HYTRONIK HC038V Tri-level Control Sensor Instruction Manual

Contents

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HYTRONIK HC038V Tri-level Control Sensor

Product Information

The Tri-level Control Sensor HC038V HCD038 is a detached linear version with a remote control. It is an occupancy detector with tri-level dimming control suitable for indoor use in various applications such as offices, commercial lighting, classrooms, and meeting rooms. This product is designed for new luminaire designs and installations.

Key Features:

- 24-hour daylight monitoring with a dawn/dusk sensor
- Special photocell to measure and differentiate natural light from LED light
- Intelligent Lux off function to set the daylight threshold before motion detection
- Tri-level dimming control based on occupancy (also known as corridor function)
- Optional 1-10V or DALI dimming control method
- Ambient daylight one-touch daylight learning via remote control
- Zero crossing detection circuit reduces the in-rush current and prolongs relay life (HC038V)
- Loop-in and loop-out terminal for efficient installation (HC038V)
- 5-year warranty

Product Usage Instructions

Before using the Tri-level Control Sensor HC038V HCD038, please ensure the following:

- Verify that the mains voltage is within the range of 220-240VAC and the frequency is 50/60Hz.
- Ensure that the product is installed indoors and suitable for the intended application such as office, commercial lighting, classrooms, or meeting rooms.

To use the Tri-level Control Sensor HC038V HCD038:

1. Connect the sensor to the mains power supply using the appropriate electrical connections.
2. If using the optional dimming control method, choose either the 1-10V or DALI dimming control and connect it accordingly.
3. Position the sensor in a suitable location where it can detect occupancy and differentiate between natural light and LED light.
4. Use the remote control to set the daylight threshold before motion detection. This will ensure the sensor responds appropriately to the available natural light.
5. Take advantage of the tri-level dimming control based on occupancy. This function allows for energy-efficient lighting by adjusting the brightness based on occupancy levels.
6. If using the HC038V model, utilize the loop-in and loop-out terminal for efficient installation.
7. Enjoy the benefits of the Tri-level Control Sensor HC038V HCD038, such as its 24-hour daylight monitoring, intelligent Lux off function, and 5-year warranty.

Note: Please refer to the user manual for detailed instructions on specific settings and configuration options.

Tri-level Control Sensor

HC038V HCD038
Detached Linear Version with Remote Control

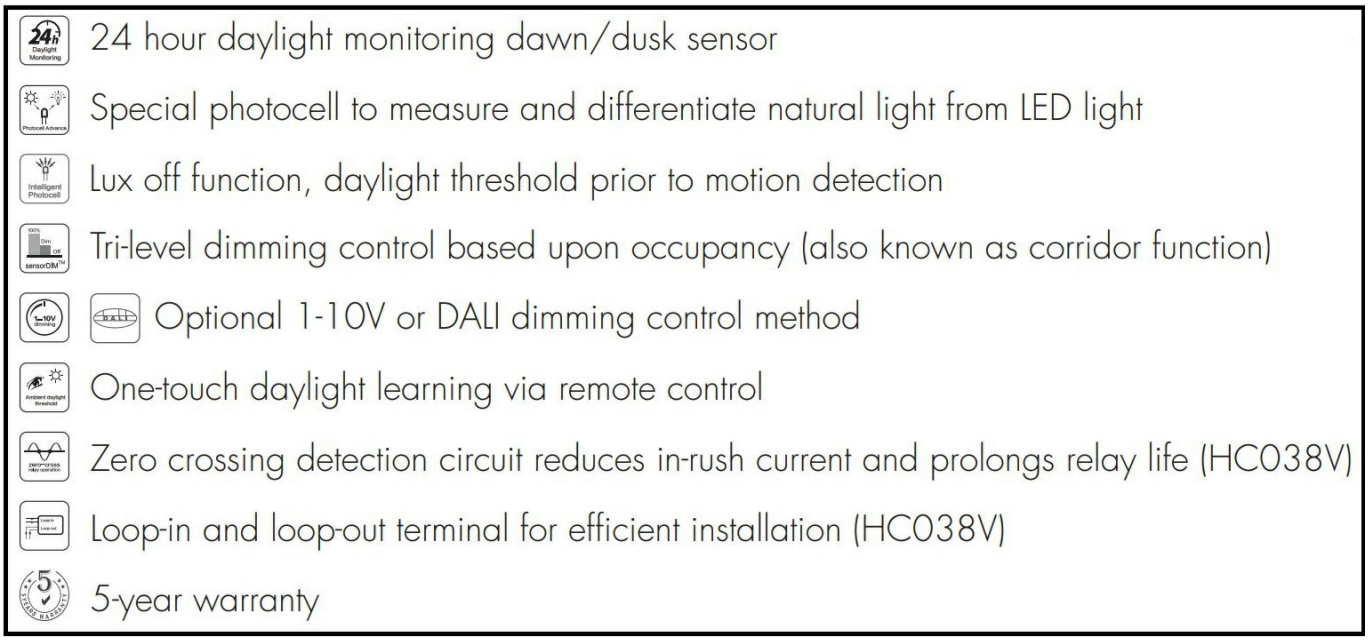
Applications
Occupancy detector with tri-level dimming control suitable for indoor use:

- Office / Commercial Lighting
- Classroom

- Meeting Room

Use for new luminaire designs and installations

Features



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

Environment

Operation temperature	Ta: -20OC ~ +55OC
Case temperature (Max.)	Tc: +80OC
IP rating	IP20

Safety and EMC

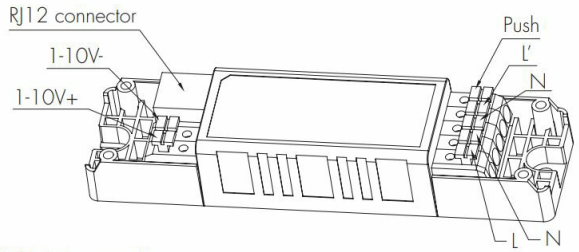
EMC standard (EMC)	EN55015, EN61000-3-2/-3-3
Safety standard (LVD)	EN60669-1/-2-1, AS/NZS60669-1/-2-1
Radio Equipment (RED)	EN300440, EN301489-1/-3, EN62479
CERTIFICATION	CB, CE, EMC, LVD, RCM

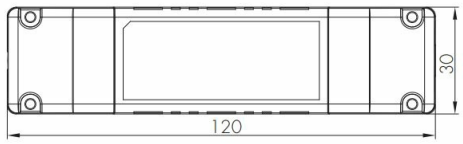
Sensor Data

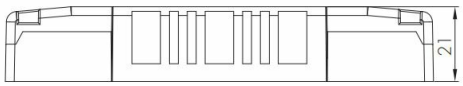
Model No.		SAM7 SAM7/I SAM7/FM HIR02 HIR04 HIR19
Sensor principle:		
SAM7 & SAM7/I SAM7/FM		High Frequency (microwave)
HIR02 HIR04 HIR19		PIR Detection
Operation frequency		5.8GHz +/- 75MHz
Transmission power		<0.2mW
Detection range:		
SAM7 & SAM7/I SAM7/FM		
Max installation height Max Detection range (Ø)		6m 12m (Diameter)
HIR02	HIR04	
Max installation height Max Detection range (Ø)		3m 6m (Diameter)
HIR19		
Max installation height		15m (forklift)
		12m (single person)
Max Detection range (Ø)		24m (forklift)
		20m (single person)
Detection angle		30O ~ 150O

Sensor Main Body

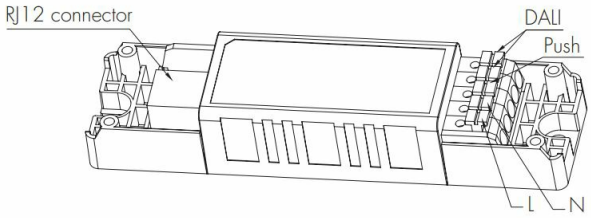
HC038V (1-10V output)

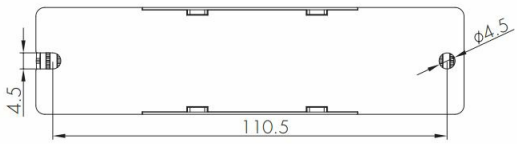






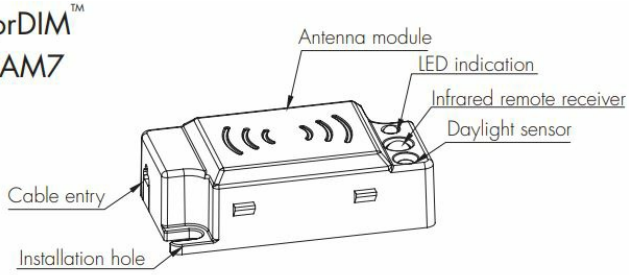
HCD038 (DALI output)

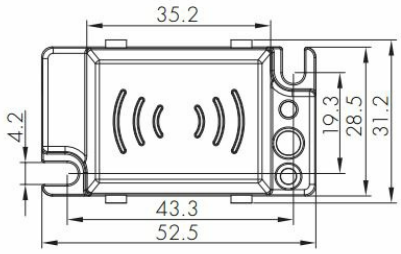




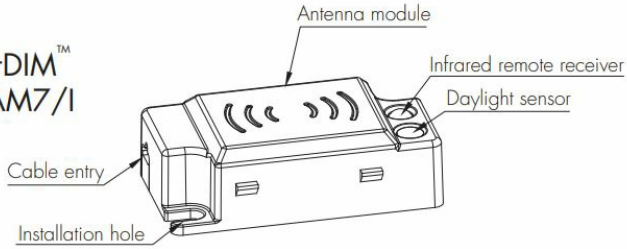
There are eight different sensor antenna modules to choose from:

HF sensorDIM™
Model SAM7

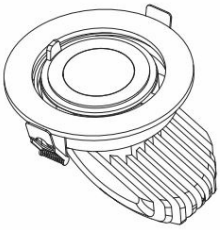


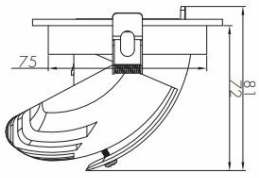


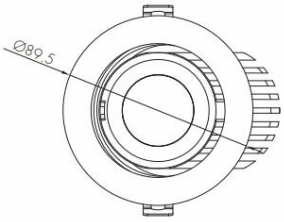
HF sensorDIM™
Model SAM7/I



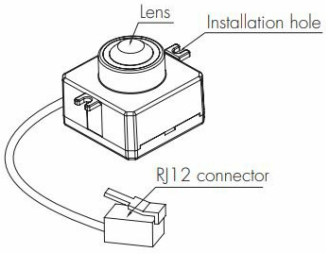
HF sensorDIM™
Model SAM7/AA

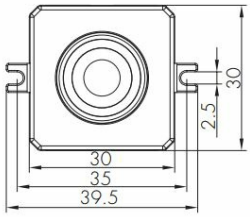


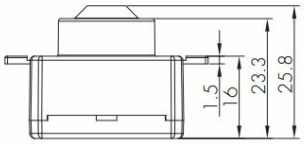




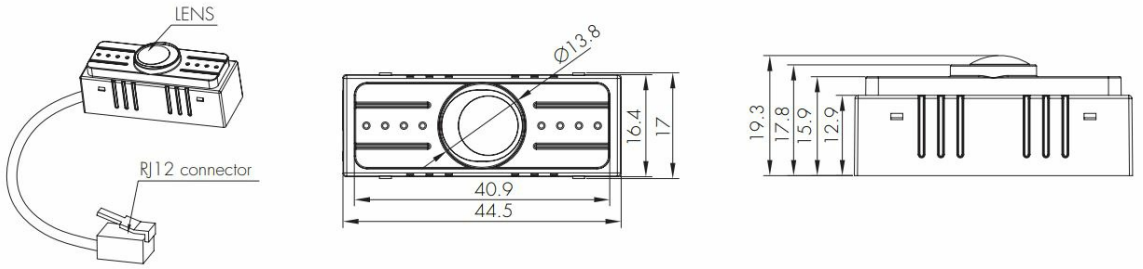
PIR Sensor Head
Model HIR02





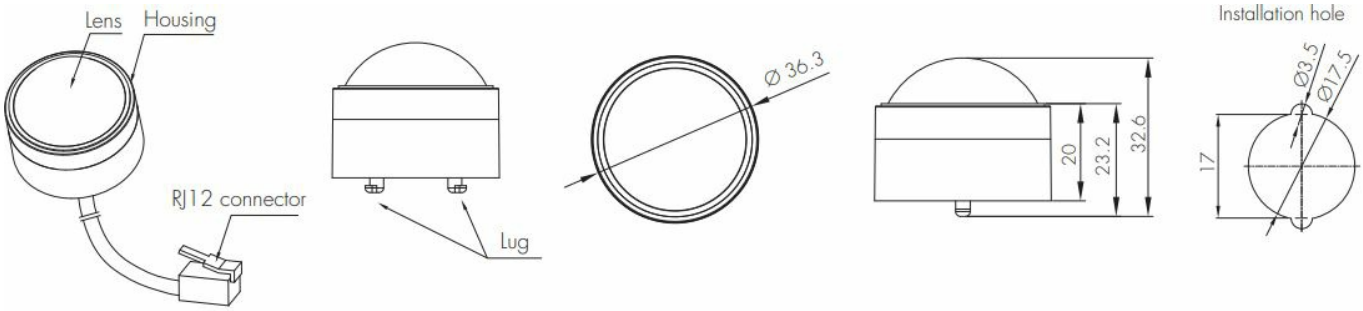


PIR Sensor Head
Model HIR04

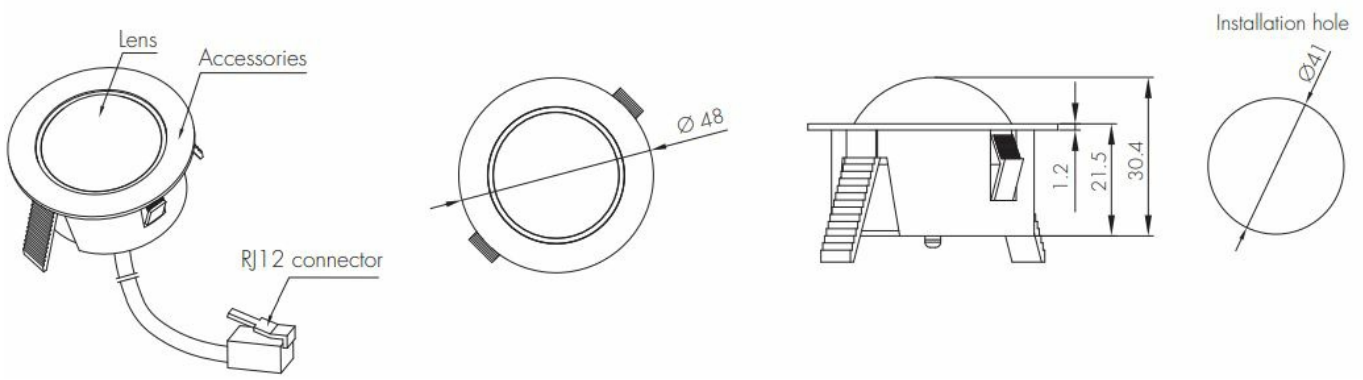


PIR Sensor Head

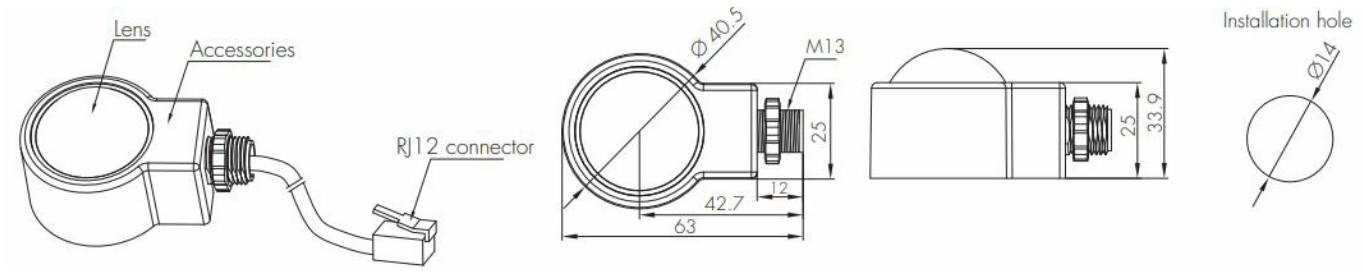
HIR19/S
Surface mounting For high-bay application IP65 (facia/lens part) The cable length is around 30cm.



HIR19/F
Flush mounting For high-bay application IP65 (facia/lens part) The cable length is around 30cm.



HIR19/C
Screw to the luminaire by conduit For high-bay application IP65 (facia/lens part) The cable length is around 30cm



8 sensor antennas and 2 control units offer 16 combinations in total:

- Microwave antenna SAM7 + DALI control HCD038
- Microwave antenna SAM7 /1 + DALI control HCD038

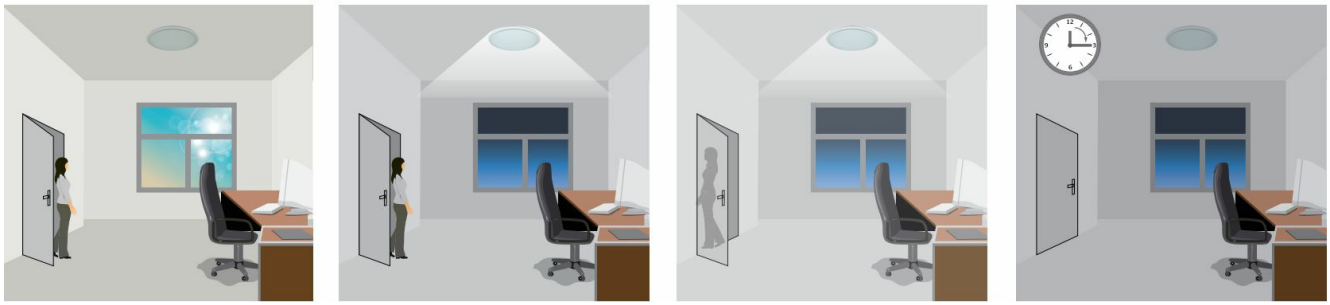
- Microwave antenna SAM7 / AA + DALI control HCD038
- PIR antenna HIRO2 + DALI control HCD038
- PIR antenna HIR04 + DALI control HCD038
- PIR antenna HIR19/S + DALI control HCD038
- PIR antenna HIR19/F + DALI control HCD038
- PIR antenna HIR19/C + DALI control HCD038
- Microwave antenna SAM7 + 1-10V control HC038V
- Microwave antenna SAM7/1 + 1-10V control HCO38V
- Microwave antenna SAM7 /AA + 1-10V control HCO38V
- PIR antenna HIRO2 + 1-10V control HCO38V
- PIR antenna HIRO4 + 1-10V control HC038V
- PIR antenna HIR 19/S + 1-10V control HC038V
- PIR antenna HIR19/F + 1-10V control HC038V
- PIR antenna HIR 19/C + 1-10V control HC038V

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 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.

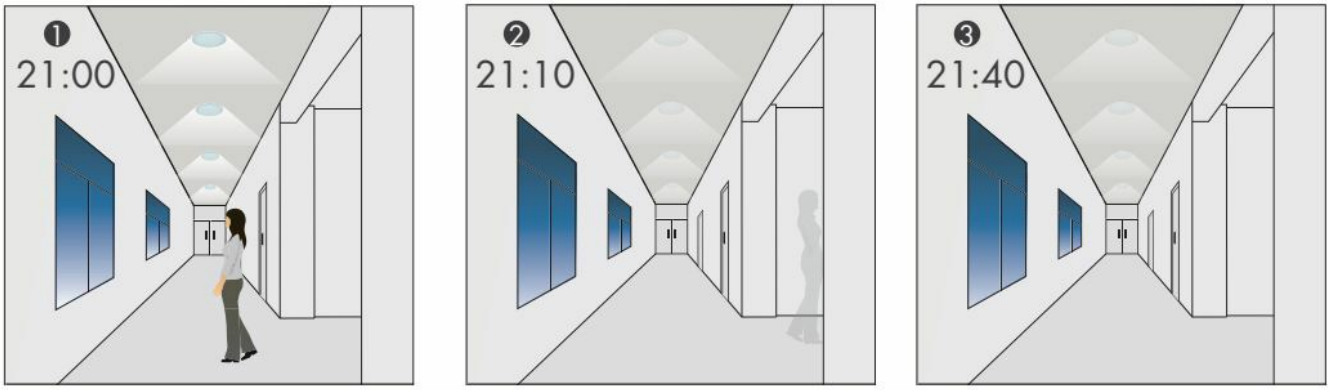
- With sufficient natural light, the light does not switch on when presence is detected.
- With insufficient natural light, the sensor switches on the light automatically when presence is detected.
- After hold-time, the light dims to stand-by level if the surrounding natural light is below the daylight threshold.
- The light switches off automatically after the stand-by period elapses.



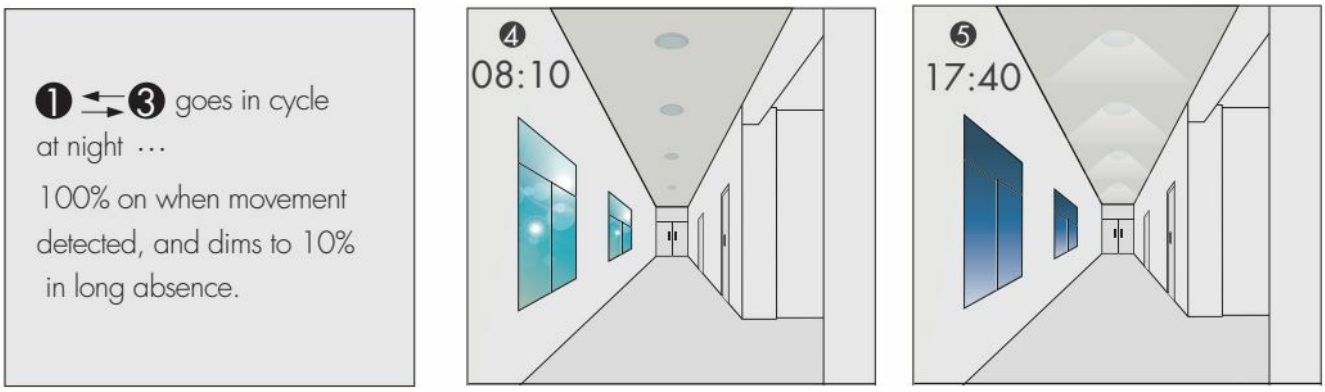
24h Daylight Monitoring Function (SAM7)
Our innovative and patented software enables our antenna with a built-in daylight sensor to provide a “smart photocell” function. This function is activated when the stand-by period is set to “+∞ ”.

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

- The light dims to a stand-by level after the hold time.
- The light remains at a dimming level at night.

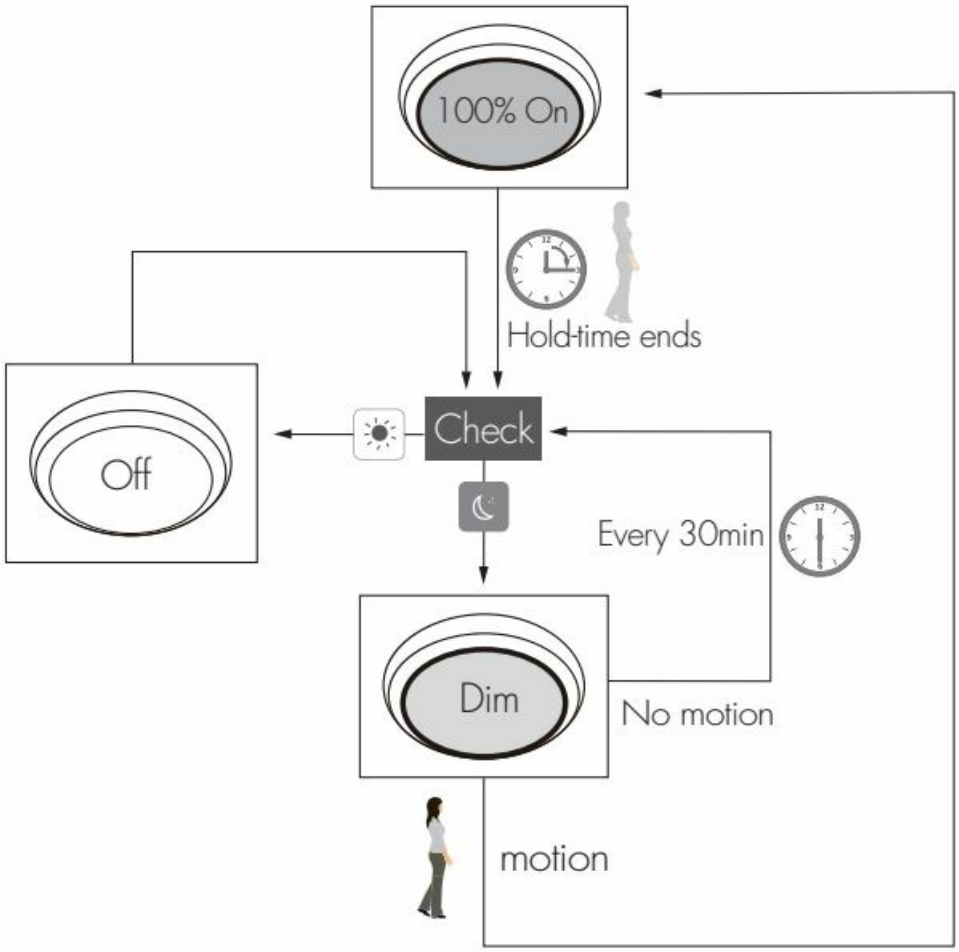


- The light turns off completely when natural light lux exceeds the daylight threshold pre-set.
- The light automatically turns on at 10% when natural light is insufficient (no motion).



Settings on this demonstration:

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



Photocell AdvanceTM 3 Function (SAM7/I, HIR04)
It's well known that LED lights have a different spectrum than natural light. Hytronik uses this principle and comes up with a 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 on the existing patents in the market.

Lux Off Function (SAM7/I, HIR02, HIR04)
The light turns off automatically whenever the surrounding natural light lux level exceeds the daylight threshold for more than 5 minutes, even if there is motion detected. For HIR02 and HIR04, please pay attention that if the stand-by period is pre-set to infinity "+", the fixture never switches off but stays at a dimming level, even when natural light is sufficient.

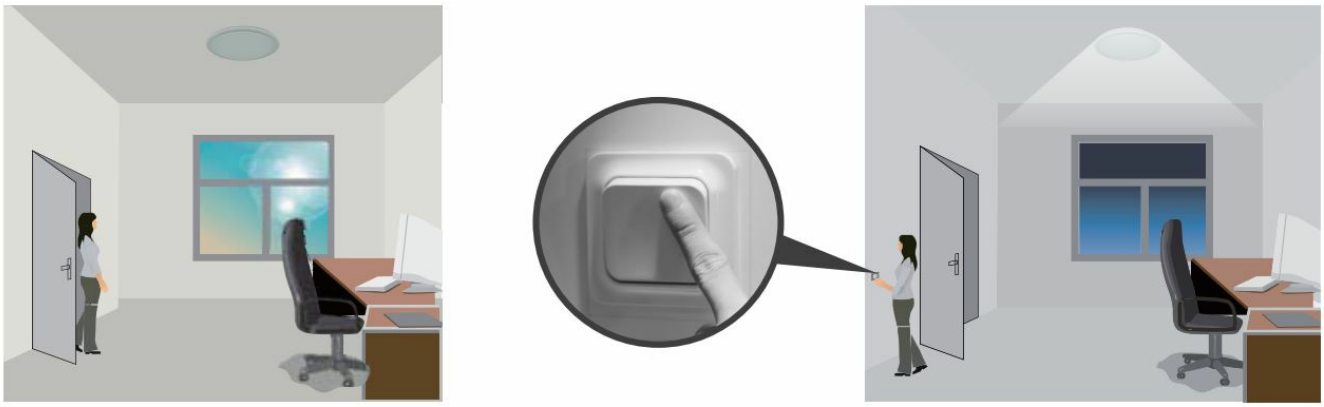
Manual Override
This sensor reserves access to the manual override function for the end-user to switch on/off, or adjust the brightness by push-switch, which makes the product more user-friendly and offers more options to t some extra-ordinary demands:

- **Short Push (<1s):** on/off function;
  - **On → Off:** the light turns off immediately and cannot be triggered ON by motion until the expiration of the 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 the ambient Lux level exceeds the daylight threshold or not.
- **Long Push (>1s):** adjust the hold-time brightness level between 10% and 100%.

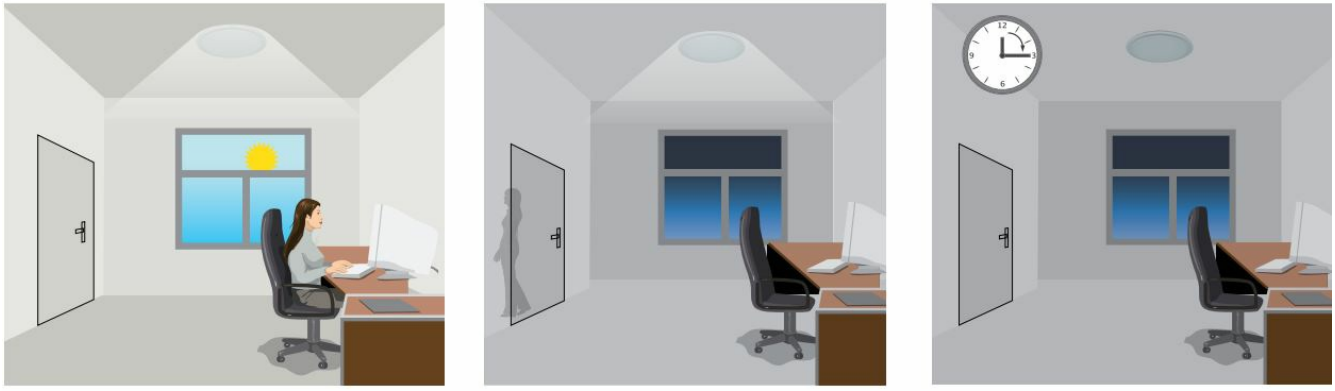
Note: if the end-user does not want this manual override function, just leave the "push" terminal unconnected to any wire.

Semi-auto Mode (Absence Detection)
It is easy to forget to switch off the light, in the office, corridor, or even at home. And in many other cases, people do not want to have a sensor to switch on the light automatically, for example, when people just quickly pass by, there is no need to have the light on. The solution is to apply this “absence detector”: a motion sensor is employed, but only activated on the main press of the push switch, the light keeps being ON in the presence, dims down in the absence, and eventually switches off in the long absence. This is a good combination of sensor automation and manual override control, to have the maximum energy saving, and at the same time, to keep efficient and comfortable lighting.

- The light does not switch on when there is a presence being detected.
- Short push to activate the sensor and switch on the light
- The light turns on full, and the sensor stays in sensor mode

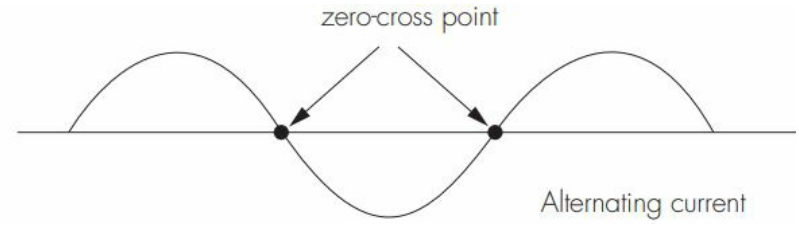


- The light keeps being ON during the presence.
- People left, and the light dimmed to stand-by level after the hold time.
- The light switches off automatically after the stand-by period elapses.



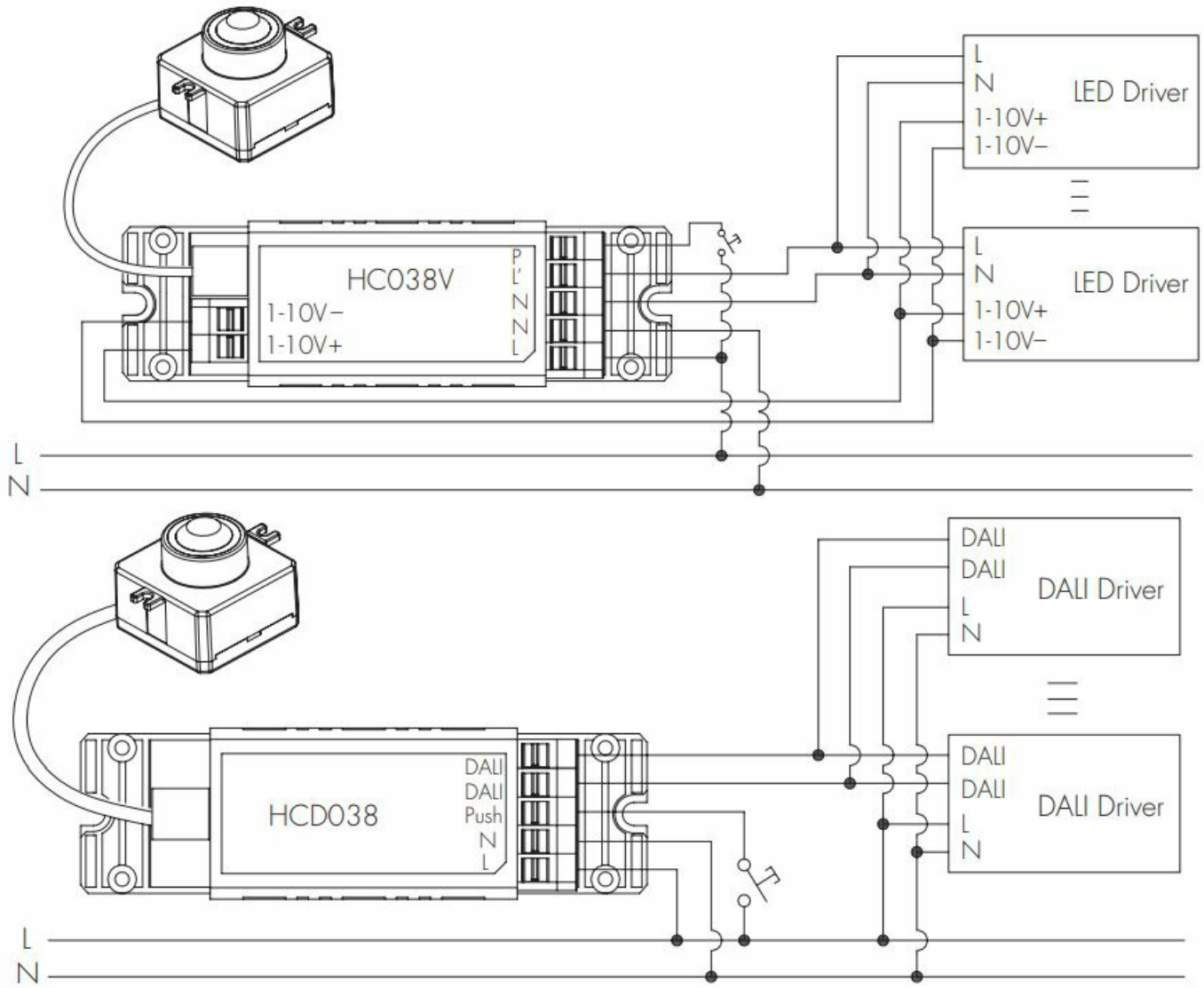
Note: The end-user can choose either function 5 or function 6 for the application. The default function is the manual override.

Zero-cross Relay Operation (HC038V)
Designed in the software, the sensor switches on/off the load right at the zero-cross point, to ensure that the in-rush current is minimized, enabling the maximum lifetime of the relay.



Loop-in and Loop-out Terminal (HC038V)

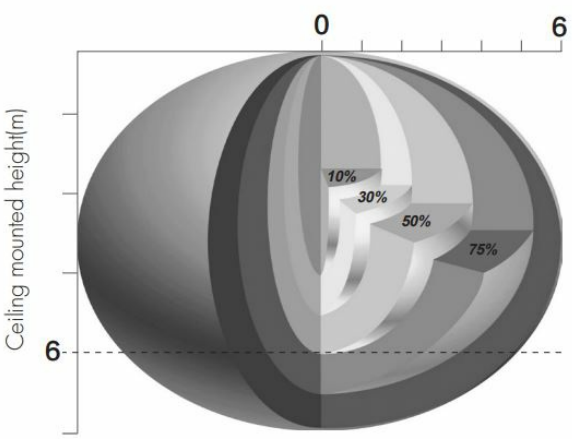
Double L N terminal makes it easy for wire loop-in and loop-out and saves the cost of terminal block and assembly time.



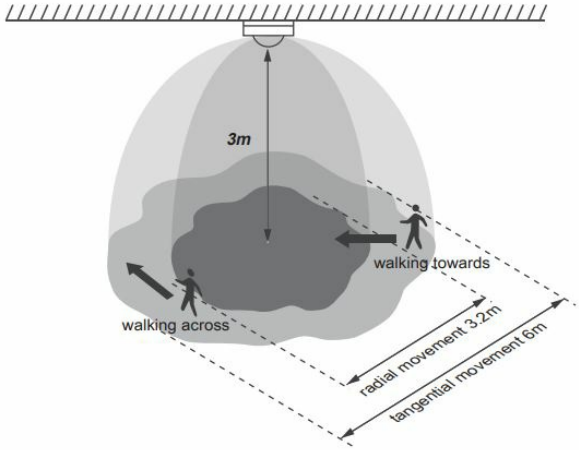
1. 200 meters (total) max. for 1mm² CSA (Ta = 50°C)
2. 300 meters (total) max. for 1.5mm² CSA (Ta = 50°C)

Detection Pattern (Ceiling mounted)

Model SAM7 & SAM7/I & SAM7/AA



Model HIR02 & HIR04

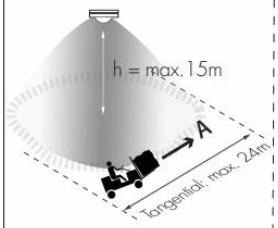


HIR19 (High-bay)

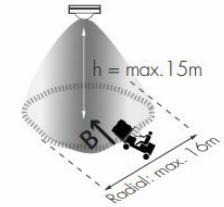
HIR19: High-bay lens detection pattern for **forklift** @ Ta = 20°C

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

A: Tangential movement



B: Radial movement

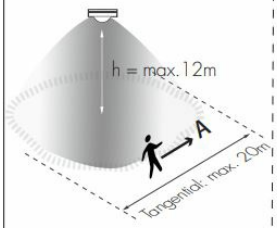


Mount height	Tangential (A)	Radial (B)
10m	max 380m² (Ø = 22m)	max 201m² (Ø = 16m)
11m	max 452m² (Ø = 24m)	max 201m² (Ø = 16m)
12m	max 452m² (Ø = 24m)	max 201m² (Ø = 16m)
13m	max 452m² (Ø = 24m)	max 177m² (Ø = 15m)
14m	max 452m² (Ø = 24m)	max 133m² (Ø = 13m)
15m	max 452m² (Ø = 24m)	max 113m² (Ø = 12m)

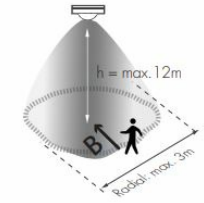
HIR19: High-bay lens detection pattern for **single person** @ Ta = 20°C

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

A: Tangential movement

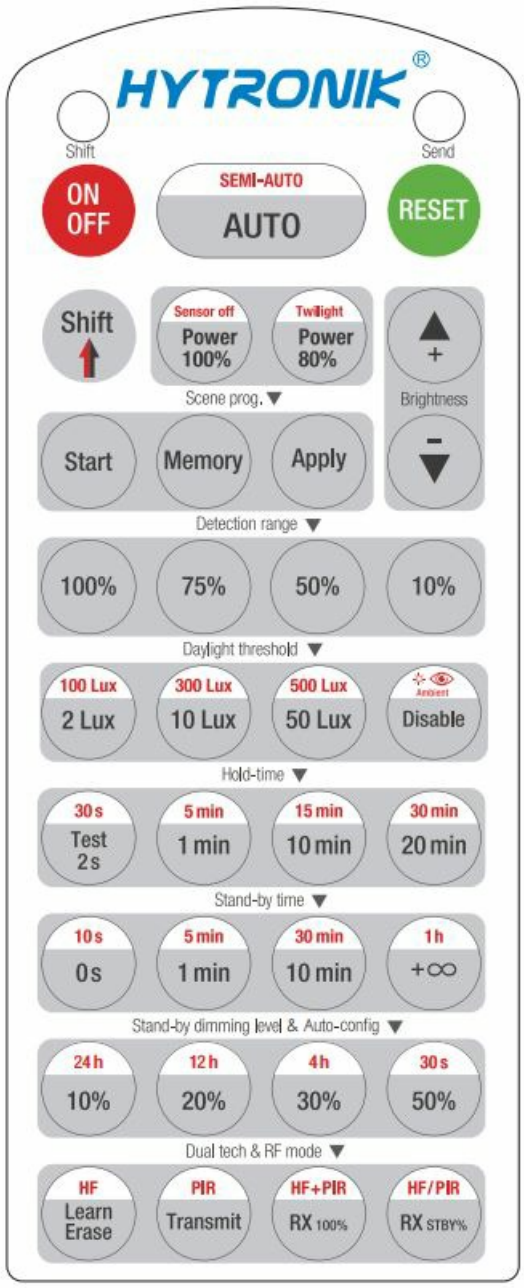


B: Radial movement



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)

Settings (Remote Control HRC-11, for SAM7/I , HIR04 and HIR19)



HRC-11

Permanent ON/OFF function

- Press the button “ON/OFF” to select permanent ON or permanent OFF mode.
- Press buttons “AUTO”, “RESET” or “Ambient” to quit this mode.
- The mode will change to AUTO Mode after power failure.

Reset Settings

- Press the button “RESET”, and all settings go back to default values.
- Detection range: 100%; Hold-time: 5min; Stand-by period: 10min;Stand-by dinmming level:10%; Lux disabled

Shift Button

- Press the 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 the 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 the button “Shift”, and the red LED flashes for indication.
2. Press the 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 standby 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 during hold time.

Scene program – 1-key commissioning

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

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

Detection range
All buttons in this zone are disabled for HIR04.

Daylight threshold

- Press buttons in the zone “ Daylight threshold” to set the daylight sensor at 2Lux/ 10Lux / 50Lux / 100Lux / 300Lux / 500Lux / Disable.

Note: To set the daylight sensor at 100Lux / 300Lux / 500Lux, press the “Shift” button first. Ambient daylight threshold

1. Press the button “Shift”, and the red LED starts to flash.
2. Press the 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 the 30s / 5min / 15min / 30min, press the “Shift” button first.
2. 2s is for testing purposes only, stand-by period and daylight sensor settings are disabled in this mode.

To exit from Test mode, press the button “RESET” or any button in “Hold-time”.

Stand-by time (corridor function)

- Press buttons in the 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 the 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-05, for SAM7 & HIR07/FM & HIR02)

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 the “Auto Mode”, “RESET” or “Scene Mode” buttons to quit this mode. The mode will change to AUTO Mode after power failure.

Sensor mode

- Press the “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 Reset function

- Press the “RESET” button, all settings go back to default settings.
- Detection range: 100%; Hold-time: 5min; Stand-by period: 10min;
- Stand-by dinmming level:10%; Lux disabled


Dim +/

- Long press “Dim +” or “Dim ” to adjust the light brightness during hold-time. “ + ” means dimming up, “ ” means dimming down.

Test mode
This button is for testing purposes 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.

Power output
By pressing these two buttons, the output shifts between 80% (at initial 10,000 hours) and 100%, for energy-saving purposes.


Ambient daylight threshold

- Press this button, the latest surrounding lux value overwrites the previous lux value learned, and it is set as the daylight threshold. This feature enables the fixture to function well in any real application circumstances.

Lux disable

- Press this button, and the built-in daylight sensor stops working, and all motion detected can turn on the lighting fixture, no matter how bright the natural light is.

M/A Auto mode / Semi-auto mode (absence detection)
By pressing this button, the sensor goes to Auto mode or Semi-auto mode (absence detection) function.

For SAM7, the buzzer beeps once if it’s Auto mode function, and beeps twice if it shifts to Semi-auto mode (absence detection). For HIR02, the LED indicator flashes if it’s Auto mode function, and is on for 2 seconds if it shifts to Semi-auto mode (absence detection).

Scene mode
There are 4 scene modes fixed program built into the remote control to choose for different applications:

Scene options	Detection range	Hold-time	Stand-by period	Stand-by dimming level	Daylight sensor
SC1	100%	1min	10min	10%	2Lux
SC2	100%	5min	10min	10%	2Lux
SC3	100%	10min	30min	10%	10Lux
SC4	100%	10min		10%	50Lux

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

Detection range

- Press the buttons of “detection range” to set the detection range at 10% /50% /100%.

***Note**: these buttons are invalid for antenna module HIR02.*

Hold-time

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

Daylight sensor

- Press the buttons of “daylight sensor” to set the daylight threshold at 2Lux / 10Lux / 50Lux.

Stand-by period (corridor function)

- Press the buttons of “stand-by period” to set the stand-by period at 0s / 10s / 1min / 10min / 30min / +∞. “0s” means on/off control; “+∞” means bi-level dimming control, the fixture never switches off when daylight sensor is

Stand-by dimming level

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

Additional Information / Documents

1. For a full explanation of Hytronik Photocell AdvanceTM technology, please kindly refer to **hytronik.com/download** ->knowledge ->Introduction of Photocell Advance
2. Regarding precautions for microwave sensor installation and operation, please kindly refer to **hytronik.com/download** ->knowledge ->Microwave Sensors – Precautions for Product Installation and Operation
3. Regarding precautions for PIR sensor installation and operation, please kindly refer to **hytronik.com/download** ->knowledge ->PIR Sensors – Precautions for Product Installation and Operation
4. The data sheet is subject to change without notice. Please always refer to the most recent release on

www.hytronik.com/products/ MotionSensors->Built-inHFSensorSensors->Built-inHFSensor

5. Regarding Hytronik standard guarantee policy, please refer to www.hytronik.com/download ->knowledge ->Hytronik Standard Guarantee Policy

Documents / Resources

	HYTRONIK HC038V Tri-level Control Sensor [pdf] Instruction Manual HC038V, HC038V Tri-level Control Sensor, Tri-level Control Sensor, Control Sensor, Sensor, HCD038

References

- Catalogue_Hytronik