

Innovative Technology

LED GROW LIGHT

Multi-layer LED Grow Light



Beyond the imagination for technology



PARUS
www.parus.co.kr

Since 2003, Professional LED grow light

Grow more and grow better
The development history of the PFL Series



Innovative Technology

LED Grow Light

Multi-layer LED PFL series



Provide a stable products with 13 years of experience know-how and technology

~2003

First generation
Round LED



2003~2007

Second generation
SMD



2007~2012

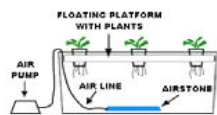
Third generation
Hi-Power & COB



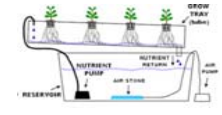
2013~



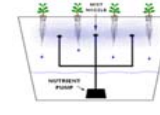
D.F.T



N.F.T



Aeroponic



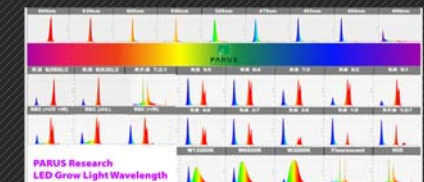
Wavelength
R&D chamber



Wavelength
R&D chamber



Wavelength
R&D chamber



Since 2003, Professional LED grow light

Grow more and grow better
Multi-layer LED Grow light



T5

PFL-s

PFL

PFL WG

PFL WCIII

EFFICIENCY



Efficiency
95%

PPF/j
3.5

Control
Wi-Fi

Angle
**60°~
140°**

7
Years
Warranty



Energy cost of a multi-layer cultivation; 300m2 (user one years)

	Fluorescent	Standard LED	PARUS LED PFL WC	Note
Power consumption	737,280 kWatt	368,640 kWatt	368,640 kWatt	Growing shelf(1200mmx600m) x 400set
(converted into) Light	154,829 kWatt	110,592 kWatt	110,592 kWatt	250umol m-2 s-1 (green vegetable standard)
(converted into) Heat	582,451 kWatt	258,048 kWatt	258,048 kWatt	Thermal energy
Energy for cooling heat	582,451 kWatt	258,048 kWatt	8,000 kWatt	Energy for using air conditioner to cool indoor air air conditioner energy efficiency 33% (grade 1)
Total energy	1,319,731 kWatt	626,688 kWatt	376,640 kWatt	
Energy cost	\$131,973 USD	\$62,669 USD	\$37,664 USD	
CO2 emission	559,566 Kg	265,716 Kg	159,695 Kg	

Calculation base :

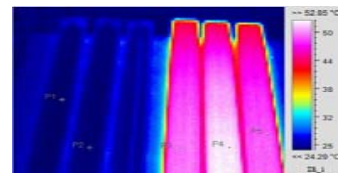
- Power consumption(input energy) : 16 hours lighting per day (all year round), 400pcs of growing shelf(growing shelf size 1200mm x 600mm)
- Energy converted into light for growing : PPF 250umol m-2 s-1
- Energy converted into heat : heat loss of the input energy
- Energy for cooling heat : additional energy to cool heat which LED generates

Fluorescent, general LED → The heat radiation of LED increases indoor temperature, so additional energy for cooling (A/C) is needed to maintain proper indoor temp.

PARUS LED light → Applying the patent technology, PARUS Water Cooling System handles heat of LED effectively, reuses heat to warm indoor air in winter, emits heat in summer to reduce energy cost.



Comparing efficiency — PFL WC vs Fluorescent



Energy Saving

Energy saving more than FL ↓ **72%**

Intensity(PPFD)

Light intensity more than FL ↑ **78%**

Life Time

Life time more then FL ↑ **80%~** longer

Applicable model

PFL WC Series



Efficiency
95%

PPF/j
3.5

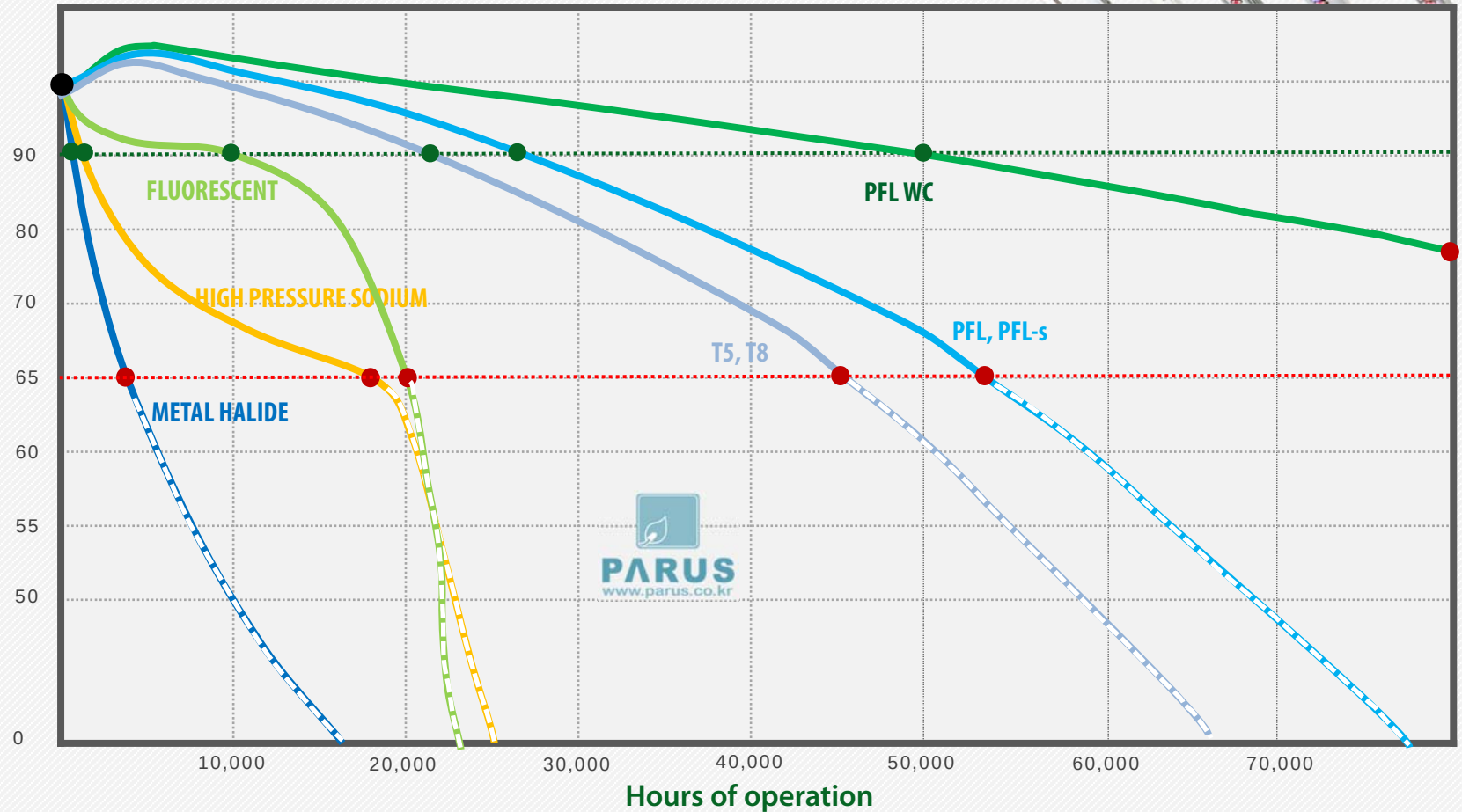
Control
Wi-Fi

Angle
**60°~
140°**

7
Years
Warranty

ESTIMATED LED LAMP LIFE

% rated lumen/micromol output
Lamp Replacement at 65% / EOL
Grow Lamp Replacement at 90% / EOL-PARUS



● **Commercial lamp life cycle**
Lamp replacement at 65% / EOL

● **Plant Grow Lamp life cycle**
Grow Lamp Replacement at 90%

METAL HALIDE : 5,000hrs
HIGH PRESSURE SODIUM : 18,000hrs
FLUORESCENT : 20,000hrs
T5, T8 : 45,000hrs
PFL, PFL-s : 52,000hrs
PFL WC : >100,000hrs

METAL HALIDE : 1,000hrs
HIGH PRESSURE SODIUM : 1,500hrs
FLUORESCENT : 10,000hrs
T5, T8 : 22,000hrs
PFL, PFL-s : 28,000hrs
PFL WC : >50,000hrs





Efficiency
95%

PPF/j
3.5

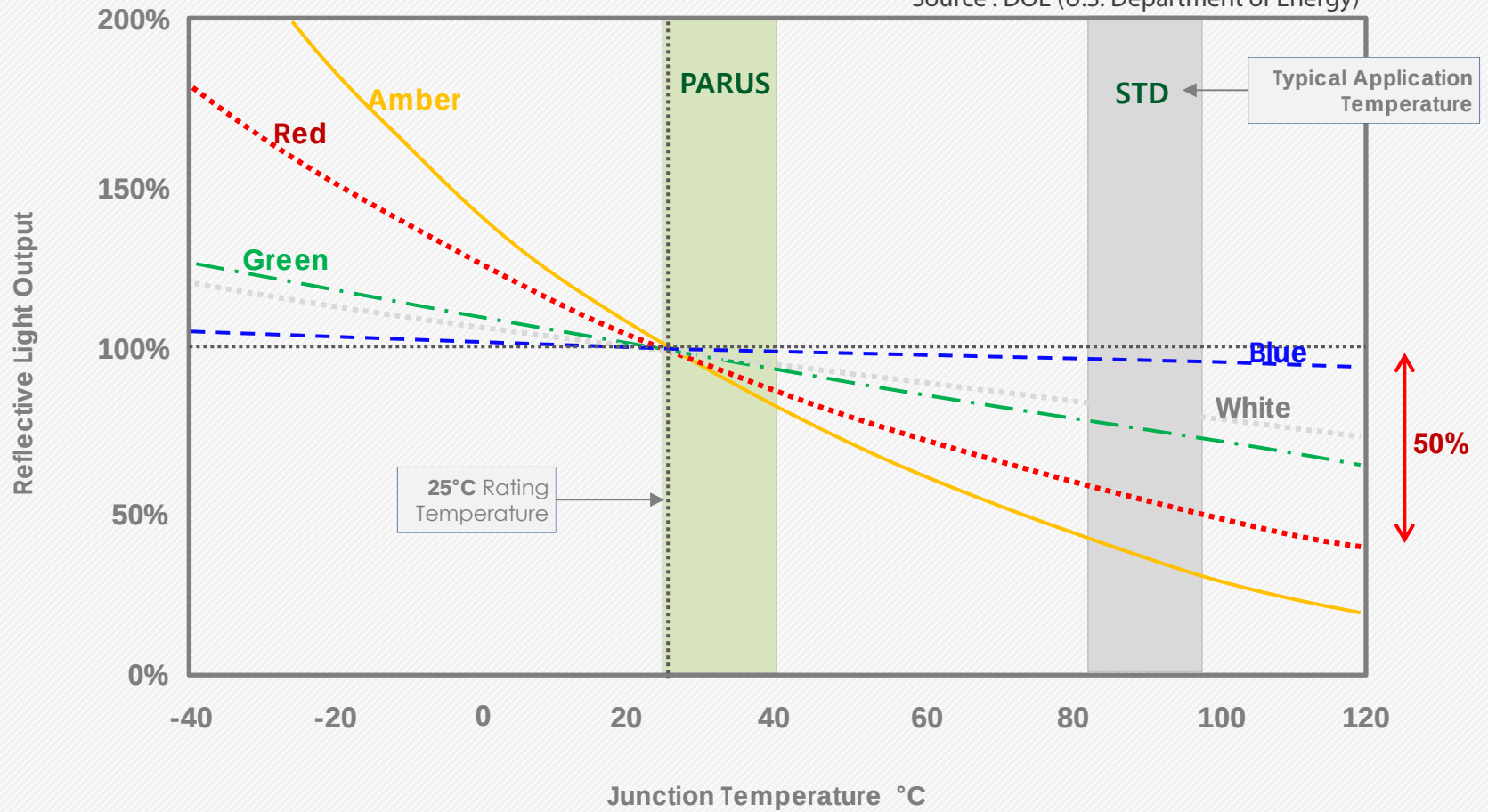


Angle
60°~140°



LED Heat sink Effect

* Source : DOE (U.S. Department of Energy)



Selection procedures of the Multi-layer LED grow lighting

Step 1

Crops?

Select crops to be applied.

- Check PPFD required for the crop
- The effective wavelength selected crops

Step 2

Cultivation?

Select the cultivation method.

- Growing? Blooming? Germination? Seedlings? Cuttings?
- Tissue culture? N.F.T? Aeroponics?

Step 3

Shelf size?

Select the size of the shelf.

- LED spacing of the crop according to the Shelf (height), Installation interval of the LED according to the required light intensity of the crop
- How to choose easy to install LED, depending on the type of Shelf

Step 4

Control & Installations

Select the easiest and safest way to install

- The control method of the selected LED
- Wavelength control?
- Dimming Control?
- On/Off control?
- Wi-Fi control?

- A single control?
- Multiple and group control?

Much of we challenge continues to be explaining different, complicated technologies in ways that can easily capture the imagination.

Since 2003, Professional LED grow light

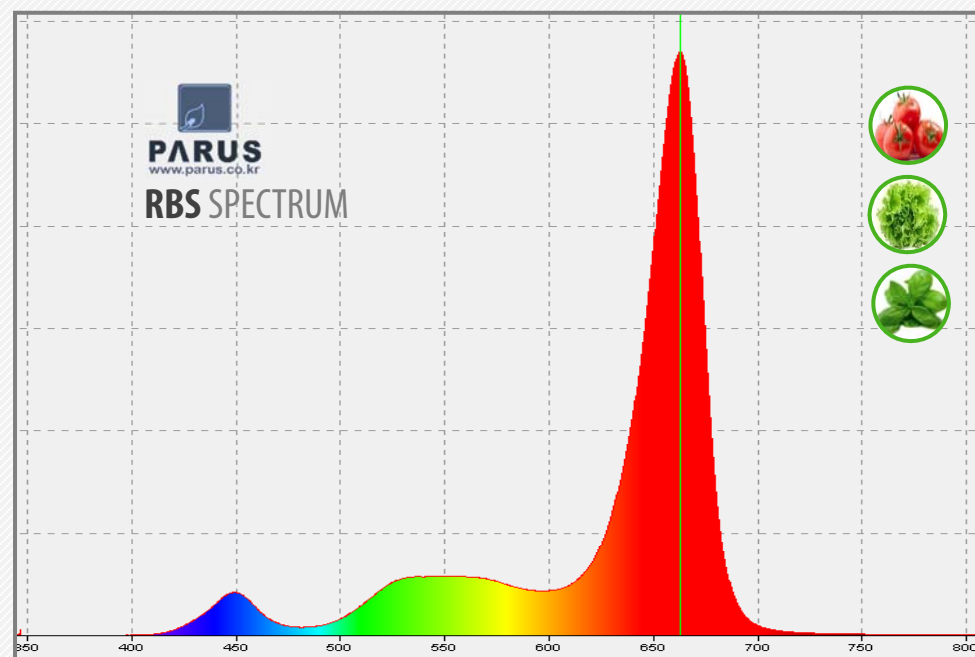
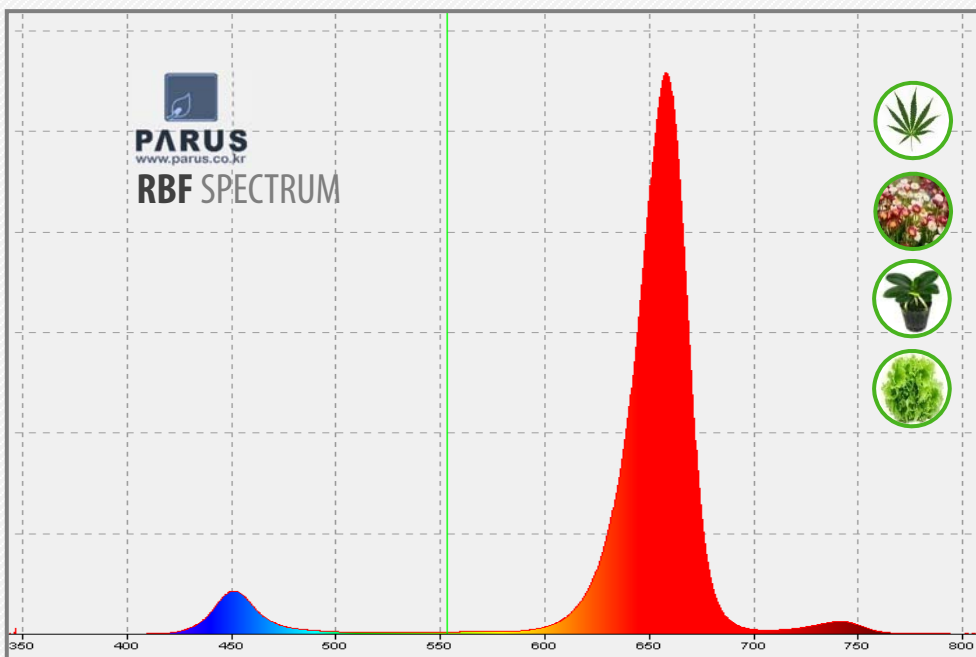
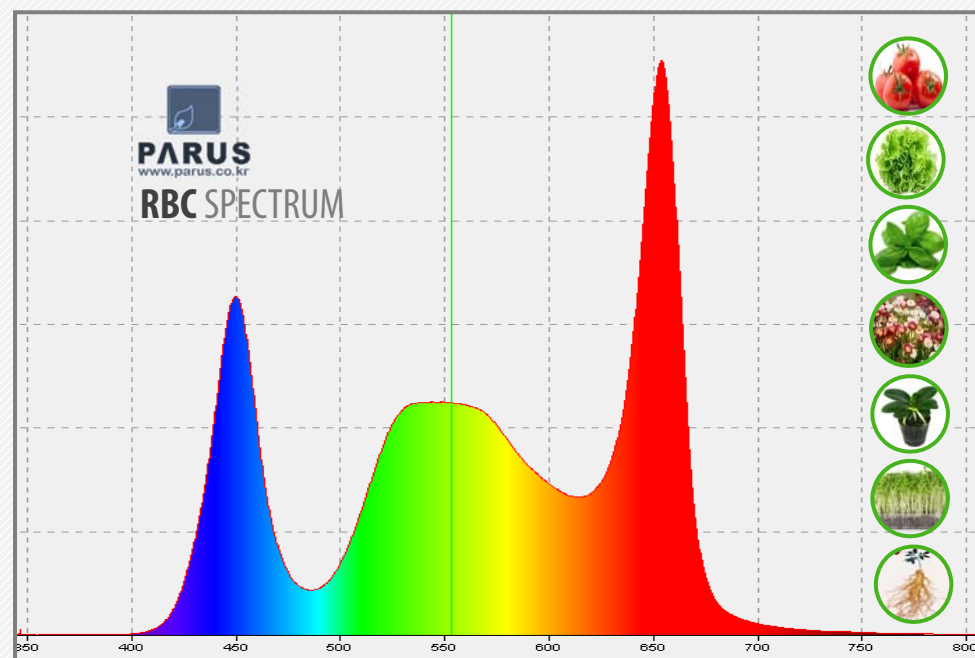
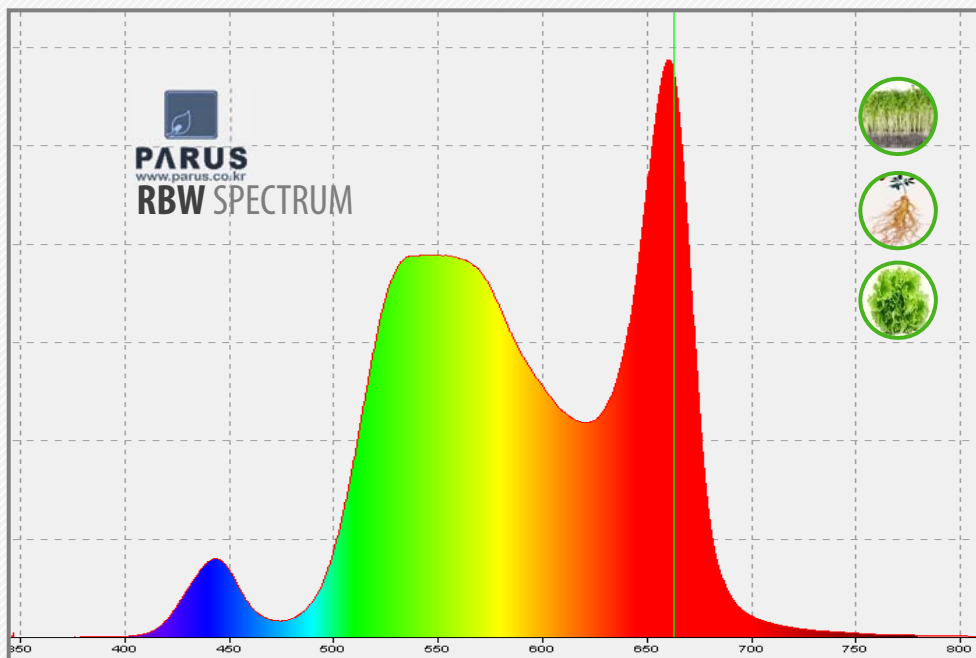
Step 1

Crops?

PPFD($\mu\text{mol m}^{-2}\text{s}^{-1}$) selection of the crop

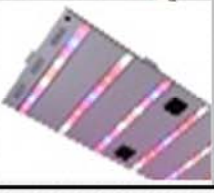
Crops	Recommended PPFD($\mu\text{mol m}^{-2}\text{s}^{-1}$)	Minimum PPFD($\mu\text{mol m}^{-2}\text{s}^{-1}$)	Available models
	600~800	300	PFL WC
	250~400	180	PFL WC PFL PFL-s
	200~300	150	PFL WC PFL PFL-s
	90~200	80	PFL PFL-s
	80~150	60	PFL PFL-s
	80~130	50	PFL-s
	60~120	30	PFL-s T5

Step 1 Spectrum selection of the crop



Step 2 Cultivation?

Selection of the cultivation

Product Model	Cultivation				Technical				
	Multi-Layer	Research	Tissue Culture	Cutting	Water Cool	Lamp Angle	IP Class	Dimming	Wi-Fi Control
 PFL STD	●	●	●	▲	☒	60°~140°	Default : IP65 Option : IP67	●	●
 PFL WC	●	●	●	▲	●	60°~140°	Default : IP67	●	●
 PFL-s	●	●	●	●	☒	60°~140°	Default : IP65 Option : IP67	●	●
 T5	▲	●	●	●	☒	140°	Default : IP65 Option : IP67	●	▲
 PGL-BOX	●	▲	●	▲	●	120°	Default : IP54	●	●
● Excellent ▲ Good ☒ Inadaptabili									

Step 3

Shelf size?

Selection of the shelf size

L1 : Length of the total cultivation shelf

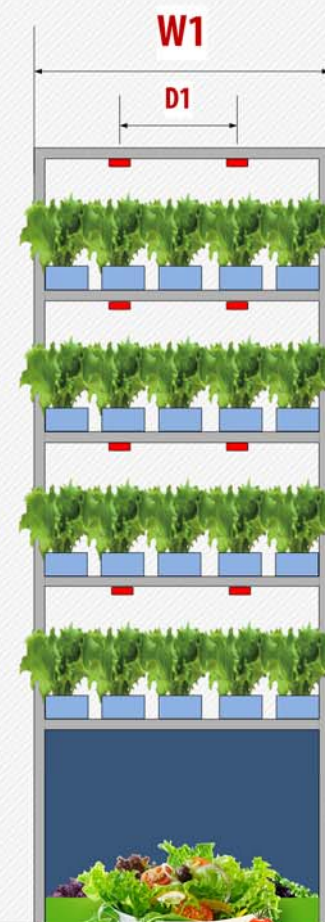
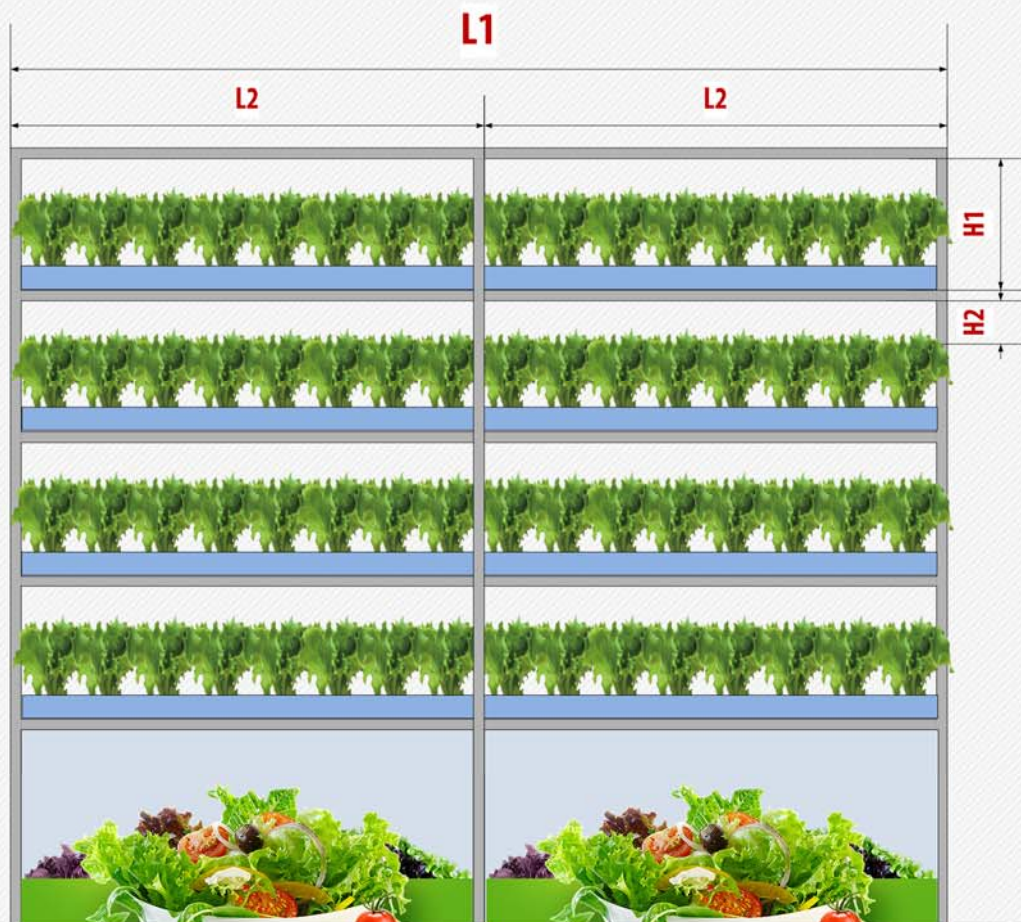
L2 : Length of the cultivation shelf

W1 : Width of the cultivation shelf

H1 : Height of the cultivation shelf

H2 : Height of the crop to LED

D1 : Interval from LED to LED



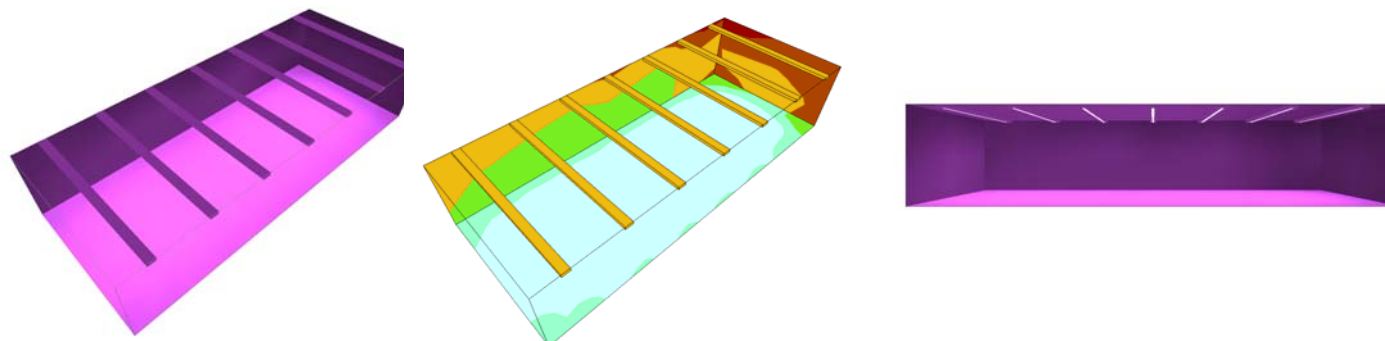
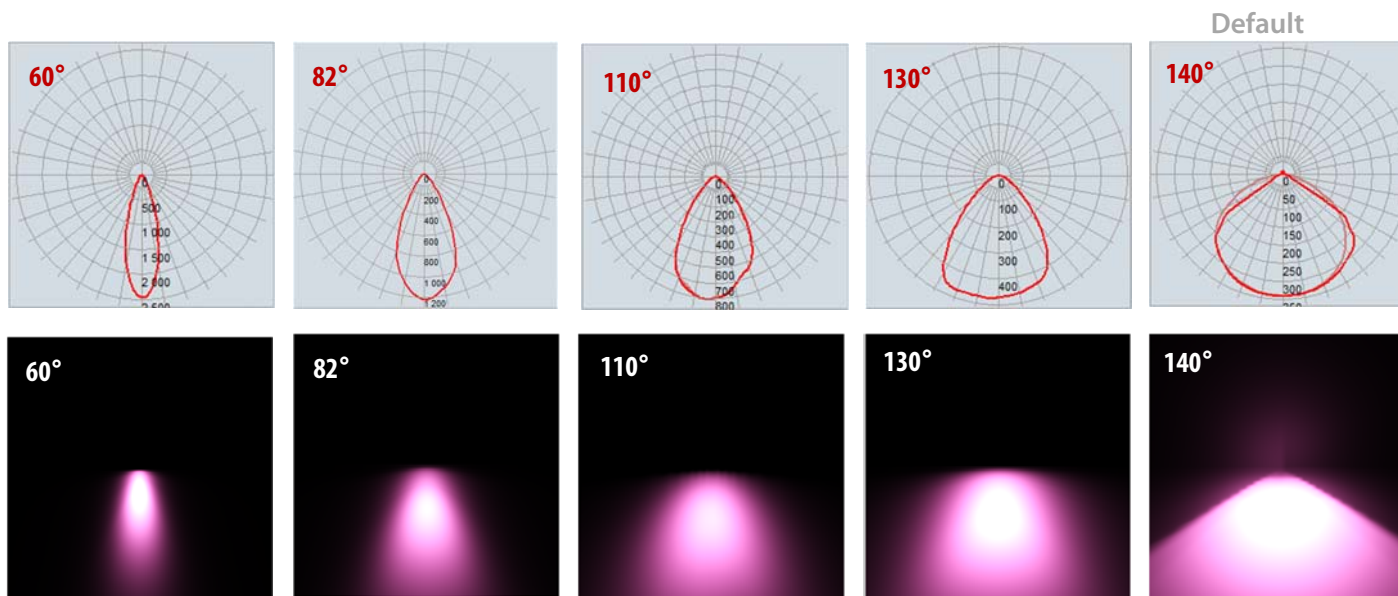
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Step 3 Shelf size?

Selection of the LED angle

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Select Angle to the height of the shelf and requirements PPFD

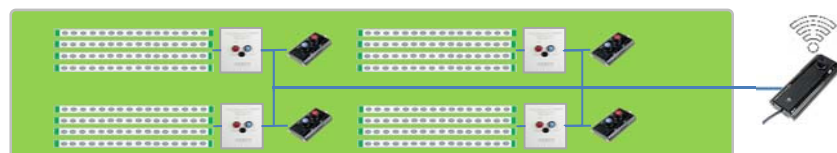


Step 4

Control & Installation?

The control method of selection LED

Multi-layer cultivation room



•
•
•
•
•



DIMMING CONTROL

- ✓ Single dimming control
- ✓ Group(1 layer, 2layer, all group) dimming control
- ✓ Wi-Fi control
 - Dimming, Timer, Climate, Schedule control
- ✓ Separated spectrum dimming(RBC model)
- ✓ Local mode & remote mode
- ✓ Easy connection for LED, SMPS, control Line
- ✓ Integrated SMPS model (150Watt ~ 2,000watt)
- ✓ Waterproof IP65
- ✓ Silver aluminum design



Wi-Fi CONTROL

- ✓ Power On/Off
- ✓ On/Off Schedule Timer
- ✓ Electricity Consumption
 - (real time check, Day/Month/Year in electricity costs)
- ✓ Check Temp/Humidity/Intensity
- ✓ Control environment (Fan, Pump, AC.....)
- ✓ Wi-Fi Camera
- ✓ Alarm Motion & Door sensor

Step 4 Control & Installation?

The control method of selection LED



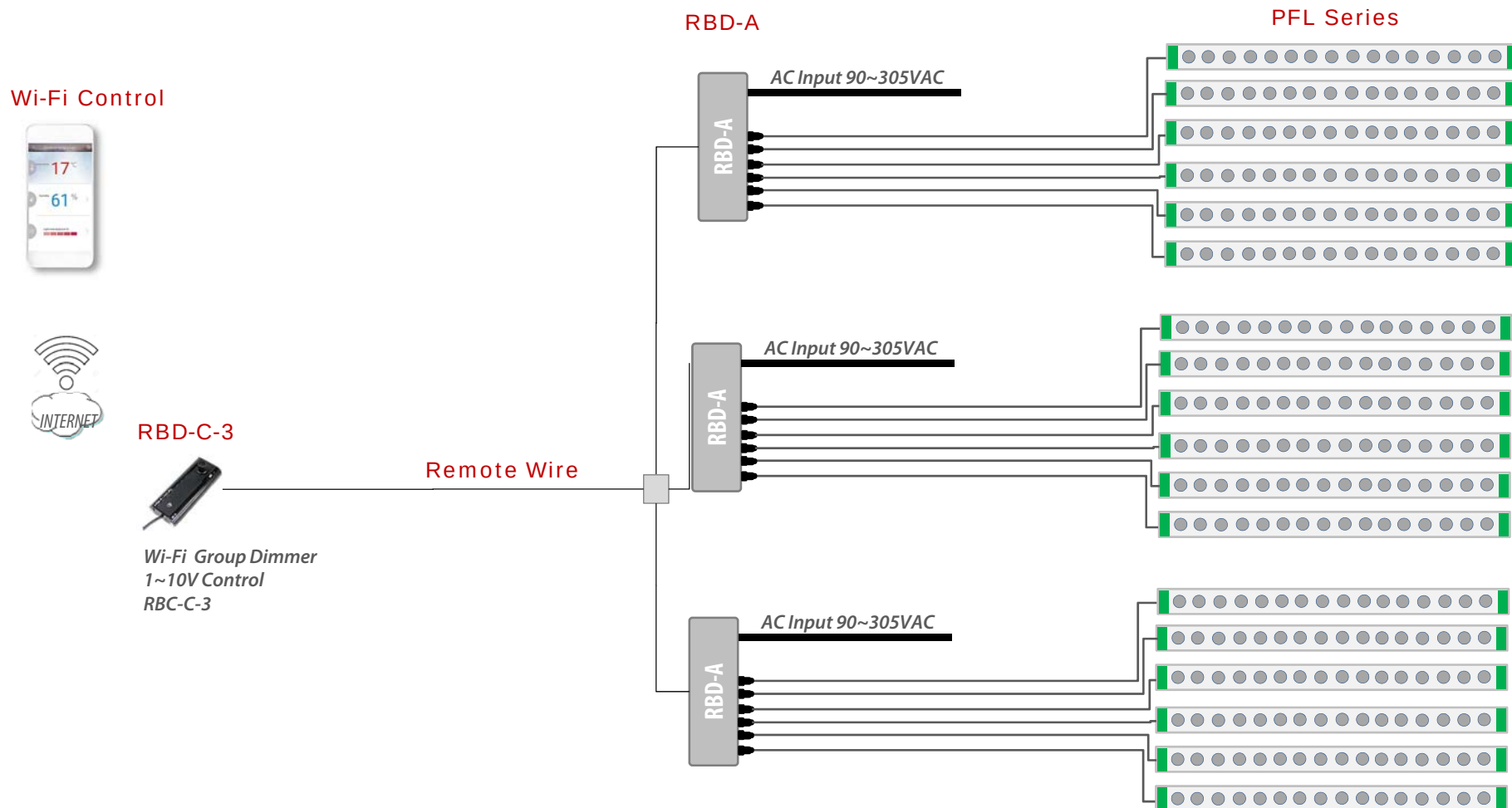
- ✓ Single/Group dimming control
- ✓ Wi-Fi control
- ✓ Red & Blue(white) separated spectrum dimming
- ✓ Local mode & remote mode
- ✓ Easy connection for LED, SMPS, control Line
- ✓ Integrated SMPS model (150Watt ~ 2,000watt)
- ✓ Waterproof IP65
- ✓ Silver aluminum design



Step 4 Control & Installation?

The control method of selection LED

Installation drawings

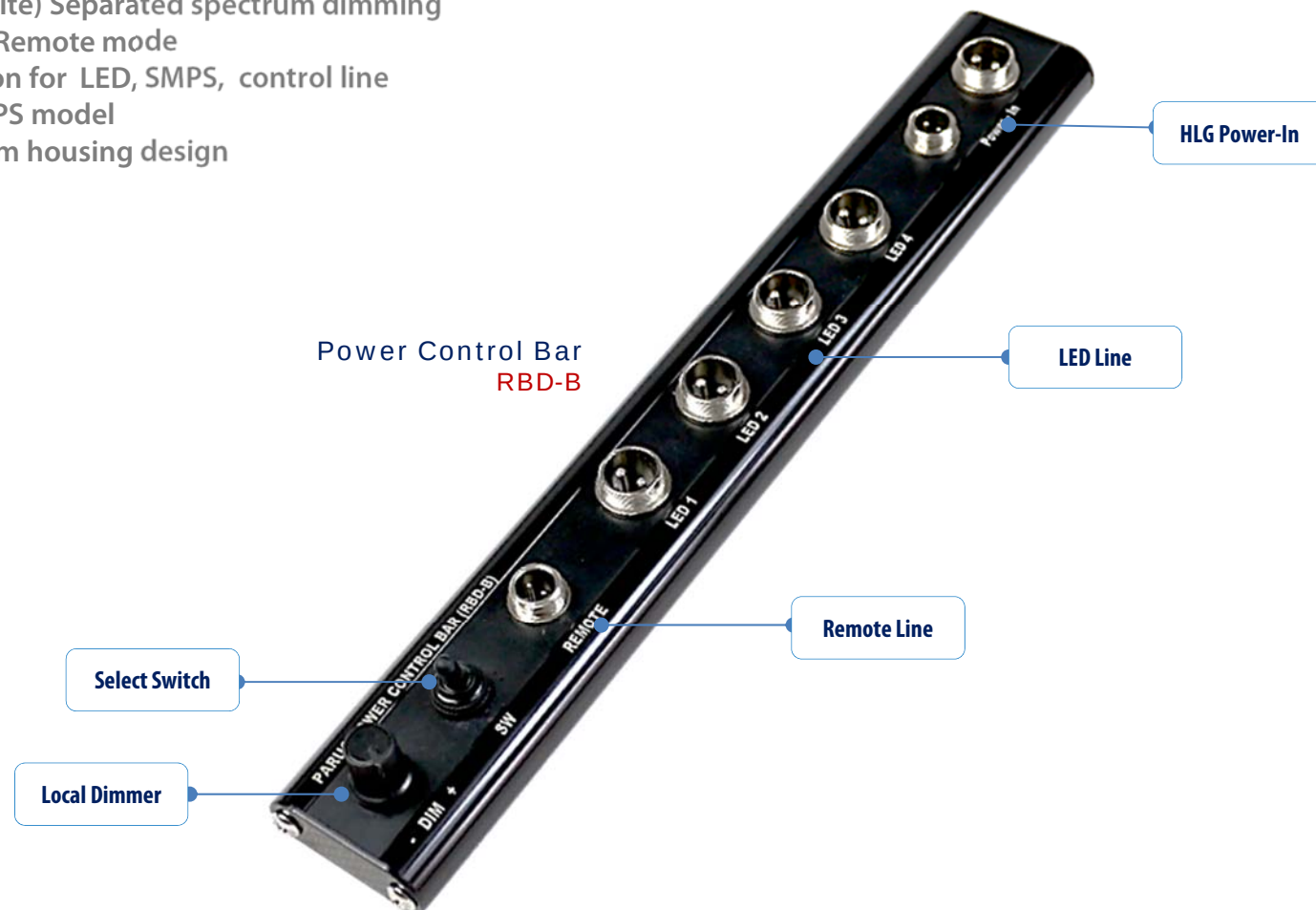


Step 4 Control & Installation?

The control method of selection LED



- ✓ Single/Group dimming control
- ✓ Wi-Fi control
- ✓ Red & Blue(white) Separated spectrum dimming
- ✓ Local mode & Remote mode
- ✓ Easy connection for LED, SMPS, control line
- ✓ Separated SMPS model
- ✓ Black aluminum housing design



Step 4

Control & Installation?

The control method of selection LED

Installation drawings



Remote Wire



Junction Box

Wi-Fi Control

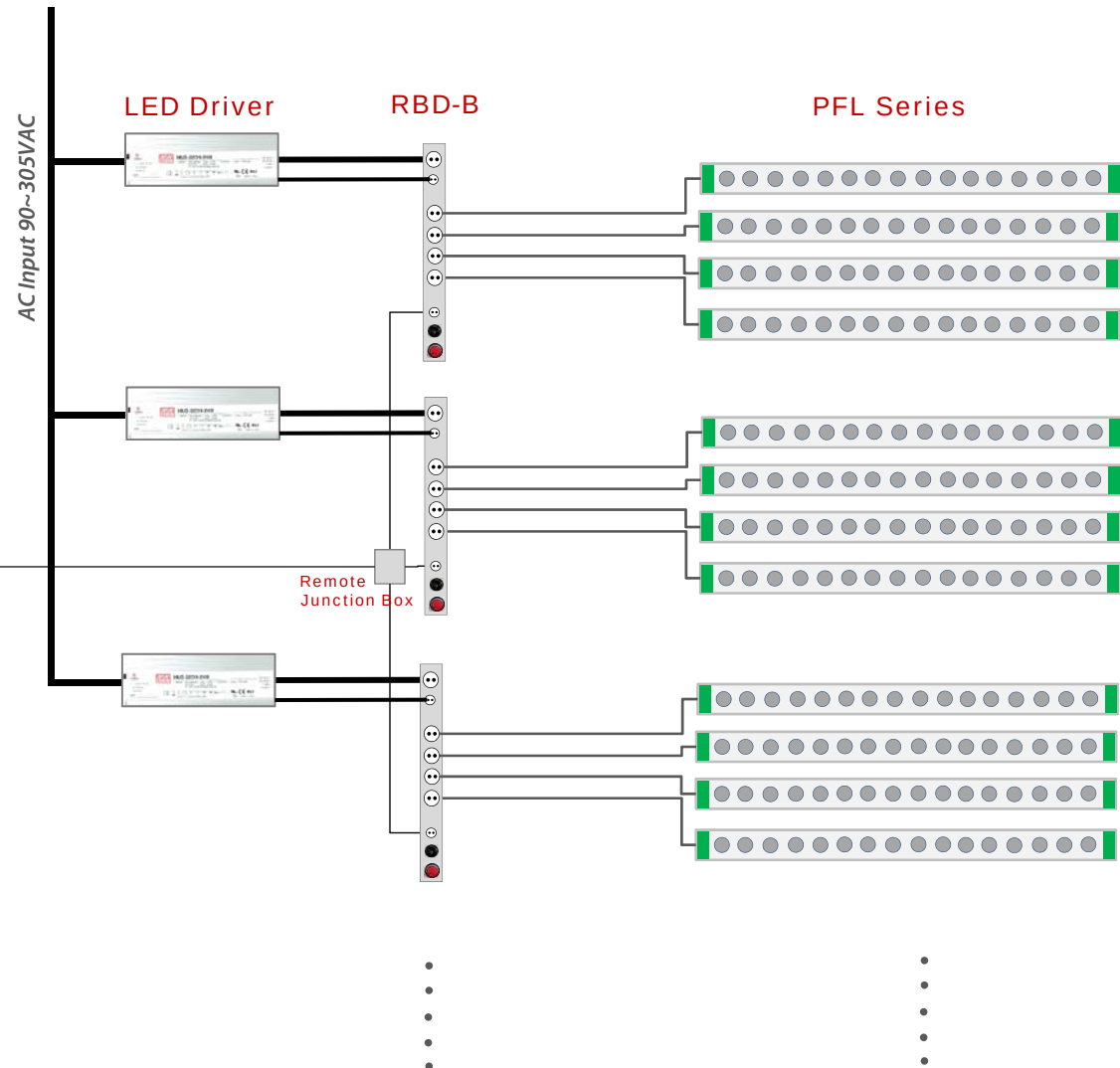


RBD-C-3



Group Dimmer
1~10V Control
RBC-C-3

Remote Wire



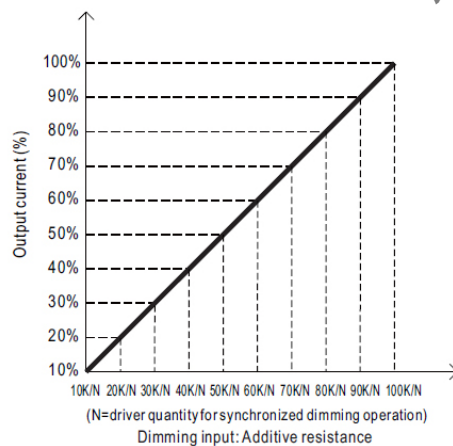
Step 4 Control & Installation?

The control method of selection LED



RBD-C-1

- ✓ Single/Group dimming control
- ✓ Easy connection for LED, SMPS, Control Line
- ✓ Black aluminum housing
- ✓ Resistance type

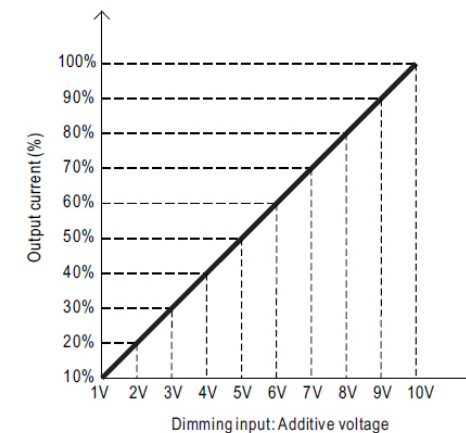


RBD-C-2

- ✓ Single/Group dimming control
- ✓ Red & Blue(white) Separated spectrum dimming
- ✓ Easy connection for LED, SMPS, Control Line
- ✓ Black aluminum housing
- ✓ Resistance type

RBD-W

- ✓ Wi-Fi Control (1-10V)
- ✓ Single/Group dimming control
- ✓ Easy connection for LED, SMPS, Control Line
- ✓ Black aluminum housing
- ✓ 1-10DVC control type
- ✓ Connector max. 2500pcs fixture



Step 4 Control & Installation?

The control method of selection LED

Wi-Fi CONTROL

Smart K2

- Operation Voltage : AC100~264V 50/60Hz
- OS : iOS, Android
- Wireless : 802.11 b/g/n
- Power on/off, timer, Electricity Consumption
- Climate sensor-Control
- Control : Line, IR, RF



-Option(Plug-In)

Climate sensor

Temp + RH + Light Intensity



IR sensor(Home & Office)

Air condition, TV, LED Lamp...
All control devices with IR receiver



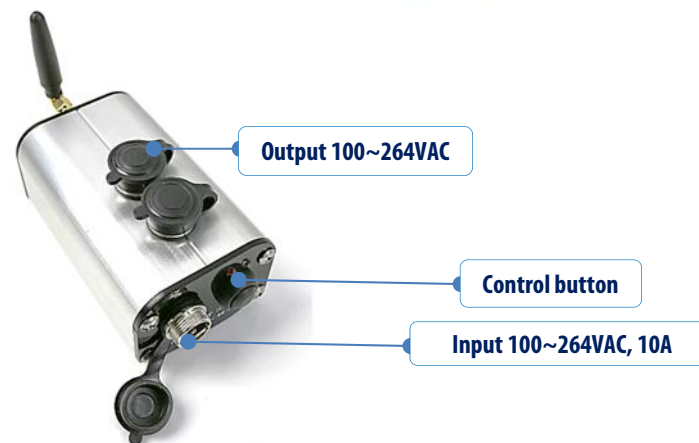
RF sensor(GreenHouse, Multi-layer)

LED Lamp, Fan, Heater, Pump...
All control devices with RF receiver



Motion sensor

Access monitoring sensor





Innovative Technology
Multi-layer - LED Grow Light

PFL WC

Water Cool
100,000 hr lifetime
High efficiency

Hi-Efficiency LED
3.5 PPF/j

Multiple Angle
30°, 45°, 60°, 90°, 120°



PFL WC
Water Cooling

Since 2003, Professional LED grow light

High efficiency

Water cool LED grow light design

Energy savings of up to 85% compared to fluorescent lamp

PPFD of up to 25% compared to other LED grow light lamp

Universal AC Standard 85~307VAC, Hi-Voltage 180 ~ 528VAC, 47~63Hz

Efficiency 95%, PFC >0.98

Easy control & Installation

Safety

Safety Design CE, LVD, EMC, UL, cUL, EAC, IP67

Easy Control

Adjustable LED spectrum - RBC

LED spectrum can be selected – RBS, RBF, RBC, RBW

Single dimming, Group dimming, Wi-Fi control

More growth

More than 25% of the crop growth

Uniform, produces high-quality plant.

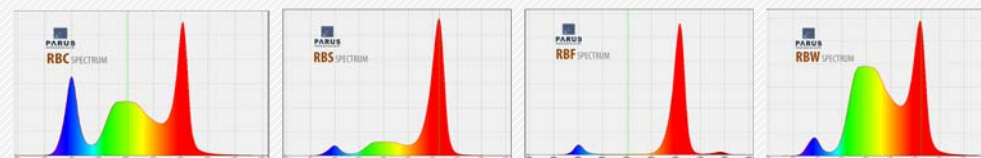
Long Lifetime

100,000hr life time

7 years warranty

Applicable spectrum

Other spectral orders can be made.



Part

T

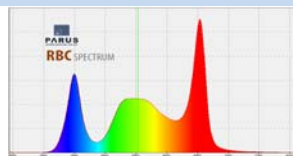
Wattage
(Adjustable $\pm 10\%$ ~110%)Model
Spectrum(Size)

Model No

LED's

PFL WCIII

RBC Spectrum



B

80 Watt

RBC (1200mm)

PFL-WCIII-RBC-B-1200

3W x 36(R22:B7:W7)

120 Watt

RBC (1800mm)

PFL-WCIII-RBC-B-1800

3W x 54(R33:B10:W11)

160 Watt

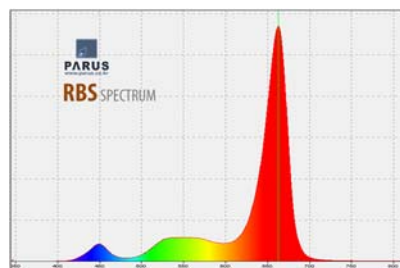
RBC (2400mm)

PFL-WCIII-RBC-B-2400

3W x72(R44:B14:W14)

PFL WCIII

RBS Spectrum



B

80 Watt

RBS (1200mm)

PFL-WCIII-RBS-B-1200

3W x 32(R24:B4:W4)

100 Watt

RBS (1500mm)

PFL-WCIII-RBS-B-1500

3W x 40(R32:B4:W4)

120 Watt

RBS (1800mm)

PFL-WCIII-RBS-B-1800

3W x 48 (R36:B6:W6)

150 Watt

RBS (2000mm)

PFL-WCIII-RBS-B-2000

3W x 60(R48:B6:W6)

160 Watt

RBS (2400mm)

PFL-WCIII-RBS-B-2400

3W x 64(R48:B8:W8)

C

120 Watt

RBS (1200mm)

PFL-WCIII-RBS-C-1200

3W x 40(R32:B4:W4)

180 Watt

RBS (1800mm)

PFL-WCIII-RBS-C-1800

3W x 60(R48:B6:W6)

240 Watt

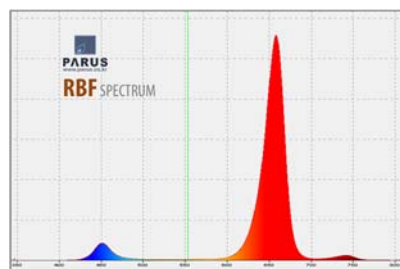
RBS (2400mm)

PFL-WCIII-RBS-C-2400

3W x 80(R64:B8:W8)

PFL WCIII

RBF Spectrum



B

80 Watt

RBF (1200mm)

PFL-WCIII-RBF-B-1200

3W x 32(R24:B4:F4)

100 Watt

RBF (1500mm)

PFL-WCIII-RBF-B-1500

3W x 40 (R32:B4:F4)

120 Watt

RBF (1800mm)

PFL-WCIII-RBF-B-1800

3W x 48(R36:B6:F6)

150 Watt

RBF (2000mm)

PFL-WCIII-RBF-B-2000

3W x 60(R48:B6:F6)

160 Watt

RBF (2400mm)

PFL-WCIII-RBF-B-2400

3W x 64(R48:B8:F8)

C

120 Watt

RBF (1200mm)

PFL-WCIII-RBF-C-1200

3W x 40(R32:B4:F4)

180 Watt

RBF (1800mm)

PFL-WCIII-RBF-C-1800

3W x 60(R48:B6:F6)

240 Watt

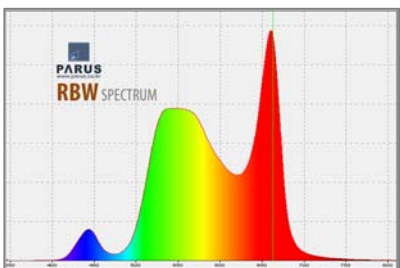
RBF (2400mm)

PFL-WCIII-RBF-C-2400

3W x 80(R64:B8:F8)

PFL WCIII

RBW Spectrum



B

80 Watt

RBW (1200mm)

PFL-WCIII-RBW-B-1200

3W x 32 (R1:W2)

100 Watt

RBW (1500mm)

PFL-WCIII-RBW-B-1500

3W x 40(R1:W2)

120 Watt

RBW (1800mm)

PFL-WCIII-RBW-B-1800

3W x 48 (R1:W2)

150 Watt

RBW (2000mm)

PFL-WCIII-RBW-B-2000

3W x 60(R1:W2)

160 Watt

RBW (2400mm)

PFL-WCIII-RBW-B-2400

3W x 64 (R1:W2)

C

120 Watt

RBW (1200mm)

PFL-WCIII-RBW-C-1200

3W x 40(R1:W2)

180 Watt

RBW (1800mm)

PFL-WCIII-RBW-C-1800

3W x 60(R1:W2)

240 Watt

RBW (2400mm)

PFL-WCIII-RBW-C-2400

3W x 80(R1:W2)

Efficiency
95%PPF/j
3.5Control
Wi-FiAngle
60°~
140°7
Years
Warranty



Technical specifications

Product	Model Name RBS Spectrum Standard (b/c) : B type / C type	PGL-PFL WC 1200 b type / c type	PGL-PFL WC 1500 b type	PGL-PFL WC 1800 b type / c type	PGL-PFL WC 2000 b type	PGL-PFL WC 2400 b type / c type
 Power	Power Consumption	80/120 Watt	100 Watt	120/180 Watt	150 Watt	160/240 Watt
	AC input voltage range	Free voltage 90~305VAC, 47~63Hz (option Hi-Voltage 180~528VAC)				
	SMPS mode (PSU)	DC Current Design(C.V, C.C Mode)				
	Protection	Short circuit, Overload, Over voltage				
	Power Factor	Efficiency $\geq 95\%$, PFC ≥ 0.98				
	Total Harmonic Distortion	THD<20%(@load $\geq 50\%$ /115VAC,230VAC; @load $\geq 75\%$ /277VAC)				
	Inrush Current	Cold Start 70A(twidth=1010 μ s measured at 50% Ipeak) at 230VAC; Per NEMA 410				
LEDs	Spectrum Spectrum Ratio(R:B:O)	RBS, RBC, RBF, RBW (Please refer to "PARUS Spectrum")				
Heat Sink	Heat Sink Type	Water cooling + Cooling by free air convention				
	FRAME Material	Body	Aluminium water cool design			
		PCB	Metal PCB(aluminium)			
		Heat conduction	2.0 w/m.k			
		Thermal resistance	0.20 °C/w			
Heat Value	BTU/h (b/c) : B type / C type Water Cooled @25°C (b/c)	164/246 16/38	205 20	246/368 25/57	307 28	328/491 33/76
Efficiency	PPF (μ mol/s) RBS Spectrum Standard	280/420	350	420/630	525	560/840
	PPF/j (μ mol/j)	3.5/RBS, 3.3/RBC, 3.4/RBF, 3.2/RBW				
	PPFD (μ mol m ⁻² s ⁻¹) RBC(c type) Spectrum Standard	735 μ mol m ⁻² s ⁻¹ (measure the distance 500mm) 452 μ mol m ⁻² s ⁻¹ (measure the distance 1,000mm) 265 μ mol m ⁻² s ⁻¹ (measure the distance 1,500mm) 169 μ mol m ⁻² s ⁻¹ (measure the distance 2,000mm)				
Control	Dimming Control	Single Dimming, Group Dimming, Wi-Fi Control (Please refer to "Color dimming controller")				
	Pulse / Duty rate	400 μ s / 0~100%				
IP Class	IP67	complete protection against contact, Water projected in powerful jets against the enclosure from any direction shall have no harmful effects.				
Ambient Temperature	Storage Temp.	-30°C ~ 85°C				
	Operation Temp.	~35°C-Cooling by free air convention, ~50°C-Water Cooling				
Angle	Lamp angle	60°, 82°, 110°, 130°, 140°				
Life time		Over 100,000hr (Please refer to "Water cooling lifetime")				
Safety	Standard	CE, EMC, UL,cUL				
Warranty	7 years	7 years				



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Innovative Technology

Multi-layer - LED Grow Light

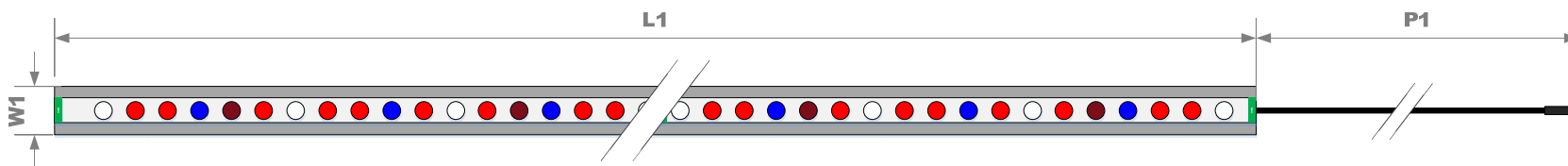
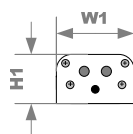
PFL WC Dimensions

PFL WC

Model	Multi-layer Led Grow Light	Dimensions(mm/inch)				Weight
		L1	W1	H1	P1	(gr/lb)
	PGL-PFL WC 1200	1200/47.24	50.9/2.00	32.6/1.28	2000/78.74	2144/4.72
	PGL-PFL WC 1500	1500/59.05	50.9/2.00	32.6/1.28	2000/78.74	2680/5.91
	PGL-PFL WC 1800	1800/70.86	50.9/2.00	32.6/1.28	2000/78.74	3216/7.09
	PGL-PFL WC 2400	2400/94.48	50.9/2.00	32.6/1.28	2000/78.74	4288/9.45

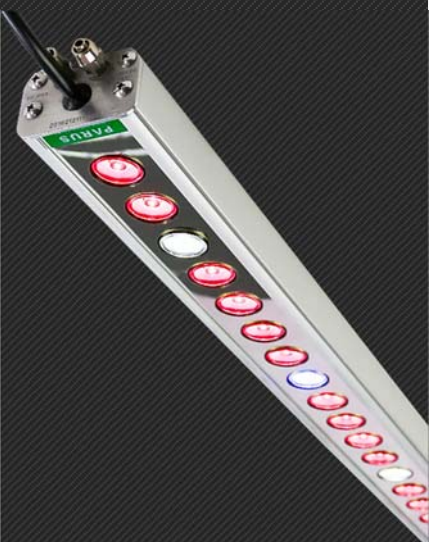
PFL WCIII

Model	Multi-layer Led Grow Light	Dimensions(mm/inch)				Weight
		L1	W1	H1	P1	(gr/lb)
	PGL-PFL WCIII 1200	1200/47.24	53/2.08	30/1.18	2000/78.74	1899/4.18
	PGL-PFL WCIII 1500	1500/59.05	53/2.08	30/1.18	2000/78.74	2370/5.22
	PGL-PFL WCIII 1800	1800/70.86	53/2.08	30/1.18	2000/78.74	2856/6.29
	PGL-PFL WCIII 2400	2400/94.48	53/2.08	30/1.18	2000/78.74	3798/8.37



PFL WC
Water Cooling

PFL WC – Mounting Options



Slide Suspend

STANDARD

Slide suspend the default mount of the PFL WC.
Using wire, you can adjust the PFL WC installation height.
Remove the screws and install the panels



Slide Mount

OPTION

Installation by adjustment depending on the size of the shelf.
Installation in accordance with the irradiation direction of the PFL WC.
Vertical installation, Depending on the angle installation



Suspend Mount

OPTION

Simple and quick installation.
Using wire, you can adjust the PFL WC installation height.
Remove the screws and install the panels



PFL WCIII – Mounting Options



STANDARD

Slide suspend the default mount of the PFL WCIII.
Using wire, you can adjust the PFL WC installation height.
Remove the screws and install the panels



x 2



OPTION

Can be easily fixed to the pipe shelf.



x 2

PFL WCIII – Water cooling fitting options

STANDARD

OPTION 1

OPTION 2

OPTION 3

OPTION 4

OPTION 5



PFL WCIII
Water Cooling

High efficiency

Excellent heatsink for LED grow light design
Energy savings of up to 75% compared to fluorescent lamp
PPFD($\mu\text{mol m}^{-2}\text{s}^{-1}$) of up to 15% compared to other LED grow light lamp
Universal AC Standard 85~307VAC, Hi-Voltage 180 ~ 528VAC, 47~63Hz
Efficiency 95%, PFC >0.98

Safety

Safety Design CE, LVD, EMC, UL, cUL, EAC, IP65, IP67(option)

Easy Control & Installation

Adjustable LED spectrum - RBC
LED spectrum can be selected – RBS, RBF, RBC, RBW
Single dimming, Group dimming, Wi-Fi control
Easy control & Installation

More growth

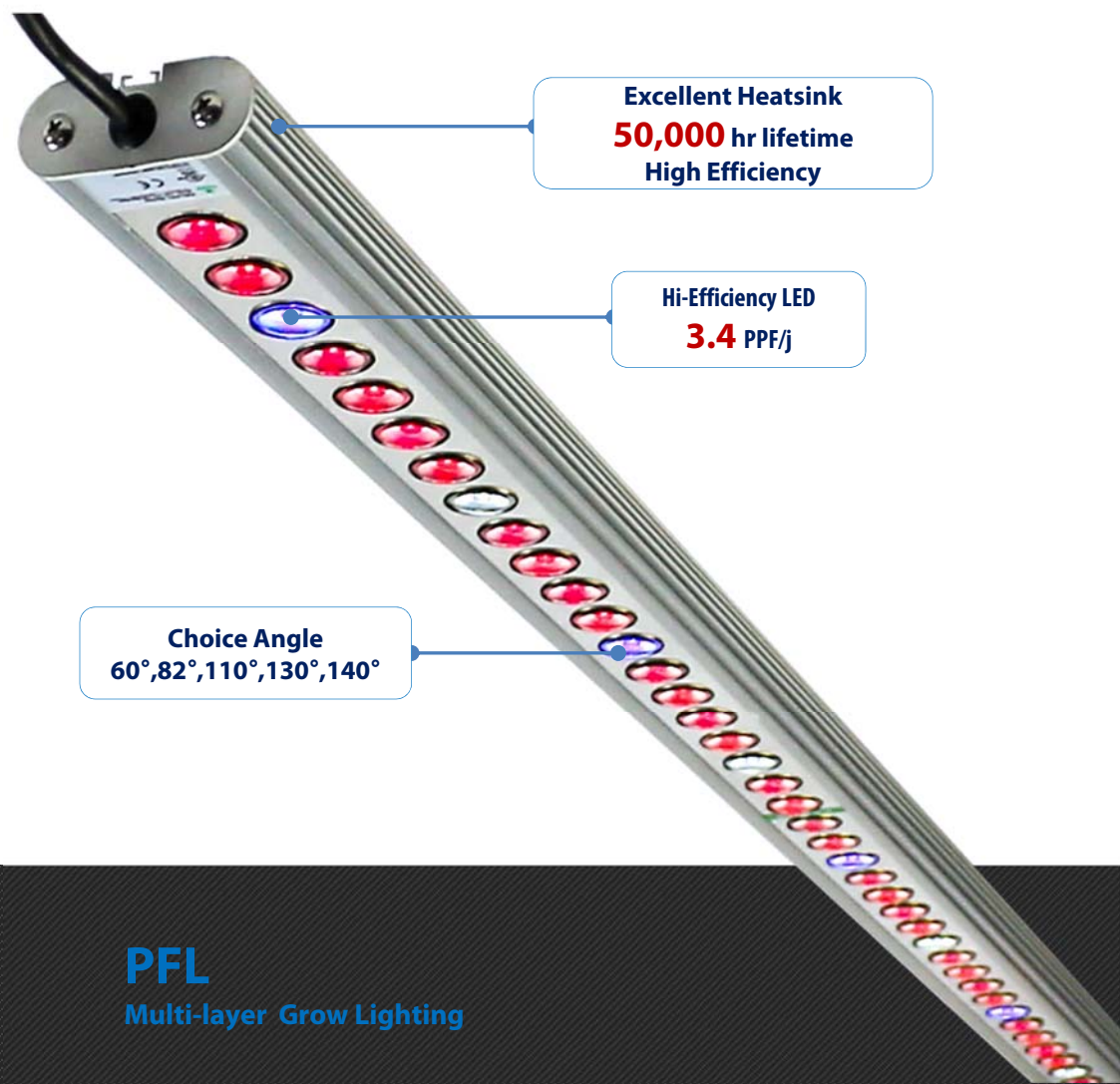
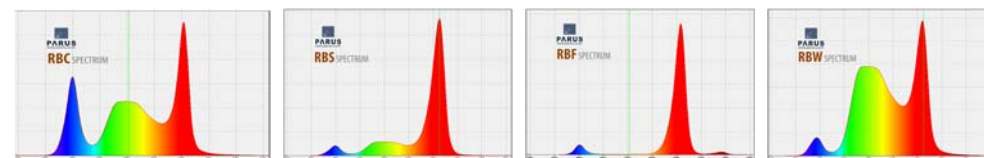
More than 20% of the crop growth
Uniform, produces high-quality plant.

Long Lifetime

50,000hr life time
5 years warranty

Applicable spectrum

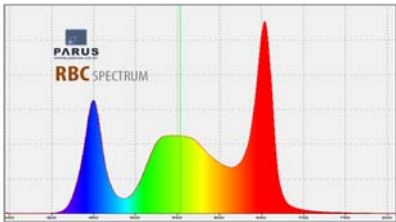
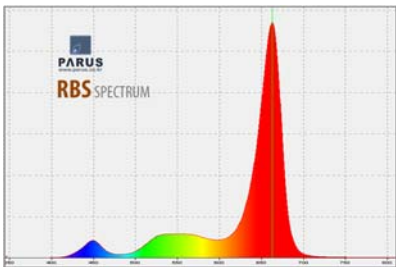
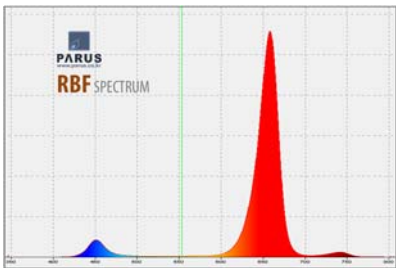
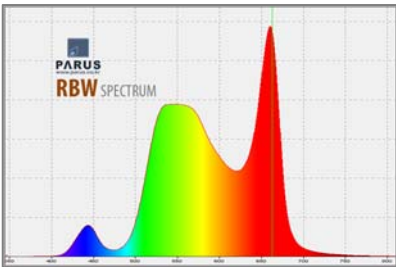
Other spectral orders can be made.



PFL

Guide Model

Efficiency
95%PPF/j
3.4Angle
60°~
140°UL cUL
CE EMC
EAC

Part	T	Wattage (Adjustable $\pm 10\%$ ~110%)	Model Spectrum(Size)	Model No	Voltage	LED's
PFL RBC Spectrum 	B	80 Watt	RBC (1200mm)	PFL-RBC-B-1200	48	3W x 36(R22:B7:W7)
		120 Watt	RBC (1800mm)	PFL-RBC-B-1800	48	3W x 54(R33:B10:W11)
		160 Watt	RBC (2400mm)	PFL-RBC-B-2400	48	3W x 72(R44:B14:W14)
PFL RBS Spectrum 	B	80 Watt	RBS (1200mm)	PFL-RBS-B-1200	48	3W x 32(R24:B4:W4)
		100 Watt	RBS (1500mm)	PFL-RBS-B-1500	48	3W x 40(R32:B4:W4)
		120 Watt	RBS (1800mm)	PFL-RBS-B-1800	48	3W x 48(R36:B6:W6)
		150 Watt	RBS (2000mm)	PFL-RBS-B-2000	48	3W x 60(R48:B6:W6)
		160 Watt	RBS (2400mm)	PFL-RBS-B-2400	48	3W x 64(R48:B8:W8)
PFL RBF Spectrum 	B	80 Watt	RBF (1200mm)	PFL-RBF-B-1200	48	3W x 32(R24:B4:F4)
		100 Watt	RBF (1500mm)	PFL-RBF-B-1500	48	3W x 40(R32:B4:F4)
		120 Watt	RBF (1800mm)	PFL-RBF-B-1800	48	3W x 48(R36:B6:F6)
		150 Watt	RBF (2000mm)	PFL-RBF-B-2000	48	3W x 60(R48:B6:F6)
		160 Watt	RBF (2400mm)	PFL-RBF-B-2400	48	3W x 64(R48:B8:F8)
PFL RBW Spectrum 	B	80 Watt	RBW (1200mm)	PFL-RBW-B-1200	54	3W x 32(R1:W2)
		100 Watt	RBW (1500mm)	PFL-RBW-B-1500	54	3W x 40(R1:W2)
		120 Watt	RBW (1800mm)	PFL-RBW-B-1800	54	3W x 48(R1:W2)
		150 Watt	RBW (2000mm)	PFL-RBW-B-2000	54	3W x 60(R1:W2)
		160 Watt	RBW (2400mm)	PFL-RBW-B-2400	54	3W x 64(R1:W2)

PFL

PFL

Technical specifications

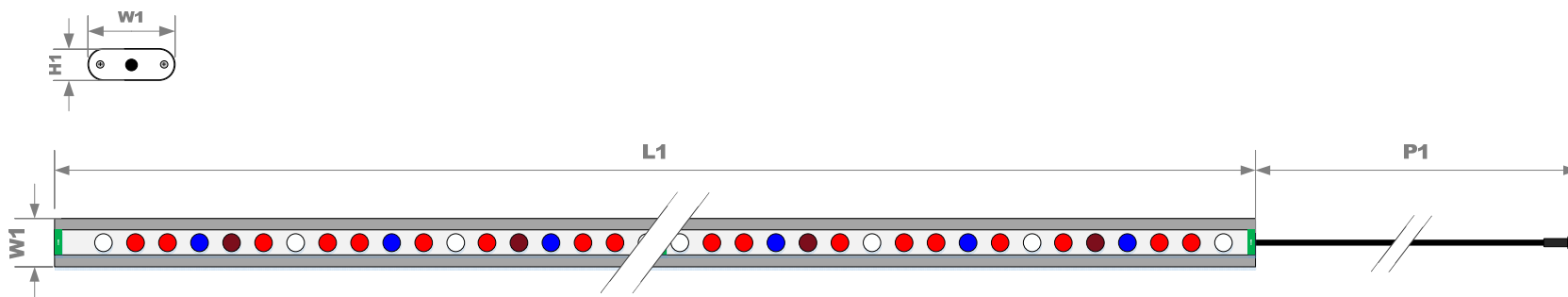
Product	Model Name		PGL-PFL 1200	PGL-PFL 1500	PGL-PFL 1800	PGL-PFL 2000	PGL-PFL 2400
	Power Consumption RBS Spectrum Standard		Max. 80 Watt	Max. 100 Watt	Max. 120 Watt	Max. 150 Watt	Max. 160 Watt
Power	AC input voltage range		Free voltage 90~305VAC, 47~63Hz				
	SMPS mode (PSU)		DC Current Design(C.V, C.C Mode)				
	Protection		Short circuit, Overload, Over voltage				
	Power Factor		Efficiency $\geq 95\%$, PFC ≥ 0.98				
	Total Harmonic Distortion		THD<20%(@load $\geq 50\%$ /115VAC,230VAC; @load $\geq 75\%$ /277VAC)				
	Inrush Current		Cold Start 70A(twidth=1010 μ s measured at 50% Ipeak) at 230VAC; Per NEMA 410				
LEDs	Spectrum Spectrum Ratio(R:B:O)		RBS, RBC, RBF, RBW (Please refer to "PARUS Spectrum")				
	Heat Sink Type		Cooling by free air convention				
Heat Sink	FRAME Material	Body:	Aluminium				
		PCB:	Metal PCB(aluminium)				
		Heat conduction	2.0 w/m.k				
		Thermal resistance	0.20 °C/w				
Heat Value	BTU/h		164	205	246	307	328
Efficiency	PPF (μ mol/s) RBS Spectrum Standard		272 μ mol/s	340 μ mol/s	408 μ mol/s	510 μ mol/s	544 μ mol/s
	PPF/j (μ mol/j)		3.4/RBS, 3.2/RBC, 3.3/RBF, 3.1/RBW				
	PPFD (μ mol m ⁻² s ⁻¹) RBS Spectrum Standard		463 μ mol m ⁻² s ⁻¹ (measure the distance 200mm) 278 μ mol m ⁻² s ⁻¹ (measure the distance 300mm) 174 μ mol m ⁻² s ⁻¹ (measure the distance 500mm) 61 μ mol m ⁻² s ⁻¹ (measure the distance 1,000mm) 37 μ mol m ⁻² s ⁻¹ (measure the distance 1,500mm)				
Control	Dimming Control		Single Dimming, Group Dimming, Wi-Fi Control (Please refer to "Color dimming controller")				
	Pulse / Duty rate		400 μ s / 0~100%				
IP Class	IP65		complete protection against contact, Water projected in powerful jets against the enclosure from any direction shall have no harmful effects. Option : IP67				
Ambient Temperature	Storage Temp.		-30°C ~ 85°C				
	Operation Temp.		~35°C				
Angle	Lamp angle		60°, 82°, 110°, 130°, 140°				
Life time			Over 50,000hr				
Safety	Standard		CE, EMC, UL,cUL				
Warranty	5 years		5 years				


 PARUS
www.parus.co.kr
Efficiency
95%PPF/j
3.4Control
Wi-FiAngle
60°~
140°UL cUL
CE EMC
EAC

PFL

PFL Dimensions

Model	Multi-layer Led Grow Light	Dimensions(mm/inch)				Weight
		L1	W1	H1	P1	(gr/lb)
PGL-PFL 1200		1200/47.24	60/2.36	22/0.86	2000/78.74	1664/3.66
PGL-PFL 1500		1500/59.05	60/2.36	22/0.86	2000/78.74	2080/4.58
PGL-PFL 1800		1800/70.86	60/2.36	22/0.86	2000/78.74	2496/5.50
PGL-PFL 2400		2400/94.48	60/2.36	22/0.86	2000/78.74	3328/7.33



PFL - Mounting Options



Clip Mount

STANDARD

Clip mount the default mount of the PFL.

Fixtures are supplied with spring clips for surface mount or depending on the angle installations.



x2



Suspend Mount

OPTION

Simple and quick installation. Using wire, you can adjust the PFL installation height. Remove the screws and install the panels



x2



Slide Mount

OPTION

Installation by adjustment depending on the size of the shelf.
Installation in accordance with the irradiation direction of the PFL.
Vertical installation, Depending on the angle installation



x2



Slide Suspend

OPTION

Easy and quick installation with slide
Using wire, you can adjust the PFL installation height. Remove the screws and install the panels



x2



Innovative Technology
Multi-layer - LED Grow Light

PFL-s

Since 2003, Professional LED grow light

High efficiency

Excellent heatsink for LED grow light design
Energy savings of up to 75% compared to fluorescent lamp
PPFD($\mu\text{mol m}^{-2}\text{s}^{-1}$) of up to 15% compared to other LED grow light lamp
Universal AC Standard 85~307VAC, Hi-Voltage 180 ~ 528VAC, 47~63Hz
Efficiency 95%, PFC >0.98

Safety

Safety Design CE, LVD, EMC, UL, cUL, EAC, IP65, IP67(option)

Easy Control & Installation

LED spectrum can be selected – RBS, RBF, RBW, BBR
Single dimming, Group dimming, Wi-Fi control
Easy control & Installation

More growth

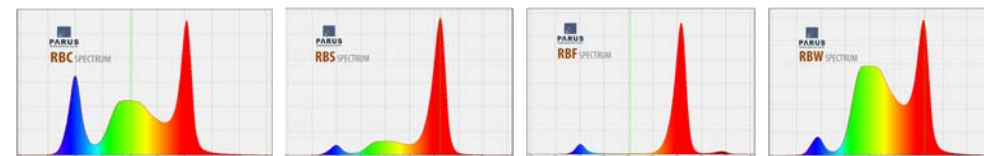
More than 20% of the crop growth
Uniform, produces high-quality plant.

Long Lifetime

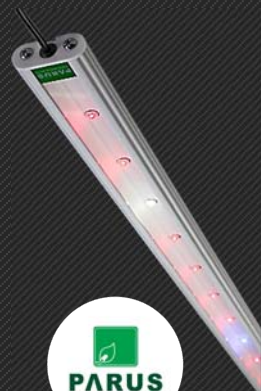
50,000hr life time
5 years warranty

Applicable spectrum

Other spectral orders can be made.



PFL-s
Multi-layer Grow Lighting



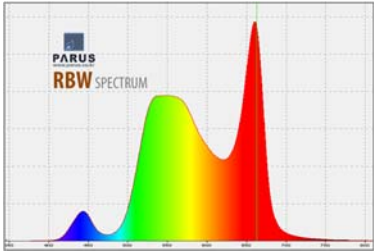
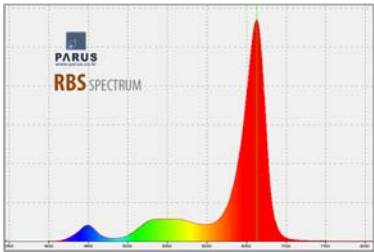
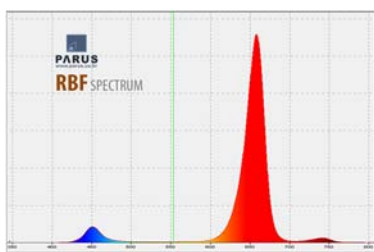
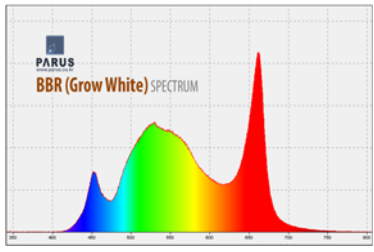
Efficiency
95%

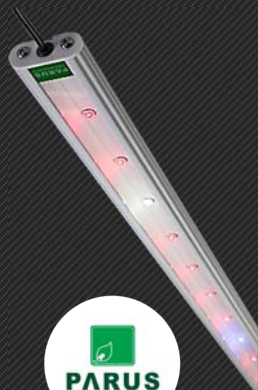
PPF/j
3.4

Control
Wi-Fi

Angle
**60°~
140°**

UL cUL
CE EMC
EAC

Part	T	Watt(MAX) (Adjustable ±30%)	Model	Model No	Voltage	LED's
PFL RBW Spectrum 	A	40 Watt	RBW (1200mm)	PFL-s-RBW-1200	48	3W x 16(R5:W11)
		50 Watt	RBW (1500mm)	PFL-s-RBW-1500	48	3W x 20 (R6:W14)
		60 Watt	RBW (1800mm)	PFL-s-RBW-1800	24	3W x 24(R6:W18)
PFL RBS Spectrum 	A	40 Watt	RBS (1200mm)	PFL-s-RBS-1200	48	3W x 16 (R12:B2:W2)
		50 Watt	RBS (1500mm)	PFL-s-RBS-1500	48	3W x 20 (R16:B2:W2)
		60 Watt	RBS (1800mm)	PFL-s-RBS-1800	24	3W x 24 (R18:B3:W3)
PFL RBF Spectrum 	A	40 Watt	RBF (1200mm)	PFL-s-RBF-1200	48	3W x 16 (R12:B2:F2)
		50 Watt	RBF (1500mm)	PFL-s-RBF-1500	48	3W x 20 (R16:B2:F2)
		60 Watt	RBF (1800mm)	PFL-s-RBF-1800	24	3W x 24 (R18:B3:F3)
PFL BBR Spectrum Grow White 	A	40 Watt	BBR (1200mm)	PFL-s-BBR-1200	50	5W x12(BBR white)
		50 Watt	BBR (1500mm)	PFL-s-BBR-1500	25	5W x15(BBR white)
		60 Watt	BBR (1800mm)	PFL-s-BBR-1800	25	5W x18(BBR white)



Efficiency
95%

PPF/j
3.4

Control
Wi-Fi

Angle
60°~
140°

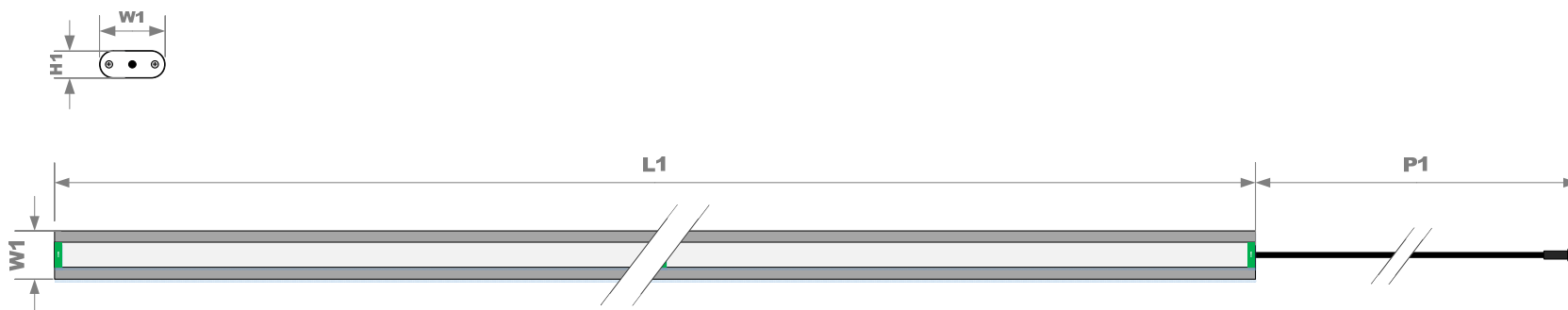
UL cUL
CE EMC
EAC

Technical specifications

Product	Model Name		PGL-PFL-s 1200	PGL-PFL-s 1500	PGL-PFL-s 1800
	Power Consumption		Max. 40 Watt	Max. 50 Watt	Max. 60 Watt
	Dimension(LxWxH)		1200mm x 45mm x 19mm	1500mm x 45mm x 19mm	1800mm x 45mm x 19mm
	Weight		1.61kg	2.01kg	2.4kg
Power	AC input voltage range		Free voltage 90~305VAC, 47~63Hz		
	SMPS mode (PSU)		DC Current Design(C.V, C.C Mode)		
	Protection		Short circuit, Overload, Over voltage		
	Power Factor		Efficiency ≥95%, PFC ≥0.98		
	Total Harmonic Distortion		THD<20%(@load≥50%/115VAC,230VAC; @load≥75%/277VAC)		
	Inrush Current		Cold Start 70A(twidth=1010μs measured at 50% Ipeak) at 230VAC; Per NEMA 410		
LEDs	Spectrum Spectrum Ratio(R:B:O)		RBS, RBF, RBW (Please refer to "PARUS Spectrum")		
	Heat Sink Type		Cooling by free air convection		
Heat Sink	FRAME Material	Body	Aluminium		
		PCB	Metal PCB(aluminium)		
		Heat conduction	2.0 w/m.k		
		Thermal resistance	0.20 °C/w		
Heat Value	BTU/h		82	102	123
Efficiency	PPF (μmol/s) RBS Spectrum Standard		136 μmol/s	170 μmol/s	204 μmol/s
	PPF/j (μmol/j)		3.4/RBS, 3.3/RBF, 3.1/RBW, 2.4/BBR		
	PPFD (μmol m ⁻² s ⁻¹) RBS Spectrum Standard		1180 μmol m ⁻² s ⁻¹ (measure the distance 100mm) 351 μmol m ⁻² s ⁻¹ (measure the distance 200mm) 192 μmol m ⁻² s ⁻¹ (measure the distance 300mm) 128 μmol m ⁻² s ⁻¹ (measure the distance 500mm)		
Control	Dimming Control		Single Dimming, Group Dimming, Wi-Fi Control (Please refer to "Color dimming controller")		
	Pulse / Duty rate		400μs / 0~100%		
IP Class	IP65		complete protection against contact, Water projected in powerful jets against the enclosure from any direction shall have no harmful effects. Option : IP67		
Ambient Temperature	Storage Temp.		-30°C ~ 85°C		
	Operation Temp.		~35°C		
Angle	Lamp angle		60°, 82°, 110°, 130°, 140°		
Life time			Over 50,000hr		
Safety	Standard		CE, EMC, UL,cUL		
Warranty	5 years		5 years		

PFL-s Dimensions

Model	Multi-layer Led Grow Light	Dimensions(mm/inch)				Weight
		L1	W1	H1	P1	(gr/lb)
PGL-PFL-s 1200		1200/47.24	45/1.77	19/0.74	2000/78.74	930/2.05
PGL-PFL-s 1500		1500/59.05	45/1.77	19/0.74	2000/78.74	1163/2.56
PGL-PFL-s 1800		1800/70.86	45/1.77	19/0.74	2000/78.74	1395/3.07



PFL-s Mounting Options



Clip Mount

STANDARD

Clip mount the default mount of the PFL-s.
Fixtures are supplied with spring clips for surface mount or depending on the angle installations.



x 2



Suspend Mount

OPTION

Simple and quick installation.
Using wire, you can adjust the PFL-s installation height.
Remove the screws and install the panels



x 2



Slide Mount

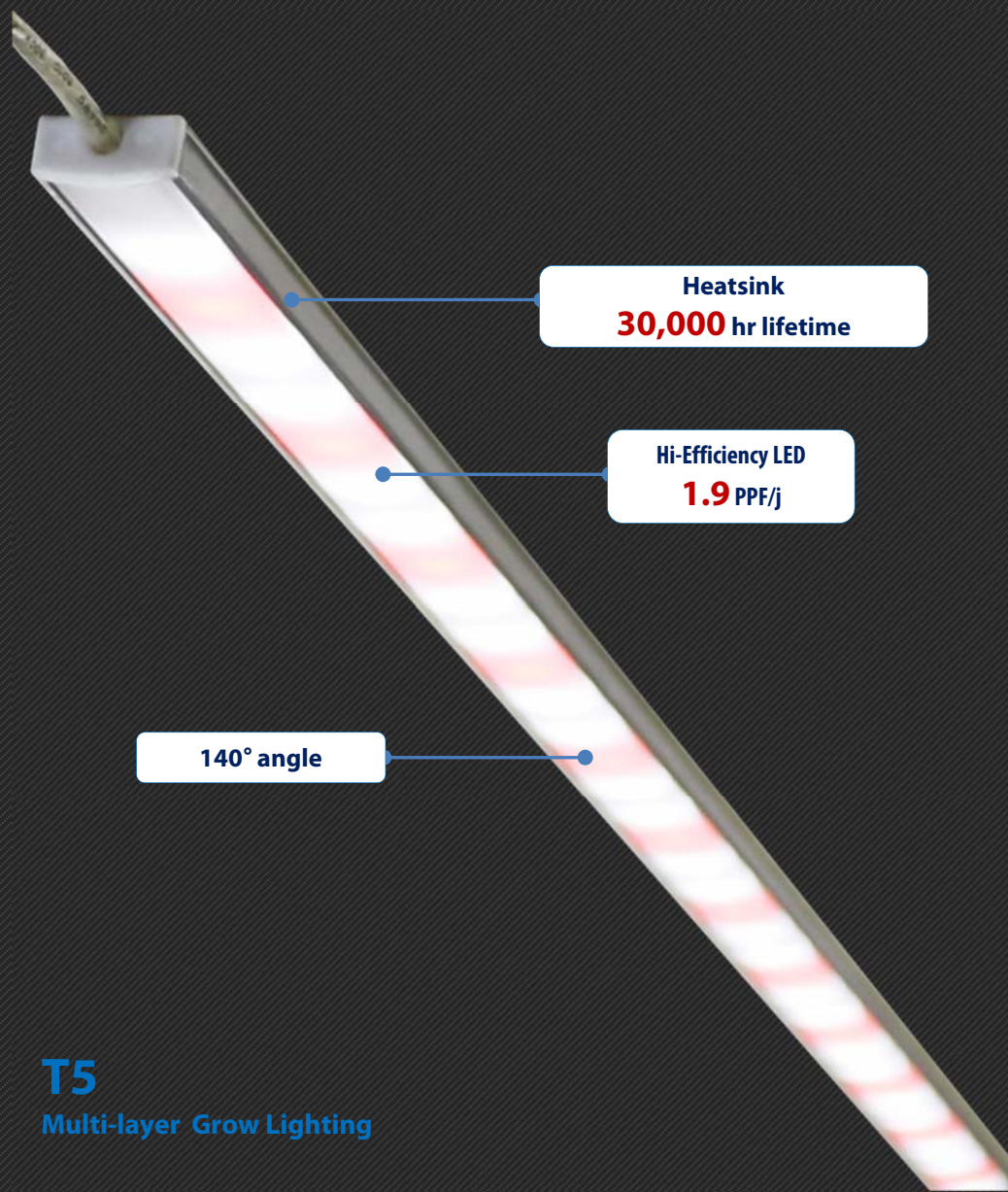
OPTION

Installation by adjustment depending on the size of the shelf.
Installation in accordance with the irradiation direction of the PFL-s.
Vertical installation, Depending on the angle installation



x 2

PFL-s



High efficiency

Heatsink for LED grow light design
Energy savings of up to 75% compared to fluorescent lamp
One to one replacement to T5 fluorescent lamp
AC Standard 85~245VAC, 50/60Hz
Efficiency 85%, PFC >0.85

Safety

Safety Design CE, LVD, EMC

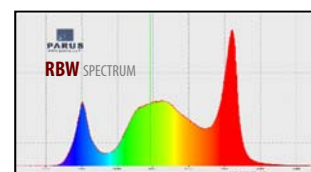
More growth

More than 10% of the crop growth
Uniform, produces high-quality plant.

Long Lifetime

30,000hr life time
3 years warranty

Applicable spectrum



Product	Model Name		PGL-FL T5	
	Power Consumption		7.5Watt(600mm)	15Watt(1200mm)
	Dimension(LxWxH)		600mm x 17mm x 8mm	1200mm x 17mm x 8mm
	Weight		0.114kg	0.191kg
Power	AC input voltage range		Free voltage 90~245VAC, 50~60Hz	
	SMPS mode (PSU)		DC Current Design(C.C Mode)	
	Protection		Short circuit, Overload, Over voltage	
	Power Factor		Over 85%	
LEDs	Spectrum Ratio(R:B:O)		RBW (1:0:2)	
	Heat Sink Type		Cooling by free air convection	
Heat Sink	FRAME Material	Body	Aluminium	
		PCB	Standard PCB	
		Heat conduction	1.2 w/m.k	
		Thermal resistance	0.12 °C/w	
Heat Value	BTU/h		18 (600mm), 36 (1200mm)	
IP Class	IP65		complete protection against contact, Water projected in powerful jets against the enclosure from any direction shall have no harmful effects.	
Efficiency	PPFD ($\mu\text{mol m}^{-2}\text{s}^{-1}$)		85 $\mu\text{mol m}^{-2}\text{s}^{-1}$ (Measure the distance 100mm)	
	PPF ($\mu\text{mol/s}$)		15.7 $\mu\text{mol/s}$ @600mm, 31.4 $\mu\text{mol/s}$ @1200mm, 2.1 PPF/j	
Ambient Temperature	Storage Temp.		-30°C ~ 85°C	
	Operation Temp.		~35°C	
Angle	Lamp angle		140°	
Life time			Over 30,000hr	
Safety	CE Standard		CE, EMC	
Warranty			3 years	



Efficiency
85%

PPF/j
2.1

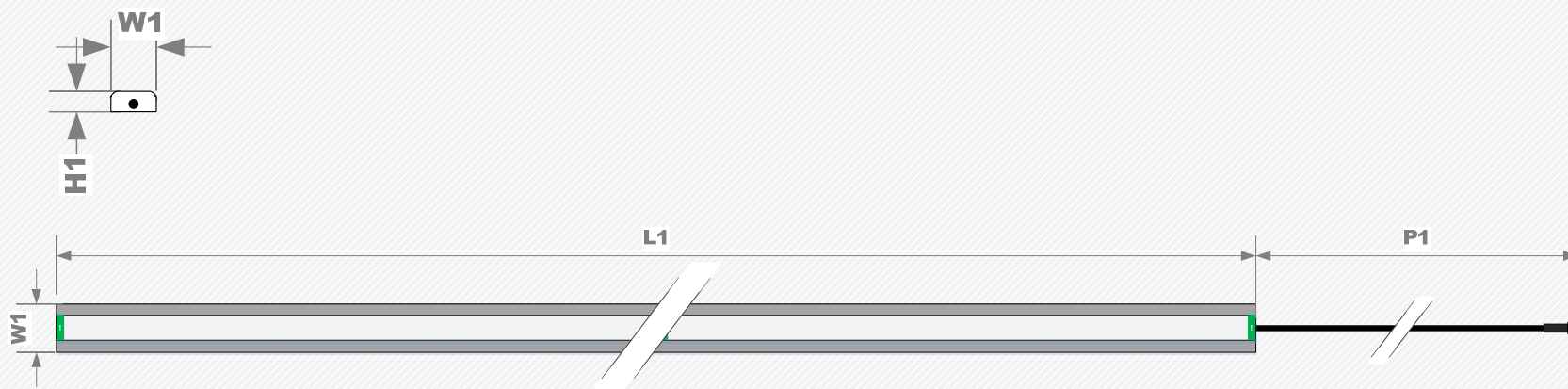
Control
Wi-Fi

Angle
140°

CE
standard

T5 Dimensions

Model	Multi-layer Led Grow Light	Dimensions(mm/inch)				Weight
		L1	W1	H1	P1	(gr/lb)
	PGL-T5 600	600/23.62	17/0.66	8.1/0.31	2000/78.74	89/0.19
	PGL-T5 1200	1200/47.24	17/0.66	8.1/0.31	2000/78.74	174/0.38



T5 Mounting



STANDARD

Clip mount the default mount of the T5.

Fixtures are supplied with clips for surface mount or depending on the angle installations.