

## Daylight Harvest PIR Sensor

HC038V HCD038

Detached Linear Version with Remote Control

# HYTRONIK®

### Applications

Occupancy detector with daylight harvest suitable for indoor use.

Suitable for building into the fixture:

- Office / Commercial Lighting
- Classroom

Use for new luminaire designs and installations



### Features

-  Daylight harvest function to regulate light output for maintaining required lux level
-  Special photocell to measure and differentiate natural light from LED light
-  Lux off function, daylight threshold prior to motion detection
-  Optional 1-10V or DALI dimming control method
-  One-touch daylight learning via remote control
-  Zero crossing detection circuit reduces in-rush current and prolongs relay life (HC038V)
-  Loop-in and loop-out terminal for efficient installation (HC038V)
-  5-Year Warranty

### Technical Data

#### Input Characteristics

Model No.	HC038V HCD038
Mains voltage	220~240VAC 50/60Hz
Stand-by power	<0.5W
Load ratings:	
HC038V	400VA (capacitive) 800W (resistive)
HCD038	30mA, 16VDC (max. 15 devices)
Warming-up	20s

#### Safety and EMC

EMC standard (EMC)	EN55015, EN61000
Safety standard (LVD)	EN60669, AS/NZS60669
Radio Equipment (RED)	EN300440, EN301489, EN62479
Certification	Semko, CB, CE, EMC, RED, RCM





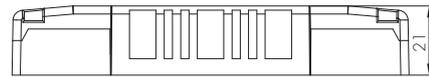
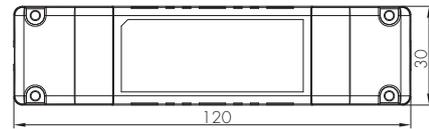
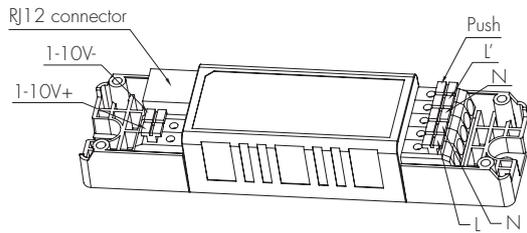



#### Sensor Data

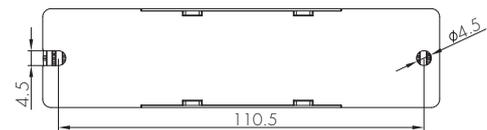
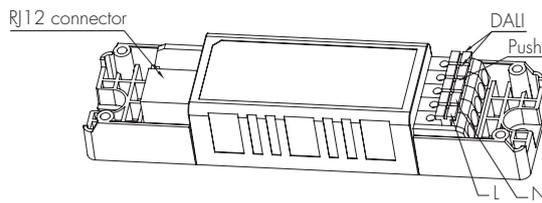
Model No.	HIRO1 HIRO1/FM HIRO3 HIRO9/S HIRO9/F HIRO9/C
Sensor principle	PIR Detection
Operation voltage	5VDC
Detection range	
HIRO1 HIRO1/FM HIRO3	
Max installation height	3m
Max Detection range	6m (Diameter)
HIRO9	
Max installation height	1.5m (forklift) 12m (single person)
Max Detection range (Ø)	24m (forklift) 20m (single person)
Detection angle	360°
Environment	
Operation temperature	Ta: -20°C ~ +55°C
Case temperature (Max.)	Tc: +80°C
IP rating	IP20

## Sensor Main Body

HC038V (1-10V output)

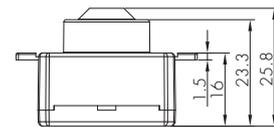
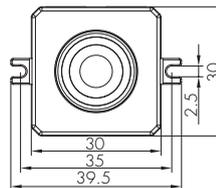
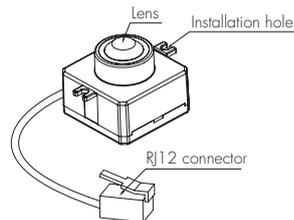


HCD038 (DALI output)

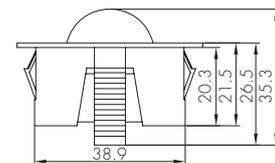
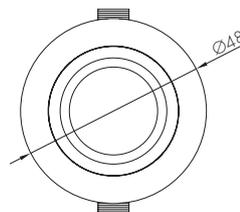
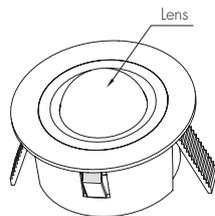


There are three different PIR sensor antenna modules to choose from:

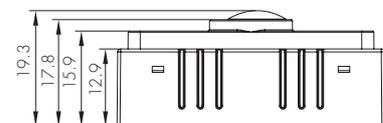
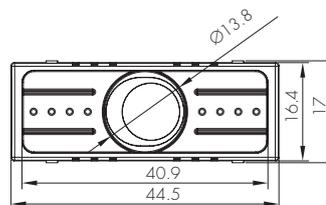
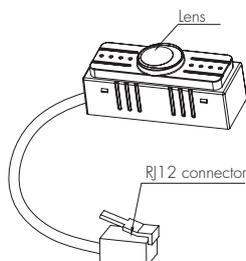
PIR Sensor Head  
Model HIRO1



PIR Sensor Head  
Model HIRO1/FM



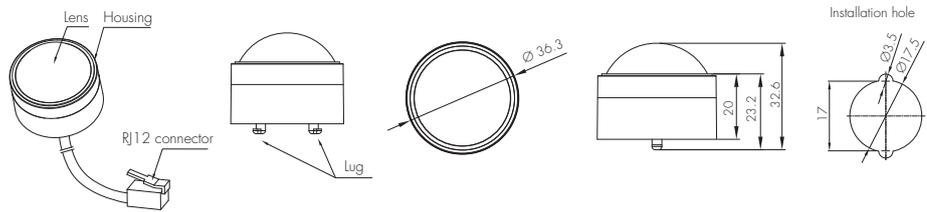
PIR Sensor Head  
Model HIRO3



## PIR Sensor Head

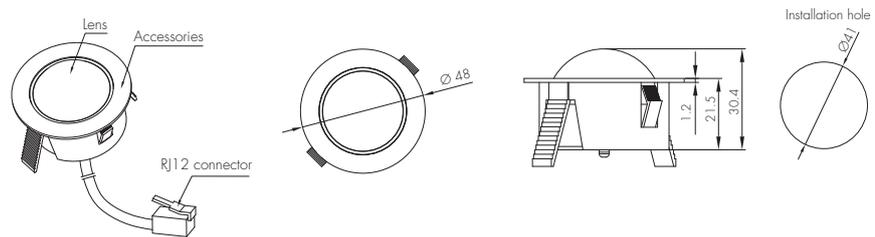
### HIRO9/S

Surface mounting  
For highbay application  
IP65 (facia/lens part)  
The cable length is around 30cm.



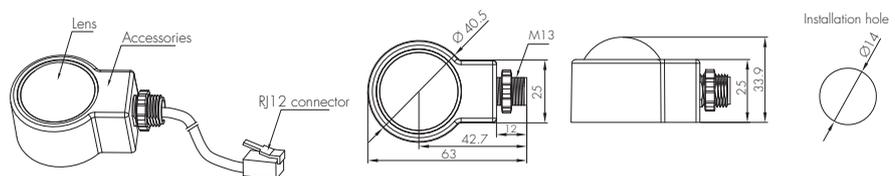
### HIRO9/F

Flush mounting  
For highbay application  
IP65 (facia/lens part)  
The cable length is around 30cm.



### HIRO9/C

Screw to the luminaire by conduit  
For highbay application  
IP65 (facia/lens part)  
The cable length is around 30cm.



12 sensor antennas and 2 control units offer 24 combinations in total:

- |  |   |
|--|---|
| A PIR antenna HIRO1 + DALI control HCD038    | B PIR antenna HIRO1 + 1-10V control HCO38V    |
| C PIR antenna HIRO1/FM + DALI control HCD038 | D PIR antenna HIRO1/FM + 1-10V control HCO38V |
| E PIR antenna HIRO3 + DALI control HCD038    | F PIR antenna HIRO3 + 1-10V control HCO38V    |
| G PIR antenna HIRO9/S + DALI control HCD038  | H PIR antenna HIRO9/S + 1-10V control HCO38V  |
| I PIR antenna HIRO9/F + DALI control HCD038  | J PIR antenna HIRO9/F + 1-10V control HCO38V  |
| K PIR antenna HIRO9/C + DALI control HCD038  | L PIR antenna HIRO9/C + 1-10V control HCO38V  |



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

## Functions and Features

### 1 Daylight Harvest



Light will not switch on when natural light is sufficient, even there is motion detected.



The light switches on automatically with presence when natural light is insufficient.



The light turns on at full or dims to maintain the lux level. The light output regulates according to the level of natural light available.



The light switches off when the ambient natural light is sufficient.



The light dims to stand-by period after hold-time and stays on selected minimum dimming level.



The light switches off completely after the stand-by period.

#### Note:

The light automatically dims down and eventually turns off if the natural light lux level exceeds the daylight threshold. However, if the stand-by period is preset at "+∞", the fixture never switches off but dim to minimum level, even the natural light is sufficient.

### 2 Photocell Advance™ Function (HIRO3)

It's well known that LED lights have a totally different spectrum to natural light. Hytronik uses this principle and comes up with special 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.

Our technology has no infringement to the existing patents in the market.

### 3 Lux Off Function

The light turns off automatically whenever surrounding natural light lux level exceeds the daylight threshold for more than 5min, even there is motion detected. However, if the stand-by period is pre-set to infinity "+∞", the fixture never switches off but stays at dimming level, even when natural light is sufficient.

### 4 Manual Override

This sensor reserves the access of manual override function for end-user to switch on/off, or adjust the target lux level 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.

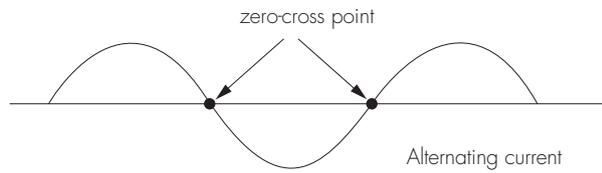
Off → On: the light turns on and goes to sensor mode, no matter if ambient Lux level exceeds the daylight threshold or not.

\* Long Push (> 1s): adjust the target lux level by turning the light up or down. Both the adjustment on RC and push switch can overwrite each other, the last adjustment remains in memory.

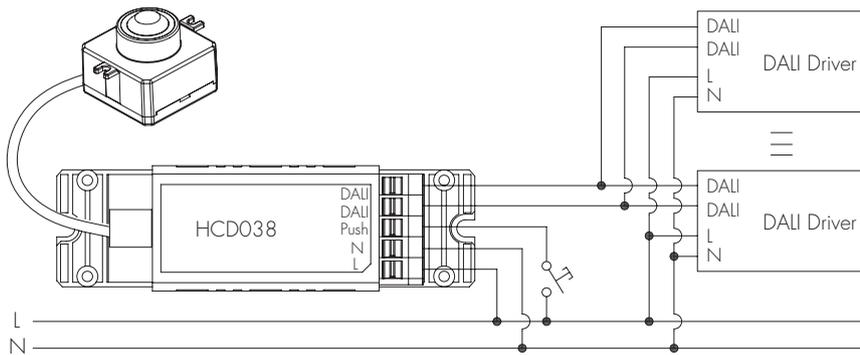
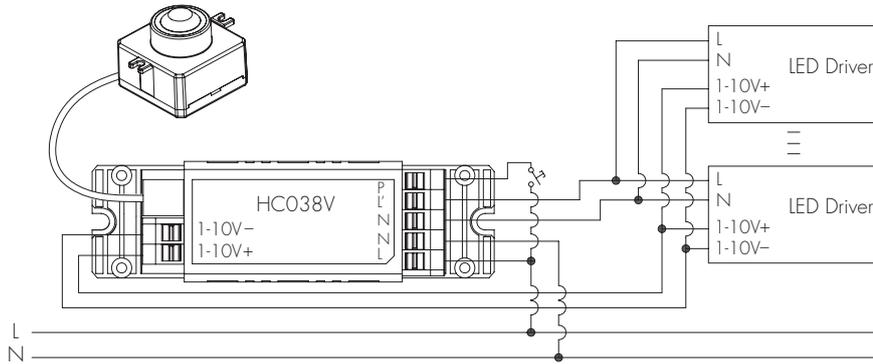
Note: if end-user do not want this manual override function, just leave the "push" terminal unconnected to any wire.

## 5 Zero-cross Relay Operation (HC038V)

Designed in the software, sensor switches on/off the load right at the zero-cross point, to ensure that the in-rush current is minimised, enabling the maximum lifetime of the relay.

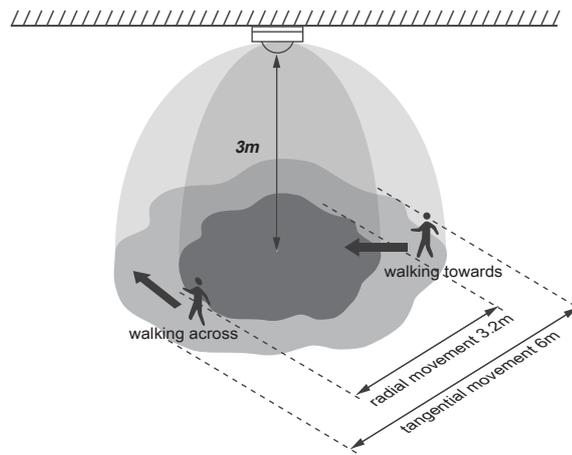


Wiring Diagram



## Detection Pattern

HIRO1 HIRO1/FM HIRO3



## HIRO9 (High-bay)



**HIRO9** : High-bay lens detection pattern for **forklift** @  $T_a = 20\text{ }^\circ\text{C}$

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

A: Tangential movement	B: Radial movement	Mount height	Tangential (A)	Radial (B)
		10m	max 380m <sup>2</sup> (Ø = 22m)	max 201m <sup>2</sup> (Ø = 16m)
		11m	max 452m <sup>2</sup> (Ø = 24m)	max 201m <sup>2</sup> (Ø = 16m)
		12m	max 452m <sup>2</sup> (Ø = 24m)	max 201m <sup>2</sup> (Ø = 16m)
		13m	max 452m <sup>2</sup> (Ø = 24m)	max 177m <sup>2</sup> (Ø = 15m)
		14m	max 452m <sup>2</sup> (Ø = 24m)	max 133m <sup>2</sup> (Ø = 13m)
		15m	max 452m <sup>2</sup> (Ø = 24m)	max 113m <sup>2</sup> (Ø = 12m)



**HIRO9** : High-bay lens detection pattern for **single person** @  $T_a = 20\text{ }^\circ\text{C}$

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

A: Tangential movement	B: Radial movement	Mount height	Tangential (A)	Radial (B)
		2.5m	max 50m <sup>2</sup> (Ø = 8m)	max 7m <sup>2</sup> (Ø = 3m)
		6m	max 104m <sup>2</sup> (Ø = 11.5m)	max 7m <sup>2</sup> (Ø = 3m)
		8m	max 154m <sup>2</sup> (Ø = 14m)	max 7m <sup>2</sup> (Ø = 3m)
		10m	max 227m <sup>2</sup> (Ø = 17m)	max 7m <sup>2</sup> (Ø = 3m)
		11m	max 269m <sup>2</sup> (Ø = 18.5m)	max 7m <sup>2</sup> (Ø = 3m)
		12m	max 314m <sup>2</sup> (Ø = 20m)	max 7m <sup>2</sup> (Ø = 3m)

## Settings (Remote Control HRC-11, for HIRO1 /FM & HIRO3 & HIRO9)



### Permanent ON/OFF function

Press button "ON/OFF" to select permanent ON or permanent OFF mode.

\* Press button "AUTO", "RESET" or "Ambient" to quit this mode.

The mode will change to AUTO Mode after power failure.



### Reset Settings

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

For HIRO1 /FM: Detection range: 100%; Hold-time: 5min; Stand-by period: 10min;

Stand-by dimming level: 20%; Constant lux: 100lux

For HIRO3: Detection range: 100%; Hold-time: 5min; Stand-by period: 10min;

Stand-by dimming level: 10%; Lux disabled

For HIRO9: Detection range: 100%; Hold-time: 5min; Stand-by period: 10min;

Stand-by dimming level: 20%; Constant lux: 100lux



### Shift Button

Press button "Shift", the LED on the top left corner is on 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

1. Press button "Shift", the red LED flashes for indication.
2. Press button "SEMI-AUTO/AUTO" to initiate semi-auto mode. The fixture is manually turned on by pressing the push-switch, and goes off automatically after stand-by time. (Absence detection 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 these two buttons to adjust the light output brightness and set a new target lux level. The daylight sensor can measure ambient daylight level and ignore the LED light, so as to calculate how much artificial light is needed to maintain the target lux level.



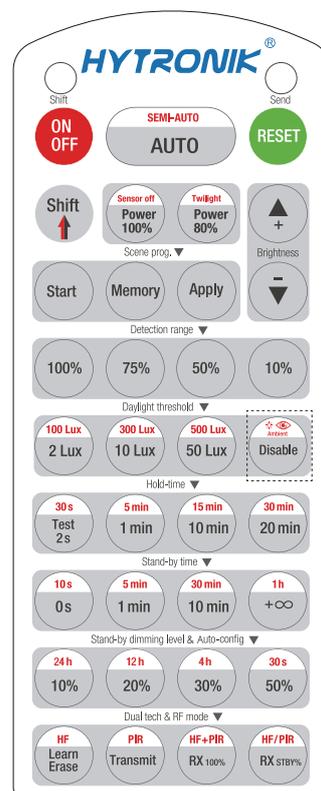
### Scene program - 1-key commissioning

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

Buttons in zone "Detection range" are disabled.



HRC-11

### 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 the stand-by time is infinite and the fixture never switches off.*

### 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%.

### Auto-configuration function

All buttons in this zone are disabled.

### Dual tech & RF mode

All buttons in this zone are disabled.

## Settings (Remote Control HRC-01, for HIR01)



### Permanent ON/OFF function

Press the "ON/OFF" button, the light goes to permanent on or permanent off mode, and the sensor is disabled.

\* Press "Auto Mode", "RESET" or "Scene mode" buttons to quit this mode.

The mode will change to AUTO Mode after power failure.



### Sensor mode

Press "Auto Mode" button, the sensor starts to function and all settings remain the same as the latest status before the light is switched on/off.



### Reset function

Press "RESET" button, all settings go back to default value (same as scene mode 3):

Detection range: 100%; Hold-time: 5min; Stand-by period: 10min;

Stand-by dimming level: 20%; Constant lux: 100lux



### Dim +/-

Press these two buttons to adjust the light output brightness and set a new target lux level. The daylight sensor can measure ambient daylight level and ignore the LED light, so as to calculate how much artificial light is needed to maintain the target lux level.



HRC-01

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



### Test mode

This button is for testing purpose only. The sensor goes to test mode (hold-time is 2s) after commissioning, meanwhile the stand-by period and daylight sensor are disabled.

\* This mode can be ended by pressing "reset", or any button of "scene mode" and "hold-time". The sensor settings are changed accordingly.



### 8H permanent on mode

In some circumstances, people want to disable the sensor and keep the light on for a certain period of time, even there is no motion detected. This function is built-in the software and can be achieved by pressing the "8H" button on the RC.

\* Press "ON/OFF", "Auto Mode", "RESET" or "Scene mode" buttons to quit from this mode.

### Scene mode

There are 6 scene modes fixed program built-in the remote control to choose for different applications:

Scene options	Hold-time	Stand-by period	Stand-by dimming level	Constant Lux	Detection range
SC1	1min	1min	10%	50Lux	disabled
SC2	3min	5min	20%	75Lux	disabled
SC3	5min	10min	20%	100Lux	disabled
SC4	10min	30min	30%	150Lux	disabled
SC5	20min	1H	30%	200Lux	disabled
SC6	30min	+∞	50%	400Lux	disabled

\* End-user can adjust the settings by pressing buttons of detection range/hold-time/stand-by period/stand-by dimming level/daylight sensor. The last setting stays in validity.

### Hold-time

Press the buttons of "hold-time" to set hold-time at 30s / 1min / 5min / 10min / 20min / 30min .

### Stand-by period (Corridor function)

Press the buttons of "stand-by period ( corridor function)" to set stand-by period at 0s/10s/1min/5min/10min/30min/1H/+∞.

Note: "0s" means on/off control; "+∞" means bi-level dimming control and the fixture never switches off.

### Stand-by dimming level

Press the buttons of "stand-by dimming level" to set the stand-by dimming level at 10%/20%/30%/50%.

### Detection range

Buttons of "detection range" are disabled.

## 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](http://www.hytronik.com/download->knowledge->Introduction%20of%20Photocell%20Advance)
2. 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](http://www.hytronik.com/download->knowledge->Microwave%20Sensors%20-%20Precautions%20for%20Product%20Installation%20and%20Operation)
3. Regarding Hytronik standard guarantee policy, please refer to [www.hytronik.com/download ->knowledge ->Hytronik Standard Guarantee Policy](http://www.hytronik.com/download->knowledge->Hytronik%20Standard%20Guarantee%20Policy)