Tunable White LED Driver + Sensor Head with Bluetooth® 5.0 SIG Mesh

HHC2045 HHC2050L

Constant Current

HYTRONIK®

CB CE IP20 SELV emc

Product Description

HHC2045 (max. 45W) and HHC2050L (max. 50W) are Tunable White LED drivers which are specially designed to work with Hytronik Human Centric sensors. By simply connecting Bluetooth sensor head HBT01/HBT02/HIR13/HIR16 to the driver, it allows for motion detection and Bluetooth mesh control. Once the sensor head is connected to the driver, COM inputs are then disabled, and sensor antenna will take control. With Bluetooth wireless mesh networking, it makes communication between luminaires much easier without time-consuming hardwiring, which eventually saves costs for projects. Meanwhile, simple device setup and commissioning can be done via Koolmesh™ app.

HHC2045

HHC2050L

App Features

- Quick setup mode & advanced setup mode
- Tri-level control
- Daylight harvest
- Circadian rhythm (Human centric lighting)
- Floorplan feature to simplify project planning
- Web app/platform for dedicated project management
- Koolmesh Pro iPad version for on-site configuration
- Grouping luminaires via mesh network
- Scenes
- Dusk/Dawn photocell (Twilight function)
- Push switch configuration
- Schedule to run scenes based on time and date
- Astro timer (sunrise and sunset)
- Staircase function (master & slave)
- Internet-of-Things (IoT) featured
- Device firmware update over-the-air (OTA)
- Device social relations check
- Bulk commissioning (copy and paste settings)
- Dynamic daylight harvest auto-adaptation
- Power-on status (memory against power loss)
- Offline commissioning
- Different permission levels via authority management
- Network sharing via QR code or keycode
- Remote control via gateway support HBGW01
- Interoperability with Hytronik Bluetooth product portfolio
- Compatible with EnOcean switch EWSSB/EWSDB
- Continuous development in progress…

Hardware Features

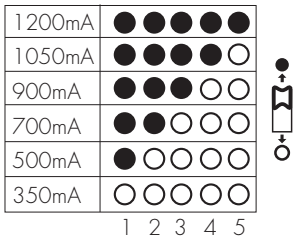
- Switch-Dim
- COM inputs for dimming and colour tuning via DALI broadcast
- Plug'n'Play for flexible installation and cost saving assemble
- 4 types of optional sensor heads available
- Photocell Advance
- Insulated terminal cover with cord restraint (for HHC2045)
- Standby power <0.5W
- Active PFC design
- Linear dimming
- Over-temperature Protection
- Short-circuit Protection
- Overload Protection
- 5-year warranty, designed for long lifetime up to 50,000 hours

EnOcean
Self-powered IoT

Fully support
EnOcean switch
EWSSB/EWSDB

Current Output Configuration

HHC2045



⚠ Warning: Please make sure the correct current is selected before starting the driver!

HHC2050L

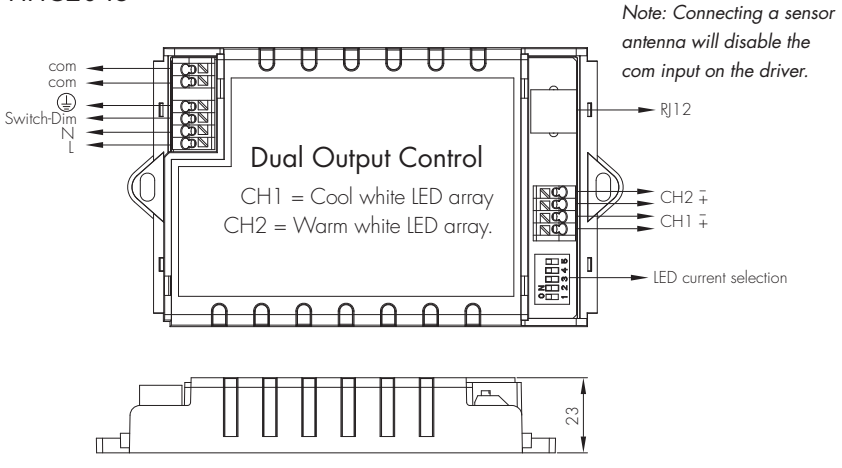
Single current 1.05A, can be customized.

Technical Specifications

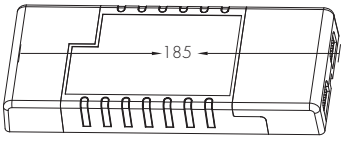
Input	Mains Voltage	220~240VAC 50/60Hz
	Mains Current	0.22~0.2A(HHC2045); 0.3-0.25A(HHC2050L)
	Power Factor	0.95
	Max. Efficiency	85%
	Dielectric Strength	Input→Output : 3000VAC
	Leakage Current	< 0.25mA
Output	Power/Current/ Voltage Range (HHC2045)	20W/350mA/10~56V 28W/500mA/10~56V 39W/700mA/10~56V 45W/900mA/10~50V 42W/1050mA/10~40V 41W/1200mA/10~34V
	Power/Current/ Voltage	50W/1.05A/12-48V (HHC2050L, can be customized)
	Output power handling	Channel 1 (CH1) + Channel 2 (CH2) = 45W (HHC2045)/50W (HHC2050L) max.
	Output channel function	CH1 = Cool white CH2 = Warm White
	Ripple Current	<3%
	Uout Max.	75V(HHC2045); 70V(HHC2050L)
	Turn-on Time	< 0.5s
Environment	Operation Temp.	Ta: -20 ~ +50℃(HHC2050L), -20 ~ +45℃(HHC2045)
	Case Temp. (Max.)	80℃(HHC2050L), 85℃(HHC2045)
	IP Rating	IP20
Safety and EMC	EMC standard	EN55015, EN61547, EN61000-3-2, EN61000-3-3
	RED standard	EN300328, EN301489-1, EN301489-17
	Safety standard	EN61347-1,EN62493,EN61347-2-13
	Certifications	CB, CE , EMC, RCM

Mechanical Structure & Dimensions

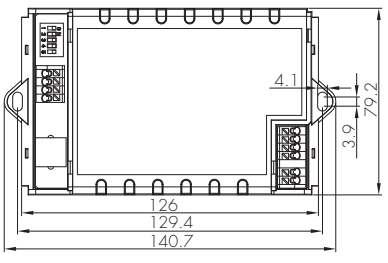
HHC2045



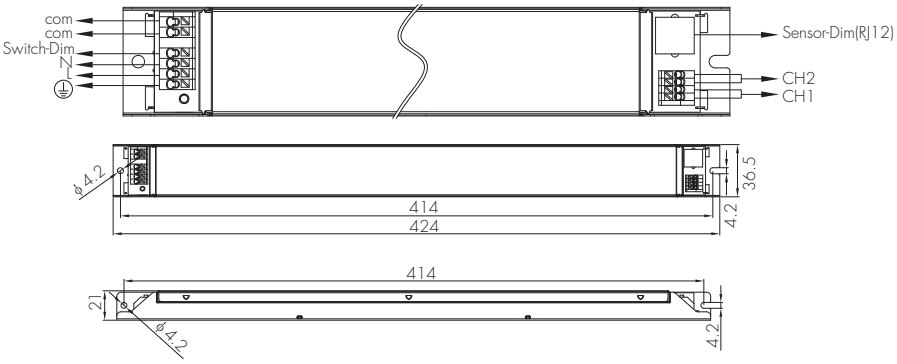
Note: Connecting a sensor antenna will disable the com input on the driver.



Additional cap for stand alone installation



HHC2050L



Note: Connecting a sensor antenna will disable the com input on the driver.

Dual Output Control

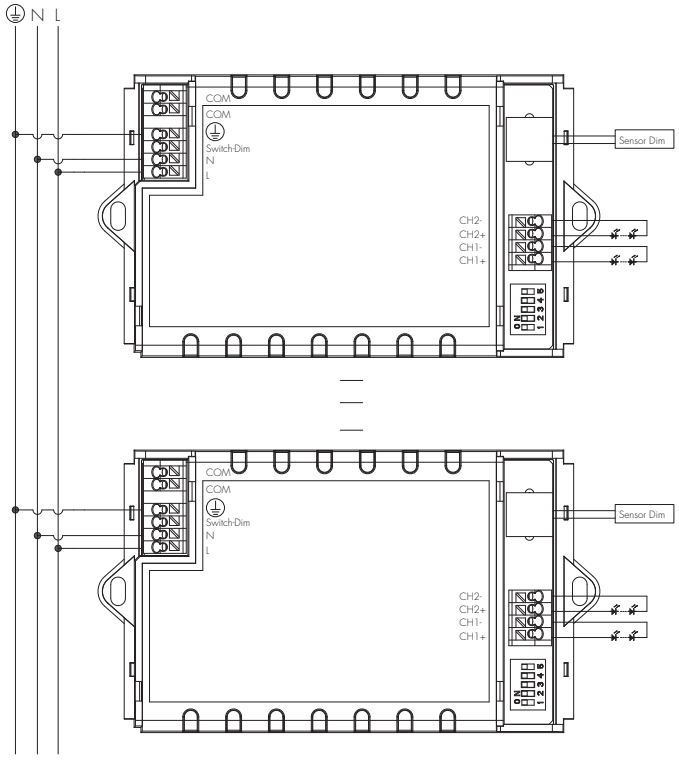
CH1 = Cool white LED array
CH2 = Warm white LED array.

* COM inputs: HHC2045 and HHC2050L are not standard DT8 tunable white driver, they are not DALI addressable but they can achieve colour tuning and dimming via DALI broadcast.

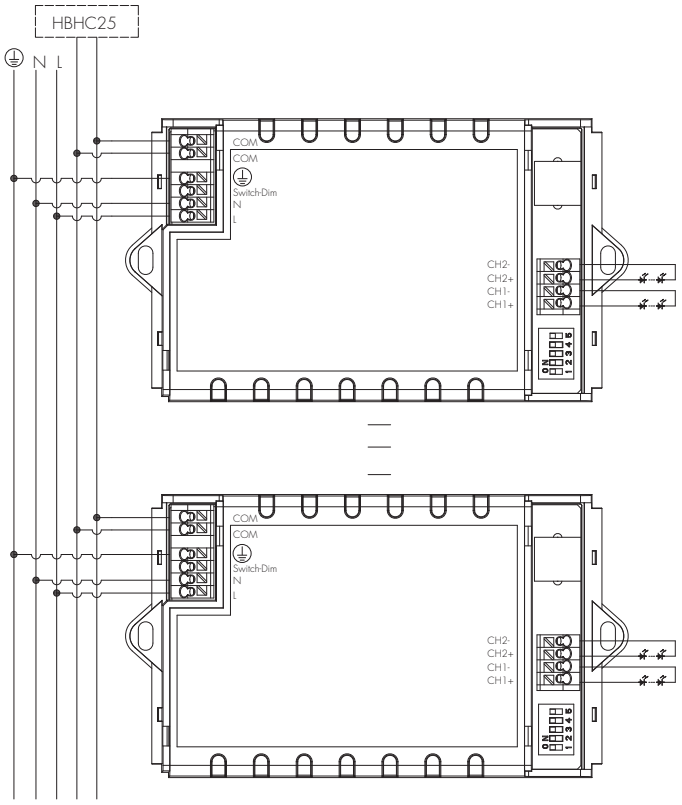
Wiring Diagram

HHC2045

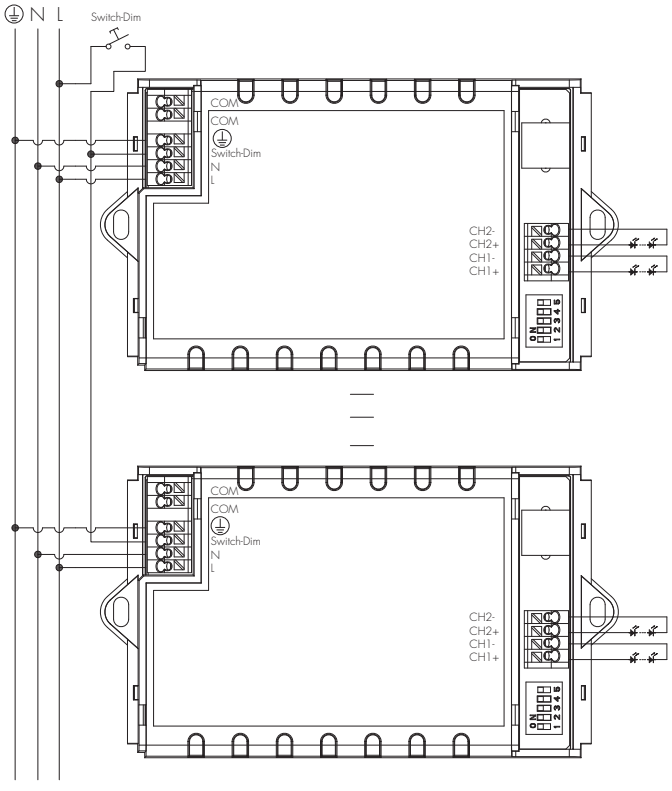
Antenna Connections (Sensor-Dim)



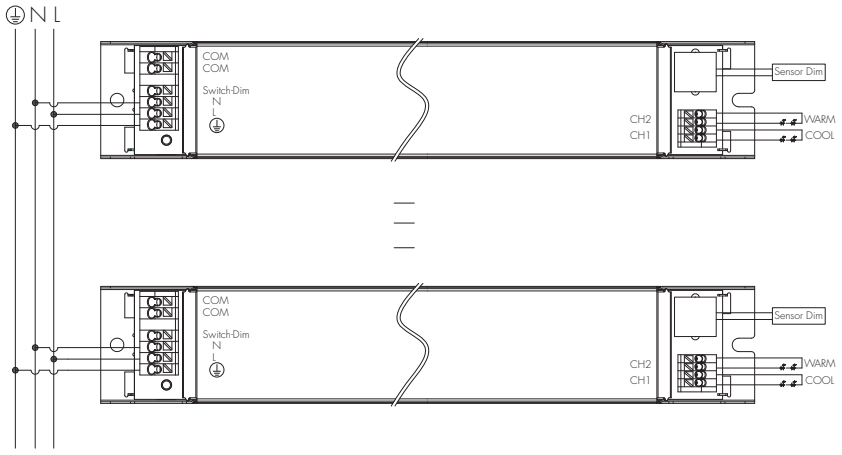
HHC2045 Com Connections (When used together with Hytronik DALI motion sensors)



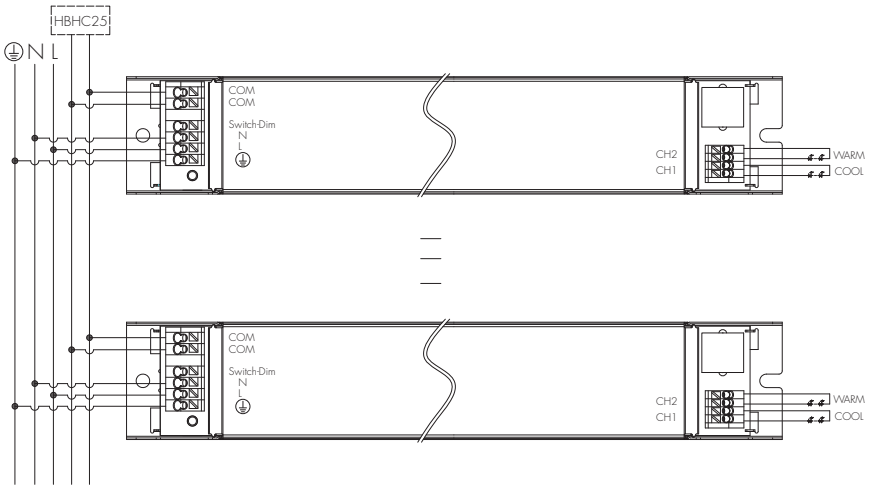
HHC2045 Switch-Dim Connections



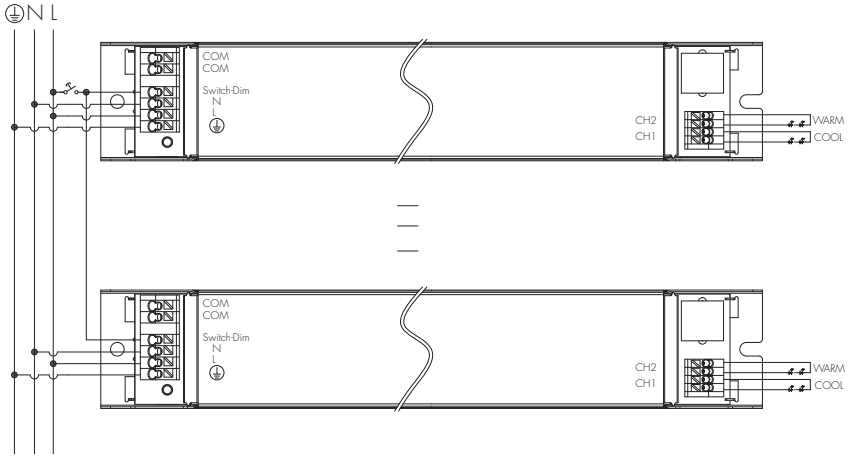
HHC2050L Antenna Connections (Sensor-Dim)



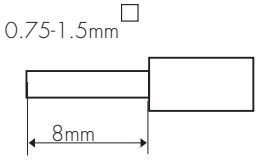
HHC2050L Com Connections (When used together with Hytronik DALI motion sensors)



HHC2050L Switch-Dim Connections



Wire Preparation



Solid or Stranded wire type 0.75 - 1.5mm².

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

Loading and In-rush Current

HHC2045 & HHC2050L

Inrush Current (Imax.)	53A
Pulse Time	36 μs

Circuit Breaker Information

Automatic circuit breaker type	B16A	B10A	B13A	B20A	B25A
HHC2045	43	27	35	54	67
HHC2050L	36	23	29	46	57

The data above is calculated according to the formula: Maximum Amount = 16/(Pn/230). In order to provide a more reliable reference in real application, the data have been revised to take 60% of the number calculated, i.e. 16/(Pn/230) x 60%. Please kindly take note that the calculation is based on ABB circuit breaker series S200. Actual values may differ due to different types of circuit breaker used and installation environment.

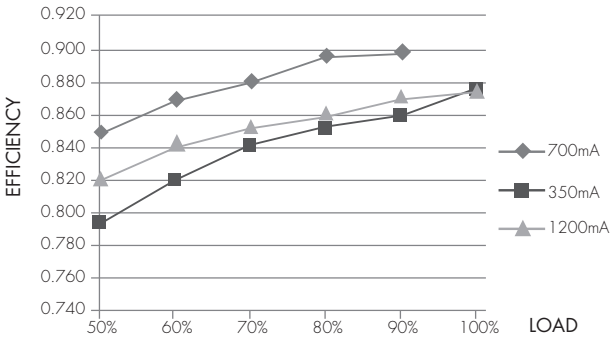
Load distribution

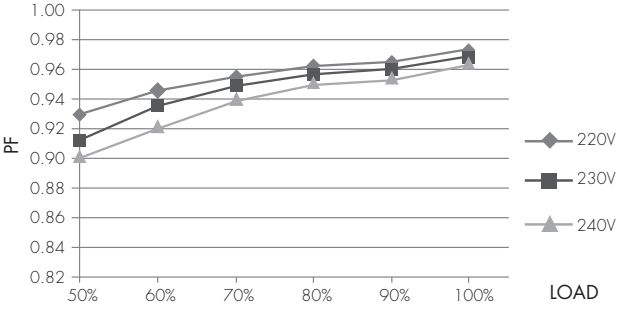
Each channel can supply the maximum load and white balance can be control led as such:

Model	Colour Temperature	Cool White	Neutral White	Warm White
HHC2045	Power Distribution	CH1=45W, CH2=0W	CH1=22.5W, CH2=22.5W	CH1=0W, CH2=45W
HHC2050L	Power Distribution	CH1=50W, CH2=0W	CH1=25W, CH2=25W	CH1=0W, CH2=50W

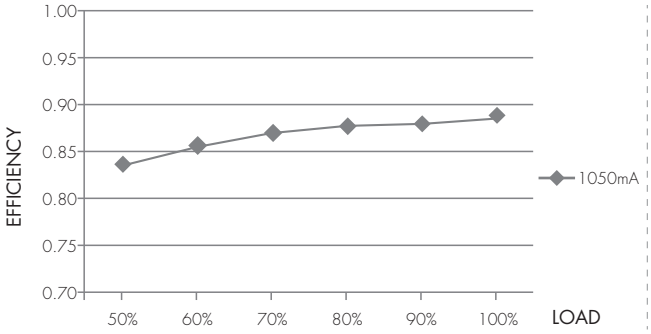
Performance Characteristics

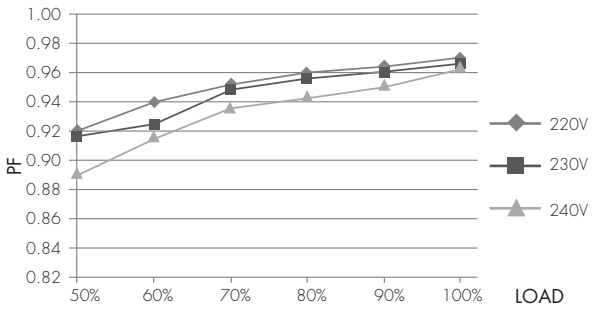
HHC2045



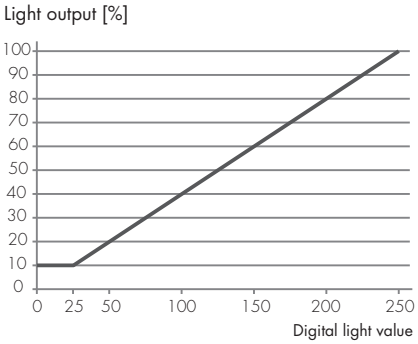


HHC2050L





Dimming Characteristics



Com Dimming Curve

Technical Specifications for Sensor Heads

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	Ta: -20°C ~ +55°C
Storage temperature	-20°C ~ +70°C
Relative humidity	0 ~ 90%
IP rating	IP20

HF Sensor Properties (HBT01)	
Sensor principle	High Frequency (microwave)
Operation frequency	5.8GHz +/- 75MHz
Transmission power	<0.2mW
Detection range*	Max installation height: 3m Max detection range: 8m (diameter)
Detection angle	30° ~ 150°

PIR Sensor Properties (HIR13 / HIR16)	
Sensor principle	PIR detection
Operation voltage	5VDC
Detection range *	HIR13 Max installation height: 15m (forklift) 12m (single person) Max detection range: 24m (diameter) HIR16 Max installation height: 15m (forklift) 12m (single person) Max detection range: 18m * 6m (L * W)
Detection angle	360°

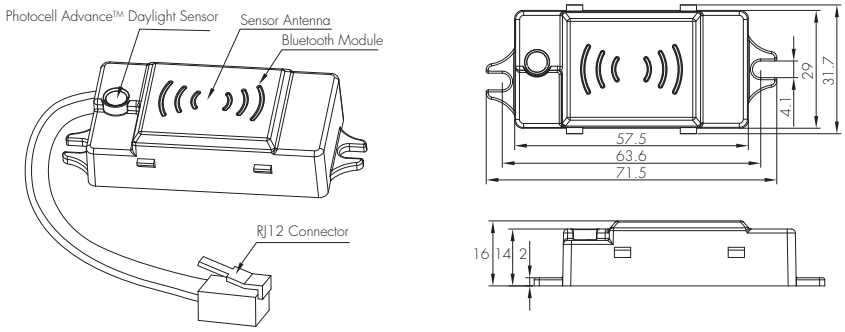
* The detection range is heavily influenced by sensor placement (angle) and different walking paces. It may be reduced under certain conditions.

PIR & microwave sensor heads

The range of PIR and microwave sensor heads below with Bluetooth modules built in 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.

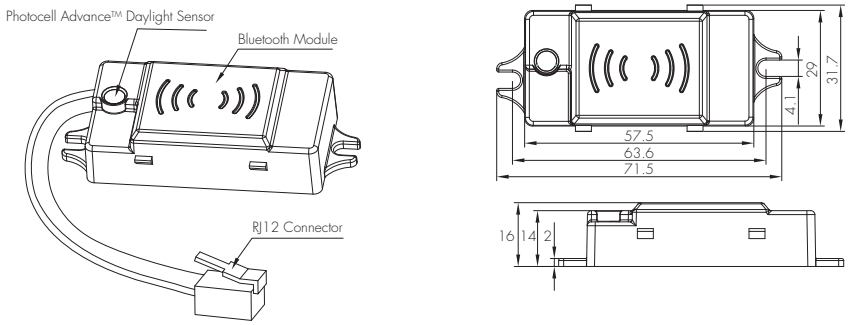
A. HBT01

Surface mounting
Photocell Advance™
The cable length is around 30cm.



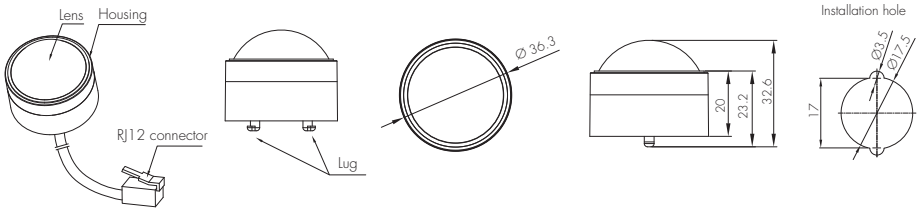
B. HBT02

Surface mounting
Without motion sensor
Photocell Advance™
The cable length is around 30cm.



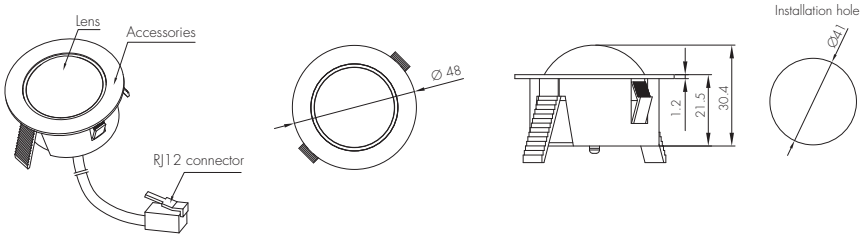
C. HIR13/S

Surface mounting
For highbay application
Lens part IP42 (IP64 can be made upon request)
The cable length is around 30cm.



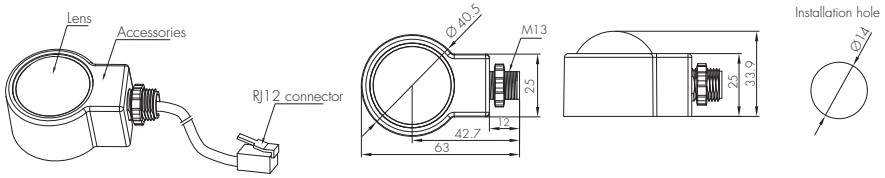
D. HIR13/F

Flush mounting
For highbay application
Lens part IP42 (IP64 can be made upon request)
The cable length is around 30cm.



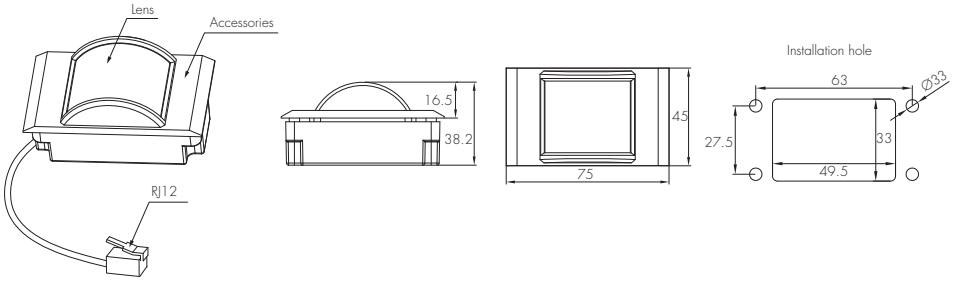
E. HIR13/C

Screw to the luminaire by conduit
For highbay application
Lens part IP42 (IP64 can be made upon request)
The cable length is around 30cm.



F. HIR16

PIR sensor head
For highbay application
IP65 (lens part)
The cable length is around 30cm.

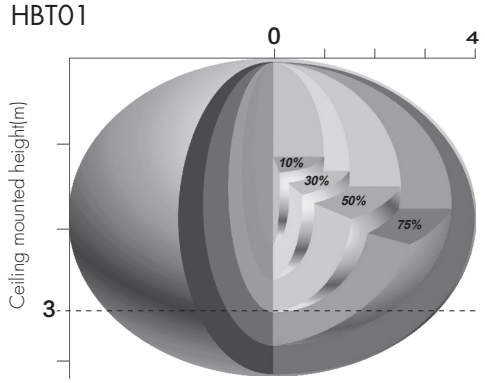


Installation for HIR16

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

Detection Pattern

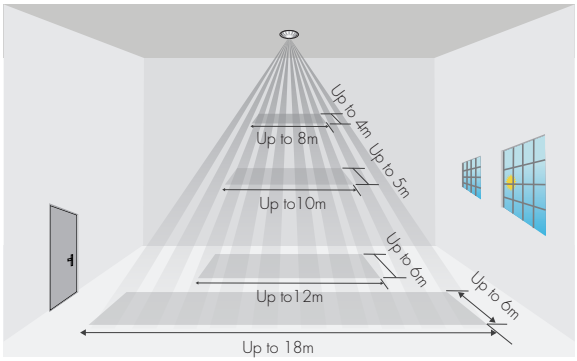
HBT01



The detection range is heavily influenced by sensor placement (angle) and different walking paces.

It may be reduced to 2m(diameter) & 3m(height) under certain conditions (walking across).

HIR16



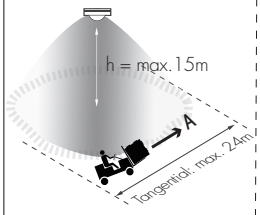
*The detection patterns are based upon 5km/h movement speed.

HIR13 (High-bay)

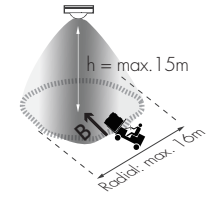
HIR13: High-bay lens detection pattern for **forklift** @ Ta = 20°C

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

A: Tangential movement



B: Radial movement

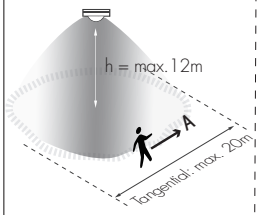


Mount height	Tangential (A)	Radial (B)
10m	max 380m² (Ø = 22m)	max 201m² (Ø = 16m)
11m	max 452m² (Ø = 24m)	max 201m² (Ø = 16m)
12m	max 452m² (Ø = 24m)	max 201m² (Ø = 16m)
13m	max 452m² (Ø = 24m)	max 177m² (Ø = 15m)
14m	max 452m² (Ø = 24m)	max 133m² (Ø = 13m)
15m	max 452m² (Ø = 24m)	max 113m² (Ø = 12m)

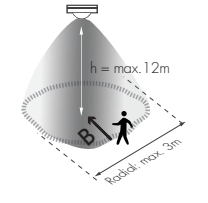
HIR13: High-bay lens detection pattern for **single person** @ Ta = 20°C

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

A: Tangential movement



B: Radial movement



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)

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. Up to 64 LED drivers maybe connected to one switch. Detailed Push switch configurations can be set on Koolmesh app.

Switch Function	Action	Descriptions
Push switch	Short press (<1 second) * Short press has to be longer than 0.1s, or it will be invalid.	- Turn on/off - Turn on only - Turn off only - Recall a scene - Exit manual mode - Do nothing
	Double push	- Turn on only - Turn off only - Recall a scene - Exit manual mode - Do nothing
	Long press (≥1 second)	- Dimming - Colour tuning - Do nothing
Simulate sensor	/	- Upgrade a normal on/off motion sensor to a Bluetooth controlled motion sensor

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

7. Data sheet is subject to change without notice. Please always refer to the most recent release on
   www.hytronik.com/products/bluetooth technology ->Bluetooth Drivers

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