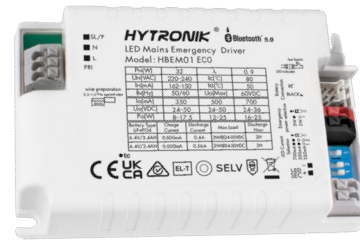


## Product Description

HBEM01 ECO is a compact, dimmable Bluetooth LED driver with integrated emergency control, delivering a comprehensive solution for intelligent emergency lighting.

## Properties

- Self - contained Emergency & LED drivers combination
- Non-maintained and maintained operations
- Mains & Emergency output (2W/3W) selection via DIP switch
- It is dimmable via switch - dim or Koolmesh app in maintaining mode
- Active PFC design
- Abnormal protection for short-circuit, 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
- Ideal for main lighting fixtures with emergency function requirements
- 5 years guarantee



## Emergency Features

 Emergency working mode:

- Normal emergency mode
- Rest mode
- Inhibit mode
- Extended emergency mode

 Monthly/Annually Automatic Testing with report generation

 Battery status check via Koolmesh app

 Automatic email notification when fault is detected

 Retrievable usage data and report history

## Batteries

- LiFePO4 batteries (BPC83/BPC84)
- Battery safeguarded from overcharge, deep discharge, and overheating
- 5 year design life for battery (up to 30 °C ambient temperature)
- 2 years guarantee (For battery compatibility refer to the Battery specifications)

\*<https://hytronik.com/emergency-led-drivers-inverters/bpc83>

\*<https://hytronik.com/emergency-led-drivers-inverters/bpc84>

## App Features

-  Emergency report generation and diagnosis
-  Quick setup mode & advanced setup mode
-  Web platform for project deployment & data analysis
-  Koolmesh Pro iPad for on-site configuration
-  Floorplan feature to simplify project planning
-  One-key device replacement
-  Device social relations check
-  Staircase function for quick setup
-  Remote control via Hytronik gateway  
& touch screen HPAD-TSJASE1
-  Heat map
-  Grouping luminaires via mesh network
-  Scenes
-  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
-  Internet-of-Things (IoT) featured
-  Device firmware update over-the-air (OTA)
-  Alert for excess lux / temperature  
/ humidity via multi-meter HBLM01
-  Seamless integration with BMS via Hytronik BMS gateway
-  Test mesh network connection quality
-  Compatible with Shelly emergency metering
-  Continuous development in progress...

## Koolmesh® - Operating Guide

### Bluetooth® 5.0 SIG mesh



Smartphone (ios)



Smartphone (Android)



iPad



Web

\*For additional information, including project and network, device, and scenes, please refer to: <http://faq.koolmesh.com/faq/en/index.html>

### Bluetooth® Kinetic Switch



HBKS01

HBKS02

HBKS03

HBKS01D

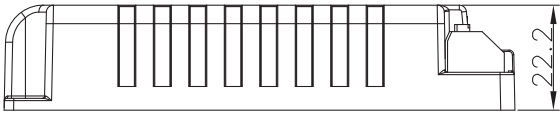
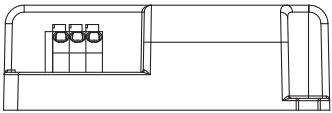
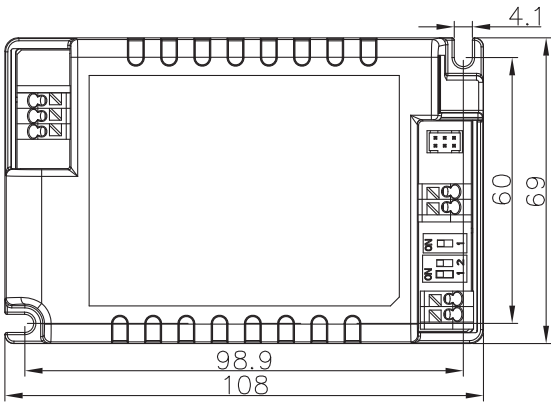
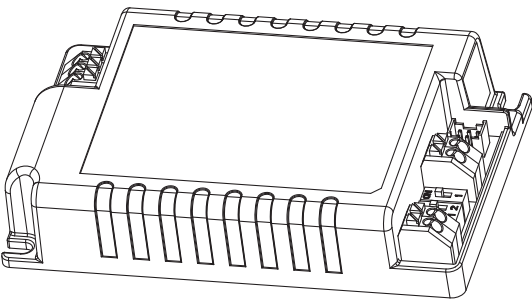
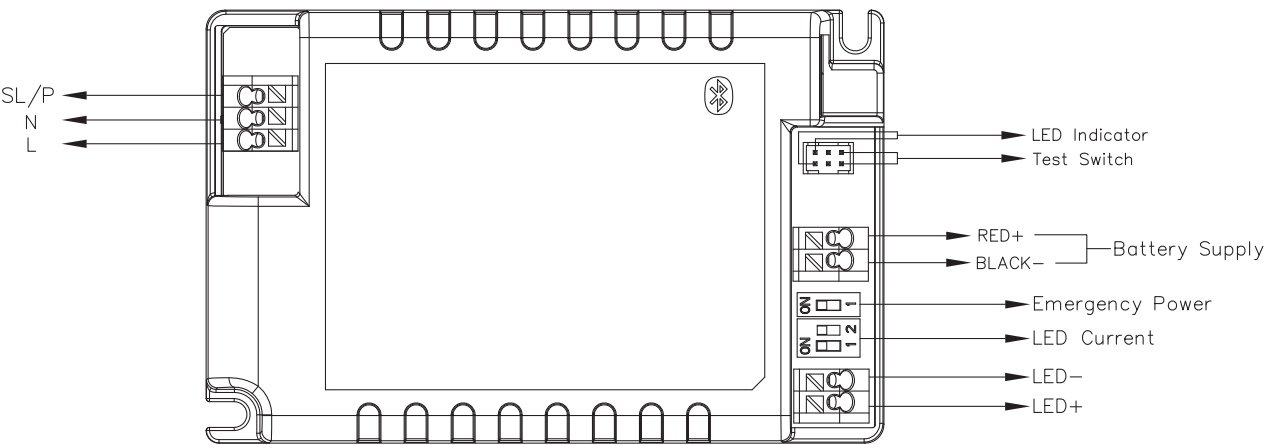
HBKS02D



EnOcean  
Self-powered IoT

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

Mechanical Structure & Dimensions



## Technical Specifications

| Input & Output Characteristics                |                                                                                |
|-----------------------------------------------|--------------------------------------------------------------------------------|
| Operating voltage                             | 220~240VAC 50/60Hz                                                             |
| Input current                                 | 162~150mA                                                                      |
| Max. Driver output power                      | 25W                                                                            |
| Max. Emergency output power                   | 3W                                                                             |
| Efficiency                                    | 85%                                                                            |
| Uout Max.                                     | 60V                                                                            |
| Power factor                                  | >0.9                                                                           |
| Main output<br>(Wattage/Current/Voltage)      | 8-17.5W / 350mA / 24-50V<br>12-25W / 500mA / 24-50V<br>16-25W / 700mA / 24-36V |
| Emergency output<br>(Wattage/Current/Voltage) | 2W / 85-40mA / 24-50V<br>3W / 125-60mA / 24-50V                                |
| In-rush current (I <sub>max</sub> .)          | 21A                                                                            |
| Pulse time                                    | 80 μs                                                                          |

| 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 |

| Environment             |                            |
|-------------------------|----------------------------|
| Operation temperature   | T <sub>c</sub> : 0~+50°C   |
| Storage temperature     | T <sub>c</sub> : -40~+70°C |
| Case temperature (Max.) | T <sub>c</sub> : +80°C     |
| IP rating               | IP20                       |

| Safety & EMC          |                                                                   |
|-----------------------|-------------------------------------------------------------------|
| EMC standard (EMC)    | EN55015, EN61547, EN61000-3-2, EN61000-3-3, EN300328, EN301489-17 |
| Safety standard (LVD) | EN61347-1, EN62493, EN61347-2-7, EN62034, IEC62133                |
| Certification         | CE, UKCA, RCM, ROHS                                               |

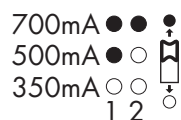
## Circuit Breaker Information

| Circuit breaker type | B10A   | B13A   | B16A   | B20A   | B25A   |
|----------------------|--------|--------|--------|--------|--------|
| HBEM01 ECO           | 35 pcs | 45 pcs | 55 pcs | 70 pcs | 85 pcs |

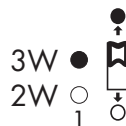
\*Calculation uses typical values from ABB series S200 as a reference. E.g. Maximum amount =  $16 / (P_n / 230)$ . We recommend to use no more than 60% of the data as the actual max. number of drivers in real application. Actual values may differ due to used circuit breaker types and installation environment.

## DIP Switch

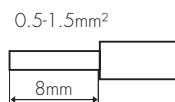
### LED Current Selection



### Emergency power Selection



## Wire Preparation

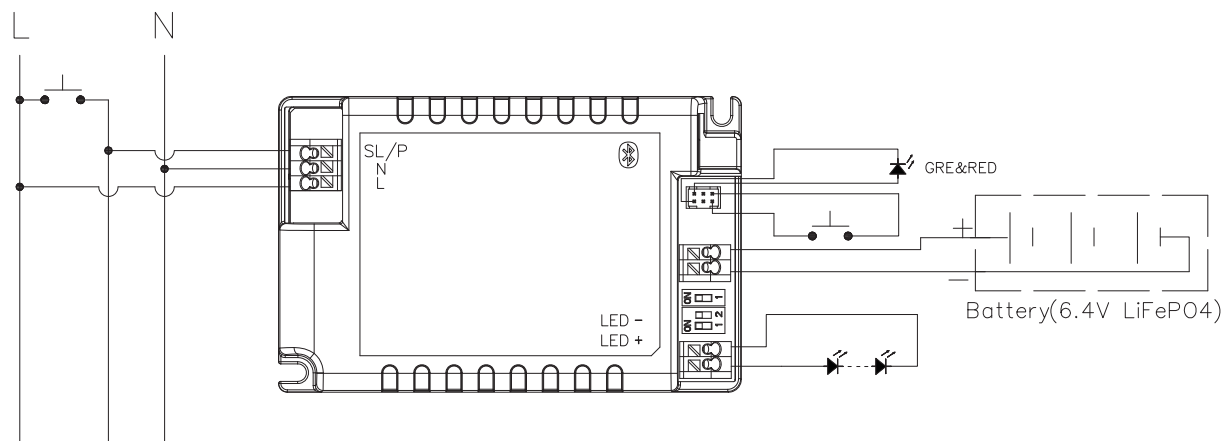


Solid or Stranded wire type 0.5 - 1.5mm<sup>2</sup>

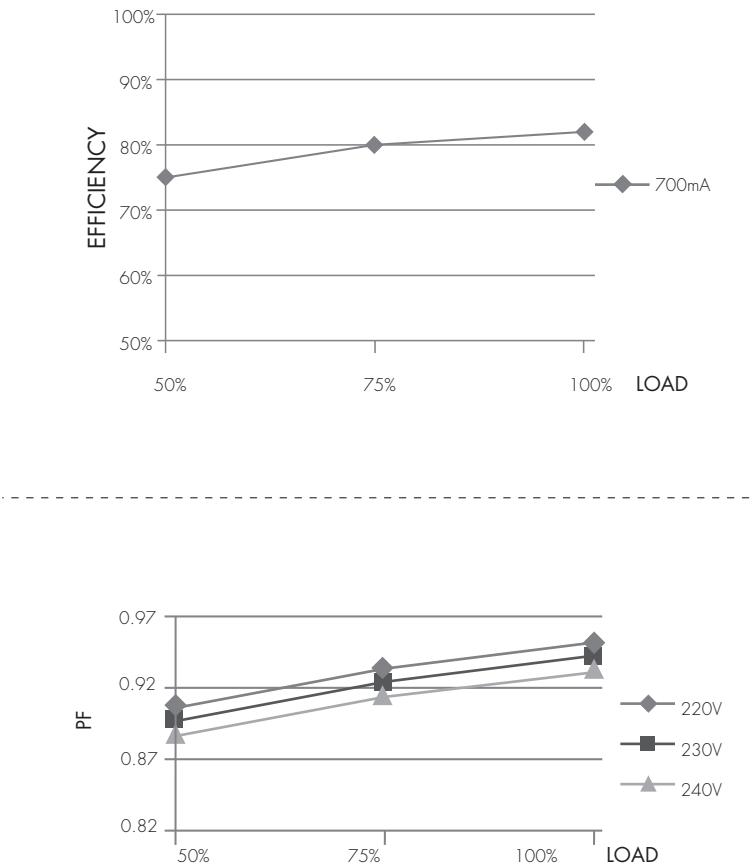
To make or release the wire from the terminal, use a screwdriver to push down the button.

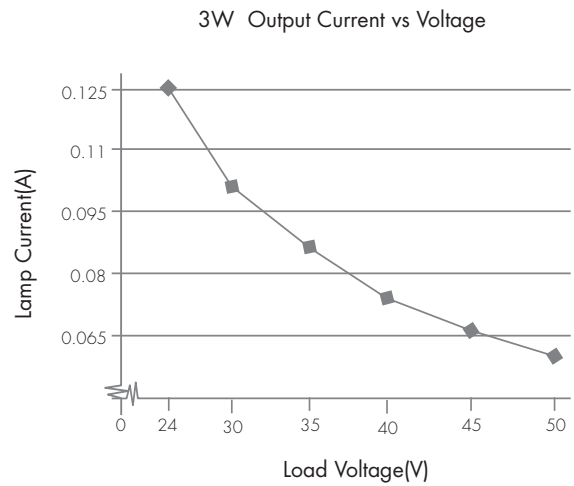
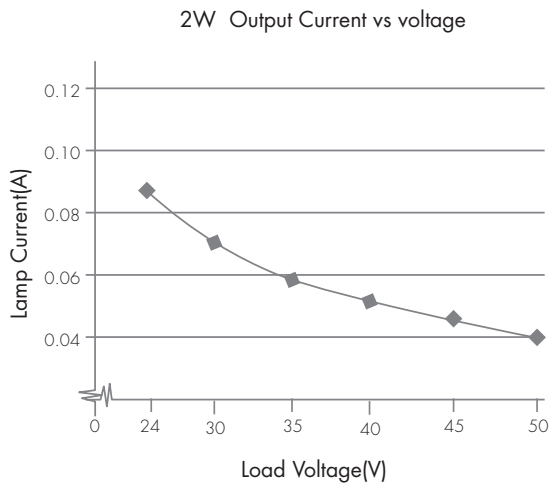
# Wiring Diagram

220-240Vac  
50/60HZ

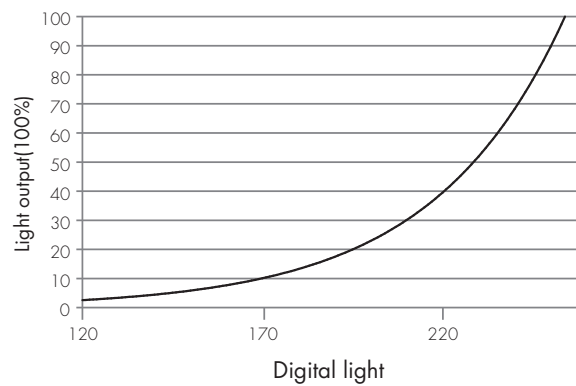


# Performance Characteristics

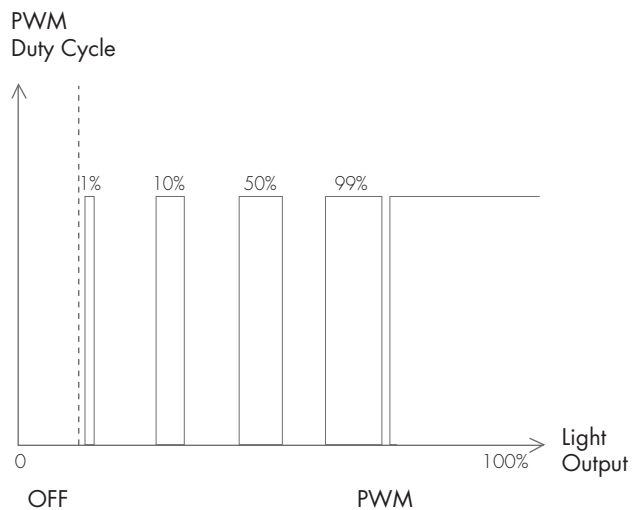




## Dimming Characteristics



## Dimming Profile



| Dimming range | Dimming technique |
|---------------|-------------------|
| 0%            | OFF               |
| 1-100%        | PWM               |

## Operating Modes & Self-Test Functions

### Normal Mode

It is the mode in which mains supply is available, with the battery charged or charging. In this mode, HBEM01 ECO is a combined Bluetooth LED driver, with ability to create scenes and controllable by motion sensor, Push switch 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, HBEM01 ECO is unable to be controlled by motion sensor, Push switch and app. However, some emergency parameters can still be configured via the app, such as time scheduled for self-test, duration for extended emergency mode etc.

### Rest Mode

It is the mode in which the luminaire is 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 luminaire will be turned off automatically and HBEM01 ECO is powered by the battery. If the luminaire is forced to turn on in this mode, HBEM01 ECO will then be adjusted to emergency mode. When mains supply is recovered, HBEM01 ECO will return to normal mode.

### Inhibit Mode

It is the mode in which HBEM01 ECO is powered from the mains but prevented from going into emergency mode in the event of mains failure. Please enter this mode only in special applications whereby emergency function is not needed, such as when electrician needs to cut off power supply when doing examination and maintenance work for HBEM01 ECO.

### Extended Emergency Mode

It is the mode in which the control gear continues to operate the lamp in the same way as in emergency mode for the programmed prolong time after the restoration of the mains supply. When this mode is enabled, HBEM01 ECO will remain in emergency mode even when mains supply is recovered. In this mode, the user has to set the time extended for emergency mode; when the time extended elapses, HBEM01 ECO will then return to normal mode.

### Self test (Monthly)

HBEM01 ECO carries out routine test on emergency lighting based on pre-programmed time via the app or after receiving manual commands from the app. 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.

### Self test (Annually)

The test is carried out mainly to check the battery level. The user has to make sure that the battery for HBEM01 ECO is fully charged before HBEM01 ECO carries out annual test. Also, the battery lifetime statistics will be analysed and displayed on a chart basis.

## Battery Installation and Protection

### Battery Pack Options

|                             |                                                                                   |                                                                                     |
|-----------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Picture                     |  |  |
| LED indicator & Test switch |  |  |
| Battery pack                | BPC83                                                                             | BPC84                                                                               |
| Battery Type                | LiFePO4                                                                           | LiFePO4                                                                             |
| Discharge current           | 6.4V, 3.6AH                                                                       | 6.4V, 3.6AH                                                                         |
| Size (mm)                   | 105*53*27.5                                                                       | 174.8*26.5*29                                                                       |
| Battery charge current      | 0 - 500mA                                                                         | 0 - 500mA                                                                           |
| Max. load/ Discharge hour   | 0.4A, 2W@24 - 50V / 3H<br>0.56A, 3W@24 - 50V / 3H                                 | 0.4A, 2W@24 - 50V / 3H<br>0.56A, 3W@24 - 50V / 3H                                   |
| Recharge Time               | 24H                                                                               | 24H                                                                                 |

- Please kindly charge battery for 24 hours before using.
- Do not short-circuit the battery pack.
- Over-discharge can damage the battery. Please avoid deep discharge and recharge promptly after emergency use.
- Do not connect the battery before installing the product. Once the battery is connected, ensure the HBEM01 ECO product 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).

### Battery-Powered Bluetooth Standby

(Only applicable to Bluetooth Emergency Drivers)

To support emergency system logging and monitoring, Bluetooth-enabled emergency drivers are designed to allow the battery to directly power the Bluetooth module when mains power is not present.

During this state, the Bluetooth module typically draws ~20mA from the battery.

Please take this standby consumption into account when assessing battery life in long-term mains-disconnected scenarios.

### Installation Warning for Unstable Mains Supply

(Important for on-site building installations)

During building installations, mains supply may not be available on a continuous 24-hour basis. If the battery is connected under such conditions, it may lead to uncontrolled and excessive charge/discharge cycles, which significantly shorten the design life of the battery.

To prevent premature battery wear, ensure the battery remains disconnected until a stable 24-hour mains power supply is available. Please refer to the corresponding emergency driver datasheets for behavior under intermittent power supply.

This warning must be clearly communicated to the installation staff and electricians to ensure proper commissioning practices on-site.

## LED Diagnostics

| Indicator Colour                                | Status                          | Meaning                                                                                                                                        |
|-------------------------------------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>GREEN SOLID</b>                              | Device OK                       | All OK, AC power is present. Battery is connected & charging                                                                                   |
| <b>GREEN FAST FLASH</b><br>(0.1s ON, 0.1s OFF)  | Monthly test/Functionality test | AC power is present. Monthly test in progress                                                                                                  |
| <b>GREEN VERY SLOW FLASH</b><br>(1s ON, 1s OFF) | Annual test/Duration test       | Annual test are being carried out                                                                                                              |
| <b>RED SOLID</b>                                | 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 |
| <b>RED SLOW FLASH</b><br>(1s ON, 1s OFF)        | Battery fault                   | Battery failure (Battery failed the duration or functional test, battery appears to be defective, battery has incorrect voltage).              |
| <b>RED / GREEN OFF</b>                          | 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

Note: Before powering on, please plug in the sensor head and then plug in the battery, otherwise the sensor is disabled.

Remedy: Only after the APP is reset and re-connected to the network can the sensor head be re-identified.

## Additional Information / Documents

1. To learn more about detailed product features/functions, please kindly refer to [https://hytronik.com/product/HBEM01\\_ECO](https://hytronik.com/product/HBEM01_ECO)
2. Regarding precautions for Bluetooth product installation and operation, please kindly refer to <https://hytronik.com/service/downloads> (Bluetooth Products Precautions for Product Installation and Operation)
3. Regarding precautions for Emergency LifePO4 Batteries, please kindly refer to <https://hytronik.com/service/downloads> (LiFePO4 Battery Precautions and Usage)
4. Data sheet is subject to change without notice. Please always refer to the most recent release on <https://hytronik.com/products/emergency-led-drivers-inverters>
5. Regarding Hytronik standard guarantee policy, please kindly refer to <https://hytronik.com/service/downloads> (Guarantee Conditions document)