DALI HF Sensor

HCD418/I

Tri-level Control with Photocell Advance™ for Independent DALI

HYTRONIK®

Applications

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

Suitable for building into the fixture:

- Office / Commercial Lighting
- Classroom
- Meeting Room

Use for retrofit and new luminaire designs/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)
- One-key commissioning via programmable remote control
- Synchronised dimming with multiple sensor circuits
- DALI dimming control method (DALI power supply circuit included)
- 5 Year, 50,000hr Warranty

Technical Data

Input Characteristics

Model No.	HCD418/I
Mains voltage	220~240VAC 50/60Hz
Stand-by power	<0.5W
Switched power	Max. 20 devices, 40mA
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, SAA

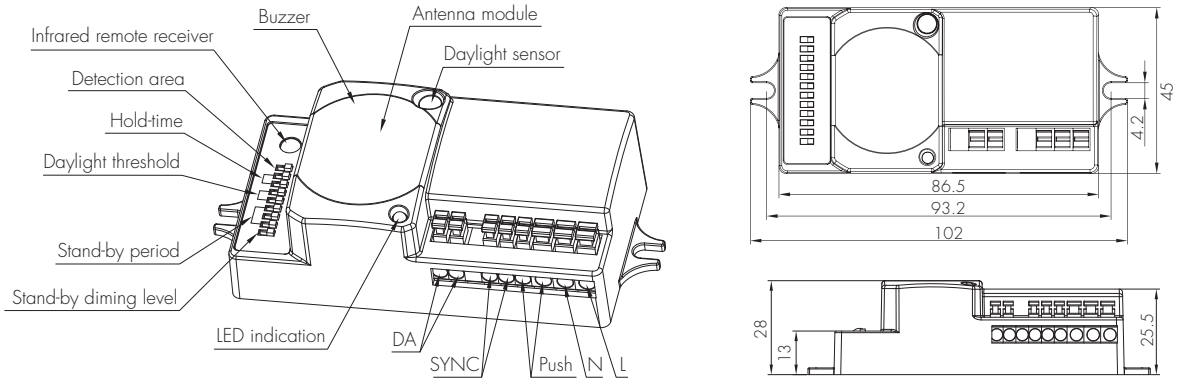
CE emc RED SAA CB IP20

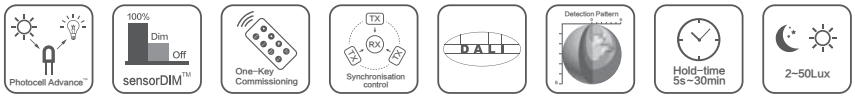
Sensor Data

Model No.	HCD418/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	50% / 100%
Hold time	5s ~ 30min (selectable)
Daylight threshold	2 ~ 50 lux, disabled
Stand-by period	0s ~ 1h, +∞ (selectable)
Stand-by dimming level	10% / 30%

Environment

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





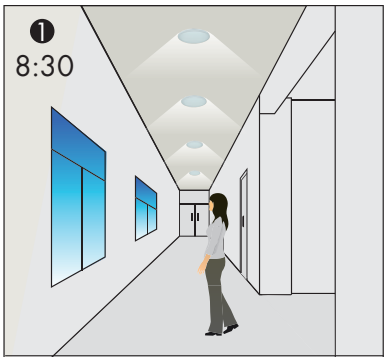
This sensor is specially designed for small scale, decentralised retrofit project, which contains a DALI power supply circuit and gives DALI output to the DALI driver to carry out on/off and dimming command. No extra DALI power supply is needed.

Functions and Features

1 Photocell Advance™ Function

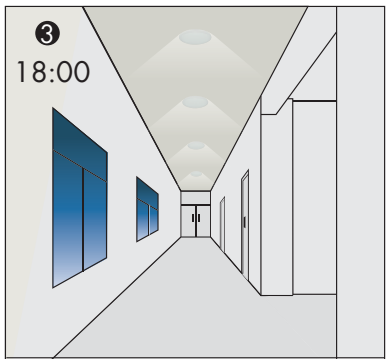
It's well known that LED lights have a totally different spectrum to natural light. Hytronik uses this principle and comes up with special photocell and sophisticated software algorithm to measure and differentiate natural light from LED light from behind the fixture cover, so that this photocell can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



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

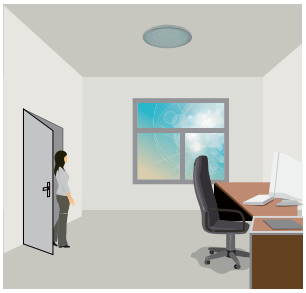
The light turns off completely whenever natural light reaches above pre-set daylight threshold, even with presence.



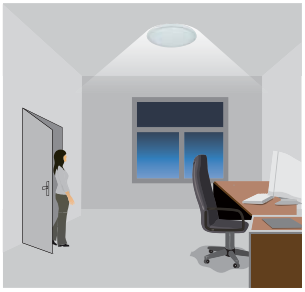
The light turns on at dim level automatically when natural light lux level drops below pre-set daylight threshold (no motion).

2 Tri-level Control (Corridor Function)

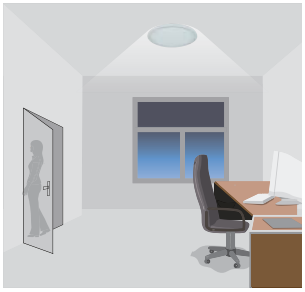
Hytronik builds this function inside the motion sensor to achieve tri-level control, for some areas which require a light change notice before switch-off. The sensor offers 3 levels of light: 100%-->dimmed light -->off; and 2 periods of selectable waiting time: motion hold-time and stand-by period; Selectable daylight threshold and freedom of detection area.



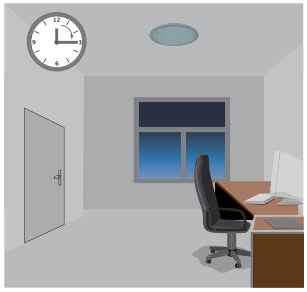
With sufficient natural light, the light does not switch on when presence is detected.



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.

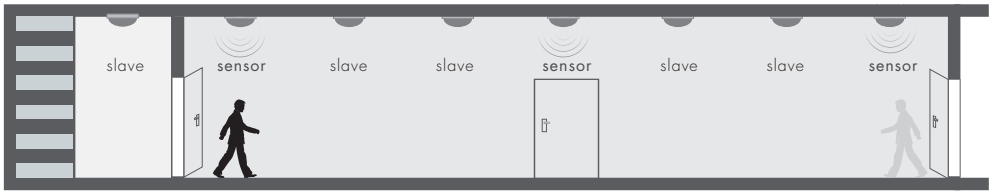


Light switches off automatically after the stand-by period elapses.

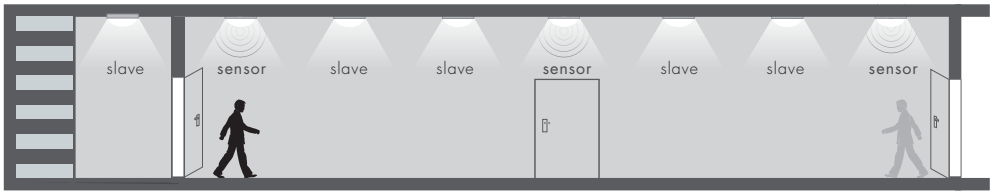
3 Synchronisation Function

By connecting the "SYNC" terminals in parallel (maximum 10pcs, see wiring diagram), no matter which sensor detects motion, all HCD418/I in the group will turn on the lights (ambient natural light is below daylight threshold). The detection area is widely enlarged in this way while other settings such as hold-time, stand-by period, stand-by dimming level and daylight threshold on each individual unit stay the same.

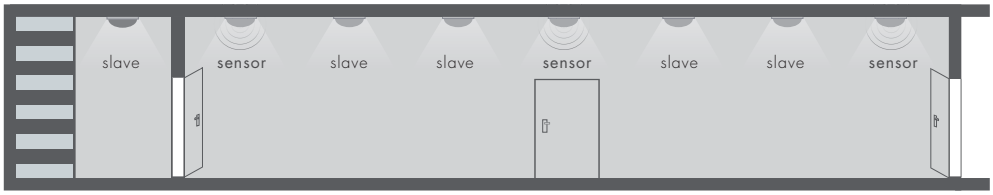
With sufficient natural light, the lights does not switch on when presence detected.



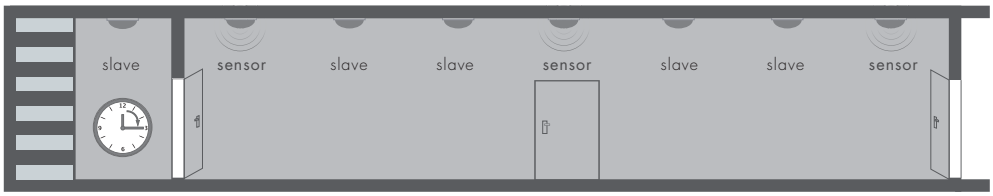
With insufficient natural light, the person comes from any direction, the whole group of lights switch on.



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.



4 Manual Override

This sensor reserves the access of manual override function for 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 fit some extra-ordinary demands:

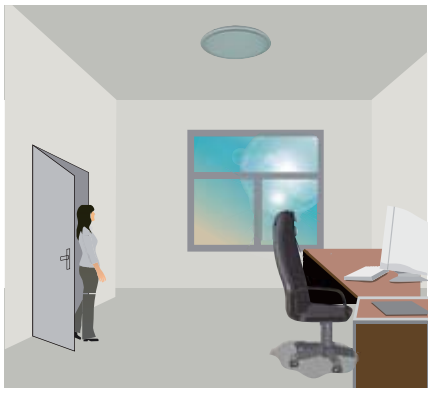
* Short Push (<1s): on/off function;
  On → Off: the light turns off immediately and cannot be triggered ON by motion until the expiration of pre-set hold-time. After this period, the sensor goes back to normal sensor mode.
  Off → On: the light turns on and goes to sensor mode, no matter if ambient Lux level exceeds the daylight threshold or not.
* Long Push (>1s): adjust the hold-time brightness level between10% and 100%.

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)

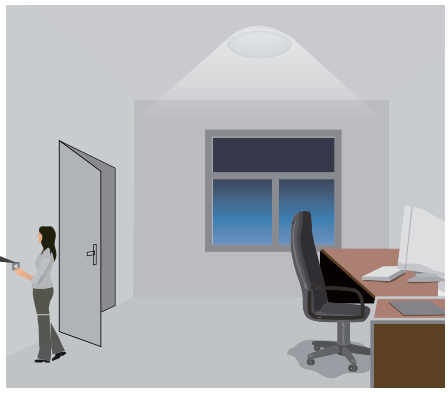
It is easy to forget to switch off the light, in office, corridor, even at home. And in many other cases, people do not want to have a sensor to switch on the light automatically, for example, when people just quickly pass-by, there is no need to have the light on. The solution is to apply this "absence detector": motion sensor is employed, but only activated on the maunal press of the push switch, the light keeps being ON in the presence, and dims down in the absence, and eventually switches off in the long absence.

This is a good combination of sensor automation and maunal override control, to have the maximum energy saving, and at the same time, to keep efficient and comfortable lighting.



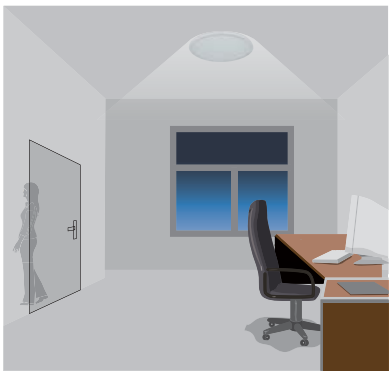
The light does not switch on when there is presence being detected.

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.

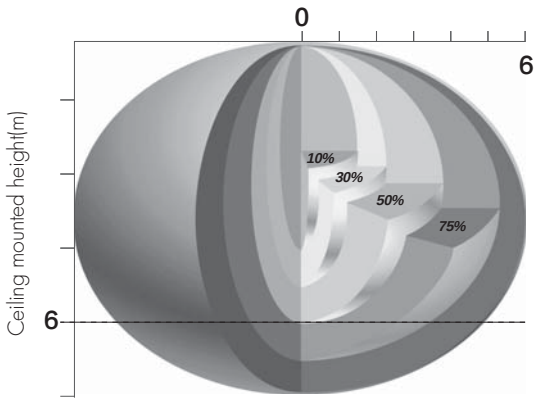


People left, the light dims to stand-by level after the hold-time.

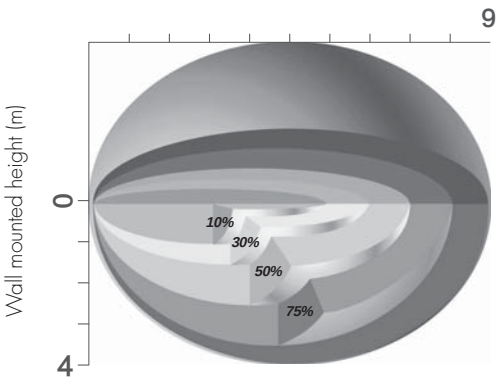
The light switches off automatically after the stand-by period elapses.

Note: end-user can choose either function 4 or function 5 for application. Default function is manual override.

Detection Pattern



Ceiling mounted detection pattern (m)



Wall mounted detection pattern (m)

Settings (Remote Control HRC-11)

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.

Reset Settings

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

Shift Button

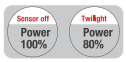
Press button "Shift", the LED on the top left corner will flash to indicate mode selection. All values / settings in RED are valid for 20 seconds.

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 in this mode. (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 the buttons to adjust the light brightness during hold-time.

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.

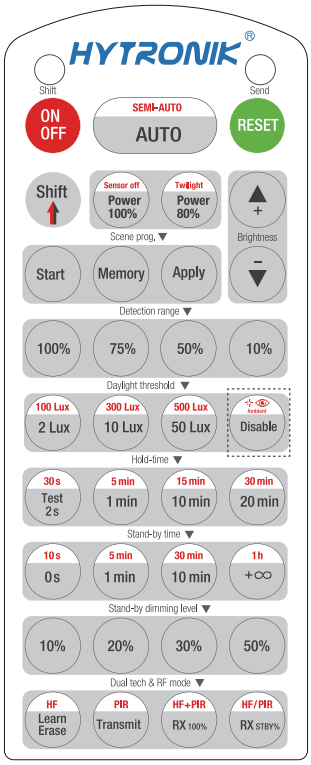
Scene program - *1-key commissioning*

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%.



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.

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.

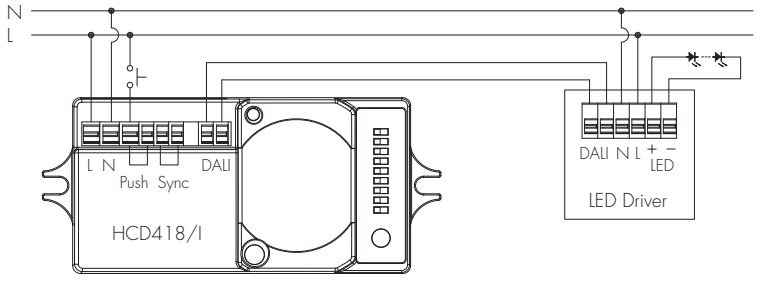
Stand-by dimming level

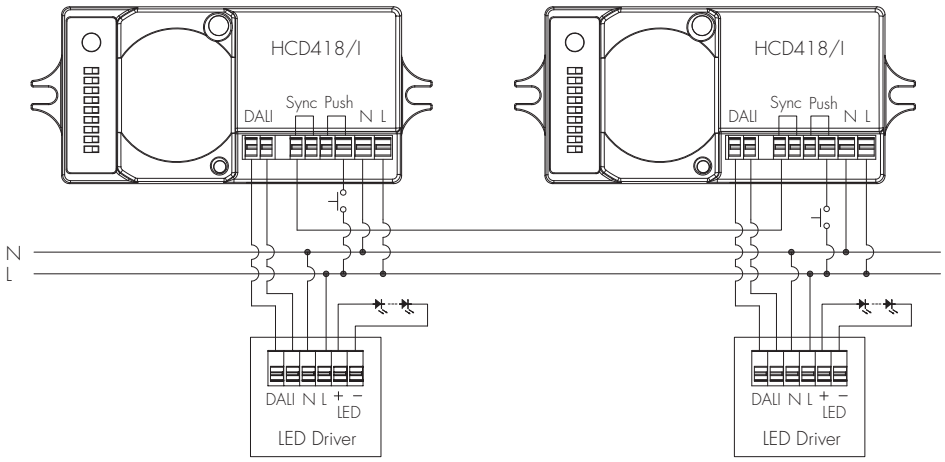
Press the button in zone "stand-by dimming level" to set the stand-by dimming level at 10% / 20% / 30% / 50%.

Dual tech & RF mode

All buttons in this zone are disabled.

Wiring Diagram





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	
I	●	100%
II	○	50%

I – 100%
II – 50%

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.

	2	3	
I	●	●	5s
II	●	○	3min
III	○	●	10min
IV	○	○	30min

I – 5s
II – 3min
III – 10min
IV – 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.

	4	5	
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.

	6	7	8	
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.

	9	
I	●	10%
II	○	30%

I – 10%
II – 30%