Lighting Control With Bluetooth® Wireless Technology

HYTRONIK®

HBHC25 HBHC26 HHC2045 HHC2050L HBP01

Human Centric Lighting System with Wireless Communication

Different from other complex lighting systems, Hytronik circadian rhythm system offers a simple de-centralized human centric lighting solution for offices, schools and hospitals with the tunable white feature. Comprised of just one master sensor HBHC25 and optional occupancy DALI sensor HBHC26, the system allows great flexibility and high specification in an easy installation and commission package.

Thanks to the bluetooth module, now the system can be easily set and commissioned on our App. What's more, the user can adjust brightness and colour temperature, as well as select different scenes on our specially designed bluetooth touch panel for human centric lighting .

Concept

Slave Sensor
HBHC26

Free APP

Wall Panel
HBP01

Colour and Human Centric Control

DALI Channel 2 Control

DALI Channel 1 Control

3 - Channel
Push Switch
Input (wired)

2 - Channel
DALI Output

Self-powered DALI
Up to 15 LED drivers
(Wired)

Master Sensor
HBHC25

Self- powered DALI
Up to 25 LED drivers (Wired)

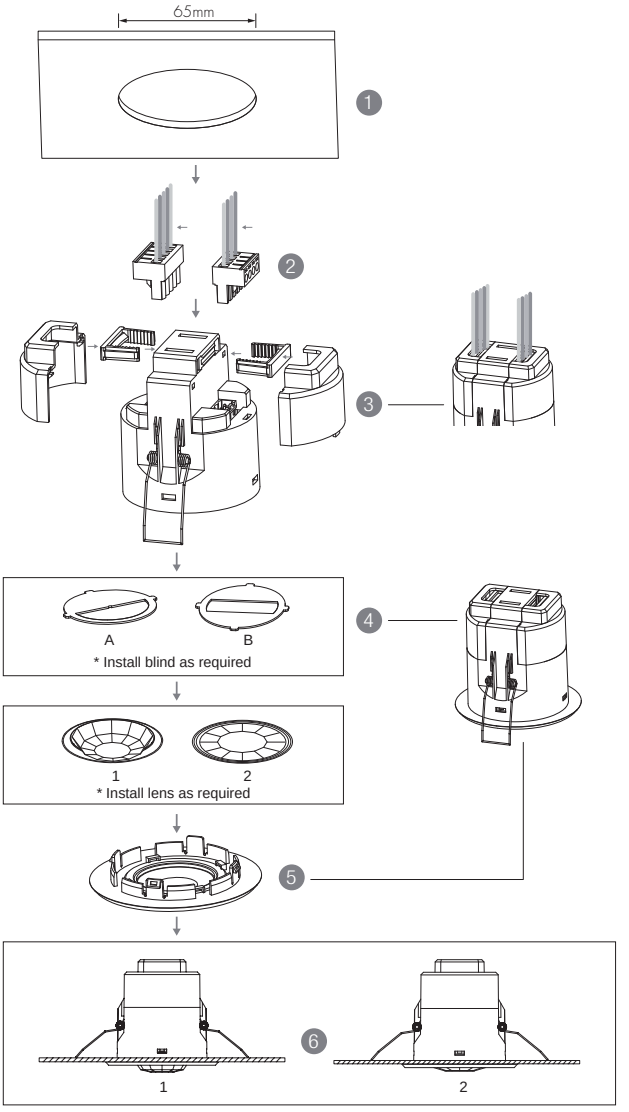
Hytronik Tunable White
LED Driver HHC2045

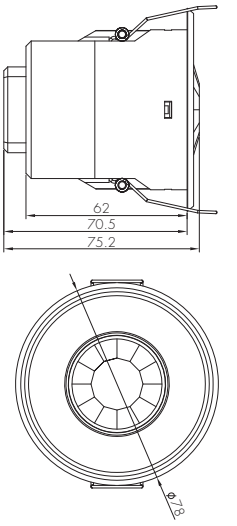
Hytronik Tunable White
LED Driver HHC2050L

DALI DT8
Tunable White
LED Driver (3rd party)

Note:
This datasheet is intended for information related to the hardware only. For detailed set-up of features available in the App, please refer to the App user guide available from our website.

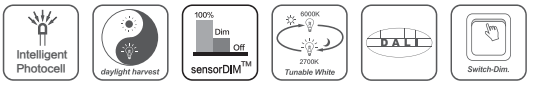
Part 1: Functions and Features of HBHC25





1. Ceiling (drill hole 65mm)
2. Make connections to the pluggable terminal blocks.
3. Insert plug connectors and secure using the provided cable clamps, then clip terminal covers to base.
4. Fit detection blind (if required) and desired lens.
5. Clip fascia to body.
6. Bend back springs and insert into ceiling.

Bluetooth®



Technical Data for HBHC25

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

Output Characteristics	
DALI Channel 1	50mA, Max. 25 LED drivers
DALI Channel 2	30mA, Max. 15 LED drivers

Suitable for DALI DT8 LED drivers

Safety and EMC	
EMC standard (EMC)	EN55015, EN61000
Safety standard (LVD)	EN60669, AS/NZS60669
RED	EN300328, EN301489
Certification	Semko, CB, CE , EMC, RED, RCM

PIR Sensor Data	
Warm-up Period	20s
Detection range	(Ø x H) 10m x 3m
Detection angle	360°
Mounting height	5m (maximum)

Environment	
Operation temperature	Ta: -20°C ~ +50°C
IP rating	IP20

Bluetooth Transceiver	
Operation frequency	2.4 GHz - 2.483 GHz
Transmission power	Max.7 dBm
Range (Typical) *	15~30m

CE emc RED CB IP20

1 Circadian Rhythm Lighting

With automatic geographic regional adjustments for latitude and seasonal adjustment, the controlled light output can enhance a user's day-to-day mood, wellbeing, productivity and attention levels. The user can select and customize the biodynamic lighting curve with pre-programmed colour (CCT) and brightness (LUX) control which automatically change according to the time of the day.

* User can obtain accurate location from Hytronik APP, so that health care profile can run in line with sun rise / sun set.

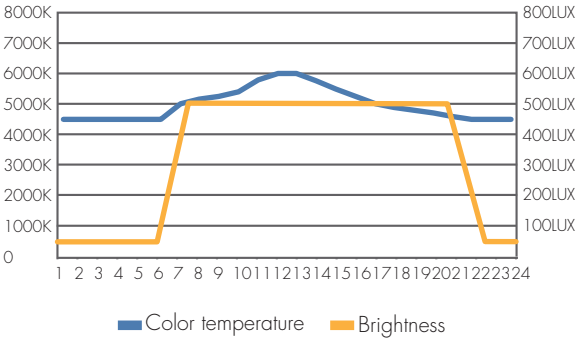
* Time Guard™: this feature is used to keep the clock inside the device running 72 hours during power outage. When the power is on again within this period of time, the circadian rhythm will run normally.
  If the time of power failure is more than 72 hours, please add the bluetooth touch panel "HBTD" to this system.

* End-user can customize the circadian rhythm profiles on the App. Please refer to our App user guide for more details.

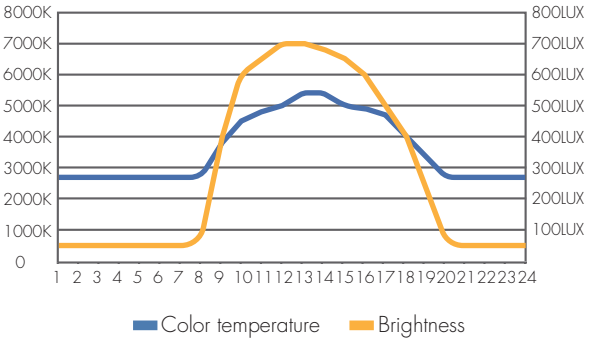
Circadian Rhythm Profiles:
A total of 2 profiles are available for selection; 1 for office application and 1 for health care purposes.

* Default profile controls for Color Control (CCT) and brightness (LUX) Control

* For office application Office



* For health care application Health Care



Recommend CCT range: cool white LED (channel 1): 2700K; warm white LED (channel 2): 6500K

2 Daylight Harvest and Lux Off Function

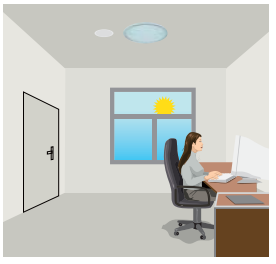
The built-in photocell performs the function of reading the natural daylight, and maintaining the lux level by calculating how much artificial light is needed according to the target lux level required by the profile preset.

Office Application

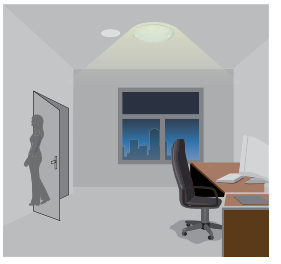
Light will not switch on when natural light is sufficient, even there is motion detected.

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 accroding to the level of natural light available.



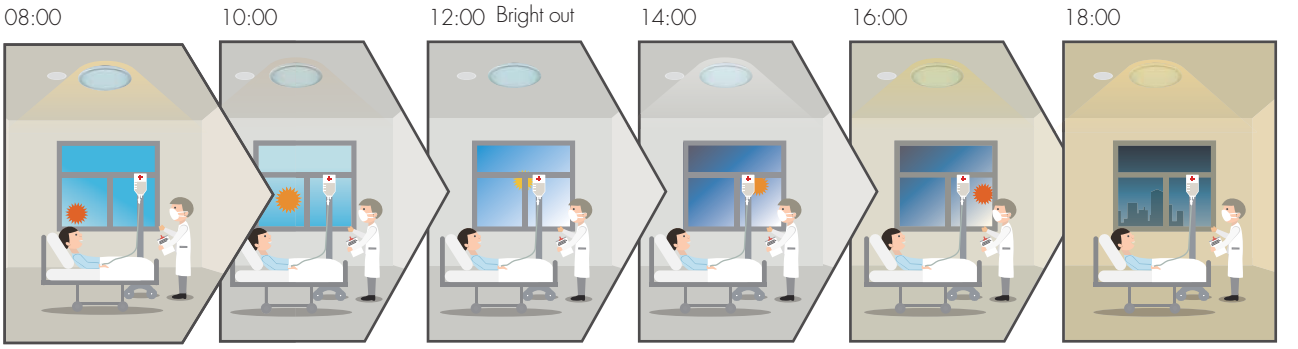
The light dims down and eventually turns off when the ambient natural light is sufficient.



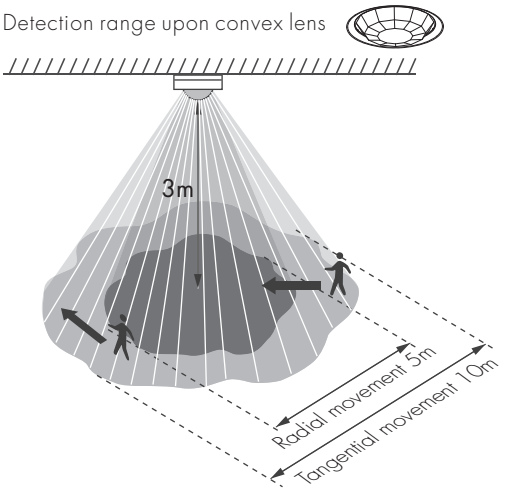
The light goes to stand-by time after hold-time and stays on dimming level.

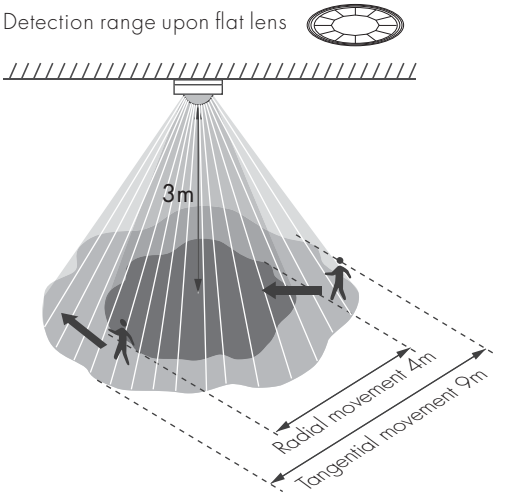
The light switches off completely after hold-time.

Health Care Application



3 Occupancy Detection





4 Bluetooth® Transceiver Nodes

Communication between the master sensor HBHC25, extender sensor HCBC26 and wall panel HBP01is performed wirelessly. This not only reduces system wiring complexity and costs, it is also beneficial in that the DALI power supply resources can be dedicated to the DALI DT8 LED drivers, such Hytronik HHC2045 and HHC2050L. Commissioning and programming of the system is via the Hytronik APP using a Bluetooth® enabled smart device using Android or iOS operating systems.
Please refer to our App user guide for more details.

5 Dual DALI Output Control

Two channels of self-powered DALI output are available on HBHC25 for connection of two groups of LED drivers. Each group can be set to support different circadian rhythm profiles on the App. Please note that both channels share the same control settings sent from the occupancy sensor and photocell.

System Capacity	DALI channel	DT8 Driver = 2mA
HBHC25 includes 2 channels total 80mA max. DALI PSU	DALI PSU Channel 1 (max 50mA)	25
	DALI PSU Channel 2 (max 30mA)	15

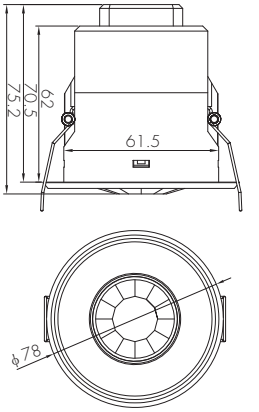
6 Manual Override (Push Function)

Three push terminals (P1, P2, P3) are available on the HBHC25 master sensor for end-users to switch on/off or change the light brightness and colour temperature of the two DALI channels temporarily. The settings will revert to the automatic timing profile (circadian rhythm mode) after sensor time-out.

* Long push on P1: adjust the hold-time light brightness of DALI channel 1;
  Short push (<1s) on P1: on/off function
* Long push on P2: adjust the hold-time light brightness of DALI channel 2;
  Short push (<1s) on P2: on/off function
* Long push on P3: cycles through colour tuning on both channels.
  Short push (<1s) on P3: resume automatic circadiam rhythm mode .

Part 2: Slave Sensor HBHC26

One or more slave sensors may be incorporated into the group using the App to extend the detection zone. Any movement detected by the sensor will be sent to the master unit HBHC25 via Bluetooth® transmission and turn all the lights in the group on. A daylight photocell is also built in the sensor to prevent the lights from switching on when there is sufficient natural light.



Part 3: Bluetooth Touch Panel HBP01

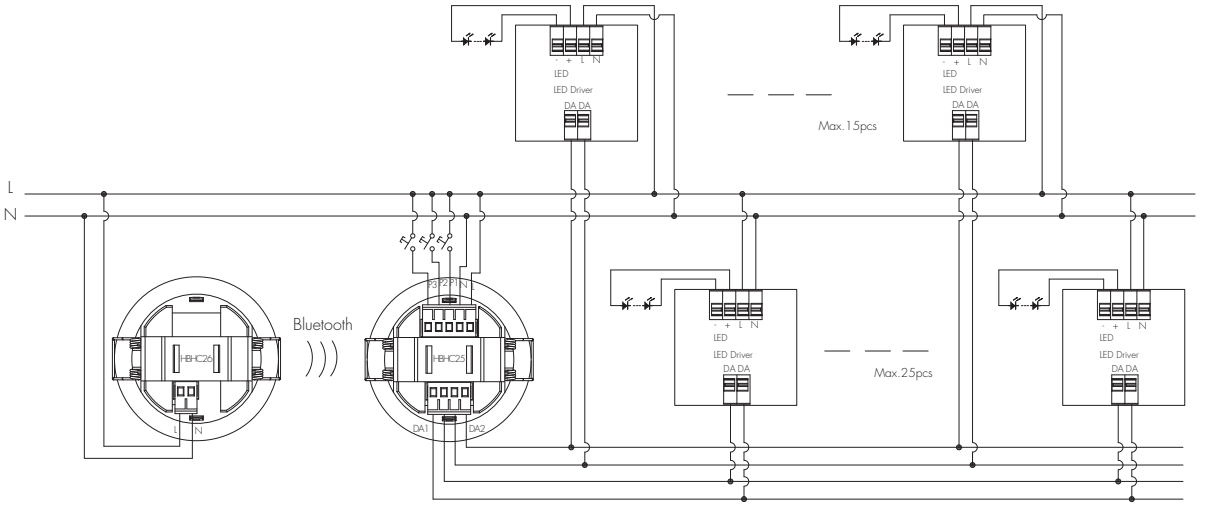
With the bluetooth module built in, the touch panel can be grouped with the master sensor HBHC25 and slave sensor HBHC26.

The end-user can:
1. Turn off/on the lights for a certain time
2. Select the circadiam rhythm profiles (office/classroom or healthcare)
3. Temporarily dim up or down the light brightness
4. Temporarily adjust the colour temperature of the lights
5. Select suitable scene programmed on the App for different applications

Please note that these over-ride functions are available under occupancy conditions. When the sensor times out, the auotmatic circadian rhythm profile will be resumed. 4 Scenes may be set up for 1-touch recall of comfort or activity settings.

Bluetooth®

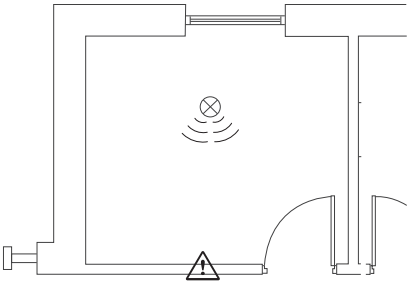
Wiring Diagram



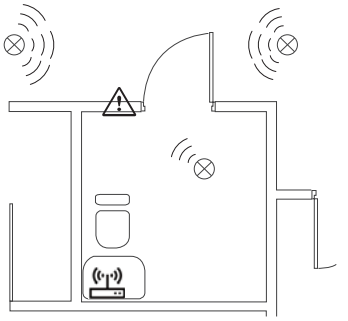
Installation and Placement Notes

To maximise the bluetooth transmission range in every direction, the following considerations should be taken into account when situating the control base in the luminaire:

Device to Device Placement



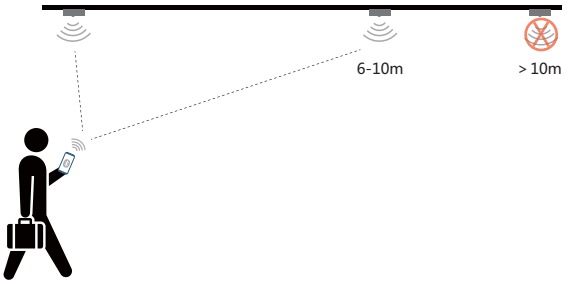
Concrete walls metals, and other building materials will reduce the range



Strong signal sources such as WiFi routers and microwave ovens will affect the range

Device placement may offer up to 30m communication distance. However, we recommend for indoor applications that device placements should be no further apart than 15m.

Smart Phone to Device Range



Notes:

The range for which a smart phone can communicate with the lighting points will vary from model to model and is dependant on its Bluetooth® capability.

Placement of the antenna within the luminaire will also effect the smart phone communication range and may appear different for each luminaire variant.

Finally, other environmental factors (as per opposite) will influence the ultimate achievable range of communication between smart phone and luminaire device.

Hytronik Tunable White LED Drivers for Human Centric Lighting System

HHC2045 and HHC2050L are specially designed to work with the Hytronik Human Centric sensors. Dual channel tunable white LED driver for accurate white balance and intensity control.

Features

- Can be commissioned by standard DT8 broadcast command to adjust light brightness and colour temperature (HHC2050L)
- Tunable White
- Linear Dimming
- Configurable Constant Current (CC) Output via Dip-Switch
- Stand-by power < 0.5W
- Active PFC Design
- Thermal Cut-out Protection
- Short Circuit Protection
- Over-load Protection

All with Auto-restart

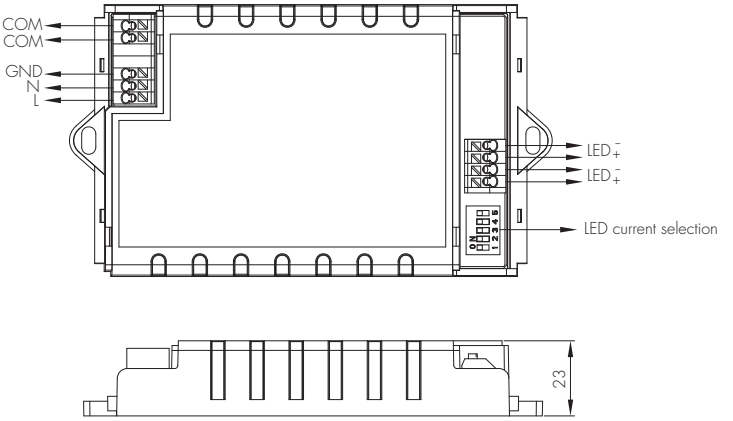
- 5 Year, 50,000hr Warranty

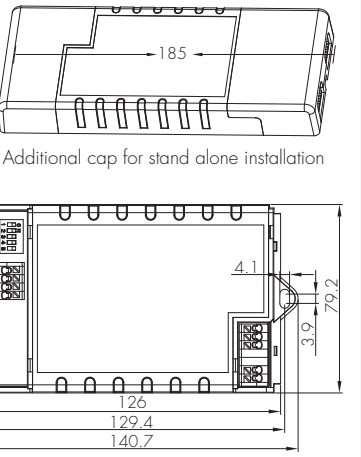
HHC2045

HHC2050L

Dimensions and Terminals

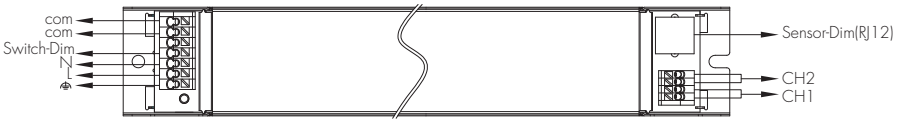
HHC2045

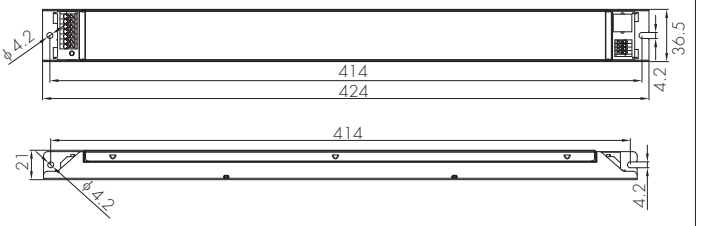




Additional cap for stand alone installation

HHC2050L



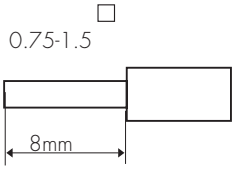


Note: if connecting an sensor antenna, the DALI input on the driver HHC2050L is disable.

Technical Data

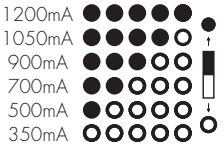
Input	Mains Voltage	220~240VAC 50/60Hz
	Mains Current	0.22~0.2A(HHC2045); 0.3-0.25A(HHC2050L)
	Power Factor	0.95
	Max. Efficiency	85%
	Dielectric Strength	Input→Output : 3000VAC
	Leakage Current	< 0.25mA
Output	Power/Current/ Voltage Range (HHC2045)	20W/350mA/10~56V 28W/500mA/10~56V 40W/700mA/10~56V 45W/900mA/10~50V 42W/1050mA/10~40V 40W/1200mA/10~34V
	Power/Current/ Voltage	50W/1.05A/12-48V (HHC2050L, can be customized)
	Output power handling	Channel 1 (CH1) + Channel 2 (CH2) = 45W (HHC2045)/50W (HHC2050L) max.
	Output channel function	CH1 = Cool white CH2 = Warm White
	Ripple Current	<3%
	Uout Max.	75V(HHC2045); 70V(HHC2050L)
	Turn-on Time	< 0.5s
Environment	Operation Temp.	Ta: -20~+50℃
	Case Temp. (Max.)	80℃
	IP Rating	IP20
Safety and EMC	EMC standard	EN55015, EN61547, EN61000-3-2, EN61000-3-3
	RED standard	EN300328, EN301489-1, EN301489-17
	Safety standard	EN61347-1,EN62493,EN61347-2-13
	Certifications	CB, CE , EMC, RCM

Wire Preparation



Solid or Stranded wire type 0.75 - 1.5mm^2.
To make or release the wire from the terminal, use a screwdriver to push down the button.

LED Current Selection (HHC2045)



⚠ Warning: Please make sure the correct current is selected before starting the driver!

LED Current (HHC2050L)

Single current 1.05A, can be customized.

Loading and In-rush Current (HHC2045)

Inrush Current (Imax.)	7.2A
Pulse Time	100 µs

Number of Drivers Based upon 16A Circuit Breaker (HHC2045)

Type B	30

Conversion table for max. quantites of drivers on other types of Miniature Circuit Breaker

MCB Type	Rating	Relative number of drivers
B	16A	100% (see table above)
B	10A	63%
B	13A	81%
B	20A	125%
B	25A	156%

MCB Type	Rating	Relative number of drivers
C	10A	104%
C	13A	135%
C	16A	170%
C	20A	208%
C	25A	260%

* Environmental factors (such as temperature) will also influence the maximum number of the drivers. Please refer to the MCB manufactures datasheet for loading and derating factors.

Dual Output Control

Connection to the LED PCB is made for CH1 and CH2 output connections

CH1 = Cool white LED array
CH2 = Warm white LED array.

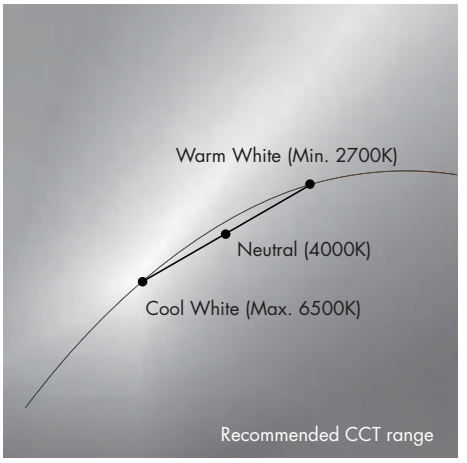
HHC2045:
Each channel can supply up to 45W and white balance can be controlled as such:

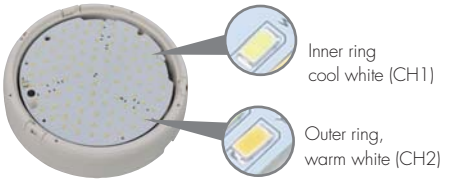
Colour Temperature	Cool White	Neutral White	Warm White
Power Distribution	CH1=45W, CH2=0W	CH1=22.5W, CH2=22.5W	CH1=0W, CH2=45W

HHC2050L:
Each channel can supply up to 50W and white balance can be controlled as such:

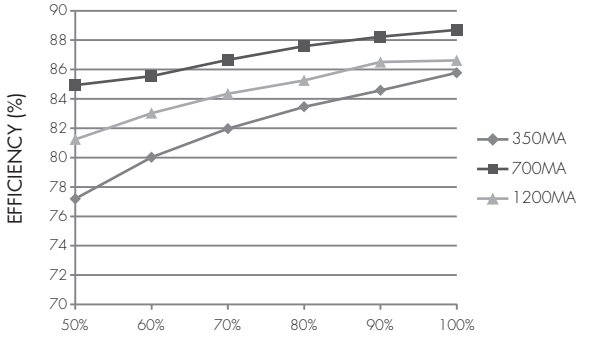
Colour Temperature	Cool White	Neutral White	Warm White
Power Distribution	CH1=50W, CH2=0W	CH1=25W, CH2=25W	CH1=0W, CH2=50W

Linear Colour Tuning Profile

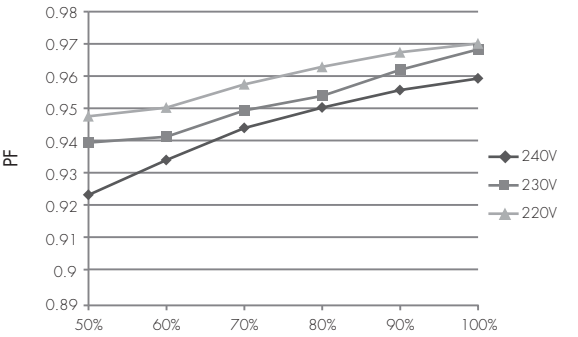




Performance Characteristics

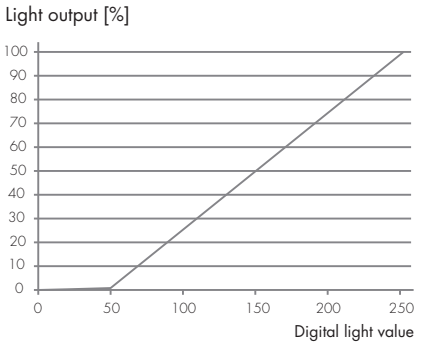


* Typical Efficiency vs Load



* Typical Power Factor vs Load

Dimming Characteristics



Com Dimming Curve