

for  **bridgelux**[®]
and supporting LED holders



Active and Passive LED Heatsinks

A Bridgelux Ecosystem Partner

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Introduction

Cooliance is a leading provider of thermal management solutions offering its customers a wide range of products and services focused on the LED lighting and Electronic markets. The LED product line boasts a comprehensive offering of standard LED heatsinks ranging from 5W to 500W. The Electronic line consists of cold-forged, extruded and machined heatsinks some of which incorporate heat pipes or vapor chambers to spread the heat.

Cooliance's expertise in Thermal Management dates back to 1995. In 2004, the company developed a proprietary mechanical attach cooling solution for BGA chips called the Smart-CLIP™. This product line offers easy application, easy removal, and a highly reliable mechanical attach mechanism. Smart-CLIP™ quickly became the preferred solution for industry-leading providers of networking and communication products due to its flexibility, thermal performance, and high reliability.

Cooliance was one of the first thermal management company to develop products specifically designed for LED applications. In 2009 the company leveraged its precision cold forged pin fin manufacturing capability to create a broad range of standard LED heatsinks. The pin fin design offers significant advantages for cooling LED applications including:

- The pins provide a high degree of surface area
- The cold forging process produces a single piece of metal; a high-density heat sink that provides outstanding thermal conductivity
- The pin fin design will work effectively in many orientations
- The forging technology provides the capability to incorporate custom features into the tool
- The precision machined 10mm thick base offers high thermal conductivity and provides a flat, uninterrupted surface for hole patterns to support LED attachment, optics, and mounting brackets

Cooliance continues to expand its product line. In 2011, the Coolstrate® line of active LED heatsinks was launched offering 50,000 plus hours of quiet and reliable cooling performance. Cooliance recently launched a line of high power passive LED heatsinks manufactured with our bonded fin technology. These products provide a light-weight, highly effective cooling solutions for 150W, 200W & 250W applications. All Cooliance LED heatsinks are tested and matched to industry leading LED COB products and come with the specific hole patterns to support mounting of the COB.

In 2011, Cooliance launched Cooliance GmbH to provide sales, service and local inventory to support customers in Europe, the Middle East, and Africa. Cooliance manufactures products in Taiwan and China and in 2016 the company established a dedicated manufacturing facility in China.

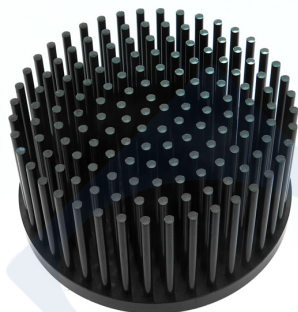
Cooliance has earned a reputation for strong engineering, developing solutions to complex thermal management challenges, providing high-quality solutions at a competitive price and meeting its delivery commitments.



Section One

Product Specifications





Features

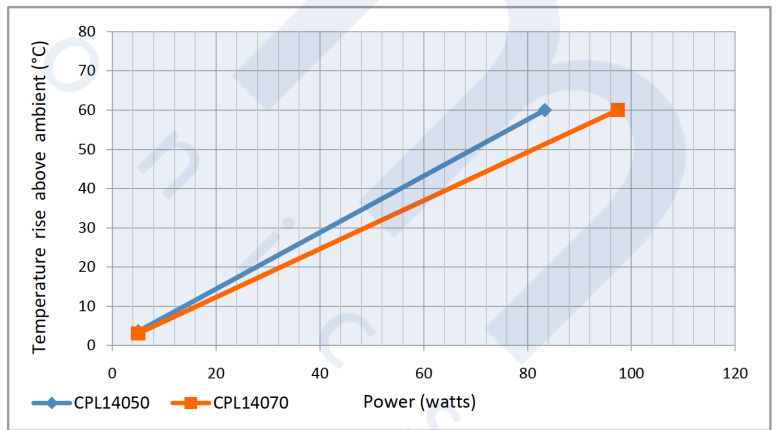
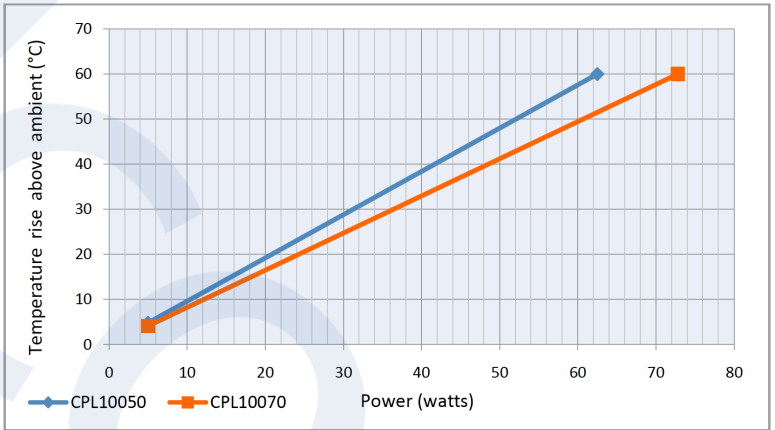
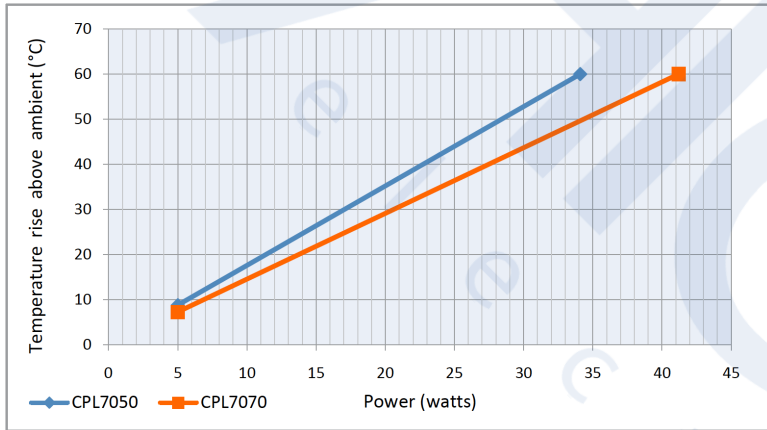
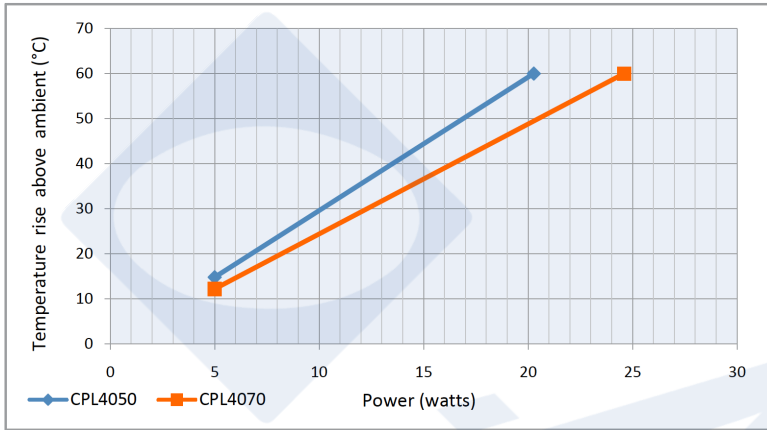
- Solid one-piece forged aluminum construction for maximum thermal conductivity.
- Pin fin design maximizes surface area and provides omnidirectional cooling to eliminate concerns about the orientation of the heat sink (unlike a linear extrusion).
- Precision-machined flat base ensures consistent contact between the heat sink, interface and LED substrate to maximize heat transfer.
- The standard 10mm base thickness allows for full recommended depth for mounting holes.

Model	Diameter (mm)	Height (mm)	Base Thickness (mm)	Weight (g)	Thermal Resistance (°C/W)	Power Dissipation (W)*	
						Ambient 25°C	Ambient 35°C
CPL4050-XXX	40	50	10	50	3.70	20	17
CPL4070-XXX	40	70	10	60	3.05	25	20
CPL5050-XXX	51	50	10	86	2.90	26	22
CPL5070-XXX	51	70	10	104	2.45	31	26
CPL7050-XXX	70	50	10	154	2.20	34	28
CPL7070-XXX	70	70	10	184	1.82	41	34
CPL8050-XXX	83	50	10	222	1.45	52	43
CPL8070-XXX	83	70	10	267	1.30	58	48
CPL10050-XXX	100	50	10	313	1.20	63	52
CPL10070-XXX	100	70	10	377	1.03	73	61
CPL12050-XXX	120	50	10	440	1.06	71	59
CPL12070-XXX	120	70	10	530	0.88	85	71
CPL14050-XXX	140	50	10	675	0.90	83	69
CPL14070-XXX	140	70	10	807	0.77	97	81
CPL16070-XXX	160	70	10	1060	0.68	110	92

To select the heatsink part # for your light engine, go to pages 21 to 26 and replace the suffix '-XXX' with the suffix in the Selection Matrix.

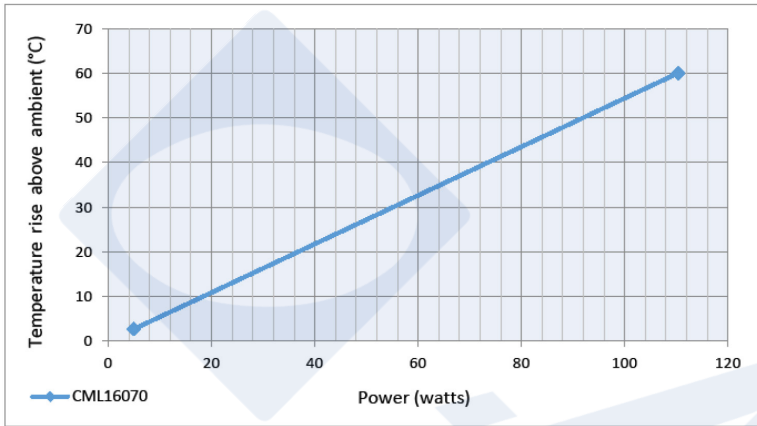
Notes

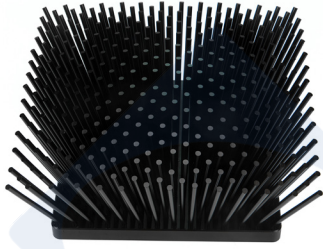
- Thermal testing is performed in open air. Results in a closed environment will vary. Cooliance recommends that each application is tested.
- *Power Dissipation (watts) calculation assumes an LED case temperature of 85°C and an LED input power to output power conversion efficiency of 80%.
- Custom versions of this product are available upon request.
- Holes for mounting LED devices are available and supported by Cooliance. Please consult factory for mounting hole options.



CPL Series, Passive

Thermal Performance Charts



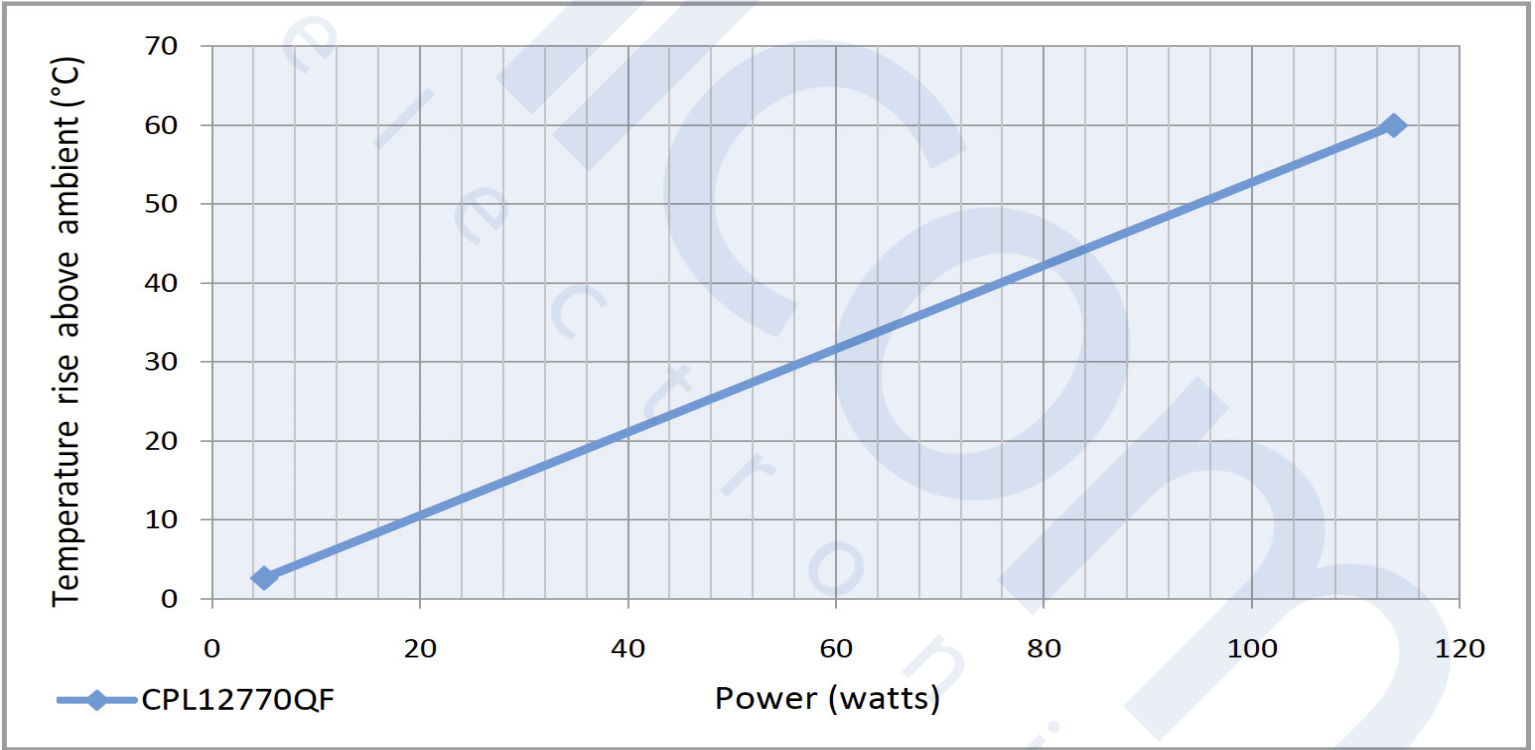


Features

- Solid one-piece forged aluminum construction for maximum thermal conductivity.
- Pin fin design maximizes surface area and provides omnidirectional cooling to eliminate concerns about the orientation of the heat sink (unlike a linear extrusion).
- Precision-machined at base ensures consistent contact between the heat sink, interface and LED substrate to maximize heat transfer.
- The standard 10mm base thickness allows for full recommended depth for mounting holes.

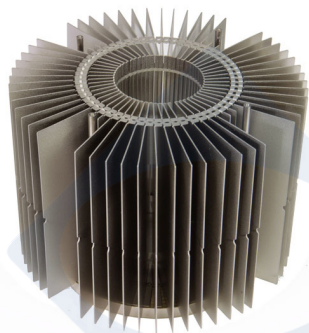
Model	Base Size (mm)	Top Size (mm)	Height (mm)	Base Thickness (mm)	Weight (g)	Thermal Resistance (°C/W)	Power Dissipation (W)*	
							Ambient 25°C	Ambient 35°C
CPL12770QF-XXX	127 x 127	160 x 160	70	10	800	0.66	114	95

To select the heatsink part # for your light engine, go to pages 21 to 26 and replace the suffix '-XXX' with the suffix in the Selection Matrix.



Notes

- Thermal testing is performed in open air. Results in a closed environment will vary. Cooliance recommends that each application is tested.
- *Power Dissipation (watts) calculation assumes an LED case temperature of 85°C and an LED input power to output power conversion efficiency of 80%.
- Custom versions of this product are available upon request.
- Holes for mounting LED devices are available and supported by Cooliance. Please consult factory for mounting hole options.



Features

- Solid, proven, bonded fin technology for maximum thermal conductivity.
- Brush nickel plated or black e-coating for superior corrosion resistance and excellent aesthetics.
- Precision-machined flat base ensures consistent contact between the heat sink, interface and LED substrate to maximize heat transfer.
- 7mm to 10mm base thickness allows for unlimited hole positioning with full recommended depth for mounting holes.
- Optional mounting posts****, shipped independent of the heatsink, for Meanwell HBG series or Inventronics EUR series drivers.

Model	Diameter (mm)	Height (mm)	Base Thickness (mm)	Weight (g)	Thermal Resistance (°C/W)	Power Dissipation (W)***	
						Ambient 25°C	Ambient 35°C
CHP150-XXX or -XXXB*	200	**95/107	10	1300	0.37	205	171
CHP200-XXX or -XXXB*	200	**153/162	10	1780	0.33	227	189
CHP250-XXX or -XXXB*	200	**150/160	7	2020	0.30	250	208

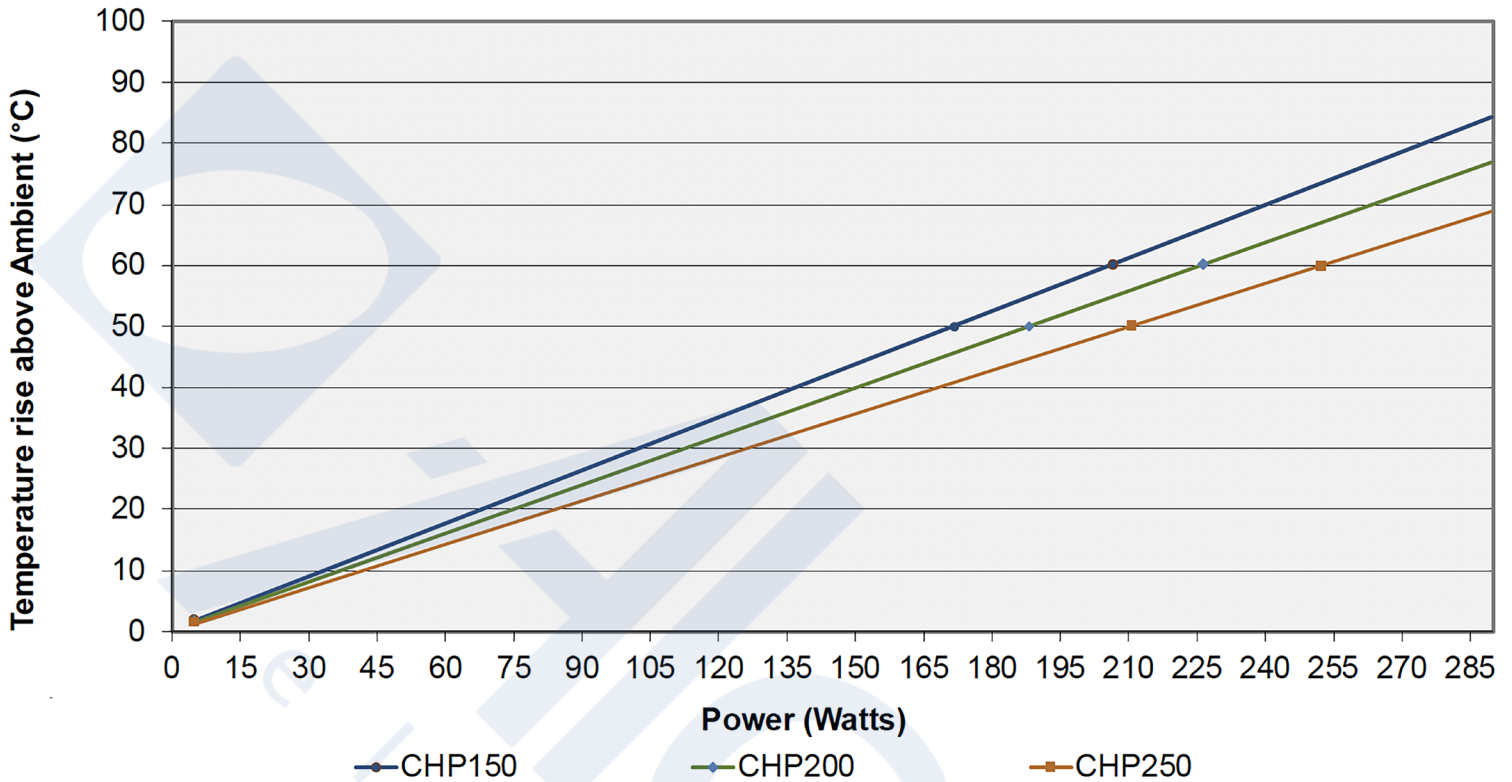
To select the heatsink part # for your light engine, go to pages 21 to 26 and replace the suffix '-XXX' with the suffix in the Selection Matrix.

Notes

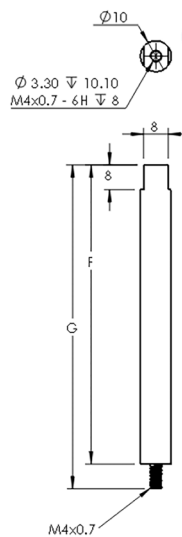
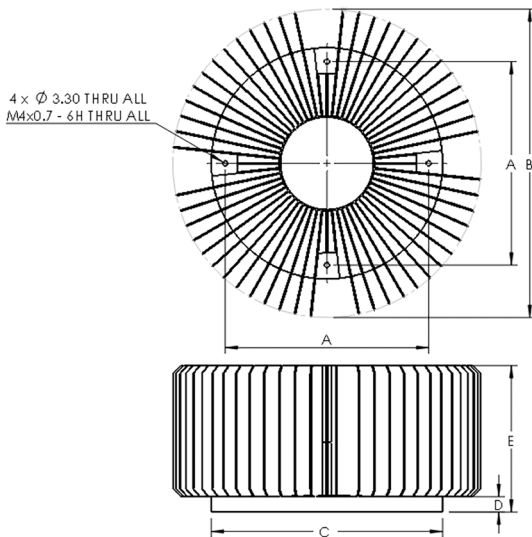
- Thermal testing is performed in open air. Results in a closed environment will vary. Cooliance recommends that each application is tested.
- * Heatsinks are available in Brush Nickel plated (-XXX) or Black E-coating (-XXXB)
- **Height column provides dimensions for the heatsink and the heatsink assembled with mounting posts.
- ***Power Dissipation (watts) calculation assumes an LED case temperature of 85°C and an LED input power to output power conversion efficiency of 80%.
- Holes for mounting LED devices are available and supported by Cooliance. Please consult factory for mounting hole options.
- CHP250 base contains copper heat pipes to increase thermal conduction (as seen as below).
- CHP250 requires additional mounting holes for posts (4) to mount Meanwell HBG-240 series or Inventronics EUR-240 series drivers
- Custom versions of this product are available upon request.



Thermal Performance Chart



Model	Dimensions (mm)						
	A	B	C	D	E	F	G
CHP150-XXX or -XXXB*	132	200	150	10	95	97	105
CHP200-XXX or -XXXB*	132	200	150	10	153	153	159
CHP250-XXX or -XXXB*	132	200	200	7	150	153	159



Ordering Information		
Heatsink	Post (4)****	Color
CHP150-XXX	CHP-POST-1	Brushed Nickel
CHP150-XXXB	CHP-POST-1B	Black E-Coat
CHP200-XXX	CHP-POST-2	Brushed Nickel
CHP200-XXXB	CHP-POST-2B	Black E-Coat
CHP250-XXX	CHP-POST-2	Brushed Nickel
CHP250-XXXB	CHP-POSRT-2B	Black E-Coat

Features



- Capable of cooling up to 117 Watts.
- No separate power supply required.
- Operating life exceeds 60,000 hours at 45°C.
- A broad range of input voltages from 11V to 75V.
- UL File #E351120 applies up to 60V input voltage
- 10 mm thick mounting base allows for an unlimited number of hole patterns.
- 5 Year Limited Warranty.
- Inaudible (<16dB noise level) at super quiet setting.
- Ability to select three fan speed settings to control thermal performance and noise.
- Integral mounting features to support attachment luminaire.

Model	Setting	dbA	Diameter (mm)	Height (mm)	Base Thickness (mm)	Weight (g)	Thermal Resistance (°C/W)	Power Dissipation (W)*	
								Ambient 25°C	Ambient 35°C
CSL5025SQ-XXX	Super Quiet	16	50	60	10	130	1.50	50	42
CSL5025Q-XXX	Quiet	20	50	60	10	130	1.10	68	57
CSL5025MP-XXX	Max. Performance	26	50	60	10	130	0.85	88	74
CSL5050SQ-XXX	Super Quiet	16	50	85	10	160	1.15	65	54
CSL5050Q-XXX	Quiet	20	50	85	10	160	0.85	88	74
CSL5050MP-XXX	Max. Performance	26	50	85	10	160	0.67	112	93
CSL5070SQ-XXX	Super Quiet	16	50	105	10	190	1.10	68	57
CSL5070Q-XXX	Quiet	20	50	105	10	190	0.80	94	78
CSL5070MP-XXX	Max. Performance	26	50	105	10	190	0.64	117	98

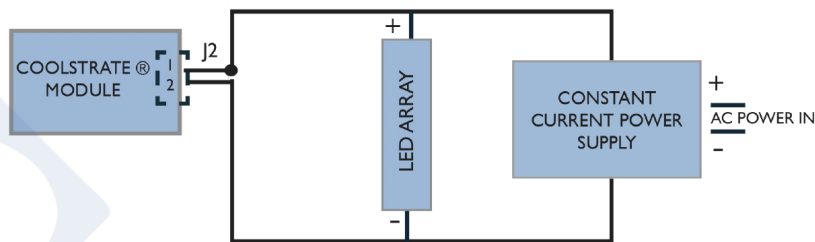
To select the heatsink part # for your light engine, go to pages 21 to 26 and replace the suffix '-XXX' with the suffix in the Selection Matrix.

Notes

- Thermal resistance values are given as a reference only and are measured in free air without airflow obstructions. Thermal resistance is measured from the bottom middle of the heat sink to ambient air. Actual thermal performance may vary by application, and final product design should be tested to assure proper thermal performance.
- Thermal design is based on the cooling a typical LED array's case temperature. Values are based on a temperature rise of 60°C or 50°C.

CSL 750 Series, Active

Connection Diagram

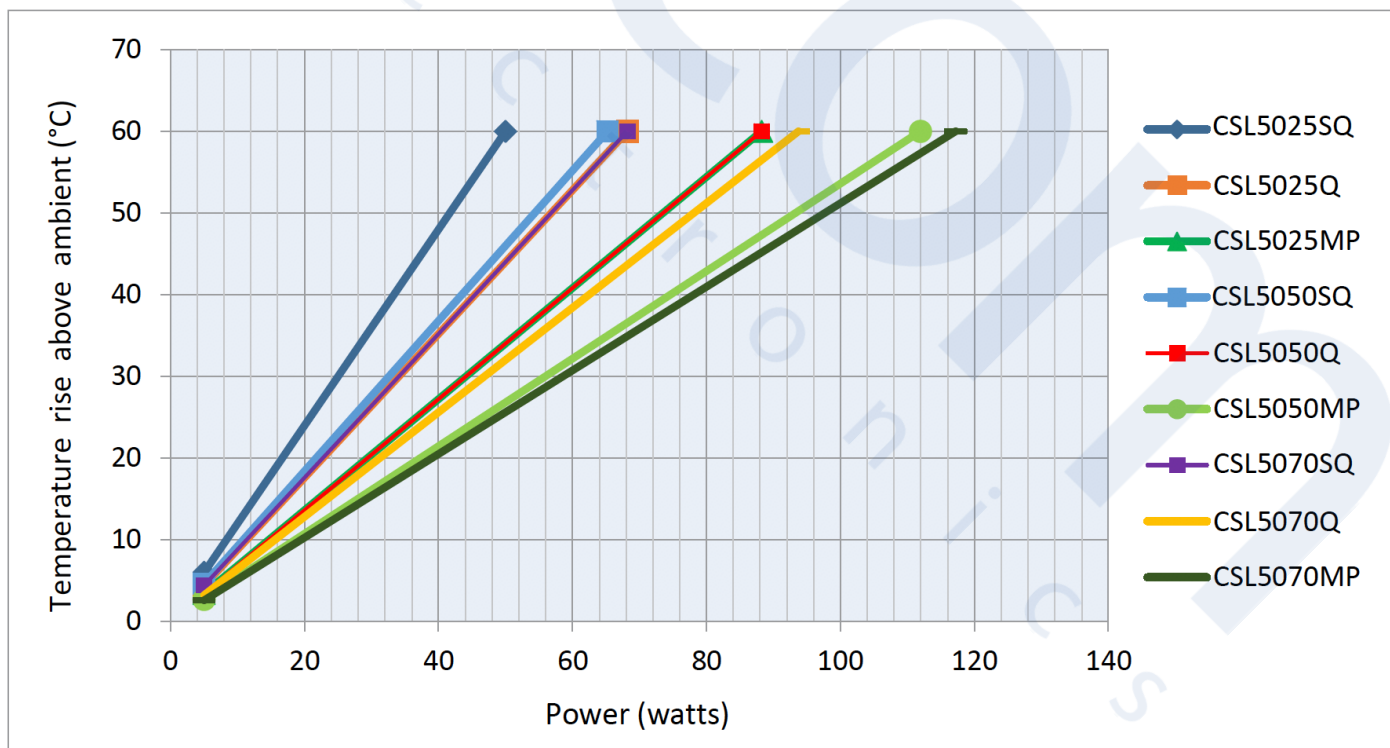


Power Consumption (Watts)

Setting	Input Voltage							
	12V	15V	20V	25V	30V	35V	40V	42V
Super Quiet	0.48	0.48	0.48	0.50	0.51	0.53	0.53	0.55
Quiet	0.74	0.74	0.74	0.75	0.75	0.77	0.80	0.80
Max. Performance	*	1.30	1.30	1.30	1.30	1.30	1.28	1.26

*MP option requires a minimum of 15V

Thermal Performance Chart



Wire Harness Options

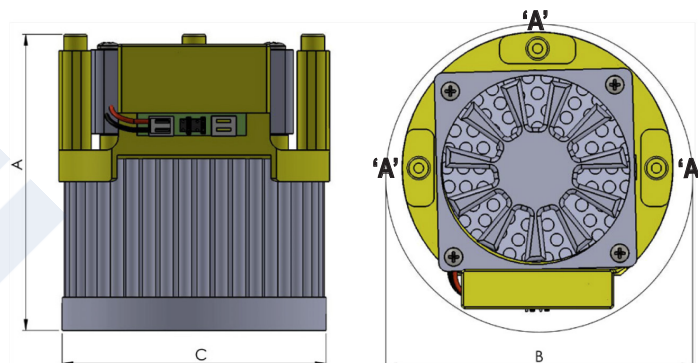
Part Number	Length (mm)	Pin	Wire Color	Symbol
CSLWH12	300	1	Red	+VDC
		2	Black	GND
CSLWH18	450	1	Red	+VDC
		2	Black	GND

Wire Connections	
Pin 1	Positive DC Ground
Pin 2	Ground
Input Connector	JST Part# PHR-2



Mechanical Dimensions

Model	A (mm)	B (mm)	C (mm)
CSL5025	60	60	50
CSL5050	85	60	50
CSL5070	105	60	50






THREE SCREWS 'A'

- Delta PT 30 or equivalent screw
- Limit installation torque to 0.40Nm @ 400 rpm
- Boss designed for 250 lb Pull-out force

COOLSTRATE CONFIGURATIONS

Coolstrate modules are factory configured for Quiet (Q) settings. The Coolstrate module may be configured per the three settings by moving the jumpers in the following configurations. The drawing as shown is referenced with the LED pointing down towards the ground.

Setting	Jumper Positions
Quiet	
Super Quiet	
Max. Performance	

Operating Modes And Descriptions

COOLSTRATE MODULE

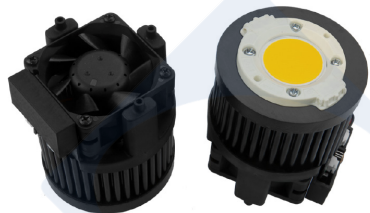
The Coolstrate module consists of a controller circuit, a special low noise, high efficiency, long life fan and an ultra-low thermal resistance heat sink. The controller circuit converts any input voltage from 11 to 75 volts to a fixed lower voltage as required by the fan. The input voltage is derived from the same voltage used to power the LED array.

OVERTEMP PROTECTION

Contact Cooliance Tech Support for further information and customized dimming and overtemp protection support.

DIMMING

Dimming should not affect the thermal performance of the Coolstrate unit. In most applications, the voltage output from a dimmed power supply will still be higher than the minimum input voltage of the Coolstrate unit and therefore its thermal operation will be unaffected. Should dimming of the LED power supply reduce the voltage output to below that of the Coolstrate minimum voltage input, the Coolstrate module will not be adversely affected and will continue to operate until the voltage reaches a point at which the fan turns off. At that point, the power output of the LEDs is at a reduced level, and the Coolstrate heat sink is typically capable of providing adequate cooling in a passive mode. As the dimming level increases back to full power, the Coolstrate module will also turn back on and function as an active unit. Please consult factory for support with a specific dimmer and application.



Features

- Capable of cooling up to 326 Watts.
- No separate power supply required.
- Operating life exceeds 60,000 hours at 45°C.
- A broad range of input voltages from 11V to 75V.
- UL File #E351120 applies up to 60V input voltage
- 10 mm thick mounting base allows unlimited hole patterns.
- 5 Year Limited Warranty.
- Inaudible (<16dB noise level) at super quiet setting.
- Ability to select three fan speed settings to control thermal performance and noise.
- Integral mounting features to support attachment luminaire.

Model	Setting	dbA	Diameter (mm)	Height (mm)	Base Thickness (mm)	Weight (g)	Thermal Resistance (°C/W)	Power Dissipation (W)*	
								Ambient 25°C	Ambient 35°C
CSL8025SQ-XXX	Super Quiet	16	80	64	10	340	0.80	94	78
CSL8025Q-XXX	Quiet	20	80	64	10	340	0.65	115	96
CSL8025MP-XXX	Max. Performance	34	80	64	10	340	0.43	174	145
CSL8050SQ-XXX	Super Quiet	16	80	92	10	480	0.50	150	125
CSL8050Q-XXX	Quiet	20	80	92	10	480	0.40	188	156
CSL8050MP-XXX	Max. Performance	34	80	92	10	480	0.27	278	231
CSL8070SQ-XXX	Super Quiet	16	80	110	10	570	0.47	160	133
CSL8070Q-XXX	Quiet	20	80	110	10	570	0.35	214	179
CSL8070MP-XXX	Max. Performance	34	80	110	10	570	0.23	326	272

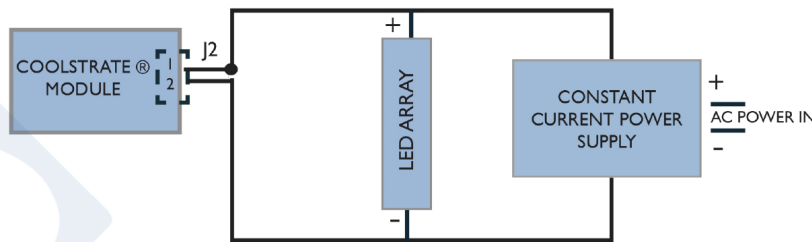
To select the heatsink part # for your light engine, go to pages 21 to 26 and replace the suffix '-XXX' with the suffix in the Selection Matrix.

Notes

- Thermal resistance values are given as a reference only and are measured in free air without airflow obstructions. Thermal resistance is measured from the bottom middle of the heat sink to ambient air. Actual thermal performance may vary by application, and final product design should be tested to assure proper thermal performance.
- Thermal design is based on the cooling a typical LED array's case temperature. Values are based on a temperature rise of 60°C or 50°C.

CSL 780 Series, Active

Connection Diagram

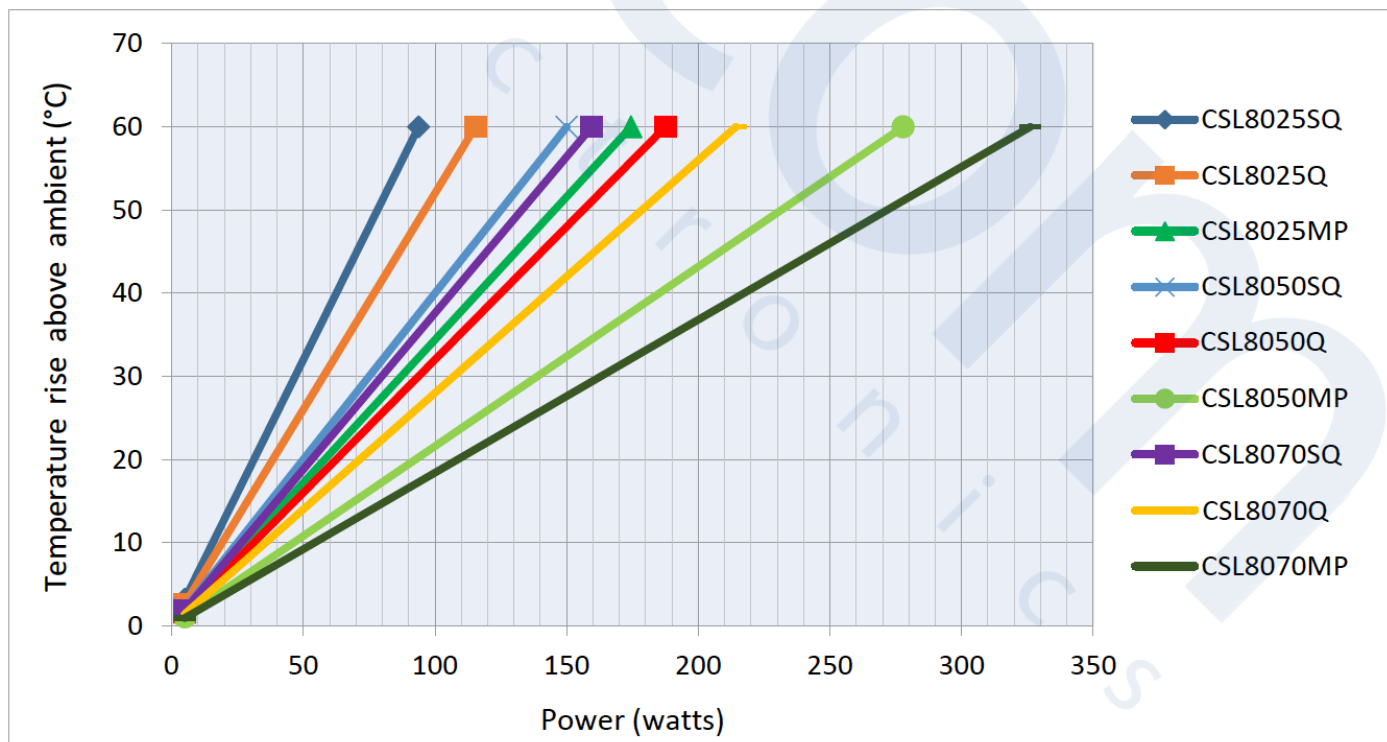


Power Consumption (Watts)

Setting	Input Voltage							
	12V	15V	20V	25V	30V	35V	40V	42V
Super Quiet	0.46	0.45	0.46	0.48	0.48	0.49	0.52	0.50
Quiet	0.80	0.78	0.80	0.78	0.78	0.80	0.80	0.80
Max. Performance	*	1.88	2.00	1.98	2.07	2.03	2.04	2.02

*MP option requires a minimum of 15V

Thermal Performance Chart



Wire Harness Options

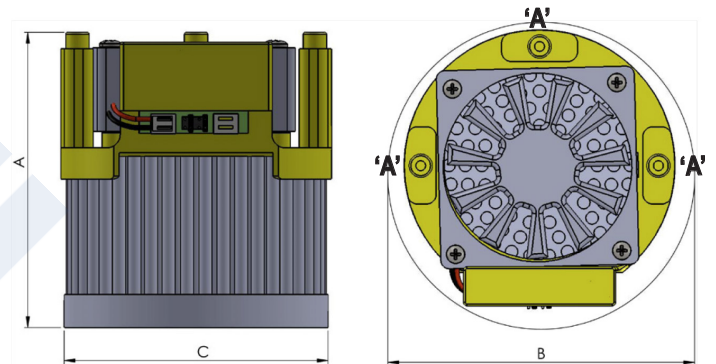
Part Number	Length (mm)	Pin	Wire Color	Symbol
CSLWH12	300	1	Red	+VDC
		2	Black	GND
CSLWH18	450	1	Red	+VDC
		2	Black	GND

Wire Connections	
Pin 1	Positive DC Ground
Pin 2	Ground
Input Connector	JST Part# PHR-2



Mechanical Dimensions

Model	A (mm)	B (mm)	C (mm)
CSL8025	64	85	80
CSL8050	92	85	80
CSL8070	110	85	80






THREE SCREWS 'A'

- Delta PT 30 or equivalent screw
- Limit installation torque to 0.40Nm @ 400 rpm
- Boss designed for 250 lb Pull-out force

COOLSTRATE CONFIGURATIONS

Coolstrate modules are factory configured for Quiet (Q) settings. The Coolstrate module may be configured per the three settings by moving the jumpers in the following configurations. The drawing as shown is referenced with the LED pointing down towards the ground.

Setting	Jumper Positions
Quiet	
Super Quiet	
Max. Performance	

Operating Modes And Descriptions

COOLSTRATE MODULE

The Coolstrate module consists of a controller circuit, a special low noise, high efficiency, long life fan and an ultra low thermal resistance heat sink. The controller circuit converts any input voltage from 11 to 75 volts to a fixed lower voltage as required by the fan. The input voltage is derived from the same voltage used to power the LED array.

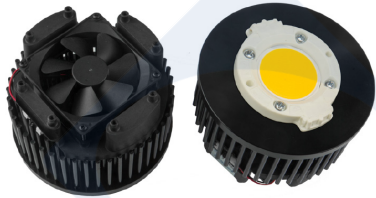
OVERTEMP PROTECTION

Contact Cooliance Tech Support for further information and customized dimming and overtemp protection support.

DIMMING

Dimming should not affect the thermal performance of the Coolstrate unit. In most applications, the voltage output from a dimmed power supply will still be higher than the minimum input voltage of the Coolstrate unit and therefore its thermal operation will be unaffected. Should dimming of the LED power supply reduce the voltage output to below that of the Coolstrate minimum voltage input, the Coolstrate module will not be adversely affected and will continue to operate until the voltage reaches a point at which the fan turns off. At that point, the power output of the LEDs is at a reduced level and the Coolstrate heat sink is typically capable of providing adequate cooling in a passive mode. As the dimming level increases back to full power, the Coolstrate module will also turn back on and function as an active unit. Please consult factory for support with a specific dimmer and application.

Features



- Capable of cooling up to 500 Watts.
- No separate power supply required.
- Operating life exceeds 60,000 hours at 45°C.
- A broad range of input voltages from 11V to 75V.
- UL File #E351120 applies up to 60V input voltage
- 10 mm thick mounting base allows unlimited hole patterns.
- 5 Year Limited Warranty.
- Inaudible (<16dB noise level) at super quiet setting.
- Ability to select three fan speed settings to control thermal performance and noise.
- Integral mounting features to support attachment luminaire.

Model	Setting	dbA	Diameter (mm)	Height (mm)	Base Thickness (mm)	Weight (g)	Thermal Resistance (°C/W)	Power Dissipation (W)*	
								Ambient 25°C	Ambient 35°C
CSL16070SQ-XXX	Super Quiet	16	160	110	10	1,200	0.22	341	284
CSL16070Q-XXX	Quiet	22	160	110	10	1,200	0.19	395	329
CSL16070MP-XXX	Max. Performance	32	160	110	10	1,200	0.15	500	419

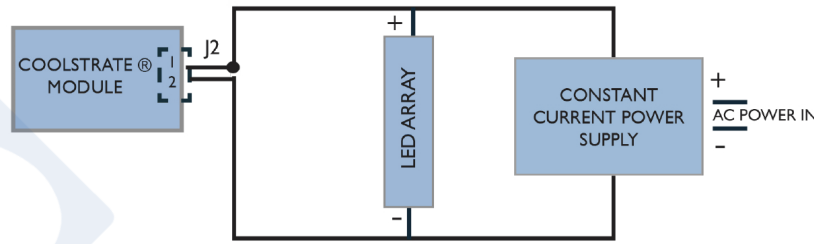
To select the heatsink part # for your light engine, go to pages 21 to 26 and replace the suffix '-XXX' with the suffix in the Selection Matrix.

Notes

- Thermal resistance values are given as a reference only and are measured in free air without airflow obstructions. Thermal resistance is measured from the bottom middle of the heat sink to ambient air. Actual thermal performance may vary by application, and final product design should be tested to assure proper thermal performance.
- Thermal design is based on the cooling a typical LED array's case temperature. Values are based on a temperature rise of 60°C or 50°C.

CSL 7160 Series, Active

Connection Diagram

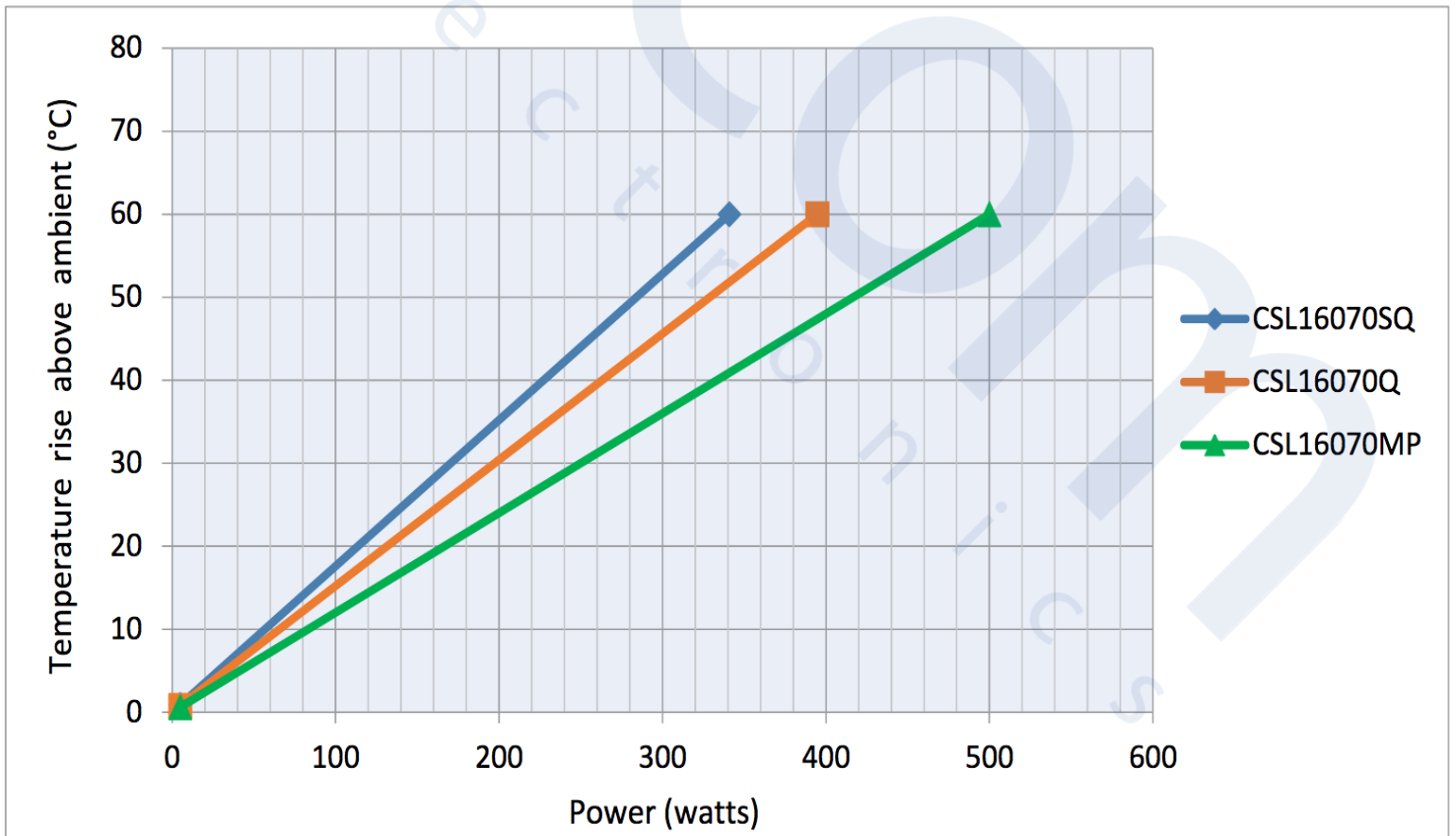


Power Consumption (Watts)

Setting	Input Voltage							
	12V	15V	20V	25V	30V	35V	40V	42V
Super Quiet	0.74	0.74	0.74	0.75	0.78	0.49	0.80	0.79
Quiet	1.44	1.17	1.16	1.72	0.78	1.20	1.20	1.22
Max. Performance	*	2.03	2.00	2.00	2.07	2.10	2.00	2.10

*MP option requires a minimum of 15V

Thermal Performance Chart



Wire Harness Options

Part Number	Length (mm)	Pin	Wire Color	Symbol
CSLWH12	300	1	Red	+VDC
		2	Black	GND

CSLWH18	450	1	Red	+VDC
		2	Black	GND

Wire Connections	
Pin 1	Positive DC Ground
Pin 2	Ground
Input Connector	JST Part# PHR-2



COOLSTRATE CONFIGURATIONS

Coolstrate modules are factory configured for Quiet (Q) settings. The Coolstrate module may be configured per the three settings by moving the jumpers in the following configurations. The drawing as shown is referenced with the LED pointing down towards the ground.

Operating Modes And Descriptions

COOLSTRATE MODULE

The Coolstrate module consists of a controller circuit, a special low noise, high efficiency, long life fan and an ultra-low thermal resistance heat sink. The controller circuit converts any input voltage from 11 to 75 volts to a fixed lower voltage as required by the fan. The input voltage is derived from the same voltage used to power the LED array.

OVERTEMP PROTECTION

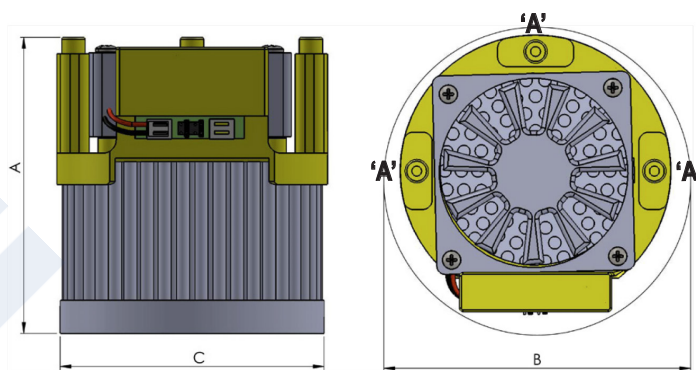
Contact Cooliance Tech Support for further information and customized dimming and overtemp protection support.

DIMMING

Dimming should not affect the thermal performance of the Coolstrate unit. In most applications, the voltage output from a dimmed power supply will still be higher than the minimum input voltage of the Coolstrate unit, and therefore its thermal operation will be unaffected. Should dimming of the LED power supply reduce the voltage output to below that of the Coolstrate minimum voltage input, the Coolstrate module will not be adversely affected and will continue to operate until the voltage reaches a point at which the fan turns off. At that point, the power output of the LEDs is at a reduced level and the Coolstrate heat sink is typically capable of providing adequate cooling in a passive mode. As the dimming level increases back to full power, the Coolstrate module will also turn back on and function as an active unit. Please consult factory for support with a specific dimmer and application.




Mechanical Dimensions

Model	A (mm)	B(mm)	C(mm)
CSL16070	110	160	160



THREE SCREWS 'A'

- Delta PT 30 or equivalent screw
- Limit installation torque to 0.40Nm @ 400 rpm
- Boss designed for 250 lb Pull-out force

Setting	Jumper Positions
Quiet	
Super Quiet	
Max. Performance	

Section Two

Select Order Number Suffixes

Cooliance products are provided with a generic order suffix as detailed in the prior product specifications pages, e.g.

CPL4050-XXX

To select the part number for your LED, or LED holder, -XXX must be replaced with the order suffix as detailed in the following pages.

The suffix designates the hole pattern for your product; hole patterns are detailed in Section 3 of this brochure.

Series	Part Number	Order Suffix	LED Holder	Part #	Order Suffix	LED Holder	Part #	Order Suffix
Vero®, Gen. 6								
	Vero 10	-813	BJB	47.319.6214	-891			
	Vero 13	-802	BJB	47.319.6264	-891			
	Vero 18*	-802						
	Vero 29	-803						
Vero®, Gen. 7								
	Vero 10B	-813						
	Vero 10C	-813						
	Vero 10D	-813						
	Vero 13B*	-802	BJB	47.319.2021	-890			
	Vero 13C*	-802	BJB	47.319.2021	-890			
	Vero 13D*	-802	BJB	47.319.2021	-890			
	Vero 18B*	-802						
	Vero18C*	-802						
	Vero18D*	-802						
	Vero 29B	-803						
	Vero 29C	-803						
	Vero 29D	-803						
Vero® SE, Gen 1								
	Vero SE 10B	-814						
	Vero SE 10C	-814						
	Vero SE 10D	-814						
	Vero SE 13B*	-802						
	Vero SE 13C*	-802						
	Vero SE 13D*	-802						
	Vero SE 18B*	-802						
	Vero SE 18C*	-802						
	Vero SE 18D*	-802						
	Vero SE 29B	-838						
	Vero SE 29C	-838						
	Vero SE 29D	-838						
Décor Ultra, Gen. 7								
	Vero 10	-813						
	Vero 13*	-802	BJB	47.319.2021	-890			
	Vero 18*	-802						

* Denotes that these products have a second set of Zhaga mounting holes (2 x M3 threaded holes on a 35mm pitch). If you are using the Zhaga mounting holes please use the order suffix -890

Series	Part Number	Order Suffix	LED Holder	Part #	Order Suffix	LED Holder	Part #	Order Suffix
Décor Class A								
	Vero SE 10	-814						
	Vero SE 13*	-802						
	Vero SE 18*	-802						
	Vero SE 29	-838						
Décor Ultra								
	Vero SE 10	-814						
	Vero SE 13*	-802						
	Vero SE 18*	-802						
Décor								
	Entertainment Vero SE 18*	-802						
	Entertainment Vero SE 29	-838						
	Food Bread & Bakery Vero SE 18*	-802						
	Food Bread & Bakery Vero SE 29	-838						
	Food Meat & Deli Vero SE 18*	-802						
	Food Meat & Deli Vero SE 29	-838						
	Showcase Vero SE 10	-814						
	Showcase Vero SE 13*	-802						
	Showcase Vero SE 18*	-802						
	Street and Landmark Vero SE 10	-814						
	Street and Landmark Vero SE 18*	-802						
	Street and Landmark Vero SE 29	-838						
Décor Class A, Gen. 7								
	Vero 10	-813						
	Vero 13*	-802	BJB	47.319.2021	-890			
	Vero 18*	-802						
	Vero 29	-803						
	V10B	-814	BJB	47.319.6060	-891	Bender+Wirth	486	-891
	V10C	-814	BJB	47.319.6060	-891	Bender+Wirth	486	-891
	V13B	-825	BJB	47.319.6023	-890	Bender+Wirth	477	-829
	V13C	-825	BJB	47.319.6023	-890	Bender+Wirth	477	-829
	V18B	-824				Bender+Wirth	462	-890
	V22D	-833	A.A.G. Stucchi	8102/G2	-890	Bender+Wirth	431	-890

* Denotes that these products have a second set of Zhaga mounting holes (2 x M3 threaded holes on a 35mm pitch). If you are using the Zhaga mounting holes please use the order suffix -890

Series	Part Number	Order Suffix	LED Holder	Part #	Order Suffix	LED Holder	Part #	Order Suffix	LED Holder	Part #	Order Suffix
V Series™, Gen 6.											
	V6		Bender+Wirth	460	-818	Kangrong	K905H	-814	Optosource	BRHV068-F	-819
	V8		Bender+Wirth	460	-818	Kangrong	K905H	-814	Optosource	BRHV068-F	-819
	V10		Bender+Wirth	455	-825				Optosource	BRHV010-C	-819
	V13		Bender+Wirth	455	-825				Optosource	BRHV013-A	-890
	V15		Bender+Wirth	456	-825				Optosource	BRHV1518-A	-890
	V18		Bender+Wirth	456	-825				Optosource	BRHV1518-A	-890
	V22		Ideal Ind.	50-2204CT	-890				A.A.G. Stucchi	8102/G2	-890
V Series™, Gen 7											
	V8D		Bender+Wirth	460	-818	Kangrong	K905H	-814	Optosource	BRHV068-F	-819
	V8E		Bender+Wirth	460	-818	Kangrong	K905H	-814	Optosource	BRHV068-F	-819
	V10B	-814	Bender+Wirth	486	-891	BJB	47.319.6060	-891			
	V10C	-814	Bender+Wirth	486	-891	BJB	47.319.6060	-891			
	V13B	-825	Bender+Wirth	477	-829	BJB	47.319.2023	-890			
	V13C	-825	Bender+Wirth	477	-829	BJB	47.319.2023	-890			
	V18B	-824	Bender+Wirth	462	-890						
	V18C	-824	Bender+Wirth	462	-890						
	V22B	-833	Bender+Wirth	431	-890				A.A.G. Stucchi	8102/G2	-890
	V22C	-833	Bender+Wirth	431	-890				A.A.G. Stucchi	8102/G2	-890
	V22D	-833	Bender+Wirth	431	-890				A.A.G. Stucchi	8102/G2	-890
VESTA®											
	Dim-To-Warm,9mm		Bender+Wirth	490	-890						
	Dim-To-Warm, 9mm(12W)		Bender+Wirth	490	-890						
	Dim-To-Warm, 15mm		Bender+Wirth	491	-890						
	Tunable White Array, 9mm		Bender+Wirth	489	-890						
	Tunable White Array, 13mm		Bender+Wirth	492	-890	Optosource	BRHV013-A	-890	Molex	180560-0001	-826

Series	Part Number	Order Suffix	LED Holder	Part #	Order Suffix	LED Holder	Part #	Order Suffix
Décor, Gen.7								
	Entertainment Vero 18*	-802						
	Entertainment Vero 29	-803						
	Food Bread & Bakery Vero 18*	-802						
	Food Bread & Bakery Vero 29	-803						
	Food Meat & Deli Vero 18*	-802						
	Food Meat & Deli Vero 29	-803						
	Entertainment V22D	-833	A.A.G. Stucchi	8102/G2	-890			
	Food V13C	-825	Bender+Wirth	477	-829	BJB	47.319.2023	-890
	Food V18B	-824	Bender+Wirth	462	-890			
	Food 22D	-833	A.A.G. Stucchi	8102/G2	-890	Bender+Wirth	431	-890
	Showcase V10B	-814				Bender+Wirth	486	-891 BJB 47.319.6060 -891
	Showcase V10C	-814				Bender+Wirth	486	-891 BJB 47.319.6060 -891
	Showcase V13B	-825				Bender+Wirth	477	-829 BJB 47.319.2023 -890
	Showcase V13C	-825				Bender+Wirth	477	-829 BJB 47.319.2023 -890
	Showcase V18C	-824				Bender+Wirth	462	-890
	Showcase V22D	-833	A.A.G. Stucchi	8102/G2	-890	Bender+Wirth	431	-890
	Showcase Vero 10	-813						
	Showcase Vero 13*	-802						
	Showcase Vero 18*	-802						
	Street and Landmark Vero 10	-813						

* Denotes that these products have a second set of Zhaga mounting holes (2 x M3 threaded holes on a 35mm pitch). If you are using the Zhaga mounting holes please use the order suffix -890

Series	Part Number	Order Suffix	LED Holder	Part #	Order Suffix	LED Holder	Part #	Order Suffix	LED Holder	Part #	Order Suffix
Décor, Gen.7											
	Street and Landmark Vero 18*	-802									
	Street and Landmark Vero 29	-803									
	Street and Landmark V10B	-814				Bender+Wirth	486	-891	BJB	47.319.6060	-891
	Street and Landmark V13B	-825				Bender+Wirth	477	-829	BJB	47.319.2023	-890
	Street and Landmark V13C	-825				Bender+Wirth	477	-829	BJB	47.319.2023	-890
	Street and Landmark V18C	-824				Bender+Wirth	462	-890			
	Street and Landmark V22C	-833	A.A.G. Stucchi	8102/G2	-890	Bender+Wirth	431	-890			
	Street and Landmark V22D	-833	A.A.G. Stucchi	8102/G2	-890	Bender+Wirth	431	-890			
	Ultra V10B	-814				Bender+Wirth	486	-891	BJB	47.319.6060	-891
	Ultra V13 B	-825				Bender+Wirth	477	-829	BJB	47.319.2023	-890
	Ultra V18B	-824				Bender+Wirth	462	-890			
	Ultra V22D	-833	A.A.G. Stucchi	8102/G2	-890	Bender+Wirth	431	-890			

* Denotes that these products have a second set of Zhaga mounting holes (2 x M3 threaded holes on a 35mm pitch). If you are using the Zhaga mounting holes please use the order suffix -890

Series	Part Number	Order Suffix	LED Holder	Part #	Order Suffix	LED Holder	Part #	Order Suffix	LED Holder	Part #	Order Suffix
H Series™, Gen 6.											
	H6		Bender+Wirth	448	-816						
	H9		Bender+Wirth	441	-891	Molex	180560-0001	-826	BJB	47.319.6104	-891
V Series HD, Gen 7.											
	V4		Bender+Wirth	460	-818						
	V6	-814	Bender+Wirth	464	-891						
	V9	-825	Bender+Wirth	496	-890						

Section Two

Hole Pattern Drawings

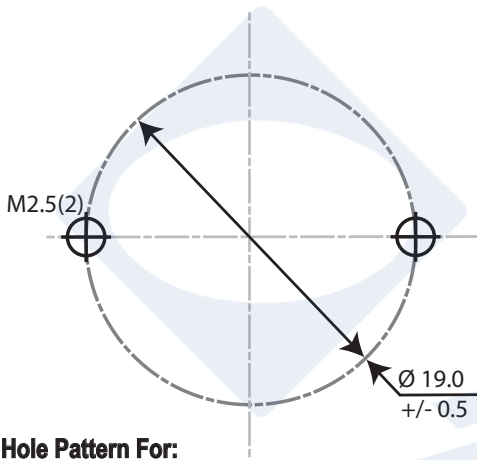
For:

LEDs: Page 28 and 29

LED Holders: Pages 30 and 31

The following pages depict the hole pattern associated with each order number.

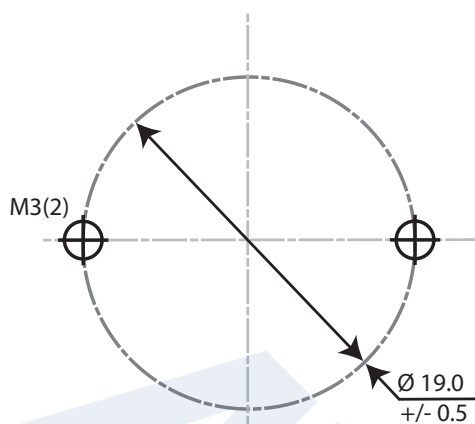
-813



Hole Pattern For:

- Gen 6 Vero 10
- Gen. 7 Décor Class A Vero 10
- Gen. 7 Décor Showcase Vero 10
- Gen. 7 Décor Street and Landmark Vero 10
- Gen. 7 Décor Ultra Vero 10
- Gen 7 Vero 10B
- Gen 7 Vero 10C
- Gen 7 Vero 10D

-814

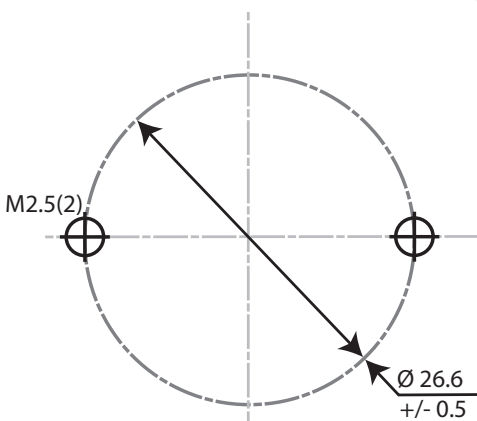


Hole Pattern For:

- Décor Class A Vero SE 10
- Décor Showcase Vero SE 10
- Décor Street and Landmark Vero SE 10
- Décor Ultra Vero SE 10
- Vero SE 10B, Gen 1
- Vero SE 10C, Gen 1
- Vero SE 10D, Gen 1

- Gen. 7 Décor Series Class A V10B
- Gen. 7 Décor Series Class A V10C
- Gen. 7 Décor Series Street and Landmark V10B
- Gen. 7 Décor Series Ultra V10B
- Gen. 7 Décor Showcase V10B
- Gen.7 Décor Showcase V10C
- Gen 7 V10B
- Gen 7 V10C
- Gen 7 V6 HD

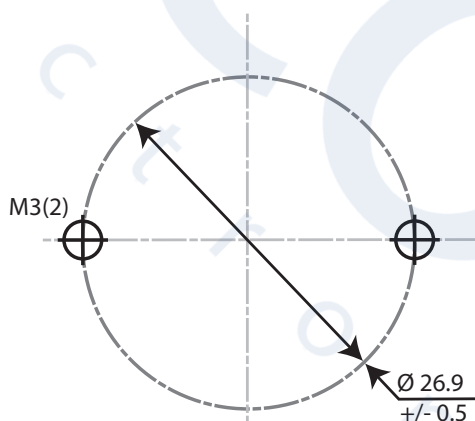
-824



Hole Pattern For:

- Gen. 7 Décor Series Class A V18B
- Gen. 7 Décor Series Food V18B
- Gen. 7 Décor Series Street and Landmark V18C
- Gen. 7 Décor Series Ultra V18B
- Gen. 7 Décor Showcase V18C
- Gen. 7 V18B
- Gen. 7 V18C

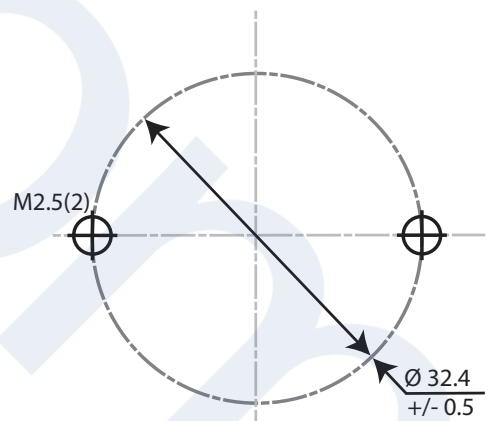
-825



Hole Pattern For:

- Gen. 7 Décor Series Class A V13B
- Gen. 7 Décor Series Class A V13C
- Gen. 7 Décor Series Food V13C
- Gen. 7 Décor Series Street and Landmark V13B
- Gen. 7 Décor Series Street and Landmark V13C
- Gen. 7 Décor Series Ultra V13B
- Gen. 7 Décor Showcase V13B
- Gen.7 Décor Showcase V13C
- Gen 7 V13B
- Gen 7 V13C
- V9 HD Gen 7

-833

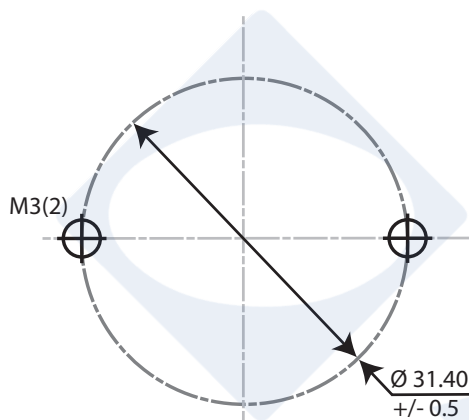


Hole Pattern For:

- Gen. 7 Décor Series Class A V22D
- Gen. 7 Décor Series Entertainment V22D
- Gen. 7 Décor Series Food V22D
- Gen. 7 Décor Series Street and Landmark V22C
- Gen. 7 Décor Series Street and Landmark V22D
- Gen. 7 Décor Series Ultra V22D
- Gen. 7 Décor Showcase V22D
- Gen. 7 V22B
- Gen. 7 V22C
- Gen. 7 V22D

Each hole pattern matches the part number order suffix.

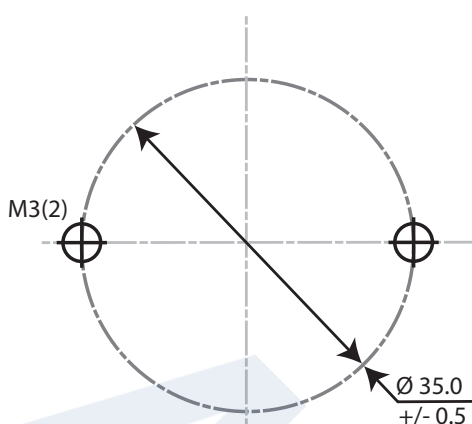
-802



Hole Pattern For:

- Décor Class A Vero SE 13
- Décor Class A Vero SE 18
- Décor Entertainment Vero SE 18
- Décor Food Bread & Bakery Vero SE 18
- Décor Food Meat & Deli Vero SE 18
- Décor Showcase Vero SE 13
- Décor Showcase Vero SE 18
- Décor Street and Landmark Vero SE 18
- Décor Ultra Vero SE 13
- Décor Ultra Vero SE 18
- Vero SE 13B
- Vero SE 13C
- Vero SE 13D
- Vero SE 18B
- Vero SE 18C
- Vero SE 18D
- Gen. 7 Décor Class A Vero 13
- Gen. 7 Décor Class A Vero 18
- Gen. 7 Décor Entertainment Vero 18
- Gen. 7 Décor Food Bread & Bakery Vero 18
- Gen. 7 Décor Food Meat & Deli Vero 18
- Gen. 7 Décor Showcase Vero 18
- Gen. 7 Décor Street and Landmark Vero 18
- Gen. 7 Décor Ultra Vero 13
- Gen. 7 Décor Ultra Vero 18
- Gen. 6 Vero 13
- Gen. 7 Vero 13B
- Gen. 7 Vero 13C
- Gen. 7 Vero 13D
- Gen. 6 Vero 18
- Gen. 7 Vero 18B
- Gen. 7 Vero 18C
- Gen. 7 Vero 18D

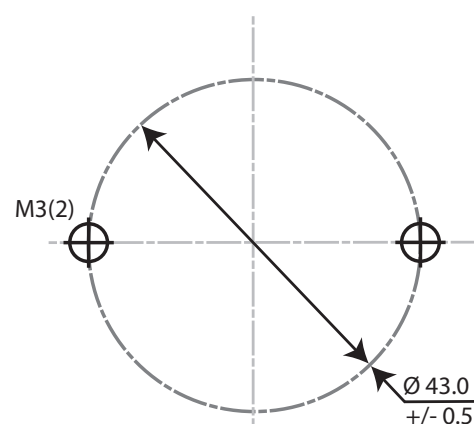
-890



Hole Pattern For:

- Décor Class A Vero SE 13
- Décor Class A Vero SE 18
- Décor Entertainment Vero SE 18
- Décor Food Bread & Bakery Vero SE 18
- Décor Food Meat & Deli Vero SE 18
- Décor Showcase Vero SE 13
- Décor Showcase Vero SE 18
- Décor Street and Landmark Vero SE 18
- Décor Ultra Vero SE 13
- Décor Ultra Vero SE 18
- Vero SE 13B
- Vero SE 13C
- Vero SE 13D
- Vero SE 18B
- Vero SE 18C
- Vero SE 18D
- Gen. 7 Décor Class A Vero 13
- Gen. 7 Décor Class A Vero 18
- Gen. 7 Décor Entertainment Vero 18
- Gen. 7 Décor Food Bread & Bakery Vero 18
- Gen. 7 Décor Food Meat & Deli Vero 18
- Gen. 7 Décor Showcase Vero 18
- Gen. 7 Décor Street and Landmark Vero 18
- Gen. 7 Décor Ultra Vero 13
- Gen. 7 Décor Ultra Vero 18
- Gen. 6 Vero 13
- Gen. 7 Vero 13B
- Gen. 7 Vero 13C
- Gen. 7 Vero 13D
- Gen. 6 Vero 18
- Gen. 7 Vero 18B
- Gen. 7 Vero 18C
- Gen. 7 Vero 18D

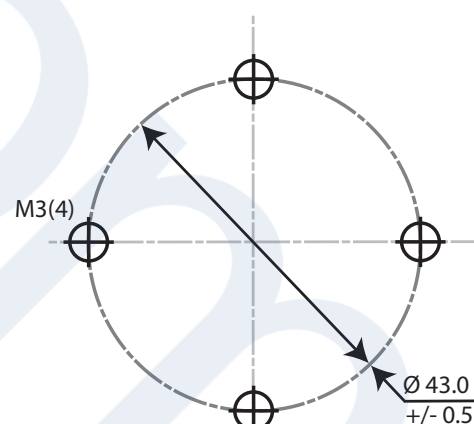
-838



Hole Pattern For:

- Décor Class A Vero SE 29
- Décor Entertainment Vero SE 29
- Décor Food Bread & Bakery Vero SE 29
- Décor Food Meat & Deli Vero SE 29
- Décor Street and Landmark Vero SE 29
- Vero SE 29B
- Vero SE 29C
- Vero SE 29D

-803



Hole Pattern For:

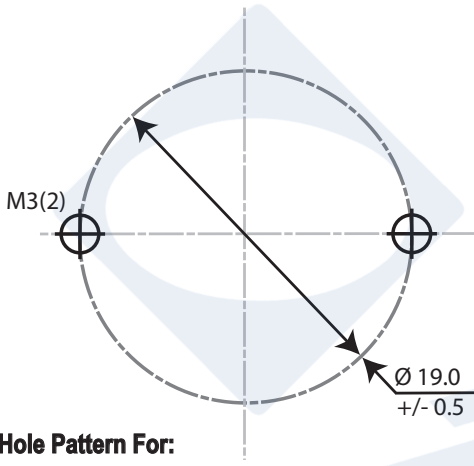
- Gen. 7 Décor Class A Vero 29
- Gen. 7 Décor Entertainment Vero 29
- Gen. 7 Décor Food Bread & Bakery Vero 29
- Gen. 7 Décor Food Meat & Deli Vero 29
- Gen. 7 Décor Street & Landmark Vero 29
- Gen. 6 Vero 29
- Gen. 7 -Vero 29B
- Gen. 7 Vero 29C
- Gen. 7 Vero 29D

These products have a second set of Zhaga mounting holes (2 x M3 threaded holes on a 35mm pitch). If you are using the Zhaga mounting holes please use the order suffix -890

cooliance Order Suffixes/Hole Patterns For LEDs Holders

Each hole pattern matches the part number order suffix.

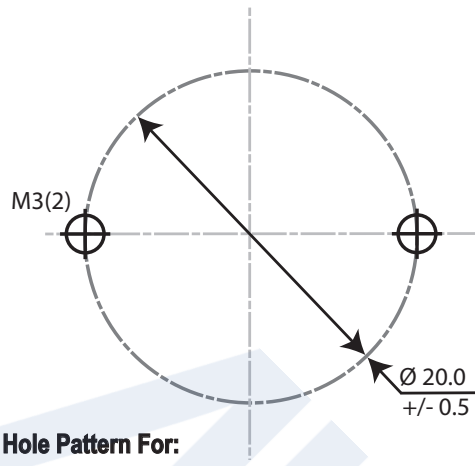
-814



Hole Pattern For:

- Kangrong K905H

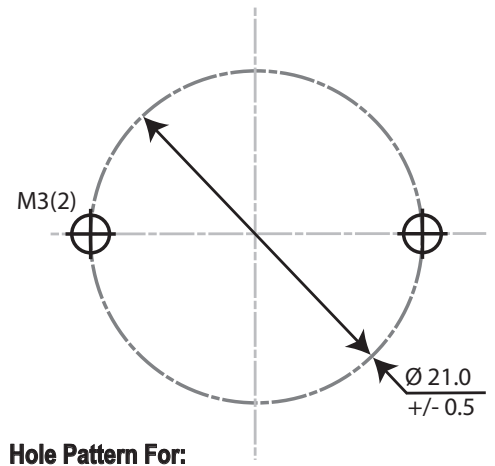
-816



Hole Pattern For:

- Bender+Wirth 448

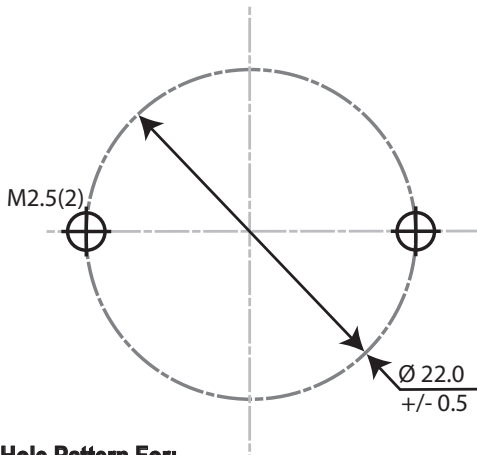
-818



Hole Pattern For:

- Bender+Wirth 460

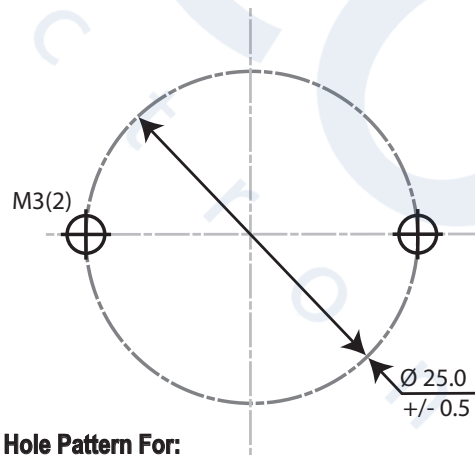
-819



Hole Pattern For:

- Optosource BRHV010-C
- Optosource BRHV068-F

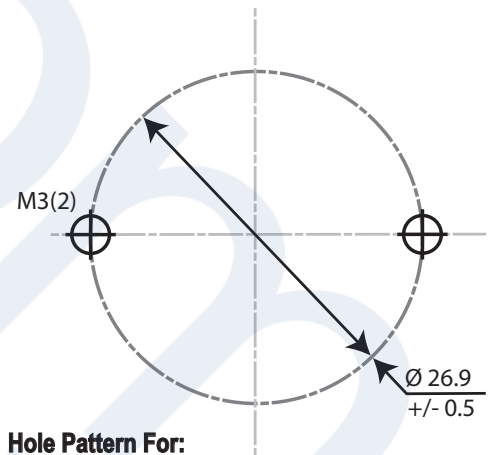
-891



Hole Pattern For:

- Bender+Wirth 486
- Bender+Wirth 441
- BJB 47.319.6060
- BJB 47.319.6104
- BJB 47.319.6214
- BJB 47.319.6264

-825

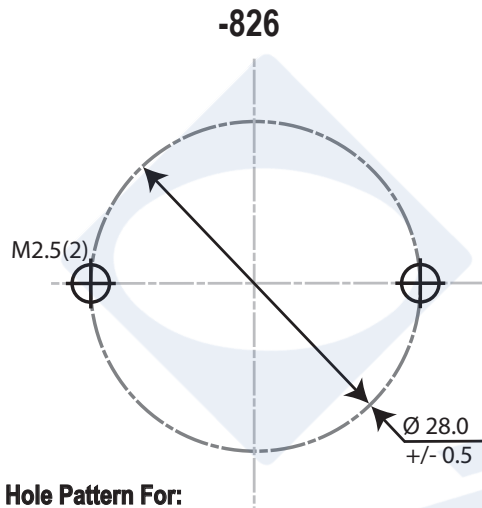


Hole Pattern For:

- Bender+Wirth 455
- bender+Wirth 456

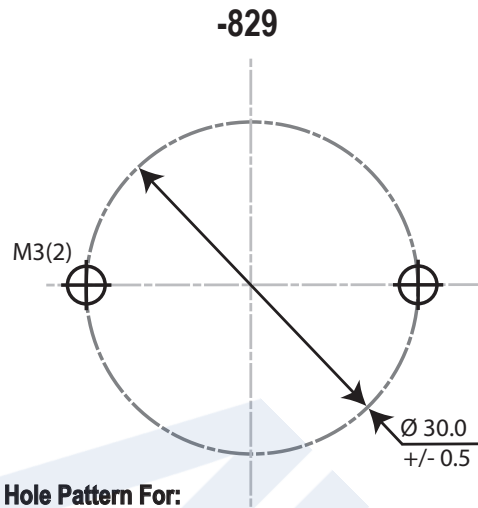
cooliance Order Suffixes/Hole Patterns For LEDs Holders

Each hole pattern matches the part number order suffix.



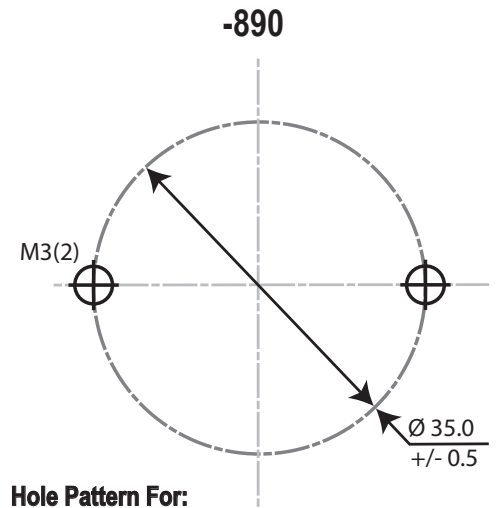
Hole Pattern For:

- Molex 180560-0001



Hole Pattern For:

- Bender+Wirth 477



Hole Pattern For:

- A.A.G Stucchi 8102/G2
- Bender+Wirth 431
- Bender+Wirth 462
- Bender+Wirth 489
- Bender+Wirth 490
- Bender+Wirth 491
- Bender+Wirth 492
- Ideal 50-2204CT
- Optosource BRHV013-A
- Optosource BHRV1518-A
- BJB 47.319.2021
- BJB 47.319.2040
- BJB 47.319.2023