HCD038/BT/RGBW

Bluetooth DALI RGBW Converter | Integrated 30 mA PSU | Attachable sensor heads

Benefits

Compact: Enabling direct Bluetooth to DALI conversion

Intelligent: Enabling RGBW dimming and colour control

Wireless: Allowing fast parameter setup and commissioning via app

Applications

Retail & Commercial Lighting

Hospitality & Restaurants

Exhibition & Gallery Lighting

Check Out the Complete System Solution on the Website:
https://www.hytronik.com/product/HCD038-BT-RGBW

Product Description

HCD038/BT/RGBW is a Bluetooth-enabled DALI dimming host designed to provide smart sensing and flexible lighting control for luminaires. It works with plug-and-play sensor heads to enable functions such as on/off control, detection sensitivity adjustment, hold time setting, and lux threshold configuration. The device supports DALI RGBW drivers for precise dimming and colour tuning. All parameters and commissioning can be easily configured via the Koolmesh app. With an integrated 30 mA DALI power supply, it provides stable power for the DALI control bus, simplifying system design and installation.

Functions and Features

See additional details at the end of datasheet

Built-in DALI PSU

DT6/DT8 Lighting Control

Daylight Harvest

Human Centric Lighting (HCL)

Koolmesh - See bluetooth contol below

Live Energy & Diagnostic Data Part 252 / 253

Luminaire Asset Data Part 251

Push-Button Input

RGBW, xyY and DUV Color light Settings

RJ12 Connection

Tri-level Dimming

Tunable White Control

nRF52840

Specifications

Main Capabilities	
Dimming (Output) Interface	DALI
Push Button Input	2

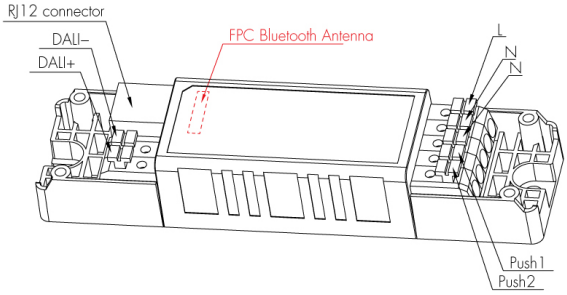
Electrical Data	
Bluetooth Platform	Nordic nRF52840
Bluetooth frequency	2.4 GHz - 2.483 GHz
Bluetooth range (Phone to Device)	15-40m
Bluetooth range (Device to Device)	15-40m
Bluetooth transmit power	8 dBm
Bluetooth system	Koolmesh
Operating voltage range	220-240 VAC 50/60 Hz
Stand-by power (Psb)	<1W
Warming-up	20 s
DALI bus maximum rated current (I_n max)	80 mA
DALI bus nominal DC voltage range (Un)	16 V
DALI bus nominal current (I guaranteed)	30 mA
DALI Bus Current Consumption	3.0 mA

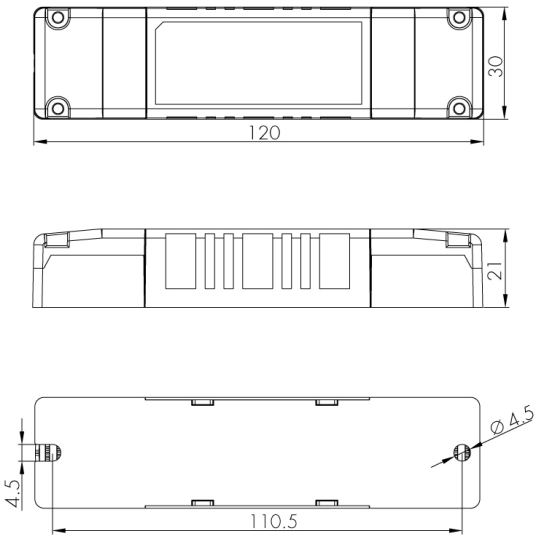
Specifications

Technical	
Product weight	46.0 g
Product height	21.0 mm
Product length	120.0 mm
Product width	30.0 mm
Ambient temperature	-20 ~ +50 °C
Storage temperature	-40 ~ +70 °C
Humidity max	10 ~ 90%
Case Temp.max	60.0 °C
IP Rate	IP20

Standard	
EMC	EN 55015, EN61000-3-2/-3-3, EN 61547
LVD	EN 60669-1, EN 60669-2-1
RED	EN 300328, EN301489-1, EN 301489-1/-17, EN 50663

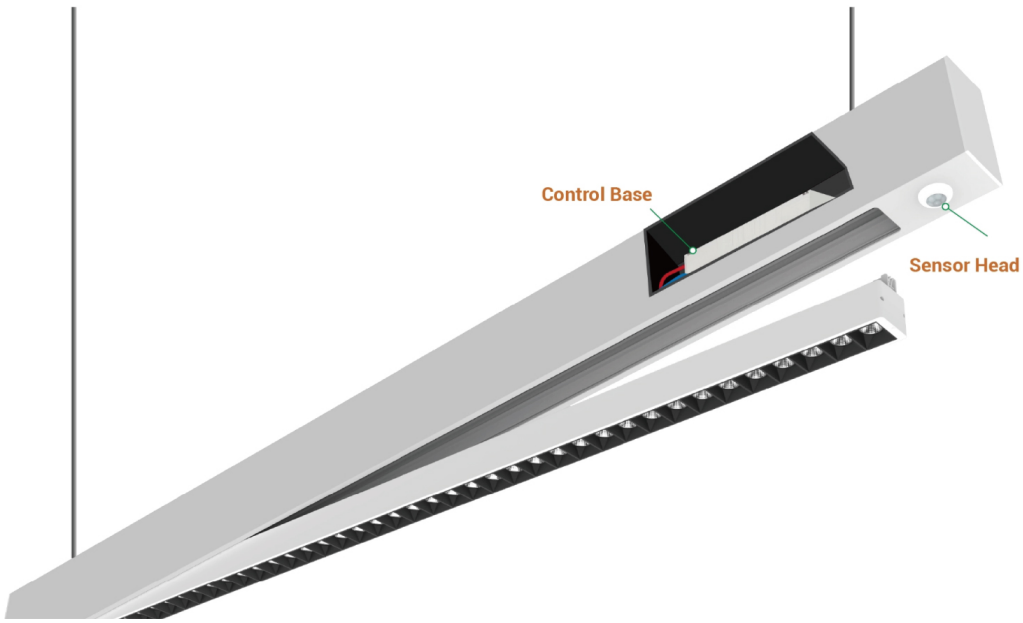
Technical Drawing





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.

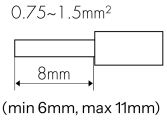
Application Example



⚠ 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.
5. Push inputs are mains-voltage inputs and must only be connected to mains-rated switches.
6. Do not connect mains voltage (L/N) to the DALI terminals.
7. For polarity-marked DALI terminals (DA+/DA−), observe correct DALI polarity.
8. For non-polarity-marked DALI terminals (DA/DA), DALI wiring is polarity-free.

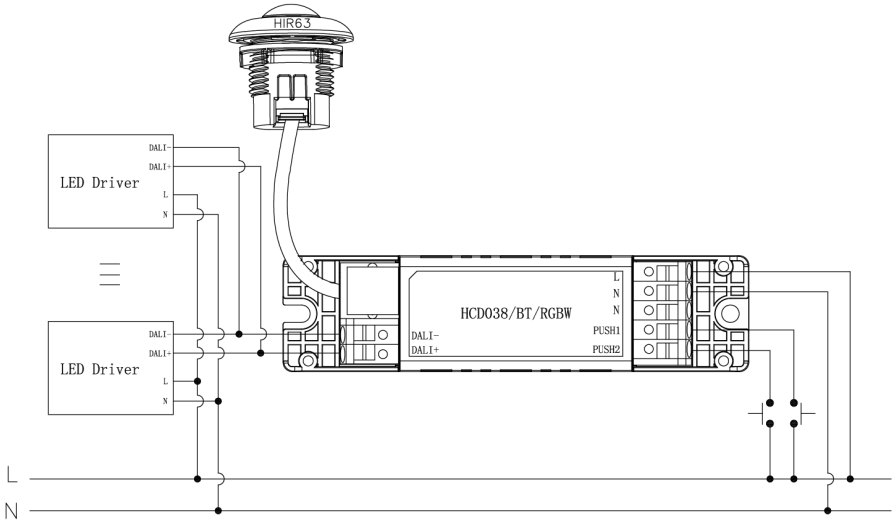
Wire Preparation



(min 6mm, max 11mm)

To make or release the wire from the terminal, use a screwdriver to push down the button. 1. 200 metres (total) max. for 1mm² CSA (Ta = 50°C) 2. 300 metres (total) max. for 1.5mm² CSA (Ta = 50°C)

Wiring Diagram



Commissioning Instructions and Precautions

A. Installation Preparations

1. To ensure better detection, keep the sensor lens part beyond the surface of the light fixture.

2. We recommend the mounting distance between sensor to sensor should be more than 2m to prevent sensors from false-triggering.

B. Sensor head Precautions

1. The control base can be used only after it is connected to the sensor head via RJ12 connection.

2. The push function and commission type are determined by the included sensor head.

C. DALI Bus Current Notes

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

D. Bluetooth Range Precautions

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

E. App Feature Precautions

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

F. Product Default Setting

1. Controller Unit Default Settings:

Dimming method: Logarithm, DALI dimming mode: standard DALI Dimming, Brightness level range: 1%-100%.

2. Sensor setting:

Note: The controller unit does not include occupancy detection by default. Sensor-related functions and settings are only available after connecting a compatible sensor head through the RJ12 interface. The default sensor parameters below will be applied once the sensor head is connected.

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

3. Push switch setting:

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

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

https://hytronik.com/service/downloads

Switch Input Function Configuration

The 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.

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
Fire Alarm Function	Refer to https://support.koolmesh.com/	• Able to connect the Fire Alarm system. • 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.
ON OFF Switch (Latching Switch)	/	• Upgrade a standard on/off control to Bluetooth control, enabling one latching switch to control multiple luminaires or zones, reducing wiring and switch count.
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
Sensor-Link	/	•Hold time/scene •Stand-by time/scene •Upgrade a normal on/off motion sensor to a Bluetooth-controlled motion sensor

Options

Compatible products (for full functionality)

HIR05

PIR Lowbay | Circadian Rhythm | RJ12 connector to control body
www.hytronik.com/product/HIR05

HIR07

PIR Lowbay | Photocell Advance | RJ12 connector to control unit
www.hytronik.com/product/HIR07

HIR63

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

HIR63/R

PIR Midbay Sensor Head | RJ12 connector | Conduit Screws
www.hytronik.com/product/HIR63-R

SAM88

HF Low-bay | Tri-level dimming | RJ12 connector to control body
www.hytronik.com/product/SAM88

Koolmesh - Operating guide

Bluetooth

Smartphone(ios) Smartphone (Android) iPad Web

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

Shared Koolmesh App Features

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

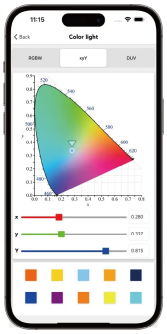
Device-specific Koolmesh App features

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

RGBW Color light Settings via Koolmesh app

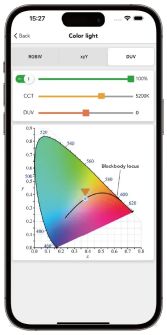
RGBW

You can adjust the color of the luminaire by dragging the RGBW slider or moving the position on the color wheel. In addition to adjusting the color, you can also fine-tune the saturation of the luminaire as needed. This can usually be done by dragging the saturation bar.



xyY

x-coordinate and y-coordinate: These two values define the position of the luminaire on the CIE 1931 chromaticity diagram, thus determining the color of the luminaire. You can adjust the color by dragging the color slider or by sliding directly on the coordinate axis. Y value: This value represents the brightness of the luminaire. You can adjust it by dragging the brightness



DUV

You can adjust the brightness and color temperature of the luminaire by dragging the brightness and color temperature sliders. You can adjust the color by dragging the sliders or adjusting the DUV curve. Positive values usually mean the luminaire hue tends to be warmer, while negative values tend to be cooler.

Application Reference

1. Art Galleries: Adjusting DUV ensures accurate color reproduction of exhibits, avoiding distortions caused by light color deviation.
2. Photo Studios: Adjusting DUV helps ensure the true color rendering of exhibits or photographed objects.
3. Office Spaces: Adjusting DUV provides a comfortable lighting environment, enhancing employee productivity.

Note:
Non-Bridgelux luminaires only support RGBW and xyY standard color tuning and do not provide a DUV interface. Due to differences in color mixing methods and color parameter definitions among LED manufacturers, deviations in RGBW color tuning may occur. For further technical information or application-specific tuning support, please contact us.

Bluetooth Mesh Network Installation & Device Access Range

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

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

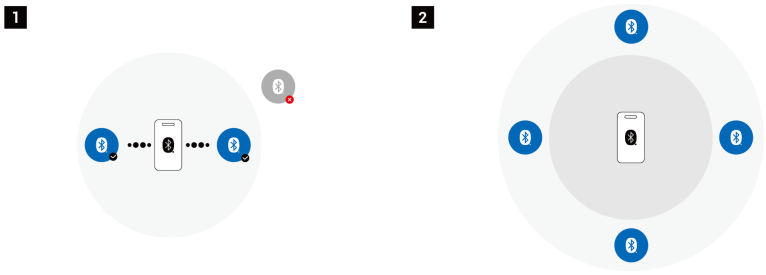
2. Device to Device Range (Mesh Network Communication)

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

Note:

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

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



Bluetooth Network Components

HBGW02

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

HBGW02/D

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

HBGW03/R

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

HBKS01/W

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

HBKS01D/W

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

HBKS02/W

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

HBKS02D/W

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

HBKS03/W

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

HBLM01

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

HPAD-TSJASE1

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

Functions and Features

Built-in DALI PSU

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

DT6 / DT8 Lighting Control

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

Daylight Harvest

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

Human Centric Lighting (HCL)

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

Live Energy & Diagnostic Data Part 252 / 253

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

Luminaire Asset Data Part 251

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

Push Button Input

This product integrates push-button (momentary switch) inputs, allowing external potential-free switches to trigger basic lighting control functions. Each input can be configured for actions such as on/off switching, dimming or scene recall, providing flexible manual control and user interaction within the lighting system. The push-button inputs operate independently of the sensor's automatic functions, enabling seamless coexistence of manual and sensor-based lighting control.

RGBW, xyY and DUV Color light Settings

The product supports RGBW color control together with xyY color coordinates and DUV adjustment, enabling flexible color mixing, precise chromaticity control, and fine tuning of white light appearance. This allows accurate and consistent color performance to meet various professional lighting application requirements.

Functions and Features

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.

Tri-level Dimming

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

Tunable White Control

Tunable White Control allows smooth adjustment of light colour temperature to create comfortable and adaptable lighting environments. By enabling dynamic white light changes throughout the day, it supports visual comfort and user wellbeing while helping improve energy efficiency in artificially lit spaces. With a simple and decentralised control approach, it provides a flexible solution for applications such as offices, schools, and healthcare environments where adjustable white light is required.

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