Tri-level Control HF Sensor

HC403VRC-KD/I
Detached Version with Photocell Advance™

HYTRONIK®

Applications

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

Suitable for building into the fixture:

- Office / Commercial Lighting
- 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
- One-key commissioning via programmable remote control
- One-touch daylight learning via remote control
- Zero crossing detection circuit reduces in-rush current and prolongs relay life
- Loop-in and loop-out terminal for efficient installation
- 5 Year, 50,000hr Warranty

Technical Data

Input Characteristics

Model No.	HC403VRC-KD/I
Mains voltage	120~277VAC 50/60Hz
Stand-by power	<0.5W
Load ratings:	
Capacitive	400VA @ 120VAC
	800VA @ 230VAC
	1000VA @ 277VAC
Warming-up	20s

Safety and EMC

EMC standard (EMC)	EN55015, EN61000
Safety standard (LVD)	EN60669-1
Radio Equipment (RED)	EN300440, EN301489, EN62479
Certification	Semko, CB, CE , EMC, RED, RCM

CE emc RED CB IP20

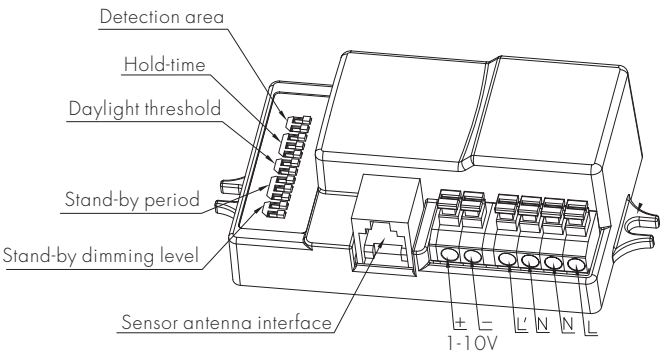
Sensor Data

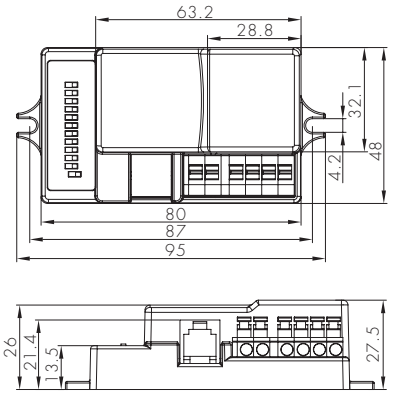
Model No.	HC403VRC-KD/I
Sensor principle	High Frequency (microwave)
Operation frequency	5.8GHz +/- 75MHz
Transmission power	<0.2mW
Detection range	Max. (Ø x H) 8m x 5m
Detection angle	30° ~ 150°
DIP Switch Settings:	
Sensitivity	10% / 50% / 75% / 100%
Hold-time	5s ~ 30min (selectable)
Daylight threshold	2 ~ 50 lux, disabled
Stand-by period	0s ~ 1h, +∞ (selectable)
Stand-by dimming level	10% / 20% / 30% / 50%

Environment

Operation temperature	Ta: -20°C ~ +60°C
Case temperature (Max.)	Tc: +80°C
IP rating	IP20

Sensor Main body

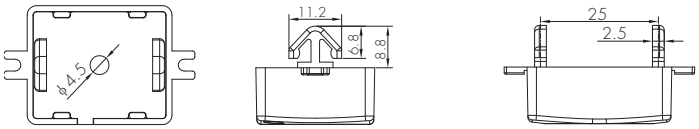


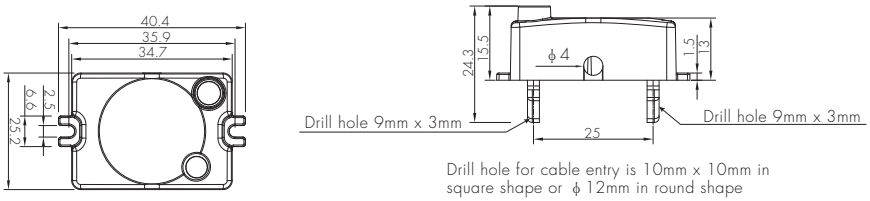


Detached Sensor Antenna Module

Model SAM5/I

Super-compact sensor antenna, with Hytronik specially designed intelligent photocell built inside.

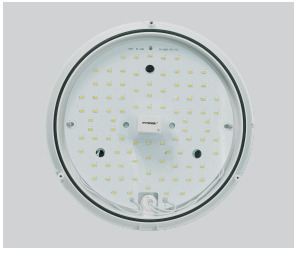




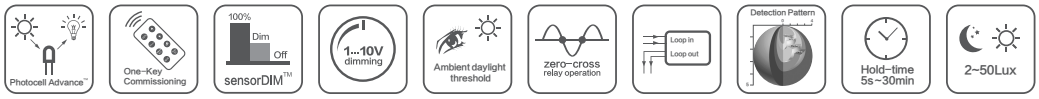
Typical applications:

1. LED bulkhead or low bay, which has limited space and ordinary sensor is too big or too thick to be built in, also easy to cast shadow in the shade.

For LED bulkhead



In such applications, only the detached small antenna is needed on the outer surface, while the sensor body and the driver/ballast can be hidden behind the panel. No shadow is cast in the shade.



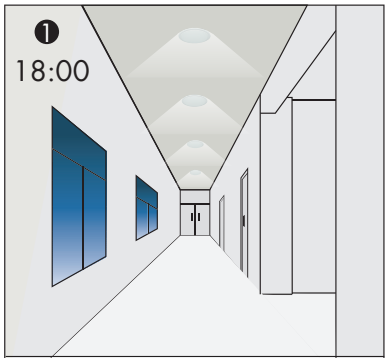
Functions and Features

1 Photocell Advance™ Function

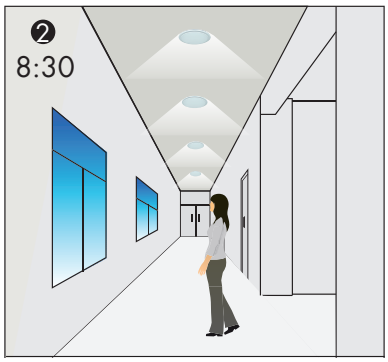
It's well known that LED lights have a totally different spectrum to natural light. Hytronik uses this principle and comes up with special photocell and sophisticated software algorithm to measure and differentiate natural light from LED light from behind the fixture cover, so that this photocell can 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:

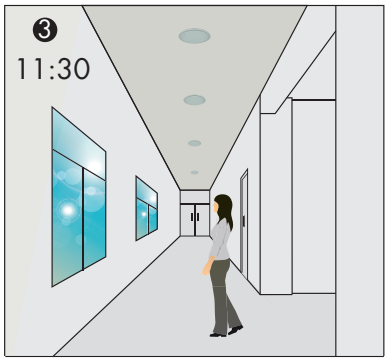
Hold-time: 10min Daylight threshold: 50lux Stand-by dimming level: 10% Stand-by period: +∞



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



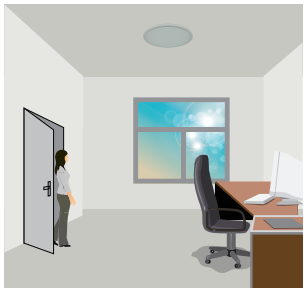
With insufficient natural light, the light switches on at 100% when there is motion detected.



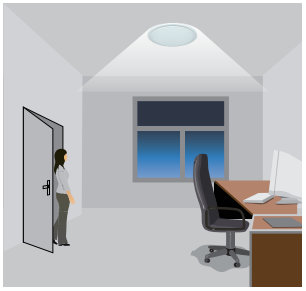
The light turns off completely whenever natural light reaches above pre-set daylight threshold, even with presence.

2 Tri-level Control (Corridor Function)

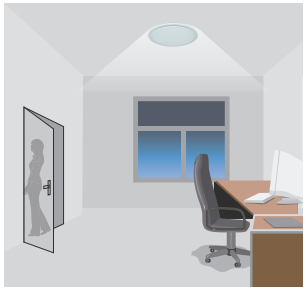
Hytronik builds this function inside the motion sensor to achieve tri-level control, for some areas which require a light change notice before switch-off. The sensor offers 3 levels of light: 100%-->dimmed light (natural light is insufficient) -->off; and 2 periods of selectable waiting time: motion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

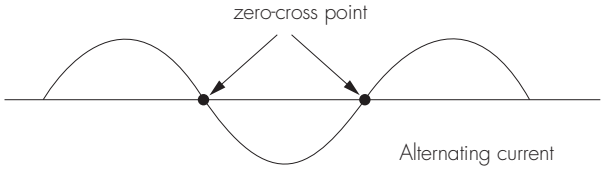


After hold-time, the light dims to stand-by level if the surrounding natural light is below the daylight threshold.

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

3 Zero-cross Relay Operation

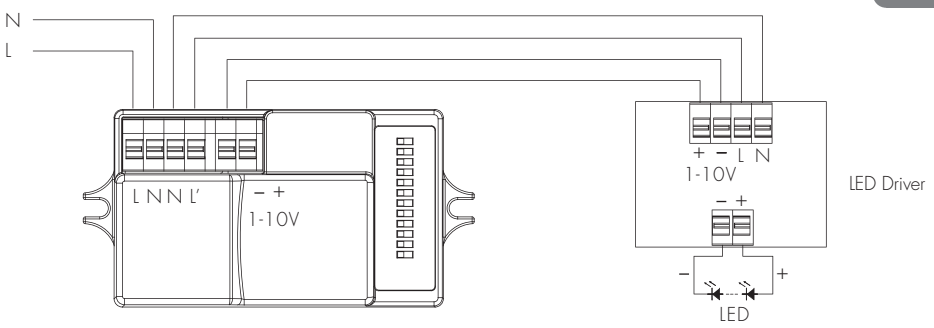
Designed in the software, sensor switches on/off the load right at the zero-cross point, to ensure that the in-rush current is minimised, enabling the maximum lifetime of the relay.



4 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.

Wiring Diagram



Settings (Remote Control HRC-11)

ON/OFF 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 Reset Settings

Press button "RESET", all settings go back to DIP switch settings.

Shift 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.

SEMI-AUTO AUTO AUTO/SEMI-AUTO mode

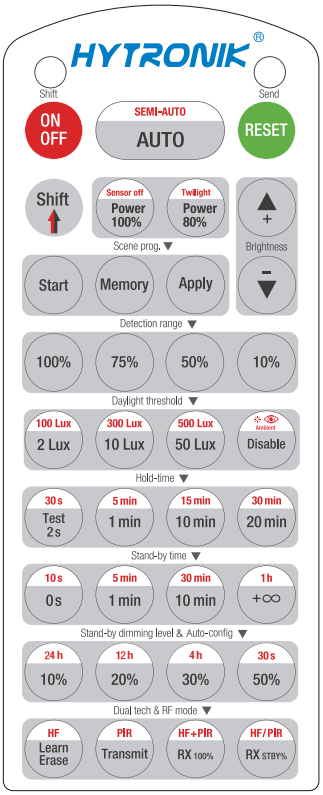
Press button "AUTO" to initiate automatic mode. The sensor starts working and all settings remain as before the light is switched ON/OFF.
Note: the function of SEMI-AUTO is disabled.

Sensor off Power 100% Twilight Power 80% 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.



HRC-11

Start Memory Apply 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

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

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 light is 100% on whenever there is motion detected, and remains at the stand-by dimming level when no presence after 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%.

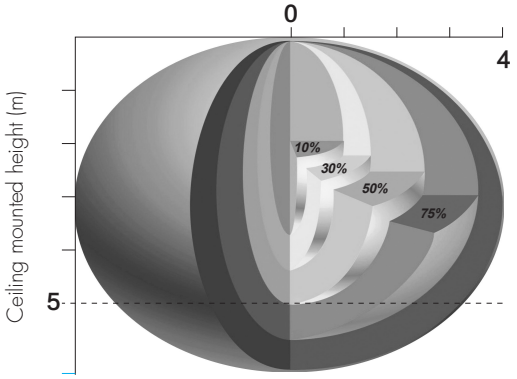
Auto-configuration function

All buttons in this zone are disabled.

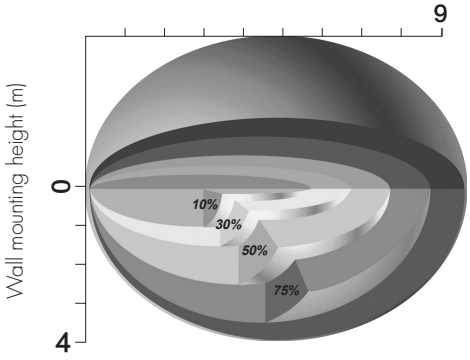
Dual tech & RF mode

All buttons in this zone are disabled.

Detection Pattern



Ceiling mounted detection pattern (m)



Wall mounted detection pattern (m)

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%