

## Multi-Directional PIR Sensor

### HIR27/AA

DALI Output & Daylight harvest

# HYTRONIK®








## Product Description

HIR27/AA is a PIR standalone motion sensor, with one DALI channel output (80mA DALI power supply built-in). It is designed with a metal surface mount box and the detection angle is adjustable by needs. HIR27/AA is ideal for typical indoor applications such as offices, classrooms, healthcare, and other commercial areas (corridors and warehouses).



## Features

-  Daylight harvest function to regulate light output for maintaining required lux level.
-  Store settings in the remote for easy commissioning when programming multiple sensors.
-  Intelligent photocell - lights and sensors only operate when needed, natural light has priority.
-  Synchronisation terminal for grouping of sensors.
-  DALI bus power supply  
I guaranteed: 64mA  
I max: 80mA  
U rated: 15VDC
-  Support to control DT8 LED drivers
-  1 Push inputs for flexible manual control
-  Black & White & Gray metal surface mount box option
-  User-friendly design for installation
-  5-year warranty

## Technical Specifications

### Input & Output Characteristics

Operating voltage	220~240VAC 50/60Hz
Stand-by power	< 1W

### Sensor Data

Sensor Principle	PIR Detection
Ceiling-mounted Detection Range	Installation Height : 3m Max. Diameter (Ø) : 9m
	Installation Height : 5m Max. Diameter (Ø) : 12m
Wall-mounted Detection Range	Installation Height : 2.5m Max. Diameter (Ø) : 14m
Detection angle	360°

\* For more details of detection range, please refer to "detection pattern" section.

### DALI Bus Power Supply

I guaranteed	64mA
I max	80mA
U rated	15VDC

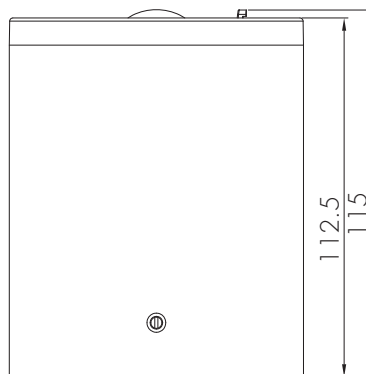
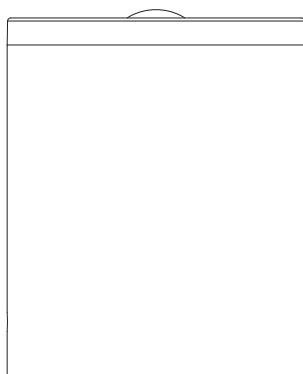
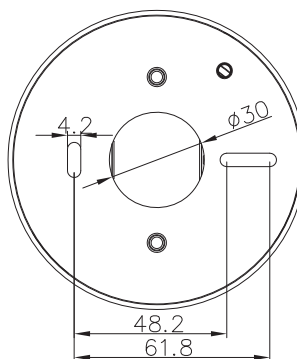
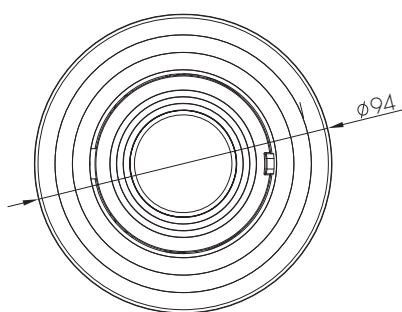
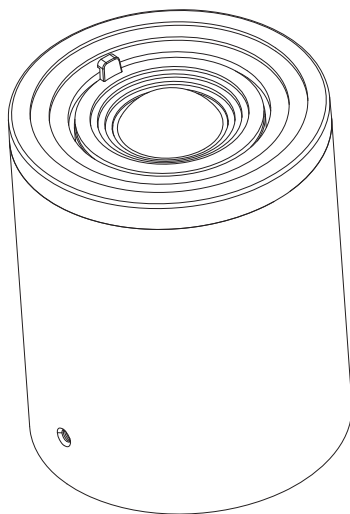
### Environment

Operation temperature	Ta: -20°C ~ +50°C
Storage temperature	-35°C ~ +55°C
Relative humidity	20~90%
IP rating	IP20

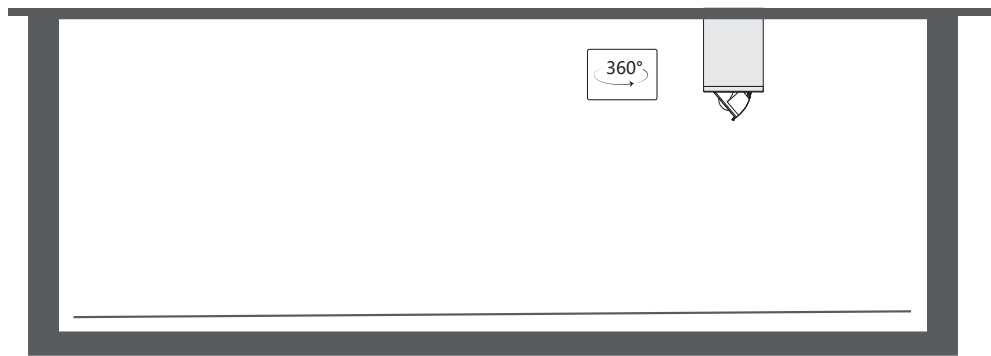
### Safety & EMC

EMC standard (EMC)	EN55015, EN61000-3-2/-3-3, EN61547
Safety standard (LVD)	EN60669-1, EN60669-2-1
RED	EN300328, EN301489-1/-17, EN50663
Certification	CE, UKCA, RED, RCM

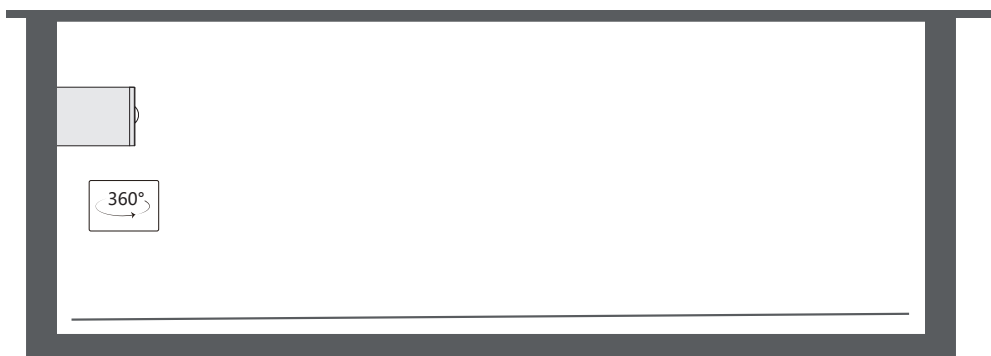
Mechanical Structure & Dimensions



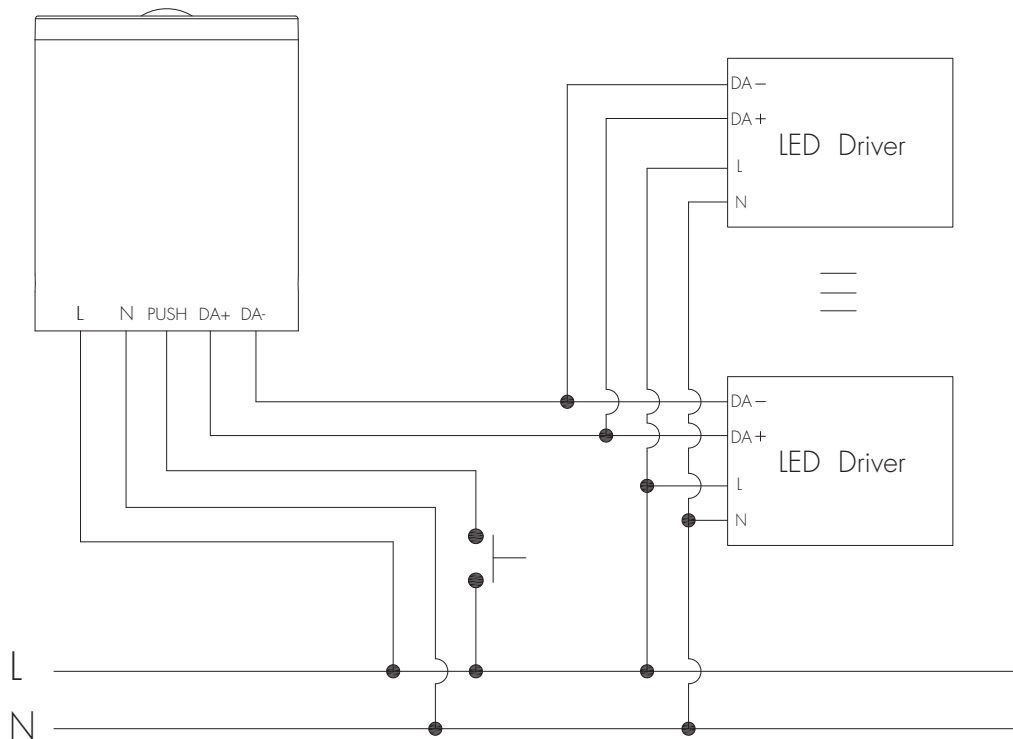
## Ceiling-mounted application



## Wall-mounted application



## Wiring Diagram



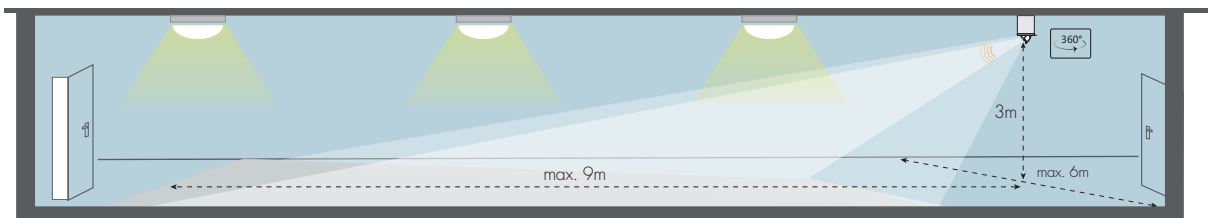
1. 200 metres (total) max. for 1mm<sup>2</sup> CSA (T<sub>a</sub> = 50 C)
2. 300 metres (total) max. for 1.5mm<sup>2</sup> CSA (T<sub>a</sub> = 50 C)

## Detection Pattern

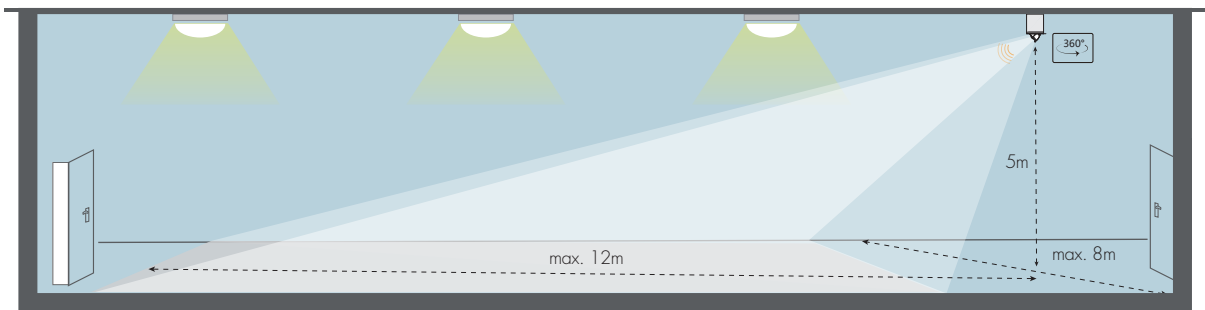
Sensitivity set to maximum, Sensor head angle set to maximum

### Ceiling-mounted application

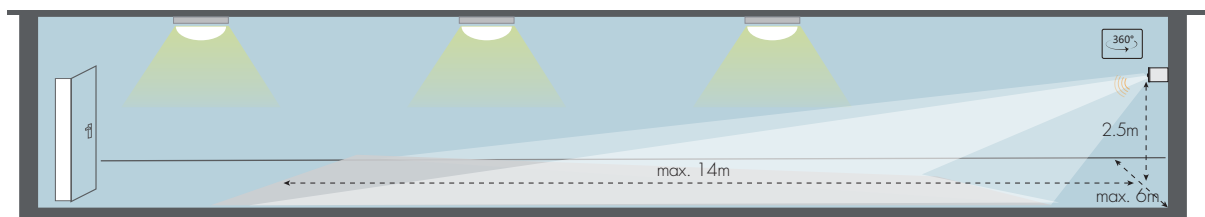
Installation height: 3m



Installation height: 12m



### Wall-mounted application



The installation data conduct by following testing conditions:

1. Environmental humidity: 80.5%;
2. Single person walking;
3. Sensor not connected to any driver that may have soft-on period;
4. Testing temperature  $T_a = 31.5^{\circ}\text{C}$ ;
5. The testing is conducted in an open and spacious indoor field, without noticeable obstacles or influences that may affect PIR performances.

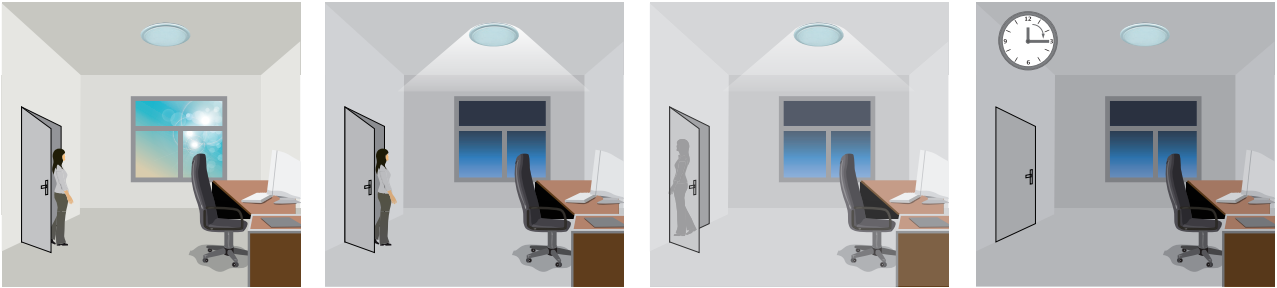
Application	Angle	Height	Tangential /Radial	Sensitivity			
				100%	75%	50%	10%
Ceiling-mounted	180°	5m	Tangential	13m	8m	5m	none
			Radial	3m	1m	none	none
	Tangential		12m	7m	6m	4m	
	Radial		6m	5m	3m	1m	
	70°	3m	Tangential	10m	7m	6m	4m
			Radial	4m	4m	2m	1m
	Tangential		9m	7m	4m	3m	
	Radial		3m	2m	1m	1m	
Wall-mounted	180°	1.8m	Tangential	15m	11m	8m	6m
			Radial	5m	2m	1m	1m
		2.5m	Tangential	14m	11m	7m	5m
			Radial	2m	1m	1m	0m

Note: The unit of 180 degree detection data is diameter.

## Functions and Features

### 1 Tri-level Control

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.

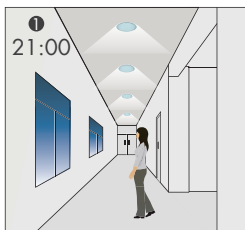
With insufficient natural light, the sensor switches on the light automatically when presence is detected.

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.

### 2 24h Daylight Monitoring Function

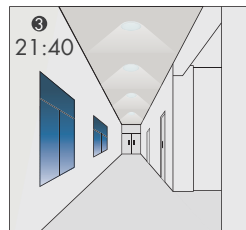
Our innovative and patented software enables our antenna with built-in daylight sensor to provide a "smart photocell" function. This function is activated when stand-by period is set to "+∞".



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



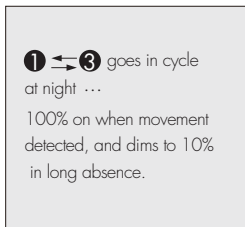
The light dims to stand-by level after the hold-time.



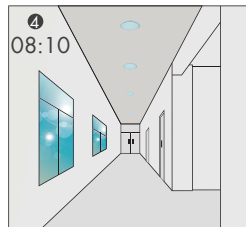
The light remains in dimming level at night.

#### Settings on this demonstration:

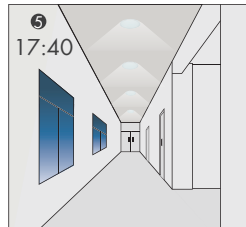
Hold-time: 10min  
Daylight threshold: 50lux  
Stand-by dimming level: 10%  
Stand-by period: +∞



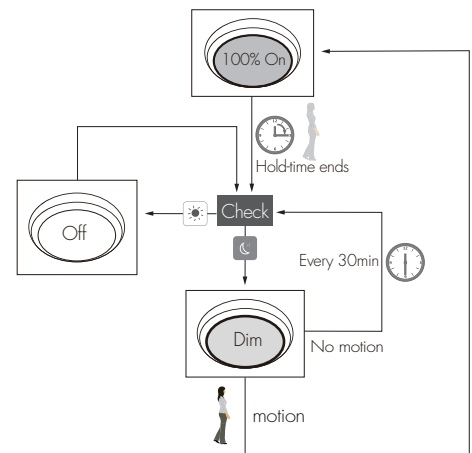
1 ↔ 3 goes in cycle at night ...  
100% on when movement detected, and dims to 10% in long absence.



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).



### 3 Daylight Harvest



Right time, right place and the right amount of light! **Daylight harvest** (Also known as **daylight regulating** or **daylight interaction**) is a must in the future lighting norms. The daylight sensor measures the available surrounding natural light and calculates how much artificial light is needed to reach the target lux level. The control output is passed to the drivers by DALI or 0/1-10V signals which then deliver the needed amount of light .



The light will not switch on when natural light is sufficient, even with 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 will be switched off when the ambient natural light is sufficient.



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



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

In the old days, to configure a daylight harvest application is not simple in real life, as it usually involves professional installers or lighting specialists with good lighting industry background and needs special equipment on site, which is not quite accessible by public users.

Aiming to simplify the daylight harvesting setup and make life easier for users, Hytronik has developed intuitive features that revolutionizes the commissioning processes --- Users can now easily commission daylight harvesting quickly and effortlessly!

#### 4 Manual Override

With the help of push-switch, this sensor can be over-riden by the end-user to manually switch on/off the light, 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 (< 1 s): 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 (> 1 s): adjust the target lux level by turning the light up or down. Both the adjustment on remote control 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 Semi-auto Mode (Absence Detection)

Selecting this mode will activate the following logic:

Manual on - The lights will not switch on until they have manually been switched on at the wall switch. The occupancy sensor is inactive whilst the lights are off.

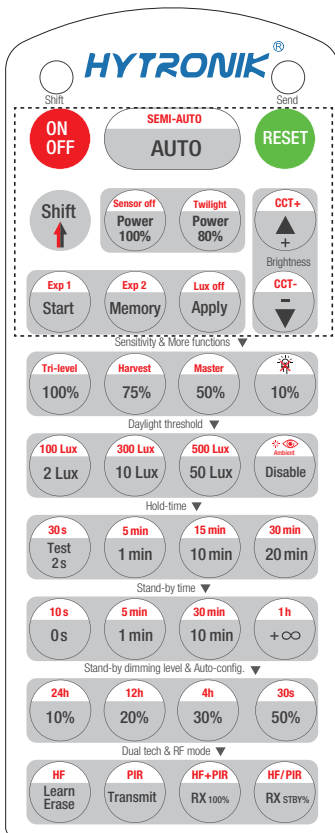
Auto off - When the lights are on, the sensor becomes active and monitors the space for activity. Once the area is vacated (absence selection), the sensor will automatically switch off the lights if the last person out forgets to switch off the light manually.

*Note: The wall switch can be assigned to function 4 or 5, but not both. The default function is manual override.*

#### 6 Synchronisation Function

By connecting the "SYNC" terminals in parallel (see wiring diagram), no matter which sensor detects motion, all HIR27 in the group will turn on the lights when surrounding natural light is below the daylight threshold. The detection area could be widely enlarged in this way.

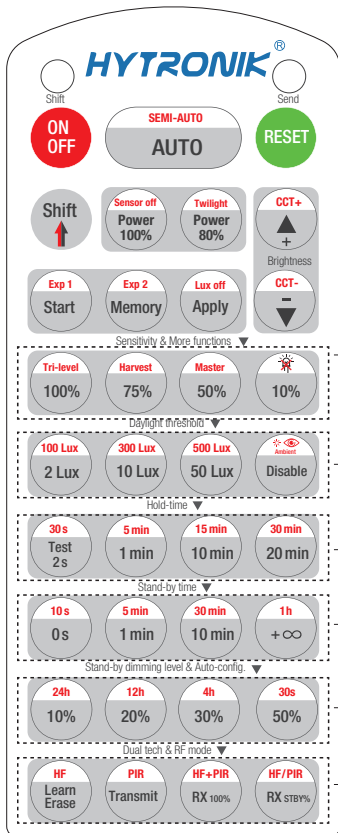
# Settings (Remote Control HRC-11)



HRC-11

	<p>Press button "ON/OFF" to select permanent ON or permanent OFF mode. * Press button "AUTO" / "RESET" to exit this mode.</p>
	<p>Press button "RESET", all settings go back to default. The default settings are: Auto mode; DALI Master mode; Detection range 100%; Hold-time 5min; Daylight sensor 100lux; Stand-by time 10min; Stand-by dimming level 20%; Maximum Brightness &amp; Color turning; LED indication off; Lux off activated; PIR detection mode.</p>
	<p>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.</p>
<p>AUTO</p>	<p>Press button "AUTO" to initiate automatic mode. The sensor starts working and all settings remain as before the light is switched ON/OFF;</p>
<p>SEMI-AUTO</p>	<p>1. Press button "Shift", the red LED on. 2. Press button "SEMI-AUTO" to initiate Semi-auto mode. The sensor is only activated with the manual press of push switch. To exit this mode, simply press button "AUTO". <i>For Sensor LED indicator references: Remains on 2s, initiate "Semi-auto" mode from "Auto" mode.</i></p>
<p>Power 100% 80%</p>	<p>Press buttons in zone "Power out" to select the light output at 80% (at initial 10,000 hours) or 100%.</p>
<p>Sensor off Twilight</p>	<p>1. Press button "Shift", the red LED on. 2. Press button "Twilight", the function of movement detection is disabled, but the function of photocell is still working, and the product becomes a pure dusk/ dawn daylight sensor.  To exit from "Twilight" mode, press button "AUTO" / "SEMI-AUTO" / "RESET".</p>
	<p>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.</p>
<p>CCT+ CCT-</p>	<p>1. Press button "Shift", the red LED on. 2. Press "CCT+" or "CCT-" button to adjust colour turning.</p>
<p>Start Memory Apply</p>	<p>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).  <i>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).</i></p>
<p>Lux off</p>	<p>The "Lux off" function is activated as default. When the ambient lux level exceeds the target level continuously for more than 5 minutes, the lights will be turned off.  In AUTO /SEMI-AUTO/Twilight modes, to disable "Lux off": 1. Press "Shift" button first, the red LED on. 2. Press "Lux off" button, the "Lux Off" function will be deactivated. The lights will not turn off even when the ambient lux level exceeds the target lux level but will dim down the brightness to the stand-by time level.  <i>For Sensor LED indicator references: 1. Fast flash 1s, "Lux off" function activated. 2. Remains on 2s, "Lux off" function deactivated.</i></p>
<p>Exp 1 Exp 2</p>	<p>"Exp" refer to Expansion, these two buttons are reserved functions and pending future development.</p>





HRC-11

Sensitivity & More functions	
100% 75% 50% 10%	This key is not applicable on this product.
<b>Tri-level Harvest</b>	This key is not applicable on this product.
<b>Master</b>	1. Press button "Shift", the red LED on. 2. Press button "Master" to select a DALI sensor in a DALI line to be a "master", so that all other DALI sensors in the same DALI line will perform daylight harvesting/ tri-level control based on the lux reading from this "master" sensor's daylight sensor.
Daylight threshold	
2 Lux 100 Lux 10 Lux 300 Lux 50 Lux 500 Lux Disable	Press buttons in zone "Daylight threshold" to set daylight sensor at 2Lux/ 10Lux / 50Lux / 100Lux / 300Lux/500Lux / Disable. <i>Note: To set daylight sensor at 100Lux / 300Lux/500Lux, press "Shift" button first.</i>
Ambient	1. Press button "Shift", the red LED on. 2. Press button "Ambient", the surrounding lux level is sampled and set as daylight threshold / target Lux level.
Hold-time mode	
Test 30s 1min 5min 10min 15min 20min 30min	In AUTO /SEMI-AUTO modes, press buttons in zone "hold-time" to set the hold-time at 2s / 30s / 1min / 5min / 10min / 15min / 20min / 30min. <i>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".</i>
Stand-by time mode	
0s 10s 1min 5min 10min 30min +∞ 1h	Press buttons in zone "stand-by time" to set the stand-by period at 0s / 10s / 1min / 5min / 10min / 30min / 1h / +∞. <i>Note: 1. To set stand-by-time at 10s/ 5min / 30min / 1h, press "Shift" button first. 2. "0s" means on/off control; 3. "+∞" means bi-level control, the fixture is 100% on when there is motion detected, and remains at the stand-by dimming level when no presence after motion hold-time. Only when the stand-by time is set in "+∞" and the ambient lux level is below the target lux level, the lux will auto-on.</i>
Stand-by dimming level & Auto-config.	
10% 20% 30% 50%	Press the button in zone "stand-by dimming level" to set the stand-by dimming level at 10% / 20% / 30% / 50%.
24h 12h 4h 30s	1. Press button "Shift", the red LED on. 2. Select a time period and the sensor will do light level measurement and determine/save the lowest light level (commission line) with 100% light on, so as to set the target lux level automatically. <i>Note: 1. Make sure the light level measurement covers the night time. 2. The fixture will go into sensor mode after the measurement, all sensor setting remain unchanged.</i>
Dual tech & RF mode	
Learn Erase Transmit	Short press "learn/erase" button to activate pairing mode, then press "transmit" on a primary mode and all the receiver modules will beep 3 times in 1s to indicate the success of pairing. Long press the "learn/erase" button for 3s will erase all the commands received previously.
RX 100% RX STBY%	This key is not applicable on this product.
HF PIR HF+PIR HF/PIR	This key is not applicable on this product.

## Dimming Interface Operation Notes

### Switch-Dim

The provided Switch-Dim interface allows for a simple dimming method using commercially available non-latching (momentary) wall switches.

Switch Function	Action	Descriptions
Push switch	Short press (<1 second) * Short press has to be longer than 0.1s, or it will be invalid.	- Turn on/off - Turn on only - Turn off only - Recall a scene - Quit manual mode - Do nothing
	Double push	- Turn on only - Turn off only - Recall a scene - Quit manual mode - Do nothing
	Long press (≥ 1 second)	- Dimming - Colour tuning - Do nothing

## Additional Information / Documents

1. Regarding precautions for PIR Sensors installation and operation, please kindly refer to [www.hytronik.com/download ->knowledge ->PIR Sensors - Precautions for Product Installation and Operation](http://www.hytronik.com/download->knowledge->PIR%20Sensors%20-%20Precautions%20for%20Product%20Installation%20and%20Operation)
2. 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)