# HBEM06

**Maintained Emergency Exit Sign Driver | Max. 4 W Output | Attachable Sensor Heads**

**Benefits**

Compact: Up to 4 W output in both mains and emergency modes

Protected: Battery thermal protection for safer emergency operation

Wireless: App-based commissioning for fast setup

**Applications**

Built-in Emergency Exit Sign light

Retrofit upgrades & New luminaire designs

Offices, Classrooms, Industry and Healthcare Spaces

Check Out the Complete System Solution on the Website:
https://www.hytronik.com/product/HBEM06

## Product Description

HBEM06 is a low-power dimmable constant current emergency driver designed for exit sign luminaires. It supports maintained and non-maintained operation via the SL terminal, providing greater flexibility for different emergency lighting applications. The driver supports 3-wire battery connection with integrated thermal protection for safer and more reliable emergency operation, while compatibility with multiple battery voltages simplifies system integration. An RJ12 interface allows connection to an external sensor head, and all configuration and commissioning can be completed easily via the Koolmesh app.

## Functions and Features

See additional details at the end of datasheet

Automatic Email Alerts on Faults

Automatic Emergency Self Testing

Emergency Operating Modes (5 Modes)

Koolmesh - See bluetooth contol below

Monthly / Annually Auto Emergency Testing

Open-Circuit Protection

Over load Protection

RJ12 Connection

Short-circuit Protection

Usage Data & Report History

nRF52840

# HBEM06

**Maintained Emergency Exit Sign Driver | Max. 4 W Output | Attachable Sensor Heads**

## Properties

• Self-contained Emergency & LED drivers combination
• Non-maintained and maintained operations
• Mains &Emergency output current (350mA/700mA) selection via DIP switch
• It is dimmable via switch - dim or Koolmesh app in maintaining mode
• Plug-and-Play sensor with Photocell AdvanceM technology for daylight & motion detection
• Abnormal pro-tection for shortcircuit, overload and open-circuit
• SELV classified (indicator LED, battery pack, test switch)
• Customized manual test switch (single press, long press)
• Battery Life Prediction and abnormal protection
• Wireless scheduling of monthly and annual EM tests via Koolmesh app
• Compact design suitable for Emergency Exit Sign light
• Supports 3-wire battery connection with integrated thermal protection for safer and more reliable emergency operation

## Specifications

| Main Capabilities | |
|---|---|
| Operating Mode | Constant Current |

| 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 |
| Input current range | Max. 60mA |
| Output Voltage | 2.7-3V/5.4-6V |
| Output Current | 350mA/700mA |
| Output Uout Max. | 15V |
| Power Factor (Max.) | 0.6 |
| Efficiency | 70.0 % |
| In-rush current | 10.0 A |
| In-rush current time | 80.0 µs |
| Mains output power (Max.) | 4W |
| EM output power (Max.) | 4W |

## Specifications

| Technical | |
|---|---|
| Product weight | 73.0 g |
| Product height | 21.3 mm |
| Product length | 139.0 mm |
| Product width | 39.7 mm |
| Storage temperature | -40 ~ +70 °C |
| Humidity max | 10 ~ 90% |
| Case Temp.max | 80.0 °C |
| IP Rate | IP20 |

| Standard | |
|---|---|
| EMC | EN 55015, EN61000-3-2/-3-3, EN 61547 |
| LVD | EN 61347-1, EN62034, EN 61347-2-7, EN 62493, IEC62133 |
| RED | EN 300328, EN301489-1, EN 50663, EN 301489-17 |

## Output configuration

### LED Current Selection


| LED Current Selection | | | | |
|---|---|---|---|---|
| Output Power | 1W | 2W | 2W | 4W |
| Output Current | 350mA | 350mA | 700mA | 700mA |
| Output Voltage | 2.7-3V | 5.4-6V | 2.7-3V | 5.4-6V |
| Battery Selection | 3.2V/2Ah | 3.2V/4Ah | 3.2V/4Ah | 3.2V/7.2Ah |

Warning: The emergency lighting output follows the same parameter settings as the normal lighting mode. Please make sure the correct current and power are selected before operating the emergency driver to ensure proper system performance and avoid possible damage.

## Circuit breaker information

| Automatic circuit breaker type | 10A | 13A | 16A | 20A | 25A |
|---|---|---|---|---|---|
| Quantity of HBEM06 | 80 | 100 | 125 | 150 | 180 |

*Calculation uses typical values from ABB series S200 as a reference. E.g. Maximum amount =16/(Pn/230). We recommend to use no more than 60% of the data as the actual max. number of drivers in real application. Actual values may differ due to used circuit breaker types and installation environment.

## LED Diagnostics

| Indicator Colour / Describe | | Status | Meaning |
|---|---|---|---|
| GREEN | SOLID | Device OK | All OK, AC power is present. Battery is connected & charging |
| | FLASH (0.3s ON, 0.3s OFF) | Monthly test/Functionality test | AC power is present. Monthly test in progress |
| | SLOW FLASH (1s ON, 1s OFF) | Annual test/Duration test | Annual test are being carried out |
| RED | SOLID | Emergency LED fault | Emergency LED is open circuit, short circuit or has otherwise failed in some way, Fault can indicate the live status or the result of a test |
| | SLOW FLASH (1s ON, 1s OFF) | Battery fault | Battery failure (Battery failed the duration or functional test, battery appears to be defective, battery has incorrect voltage). |
| RED /GREEN OFF | | No power available | AC power is lost, unit in emergency mode |

If you want to see the diagnostic report, please go to the APP or web platform to see the full report and analysis

## Battery Specifications - battery selection

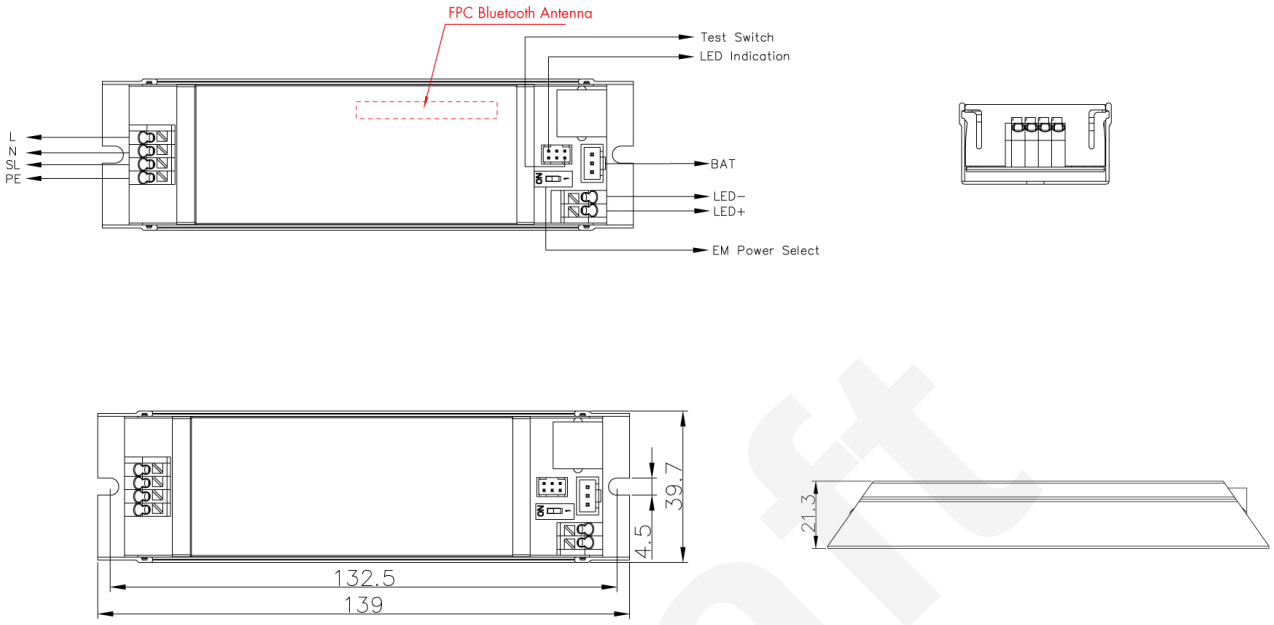
| Battery Selection | | |
|---|---|---|
| Battery pack | Battery Type | Size L×W×H(mm) |
| BPC86 | LiFePO4 | 110×20×21.5 |
| BPC87 | LiFePO4 | 110×27.5×29.5 |
| BPC88 | LiFePO4 | 110×70×21 |

| Battery Charge / Discharge Data | | | | |
|---|---|---|---|---|
| Battery pack | Max. load / Discharge hour | Discharge Current | Charge Current | Recharge Time |
| BPC86 | 0.33A, 1W@3V / 3H | 3.2V/2Ah | 0 - 500mA | 24H |
| BPC87 | 5.4-6V/350mA,<br>2.7-3V/700mA, 2W / 3H | 3.2V/3.4Ah | 0 - 500mA | 24H |
| BPC88 | 5.4-6V/700mA, 4W / 3H | 3.2V/7.2Ah | 0 - 500mA | 24H |

HBEM06 integrates thermal protection for safer battery operation and improved system reliability. Please refer to the following detailed thermal protection specifications and operating data.
Discharge high temperature protection temperature: 65±5°C
Discharge high temperature protection recovery temperature: 60±5°C
Discharge low temperature protection temperature: -27±5°C
Discharge low temperature protection recovery temperature: -22±5°C
Charging high temperature protection temperature: 55±5°C
Charging high temperature protection recovery temperature: 50±5°C
Charging low temperature protection temperature: 0±5°C
Charging low temperature protection recovery temperature: 3±5°C

Note:
• Please charge the battery for 24 hours before first use.
• Do not short-circuit the battery pack or output load. Frequent short-circuit conditions may trigger battery protection and affect normal operation.
• Over-discharge may damage the battery. Avoid deep discharge and recharge promptly after emergency operation.
• To help maintain battery lifetime and stable operation, it is recommended to keep the battery storage temperature below 30°C and the battery surface operating temperature below 55°C. At a battery surface temperature of 55°C, the recommended maximum charge/discharge cycle count is 40 cycles.
• If the product is stored for more than 3 months, it is recommended to disconnect the battery connector. During initial use after long-term storage, repeated charge and discharge cycles may be required to reactivate battery performance.
• Do not connect the battery before product installation is completed. After connecting the battery, ensure the HBEM06 powers on and operates normally within 24 hours.
• For more details on battery precautions and usage, please visit the following link: https://hytronik.com/service/downloads (LiFePO4 Battery Precautions and Usage).

## Technical Drawing



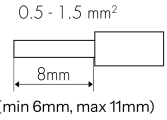

The Bluetooth antenna is located at the marked end of the device.
· Keep the antenna area clear of metal or conductive materials.
· Maintain at least 10 mm clearance around the antenna whenever possible for optimal wireless performance.
· Avoid installing the antenna section inside a metal enclosure 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

## ⚠ Wiring Guidelines

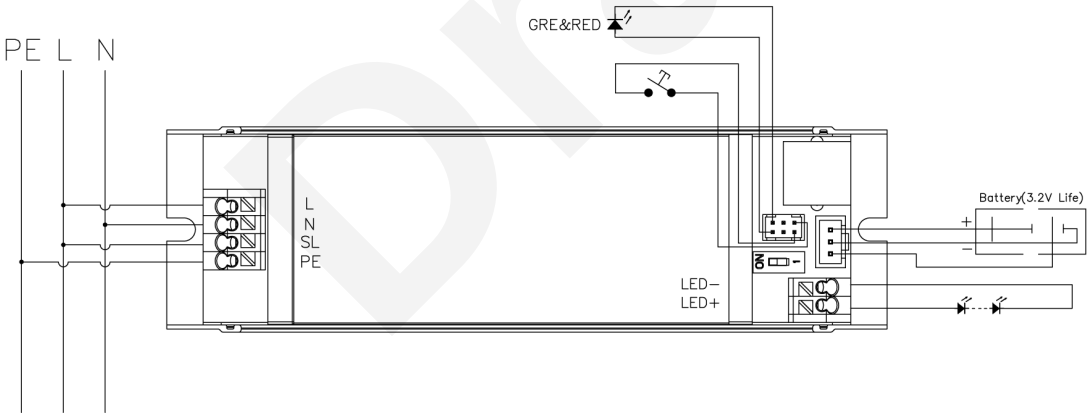
1. Installation by a qualified electrician only and in accordance with local electrical regulations.
2. Disconnect mains power before installation, wiring, maintenance or replacement.
3. Failure to follow the wiring diagram may result in product damage and malfunction.
4. Refer to the Wire Preparation section for recommended wire diameter and strip length.

## Wire Preparation

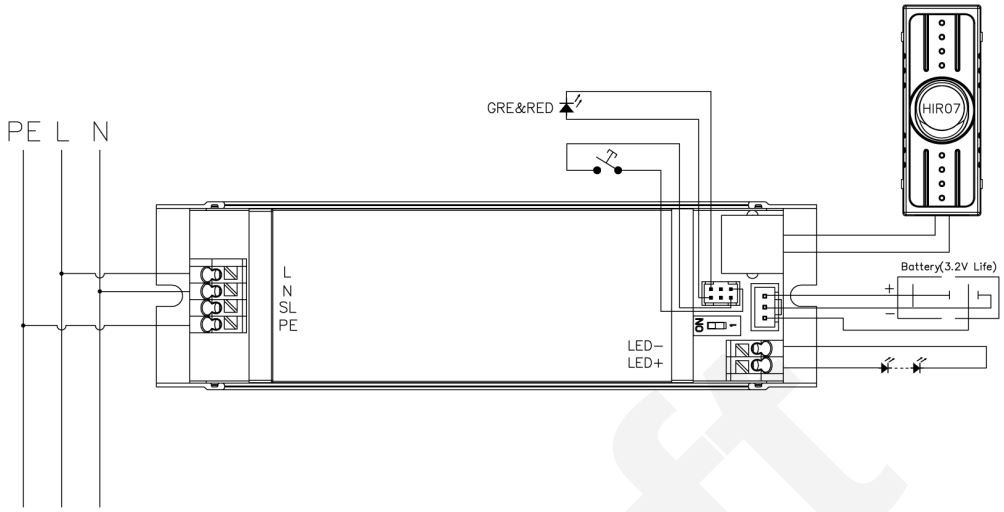



## Wiring Diagram

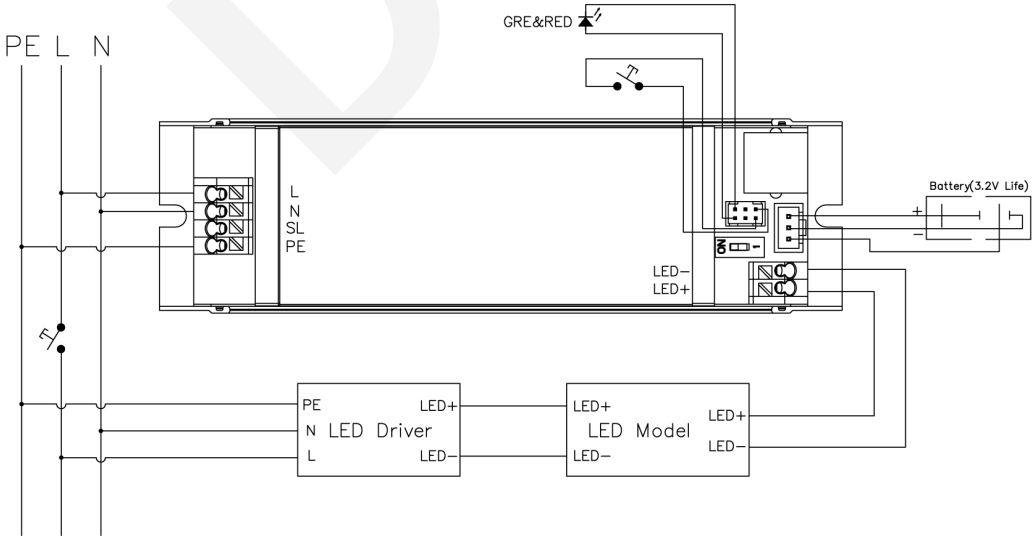
**SL Connection – Maintained model**



**No SL Connection – Non-maintained model**




**Combined Mains and Emergency Lighting**



## Commissioning Instructions and Precautions

**A. Installation Notes**

1. This product should be installed by a qualifed electrician.

2. Please select the correct power and current before turning on the device.

**B. SL & PUSH Function Notes**

1. HBEM06 supports maintained and non-maintained operation via the SL terminal.The SL function must be enabled in the Koolmesh app before use.

2. When the SL wire is connected (maintained mode), the unit illuminates with fixed output under mains power( the fixed output is the same selection you made with dip switch). Sensors do not function in this mode (whether mains-powered or battery-powered). The system automatically switches to emergency operation when mains power fails. During normal mains operation, the status LED remains constantly green; in emergency mode, the status LED stays off unless a fault occurs.

3. When the SL wire is not connected (non-maintained mode), the main lighting remains OFF during normal operation, and the emergency lighting will only operate during power failure.

4. When the SL function is enabled, the sensor function will be disabled. To enable sensor operation, set the push switch function to “Normal PUSH (Retractive Switch)” in the Koolmesh app.

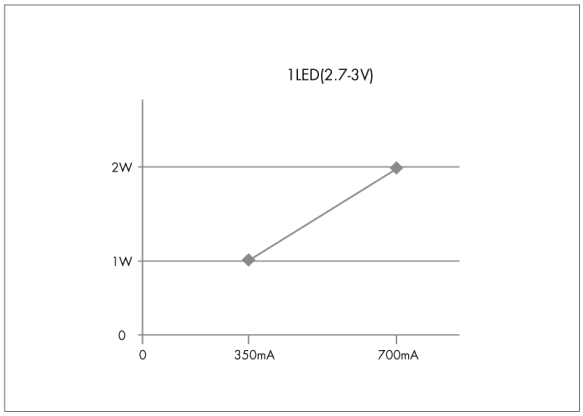
**C. Wiring Diagram Notes**

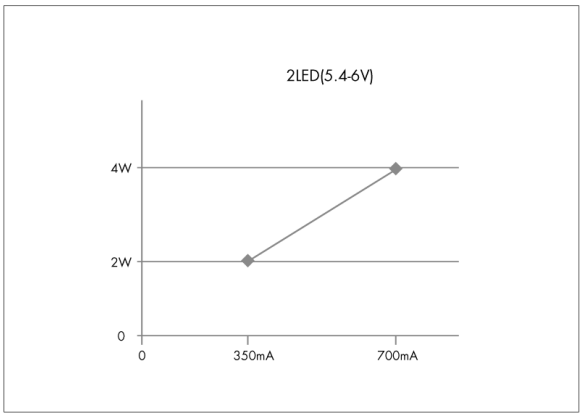
1. Combined Mains and Emergency Lighting: Since independent circuits are used, it is essential to switch off both the mains LED driver supply and the permanent emergency supply before testing. Otherwise, the operation of the emergency LEDs may not be visible. A circuit similar to the one shown should be used.

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

https://hytronik.com/service/downloads

## Performance characteristics



## 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 |
|---|---|---|
| Emergency SL (Switch Emergency/Lighting) | Single press (>0.1s) | • ON/OFF emergency light, enter EM mode |
| Virtual- Emergency Self-Test Function | Single press (>0.1s)<br>Double press | • Disable<br>• Function test<br>• Duration test<br>• Erminated test |
| Virtual-Normal PUSH (Retractive Switch) | Single press (>0.1s)<br>Double press<br>Press and hold ( >=1s) | • ON/OFF<br>• OFF only<br>• Recall this scene<br>• Sensor take over<br>• Not in use |

## Emergency Operating Modes

**Normal Mode**

It is the mode in which mains supply is available, with the battery either charged or charging. In this mode, the device operates as a combined Bluetooth LED driver, capable of creating scenes and being controlled by motion sensors, Push switches, and the mobile app.

**Emergency Mode**

It is the mode in which mains supply has failed and the control gear is powered by the battery until deep-discharge protection is reached. In this mode, the device cannot be controlled by motion sensors, Push switches, or the app. However, certain emergency parameters can still be configured via the app, such as scheduled self-test time, extended emergency duration, etc.

**Rest Mode**

It is the mode in which the luminaire is intentionally turned off while the control gear is powered by the battery. To enter this mode, mains supply must not be present. In this mode, the luminaire turns off automatically while the device continues to draw power from the battery. If the luminaire is forced on, the device will switch to emergency mode. When mains supply is restored, the device will return to normal mode.

**Inhibit Mode**

It is the mode in which the device is powered from the mains but prevented from entering emergency mode in the event of a mains failure. This mode is intended only for special applications where emergency functionality is not required, such as when electricians need to temporarily disable emergency operation during inspection or maintenance work.

**Extended Emergency Mode**

It is the mode in which the device continues operating the luminaire in the same manner as emergency mode for a programmed extended duration after mains power is restored. When enabled, the device remains in emergency mode even when mains supply returns. Once the programmed extended time expires, the device will switch back to normal mode.

## Emergency Self-Test Functions

**Self-test (Monthly)**

The device performs routine tests on emergency lighting based on pre-programmed schedules via the app or upon receiving manual commands. During the monthly self-test, load connections (e.g., open-circuit, short-circuit) and battery connections (e.g., open-circuit, short-circuit, polarity reversal) are inspected. After the device reports a functional fault, a new monthly functional test shall be carried out after corrective actions to verify that the fault has been eliminated.

**Self-test (Annually)**

The annual test is mainly used to evaluate battery capacity and condition. The user must ensure that the battery is fully charged before the test begins. Battery lifetime statistics will be analysed and presented graphically. When the device reports insufficient battery capacity and the battery is replaced, an annual test shall be performed to ensure that the new battery meets the required performance criteria.

## Options

**A. Installationshinweise**

1. Die Installation dieses Produkts darf ausschließlich durch eine Elektrofachkraft erfolgen.

2. Bitte wählen Sie vor dem Einschalten die richtige Ausgangsleistung und den richtigen Ausgangsstrom aus.

**B. Hinweise zu SL- und PUSH-Funktion**

1. HBEM06 unterstützt Dauer- und Bereitschaftsbetrieb über den SL-Anschluss. Vor der Verwendung muss die SL-Funktion in der Koolmesh App aktiviert werden.

2. Ist der SL-Anschluss verbunden (Dauerbetrieb), arbeitet die Leuchte im Netzbetrieb mit einer festen Ausgangsleistung. Diese entspricht der am DIP-Schalter gewählten Einstellung. Die Sensorfunktion ist in diesem Betriebsmodus sowohl im Netz- als auch im Batteriebetrieb deaktiviert. Bei Netzausfall schaltet das System automatisch in den Notbetrieb. Während des normalen Netzbetriebs leuchtet die Status-LED dauerhaft grün. Im Notbetrieb bleibt die Status-LED ausgeschaltet, sofern keine Störung vorliegt.

3. Ist der SL-Anschluss nicht verbunden (Bereitschaftsbetrieb), bleibt die Hauptbeleuchtung im Normalbetrieb ausgeschaltet. Die Notbeleuchtung wird ausschließlich bei Netzausfall aktiviert.

4. Ist die SL-Funktion aktiviert, ist die Sensorfunktion deaktiviert. Für den Sensorbetrieb muss in der Koolmesh App die Tasterfunktion „Standard-PUSH (Taster)“ ausgewählt werden.

**C. Hinweise zum Schaltplan**

1. Kombinierter Netz- und Notlichtbetrieb: Da Netz- und Notstromversorgung über getrennte Stromkreise erfolgen, müssen vor einer Funktionsprüfung sowohl die Versorgung des LED-Treibers als auch die permanente Notstromversorgung abgeschaltet werden. Andernfalls ist der Betrieb der Notlicht-LEDs möglicherweise nicht sichtbar. Es sollte eine Schaltung entsprechend der dargestellten Abbildung verwendet werden.

### Included Accessories

LED indicator | Used to display the status of the product

Test switch| For checking the device function

### Compatible products (for full functionality)

**BPC86**

LiFePO4 Battery Pack | Emergency Lighting | 3.2V, 2Ah
www.hytronik.com/product/BPC86

**BPC87**

LiFePO4 Battery Pack | Emergency Lighting | 3.2V, 3.4Ah
www.hytronik.com/product/BPC87

**BPC88**

LiFePO4 Battery Pack | Emergency Lighting | 3.2V, 7.2Ah
www.hytronik.com/product/BPC88

**HIR11/C**

PIR Highbay | Ciradian Rhyhm | RJ12 connector to control body
www.hytronik.com/product/HIR11-C

**HIR11/F**

PIR Highbay | Ciradian Rhyhm | RJ12 connector to control body
www.hytronik.com/product/HIR11-F

**HIR63**

PIR Lowbay Sensor Head | RJ12 connector | Conduit Screws
www.hytronik.com/product/HIR63

## 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

- 4 push inputs supported
- Adjustable motion & static sensitivity & adjustable sensing distance
- Compatible with EnOcean kinetic switches
- Detailed motion sensor settings
- 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.

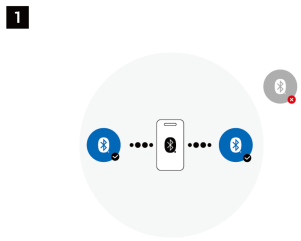
**2. Device to Device Range (Mesh Network Communication)**

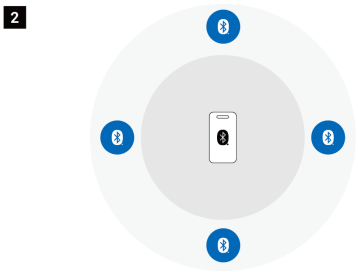
Once commissioned, devices communicate through the wireless mesh network. Users can access and control all devices within the network when connected to any active mesh node.

**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

### Automatic Email Alerts on Faults

When a fault is detected, the system automatically sends email notifications to alert maintenance personnel, enabling timely intervention and reducing system downtime.

### Automatic Emergency Self-Testing

The product supports automatic emergency self-testing to verify emergency lighting functionality and battery condition without manual intervention, ensuring reliable operation and compliance with emergency lighting requirements.

### Emergency Operating Modes (5 Modes)

The product supports five emergency operating modes: Normal Mode, Emergency Mode, Rest Mode, Inhibit Mode and Extended Emergency Mode. In the event of a mains power failure, it provides standard emergency lighting operation. During normal mains operation, the emergency output remains inactive while the battery is charged to preserve battery capacity. Emergency operation can be temporarily inhibited via control commands for maintenance or testing purposes. An Extended Emergency Mode, configurable via the Koolemsh app, allows the emergency light to continue operating for a preset duration after mains power is restored, reducing the risk of darkness in the event of a subsequent power interruption.

### Monthly Annually Auto Emergency Testing

This product complies with emergency lighting requirements and supports automatic self-testing, including monthly functional tests and annual duration tests. Test results and reports can be generated via the Koolmesh app, simplifying routine inspection, maintenance planning and compliance documentation.

### Open-Circuit Protection

This product incorporates open-circuit protection to safeguard the device and connected system in the event of a disconnected load or open wiring condition. When an open circuit is detected, the output is automatically limited or disabled to prevent abnormal operation or component damage, ensuring safe and reliable system behaviour.

### Over load Protection

This product incorporates overload protection that limits or disables the output when the connected load exceeds the rated capacity. This protection helps prevent overheating, excessive component stress and unstable operation, ensuring safe and reliable system performance.

### RJ12 Sensor Connection

The product features an RJ12 plug-and-play connection interface, enabling quick, tool-free installation and easy maintenance. The standardized connector supports flexible integration between drivers, sensor bases and sensor heads, ensuring reliable communication and simplifying replacement or system expansion. This modular connection method enhances installation efficiency and reduces wiring complexity in both new and retrofit applications.

### Short-Circuit Protection

This product incorporates short-circuit protection that automatically disables the output in the event of a short circuit. Normal operation is restored automatically once the fault condition is removed, protecting the device and connected components from damage.

## Functions and Features

### Usage Data & Report History

The system stores usage data and historical reports, supporting inspections, maintenance analysis and compliance documentation.

### 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