Integrated SensorDIM™ LED Driver
Constant Current Version - DALI/Switch-Dim/SensorDIM™

HYTRONIK ®

HEC7030/BF

Applications

Supporting DALI, Switch-Dim, or controlled by a versatile range of antenna options, the HEC7030/BF lends itself to almost any application!

- Office / Commercial Lighting
- Classrooms
- Low-bay warehouse

Use for retrofit upgrades & new luminaire designs.

Features

- Switch-Dim with Synchronization
- Stand-by Power Consumption
- Active PFC Design
- Configurable Constant Current (CC) Output via Dip-Switch
- Analogue Flicker-free Dimming
- Logarithmic Dimming with Multiple Dimming Inputs:
- Intelligent Thermal Management
- Thermal Cut-out Protection
- Short Circuit Protection
- Over-load Protection

} All with Auto-restart

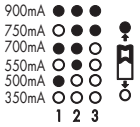
- Permanent Settings Memory, Protected against Loss of Power
- 5-year warranty, designed for long lifetime up to 50,000 h

Direct-to-driver occupancy and daylight controls:

For specific features relating to the available sensors, please refer to the relevant sections of this datasheet

Output Configuration

HEC7030/BF, 1x30W



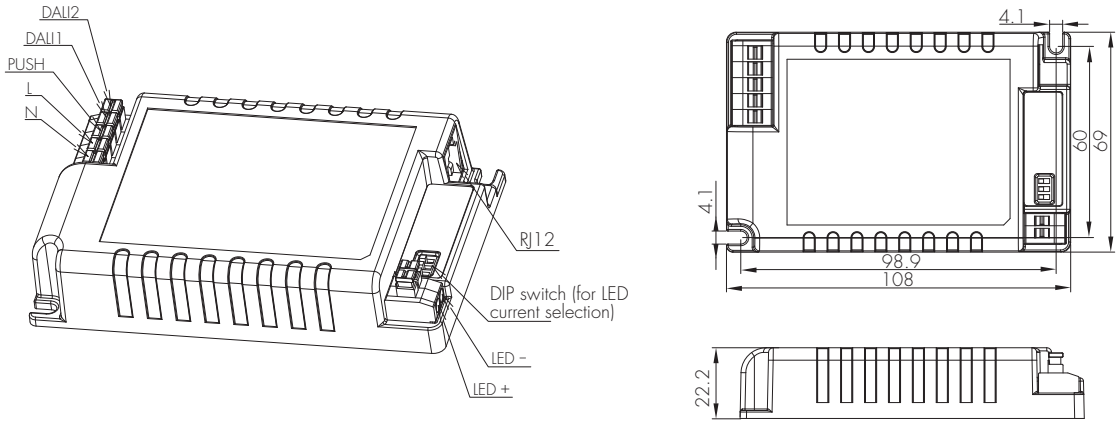
⚠ Warning: Please make sure the correct current is selected before starting the driver!

Technical Data

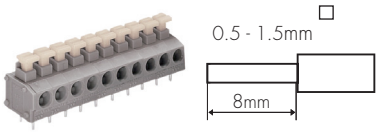
	Model No.	HEC7030/BF
Input	Mains Voltage	220~240VAC 50/60Hz
	Mains Current	0.17~0.16A
	Power Factor	0.9
	Max. Efficiency	86%
	Dielectric Strength	Input→Output : 3000VAC
	Leakage Current	< 0.25mA
Output	Uout Max.	75V
	Turn-on Time	< 0.5s
Environment	Dimming Interface	DALI, Switch-Dim
	Operation Temp.	Ta: -20~+50℃
	Case Temp. (Max.)	80℃
	IP Rating	IP20
Safety and EMC	EMC Standard	EN55015, EN61547, EN61000-3-2, EN61000-3-3
	Safety Standard	EN61347-1,EN62493,EN61347-2-13
	DALI Standard	IEC62386-101 ; IEC62386-102 ; IEC62386-207
	Certifications	Semko, CB, RCM, CE , EMC

Model No.	Max. output power/current/voltage range			
HEC7030/BF	21W/350mA /10~60V	30W/ 500mA /10~60V	30W/ 550mA /10~55V	30W/ 700mA /10~43V
	30W/750mA /10~40V	23W/ 900mA /10~25V		

Model: HEC7030/BF 1x30W



Wire Preparation



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

Loading and In-rush Current

Model	HEC7030 /BF
In-rush Current (Imax.)	67A
Pulse Time	6.6 μs

Number of Drivers Based upon 16A Circuit Breaker

Cct Breaker Type	HEC7030/BF
Type B	54

Conversion table for max. quantities of drivers on other types of Miniature Circuit Breaker

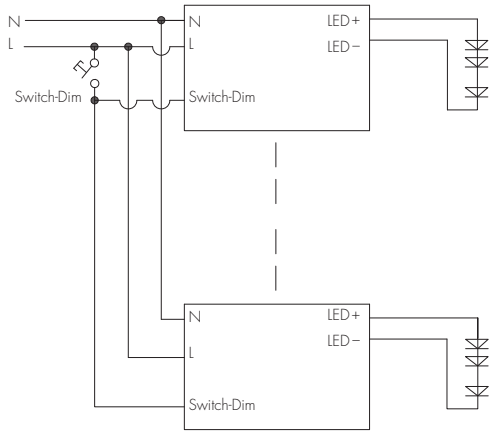
MCB Type	Rating	Relative number of drivers
B	16A	100% (see table above)
B	10A	63%
B	13A	81%
B	20A	125%
B	25A	156%

MCB Type	Rating	Relative number of drivers
C	10A	104%
C	13A	135%
C	16A	170%
C	20A	208%
C	25A	260%

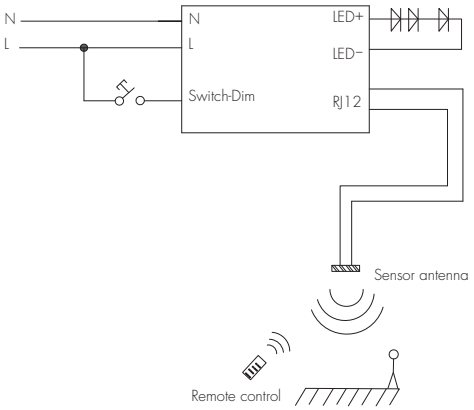
* Environmental factors (such as temperature) will also influence the maximum number of the drivers. Please refer to the MCB manufactures datasheet for loading and derating factors.

Wiring Diagrams

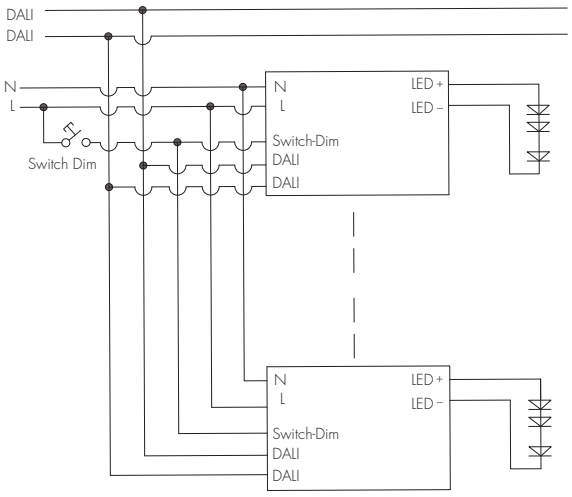
Switch-Dim Connections



Antenna Connections (with optional Switch-Dim)



DALI Connections

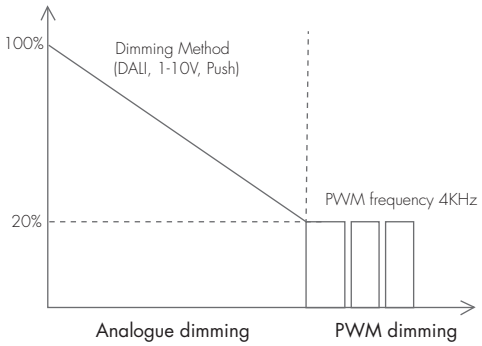


*Optional Switch-Dim for manual over-ride of DALI.

Note:
1. Unused terminals have been omitted for clarity.
2. If connecting an antenna, the DALI inputs are disabled.

Dimming Profile

Light Output



Dimming range	Dimming technique
20%-100%	Analogue
1-20%	PWM

Dimming Interface Operation Notes

DALI

This series of products are supplied as DALI default group 0 and are 'plug n'play DALI' or 'independent DALI' system ready.
These models are also fully DALI addressable and may be assigned to groups within the limits specified by the DALI protocol or supporting DALI controllers by using a DALI programming tool.

Switch-Dim

The provided Switch-Dim interface allows a simple dimming method using commercially available non-latching (momentary) wall switches. Up to 64 LED drivers may be connected to one switch. The Switch-Dim interface may also be used at the same time as DALI to serve as a manual over-ride.

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Switch Action	Response
Short press (<0.4 second) Note: short press has to be longer than 0.1s, or it will be invalid.	Toggle light on / off
Long press (>0.4 second)	Toggle dim light / increase brightness

Synchronization

Switch Action	Response
Long press (>15 seconds)	All lights will dim down to minimum then return to 50% brightness

* We recommend the number of drivers connected to a switch does not exceed 25 pieces. The maximum length of the wires from push to driver should be no more than 20 meters.

Antenna Attachment options

Our range of antenna options allow a very powerful number of 'direct-to-driver' feature options to expand the flexibility of luminaire design. This approach to luminaire design reduces space requirements and component costs whilst simplifying production.

Tri-level Control (Corridor Function)

Options: Microwave occupancy detection HBT01

Wireless Connectivity (RF) with Tri-Level Control

Options: Microwave occupancy detection (SAM8/RC11/SAM11)

HBT01/ 02

SAM8/RC11

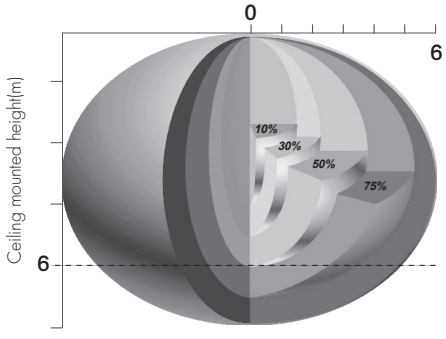
SAM11

Technical Data For SAM8/RC11, SAM11

HF Sensor Data	
Sensor principle	High Frequency (microwave)
Operation frequency	5.8GHz +/- 75MHz
Transmission power	<0.2mW
Detection range	Max. (Ø x H) 12m x 6m
Detection angle	30° ~ 150°

HF Sensor & RF Data	
Sensor principle	High Frequency (microwave)
Operation frequency	5.8GHz +/- 75MHz
Transmission power	<0.2mW
Detection range	Max. (Ø x H) 12m x 6m
Detection angle	30° ~ 150°
RF frequency	868MHz (FSK mode)
RF transmission distance	30m indoor, 50m outdoor

Detection Pattern

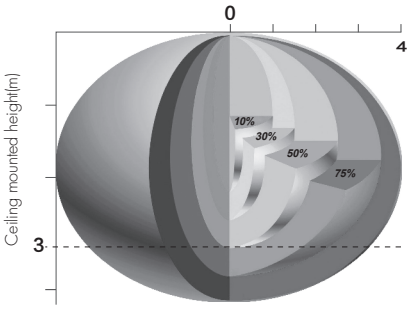


Technical Data For Bluetooth Node (HBT01 / HBT02)

HF Sensor Properties (HBT01 only)	
Sensor principle	High Frequency (microwave)
Operation frequency	5.8GHz +/- 75MHz
Transmission power	<0.2mW
Detection range [1]	Max. (Ø x H) 8m x 3m
Detection angle	30° ~ 150°

Environment	
Operation temperature	Ta: -20°C ~ +70°C
Case temperature (Max.)	Tc: +80°C
Storage temperature	-35°C ~ 55°C
Relative humidity	0 ~ 90%
IP rating	IP20

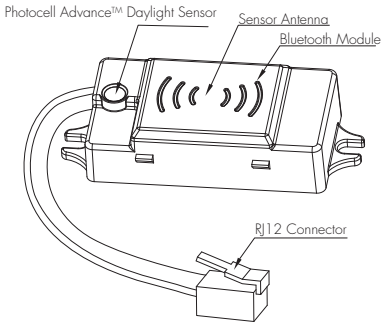
Bluetooth Transceiver	
Operation frequency	2.4 GHz - 2.483 GHz
Transmission power	Max. 7 dBm
Range (Typical) [2]	15~30m

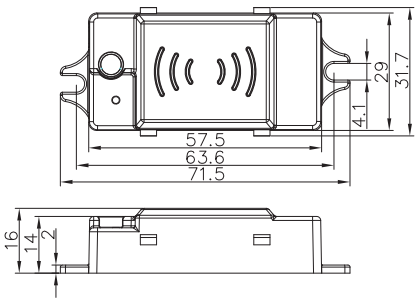


1. The detection range is heavily influenced by antenna placement (angle of approch) and different walking paces.
   It may be reduced to (Ø x H) of 2 x 3m under certain conditions (walking across).
2. Please refer to placement guidance provided later in this document .

Dimensions and Terminals

Bluetooth® HF sensor
Model HBT01 / HBT02

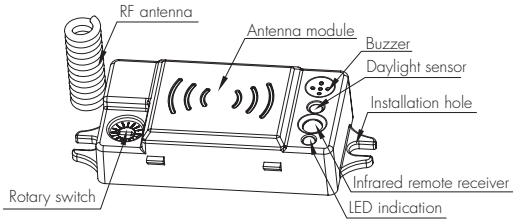


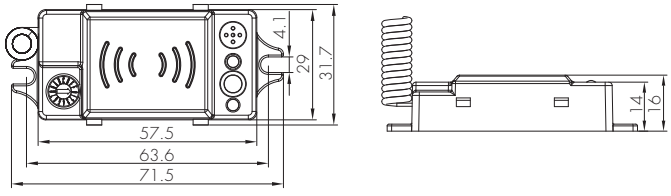


Wireless Connectivity (RF) with Tri-Level Control

HF sensorDIM™

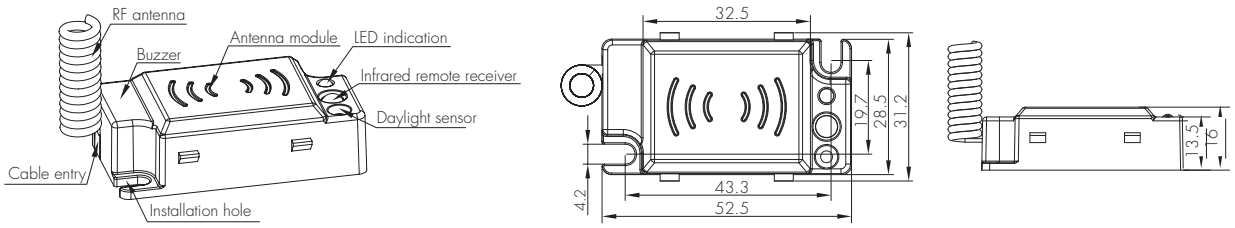
Model SAM11 (RF grouping by rotary switch or remote control)





HF sensorDIM™

Model SAM8/RC11 (RF grouping by remote control only)



Bluetooth Transceiver Node HBT01 / HBT02

Photocell Advance™ Function (Built into HBT01 / HBT02)

It's well known that LED lights have a totally different spectrum to natural light. Hytronik uses this principle with a custom-designed photocell and sophisticated software algorithm to measure and differentiate natural light from LED light, so that this photocell can ignore the LED light and only respond to the natural light.

Hardware Reset Button

A HBT01/HBT02 should always be removed from a network via the APP through the devices menu, and it is highly recommended that the hardware reset button is only used as a last resort, such as the newtork to which it belonged has accidently been deleted from the smart device, or the account to which the network & device belongs to is irretrievable.

The reset button will erase the device from any mesh network it may have been added to.

Note: After the following process has been carried out, the device will not be able to communicate with the APP, so has no way to automatically "clear" itself from active networks on the smart device.

The device will show itself as a "new device" when performing a device search. When re-connecting to the network, the device setings will need to be re-configured as if connecting a new device.

To perform the reset:

* The HBT01/HBT02 must be connected and powered up.
* Press and hold the reset button until the lamp flashes twice to confirm the reset is complete (It will take around 2- 5 Seconds).

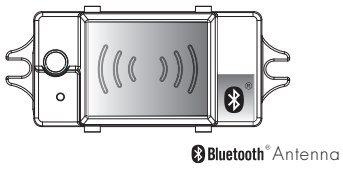
HBT01/ HBT02 Antenna Installation and Placement Notes

To maximise the range in every direction, the following considerations should be taken into account when situating the antenna in the luminaire:

HBT01

The HBT01 contains both a HF microwave antenna and the Bluetooth® transceiver module and are located within the device as per fig.1.

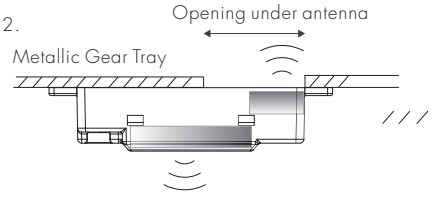
fig.1. HF Microwave Antenna



When the antenna is mounted to a metallic backplane, such as a gear tray, a cut-out opening should be made as large as possible as shown in fig.2.

If possible, try to position the sensor as far away as possible from the LED Driver or other strong sources of HF interference.

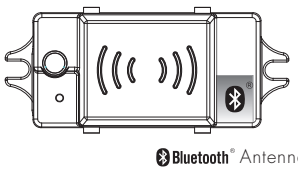
fig.2.



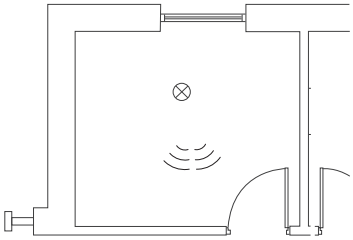
HBT02

The HBT02 contains only the Bluetooth® transceiver module and is located in the same position as per fig.3. The same consideration to mounting on metal gear trays is therefore also as per fig.2.

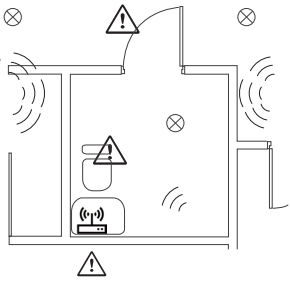
fig.3.



Device to Device Placement



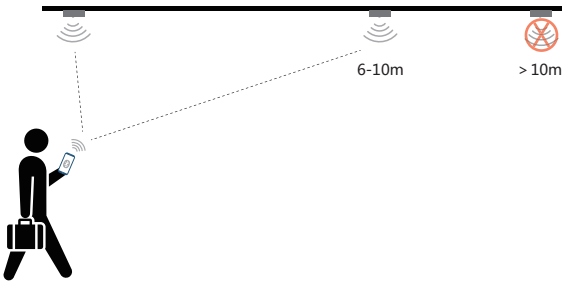
Concrete walls
Metals, and other
building materials
will reduce the range



Strong signal sources such as WiFi routers
and microwave ovens will affect the range

Device placement may offer up to 30m communication distance. However, we recommend for indoor applications that device placements should be no further apart than 15m.

Smart Phone to Device Range



Notes:

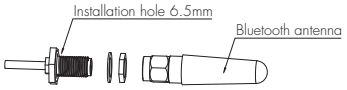
The range for which a smart phone can communicate with the lighting points will vary from model to model and is dependant on its Bluetooth® capability

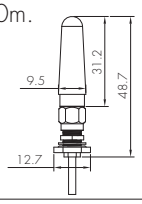
Placement of the antenna within the luminaire will also effect the smart phone communication range and may appear different for each luminaire variant.

Finally, other environmental factors (as per opposite) will influence the ultimate achievable range of communication between smart phone and luminaire device.

Optional accessory: reinforced bluetooth antenna

For some special applications, customers may need a larger bluetooth transmission for both smart phone to device and device to device. Thanks to the reinforced bluetooth antenna, with it adding to the sensor head, the transmission distance (smart phone to device) enlarges to 20m, the distance of device to device is around 50m.

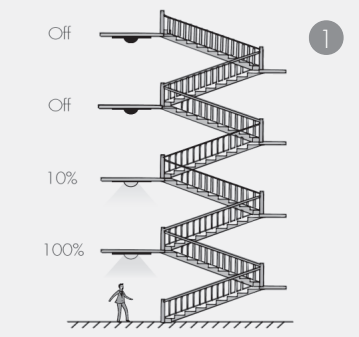


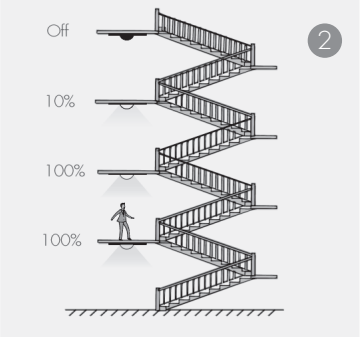


Wireless Connectivity (RF) with Tri-Level Control — SAM8/RC11 or SAM11

The motion detected by the RF sensor antenna SAM8/RC11 or SAM11 will operate all other units programmed on the same group via RF transmission. The transmission can reach 30 meters indoor and 50 meters in open areas. A daylight sensor is also built-in to prevent the light switching on when surrounding natural light is sufficient.

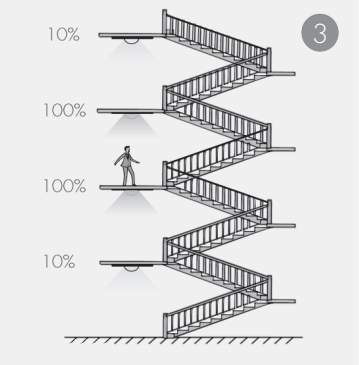
For staircase (SAM8/RC11 or SAM11 serves as both master and slave)

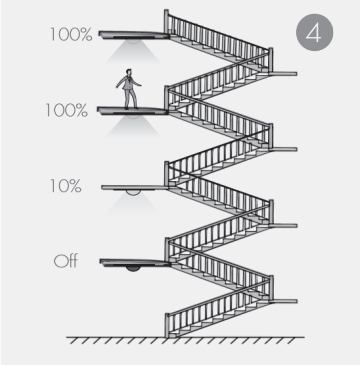




1. The 1st sensor detects motion, it turns the light on 100% and sends signal to the 2nd sensor at the same time. The 2nd light is switched on at stand-by brightness.

2. The person walks to the 2nd floor, the 2nd sensor turns the light on 100%, meanwhile, the 3rd light is switched to stand-by brightness.



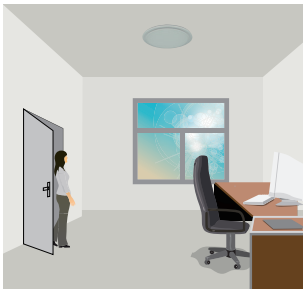


3. The person walks to the 3rd floor, the 3rd sensor turns on the light 100%, meanwhile, the 4th light is switched to stand-by brightness. The 1st light is dimmed to stand-by brightness after hold-time.

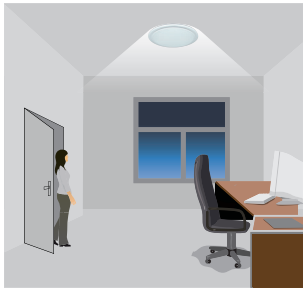
4. The person walks to the 4th floor, the 4th sensor turns on the light 100%, meanwhile, the next light is switched to stand-by brightness. The 1st light is off after stand-by period and the 2nd light is dimmed to stand-by brightness.

Tri-level Control (Corridor Function)

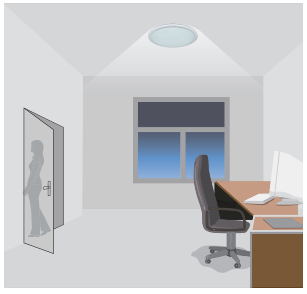
Hytronik builds this function inside the motion sensor to achieve tri-level control, for some areas which require a light change notice before switch-off. The sensor offers 3 levels of light: 100%-->dimmed light (natural light is insufficient) -->off; and 2 periods of selectable waiting time: motion hold-time and stand-by period; Selectable daylight threshold and freedom of detection area.



With sufficient natural light, the light does not switch on when presence is detected.



With insufficient natural light, the sensor switches on the light automatically when presence is detected.



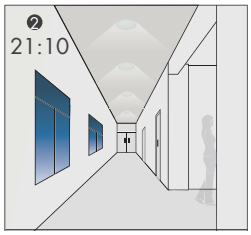
After hold-time, the light dims to stand-by level if the surrounding natural light is below the daylight threshold.

Light switches off automatically after the stand-by period elapses.

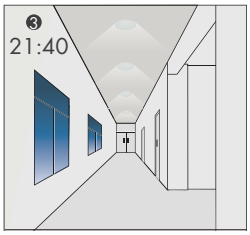
24h Daylight Monitoring Function

Our innovative and patented software enables our antenna with built-in daylight sensor to provide a "smart photocell" function. This function is activated when stand-by period is set to "+∞ ".

The light switches on at 100% when there is movement detected.



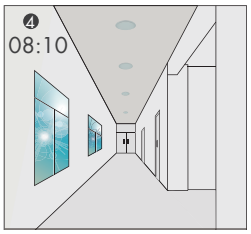
The light dims to stand-by level after the hold-time.



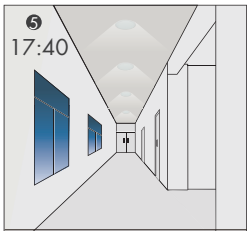
The light remains in dimming level at night.

Settings on this demonstration:
Hold-time: 10min
Daylight threshold: 50lux
Stand-by dimming level: 10%
Stand-by period: +∞

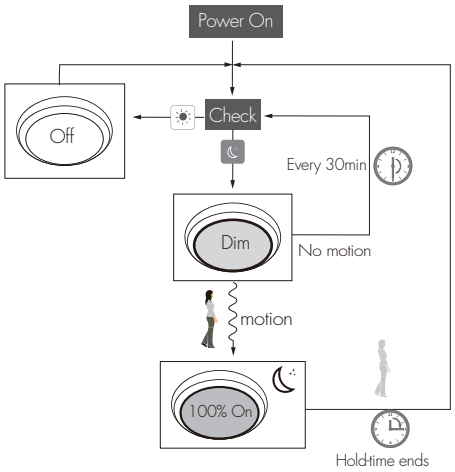
❶ ⇄ ❸ goes in cycle at night ···
100% on when movement detected, and dims to 10% in long absence.



The light turns off completely when natural light lux exceeds daylight threshold pre-set.



The light automatically turns on at 10% when natural light is insufficient (no motion).



Manual Override

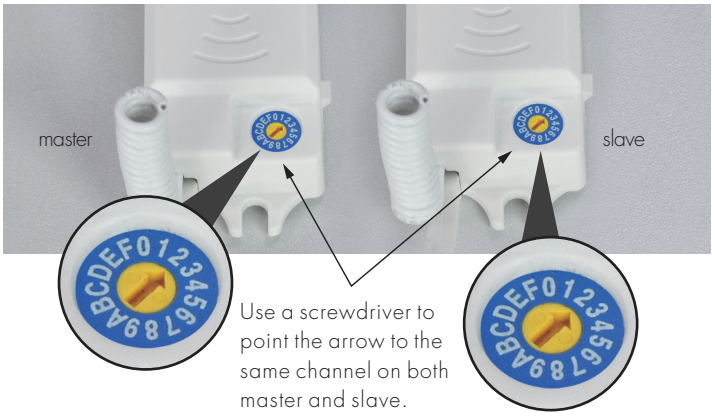
This sensor reserves the access of manual override function for end-user to switch on/off, or adjust the brightness by push-switch, which makes the product more user-friendly and offers more options to fit some extra-ordinary demands:

* Short Push (<1s): on/off function;
  On → Off: the light turns off immediately and cannot be triggered ON by motion until the expiration of pre-set hold-time. After this period, the sensor goes back to normal sensor mode.
  Off → On: the light turns on and goes to sensor mode, no matter if ambient Lux level exceeds the daylight threshold or not. When manually push on the master via the push switch, it sends out the RF "ON" signal to all slaves in the same group. The slave only turns on the light when ambient light is insufficient.
* Long Push (>1s): adjust the hold-time brightness level between10% and 100%.

Note: if end-users do not want this manual override function, just leave the "push" terminal unconnected to any wire.

RF Grouping via Rotary Switch (for SAM11 only)

By selecting the same channel on both of the transmitter unit (master) and receiving unit (slave), the grouping is automatically completed. 16 channels (maximum 16 groups) are available for both the master & slave unit.



Settings (Remote Control HRC-11)

Permanent ON/OFF function

Press button "ON/OFF" to select permanent ON or permanent OFF mode.
* Press button "AUTO", "RESET" to quit this mode.

Reset Settings

Press button "RESET", all settings go back to default settings.

Shift Button

Press button "Shift", the LED on the top left corner will flash to indicate mode selection. All values / settings in RED are valid for 20 seconds.

AUTO mode

Press button "AUTO" to initiate automatic mode. The sensor starts working and all settings remain as before the light is switched ON/OFF.

SEMI-AUTO mode

First press button "Shift" then "SEMI-AUTO" to initiate semi-auto mode. The fixture is manually on by push-switch and automatically off in this mode.

Power output

Press the buttons to select light output at 80% (at initial 10,000 hours) or 100%.
Note: "Sensor off" and "Twilight" functions are disabled.

Brightness +/-

Press the buttons to adjust the light brightness during hold-time.

Scene program - *1-key commissioning*

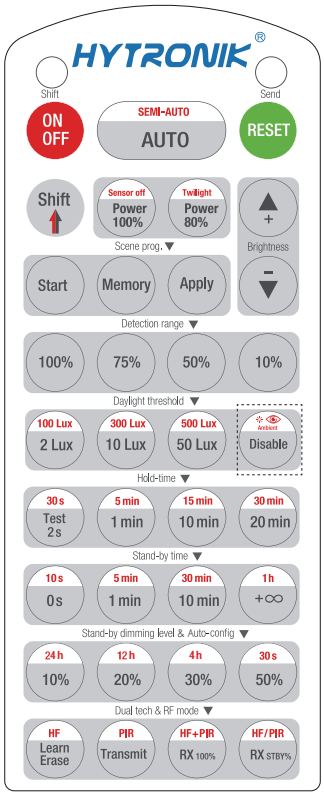
1. Press button "Start" to program.
2. Select the buttons in "Detection range", "Daylight threshold", "Hold-time", "Stand-by time", "Stand-by dimming level" to set all parameters.
3. Press button "Memory" to save all the settings programmed in the remote control.
4. Press button "Apply" to set the settings to each sensor unit(s).

For example, to set detection range 100%, daylight threshold Disable, hold-time 5min, stand-by time +∞, stand-by dimming level 30%, the steps should be:

Press button "Start", button "100%", "Disable", "Shift", "5min", "Shift", "+∞", "30%", "Memory". By pointing to the sensor unit(s) and pressing "Apply", all settings are passed on the sensor(s).

Detection range (valid for master only)

Press buttons in zone "Detection range" to set detection range at 100% / 75% / 50% / 10%.



HRC-11

Note: the buzzer beeps one time when RC receives signal successfully.

Daylight threshold

Press buttons in zone " Daylight threshold" to set daylight sensor at 2Lux / 10Lux /50Lux / 100Lux / 300Lux / 500Lux / Disable.
Note: To set daylight sensor at 100Lux / 300Lux / 500Lux, press "Shift" button first.

Ambient daylight threshold

1. Press button "Shift", the red LED starts to flash.
2. Press button "Ambient", the surrounding lux level is sampled and set as the new daylight threshold.

Hold-time

Press buttons in zone "hold-time" to set the hold-time at 2s / 30s / 1min / 5min / 10min / 15min / 20min / 30min.
Note: 1. To set hold-time at 30s / 5min / 15min / 30min, press "Shift" button first.
2. 2s is for testing purpose only, stand-by period and daylight sensor settings are disabled in this mode.
*To exit from Test mode, press button "RESET" or any button in "Hold-time".

Stand-by time (corridor function)

Press buttons in zone "stand-by time" to set the stand-by period at 0s / 10s / 1min / 5min / 10min / 30min / 1h / +∞.
Note: "0s" means on/off control; "+∞" means bi-level control, if daylight threshold is disabled or natural light is insufficient, the fixture is 100% on when there is motion detected, and remains at the stand-by dimming level after motion hold-time.

Stand-by dimming level

Press the button in zone "stand-by dimming level" to set the stand-by dimming level at 10% / 20% / 30% / 50%.
Note:The function of 24h / 12h / 4h / 30s are disabled.

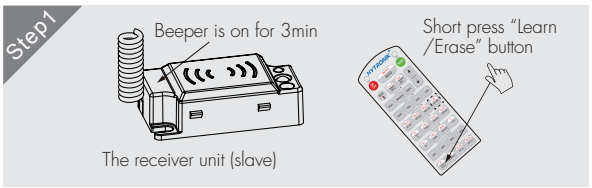
Dual tech & RF mode

"HF","PIR", "HF+PIR", "HF/PIR" are disabled.
For RF grouping via remote control, please refer to steps below:

RF grouping by HRC-11

Short press "Learn/Erase" button on RC to activate pairing mode, and the receiver unit starts to beep once every second for 3min.

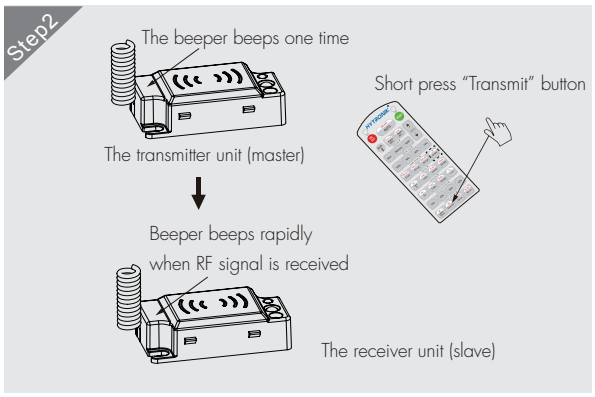
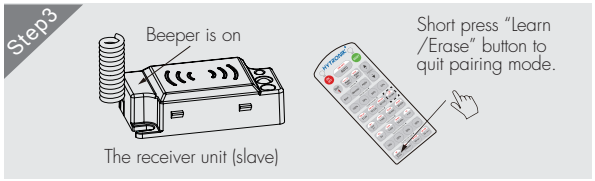
Note: the unit can only pair up to 30 units.



Short press "Transmit" button on RC, the commander unit (master unit) beeps one time to send the transmission signal.
Upon receiving the transmission signal, the receiver unit (slave unit) rapidly beeps 3 times in 1s to indicate the success of pairing. Repeat this step to pair more units.

One more short press on "Learn/Erase" button to the receiver unit to complete the pairing process, the receiver unit will quit the pairing mode.

Note: Press button RX100%, the light on receiver unit is 100% on upon receiving RF on signal; Press "RX STBY%" button, the light(s) goes to preset stand-by dimming level directly.



Erase:
Long press "Learn/Erase" button for 3s to the sensor unit. The beeper beeps rapidly for about 5s. All commands received before are erased.