LED Drivers With ✸ Bluetooth® 5.0 SIG Mesh

HED6040/BT   HED6060/BT

Constant Current

HYTRONIK®

✸ CE UKCA SELV RoHS

Product Description

This series is a Bluetooth dimming LED driver with 40W to 60W max power output. It has a Switch-Dim interface via a Push switch. By connecting sensor heads like HIR05, HIR07, HIR11, HIR12, HIR63, HIR63/R, SAM20, SAM21, SAM22, SAM23 to the driver, it enables motion detection and Bluetooth mesh control. It is ideal for direct projects or new luminaire designs for lighting manufacturers. 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.

HED6040/BT

HED6060/BT

App Features

- Quick setup mode & advanced setup mode
- Web app/platform for project deployment & data analysis
- Koolmesh Pro app on iPad for on-site configuration
- Floorplan feature to simplify project planning
- One-key device replacement
- Device social relations check
- Staircase function (primary & secondary)
- Remote control via gateway support HBGW01
- Heat map
- Grouping luminaires via mesh network
- Scenes
- Push switch configuration
- 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
- Compatible with EnOcean BLE switches
- Internet-of-Things (IoT) featured
- Device firmware update over-the-air (OTA)
- Continuous development in progress…

Hardware Features

- Switch-Dim with two Push inputs
- Flicker free (1-100%)
- Standby power <0.5W
- Active PFC design
- Logarithmic Dimming
- Linear Dimming
- Configurable constant current (CC) output via DIP switch
- Short-circuit Protection
- Overload Protection
- Open-circuit Protection
- 5-year warranty

Bluetooth® Kinetic Switch

| HBKS01 | HBKS02 | HBKS03 | HBKS01D | HBKS02D |

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

EnOcean
Self-powered IoT

Bluetooth® 5.0 SIG mesh

iOS / Android

for iOS   for Android

Smartphone app for both iOS & Android platform

for iPad

Koolmesh Pro app for iPad

Web

for Web

Web app/platform: www.iot.koolmesh.com
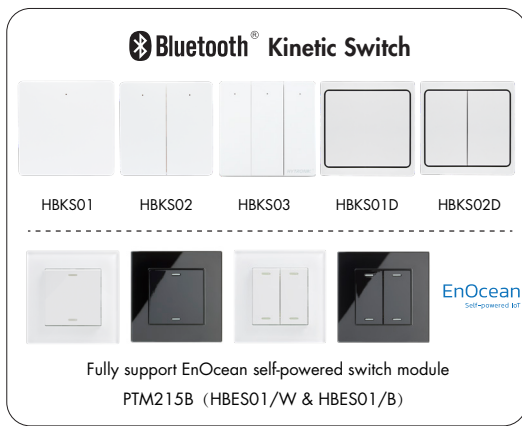
Output Configuration

HED6040/BT, 1x40W

1200mA	● ● ●
1100mA	○ ● ●
1000mA	● ○ ●
900mA	○ ○ ●
800mA	● ● ○
700mA	○ ● ○
600mA	● ○ ○
500mA	○ ○ ○
	1 2 3

HED6060/BT, 1x60W

1500mA	● ● ●
1400mA	○ ● ●
1300mA	● ○ ●
1200mA	○ ○ ●
1100mA	● ● ○
1000mA	○ ● ○
900mA	● ○ ○
800mA	○ ○ ○
	1 2 3
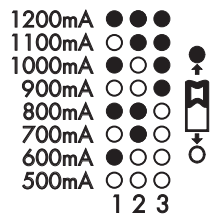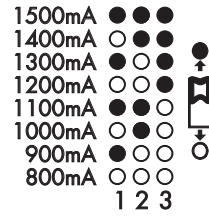
⚠ Warning: Please make sure the correct current is selected before starting the driver!

Technical Specifications

	Model No.	HED6040/BT	HED6060/BT
Input	Input Voltage	220~240VAC 50/60Hz	220~240VAC 50/60Hz
	Input Current	210~190mA	310~280mA
	Power Factor	0.95	0.95
	Input Power	45W	68W
	Max. Efficiency	88%	88%
Output	Ripple Current	<3%	<3%
	Uout Max.	60V	60V
	Turn-on Time	<0.5s	<0.5s
	Stand-by Power	<0.5W	<0.5W
	Dimming Interface	Switch-Dim	Switch-Dim
Environment	Operation Temp.	-20 ~ +50℃	-20 ~ +50℃
	Case Temp. (Max.)	80℃	80℃
	Operating Humidity	10~90%	10~90%
	Storage Temperature	-40~+70℃	-40~+70℃
	IP Rating	IP20	IP20
	Protection Class	Class I	Class I

Safety and EMC	EMC Standard	EN55015 EN61547 EN61000-3-2/-3-3
	Safety Standard	EN61347-1 EN61347-2-13
	RED	EN300 328 EN301489-1/-17 EN50663
	Dielectric strength	Input→output: 3000VAC / 5mA /1min
	Abnormal protection	Output short-circuit protection, Open-circuit protection, Overload protection

Model No.	Max. output power/current/voltage range
HED6040/BT	10-23W/ 500mA /20-46V 12-28W/ 600mA /20-46V 14-32W/ 700mA /20-46V 16-37W/ 800mA /20-46V 18-40W/ 900mA /20-44V 20-40W/1000mA/20-40V 22-40W/ 1100mA /20-36V 24-40W/ 1200mA /20-33V
HED6060/BT	16-37W/800mA /20-46V 18-42W/ 900mA /20-46V 20-46W/ 1000mA /20-46V 22-51W/ 1100mA /20-46V 24-55W/ 1200mA /20-46V 26-60W/1300mA /20-46V 28-60W/ 1400mA /20-43V 30-60W/ 1500mA /20-40V

Mechanical Structure & Dimensions

Wire Preparation

0.5 - 1.5mm²

8mm
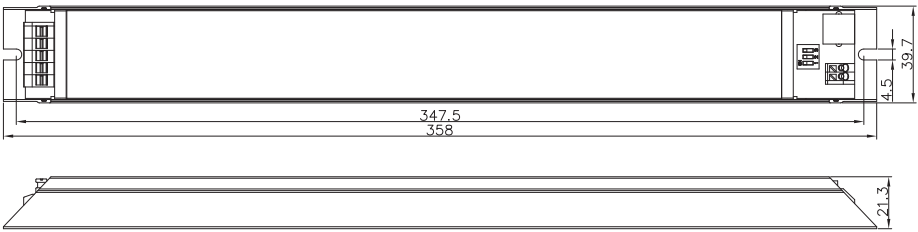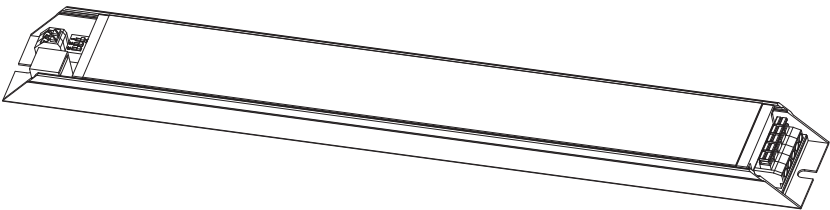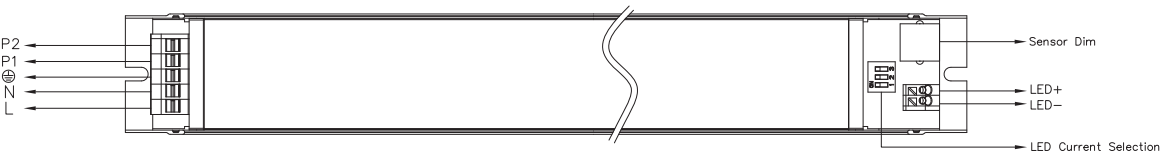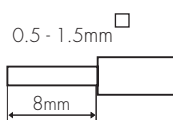
To make or release the wire from the terminal, use a screwdriver to push down the button.

Wiring Diagram
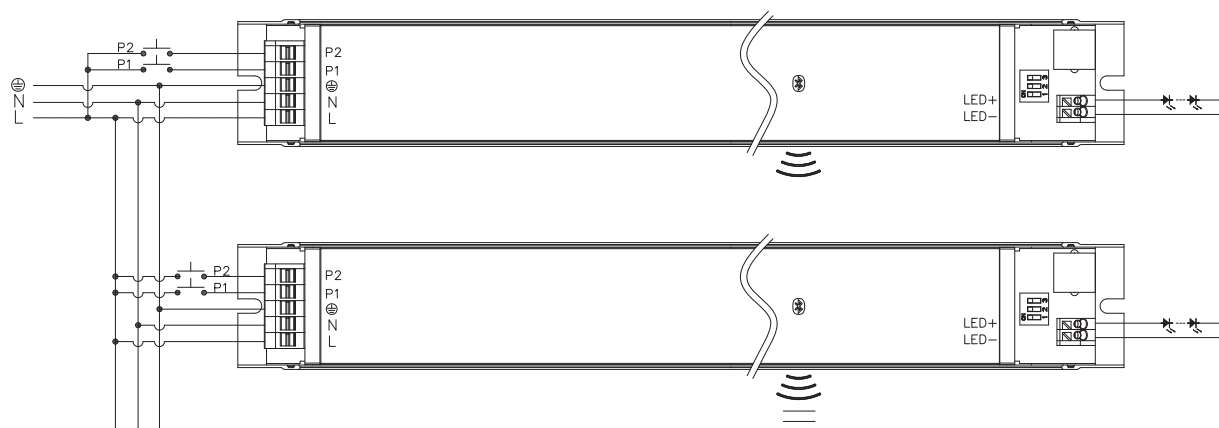
Loading and In-rush Current

Model	HED6040/BT	HED6060/BT
In-rush Current (Imax.)	25.3A	25.3A
Pulse Time	56µs	56µs

Circuit Breaker Information

Automatic circuit breaker type	B16A	B10A	B13A	B20A	B25A
HED6040/BT	46	29	38	58	73
HED6060/BT	31	19	25	38	48

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.

Performance Characteristics

HED6040/BT

EFFICIENCY vs LOAD

- 500mA
- 800mA
- 1200mA

* Typical Efficiency vs Load

PF vs LOAD

- 220V
- 230V
- 240V

* Typical Power Factor vs Load

HED6060/BT

EFFICIENCY vs LOAD

- 800mA
- 1100mA
- 1500mA

* Typical Efficiency vs Load

PF vs LOAD

- 220V
- 230V
- 240V

* Typical Power Factor vs Load
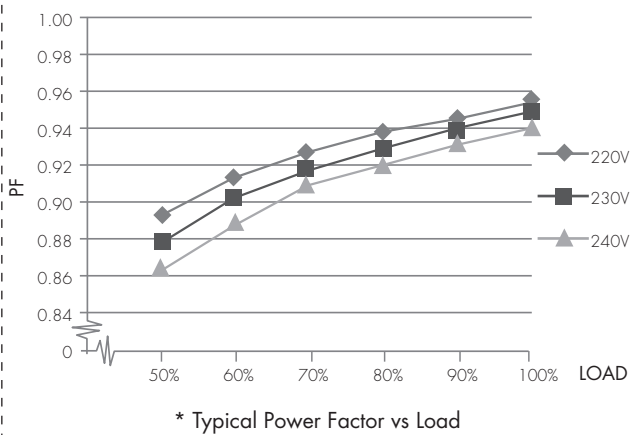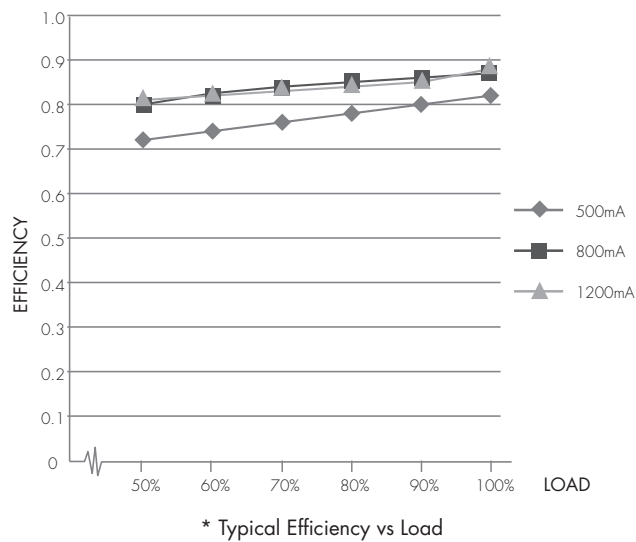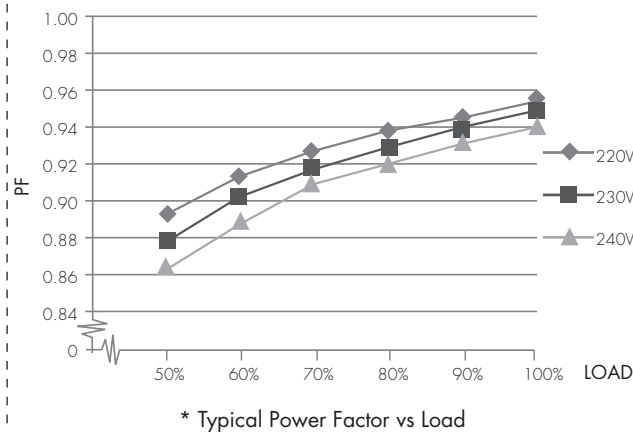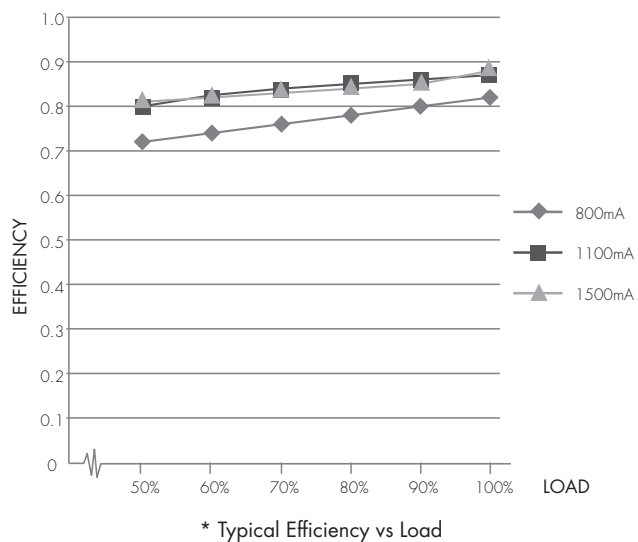
Dimming Characteristics

Logarithmic dimming

Power output(%) vs Dim Level(%)

Linear dimming

Power output(%) vs Dim Level(%)
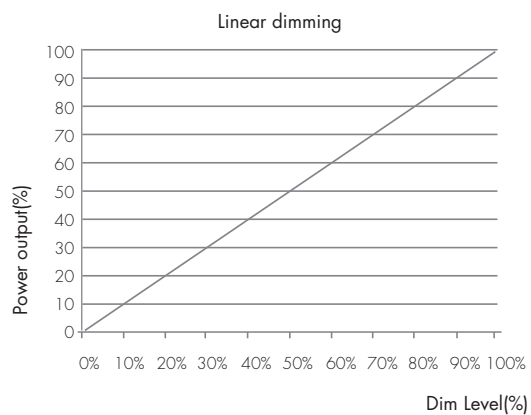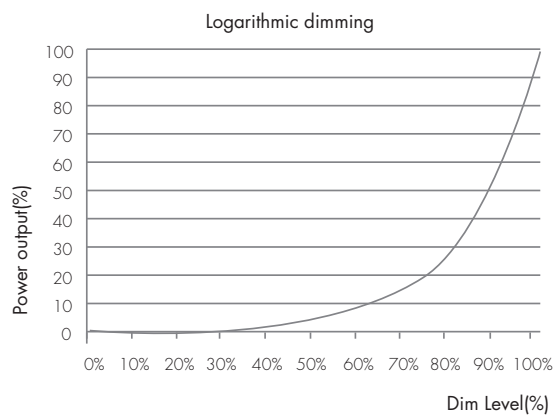
Technical Specifications for Sensor Heads

PIR Sensor Properties		
Sensor principle		PIR detection
Operating voltage		5VDC
Detection range *	HIR05 & HIR05/FM & HIR07	Max installation height: 3m; Max detection range: 6m (diameter)
	HIR11	Max installation height: 15m (forklift); 12m (single person); Max detection range: 24m (diameter)
	HIR12	Max installation height: 15m (forklift); 12m (single person); Max detection range: 18m*6m (L*W)
	HIR63	Max installation height: 3m; Max detection range: 12m (diameter)
	HIR63/R	Max installation height: 12m (forklift); 8m (single person); Max detection range: 14m (diameter)

HF Sensor Properties		
Sensor principle		High Frequency (microwave)
Operating voltage		5VDC
Operation frequency		5.8GHz +/- 75MHz
Transmission power		<0.2mW
Detection range *	SAM20 & SAM21 SAM22	Max installation height: 3m; Max detection range: 12m (diameter)
	SAM23	Max installation height: 15m (forklift); 12m (single person); Max detection range: 20m (diameter)

* 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 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. HIR05
PIR sensor head
The cable length is around 65cm.
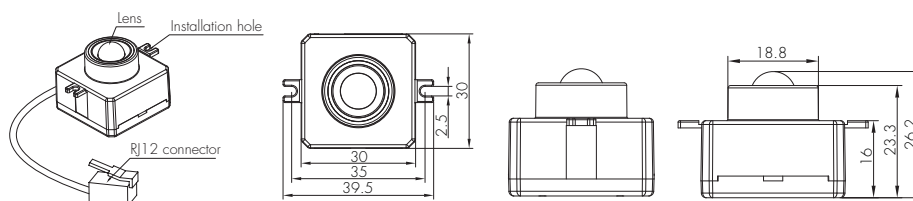
C. HIR05/FM
PIR sensor head
The cable length is around 65cm.

D. HIR07
PIR sensor head
Photocell Advance™
The cable length is around 30cm.

Lens
RJ12 connector

Ø13.8
16.4
17
40.9
44.5
19.3
17.8
15.9
12.9

E. HIR11/S
PIR sensor head
Surface mounting
For highbay application
IP65 (facia / lens part)
The cable length is around 65cm.

Lens
Housing
RJ12 connector
Lug

Ø36.3
20
23.2
32.6

Installation hole
Ø3.5
Ø17.5
17
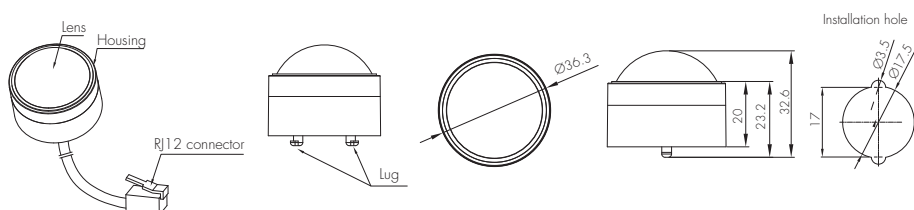
F. HIR11/F
PIR sensor head
Flush mounting
For highbay application
IP65 (facia / lens part)
The cable length is around 65cm.

Lens
Accessories
RJ12 connector

Ø48
1.2
21.5
30.4

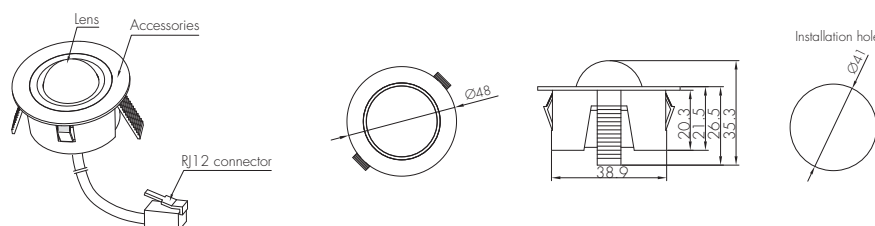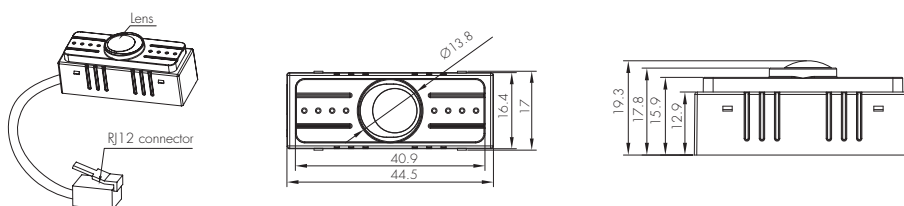Installation hole
Ø41
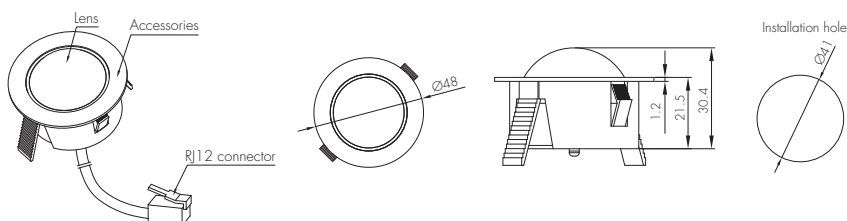
G. HIR11/C
PIR sensor head
Screw to the luminaire by conduit
For highbay application
IP65 (facia / lens part)
The cable length is around 65cm.

Lens
Accessories
RJ12 connector

Ø40.5
M13
25
42.7
12
63
25
33.9

Installation hole
Ø14
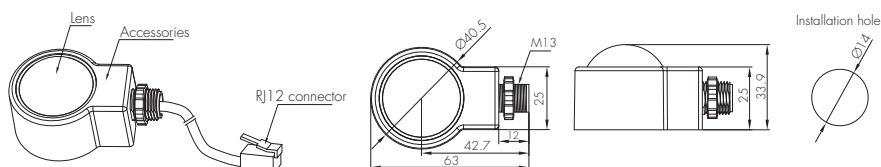
I. HIR63
PIR sensor head
The cable length is around 30cm.

RJ12

Ø26
22.4
31.8
21.7

Installation hole
Ø22.23 +0.78 -0.41
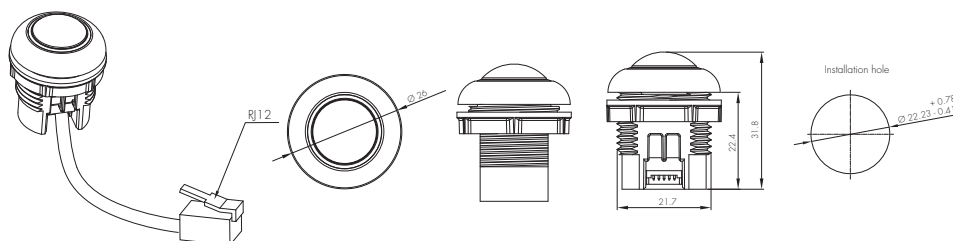
J. HIR63 with HA04
PIR sensor head
Optional accessory
The cable length is around 30cm.

RJ12

Ø15
22
52
25
33.3

Installation hole
R2.3±0.1
17.2±0.1
44.2±0.1
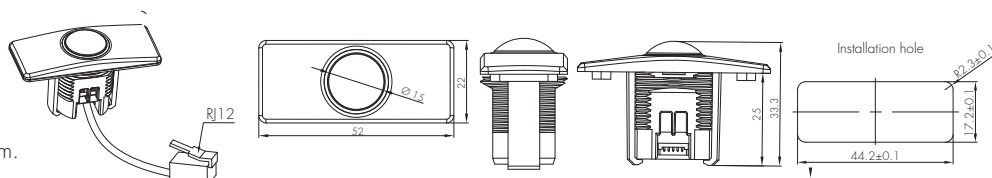
K. HIR63 with HA05
PIR sensor head
Optional accessory
The cable length is around 30cm.

RJ12

Ø 15
68
27
22.4
31.7
21.7
Installation hole
Max R0.5
60±0.2
22±0.2
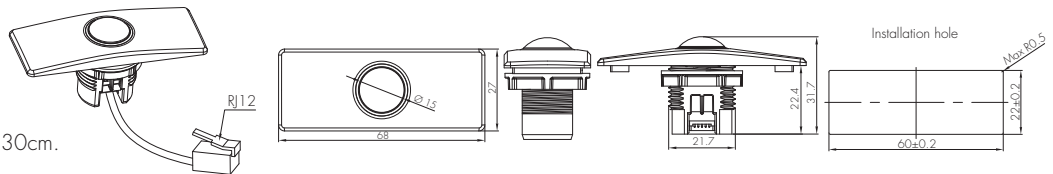
L. HIR63/R
PIR sensor head
IP65 (facia / lens part)
The cable length is around 30cm.

RJ12

Ø 36
43.4
34
22.7
21.7
Installation hole
Ø 22.23 $^{+0.78}_{-0.41}$
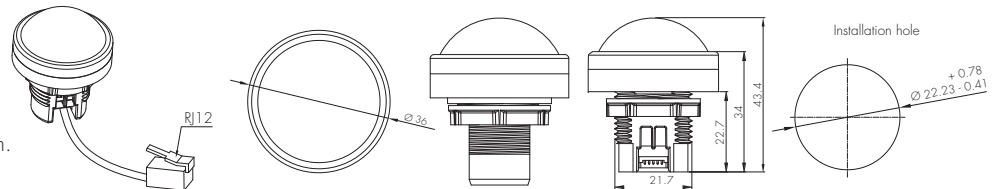
L. HIR12
PIR sensor head
For highbay application
IP65 (facia / lens part)
The cable length is around 65cm.

Lens
Accessories
RJ12

16.5
38.2
75
45
Installation hole
63
Ø33
27.5
33
49.5
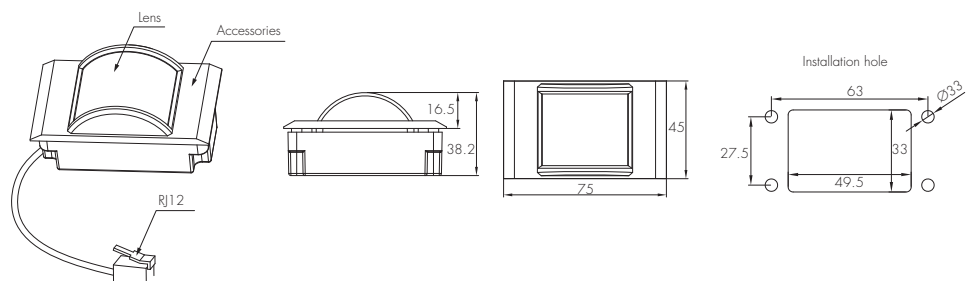
Installation for HIR12

Thickness: 0.8mm – 1.6mm

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

N. SAM20
HF sensor head
Photocell Advance™
The cable length is around 30cm.

Cable side entry
34.7
35.9
40.4
25.2
2.3
2.6
24.3
15.5
ØA
1.5
3
8.8
6.8
2.5
25
11.2
Ø4.5
Cable back entry
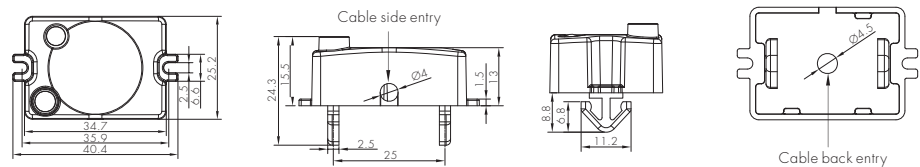
M. SAM21
HF sensor head
IP65
The cable length is around 65cm.

HF antenna module
Ø41
3.9
40.3
M16
14.6
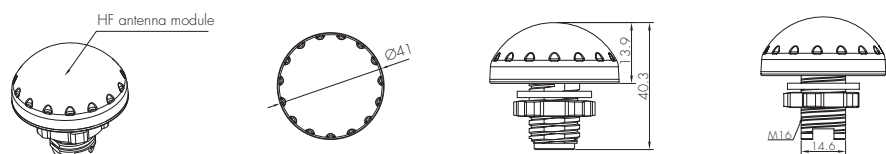
O. SAM22

HF sensor head
Flush mount
The cable length is around 65cm.

Ø48

38.9
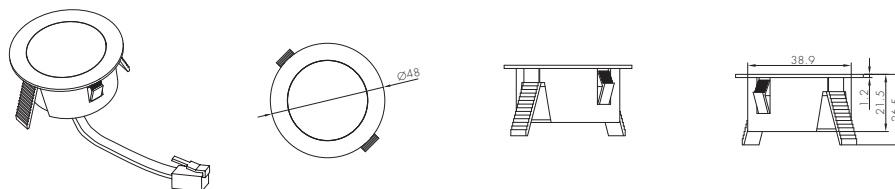
P. SAM23

HF sensor head
Photocell advance™
For highbay application
The cable length is around 30cm.

Infrared remote receiver
Photocell advance™
Daylight sensor
Slots for T5 or T8 tube

Slots for T8 tube

45.2

32.2

2.5

33.5

15
12

50.2

26.5

9
2
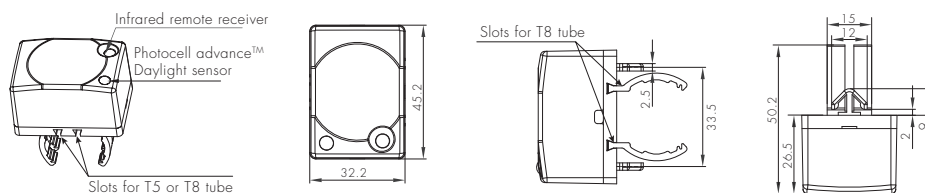
Detection Pattern

SAM20 / SAM21 / SAM22

0   6

Ceiling mounted height(m)

10%
30%
50%
75%

3

Ceiling mounted detection pattern (m)

SAM23

0   8

Ceiling mounted height(m)

10%
30%
50%
75%

12

Ceiling mounted detection pattern (m)
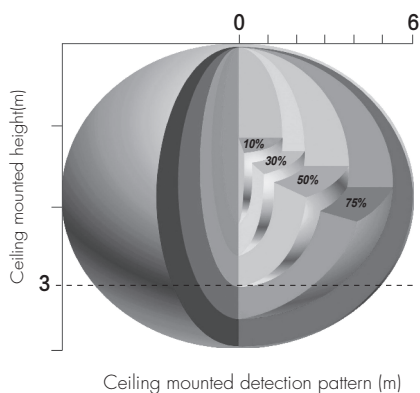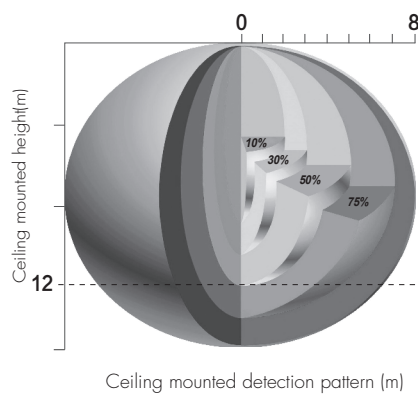
HIR11 (High-bay)

HIR11: High-bay lens detection pattern for **forklift** @ Ta = 20°C
(Recommended installation height **10m-15m**)

A: Tangential movement   B: Radial movement

h = max.15m   Tangential: max. 24m   h = max.15m   Radial: max. 16m

insensitive — sensitive

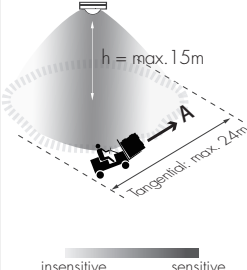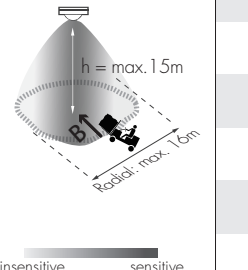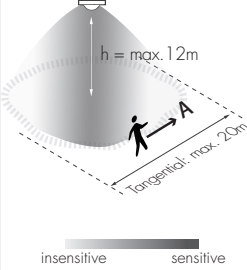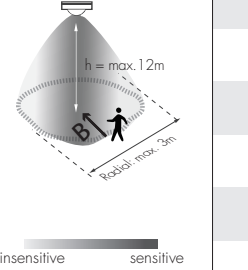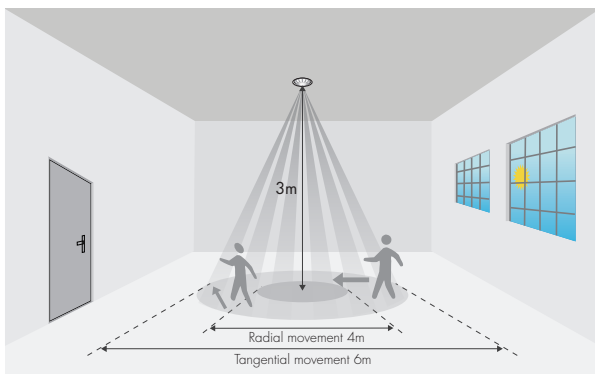| Mount height	Tangential (A)	Radial (B)
10m	max 380m² (Ø = 22m)	max 201m² (Ø = 16m)
11m	max 452m² (Ø = 24m)	max 201m² (Ø = 16m)
12m	max 452m² (Ø = 24m)	max 201m² (Ø = 16m)
13m	max 452m² (Ø = 24m)	max 177m² (Ø = 15m)
14m	max 452m² (Ø = 24m)	max 133m² (Ø = 13m)
15m	max 452m² (Ø = 24m)	max 113m² (Ø = 12m)

HIR11: High-bay lens detection pattern for **single person** @ Ta = 20°C
(Recommended installation height **2.5m-12m**)

A: Tangential movement   B: Radial movement

h = max.12m   Tangential: max. 20m   h = max.12m   Radial: max. 3m

insensitive — sensitive

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)

HIR05 & HIR05/FM & HIR07

3m

Radial movement 4m
Tangential movement 6m

HIR12

3m   Up to 4m   Up to 8m   Up to 5m

5m   Up to 10m

12m¹   Up to 6m

15m   Up to 12m   Up to 6m
*for forklift
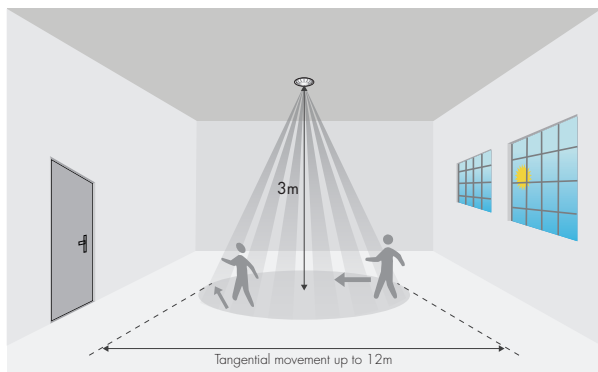
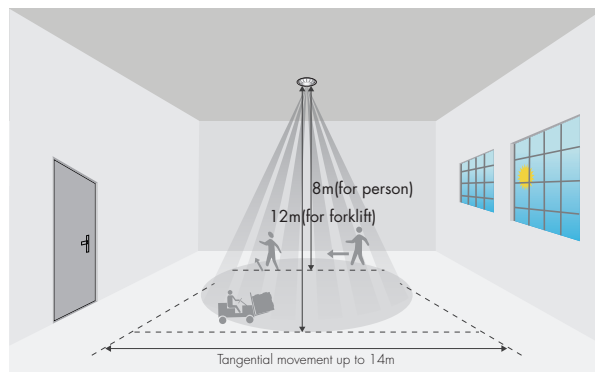Up to 18m
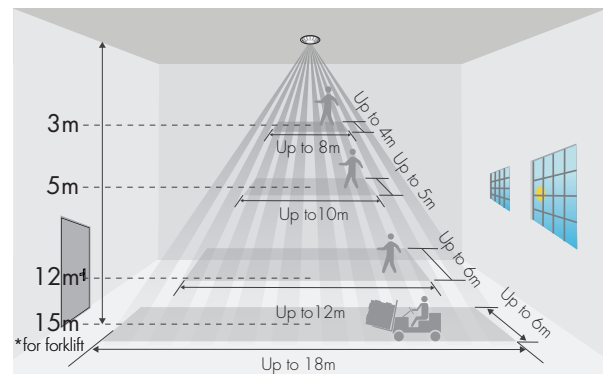
HIR63   HIR63/R

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

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 - Recall a scene - Turn on only - Quit manual mode - Turn off only - Do nothing
	Double push	- Turn on only - Quit manual mode - Turn off only - Do nothing - Recall a scene
	Long press (≥1 second)	- Dimming - Colour tuning - Do nothing
Sensor-link	/	- Upgrade a normal on/off motion sensor to a Bluetooth controlled motion sensor
Emergency Self-Test Function	Short press (<1 second) * Short press has to be longer than 0.1s, or it will be invalid.	- Start Self test (Monthly) - Start Self test (Annually) - Stop Self test - Invalid
	Long press (≥1 second)	- Start Self test (Monthly) - Start Self test (Annually) - Stop Self test - Invalid
Fire Alarm (VFC signal only)	Refer to **Koolmesh**™ App User Manual V2.1	- 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.

Additional Information / Documents

1. To learn more about detailed product features/functions, please kindly refer to
   https://hytronik.com/product/hed6040-bt

2. Regarding precautions for Bluetooth product installation and operation, please kindly refer to
   https://hytronik.com/service/downloads (Bluetooth Products Precautions for Product linstallation and Operation)

3. Regarding precautions for LED Drivers installation and operation, please kindly refer to
   https://hytronik.com/service/downloads (LED Drivers Precautions for Product Installation and Operation)

4. Data sheet is subject to change without notice. Please always refer to the most recent release on
   https://hytronik.com/products/led-drivers

5. Regarding Hytronik standard guarantee policy, please kindly refer to
   https://hytronik.com/service/downloads (Guarantee Conditions document)