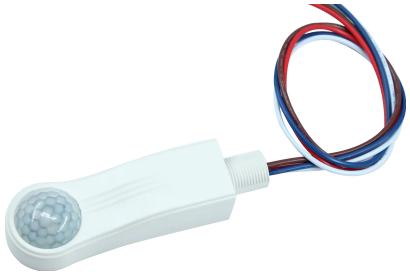
HCD049/BT

Bluetooth DALI PIR Highbay | Integrated 30mA PSU | Batten-fit/Bolt-on mount



Benefits

Adaptable: Removable shielding accessory for different detection ranges

Integrated: Built-in 30 mA DALI PSU simplifying system wiring

Wireless: Bluetooth mesh enabling control without extra wiring

Applications

Batten-fit/Bolt-on mount style

Wireless control integration

Offices, Classrooms, Industry

Check Out the Complete System Solution on the Website:
https://www.hytronik.com/product/HCD049-BT

Product Description

HCD049/BT is a Bluetooth DALI high-bay PIR motion sensor designed for professional luminaire manufacturers who want to integrate wireless lighting control directly into their luminaires. With a typical installation height of up to 15 m, a built-in daylight sensor, and a design optimized for batten-style luminaires, it provides a reliable solution for high-bay applications while simplifying luminaire integration. Bluetooth mesh networking enables wireless communication between luminaires without additional control wiring, helping reduce installation costs and improve system flexibility. All parameters and commissioning can be completed easily through the app.

Functions and Features

See additional details at the end of datasheet

Built-in DALI PSU

D4i Driver Compatibility

DALI Broadcast Output

DT6/DT8 Lighting Control

Daylight Harvest

Human Centric Lighting (HCL)

IP65 Protection

Koolmesh - See bluetooth control below

Live Energy & Diagnostic Data Part 252 / 253

Luminaire Asset Data Part 251

Tri-level Dimming

nRF52840

Specifications

Main Capabilities	
Dimming (Output) Interface	DALI/DALI-2

Sensor Data	
Detection angle	360°
Max. Detection range (Diameter)	16.0 m
Maximum Mounting Height	15.0 m
Detection area	201 m^2
Sensitivity	10%/ 30% /50% /75%/ 100%
Detection Methods	Passive Infrared (PIR)

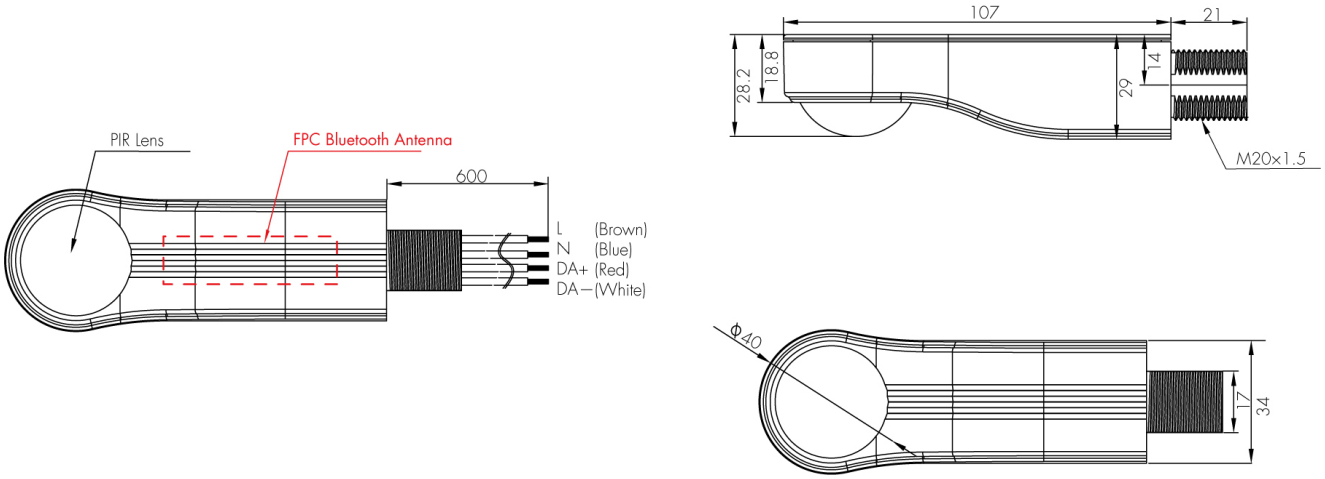
Electrical Data	
Bluetooth Platform	Nordic nRF52840
Bluetooth frequency	2.4 GHz - 2.483 GHz
Bluetooth range (Phone to Device)	15-40m
Bluetooth range (Device to Device)	15-40m
Bluetooth transmit power	8 dBm
Bluetooth system	Koolmesh
Operating voltage range	220-240 VAC 50/60 Hz
Stand-by power (Psb)	<0.5W
Warming-up	20 s
DALI bus maximum rated current (I_n max)	50 mA
DALI bus nominal DC voltage range (Un)	16 V
DALI bus nominal current (I guaranteed)	30 mA

Specifications

Technical	
Product weight	87.0 g
Product height	28.2 mm
Product length	107.0 mm
Product width	34.0 mm
Mounting hole	40.0 mm
Ambient temperature	-20 ~ +50 °C
Storage temperature	-25 ~ +70 °C
Humidity max	10 ~ 90%
IP Rate	IP65

Standard	
EMC	EN 55015, EN61000-3-2/-3-3, EN 61547
LVD	EN 61347-1, EN 61347-2-11
RED	EN 300328, EN301489-1, EN 301489-1/-17

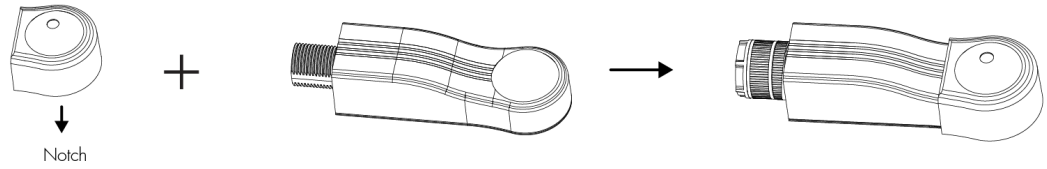
Technical Drawing

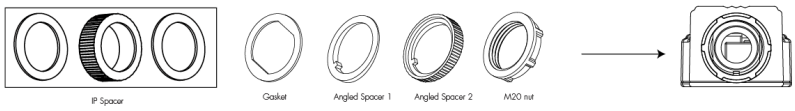


The Bluetooth antenna is located at the marked end of the device.
· Keep the antenna area clear of metal or conductive materials.
· Maintain at least 10 mm clearance around the antenna whenever possible for optimal wireless performance.
· Avoid installing the antenna section inside a metal enclosure or behind large metal structures.
· This product contains an internal FPC antenna. The antenna is attached to the inside of the housing. When opening the housing, separate the housing halves carefully to avoid pulling the antenna or damaging the antenna to PCB connection.

Application Example

Installation Process





Detailed Installation Instructions

Installation with shielding cover

The sensor cover is pre-installed on the product. Remove it before use to enable normal detection. If partial shielding of the detection area is required, the cover can be reinstalled as needed.

Installation steps

Step 1: Installation

Align the HAS49 cover with the HCD049 series sensor and press down evenly with two fingers. Once an audible sound is heard, the cover is securely installed.

Step 2: Removal

To detach the HAS49 cover, locate the release notch on the edge. Gently lift the cover upward from the notch to remove it.

*For more details about the shielding cover, please refer to the last page of this datasheet.

Installation with Silicone Gasket (IP65 protection)

A. Standard tri-proof luminaires

B. Tri-proof luminaires with a sloped surface

Installation Steps (for both A and B)

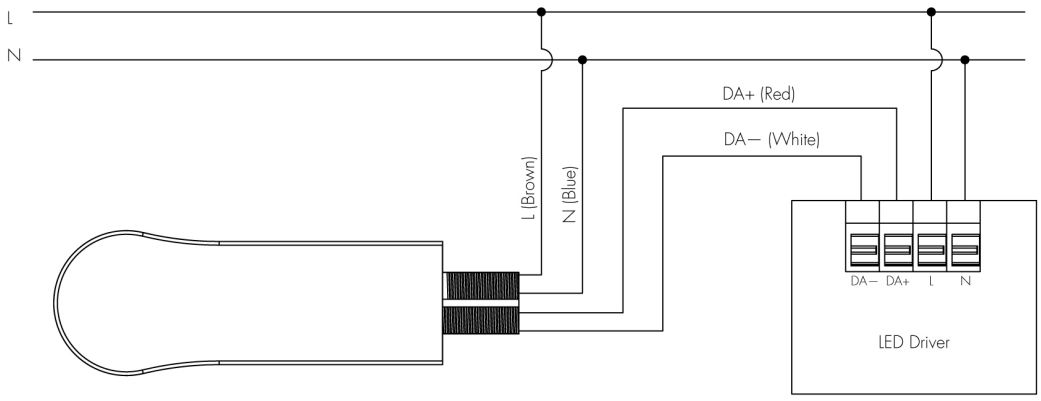
1. Place the silicone gasket between the cable and the mounting hole to ensure a proper seal.

2. Evenly tighten the screws to secure the fixture and achieve IP65 protection.

⚠ Wiring Guidelines

1. Installation by a qualified electrician only and in accordance with local electrical regulations.
2. Disconnect mains power before installation, wiring, maintenance or replacement.
3. Failure to follow the wiring diagram may result in product damage and malfunction.
4. Do not connect mains voltage (L/N) to the DALI terminals.
5. For polarity-marked DALI terminals (DA+/DA−), observe correct DALI polarity.
6. For non-polarity-marked DALI terminals (DA/DA), DALI wiring is polarity-free.

Wiring Diagram



Detection Range

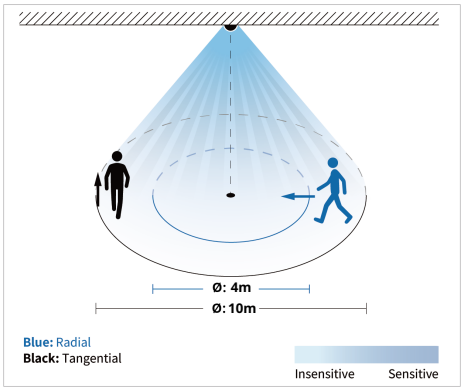
Single Person Walk (Ceiling mount)

The data is tested under following conditions:

- Single person walking
- Sensor not connected to any driver that may have soft-on period
- The testing is conducted in an open and spacious indoor field, without noticeable obstacles or influences that may affect PIR performances.

The detection range may be significantly reduced under certain conditions due to factors such as sensor placement (angle) and variations in temperature and humidity levels.

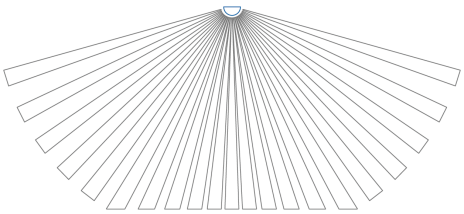
Detection example 3m mounting height:



Tangential movement		
H[m]	3	12
Ø[m]	10	12

Radial movement		
H[m]	3	12
Ø[m]	4	8

Detection schematic diagram



Detection Range

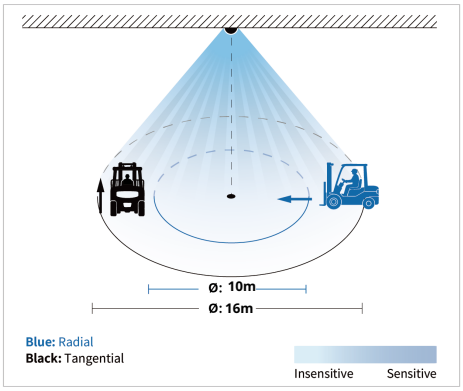
Forklift (Ceiling mount)

The data is tested under following conditions:

- Forklift driving at a speed of 5km/h
- Sensor not connected to any driver that may have soft-on period
- Testing temperature Ta = 20°C
- The testing is conducted in an open and spacious indoor field, without noticeable obstacles or influences that may affect PIR performances.

The detection range may be significantly reduced under certain conditions due to factors such as sensor placement (angle) and variations in temperature and humidity levels.

Detection example 15m mounting height:



Tangential movement	
H[m]	15
Ø[m]	16

Radial movement	
H[m]	15
Ø[m]	10

Commissioning Instructions and Precautions

A. Factory settings Notes

1. Sensor setting: Control object: Zone, Sensor status: Sensor ON, Detection range: 100%, Hold time: 20min, Hold time scene: ALL ON, Stand-by time: 5s, Stand-by time scene1: 10%, Sensor mode: Auto, Mode in priority: Manual prior to sensor.

2. Push switch setting: Push switch function: Normal PUSH (Retractive switch), Control object: Zone, Single press: ON/OFF, Double press: disable, Press and hold: Brightness dimming.

B. DALI Bus Current Notes

1. Typical DALI bus current consumption per driver is approximately 2 mA. Before installation, calculate the total bus current consumption of all devices connected to the same DALI bus. Ensure that the total current consumption does not exceed the guaranteed supply current of the DALI bus power supply, and allow sufficient system margin.

C. Wiring preparation

1. This product includes a built-in power cord. Please follow the instructions below to wire it correctly.

• 200 metres (total) max. for 1mm^2 CSA (Ta = 50°C)

• 300 metres (total) max. for 1.5mm^2 CSA (Ta = 50°C)

D. Environment

1. When used in -35°C ~ -20°C environment, the sensor still functions but the detection range & life-span would be compromised.The optimal Ta would be -20°C ~ +50°C and we apply 5-year guarantee for such usage condition.

E. Bluetooth Range Precautions

1. Device-to-device communication can extend up to 40m under indoor test conditions. In open outdoor environments, the transmission distance may be reduced due to fewer surrounding structures and signal reflections. Actual performance may vary depending on the installation environment.

F. Version Precautions

1. This datasheet applies to the nRF52840 version. Certain functions and specifications may differ between the nRF52840 and nRF52832 versions. For the nRF52832 version datasheet, please refer to the “Phased-out Products Library” in the Download section of our website, or contact our technical support team for further assistance.

G. App Feature Precautions

1. Features marked with green icons in the “Device-specific Koolmesh App Features” section are available only for the nRF52840 version.

Warning: For additional important documents, including installation precautions, product guidelines, and guarantee conditions, please refer to the official downloads.

https://hytronik.com/service/downloads

Switch Input Function Configuration

The Virtual Push interface provides a software-based dimming control method without the need for a physical wall switch. Push functions are simulated via the Koolmesh app, where detailed push behaviors and parameters can be flexibly configured.

Note: Single press, double press, and press-and-hold actions can each be independently assigned to one function via the app. Once configured, each action triggers only its assigned function. Multiple functions cannot be activated by a single press action.

Switch function	Action	Descriptions
Virtual-Normal PUSH (Retractive Switch)	Single press (>0.1s) Double press Press and hold (>=1s)	• ON/OFF • OFF only • Recall this scene • Sensor take over • Not in use

Options

Included Accessories

Shielding accessory | HAS49

Koolmesh - Operating guide

Bluetooth

Smartphone(ios) Smartphone (Android) iPad Web

For additional information, including project and network, device, and scenes, please refer to: http://faq.koolmesh.com/

Shared Koolmesh App Features

- Alert for excess lux / temperature / humidity via multi-meter HBLM01
- Astro timer (sunrise and sunset)
- Bulk commissioning (copy and paste settings)
- Compatible with Shelly energy metering
- Continuous development in progress...
- Device firmware update over-the-air (OTA)
- Device social relations check
- Different permission levels via authority management
- Floorplan feature to simplify project planning
- Grouping luminaires via mesh network
- Internet-of-Things (IoT) featured
- Koolmesh Pro iPad for on-site configuration
- Network sharing via QR code or keycode
- Offline commissioning
- One-key device replacement
- Quick setup mode & advanced setup mode
- Remote control via Hytronik gateway & touch screen HPAD-TSJASE1
- Scenes
- Schedule
- Staircase function for quick setup
- Test mesh network connection quality
- Web platform for project deployment & data analysis

Device-specific Koolmesh App features

- 3 DALI channels with independent control (under development)
- 4 push inputs supported
- Adjustable motion & static sensitivity & adjustable sensing distance
- Compatible with EnOcean kinetic switches
- DALI & D4i failure email reporting
- Detailed motion sensor settings
- Displays luminaire status & energy consumption Data
- Dusk/Dawn photocell (twilight function)
- Dynamic daylight harvest auto-configuration
- Mesh OTA & remote commissioning (under development)
- Motion sensor range test
- Motion sensor trigger diagnosis
- Partition control with HBTD8200P
- Push scene cycling
- Push switch configuration
- Tri-level luminaire control

Bluetooth Mesh Network Installation & Device Access Range

1. Phone/Pad to Device Range (Bluetooth Connection)

During commissioning, the installer must remain within Bluetooth range of the target device when adding it via the App.

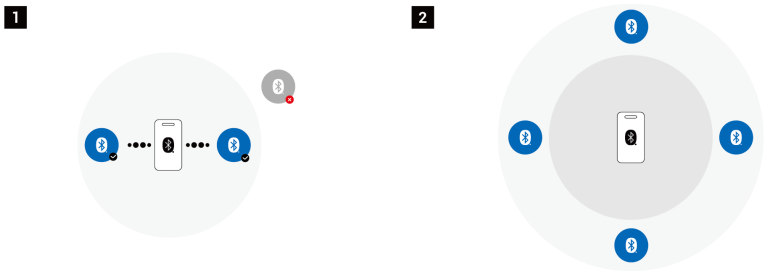
2. Device to Device Range (Mesh Network Communication)

Once commissioned, devices communicate through the wireless mesh network. Users can access and control all devices within the network when connected to any active mesh node.

Note:

a. Bluetooth range varies by product. Refer to the Specification section for details.

b. Actual communication range may vary depending on product type, obstacles, environmental conditions, and luminaire construction.



Bluetooth Network Components

HBGW02

Bluetooth Mesh Gateway | Ethernet or Wi-Fi 2.4GHz | wall/flat surface mounting
www.hytronik.com/product/HBGW02

HBGW02/D

Bluetooth Mesh Gateway | Dual-band Wi-Fi | wall/flat surface mounting
www.hytronik.com/product/HBGW02-D

HBGW03/R

BACnet Gateway | Dual-band Wi-Fi or Ethernet | DIN rail/wall/flat surface mounting
www.hytronik.com/product/HBGW03-R

HBKS01/W

Bluetooth Kinetic Switch | One-gang | Wireless Control
www.hytronik.com/product/HBKS01-W

HBKS01D/W

Bluetooth Kinetic Switch | Single Rocker | White Color
www.hytronik.com/product/HBKS01D-W

HBKS02/W

Bluetooth Kinetic Switch | Two-gang | White Color
www.hytronik.com/product/HBKS02-W

HBKS02D/W

Bluetooth Kinetic Switch | Double Rocker | White Color
www.hytronik.com/product/HBKS02D-W

HBKS03/W

Bluetooth Kinetic Switch| Three-gang | White Color
www.hytronik.com/product/HBKS03-W

HBLM01

Multi-meter | Bluetooth & NFC | Lux Measurements
www.hytronik.com/product/HBLM01

HPAD-TSJASE1

Bluetooth Touch Tablet | Gateway Integrated | Switch Boxes
www.hytronik.com/product/HPAD-TSJASE1

Functions and Features

Built-in DALI PSU

Built-in DALI PSU means the DALI bus power supply is integrated into the product, eliminating the need for an external DALI power unit.
This reduces wiring complexity, saves installation space, and simplifies commissioning, making the system more compact and efficient.

D4i Driver Compatibility

Designed to operate with D4i-certified drivers within D4i luminaires, supporting standard DT6 / DT8 control behaviour in D4i systems.

DALI Broadcast Ouput

This product supports DALI broadcast output, allowing control commands to be sent simultaneously to all devices on the DALI bus without individual addressing.
This enables simple group control, synchronized operation, and fast commissioning within a DALI lighting system.

DT6 / DT8 Lighting Control

Supports DT6 (single-channel dimming) and/or DT8 (tunable white / colour) lighting control via DALI, enabling brightness and colour temperature adjustment based on control logic such as occupancy or daylight.

Daylight Harvest

Right time, right place and the right amount of light! Daylight harvest (Also known as daylight regulating or daylight interaction) is a must in the future lighting norms. It automatically measures available natural light and adjusts artificial lighting output to maintain the target illuminance level. Using daylight sensor feedback, control signals are transmitted to the LED drivers via DALI or 0–10V interfaces, ensuring the required light output is delivered only when needed, improving visual comfort and reducing energy consumption.

Human Centric Lighting (HCL)

Human Centric Lighting (HCL) helps reduce energy consumption while supporting human wellbeing and productivity in artificially lit environments. Through Hytronik's decentralised tunable white control with integrated time-based operation, HCL enables cost-effective circadian rhythm lighting without the complexity of centralised lighting systems.Designed as a simple and flexible solution, it is ideal for offices, schools, and healthcare applications requiring dynamic white light adjustment throughout the day.

IP65 Protection

This product features an IP65-rated enclosure, providing complete protection against dust ingress and low-pressure water jets to ensure reliable operation in demanding indoor and outdoor environments. The robust environmental sealing supports long-term stability and consistent performance in applications such as warehouses, parking areas and industrial facilities.

Live Energy & Diagnostic Data Part 252 / 253

Koolmesh can wirelessly read live operating data from D4i drivers, or compatible DALI drivers with Part 252 / 253 implemented.
Readable data may include real-time power (W), energy consumption (kWh), voltage (V), current (mA), power factor, operating hours (burn hours), driver temperature, start counters and LED failure flags (open/short circuit).
For standard DALI-2 DT6/DT8 drivers, Koolmesh can read the data points made available by the driver, with the actual retrievable data depending on the driver's supported functions.

Functions and Features

Luminaire Asset Data Part 251

Koolmesh can read Part 251 luminaire asset data where available, such as GTIN, serial number, manufacturing date, luminous flux, colour temperature and manufacturer ID. The information must be pre-written into Memory Bank 1 by the luminaire OEM or driver manufacturer. If left unconfigured, related fields may be blank or unavailable.

Tri-level Dimming

Hytronik's tri-level dimming products offer 3 levels of light control: 100% dimmed light off, with settable time periods between each phase, as well dimming level and daylight threshold.
*All Hytronik's tri-level dimming products can also be configured as bi-level control (by setting the stand-by period to infinity), so that the light always remains in the dimmed mode in absence for areas where there are safety, security or enhanced comfort requirements.

nRF52840

Powered by Nordic nRF52840 Bluetooth® 5.0 SoC, the product delivers enhanced memory capacity and processing performance for advanced Bluetooth Mesh lighting applications. The larger Flash and RAM resources support OTA updates, complex commissioning, diagnostics, and future firmware expansion. External EEPROM provides reliable storage for configuration data, network parameters, and device settings, ensuring stable operation and easy maintenance.

Check out for further explanation of features

https://hytronik.com/solutions/lighting-control-features

Additional Notes

Shielding accessory (HAS49) details

The shielding accessory allows flexible adjustment of the detection range by masking unwanted detection areas. It can help block potential interference sources, such as moving machinery or lift doors, and prevent unintended triggering of the sensor.

The marked line patterns on the shielding accessory can be cut as required to create different shielding areas, such as rectangular or semi-circular detection patterns. The clip-on design also makes installation simple: just fit the shielding accessory onto the lens cover.

For reference, the next page includes detection pattern and dimensional drawings to support actual installation and application. The detection diagram is based on the following test conditions:

Detection Range Test Conditions:

Single person walking or forklift driving at 5 km/h

Sensor not connected to a driver with soft-on period

Ambient temperature (Ta): 20 °C

Test conducted in a large open indoor area without obstacles affecting PIR performance

Note: Detection range may vary depending on installation angle, temperature, and humidity conditions.

Additional Diagram