# DALI-to Bluetooth Converter/Translator Module

## HBEM038
DALI Emergency

# HYTRONIK ®

CB ⚠ CE SELV ▢ emc UK CA D⁴i

## Product Description

HBEM038 is a wireless DALI/Bluetooth convertor with 30mA DALI power supply built in, which converts a standard DALI/DALI2 emergency driver output to Bluetooth output. It can work with a wide range of microwave and PIR sensor heads by plug and play. In the meantime, it enables users to manage and customize monthly functional and annual duration tests based on the Koolmesh Emergency system. The high-end Koolmesh platform provides powerful and convenient features, for users, they can effortlessly view, edit, and oversee the entire emergency system; for features, scheduling a monthly self-test or annual self-test in the app, checking the DALI/DALI2 emergency drivers' status, including automatic email notification upon detecting the fault, automatic monthly/annually (functional/duration test) emergency report generation, etc. All the settings and parameters can be set in Koolmesh app, all the information such as reports can be viewed and downloaded from Koolmesh IoT platform.

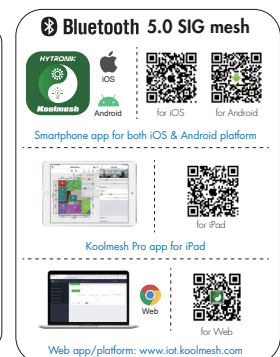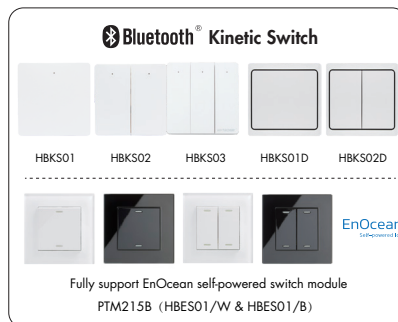In addition, HBEM038 can control serval DALI/DALI2 DT6 or DT8 drivers at the same time.

## App Features

- Quick setup mode & advanced setup mode
- Web app/platform for project deployment & data analysis
- Koolmesh Pro app on iPad for on-site configuration
- Floorplan feature to simplify project planning
- D4i supported
- One-key device replacement
- Device social relations check
- Staircase function (primary & secondary)
- Remote control via gateway support HBGW01
- Heat map
- Dynamic daylight harvest auto-adaptation
- Grouping luminaires via mesh network
- Scenes
- Dusk/Dawn photocell (Twilight function)
- Tri-level control
- Daylight harvest
- Push switch configuration
- Detailed motion sensor settings
- Schedule
- Astro timer (sunrise and sunset)
- Power-on status (memory against power loss)
- Offline commissioning
- Bulk commissioning (copy and paste settings)
- Different permission levels via authority management
- Network sharing via QR code or keycode

- Interoperability with Hytronik Bluetooth product portfolio
- Compatible with EnOcean BLE switches
- Internet-of-Things (IoT) featured
- Device firmware update over-the-air (OTA)
- Continuous development in progress…

## Hardware Features

- DALI bus power supply:
  I guaranteed:30mA
  I max:80mA
- Plug'n'Play for flexible installation and cost saving assemble
- Support to control DT8 LED drivers
- 2 Push inputs for flexible manual control
- 5-year warranty

### Bluetooth® Kinetic Switch

| HBKS01 | HBKS02 | HBKS03 | HBKS01D | HBKS02D |

EnOcean Self-powered IoT

Fully support EnOcean self-powered switch module
PTM215B（HBES01/W & HBES01/B)

### Bluetooth 5.0 SIG mesh

Koolmesh
iOS / Android

for iOS    for Android

Smartphone app for both iOS & Android platform

Koolmesh Pro app for iPad

for iPad

Web

for Web

Web app/platform: www.iot.koolmesh.com

## Note:

1. 1pc HBEM038 convertor for 1pc 3rd party DALI/DALI2 emergency driver.

2. 1pc HBEM038 convertor can control serval DALI/DALI2 DT6 or DT8 drivers at the same time.

3. With Bluetooth gateway HBGW01, users can remotely control and monitor emergency system via Koolmesh mobile/tablet app & web app platform.

4. HBEM038 & 3rd Party standard DALI/DALI2 emergency driver does not need to connect to central DALI PSU.

5. HBEM038 provides power supply to the 3rd party standard DALI/DALI2 emergency driver and DT6 or DT8 drivers.

## Technical Specifications

| Bluetooth Transceiver | |
|---|---|
| Operation frequency | 2.4 GHz - 2.483 GHz |
| Transmission power | 4 dBm |
| Range (Typical indoor) | 10~30m |
| Protocol | Bluetooth® 5.0 SIG Mesh |

| Safety & EMC | |
|---|---|
| EMC standard (EMC) | EN55015, EN61000, EN61547 |
| Safety standard (LVD) | EN60669-1, EN60669-2-1 |
| RED | EN300328, EN301489-1/-17 |
| Certification | Semko, CB, CE , EMC, RED, RCM |

| Input & Output Characteristics | |
|---|---|
| Operating voltage | 220~240VAC 50/60Hz |
| Stand-by power | <1W |
| Warming-up | 20s |

| Environment | |
|---|---|
| Operation temperature | Ta: -20°C ~ +55°C |
| Case temperature (Max.) | Tc: +75°C |
| IP rating | IP20 |

| DALI Bus Power Supply | |
|---|---|
| I guaranteed | 30mA |
| I max | 80mA |

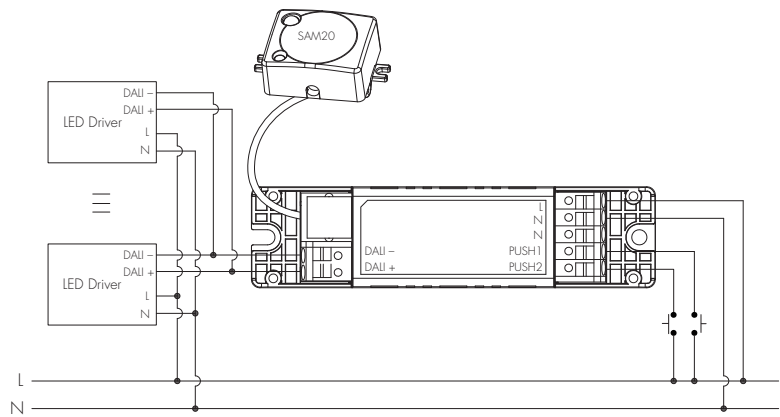## Mechanical Structure & Dimensions



## Wire Preparation



0.75~1.5mm

8mm
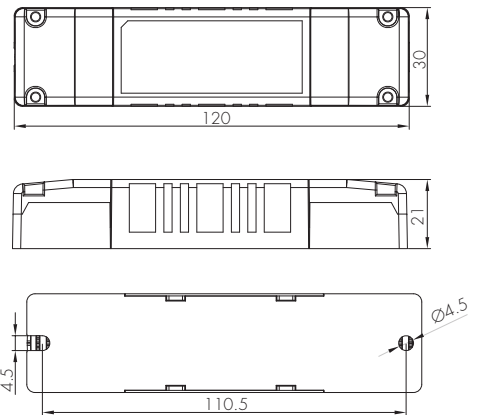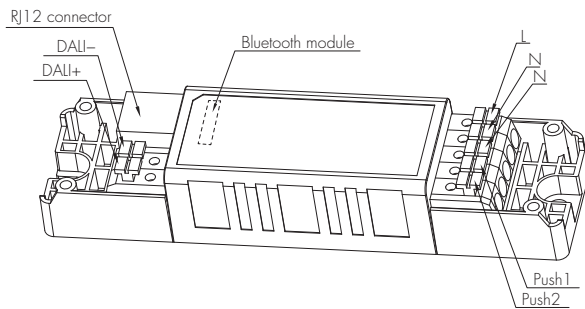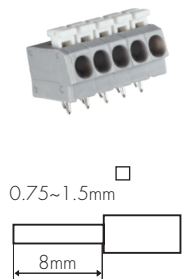
To make or release the wire from the terminal, use a screwdriver to push down the button.

## Wiring Diagram

# Technical Specifications for Sensor Heads

| PIR Sensor Properties | | |
|---|---|---|
| Sensor principle | PIR detection | |
| Operating voltage | 5VDC | |
| Detection range * | HIR05 & HIR05/FM HIR05/AA & & HIR07 | Max installation height: 3m; Max detection range: 6m (diameter) |
| | HIR11 | Max installation height: 15m (forklift); 12m (single person); Max detection range: 24m (diameter) |
| | HIR12 | Max installation height: 15m (forklift); 12m (single person); Max detection range: 18m*6m (L*W) |
| | HIR63 | Max installation height: 3m; Max detection range: 12m (diameter) |
| | HIR63/R | Max installation height: 12m (forklift); 8m (single person); Max detection range: 14m (diameter) |

| HF Sensor Properties | | |
|---|---|---|
| Sensor principle | High Frequency (microwave) | |
| Operating voltage | 5VDC | |
| Operation frequency | 5.8GHz +/- 75MHz | |
| Transmission power | <0.2mW | |
| Detection range * | SAM20 & SAM21 SAM22 & SAM22/AA | Max installation height: 3m; Max detection range: 12m (diameter) |
| | SAM23 | Max installation height: 15m (forklift); 12m (single person); Max detection range: 20m (diameter) |

\* The detection range is heavily influenced by sensor placement (angle) and different walking paces. It may be reduced under certain conditions.

## PIR & microwave sensor heads

The range of PIR and microwave sensor heads below offers powerful number of Plug'n'Play feature options to expand the flexibility of luminaires design. This approach to luminaire design reduces space requirements and component costs whilst simplifying production.
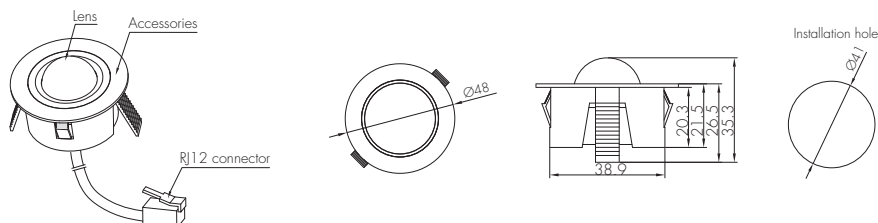
### A. HIR05
PIR sensor head
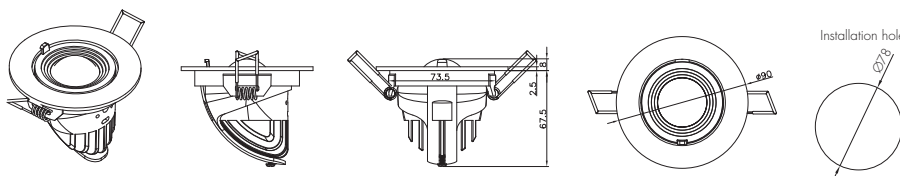The cable length is around 30cm.
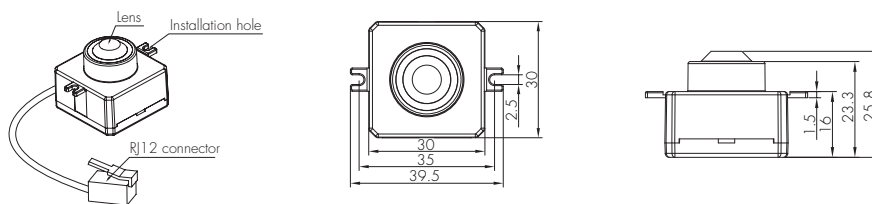


### B. HIR05/FM
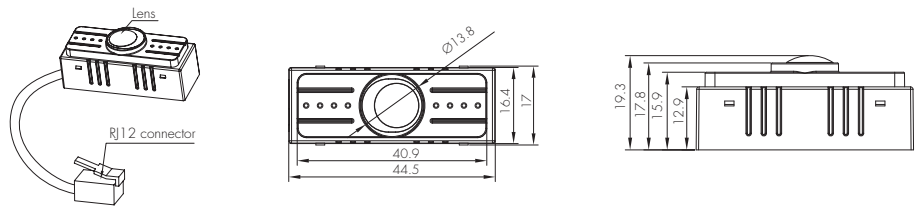PIR sensor head
The cable length is around 30cm.



### C. HIR05/AA
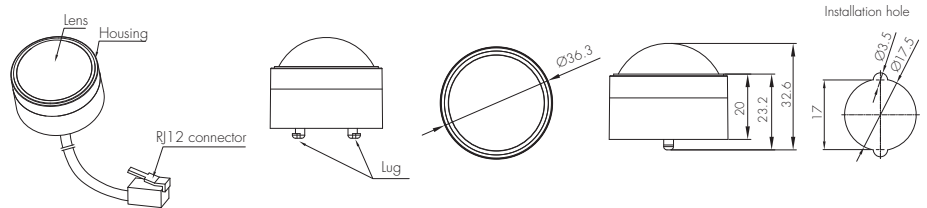PIR sensor head
Adjustable angle
The cable length is around 30cm.

## D. HIR07
PIR sensor head
Photocell Advance™
The cable length is around 30cm.

Lens
RJ12 connector

Ø13.8
16.4
17
40.9
44.5

19.3
17.8
15.9
12.9

## E. HIR11/S
PIR sensor head
Surface mounting
For highbay application
IP65 (facia / lens part)
The cable length is around 30cm.

Lens
Housing
RJ12 connector
Lug

Ø36.3

20
23.2
32.6
17

Installation hole
Ø3.5
Ø17.5

## F. HIR11/F
PIR sensor head
Flush mounting
For highbay application
IP65 (facia / lens part)
The cable length is around 30cm.

Lens
Accessories
RJ12 connector

Ø48

1.2
21.5
30.4

Installation hole
Ø41
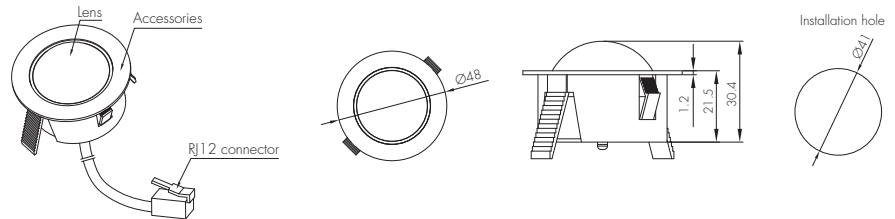
## G. HIR11/C
PIR sensor head
Screw to the luminaire by conduit
For highbay application
IP65 (facia / lens part)
The cable length is around 30cm.

Lens
Accessories
RJ12 connector

Ø40.5
M13
25
33.9
42.7
12
63

Installation hole
Ø14
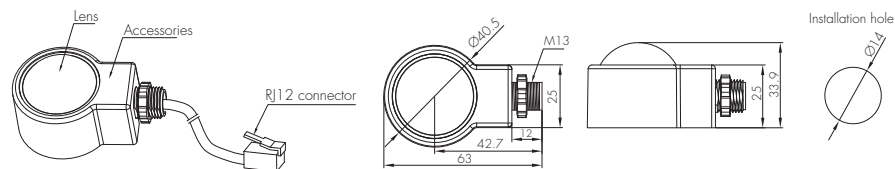
## H. HIR12
PIR sensor head
For highbay application
IP65 (facia / lens part)
The cable length is around 30cm.

Lens
Accessories
RJ12

16.5
38.2
45
75

Installation hole
63
Ø33
27.5
33
49.5
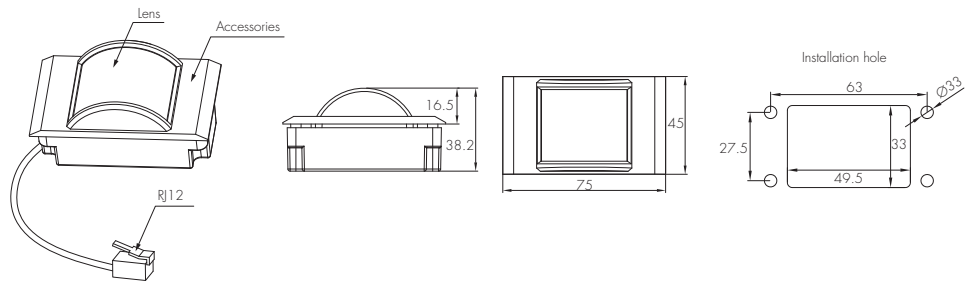
### Installation for HIR12

Thickness: 0.8mm – 1.6mm
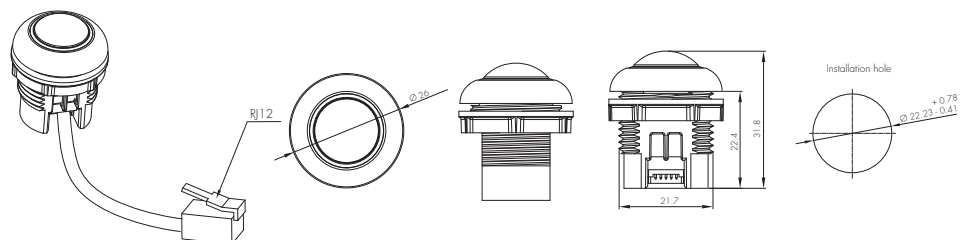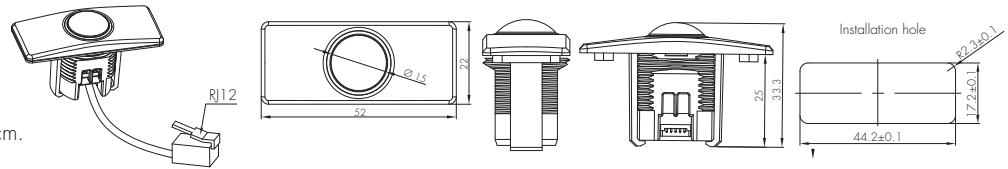
We suggest that the metal plate thickness to be 0.8mm – 1.6mm to ensure perfect focal length for the PIR lens.

## I. HIR63
PIR sensor head
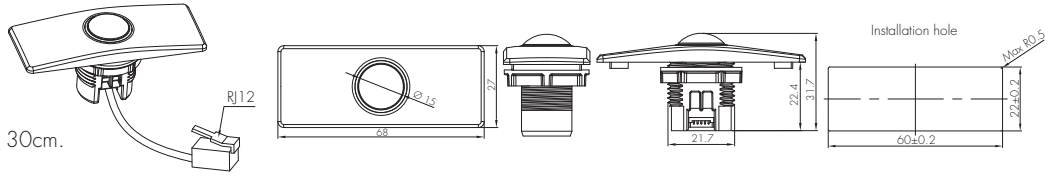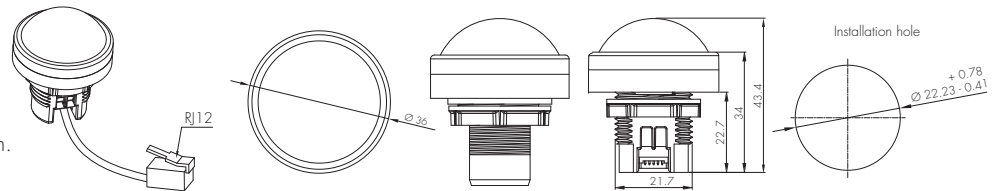The cable length is around 30cm.

RJ12

Ø26

22.4
31.8
21.7

Installation hole
Ø 22.23 +0.78 -0.41

---

**J. HIR63 with HA04**
PIR sensor head
Optional accessory
The cable length is around 30cm.

RJ12
Ø15
52
22
25
33.3
Installation hole
R2.3±0.1
17.2±0.1
44.2±0.1

**K. HIR63 with HA05**
PIR sensor head
Optional accessory
The cable length is around 30cm.

RJ12
Ø15
68
22
22.4
31.7
21.7
Installation hole
Max R0.5
22±0.2
60±0.2

**L. HIR63/R**
PIR sensor head
IP65 (facia / lens part)
The cable length is around 30cm.

RJ12
Ø36
43.4
34
22.7
21.7
Installation hole
Ø 22.23 +0.78 -0.41

**M. SAM20**
HF sensor head
Photocell Advance™
The cable length is around 30cm.

25.2
2.5
6.6
34.7
35.9
40.4
Cable side entry
15.5
24.3
1.5
3
ØA
2.5
25
8.8
6.8
11.2
Ø4.5
Cable back entry
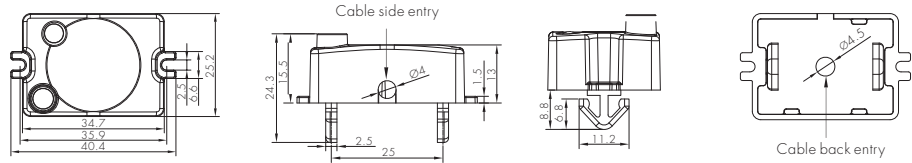
**N. SAM21**
HF sensor head
IP65
The cable length is around 30cm.

HF antenna module
Ø41
13.9
40.3
M16
14.6
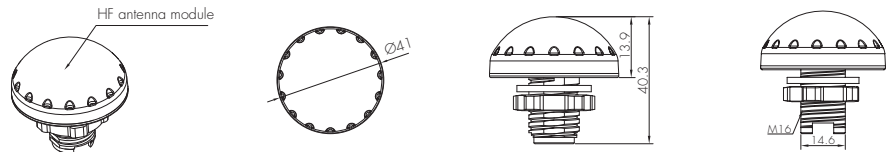
**O. SAM22**
HF sensor head
Flush mount
The cable length is around 30cm.

Ø48
38.9
1.2
21.5
26.5
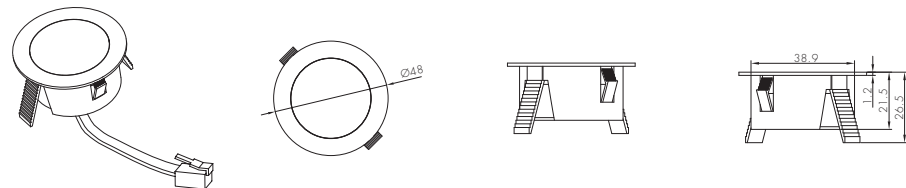
**P. SAM22/AA**
HF sensor head
Adjustable angle
The cable length is around 30cm.

67.5
70
Ø90
Installation hole
Ø78
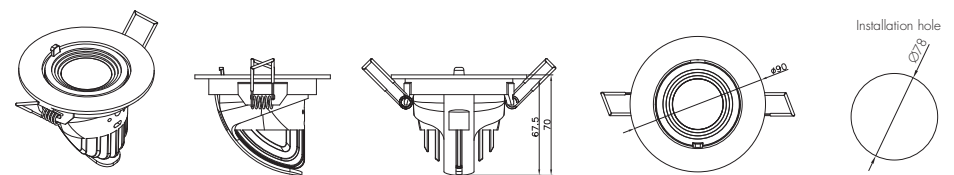
**Q. SAM23**
HF sensor head
Photocell advance™
For highbay application
The cable length is around 30cm.

Infrared remote receiver
Photocell advance™
Daylight sensor
Slots for T5 or T8 tube
45.2
32.2
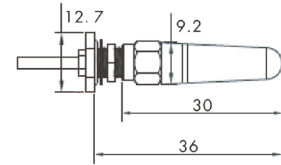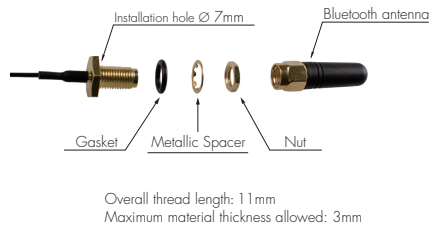Slots for T8 tube
2.5
33.5
15
12
50.2
26.5
9
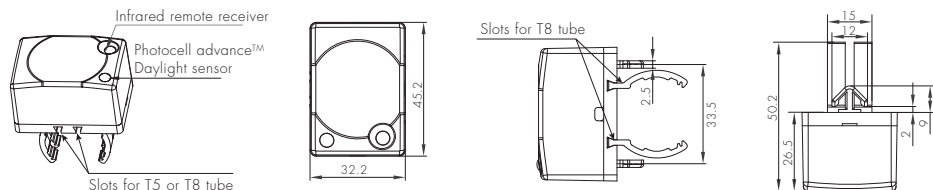
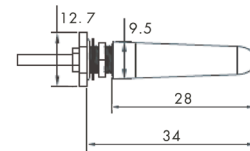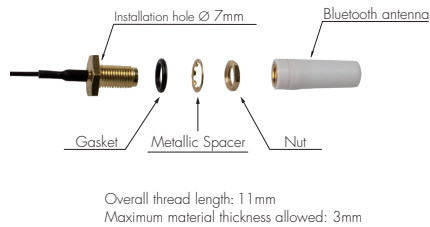## Optional Accessory: Reinforced Bluetooth Antenna

For some special applications, customers may need a larger Bluetooth transmission for both smartphone to device and device to device. Thanks to the reinforced Bluetooth antenna (optional black or white color to choose from), with it being added to the control base HBEM038, the transmission distance (smartphone to device) enlarges to 20m, the distance of device to device is around 50m.

Installation hole Ø 7mm      Bluetooth antenna

Gasket   Metallic Spacer   Nut

**HA01B**

Overall thread length: 11mm
Maximum material thickness allowed: 3mm

12.7   9.2   30   36

Installation hole Ø 7mm      Bluetooth antenna

Gasket   Metallic Spacer   Nut

**HA01W**

Overall thread length: 11mm
Maximum material thickness allowed: 3mm

12.7   9.5   28   34

## Installation Method

Bluetooth module

Solder the antenna to the Bluetooth module
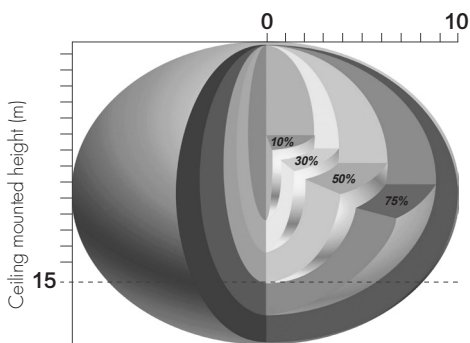
Ø 7mm

Drill a 7mm hole in the fixture
Assemble the antenna parts in turn

Make sure the antenna head is outside the fixture

## Detection Pattern
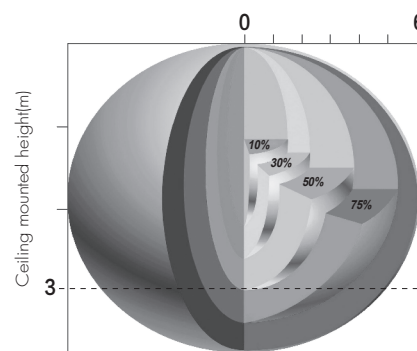
**SAM23**

Ceiling mounted height (m)

0    10

10%
30%
50%
75%

15

Ceiling mounted detection pattern (m)

**SAM20 & SAM21 & SAM22 & SAM22/AA**

Ceiling mounted height(m)

0    6

10%
30%
50%
75%

3

Ceiling mounted detection pattern (m)

HIR05 & HIR05/FM & HIR05/AA & HIR07

HIR12



3m

Radial movement 4m
Tangential movement 6m

3m
5m

12m
15m
*for forklift

Up to 4m
Up to 8m
Up to 5m
Up to 10m
Up to 6m
Up to 6m
Up to 12m
Up to 18m

HIR63

HIR63/R

3m

Tangential movement up to 12m

8m(for person)
12m(for forklift)
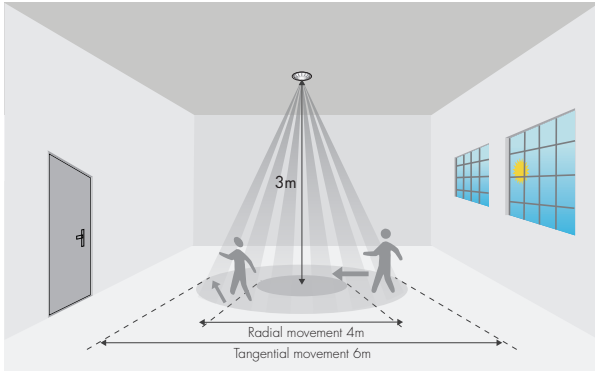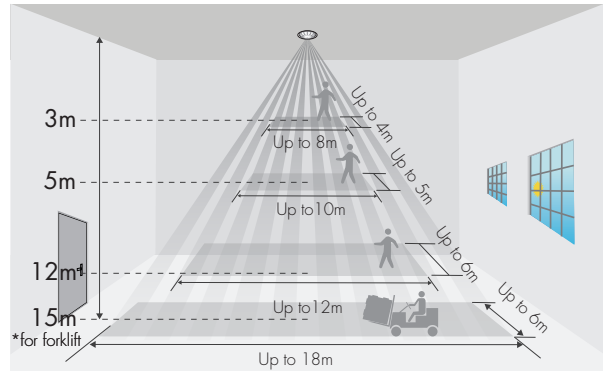
Tangential movement up to 14m
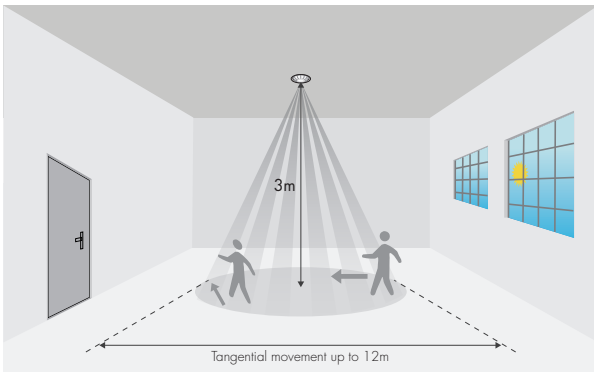
*The detection patterns are based upon 5km/h movement speed.

## HIR11 (High-bay)



**HIR11:** High-bay lens detection pattern for **forklift** @ Ta = 20°C

(Recommended installation height **10m-15m**)



A: Tangential movement

B: Radial movement

insensitive — sensitive

insensitive — sensitive

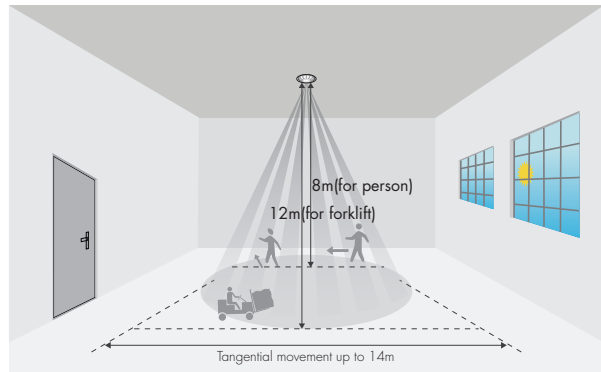| Mount height | Tangential (A) | Radial (B) |
|---|---|---|
| 10m | max 380m² (Ø = 22m) | max 201m² (Ø = 16m) |
| 11m | max 452m² (Ø = 24m) | max 201m² (Ø = 16m) |
| 12m | max 452m² (Ø = 24m) | max 201m² (Ø = 16m) |
| 13m | max 452m² (Ø = 24m) | max 177m² (Ø = 15m) |
| 14m | max 452m² (Ø = 24m) | max 133m² (Ø = 13m) |
| 15m | max 452m² (Ø = 24m) | max 113m² (Ø = 12m) |



**HIR11:** High-bay lens detection pattern for **single person** @ Ta = 20°C

(Recommended installation height **2.5m-12m**)



A: Tangential movement

B: Radial movement

insensitive — sensitive

insensitive — sensitive

| Mount height | Tangential (A) | Radial (B) |
|---|---|---|
| 2.5m | max 50m² (Ø = 8m) | max 7m² (Ø = 3m) |
| 6m | max 104m² (Ø = 11.5m) | max 7m² (Ø = 3m) |
| 8m | max 154m² (Ø = 14m) | max 7m² (Ø = 3m) |
| 10m | max 227m² (Ø = 17m) | max 7m² (Ø = 3m) |
| 11m | max 269m² (Ø = 18.5m) | max 7m² (Ø = 3m) |
| 12m | max 314m² (Ø = 20m) | max 7m² (Ø = 3m) |

## Normal Mode

It is the mode in which mains supply is available, with the battery charged or charging. In this mode, if there is no motion sensor head is plugged, then it is a standard Bluetooth dimmer with DALI broadcasting function; if there is a motion sensor head is plugged, then it will be a standard built-in Bluetooth motion sensor with DALI broadcasting function. Both conditions are with ability to create scenes and controllable by motion sensor, Push switch, schedules and app.

## Emergency Mode

It is the mode in which mains supply has failed and whilst the control gear is powered by the battery until deep discharge point. In this mode, HBEM038 is unable to be controlled by motion sensor, Push switch, schedules and app. However, some emergency parameters can still be conjured via the app, such as time scheduled for self-test, duration for extended emergency mode etc.

## Rest Mode

It's the mode in which the luminaires are intentionally off whilst the control gear is powered by the battery. To enter this mode, the prerequisite is that there is no mains supply. In this mode, the luminaires will be turned off automatically and HBEM038 is powered by the battery. If the luminaires are forced to turn on in this mode, HBEM038 will then be adjusted to emergency mode. When mains supply is recovered, HBEM038 will return to normal mode.

## Inhibit Mode

It is the mode in which HBEM038 is powered from mains but prevented from going into emergency mode in the event mains failure. Please enter this mode only in special applications whereby emergency functions is not needed, such as when electricians need to cut off power supply when doing examinations and maintenance work of HBEM038.

## Extended Emergency Mode

It is the mode in which the control gear continues to operate the luminaires in the same way as in emergency mode for the programmed prolong time after the restorations of the mains supply. When this mode is enabled, HBEM038 will remain in emergency mode even when mains supply is recovered. In this mode, the user must set the time extended for emergency mode; when the time extended elapses, HBEM038 will return to normal mode.

## Self test (Monthly)

HBEM038 carries out routine test on emergency lighting based on pre-programmed time via the app & web app platform or after receiving manual commands from the app & web app platform. During the self test process, tests for load connections (such as open circuit, short-circuit) and battery connections (such as open circuit, short-circuit, polarity reversal etc.) will be carried out.

All the DALI emergency drivers Self Test feedbacks, results and related Events (Such as the open circuit and short circuit of the load connection, open circuit and short circuit for battery connection) are generated by the driver itself, the HBEM038 convertor will only retrieve the data from the emergency driver and translate the DALI feedback into Bluetooth Mesh data correctly and accurately and display to the end user interface (App and Web app Platform). It will not contain any Emergency Self Test circuit in the products itself.

## Self test (Annually)

The test is carried out mainly to check the battery level. The user must make sure that the battery for DALI emergency driver is fully charged before HBEM038 carries out annual test. Also, the battery lifetime statistics will be analysed and displayed on a chart basis.

## Push switch function

Users can connect Push switch to HBEM038 to achieve multiple functions such as manually trigger monthly self test, annually self test, invalid and back to normal mode. Those options can be selected in Koolmesh app Push swich settings.

# Dimming Interface Operation Notes

### Switch-Dim

The provided Switch-Dim interface allows for a simple dimming method using commercially available non-latching (momentary) wall switches. Detailed Push switch configurations can be set on Koolmesh app.

| Switch Function | Action | Descriptions |
|---|---|---|
| Push switch | Short press (<1 second)<br>* Short press has to be longer than 0.1s, or it will be invalid. | - Turn on/off    - Recall a scene<br>- Turn on only    - Quit manual mode<br>- Turn off only    - Do nothing |
| | Double push | - Turn on only    - Quit manual mode<br>- Turn off only    - Do nothing<br>- Recall a scene |
| | Long press (≥1 second) | - Dimming<br>- Colour tuning<br>- Do nothing |
| Sensor-link | / | - Upgrade a normal on/off motion sensor to a Bluetooth controlled motion sensor |
| Emergency Self-Test Function | Short press (<1 second)<br>* Short press has to be longer than 0.1s, or it will be invalid. | - Start Self test (Monthly)    - Start Self test (Annually)<br>- Stop Self test    - Invalid |
| | Long press (≥1 second) | - Start Self test (Monthly)    - Start Self test (Annually)<br>- Stop Self test    - Invalid |
| Fire Alarm (VFC signal only) | Refer to **Koolmesh**™ App User Manual V2.1 | - Able to connect the Fire Alarm system<br>- Once the fire alarm system is triggered, all the luminaries controlled by the Push Switch will enter the preset scene (normally it's full on), after the fire alarm system gives the ending signal, all the luminaries controlled by this Push Switch will revert back to normal status. |

# Additional Information / Documents

1. For full explanation of Hytronik Photocell Advance™ technology, please kindly refer to
   www.hytronik.com/download ->knowledge ->Introduction of Photocell Advance

2. To learn more about detailed product features/functions, please refer to
   www.hytronik.com/download ->knowledge ->Introduction of App Scenes and Product Functions

3. Regarding precautions for Bluetooth product installation and operation, please kindly refer to
   www.hytronik.com/download ->knowledge ->Bluetooth Products - Precautions for Product Installation and Operation

4. Regarding precautions for microwave sensor installation and operation, please kindly refer to
   www.hytronik.com/download ->knowledge ->Microwave Sensors - Precautions for Product Installation and Operation

5. Regarding precautions for PIR Sensors installation and operation, please kindly refer to
   www.hytronik.com/download ->knowledge ->PIR Sensors - Precautions for Product Installation and Operation

6. Data sheet is subject to change without notice. Please always refer to the most recent release on
   www.hytronik.com/products/bluetooth technology ->DALI-to Bluetooth Converter/Translator Module

7. Regarding Hytronik standard guarantee policy, please refer to
   www.hytronik.com/download ->knowledge ->Hytronik Standard Guarantee Policy