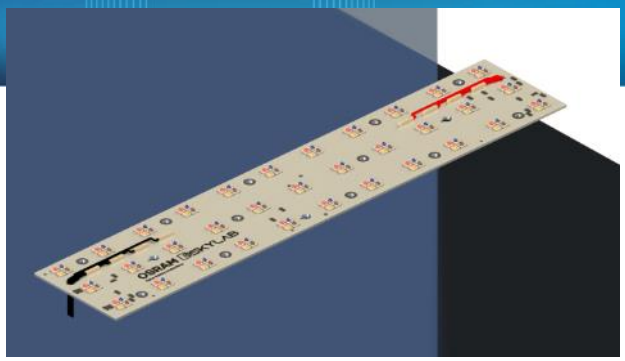
HORTILAMP GROWTH PLANTS



LEVEL II PCB for High Power Horticulture Lighting Applications

Description

Horticulture High 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 high light output of more than 150 µmol/s/m2 with an efficacy above 2.5 µmol/J applying typical values at 700mA 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.

RoHS 2011/65/EU

Applications

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

FRUITS

FLOWER

HYDROPONY AND HERBS

VEGETABLES

Product specifications

LEDS UTILIZADOS

- Hiper Red
- Deep Blue
- HORTIWHITE
- Far Red

System Properties		
Solder Point Temperature 80 °C	65	°C
Optical Efficiency 88 %	0.88	%
Electrical Efficiency 90 %	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).

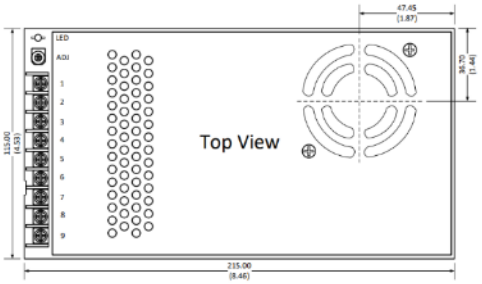
OSLON SQUARE				
LED TYPE	HR	HW	DB	FR
LEDS QTTY	11	8	8	11
LED min VF	1.8	2.7	2.8	1.65
LED min If	0.2	0.15	0.5	0.1
Led min Power	0.36	0.405	1.4	0.165
SYS min VF	19.8	21.6	22.4	18.15
SYS min If	0.2	0.15	0.5	0.1
Sys min Power	3.96	3.24	11.2	1.815
DIODE SF36 3A 400V (1.3)	3 6	2 24.2	1 23.7	5 24.65
DIODE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

OSLON SQUARE				
LED TYPE	HR	HW	DB	FR
LED 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 24	0 24	0 24	0 24
DIODE SF56 5A 400V (1.25)	1 24	0 24	0 24	0 24
DIODE FR107 1A 1000V (1.25)	1 24	0 24	0 24	0 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 25.5	0 24.8	0 25.1	0 25.3
DIODE SF56 5A 400V (1.25)	1 25.5	0 24.8	0 25.1	0 25.3
DIODE FR107 1A 1000V (1.25)	1 25.5	0 24.8	0 25.1	0 25.3

AIMTEC AC/DC CONVERTER 350W

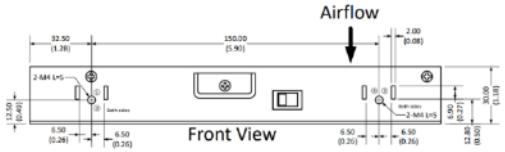
Single Output								
Model	Input Voltage (VAC/VAC/Hz)*	Input Voltage (VDC)**	Max Output Wattage (W)	Output Voltage (V)	Output Voltage Adjustable Range (V)	Output Current (A)	Maximum capacitive load (µF)	Efficiency @230VAC (%)
AMES350-24SNZ	90-132/ 180-264/ 47-63	240-373	350.4	24	21.6 - 28.8	14.6	1500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

DIMENSIONS



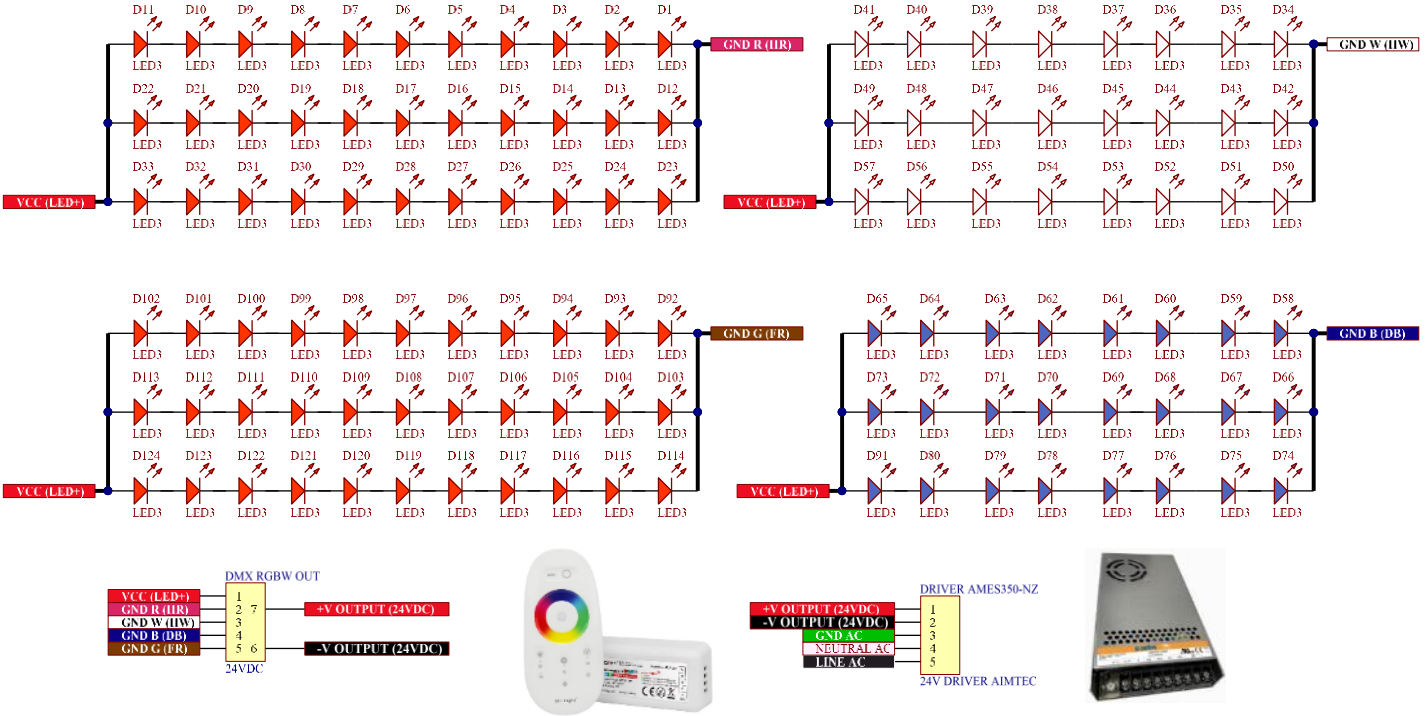
Pin Output Specifications	
Pin	Single
1	+V Output
2	+V Output
3	+V Output
4	-V Output
5	-V Output
6	-V Output
7	GND
8	AC Input (N)
9	AC Input (L)

aimtec
Your Power Partner



Microsoft Word - AMES350-NZ REV_07_20_A.docx (aimtec.com)

SCHEMATIC WITH RGBW DMX CONTROLLER



DMX DESCRIPTION

350W AIMTEC AC/DC CONVERTER

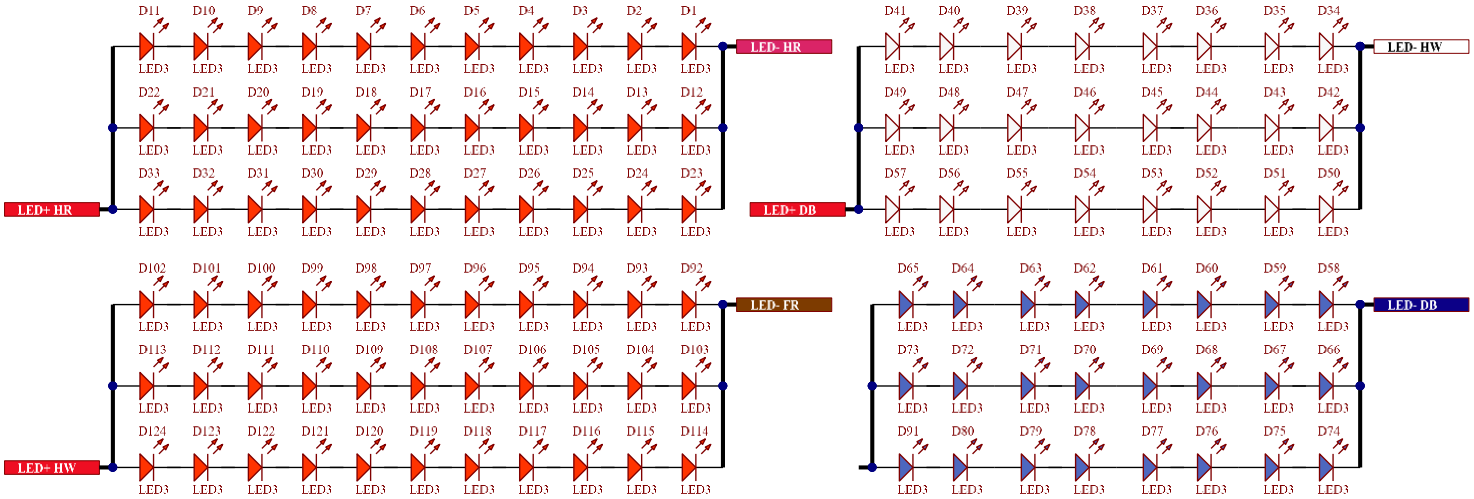
Product Name: 2.4GHz Touch RGBW LED Strip Controller
Model No: FUT027
Voltage: 12 V-24 V CC.
Output: máx. 6A/canal, salida total Max.10A
Control distance: 30 m.
Controller size: 85 x 45 x 22,5 mm.
Remote size: 110 x 53 x 20,5 mm.
Package includes: 1 receiver box for LED lights and 1 remote control (without batteries).

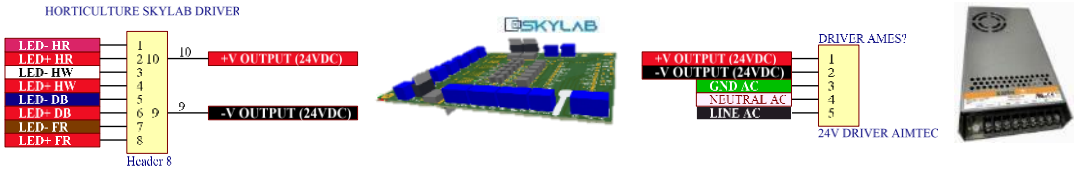
LINKS TO BUY IN THE WEB

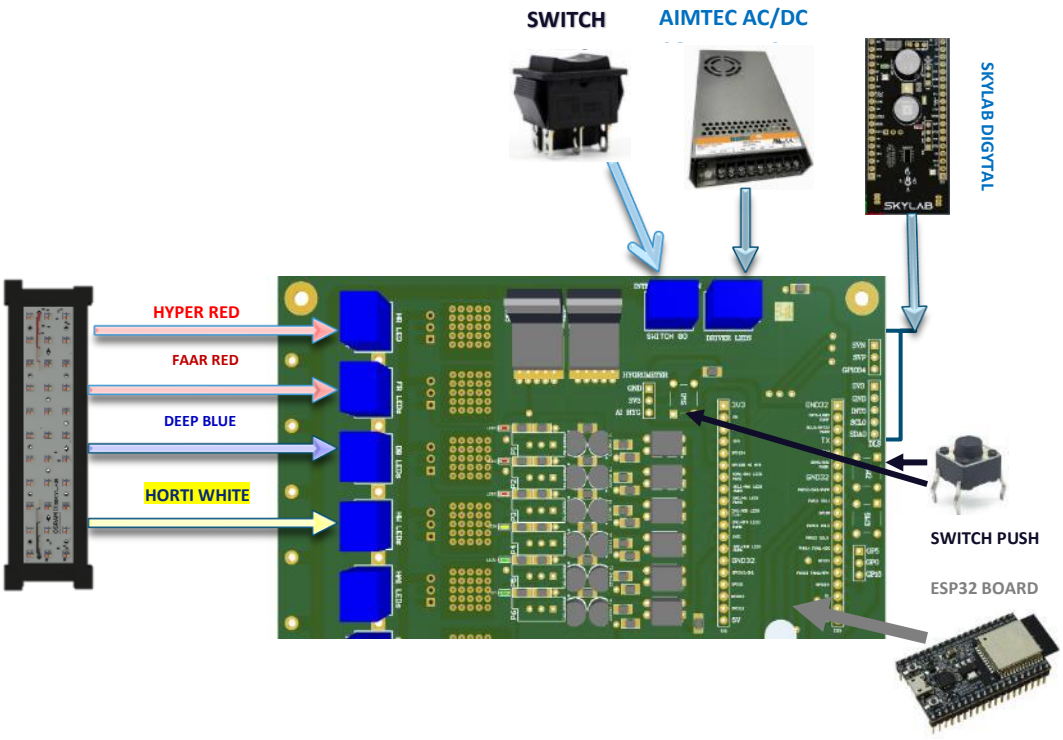
https://www.amazon.com.mx/LGIDTECH-inal%C3%A1mbrico-controlador-compatible-controlado/dp/B0756TNMJB/ref=sr_1_2?__mk_es_MX=%C3%85M%C3%85%C5%BD%C3%95%C3%91&dchild=1&keywords=mi+light+rgbw&qid=1623896340&sr=8-2

https://articulo.mercadolibre.com.mx/MLM-925320087-control-tira-rgbw-touch-24g-12v-a-24v-30-metros-24a-dimmer-_JM?searchVariation=86215077597#searchVariation=86215077597&position=18&search_layout=grid&type=item&tracking_id=09322b68-b65c-46ac-858c-94a87b5ab02e

SCHEMATIC WITH LED MOSFET DRIVER FOR HORTICULTURE APPLICATIONS 4CH



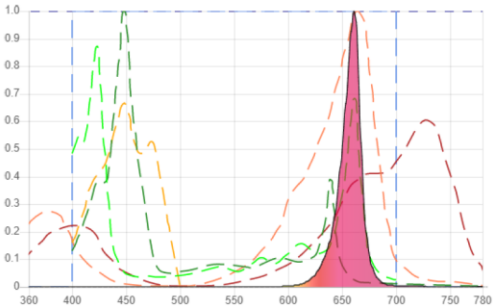


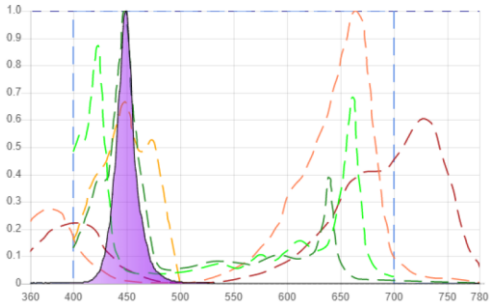


Spectral Distribution per LED

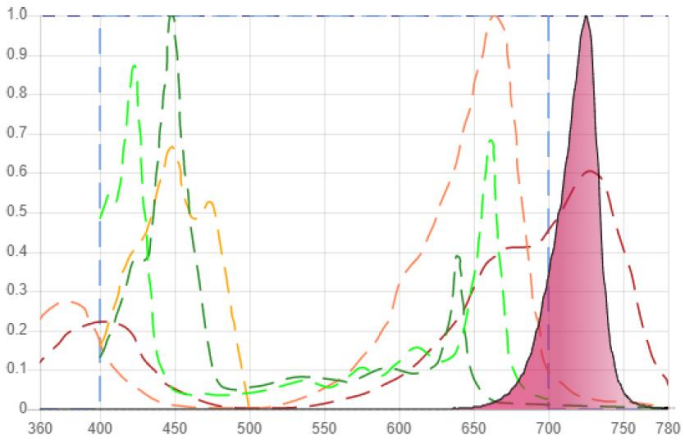
System setup and performance of one luminaire								
Color	Hyper Red (635-666 nm)				Deep Blue (439-461 nm)			
Product	GH CSSRM4.24				GD CSSRM2.14			
Photon Flux Ratio	100%	100%	100%	100%	100%	100%	100%	100%
LED Qtty	33	66	99	132	24	48	72	96
Photon Flux (µmol/s)	157	322	484	646	114	229	343	457
Binning Brightness (mW)	1040	1040	1040	1040	1470	1470	1470	1470
Vf (V)	2.02	2.02	2.02	2.02	2.9	2.9	2.9	2.9
If (mA)	700	700	700	700	700	700	700	700
Radiand Flux (W)	29	59	88	118	30	61	91	121
Luminaire Photon Flux (360-780nm) (µmol/s)	161	323	484	646	114	229	343	457
Average Photon Flux Density (PFD) on plant Area (µmol/s/m²)	38	58	101	153	31	62	60	100
Luminaire Photon Flux Efficacy (360-780nm) (µmol/J)	3.19	3.19	3.19	3.19	2.16	2.16	2.16	2.16
Uniformity on plant area (PFDmin/PFDmax)	0.48	0.48	0.48	0.48	0.45	0.45	0.44	0.45
Luminaire Photosynthetic Photon Flux (400-700nm) (µmol/s)	161	321	482	643	114	228	342	456
Minimum Photon Flux Density (PFD) on plant Area (µmol/s/m²)	24.2	38.69	64.52	96.81	18.36	36.71	36.69	61.2
Luminaire Photosynthetic Photon Flux Efficacy (400-700nm) (µmol/J)	3.18	3.18	3.18	3.18	2.15	2.15	2.15	2.15
Maximum Photon Flux Density (PFD) on plant Area (µmol/s/m²)	50.42	80.9	134.62	201.69	41.72	83.25	83.51	138.77
Luminaire Power Consumption	51	101	152	202	53	106	159	212

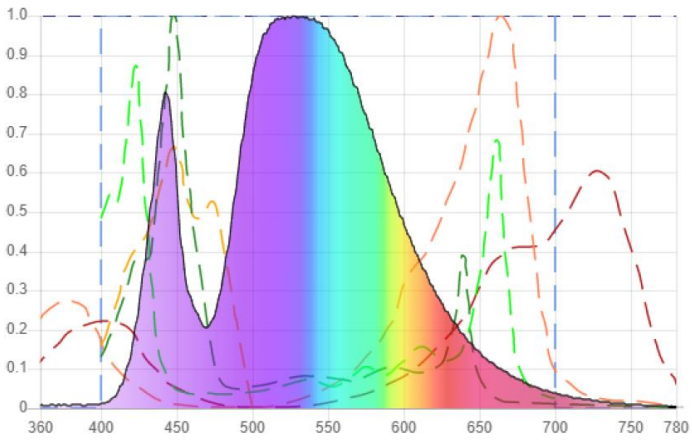
- Beta Carotene
- Chlorophyll A
- Chlorophyll B
- PPF
- BPF
- Phytochrome Pr
- Phytochrome Pfr





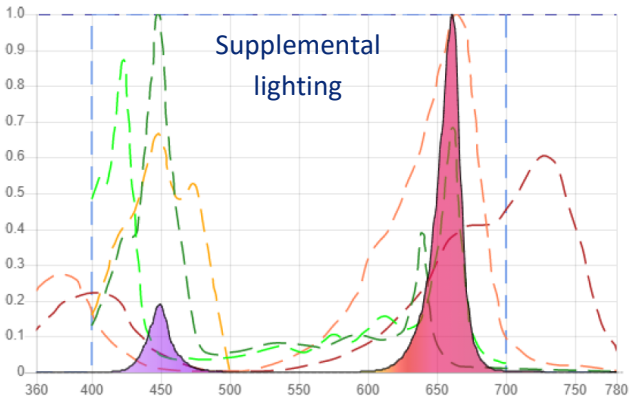
System setup and performance of one luminaire								
Color	Far Red (720-740 nm)				WHITE	WHITE	WHITE	WHITE
Product	GF JTLPS1.24				GW JTLPS1.EM 4000K			
Photon Flux Ratio	100%	100%	100%	100%	100%	100%	100%	100%
LED Qtty	33	66	99	132	24	48	72	96
Photon Flux (µmol/s)	121	241	362	482	106	212	317	423
Binning Brightness (mW)	382.5	382.5	382.5	382.5	1130	1130	1130	1130
Vf (V)	1.95	1.95	1.95	1.95	2.9	2.9	2.9	2.9
If (mA)	700	700	700	700	700	700	700	700
Radiand Flux (W)	20	40	60	80	24	47	71	95
Luminaire Photon Flux (360-780nm) (µmol/s)	121	241	362	482	106	212	318	424
Average Photon Flux Density (PFD) on plant Area (µmol/s/m²)	33	49	86	131	28	57	55	91
Luminaire Photon Flux Efficacy (360-780nm) (µmol/J)	2.23	2.23	2.23	2.23	2	2	2	2
Uniformity on plant area (PFDmin/PFDmax)	0.49	0.49	0.49	0.49	0.46	0.45	0.45	0.45
Luminaire Photosynthetic Photon Flux (400-700nm) (µmol/s)	16	32	48	65	104	209	313	418
Minimum Photon Flux Density (PFD) on plant Area (µmol/s/m²)	20.73	33.21	55.24	82.91	17.3	34.6	34.6	57.66
Luminaire Photosynthetic Photon Flux Efficacy (400-700nm) (µmol/J)	0.3	0.3	0.3	0.3	1.97	1.97	1.97	1.97
Maximum Photon Flux Density (PFD) on plant Area (µmol/s/m²)	42.75	68.56	114.01	170.99	38.41	76.72	76.89	127.9
Luminaire Power Consumption	54	108	162	216	53	106	159	211

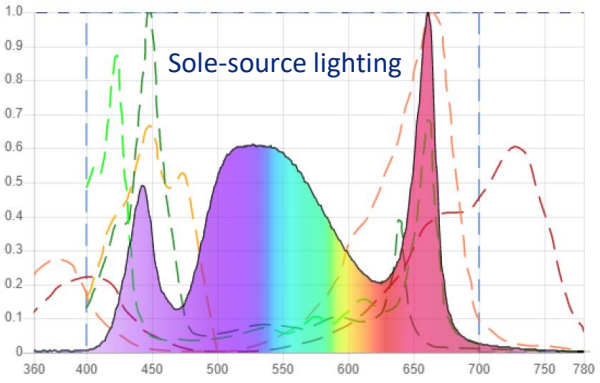




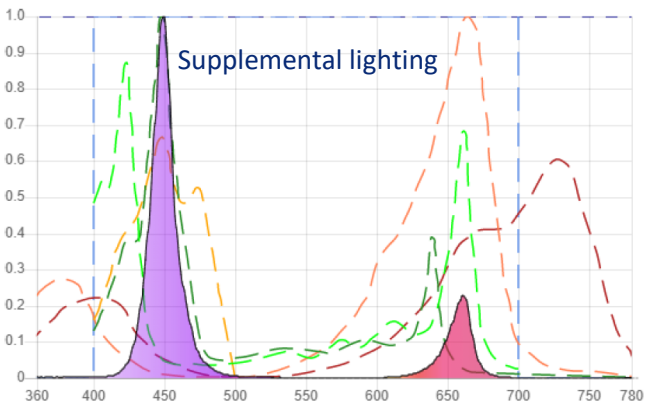
Summary of typical recipes

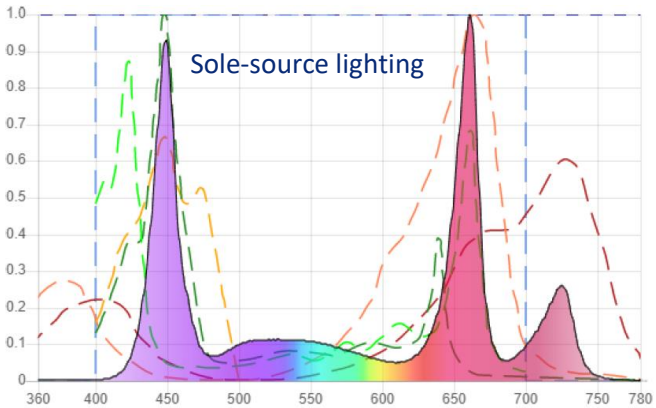
PLANT GROWTH				
Lighting Conditions	Supplemental Lighting		Sole-source Lighting	
Color	Hyper Red (635-666 nm)	Deep Blue (439-461 nm)	Hyper Red (635-666 nm)	WHITE
Product	GH JTLPS1.24	GD JTLPS1.14	GH JTLPS1.24	GH JTLPS1.24
Photon Flux Ratio	89%	11%	22%	78%
LED Qtty	99	24	33	72
Photon Flux (µmol/s)	484	62	114	404
Binning Brightness (mW)	1040	1595	1040	1130
Vf (V)	2.02	2.9	2.02	2.9
If (mA)	700	334	500	926
Radiand Flux (W)	88	17	90	112
Luminaire Photon Flux (360-780nm) (µmol/s)	547		521	
Average Photon Flux Density (PFD) on plant Area (µmol/s/m²)	136		138	
Luminaire Photon Flux Efficacy (360-780nm) (µmol/J)	3.11		2.09	
Uniformity on plant area (PFDmin/PFDmax)	0.48		0.46	
Luminaire Photosynthetic Photon Flux (400-700nm) (µmol/s)	544		514	
Minimum Photon Flux Density (PFD) on plant Area (µmol/s/m²)	87.45		87.01	
Luminaire Photosynthetic Photon Flux Efficacy (400-700nm) (µmol/J)	3.09		2.07	
Maximum Photon Flux Density (PFD) on plant Area (µmol/s/m²)	184.39		189.96	
Luminaire Power Consumption	176		249	



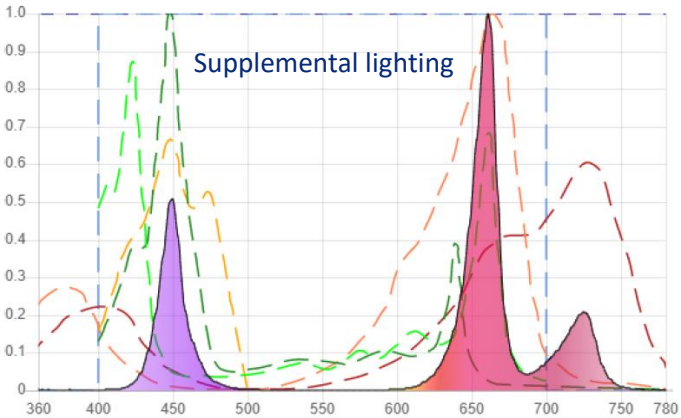


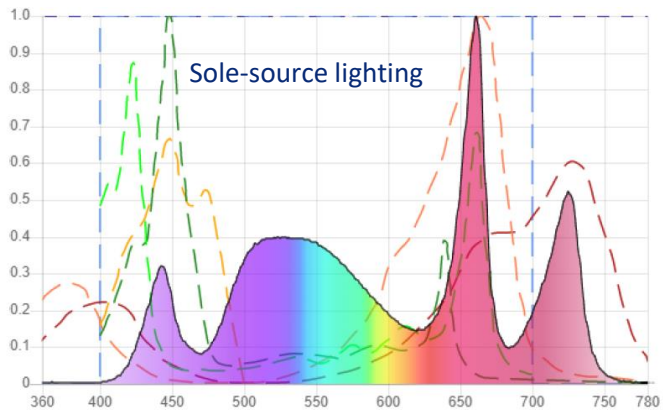
PROPAGATION						
Lighting Conditions	Supplemental Lighting		Sole-source Lighting			
Color	Hyper Red (635-666 nm)	Deep Blue (439-461 nm)	Hyper Red (635-666 nm)	Deep Blue (439-461 nm)	Far Red (720-740 nm)	WHITE
Product	GH JTLPS1.24	GD JTLPS1.14	GH JTLPS1.24	GD JTLPS1.14	GF JTLPS1.24	GH JTLPS1.24
Photon Flux Ratio	25%	75%	38%	23%	16%	23%
LED Qtty	33	72	40	24	26	24
Photon Flux (µmol/s)	128	382	190	115	80	115
Binning Brightness (mW)	1015	1470	1015	1450	1255	425
Vf (V)	2.02	2.9	2.02	2.9	1.95	2.9
If (mA)	566	793	713	720	531	700
Radiand Flux (W)	102	125	35	31	14	26
Luminaire Photon Flux (360-780nm) (µmol/s)	511		510			
Average Photon Flux Density (PFD) on plant Area (µmol/s/m²)	137		137			
Luminaire Photon Flux Efficacy (360-780nm) (µmol/J)	2.31		2.54			
Uniformity on plant area (PFDmin/PFDmax)	0.46		0.47			
Luminaire Photosynthetic Photon Flux (400-700nm) (µmol/s)	509		436			
Minimum Photon Flux Density (PFD) on plant Area (µmol/s/m²)	84.56		84.63			
Luminaire Photosynthetic Photon Flux Efficacy (400-700nm) (µmol/J)	2.3		2.17			
Maximum Photon Flux Density (PFD) on plant Area (µmol/s/m²)	187.3		181.75			
Luminaire Power Consumption	221		201			





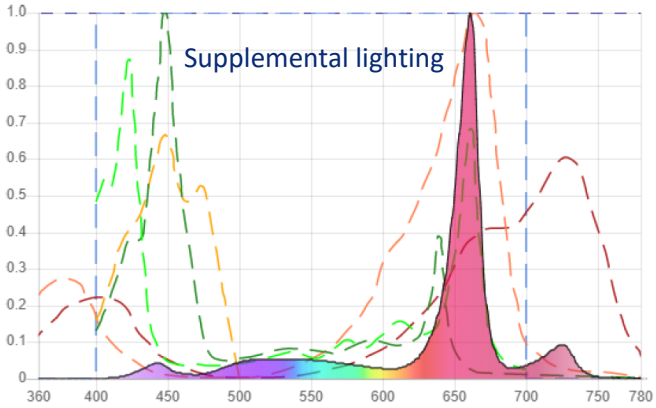
FLOWERING						
Lighting Conditions	Supplemental Lighting			Sole-source Lighting		
Color	Hyper Red (635-666 nm)	Deep Blue (439-461 nm)	Far Red (720-740 nm)	Hyper Red (635-666 nm)	Far Red (720-740 nm)	WHITE
Product	GH JTLPS1.24	GD JTLPS1.14	GF JTLPS1.24	GH JTLPS1.24	GF JTLPS1.24	GH JTLPS1.24
Photon Flux Ratio	60%	20%	20%	24%	21%	55%
LED Qtty	66	24	33	33	33	48
Photon Flux (µmol/s)	315	105	105	120	105	275
Binning Brightness (mW)	1015	1450	425	977.5	425	1255
Vf (V)	2.02	2.9	1.95	2.02	1.95	2.9
If (mA)	700	678	542	565	550	840
Radiand Flux (W)	57	29	18	22	18	62
Luminaire Photon Flux (360-780nm) (µmol/s)	530			506		
Average Photon Flux Density (PFD) on plant Area (µmol/s/m²)	136			144		
Luminaire Photon Flux Efficacy (360-780nm) (µmol/J)	2.76			2.42		
Uniformity on plant area (PFDmin/PFDmax)	0.48			0.47		
Luminaire Photosynthetic Photon Flux (400-700nm) (µmol/s)	437			408		
Minimum Photon Flux Density (PFD) on plant Area (µmol/s/m²)	86.85			89.4		
Luminaire Photosynthetic Photon Flux Efficacy (400-700nm) (µmol/J)	2.27			1.95		
Maximum Photon Flux Density (PFD) on plant Area (µmol/s/m²)	183.28			191.53		
Luminaire Power Consumption	192			209		

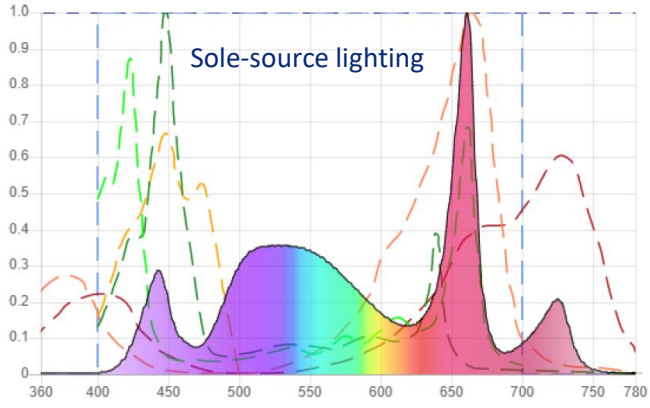




FRUITING

Lighting Conditions	Supplemental Lighting			Sole-source Lighting		
Color	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	70%	10%	20%	30%	10%	60%
LED Qtty	72	27	24	33	33	48
Photon Flux (µmol/s)	350	50	100	150	50	300
Binning Brightness (mW)	1015	377.5	1077.5	977.5	335	1255
Vf (V)	2.02	1.95	2.9	2.02	1.95	2.9
If (mA)	715	350	700	700	320	930
Radiand Flux (W)	64	9	23	28	8	67
Luminaire Photon Flux (360-780nm) (µmol/s)	503			504		
Average Photon Flux Density (PFD) on plant Area (µmol/s/m²)	132			141		
Luminaire Photon Flux Efficacy (360-780nm) (µmol/J)	2.71			2.33		
Uniformity on plant area (PFDmin/PFDmax)	0.48			0.47		
Luminaire Photosynthetic Photon Flux (400-700nm) (µmol/s)	456			454		
Minimum Photon Flux Density (PFD) on plant Area (µmol/s/m²)	85.18			87.04		
Luminaire Photosynthetic Photon Flux Efficacy (400-700nm) (µmol/J)	2.45			2.1		
Maximum Photon Flux Density (PFD) on plant Area (µmol/s/m²)	179.27			187.61		
Luminaire Power Consumption	186			216		





Photosynthetic photon flux for some types of plants

PLANT	RECEIP (µmol/s/m²)	MODULES and LED QTTIES (PLANT GROWTH)					
		Supplemental Lighting	HR	DB	Sole-source Lighting	HR	WHITE
		modules	qtty	qtty	modules	qtty	qtty
Tulip	32.5	0.24	24	6	0.24	8	17
Gerbera	92.5	0.68	67	16	0.67	22	48
Anthurium-Orchid (cut	87.5	0.64	64	15	0.63	21	46
Alstroemeria	82.5	0.61	60	15	0.60	20	43
Lisianthus	185	1.36	135	33	1.34	44	97
Lily	90	0.66	66	16	0.65	22	47
Rose	185	1.36	135	33	1.34	44	97
Chrisanthemum	117.5	0.86	86	21	0.85	28	61
Geranium	50	0.37	36	9	0.36	12	26
Rose (Potted)	50	0.37	36	9	0.36	12	26
Chrisanthemum (potec	50	0.37	36	9	0.36	12	26
Kalanchoe	82.5	0.61	60	15	0.60	20	43
Anthurium	70	0.51	51	12	0.51	17	37
Bromelia	50	0.37	36	9	0.36	12	26
Dendrobium	195	1.43	142	34	1.41	47	102
Orchid/phalaenopsis	105	0.77	76	19	0.76	25	55
cucumber	150	1.10	109	26	1.09	36	78
Pepper	100	0.74	73	18	0.72	24	52

Photosynthetic photon flux for some types of plants

PLANT	RECEIP (µmol/s/m²)	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	0.2	8	17	0.24	9	6	6	6
Gerbera	92.5	0.7	22	49	0.68	27	16	18	16
Anthurium-Orchid (cut)	87.5	0.6	21	46	0.64	26	15	17	15
Alstroemeria	82.5	0.6	20	43	0.60	24	14	16	14
Lisianthus	185	1.4	45	97	1.35	54	32	35	32
Lily	90	0.7	22	47	0.66	26	16	17	16
Rose	185	1.4	45	97	1.35	54	32	35	32
Chrisanthemum	117.5	0.9	28	62	0.86	34	21	22	21
Geranium	50	0.4	12	26	0.36	15	9	9	9
Rose (Potted)	50	0.4	12	26	0.36	15	9	9	9
Chrisanthemum (poted)	50	0.4	12	26	0.36	15	9	9	9
Kalanchoe	82.5	0.6	20	43	0.60	24	14	16	14
Anthurium	70	0.5	17	37	0.51	20	12	13	12
Bromelia	50	0.4	12	26	0.36	15	9	9	9
Dendrobium	195	1.4	47	102	1.42	57	34	37	34
Orchid/phalaenopsis	105	0.8	25	55	0.77	31	18	20	18
cucumber	150	1.1	36	79	1.09	44	26	28	26
Pepper	100	0.7	24	53	0.73	29	18	19	18

Photosynthetic photon flux for some types of plants

PLANT	RECEIP (µmol/s/m²)	MODULES and LED QTTIES (FLOWERING)							
		Supplemental Lighting	HR	DB	FR	Sole-source Lighting	HR	FR	WHITE
		modules	qtty	qtty	qtty	modules	qtty	qtty	qtty
Tulip	32.5	0.24	16	6	8	0.23	7	7	11
Gerbera	92.5	0.68	45	16	22	0.64	21	21	31
Anthurium-Orchid (cut	87.5	0.64	42	15	21	0.61	20	20	29
Alstroemeria	82.5	0.61	40	15	20	0.57	19	19	28
Lisianthus	185	1.36	90	33	45	1.28	42	42	62
Lily	90	0.66	44	16	22	0.63	21	21	30
Rose	185	1.36	90	33	45	1.28	42	42	62
Chrisanthemum	117.5	0.86	57	21	29	0.82	27	27	39
Geranium	50	0.37	24	9	12	0.35	11	11	17
Rose (Potted)	50	0.37	24	9	12	0.35	11	11	17
Chrisanthemum (potec	50	0.37	24	9	12	0.35	11	11	17
Kalanchoe	82.5	0.61	40	15	20	0.57	19	19	28
Anthurium	70	0.51	34	12	17	0.49	16	16	23
Bromelia	50	0.37	24	9	12	0.35	11	11	17
Dendrobium	195	1.43	95	34	47	1.35	45	45	65
Orchid/phalaenopsis	105	0.77	51	19	25	0.73	24	24	35
cucumber	150	1.10	73	26	36	1.04	34	34	50
Pepper	100	0.74	49	18	24	0.69	23	23	33

Photosynthetic photon flux for some types of plants

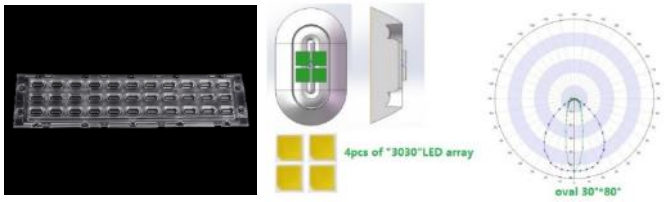
PLANT	RECEIP (µmol/s/m²)	MODULES and LED QTTIES (FRUITING)							
		Supplemental Lighting	HR	DB	WHITE	Sole-source Lighting	HR	FR	WHITE
		modules	qtty	qtty	qtty	modules	qtty	qtty	qtty
Tulip	32.5	0.2	18	7	6	0.23	7	7	11
Gerbera	92.5	0.7	50	19	17	0.64	21	21	31
Anthurium-Orchid (cut)	87.5	0.7	48	18	16	0.61	20	20	29
Alstroemeria	82.5	0.6	45	17	15	0.57	19	19	28
Lisianthus	185	1.4	101	38	34	1.28	42	42	62
Lily	90	0.7	49	18	16	0.63	21	21	30
Rose	185	1.4	101	38	34	1.28	42	42	62
Chrisanthemum	117.5	0.9	64	24	21	0.82	27	27	39
Geranium	50	0.4	27	10	9	0.35	11	11	17
Rose (Potted)	50	0.4	27	10	9	0.35	11	11	17
Chrisanthemum (poted)	50	0.4	27	10	9	0.35	11	11	17
Kalanchoe	82.5	0.6	45	17	15	0.57	19	19	28
Anthurium	70	0.5	38	14	13	0.49	16	16	23
Bromelia	50	0.4	27	10	9	0.35	11	11	17
Dendrobium	195	1.5	106	40	35	1.35	45	45	65
Orchid/phalaenopsis	105	0.8	57	21	19	0.73	24	24	35
cucumber	150	1.1	82	31	27	1.04	34	34	50
Pepper	100	0.8	55	20	18	0.69	23	23	33

Types of Optics

ASAHI

Model:

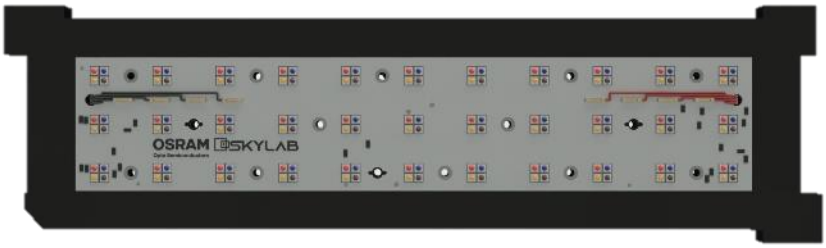
ALHB321D66LED60GIP / ALHB321D66LED90GIP / ALHB321D66LED3080GIP



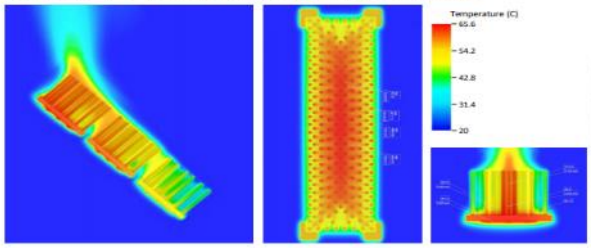
BOX WITH LED DRIVER AND PWM CONTROLLER

Heatsink type and its thermal data

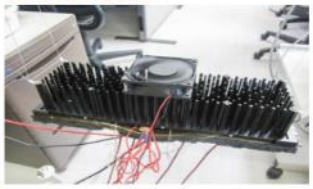
MECHATRONIX



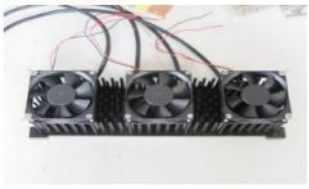
CoolBlock® HC-01-3x11 thermal simulations results CFD

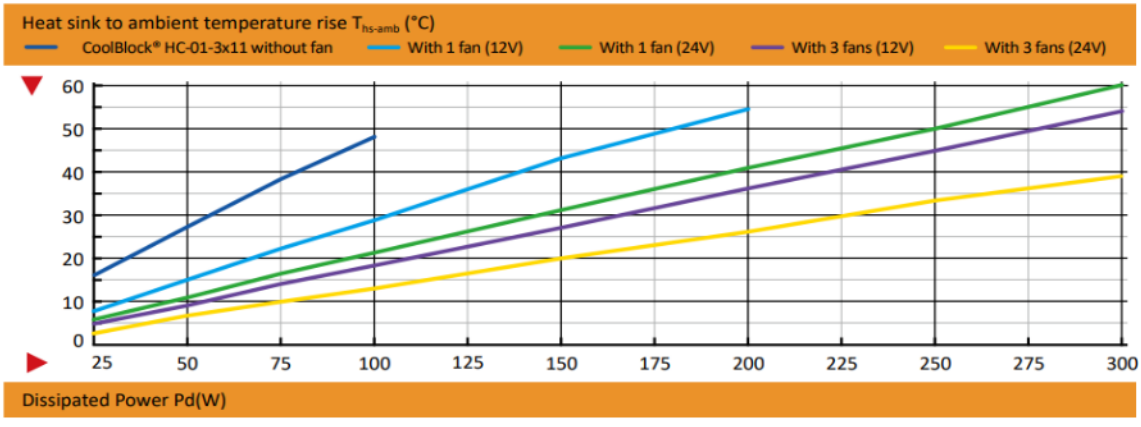


Single fan solution



3 fans solution



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

Pd = Pe x (1-ηL)		Heat sink to ambient thermal resistance $R_{hs\text{-}amb}$ (°C/W)					Heat sink to ambient temperature rise $T_{hs\text{-}amb}$ (°C)				
	Fan (Optional)	-	1 fan (12V)	1 fan (24V)	3 fans (12V)	3 fans (24V)	-	1 fan (12V)	1 fan (24V)	3 fans (12V)	3 fans (24V)
Dissipated Power Pd(W) 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