

## Tri-level Control HF Sensor

HC019V/I

Synchronised Control Version with Photocell Advance™

**HYTRONIK®**

### Applications

Occupancy detector with tri-level control suitable for indoor use.








Suitable for building into the fixture:

- Office / Commercial Lighting
- Meeting room
- Classroom

Use for new luminaire designs and installations



### Features

-  Special photocell to measure and differentiate natural light from LED light from behind the fixture cover
-  Tri-level dimming control based upon occupancy (also known as corridor function)
-  1-10V dimming control method
-  Synchronised dimming with multiple sensor circuits
-  Zero crossing detection circuit reduces in-rush current and prolongs relay life
-  Loop-in and loop-out terminal for efficient installation
-  5-Year Warranty

### Technical Data

#### Input Characteristics

Model No.	HC019V/I
Mains voltage	220~240VAC 50/60Hz
Stand-by power	<0.8W
Load ratings:	
Capacitive	800VA
Resistive	2000W
Warming-up	20s

#### Safety and EMC

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

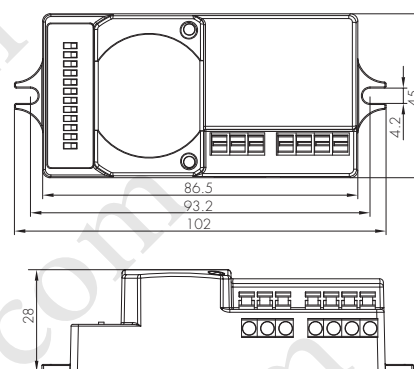
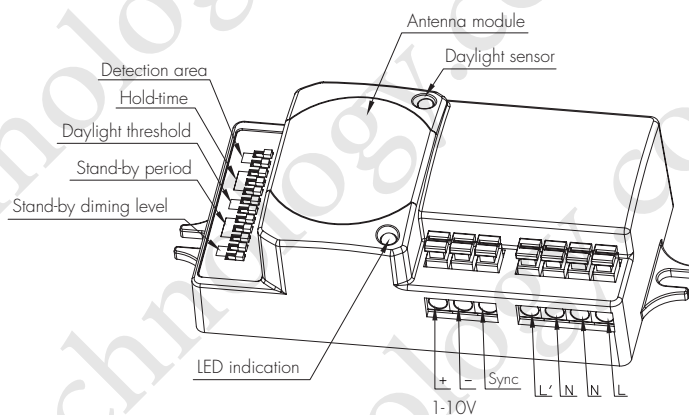
#### Sensor Data

Model No.	HC019V/I
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°
Setting adjustments:	
Sensitivity	10% / 50% / 75% / 100%
Hold-time	5s ~ 30min (selectable)
Daylight threshold	2 ~ 50 lux, disabled
Stand-by period	0s ~ 1h, +∞ (selectable)
Stand-by dimming level	10% / 20% / 30% / 50%

#### Environment

Operation temperature	Ta: -35°C ~ +70°C
Case temperature (Max.)	Tc: +80°C
IP rating	IP20

CE emc RED  CB IP20



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 Photocell Advance™ Function

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 from behind the fixture cover, so that this photocell can ignore internal LED light and only respond to the natural light outside. Our technology has no infringement to the existing patents in the market.

#### Settings on this demonstration:

Hold-time: 10min

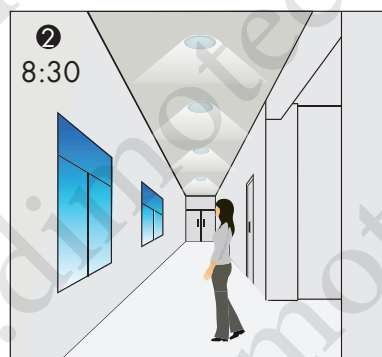
Daylight threshold: 50lux

Stand-by dimming level: 10%

Stand-by period: +∞



The light automatically turns on at dim level when natural light lux level drops below pre-set daylight threshold.



With insufficient natural light, the light switches on at 100% when there is motion detected.



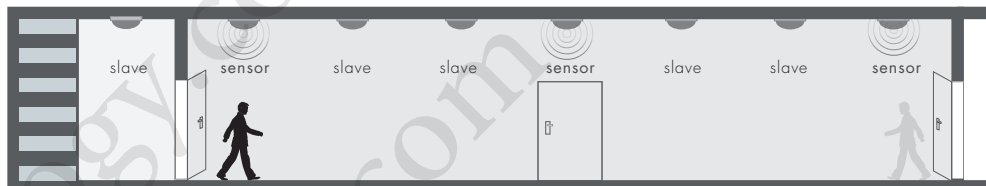
The light turns off completely whenever natural light reaches above pre-set daylight threshold, even with presence.

### 2 Synchronised Control

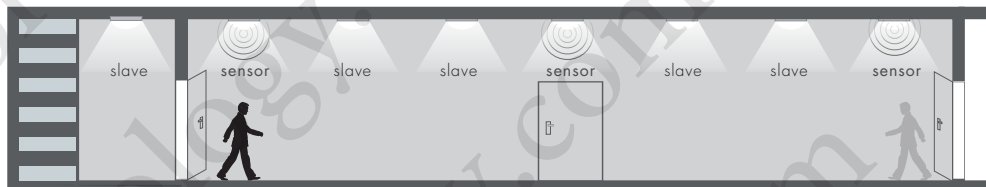
By connecting the "SYNC" terminals in parallel (maximum 10pcs, see wiring diagram), no matter which sensor detects motion, all HC019V/I in the group will turn on the lights (ambient natural light is below daylight threshold). The sensor antennas are effectively 'shared' and the detection area is widely enlarged in this way.

*Note: to avoid fixtures turning on unnecessarily, daylight sensing takes priority on a point-by-point basis. Occupancy sensing (sync) is disabled on those units in which the ambient light exceeds the daylight threshold.*

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



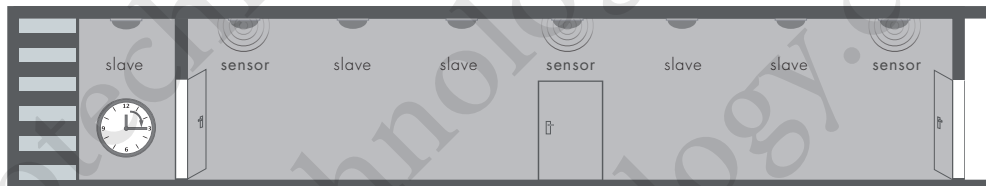
With insufficient natural light, the person comes from any direction, the whole group of lights switch on.



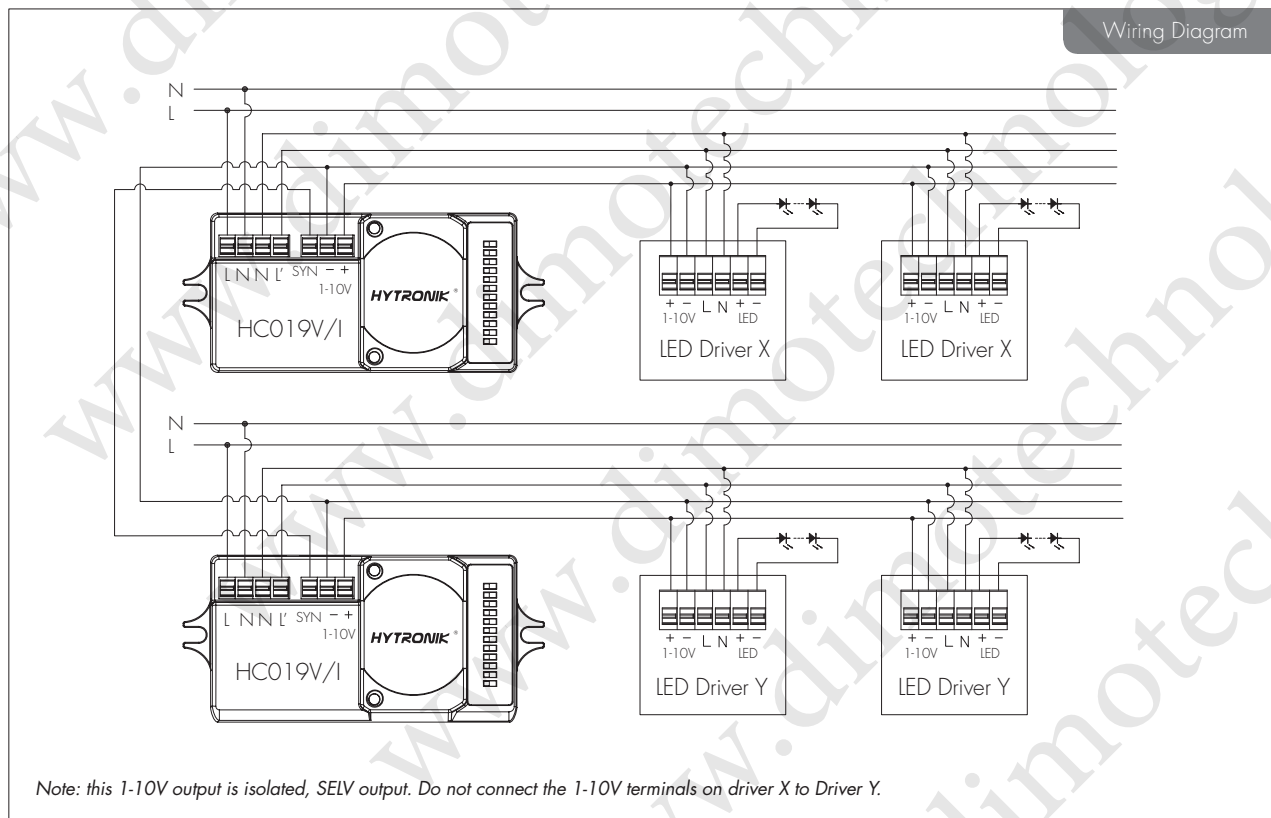
The lights dim to stand-by level after hold-time, or turn off completely if surrounding natural light is sufficient.



The lights switch off automatically after the stand-by period.



Multiple sensors control the same group of ballast / driver

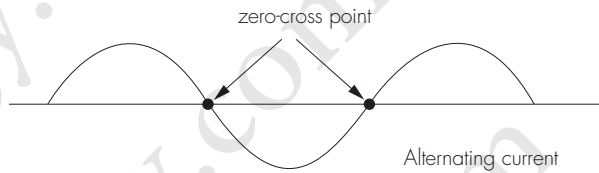


### 3 Tri-level Control (Corridor Function)

Hytronik builds this function inside the motion sensor to achieve tri-level control, for some areas that 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.

### 4 Zero-cross Relay Operation

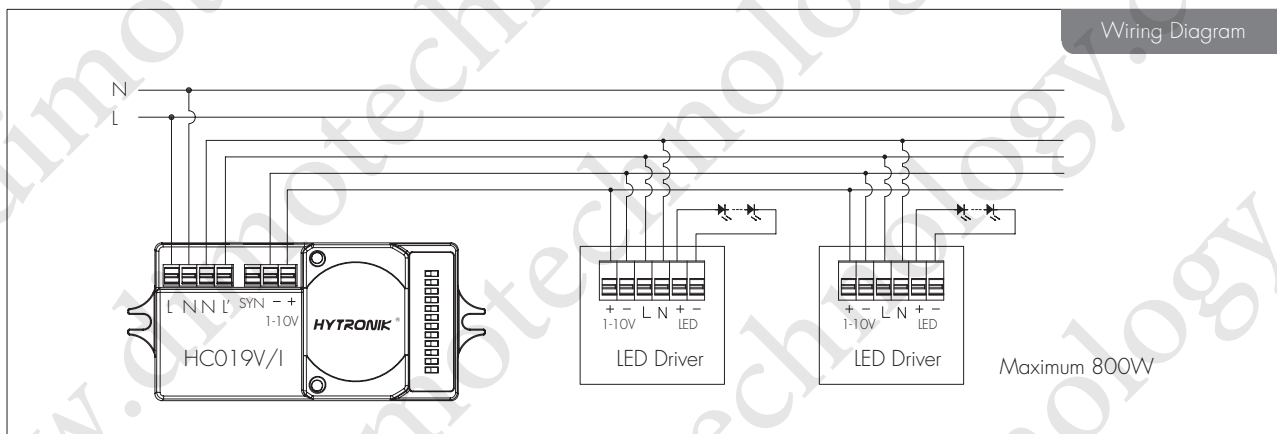
Designed in the software, sensor switches on/off the load right at the zero-cross point, to ensure that the in-rush current is minimised, enabling the maximum lifetime of the relay.



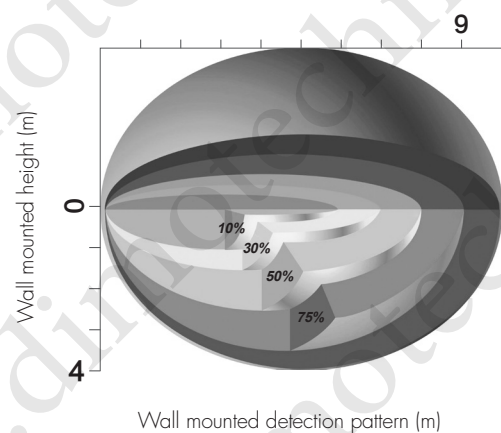
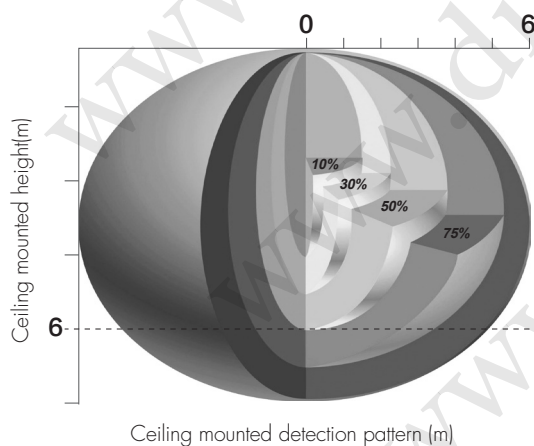
### 5 Loop-in and Loop-out Terminal

Double L N terminal makes it easy for wire loop-in and loop-out, and saves the cost of terminal block and assembly time.

One sensor controls a group of driver / ballast:



### Detection Pattern



## DIP Switch Settings

### 1 Detection Range

Sensor sensitivity can be adjusted by selecting the combination on the DIP switches to fit precisely for each specific application.

	1	2	
I	●	●	100%
II	●	○	75%
III	○	●	50%
IV	○	○	10%

I – 100%  
II – 75%  
III – 50%  
IV – 10%



### 2 Hold Time

Select the dip switch configuration for the full brightness on-time after presense detection.

*Please note that this function is disabled when the natural daylight exceeds the daylight threshold setting for more than 5 minutes.*

	1	2	3	
I	●	●	●	5s
II	●	●	○	30s
III	●	○	●	1min
IV	●	○	○	5min
V	○	●	●	10min
VI	○	●	○	20min
VII	○	○	○	30min

I – 5s  
II – 30s  
III – 1min  
IV – 5min  
V – 10min  
VI – 20min  
VII – 30min



### 3 Daylight Threshold

Set the level according to the fixture and environment. In Photocell Advance™ mode this level will determine at which point the light turns off, and automatically turns back on again (stand-by time is set to infinity).

*Please note that the levels refer to internal light reaching the sensor.*

Disabling the daylight sensor will put the sensor into occupancy detection only mode.

	1	2	
I	●	●	Disable
II	●	○	50Lux
III	○	●	10Lux
IV	○	○	2Lux

I – Disable  
II – 50Lux  
III – 10Lux  
IV – 2Lux



### 4 Stand-by period (corridor function)

This is the time period you would like to keep at the low light output level before it is completely switched off in the long absence of people.

*Note: "0s" means on/off control;*

*"+ ∞" means the stand-by time is infinite and the fixture is effectively controlled by the daylight sensor, automatic on/off operation based upon daylight. Selecting other time periods will disable 'automatic on' operation and the photocell is used only to turn off the fixture automatically.*

	1	2	3	
I	●	●	●	0s
II	●	●	○	10s
III	●	○	●	1min
IV	●	○	○	5min
V	○	●	●	10min
VI	○	●	○	30min
VII	○	○	●	1H
VIII	○	○	○	+∞

I – 0s  
II – 10s  
III – 1min  
IV – 5min  
V – 10min  
VI – 30min  
VII – 1H  
VIII – +∞



### 5 Stand-by dimming level

The setting is used to select the desired dimmed light level used in periods of absence for enhanced comfort and safety.

	1	2	
I	●	●	10%
II	●	○	20%
III	○	●	30%
IV	○	○	50%

I – 10%  
II – 20%  
III – 30%  
IV – 50%



## Additional Information / Documents

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

# HC019V/I

## Fixture Built-in Microwave Sensor

## Photocell Advance



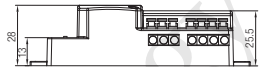
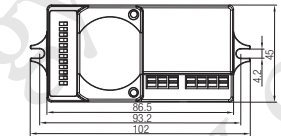
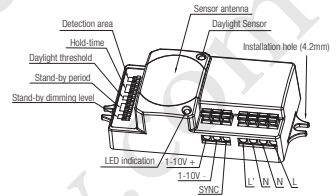
### Introduction

This product utilises photocell advance technology to realise occupancy and true automatic photocell functions in one product. The patented technology allows luminaire design to be simplified as the luminaire body no longer needs to be drilled to accept a photocell for assessing the daylight condition. Ideal for applications such as communal and stairwell areas on social housing projects; this product is designed to be enclosed within the luminaire so naturally offers security against vandalism and degradation which can be unwanted factors when using external lighting control components.

The light will be switched off eventually if ambient daylight is sufficient, no matter it is during hold-time or stand-by time, with or without motion.

### Technical Specifications

Product type	Built-in microwave motion sensor (photocell advance)
Operating voltage	220~240VAC 50/60Hz
Switched power	800W Reactive / 2000W Resistive
Stand-by power	< 1W
Detection settings	10% / 50% / 75% / 100%
Hold time	5s / 30s / 1min / 5min / 10min / 20min / 30min
Stand-by time	0s / 10s / 1min / 5min / 10min / 30min / 1h / +∞
Stand-by dimming level	10% / 20% / 30% / 50%
Daylight threshold	2 ~ 50Lux , Disable
Detection area (DxH)	12 x 6 m
Microwave frequency	5.8 GHz +/- 75Mhz
Microwave power	0.2 mW
Warming-up time	20s
Operating temperature	-35°C ~ +70°C



Dimensions (mm)

### Installation

Please read this manual carefully before installing the microwave sensor and siting the luminaire.

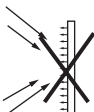
Both the microwave sensor (antenna) and the photocell elements of the product must be in front of any metal work and have full line of sight to the cover/diffusing element of the fixture for trouble-free operation.

After installing the sensor, it is highly recommended that the luminaire is tested for compatibility and correct operation of all components.

Note: If testing under laboratory conditions, the unique nature of this product requires full bandwidth of the visible and invisible parts of the electromagnetic spectrum, therefore it is not recommended to attempt daylight simulation with artificial light sources.

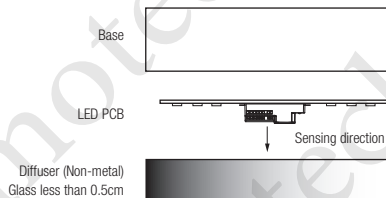


Not suitable for use with Incandescent or Halogen lamps

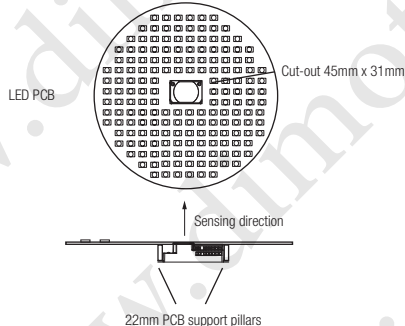


Not suitable for use in installations where glass is treated for reflection of infrared radiation

### Diagram 1. Typical layout - in front of LED PCB



### Diagram 2. Typical layout - behind LED PCB with cut-out



### Preparation of Luminaire

#### 1. Positioning

This microwave sensor is ideal for use with LED luminaires with the following considerations:

For simple mounting, the sensor may be placed on the LED side of the LED PCB. The microwave sensor will not be able to 'see' through any metal components of the fixture. (See diagram 1 opposite).

For shadow-free operation, it is recommended that the LED PCB is designed with a viewing window for the sensor so that it may fit flush (or slightly proud) of the LED PCB. (Please refer to diagram 2)

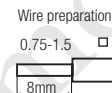
#### 2. Configure the luminaire

Referring to the wiring diagrams overleaf, it is best to consider terminations of the luminaires offered to the installer dependant on system or project design. If in any doubt, it is recommended that all 7 terminals of the sensor are made accessible to the installer so that all of the features may be used if required.

#### 3. Wiring

To assist with installation, Hytronik use push-wire style terminals. It is recommended that single core (1/0.8mm for example) is used for making the connections to the sensor.

The full specification for the wiring terminal is:





## Feature Operation

### 1. Detection Range

Setting these switches will determine the sensitivity of the occupancy sensor. During commissioning it is recommended to start at 10% to satisfy correct installation, before increasing the sensitivity to the environment for normal operation.

	1	2	
I	●	●	100%
II	●	○	75%
III	○	●	50%
IV	○	○	10%

### 2. Hold Time

Select the dip switch configuration for the full brightness on-time after presense detection. Please note that this function is disabled when the natural daylight exceeds the daylight threshold setting more than 5 minutes.

	1	2	3	
I	●	●	●	5s
II	●	●	○	30s
III	●	○	○	1min
IV	○	●	○	5min
V	○	○	●	10min
VI	○	○	○	20min
VII	○	○	○	30min

Note for commissioning: There is a 20 second "warm-up" period for the sensor upon power-on. This time must elapse before testing for presense detection.

### 3. Daylight Threshold

Set the level according to the fixture and environment. In Photocell Advance mode this level will determine at which point the fixture turns off and automatically turns back on again. Please note the levels refer to internal light reaching the sensor, and do not directly relate to lux levels outside of the fixture.

	1	2	
I	●	●	Disable
II	●	○	50 Lux
III	○	●	10 Lux
IV	○	○	2 Lux

Disabling the daylight sensor will put the sensor into occupancy detection only mode.

### 4. Stand-by period

This setting is used to select the mode of operation of the sensor:

Selecting Infinity '∞' will put the sensor into Photocell Advance mode. the stand-by period is effectively controlled by the daylight sensor (Automatic on/off operation based upon daylight)

Selecting one of the time periods will disable 'automatic on' operation and the photocell will be used only to turn off the fixture automatically. The selected time will determine the period before the fixture switches completely off from the stand-by dimming level in periods of absence.

	1	2	3	
I	●	●	●	∞s
II	●	●	○	10s
III	●	○	○	1min
IV	○	●	○	5min
V	○	○	●	10min
VI	○	○	○	30min
VII	○	○	○	1h
VIII	○	○	○	∞

### 5. Stand-by Dimming Level

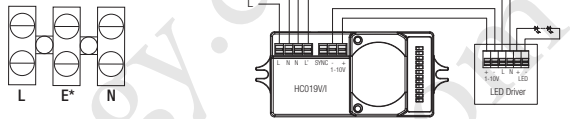
This setting is used to select the desired dimmed light level used in periods of absence for enhanced comfort and safety. In Photocell Advance mode, it is also the level the fixture will automatically come on at when the natural daylight falls below the daylight threshold setting.

	1	2	
I	●	●	10%
II	●	○	20%
III	○	●	30%
IV	○	○	50%

## Terminations and wiring diagrams

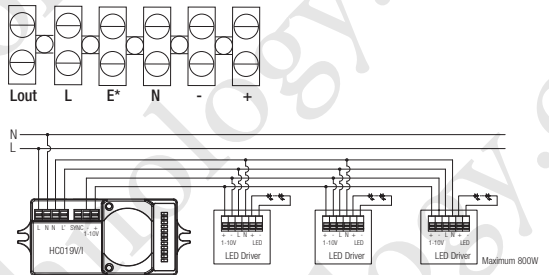
### Basic

Point-by-point basic end user installation



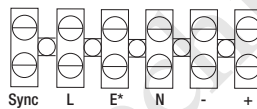
### Basic - 'Master'

Loop-out provision to other non-sensor luminaires (max. load 800W, recommended total 50m max. for -/+)



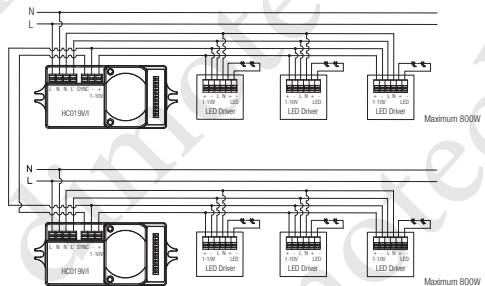
### Synchronised - 'Master'

Sync terminal to other sensor luminaires (max. load 800W, recommended total 50m max. for each -/+) 1-10V circuit



By connecting the "SYNC" terminals in parallel (maximum 10pcs, see wiring diagram), no matter which sensor detects motion, all HC019V/I in the group will turn on the lights when surrounding natural light is below the daylight threshold. The sensor antennas are effectively 'shared' and the detection area is widely enlarged in this way. For maximum flexibility, the operational settings such as hold-time, stand-by period, stand-by dimming level and daylight threshold are programmable on each individual unit.

Note: To avoid fixtures turning on unnecessarily, daylight sensing takes priority on a point-by-point basis. Occupancy sensing (SYNC) is disabled on those units in which the ambient light exceeds the daylight threshold.




\*Earth if required - (no earth connection necessary on HC019V/I)

# Test Verification of Conformity

Verification Number: 190925152GZU-VOC001

On the basis of the referenced test report(s), sample(s) tested of the below product have been found to comply with the standards harmonized with the directives listed on this verification at the time the tests were carried out. Other standards and Directives may be relevant to the product. This verification is part of the full test report(s) and should be read in conjunction with it <them>. This verification replaces previous verification dated: 16-08-2018: 140625045GZU-001

Once compliance with all product relevant  mark directives are verified, including any relevant e.g. risk assessment and production control, the manufacturer may indicate compliance by signing a Declaration of Conformity themselves and applying the mark to products identical to the tested sample(s).

Applicant Name & Address:	Hytronik Electronics Co., Ltd. 3rd Floor, block C, Complex building 155#, Bai'gang Road South Bai'gang Village, Xiao Jin Kou Town Huicheng District, Huizhou, Guangdong, China
Product Description:	Lighting control switch (Motion sensor)
Ratings & Principle Characteristics:	See appendix
Models/Type References:	See appendix
Brand Name:	HYTRONIK
Relevant Standards:	EN 60669-2-1: 2004 +A1: 2009+ A12: 2010; EN 60669-1: 2018; EN 62493: 2015
Verification Issuing Office Name & Address:	Intertek Testing Services Shenzhen Ltd. Guangzhou Branch Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD, Guangzhou, China
Date of Tests:	25 September 2019 to 31 October 2019
Test Report Number(s):	190925152GZU-001

Additional information in Appendix.

Signature 

Name: Shelley Ying

Position: Technical Manager

Date: 19 November 2019

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## APPENDIX: Test Verification of Conformity

This is an Appendix to Test Verification of Conformity Number: 190925152GZU-VOC001

Manufacturer:	Hytronik Electronics Co., Ltd.  3rd Floor, block C, Complex building, 155#, Bai'gang road south, Bai'gang village, Xiao Jin Kou town, Huicheng district, Huizhou, Guangdong, China
Ratings & Principle Characteristics:	220-240 VAC; 50/60 Hz; Micro-gap; IP20; Integral type;  HC005S; DS05; HC005S/I: Max. 800 W for incandescent Lamp and Max. 400 W for fluorescent Lamp;  HC017V; HC018V; HC019V; HC019V/I; HC019V/DH: Max. 800 W for fluorescent Lamp;  HC018V /RF; HC023RF; HC024RF: Max. 1200 W for incandescent Lamp and Max. 400 W for fluorescent Lamp
Models/Type References:	HC005S; DS05; HC017V; HC018V; HC019V; HC018V /RF; HC023RF; HC024RF; HC005S/I; HC019V/I; HC019V/DH (total 11 models)

Signature



**Name:** Shelley Ying

**Position:** Technical Manager

**Date:** 19 November 2019

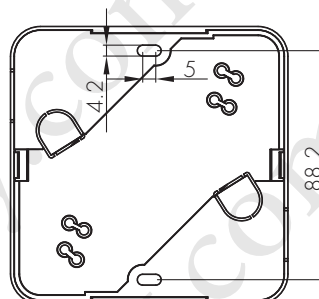
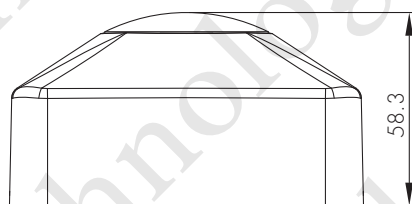
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## IP20 Housing for HF Motion Sensor

HC-IP20

**HYTRONIK**®

### Mechanical structure



Below sensors can be mounted inside the IP20 box, for stand alone independent electrical installation.  
(the milky lens allows natural light come through)

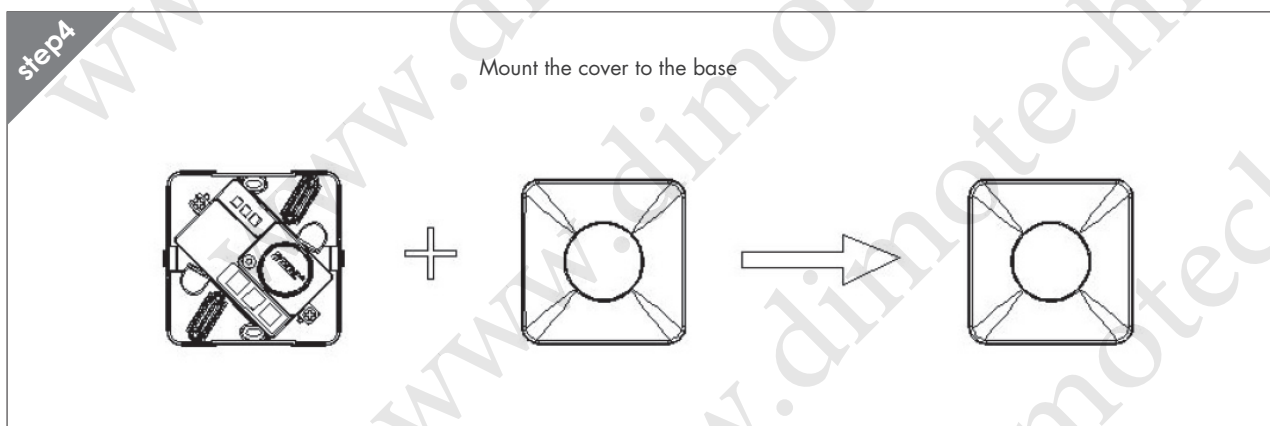
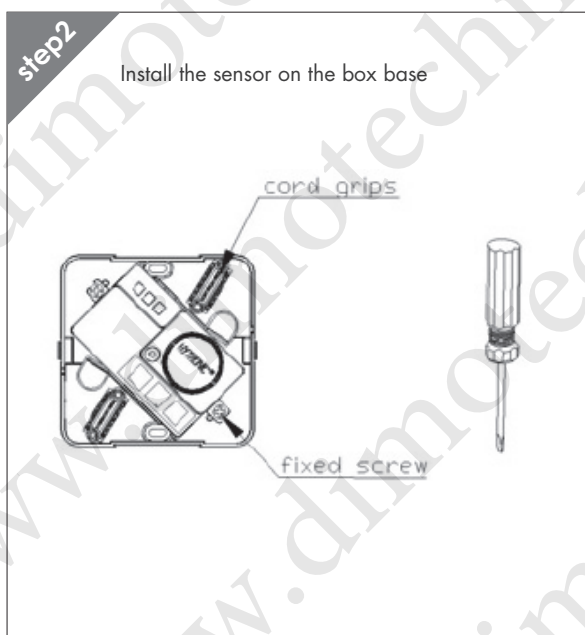
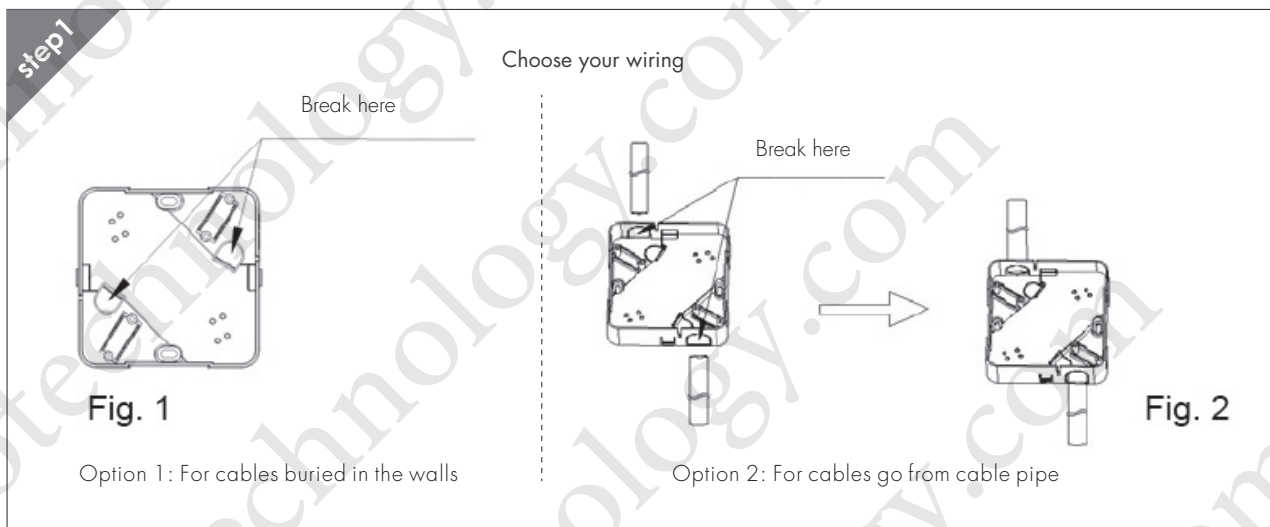


IP20 box



Stand-alone version  
microwave motion sensor

• • •

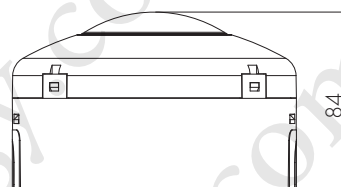
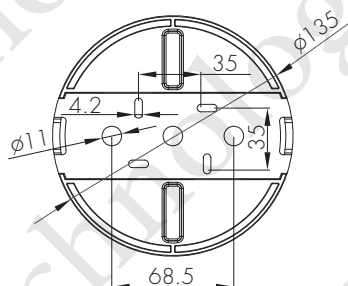


## IP65 Housing for HF Motion Sensor

HC-IP65

**HYTRONIK**®

### Mechanical structure



Putting the sensors inside the IP65 box, they are then safe and ready for independent installation. They are 2 colors of the box: transparent PC for daylight, and white PC when the daylight sensor is not intended to use.



...



IP65 box



Stand-alone version  
microwave motion sensor

## Installation Instructions

step1

Put motion sensor into the IP housing and click the cover on

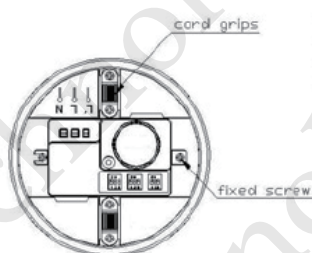


Fig 1.1

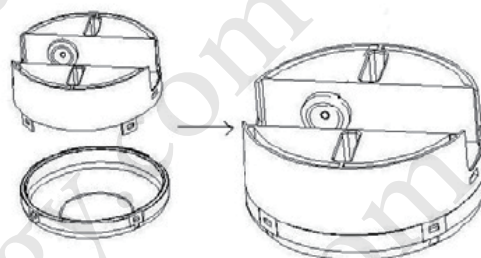


Fig 1.2

step2

Mounting bracket (three options):

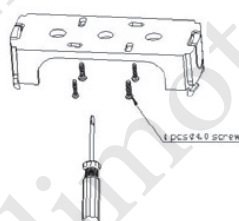


Fig 2.1

Option 1: Mount bracket to flat surface with screws

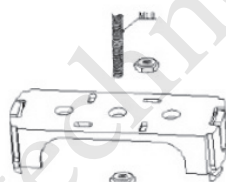


Fig 2.2

Option 2: Mount bracket to ceiling pole with nut

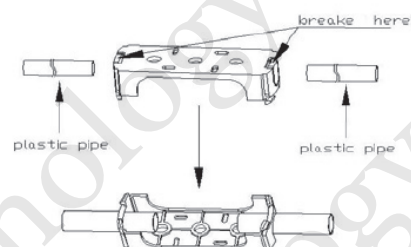


Fig 2.3

Option 3: Put pipe through the bracket hole

step3

Mount the bracket to the cover

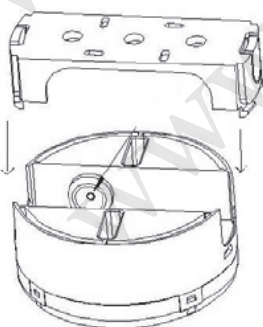


Fig 3.1

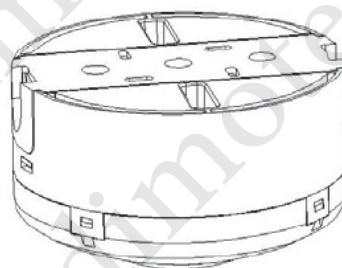


Fig 3.2