

HBEM06 ECO

Emergency Sign Maintained Max.4w | Constant Current | Battery protection

HYTRONIK[®]
SENSORS & LIGHTING CONTROL



Benefits

Compact: Max. 4W Main Power EM Power Supply

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-ECO>



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. 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 control below



Monthly / Annually Auto Emergency Testing



Open-Circuit Protection



Over load Protection



Short-circuit Protection



Usage Data & Report History



nRF52840

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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
- Abnormal protection 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

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)	15-35m
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

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Specifications

Technical	
Product weight	70.0 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

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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 $= 16 / (P_n / 230)$. 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.

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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 LxWxH(mm)
BPC86	LiFePO4	110x20x21.5
BPC87	LiFePO4	110x27.5x29.5
BPC88	LiFePO4	110x70x21

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, 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:

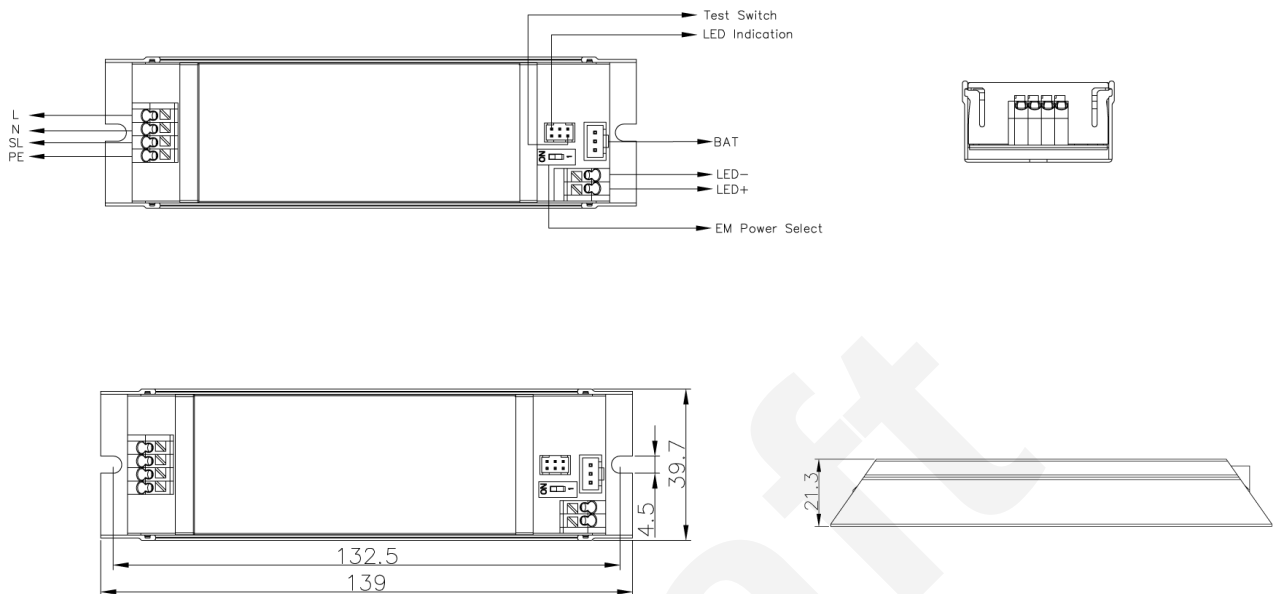
- Please charge the battery for 24 hours before first use.
- Do not short-circuit the battery pack or output load. Frequent short-circuit conditions may trigger battery protection and affect normal operation.
- Over-discharge may damage the battery. Avoid deep discharge and recharge promptly after emergency 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).

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Technical Drawing



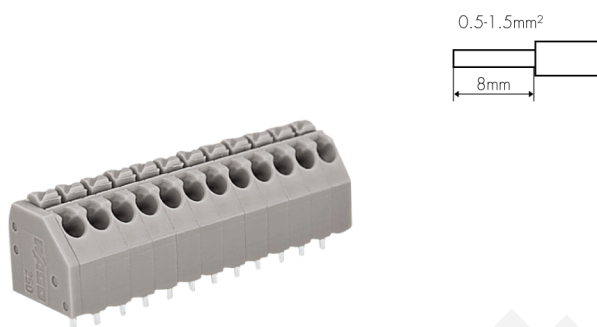
Application Example



HBEM06 ECO

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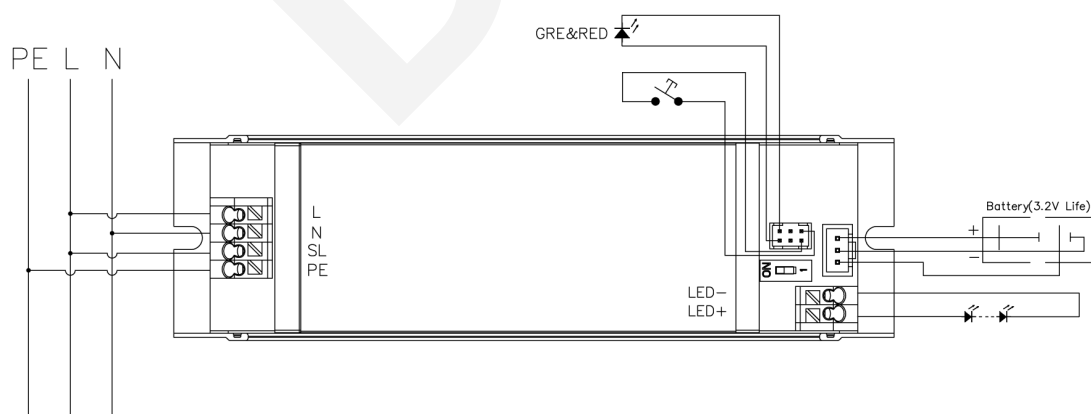
Wire Preparation



Solid or Stranded wire type 0.5 - 1.5mm² To make or release the wire from the terminal, use a screwdriver to push down the button.

Wiring Diagram

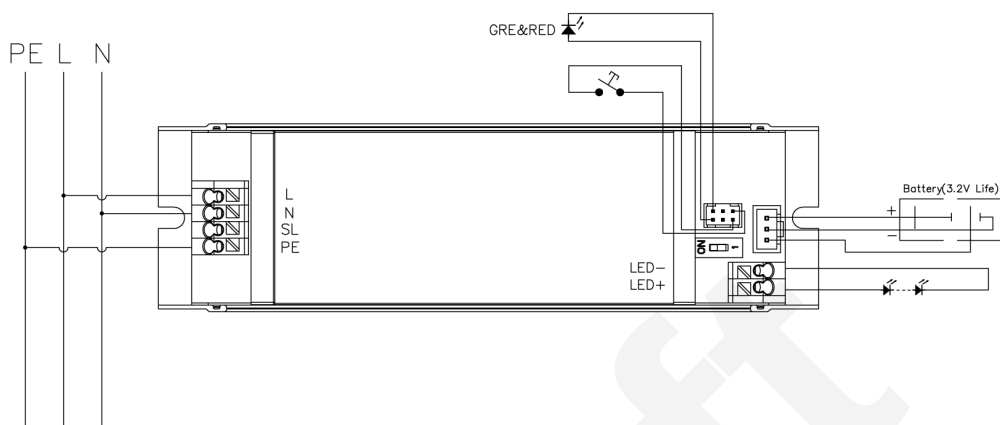
SL Connection – Maintained model



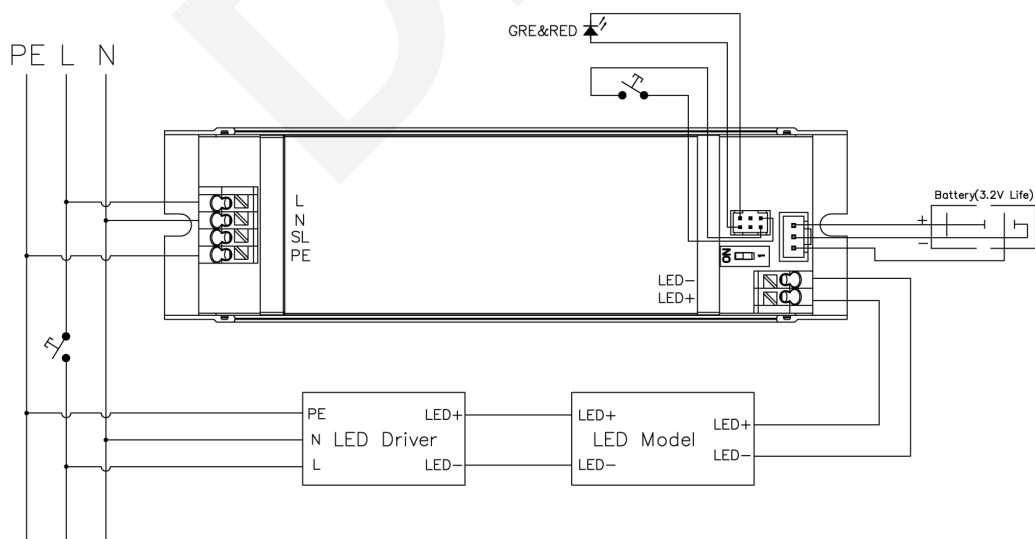
HBEM06 ECO

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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 qualified 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). 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.

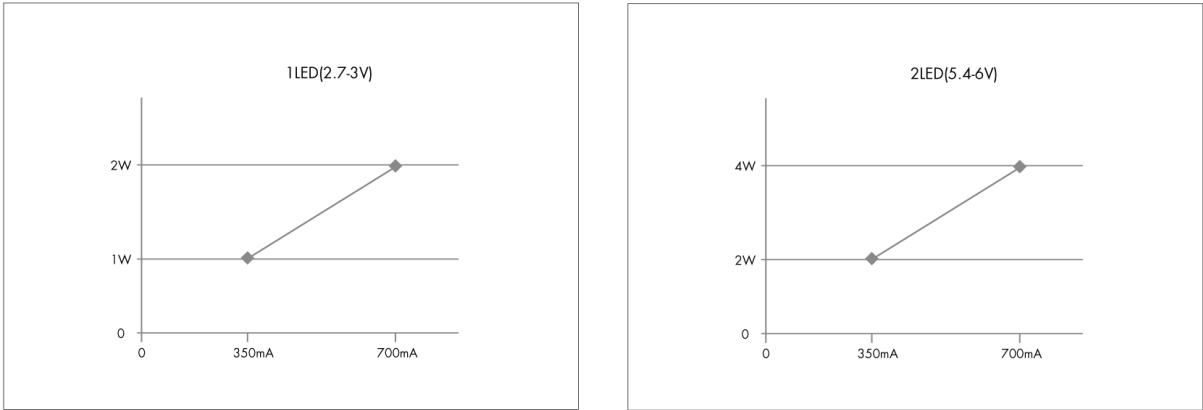
C. Wiring Diagram Notes

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



Dimming Interface Operation Notes

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) Double press	• Disable • Function test • Duration test • Erminated test
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

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.

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Options

Included Accessories



LED indicator | Used to display the status of the product



Test switch | For checking the device function

Draft

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

Device-specific Koolmesh App features

- | | |
|--|---|
|  4 push inputs supported |  Motion sensor range test |
|  Adjustable motion & static sensitivity & adjustable sensing distance |  Motion sensor trigger diagnosis |
|  Compatible with EnOcean kinetic switches |  Partition control with HBT8200P |
|  Detailed motion sensor settings |  Push scene cycling |
|  Dusk/Dawn photocell (twilight function) |  Push switch configuration |
|  Dynamic daylight harvest auto-configuration |  Tri-level luminaire control |
|  Mesh OTA & remote commissioning (under development) | |

Bluetooth Mesh Network Installation & Device Access Range

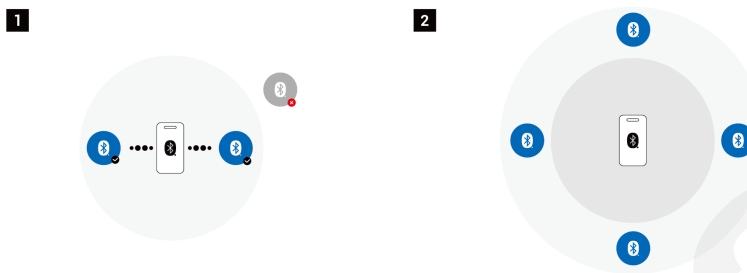
1. Phone/Pad to Device Range (Bluetooth Connection)

During installation and commissioning, the device is added via the App over Bluetooth. The installer must stay within the effective Bluetooth range of the target device to ensure successful addition. The Bluetooth transmission range varies by product — refer to the “Specification” section of this datasheet for details.

2. Device to Device Range (Mesh Network Communication)

Once devices have been successfully added via the App, they automatically communicate with each other through the wireless mesh network. After the mesh network is established, the user can access and control any device in the network as long as they are within the communication range of at least one mesh node.

Note: a. The Bluetooth transmission range for each product varies. Please proceed to the "Specification" section of this datasheet to view more details. b. Performance is based on testing with individual devices in open, unobstructed environments without wireless interference. Actual communication range may vary depending on product type, obstacles, environmental conditions, and luminaire structure.



Bluetooth Network Components



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 Koolmesh 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.



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.



Usage Data & Report History

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

Check out for further explanation of features

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