

HORTILAMP GROWTH PLANTS

LEVEL II PCB for Low Power Horticulture Lighting Applications



Description

Horticulture Low Power Level II PCB is made to be able to modulate the wavelength spectrum from 445nm to 730nm, it has color modulation to create different recipes for the great variety of plants and agricultural foods.

And for different applications, influencing various plant parameters such as biomass, shape, nutritional content, taste, germination and time of flowering.

The lamp is made for the difficult environments of plant factories and greenhouses, with an IP67 optic avoiding the filtration of dust and water so that the LED can fulfill its full life potential.

It is made in such a way that it produces a Photon Flux of 91 $\mu\text{mol/s}$ with an efficacy above 1.98 $\mu\text{mol/J}$ applying typical values per color in different variety of recipes.

HORTILAMP improves crop growth as well as product quality.

Advantages and benefits

- Decrease the growth cycles of your crop
- Growth throughout the year
- Reduces area and produces more year-round
- Minimize lamp maintenance as it is designed to dissipate heat efficiently, prolonging its life
- Easy to install
- PWM control system to generate different recipes for different types of plants.
- Up to 4 channels per optical point.
- Excellent light uniformity which helps to have uniform crops
- Adaptable lamp for different types of agricultural applications.



Applications

- Indoor growing houses
- Greenhouses
- Top Lighting
- Vertical farming
- Floriculture
- Spread
- Growth for medicinal plants.



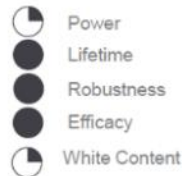
Top Lighting



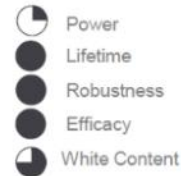
Top Sole-Lighting



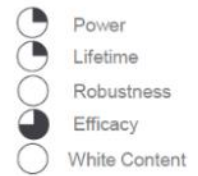
Inter Lighting



Vertical Farming



Consumer



FRUITS



FLOWER



HYDROPONY AND HERBS



VEGETABLES



Product specifications

OSRAM LEDS

- Hiper Red
- Deep Blue
- White 4000K, 5000K
- Far Red

System Properties		
Solder Point Temperature	65	°C
Optical Efficiency	0.9	%
Electrical Efficiency	0.9	%
Luminaire Setup		
Luminaire Length	321	mm
Luminaire Width	79	mm
Greenhouse Setup		
Illumination Top	Top Lighting	
Distance: Luminaire – Plants	1	m
Plant Area Length 1 m	1	m
Plant Area Width 1 m	1	m
Number of Luminaires in a row	1	PCS
Number of Luminaires in a column	1	PCS

SCHEMATIC ARRAY AND CONTROL OPTIONS

DIODE QUANTITY

The next chart show the Diodes quantities needed per serial to adjust the Vf system at 24V depending on the If (Next data are just for reference).

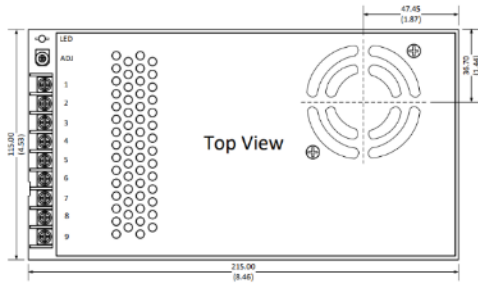
OSLON SQUARE				
LED TYPE	HR	HW	DB	FR
LEDS QTTY	11	8	8	11
LED min VF	1.8	2.7	2.8	1.65
LED min If	0.2	0.15	0.5	0.1
Led min Power	0.36	0.405	1.4	0.165
SYS min VF	19.8	21.6	22.4	18.15
SYS min If	0.2	0.15	0.5	0.1
Sys min Power	3.96	3.24	11.2	1.815
DIODE SF36 3A 400V (1.3)	3	2	1	5
	6	24.2	23.7	24.65
DIODE SF56 5A 400V (1.25)	3	2	1	5
	23.55	24.1	23.65	24.4
DIODE FR107 1A 1000V (1.25)	3	2	1	5
	23.55	24.1	23.65	24.4
LED QTTY	11	8	8	11
LED TYP VF	2.02	2.85	2.85	1.85
LED TYP If	0.7	0.7	0.7	0.35
Led Typ Power	1.414	1.995	1.995	0.6475
SYS TYP VF	22.22	22.8	22.8	20.35
SYS TYP If	0.7	0.7	0.7	0.35
Sys Typ Power	15.554	15.96	15.96	7.1225
DIODE SF36 3A 400V (1.3)	1	1	1	3
	23.52	24.1	24.1	24.25
DIODE SF56 5A 400V (1.25)	1	1	1	3
	23.47	24.05	24.05	24.1
DIODE FR107 1A 1000V (1.25)	1	1	1	3
	23.47	24.05	24.05	24.1

OSLON SQUARE				
LED TYPE	HR	HW	DB	FR
LEDS QTTY	11	8	8	11
LED VF	2.065	3	3	2.182
LED If	0.97	1.3	1.3	0.97
Led Power	2.00	3.9	3.9	2.11654
SYS VF	22.72	24	24	24
SYS If	0.97	1.3	1.3	0.97
Sys Power	22.03	31.2	31.2	23
DIODE SF36 3A 400V (1.3)	1	0	0	0
	24	24	24	24
DIODE SF56 5A 400V (1.25)	1	0	0	0
	24	24	24	24
DIODE FR107 1A 1000V (1.25)	1	0	0	0
	24	24	24	24
LED QTTY	11	8	8	11
LED MAX VF	2.2	3.1	3.14	2.3
LED MAX If	1.4	1.8	2	1
Led Typ Power	3.08	5.58	6.28	2.3
SYS MAX VF	24.2	24.8	25.12	25.3
SYS MAX If	1.4	1.8	2	1
Sys Typ Power	33.88	44.64	50.24	25.3
DIODE SF36 3A 400V (1.3)	1	0	0	0
	25.5	24.8	25.1	25.3
DIODE SF56 5A 400V (1.25)	1	0	0	0
	25.5	24.8	25.1	25.3
DIODE FR107 1A 1000V (1.25)	1	0	0	0
	25.5	24.8	25.1	25.3

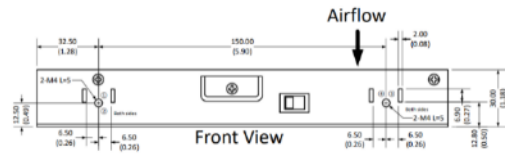
AIMTEC AC/DC CONVERTER 350W

Single Output								
Model	Input Voltage (VAC/VAC/Hz)*	Input Voltage (VDC)**	Max Output Wattage (W)	Output Voltage (V)	Output Voltage Adjustable Range (V)	Output Current (A)	Maximum capacitive load (μ F)	Efficiency @230VAC (%)
AMES350-24SNZ	90-132/ 180-264/ 47-63	240-373	350.4	24	21.6 - 28.8	14.6	1500	87

DIMENSIONS

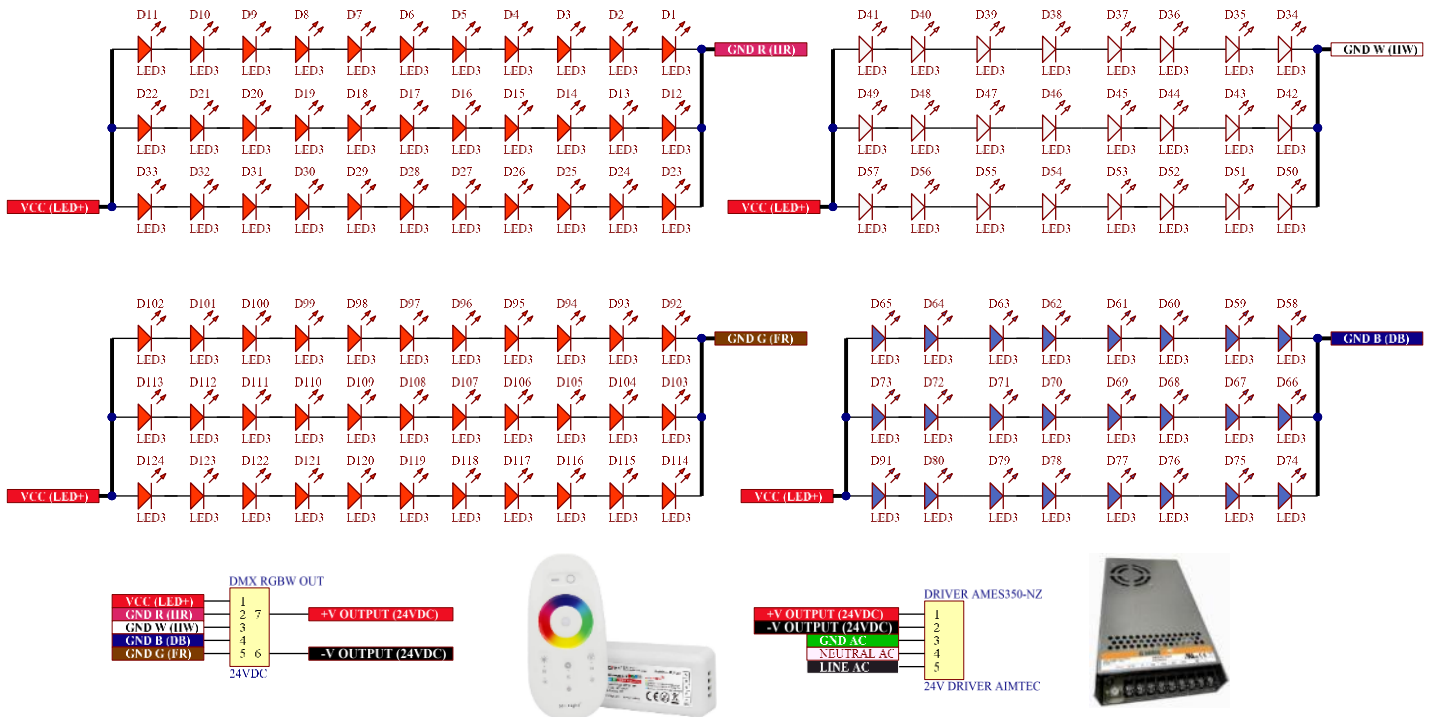


Pin	Output Specifications
1	Single
2	+V Output
3	+V Output
4	-V Output
5	-V Output
6	GND
7	GND
8	AC Input (N)
9	AC Input (L)



[Microsoft Word - AMES350-NZ REV_07_20_A.docx \(aimtec.com\)](#)

SCHEMATIC WITH RGBW DMX CONTROLLER



DMX DESCRIPTION

Product Name: 2.4GHz Touch RGBW LED Strip Controller

Model No: FUT027

Voltage: 12 V-24 V CC.

Output: máx. 6A/canal, salida total Max.10A

Control distance: 30 m.

Controller size: 85 x 45 x 22,5 mm.

Remote size: 110 x 53 x 20,5 mm.

Package includes: 1 receiver box for LED lights and 1 remote control (without batteries).

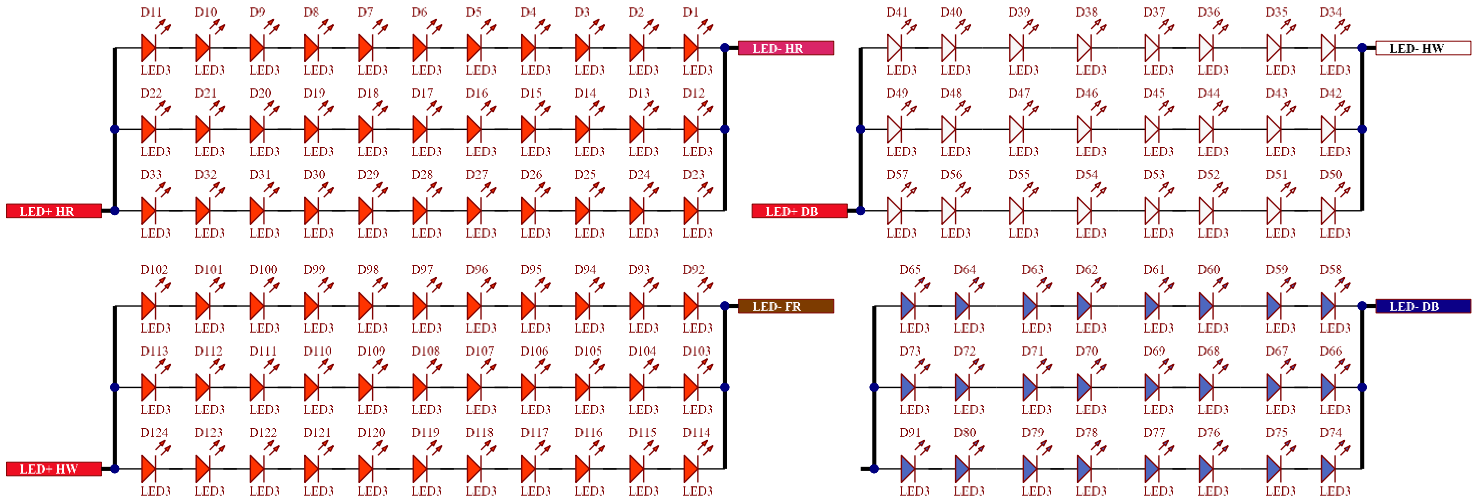
350W AIMTEC AC/DC CONVERTER

LINKS TO BUY IN THE WEB

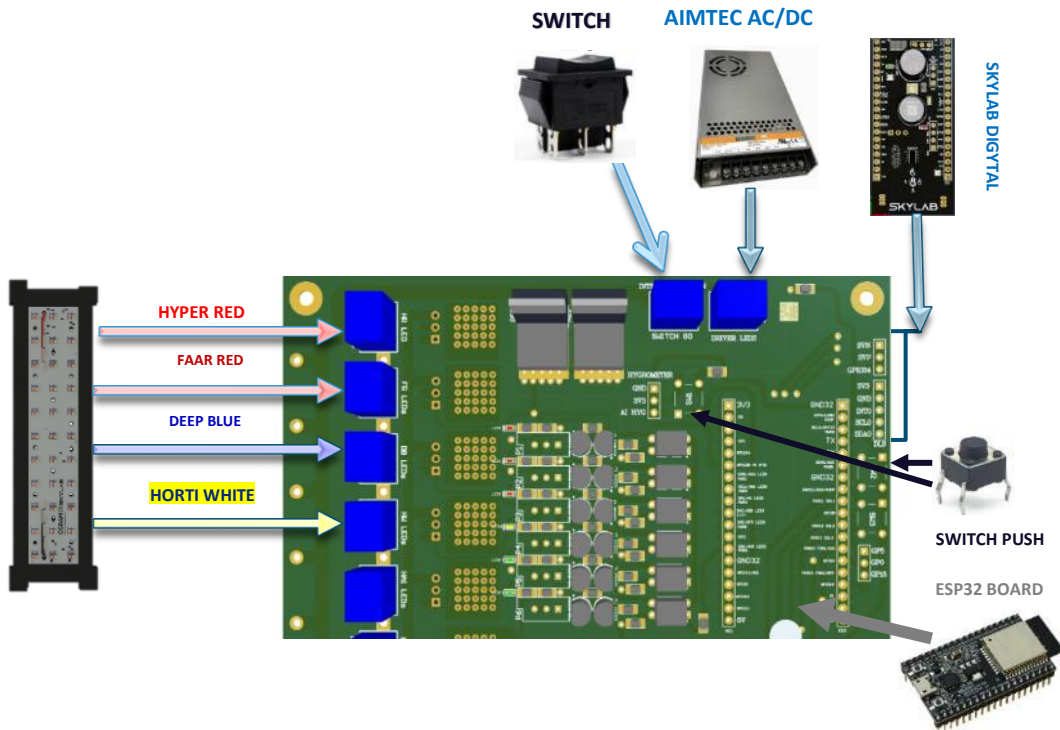
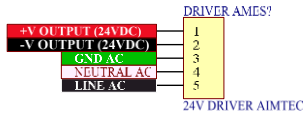
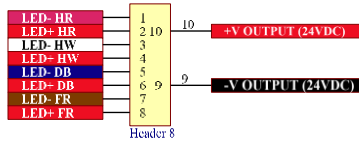
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SCHEMATIC WITH LED MOSFET DRIVER FOR HORTICULTURE APPLICATIONS 4CH

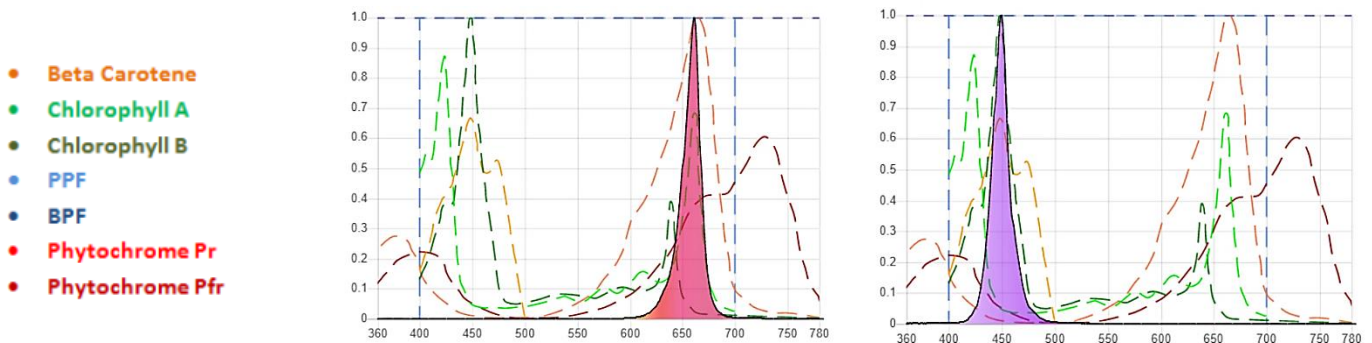


HORTICULTURE SKYLAB DRIVER



Spectral Distribution per LED

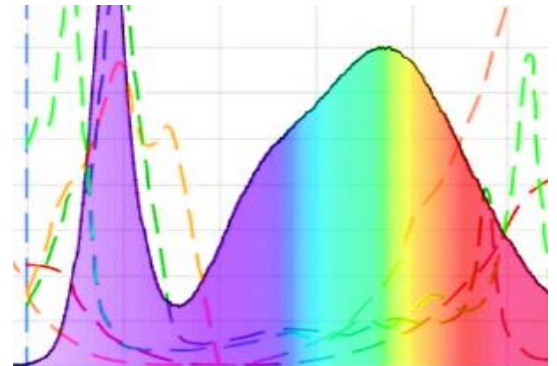
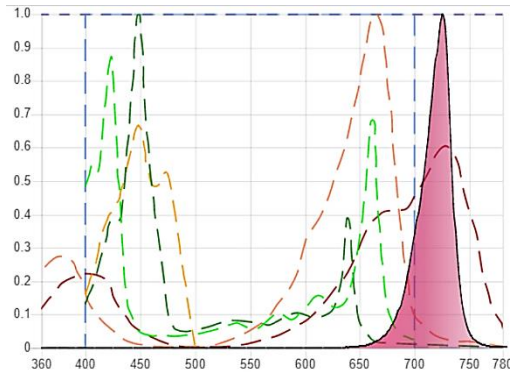
Color	Hyper Red (635-666 nm)	Hyper Red (635-666 nm)	Hyper Red (635-666 nm)	Hyper Red (635-666 nm)	Deep Blue (439-461 nm)	Deep Blue (439-461 nm)	Deep Blue (439-461 nm)	Deep Blue (439-461 nm)
Product	GH JTLPS1.24	GH JTLPS1.24	GH JTLPS1.24	GH JTLPS1.24	GD JTLPS1.14	GD JTLPS1.14	GD JTLPS1.14	GD JTLPS1.14
Photon Flux Ratio	100%	100%	100%	100%	100%	100%	100%	100%
LED Qty	33	66	99	132	24	48	72	96
Photon Flux (μmol/s)	22	48	72	88	26	53	79	105
Binning Brightness (mW)	145	157.5	157.5	145	345	345	345	345
Vf (V)	2.2	2.2	2.2	2.2	3	3	3	3
If (mA)	150	150	150	150	150	150	150	150
Radiant Flux (W)	4	9	13	16	7	14	21	28
Luminaire Photon Flux (360-780nm) (μmol/s)	22	47	72	88	26	53	79	105
Average Photon Flux Density (PFD) on plant Area (μmol/s/m²)	5	9	16	22	7	14	14	23
Luminaire Photon Flux Efficacy (360-780nm) (μmol/J)	1.96	2.13	2.13	1.96	2.4	2.24	2.24	2.24
Uniformity on plant area (PFDmin/PFDmax)	0.46	0.45	0.45	0.46	0.46	0.46	0.46	0.46
Luminaire Photosynthetic Photon Flux (400-700nm) (μmol/s)	22	48	72	88	26	52	78	105
Minimum Photon Flux Density (PFD) on plant Area (μmol/s/m²)	3.3	5.73	9.55	13.19	4.37	8.75	8.74	14.58
Luminaire Photosynthetic Photon Flux Efficacy (400-700nm) (μmol/J)	1.95	2.11	2.11	1.95	2.23	2.23	2.23	2.23
Maximum Photon Flux Density (PFD) on plant Area (μmol/s/m²)	7.32	12.76	21.22	29.28	9.69	19.34	19.42	32.27
Luminaire Power Consumption	12	23	34	45	12	24	35	47



System setup and performance of one luminaire

Color	Far Red (720-740 nm)	Far Red (720-740 nm)	Far Red (720-740 nm)	Far Red (720-740 nm)	WHITE	WHITE	WHITE	WHITE
Product	GF JTLPS1.24	GF JTLPS1.24	GF JTLPS1.24	GF JTLPS1.24	GW JTLPS1.EM 4000K	GW JTLPS1.EM 4000K	GW JTLPS1.EM 4000K	GW JTLPS1.EM 4000K
Photon Flux Ratio	100%	100%	100%	100%	100%	100%	100%	100%
LED Qty	33	66	99	132	24	48	72	96
Photon Flux (μmol/s)	21	41	61	82	26	53	80	106
Binning Brightness (mW)	127.5	122.5	122.5	122.5	94	94	94	94
Vf (V)	1.9	1.9	1.9	1.9	3.05	3.05	3.05	3.05
If (mA)	150	150	150	150	150	150	150	150
Radiant Flux (W)	4	7	10	14	6	11	17	23
Luminaire Photon Flux (360-780nm) (μmol/s)	21	41	62	82	27	53	80	106
Average Photon Flux Density (PFD) on plant Area (μmol/s/m²)	5	8	14	21	7	15	14	24
Luminaire Photon Flux Efficacy (360-Uniformity on plant area (PFDmin/PFDmax)	2.12	2.03	2.03	2.03	2.25	2.25	2.25	2.25
Luminaire Photosynthetic Photon Flux (400-700nm) (μmol/s)	3	6	9	11	26	52	78	103
Minimum Photon Flux Density (PFD) on plant Area (μmol/s/m²)	3.23	4.97	8.28	12.43	4.44	8.89	8.9	14.79
Luminaire Photosynthetic Photon Flux Efficacy (400-700nm) (μmol/J)	0.3	0.28	0.28	0.28	2.18	2.18	2.18	2.18
Maximum Photon Flux Density (PFD) on plant Area (μmol/s/m²)	7.12	10.98	18.25	27.37	9.92	19.8	19.88	33.04
Luminaire Power Consumption	10	20	30	40	12	24	36	47

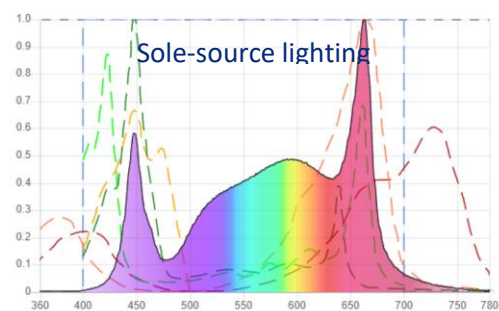
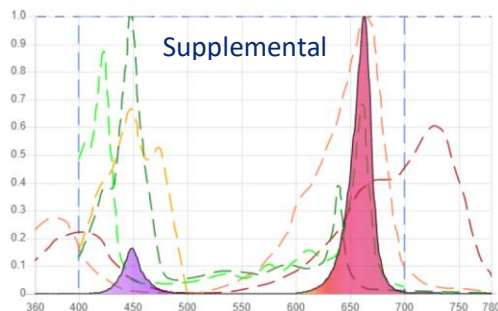
- Beta Carotene
- Chlorophyll A
- Chlorophyll B
- PPF
- BPF
- Phytochrome Pr
- Phytochrome Pfr





PLANT GROWTH

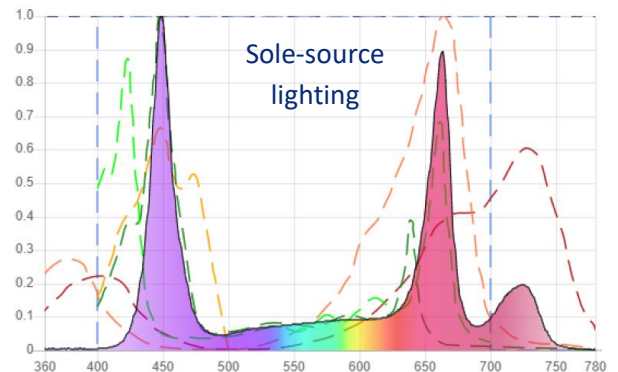
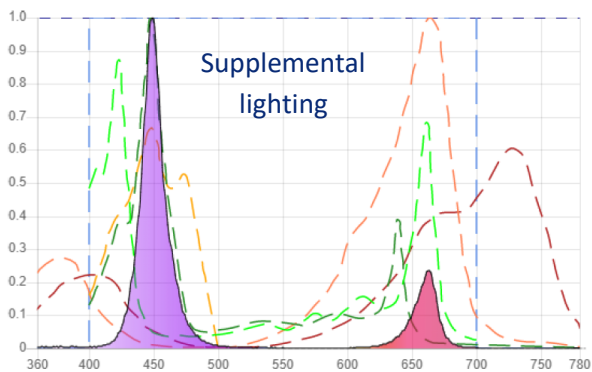
Lighting Conditions	Supplemental Lighting		Sole-source Lighting	
	Hyper Red (635-666 nm)	Deep Blue (439-461 nm)	Hyper Red (635-666 nm)	WHITE
Product	GH JTLPS1.24	GD JTLPS1.14	GH JTLPS1.24	GH JTLPS1.24
Photon Flux Ratio	90%	10%	20%	80%
LED Qty	99	24	33	72
Photon Flux ($\mu\text{mol/s}$)	70	8	16	64
Binning Brightness (mW)	152.5	285	152.5	74 lm
Vf (V)	2.1	3	2.1	3.05
If (mA)	151	52	103	154
Radiant Flux (W)	13	2	3	14
Luminaire Photon Flux (360-780nm) ($\mu\text{mol/s}$)	78		80	
Average Photon Flux Density (PFD) on plant Area ($\mu\text{mol/s/m}^2$)	20		22	
Luminaire Photon Flux Efficacy (360-780nm) ($\mu\text{mol/J}$)	2.16		1.84	
Uniformity on plant area (PFDmin/PFDmax)	0.46		0.46	
Luminaire Photosynthetic Photon Flux (400-700nm) ($\mu\text{mol/s}$)	78		78	
Minimum Photon Flux Density (PFD) on plant Area ($\mu\text{mol/s/m}^2$)	12.52		13.58	
Luminaire Photosynthetic Photon Flux Efficacy (400-700nm) ($\mu\text{mol/J}$)	2.15		1.8	
Maximum Photon Flux Density (PFD) on plant Area ($\mu\text{mol/s/m}^2$)	27.83		30.2	
Luminaire Power Consumption	36		44	





PROPAGATION

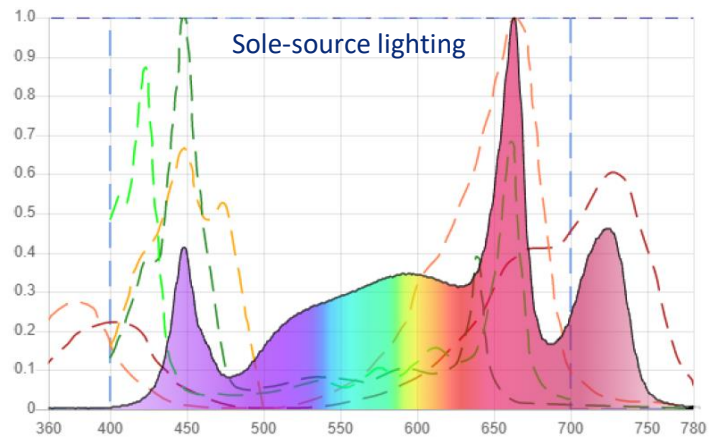
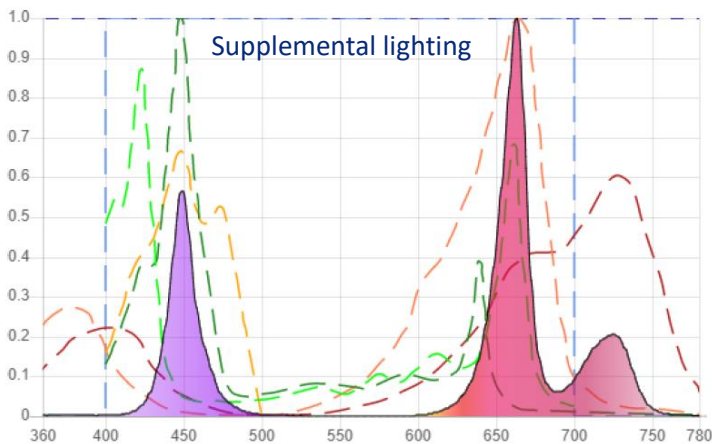
Lighting Conditions	Supplemental Lighting		Sole-source Lighting			
Color	Hyper Red (635-666 nm)	Deep Blue (439-461 nm)	Hyper Red (635-666 nm)	Deep Blue (439-461 nm)	Far Red (720-740 nm)	WHITE
Product	GH JTLPS1.24	GD JTLPS1.14	GH JTLPS1.24	GD JTLPS1.14	GF JTLPS1.24	GH JTLPS1.24
Photon Flux Ratio	25%	75%	35%	25%	15%	25%
LED Qty	33	72	46	24	20	24
Photon Flux ($\mu\text{mol/s}$)	24	71	32	23	14	23
Binning Brightness (mW)	147.5	315	147.5	315	127.5	74 lm
Vf (V)	2.1	3	2.1	3	1.9	3.05
If (mA)	160	150	152	146	158	166
Radiant Flux (W)	4	19	6	6	2	5
Luminaire Photon Flux (360-780nm) ($\mu\text{mol/s}$)	96		91			
Average Photon Flux Density (PPFD) on plant Area ($\mu\text{mol/s/m}^2$)	26		26			
Luminaire Photon Flux Efficacy (360-780nm) ($\mu\text{mol/J}$)	2.05		1.98			
Uniformity on plant area (PPFDmin/PPFDmax)	0.46		0.46			
Luminaire Photosynthetic Photon Flux (400-700nm) ($\mu\text{mol/s}$)	95		79			
Minimum Photon Flux Density (PPFD) on plant Area ($\mu\text{mol/s/m}^2$)	16.25		15.84			
Luminaire Photosynthetic Photon Flux Efficacy (400-700nm) ($\mu\text{mol/J}$)	2.04		1.7			
Maximum Photon Flux Density (PPFD) on plant Area ($\mu\text{mol/s/m}^2$)	35.95		35.14			
Luminaire Power Consumption	47		46			





FLOWERING

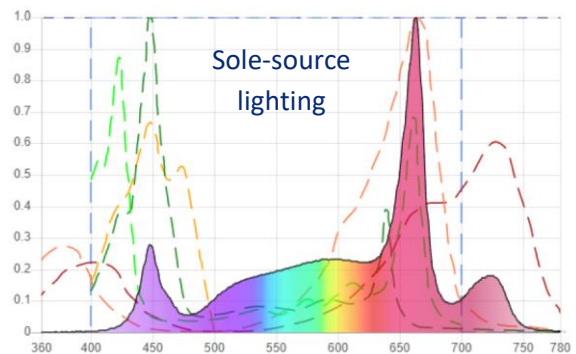
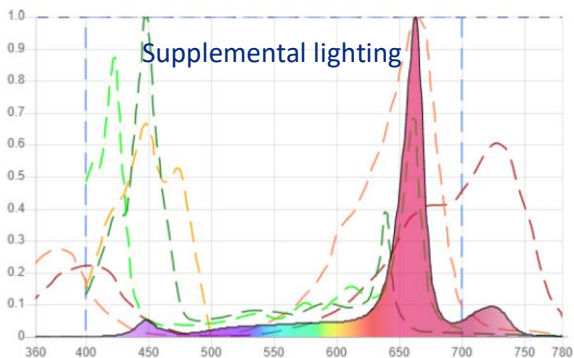
Lighting Conditions	Supplemental Lighting			Sole-source Lighting		
	Hyper Red (635-666 nm)	Deep Blue (439-461 nm)	Far Red (720-740 nm)	Hyper Red (635-666 nm)	Far Red (720-740 nm)	WHITE
Color						
Product	GH JTLPS1.24	GD JTLPS1.14	GF JTLPS1.24	GH JTLPS1.24	GF JTLPS1.24	GH JTLPS1.24
Photon Flux Ratio	60%	22%	22%	21%	21%	58%
LED Qty	66	24	33	33	33	48
Photon Flux ($\mu\text{mol/s}$)	50	20	20	18	18	50
Binning Brightness (mW)	152.5	315	127.5	137.5	122.5	78 lm
Vf (V)	2.1	3	1.9	2.1	1.9	3.05
If (mA)	163	124	139	132	133	174
Radiand Flux (W)	9	5	3	3	3	11
Luminaire Photon Flux (360-780nm) ($\mu\text{mol/s}$)		91			87	
Average Photon Flux Density (PPFD) on plant Area ($\mu\text{mol/s/m}^2$)		23			25	
Luminaire Photon Flux Efficacy (360-780nm) ($\mu\text{mol/J}$)		2.13			1.88	
Uniformity on plant area (PPFDmin/PPFDmax)		0.46			0.46	
Luminaire Photosynthetic Photon Flux (400-700nm) ($\mu\text{mol/s}$)		73			69	
Minimum Photon Flux Density (PPFD) on plant Area ($\mu\text{mol/s/m}^2$)		14.5			14.98	
Luminaire Photosynthetic Photon Flux Efficacy (400-700nm) ($\mu\text{mol/J}$)		1.72			1.51	
Maximum Photon Flux Density (PPFD) on plant Area ($\mu\text{mol/s/m}^2$)		32.08			33.22	
Luminaire Power Consumption		42			46	



Summary of typical recipes



FRUITING						
Lighting Conditions	Supplemental Lighting			Sole-source Lighting		
	Hyper Red (635-666 nm)	Far Red (720-740 nm)	WHITE	Hyper Red (635-666 nm)	Far Red (720-740 nm)	WHITE
Product	GH JTLPS1.24	GF JTLPS1.24	GH JTLPS1.24	GH JTLPS1.24	GF JTLPS1.24	GH JTLPS1.24
Photon Flux Ratio	68%	12%	20%	33%	11%	56%
LED Qty	83	16	24	48	18	48
Photon Flux ($\mu\text{mol/s}$)	59	10	18	28	10	48
Binning Brightness (mW)	147.5	127.5	66 lm	137.5	122.5	78 lm
Vf (V)	2.1	1.9	3.05	2.1	1.9	3.05
If (mA)	156	150	142	139	132	168
Radiant Flux (W)	11	2	4	5	2	10
Luminaire Photon Flux (360-780nm) ($\mu\text{mol/s}$)		87			87	
Average Photon Flux Density (PFD) on plant Area ($\mu\text{mol/s/m}^2$)		21			24	
Luminaire Photon Flux Efficacy (360-780nm) ($\mu\text{mol/J}$)		1.96			1.85	
Uniformity on plant area (PFDmin/PFDmax)		0.46			0.46	
Luminaire Photosynthetic Photon Flux (400-700nm) ($\mu\text{mol/s}$)		77			76	
Minimum Photon Flux Density (PFD) on plant Area ($\mu\text{mol/s/m}^2$)		13.26			14.38	
Luminaire Photosynthetic Photon Flux Efficacy (400-700nm) ($\mu\text{mol/J}$)		1.74			1.63	
Maximum Photon Flux Density (PFD) on plant Area ($\mu\text{mol/s/m}^2$)		29.49			31.97	
Luminaire Power Consumption		44			47	



Photosynthetic photon flux for some types of plants

PLANT	RECEIP ($\mu\text{mol/s/m}^2$)	MODULES and LED QTTIES (PLANT GROWTH)					
		Supplemental Lighting	HR	DB	Sole-source Lighting	HR	WHITE
		modules	qtty	qtty	modules	qtty	qtty
Tulip	32.5	1.63	161	39	1.48	49	106
Gerbera	92.5	4.63	458	111	4.20	139	303
Anthurium-Orchid (cut)	87.5	4.38	433	105	3.98	131	286
Alstroemeria	82.5	4.13	408	99	3.75	124	270
Lisianthus	185	9.25	916	222	8.41	278	605
Lily	90	4.50	446	108	4.09	135	295
Rose	185	9.25	916	222	8.41	278	605
Chrisanthemum	117.5	5.88	582	141	5.34	176	385
Geranium	50	2.50	248	60	2.27	75	164
Rose (Potted)	50	2.50	248	60	2.27	75	164
Chrisanthemum (poted)	50	2.50	248	60	2.27	75	164
Kalanchoe	82.5	4.13	408	99	3.75	124	270
Anthurium	70	3.50	347	84	3.18	105	229
Bromelia	50	2.50	248	60	2.27	75	164
Dendrobium	195	9.75	965	234	8.86	293	638
Orchid/phalaenopsis	105	5.25	520	126	4.77	158	344
cucumber	150	7.50	743	180	6.82	225	491
Pepper	100	5.00	495	120	4.55	150	327

Photosynthetic photon flux for some types of plants

PLANT	RECEIP ($\mu\text{mol/s/m}^2$)	MODULES and LED QTTIES (PROPAGATION)							
		Supplemental Lighting	HR	DB	Sole-source Lighting	HR	DB	FR	WHITE
		modules	qtty	qtty	modules	qtty	qtty	qtty	qtty
Tulip	32.5	1.3	41	90	1.25	58	30	25	30
Gerbera	92.5	3.6	117	256	3.56	164	85	71	85
Anthurium-Orchid (cut)	87.5	3.4	111	242	3.37	155	81	67	81
Alstroemeria	82.5	3.2	105	228	3.17	146	76	63	76
Lisianthus	185	7.1	235	512	7.12	327	171	142	171
Lily	90	3.5	114	249	3.46	159	83	69	83
Rose	185	7.1	235	512	7.12	327	171	142	171
Chrisanthemum	117.5	4.5	149	325	4.52	208	108	90	108
Geranium	50	1.9	63	138	1.92	88	46	38	46
Rose (Potted)	50	1.9	63	138	1.92	88	46	38	46
Chrisanthemum (poted)	50	1.9	63	138	1.92	88	46	38	46
Kalanchoe	82.5	3.2	105	228	3.17	146	76	63	76
Anthurium	70	2.7	89	194	2.69	124	65	54	65
Bromelia	50	1.9	63	138	1.92	88	46	38	46
Dendrobium	195	7.5	248	540	7.50	345	180	150	180
Orchid/phalaenopsis	105	4.0	133	291	4.04	186	97	81	97
cucumber	150	5.8	190	415	5.77	265	138	115	138
Pepper	100	3.8	127	277	3.85	177	92	77	92

Photosynthetic photon flux for some types of plants

PLANT	RECEIP ($\mu\text{mol/s/m}^2$)	MODULES and LED QTTIES (FLOWERING)							
		Supplemental Lighting	HR	DB	DB	Sole-source Lighting	HR	FR	WHITE
		modules	qty	qty	qty	modules	qty	qty	qty
Tulip	32.5	1.41	93	34	47	1.30	43	43	62
Gerbera	92.5	4.02	265	97	133	3.70	122	122	178
Anthurium-Orchid (cut)	87.5	3.80	251	91	126	3.50	116	116	168
Alstroemeria	82.5	3.59	237	86	118	3.30	109	109	158
Lisianthus	185	8.04	531	193	265	7.40	244	244	355
Lily	90	3.91	258	94	129	3.60	119	119	173
Rose	185	8.04	531	193	265	7.40	244	244	355
Chrysanthemum	117.5	5.11	337	123	169	4.70	155	155	226
Geranium	50	2.17	143	52	72	2.00	66	66	96
Rose (Potted)	50	2.17	143	52	72	2.00	66	66	96
Chrysanthemum (potec)	50	2.17	143	52	72	2.00	66	66	96
Kalanchoe	82.5	3.59	237	86	118	3.30	109	109	158
Anthurium	70	3.04	201	73	100	2.80	92	92	134
Bromelia	50	2.17	143	52	72	2.00	66	66	96
Dendrobium	195	8.48	560	203	280	7.80	257	257	374
Orchid/phalaenopsis	105	4.57	301	110	151	4.20	139	139	202
cucumber	150	6.52	430	157	215	6.00	198	198	288
Pepper	100	4.35	287	104	143	4.00	132	132	192

Photosynthetic photon flux for some types of plants

PLANT	RECEIP ($\mu\text{mol/s/m}^2$)	MODULES and LED QTTIES (FRUITING)							
		Supplemental Lighting	HR	FR	WHITE	Sole-source Lighting	HR	FR	WHITE
		modules	qty	qty	qty	modules	qty	qty	qty
Tulip	32.5	1.5	128	25	37	1.30	62	23	62
Gerbera	92.5	4.4	366	70	106	3.70	178	67	178
Anthurium-Orchid (cut)	87.5	4.2	346	67	100	3.50	168	63	168
Alstroemeria	82.5	3.9	326	63	94	3.30	158	59	158
Lisianthus	185	8.8	731	141	211	7.40	355	133	355
Lily	90	4.3	356	69	103	3.60	173	65	173
Rose	185	8.8	731	141	211	7.40	355	133	355
Chrysanthemum	117.5	5.6	464	90	134	4.70	226	85	226
Geranium	50	2.4	198	38	57	2.00	96	36	96
Rose (Potted)	50	2.4	198	38	57	2.00	96	36	96
Chrysanthemum (potec)	50	2.4	198	38	57	2.00	96	36	96
Kalanchoe	82.5	3.9	326	63	94	3.30	158	59	158
Anthurium	70	3.3	277	53	80	2.80	134	50	134
Bromelia	50	2.4	198	38	57	2.00	96	36	96
Dendrobium	195	9.3	771	149	223	7.80	374	140	374
Orchid/phalaenopsis	105	5.0	415	80	120	4.20	202	76	202
cucumber	150	7.1	593	114	171	6.00	288	108	288
Pepper	100	4.8	395	76	114	4.00	192	72	192

Types of Optics

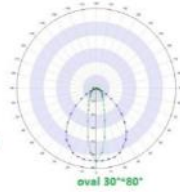
ASAHI

Model:

ALHB321D66LED60GIP / ALHB321D66LED90GIP / ALHB321D66LED3080GIP



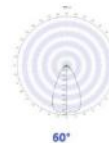
4pcs of "3030" LED array



oval 30°x80°



4pcs of "3030" LED array



60°



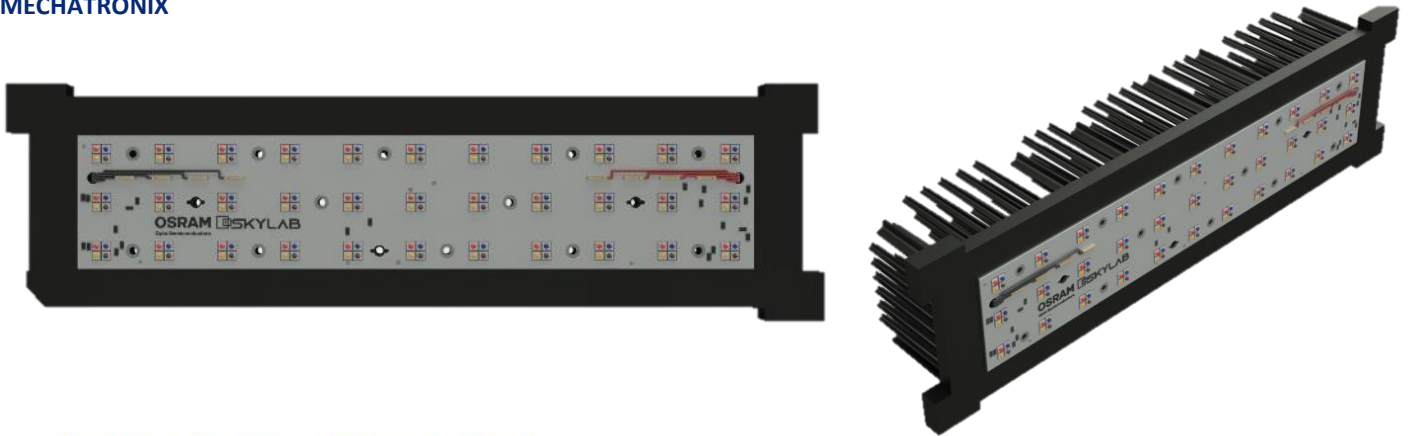
90°

BOX WITH LED DRIVER AND PWM CONTROLLER

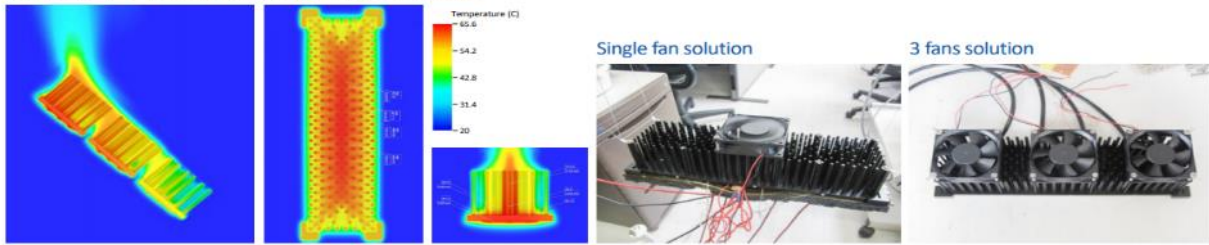


Heatsink type and its thermal data

MECHATRONIX



CoolBlock® HC-01-3x11 thermal simulations results CFD



Fan Speed: 12V = 1310 RPM 24V = 2350 RPM

Dissipated Power Pd(W)	Fan (Optional)	Heat sink to ambient thermal resistance R_{hs-amb} (°C/W)				Heat sink to ambient temperature rise T_{hs-amb} (°C)					
		-	1 fan (12V)	1 fan (24V)	3 fans (12V)	3 fans (24V)	-	1 fan (12V)	1 fan (24V)	3 fans (12V)	3 fans (24V)
25		0.64	0.32	0.23	0.19	0.14	16	8	6	5	3
50		0.55	0.30	0.22	0.18	0.13	27	15	11	9	7
75		0.50	0.29	0.22	0.18	0.13	38	22	16	14	10
100		0.48	0.29	0.21	0.18	0.13	48	29	21	18	13
150		-	0.28	0.21	0.18	0.13	-	43	31	27	20
200		-	0.28	0.20	0.18	0.13	-	55	41	36	26
250		-	-	0.20	0.18	0.13	-	-	50	45	33
300		-	-	0.20	0.18	0.13	-	-	60	54	39

Heat sink to ambient temperature rise T_{hs-amb} (°C)
 — CoolBlock® HC-01-3x11 without fan — With 1 fan (12V) — With 1 fan (24V) — With 3 fans (12V) — With 3 fans (24V)

