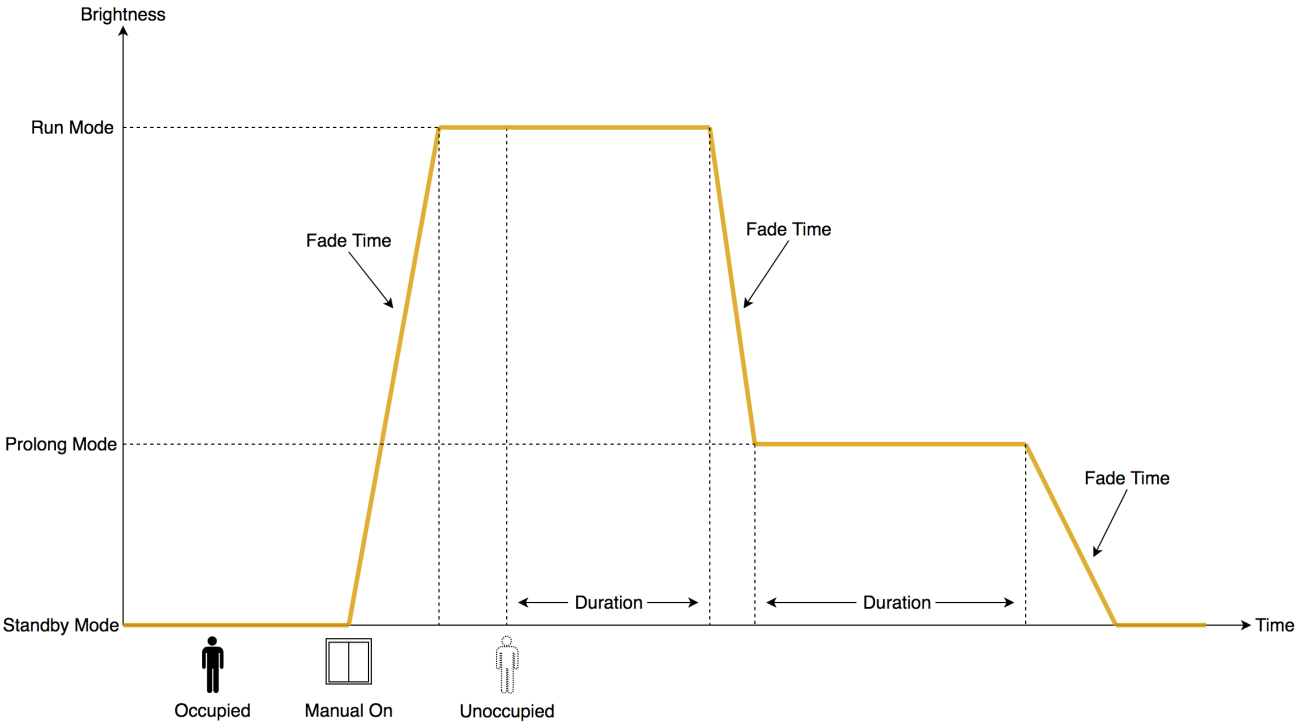
Occupancy Scenario



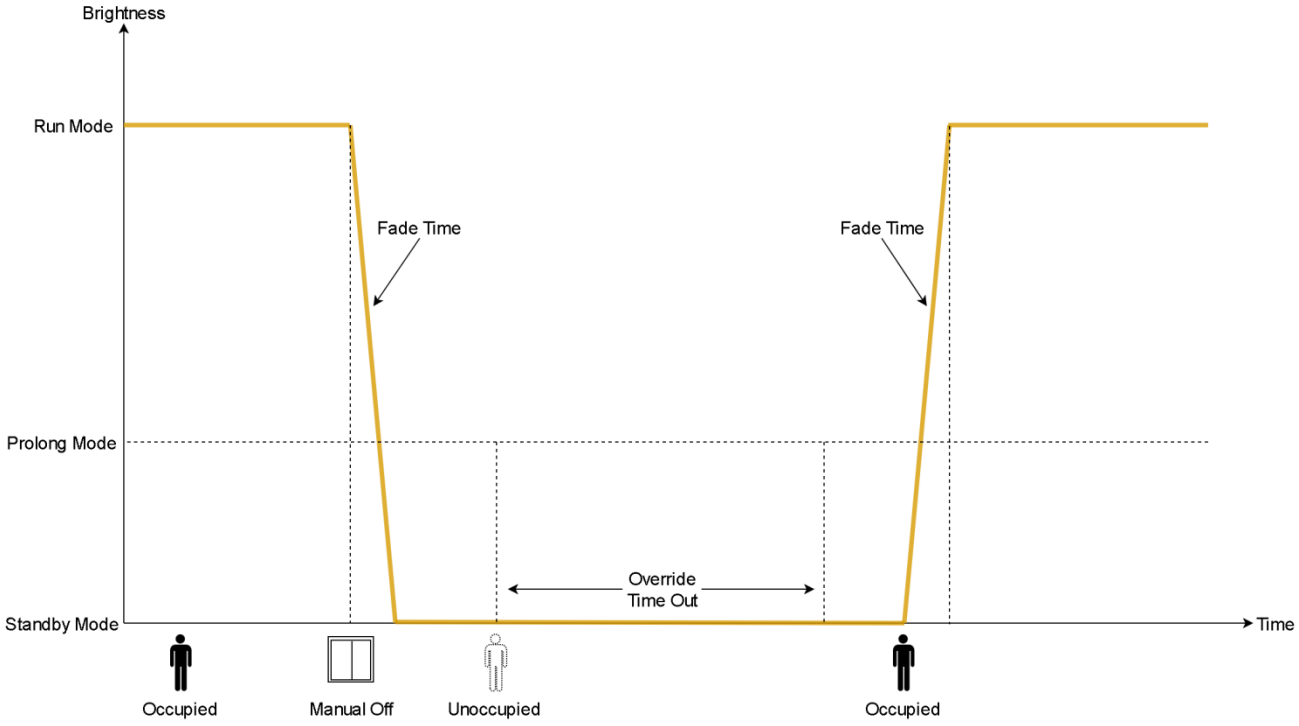
Occupancy Scenario with Daylight Harvesting



Vacancy Scenario

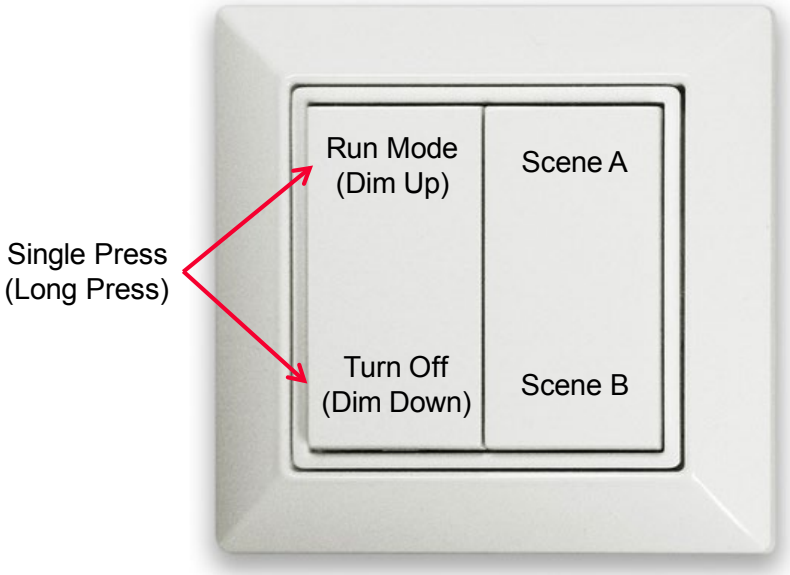


Occupancy Scenario with Manual Override



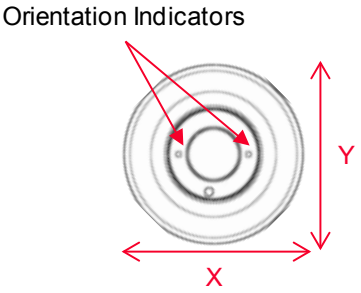
17. EnOcean BLE Switch

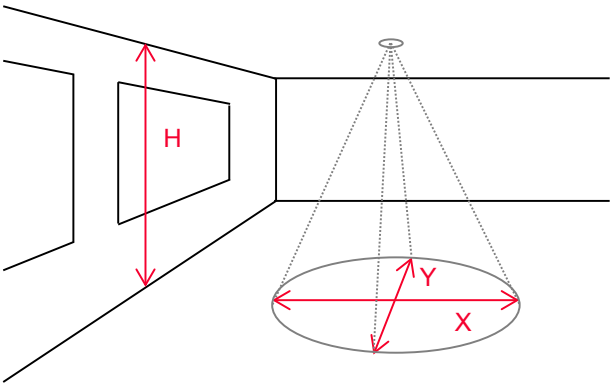
EnOcean BLE switches can be used to control the Node-equipped luminaires. The switches can easily be linked to a Bluetooth mesh Node by using the Silvair iOS app.

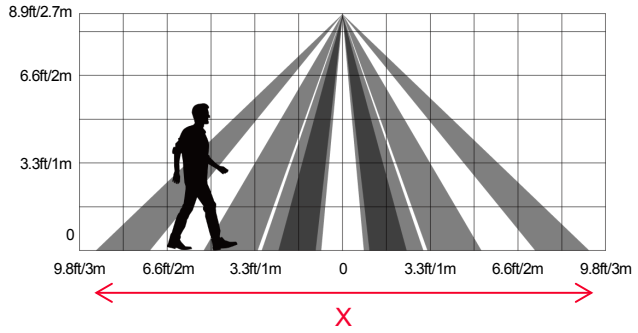


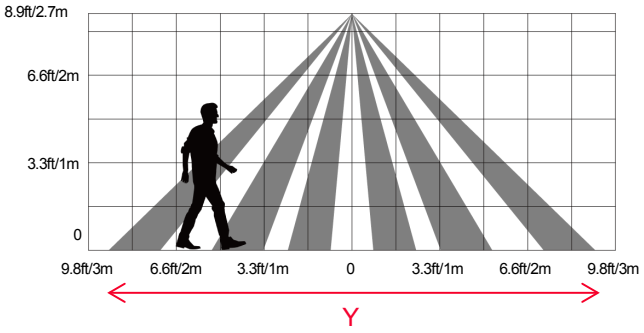
18. Occupancy Detection Pattern

H	X	Y
7.9' (2.4m)	16.4' (5.0m)	16.4' (5.0m)
8.9' (2.7m)	18.4' (5.6m)	18.4' (5.6m)
9.8' (3.0m)	20.3' (6.2m)	20.3' (6.2m)









19. General Information

Item	Description
Model No.	LBCC2ZZ1PR, LBCC2ZZ1PR-280, LBCC2ZZ1UY, LBCC2ZZ1UY-408
FCC ID	VPYLB1PR
IC	772C-LB1PR

20. Specifications

Item	Description
Sample Part Number	LBCC2ZZ1PR-TEMP (Sensor Controller Node) LBCC2ZZ1UY-TEMP (Sensor-less Controller Node)
Production Part Number	LBCC2ZZ1PR-280 (Sensor Controller Node) LBCC2ZZ1UY-408 (Sensor-less Controller Node)
Dimensions	See Dimensions
Weight	12.3g (without locknut) / 21.3 (with locknut)
Mounting (Luminaire Hole)	1/2" trade size knockout (22.2-23.0 mm)
Material / Color	ABS / White
Connectors / Wire Gauge	(2) two-pole connectors 24 to 18 AWG (0.2-0.75mm$^{2\square}$) / Strip length 0.28-0.35 in. / 7-9 mm
Supply Voltage	12 VDC +/- 10%
Current Consumption	< 30mA (when dimming method = sink)
Dimming Control	Analog (0-10V) Dim-to-off threshold = 1.25V 4mA (sink) / 10mA (source)
Status Indicators	Green (network status), Red (occupancy detection) **
Radio Frequency	2.4 GHz
Wireless Protocol	Bluetooth® mesh / Bluetooth® 5
Wireless Range	100 feet (30m) Line of sight
Motion Sensor Type	Murata passive infrared (PIR) sensor
Occupancy Viewing Angle	92° (see Occupancy Detection Pattern) **
Occupancy Detection Range	10 feet / 3m (see Occupancy Detection Pattern) **
Occupancy Warm Up Time	40 seconds **
Daylight Harvesting Type	Ambient light sensor / Light pipe (closed loop) **
Compatible EnOcean Switch	EnOcean ESRPB/ EDRPB / EWSSB / EWSDB
Radio Certification	FCC/IC, CE
Safety Certification / IP Rating	cULus Listed, Plenum Rated / IP 20
Storage Temperature	0-60 deg. C
Storage Relative Humidity	0-95 %RH (non condensing)
Operating Temperature	0-40 deg. C
Operating Relative Humidity	0-95 %RH (non condensing)

** Not available in Sensor-less Controller

21. Supported Bluetooth mesh Models

Bluetooth Mesh Models Messages	
Mesh Model Generic Default Transition Time Messages	Mesh Model Sensor Cadence Message
Mesh Model Generic Delta Message	Mesh Model Sensor Column Message
Mesh Model Generic Level Message	Mesh Model Sensor Descriptor Message
Mesh Model Generic Move Message	Mesh Model Sensor Message
Mesh Model Generic OnOff Message	Mesh Model Sensor Series Message
Mesh Model Generic On Power Up Message	Mesh Model Sensor Setting Message
Mesh Model Light LC Light OnOff Message	Mesh Model Sensor Settings Message
Mesh Model Light LC Mode State Message	
Mesh Model Light LC Occupancy Mode State Message	
Mesh Model Light LC Property Message	
Mesh Model Light Lightness Default Message	
Mesh Model Light Lightness Last Message	
Mesh Model Light Lightness Linear Message	
Mesh Model Light Lightness Message	
Mesh Model Light Lightness Range Message	
Bluetooth Mesh Models Servers	
Mesh Model Servers	Mesh Model Sensor Server
Mesh Model Generic Default Transition Time Server	Mesh Model Sensor Setup Server
Mesh Model Generic Level Server	Mesh Model Sensor Setup Server Private
Mesh Model Generic OnOff Server	Mesh Model Sensor Server Publisher
Mesh Model Generic Power On Off Server	
Mesh Model Generic Power On Off Setup Server	
Mesh Model Light LC Server	
Mesh Model Light LC Setup Server	
Mesh Model Light Lightness Server	
Mesh Model Light Lightness Setup Server	

22. FCC and Industry Canada Compliance Information

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Please note that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions: (1) This device may not cause interference; and (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage; (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

CAN ICES-3 (B)/NMB-3(B)

Murata Manufacturing Co., Ltd.
10-1, Higashikotari 1-chome
Nagaokakyo-shi, Kyoto 617-8555, Japan
wireless.murata.com/lighting