



Horticulture
LED Solutions

GrowWise Control System



Custom light recipes for full flexibility and control

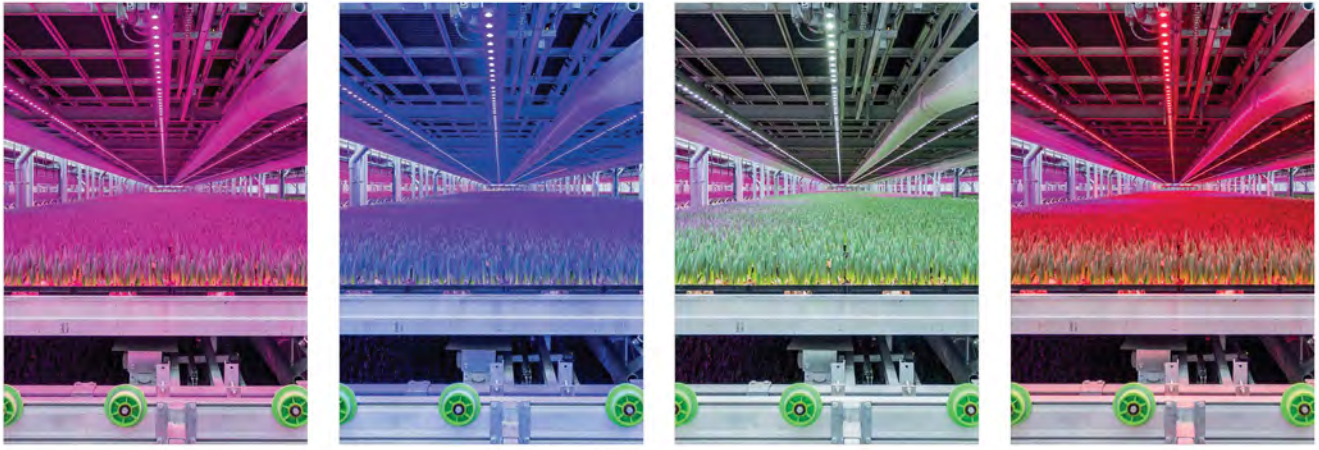
Get full flexibility and control over your lighting to improve your crop quality, productivity and operational efficiency with Philips GrowWise Control System. It allows you to easily create and run custom light recipes on dimmable and color controllable modules. Via the Modbus TCP/IP interface, the GrowWise Control System can be integrated to your climate control or greenhouse management system to simplify operation. It is designed for vertical farms, greenhouses and research facilities to optimize your yield.

The right light, at the right time, in the right place

Different plants have different lighting needs. The Philips GrowWise Control System enables you to create your own light recipes; when do you start lighting your crop, for how long and how many micromoles per square meter, to fit your specific needs. Color Controllable Modules also allow for mixing a variety of colors (red, blue, green, and far red) to steer specific plant characteristics, such as compactness, color intensity, branch development and flowering. This can deliver better crop yield and quality and more predictable results.

Key benefits

- Fully schedule your crop growth cycle from seed to harvest
- Different lighting per growth phase
- Steer on quality; e.g., shelf life, bio mass, vitamin level or plant color
- Easily adapt light for new crops without installing new lights
- Predictable production year-round



The right light, at the right time, in the right place

Services & Support



Getting it right from the start

It all starts with a detailed intake assessment to define the correct system set-up for your project. Our specialists look at the functionality and flexibility needed for your specific layout and technical infrastructure. Based on this input, they propose the optimal configuration for your individual light plan to help you achieve your goals. Once installed, we train you on how to use all aspects of the system.



System that evolves with you

The GrowWise Control System is scalable and modular, so it can be expanded over time as your facility grows.



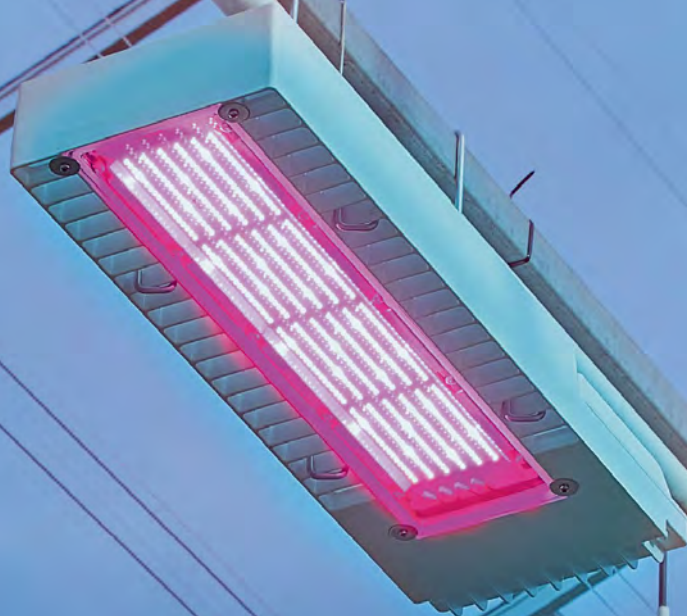
Remote support

No need to wait for an engineer to come to your site for maintenance. You can quickly contact a service expert for service or assistance.

PHILIPS

Horticulture
LED Solutions

GreenPower LED
toplighting compact



The easy switch to LED toplighting

As a grower, you are probably familiar with the benefits of using LED lighting in greenhouses. It will bring you higher yield, better quality crop and improved predictability. The Philips GreenPower LED toplighting compact allows you to easily switch to LED lighting, replacing your existing HPS set-up, or when you are building a new installation.

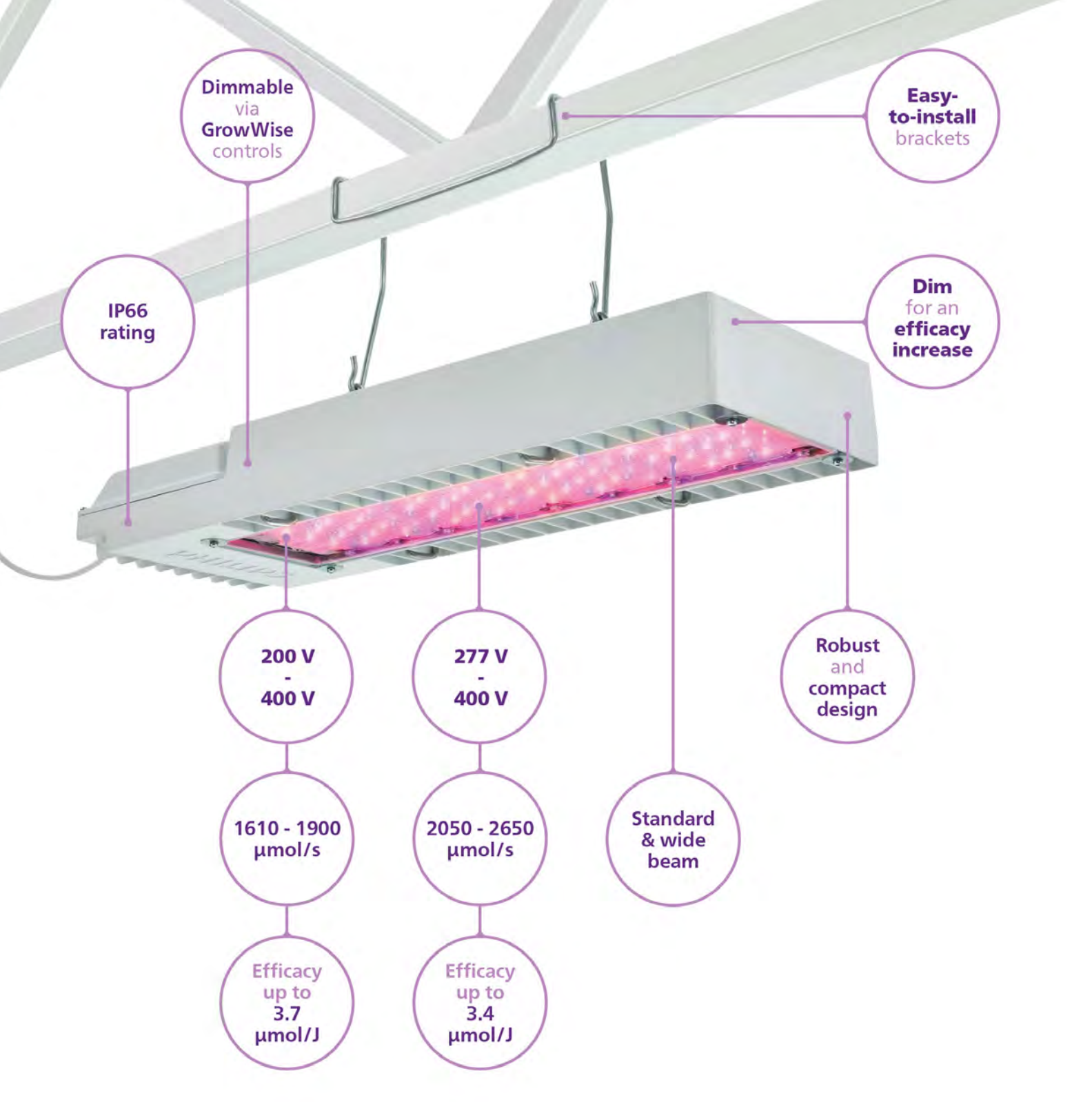
The high light output of up to 2650 $\mu\text{mol/s}$ or high efficacy of up to 3.7 $\mu\text{mol/J}$ helps you effectively optimize crop growth, enhance crop quality and cut operational costs. With a wide beam or standard beam you can cater for any greenhouse height and the dimming possibility allows you to dim the grow lights to 10% of its maximum output to increase flexibility.

The capabilities of the Philips GreenPower LED toplighting compact bring benefits to growers in many different segments:

- Vegetables and fruits like tomatoes, cucumbers, lettuce and strawberries
- Cut flowers and potted plants like roses, chrysanthemums and orchids
- Medicinal cannabis

Key benefits

- Go-to product for an easy HPS 1-to-1 LED replacement with a plug and play installation to save time and money
- Light output up to 2650 $\mu\text{mol/s}$
- Efficacy up to 3.7 $\mu\text{mol/J}$ to save overall energy costs
- Dimmable; reach 4.0 $\mu\text{mol/J}$ efficiency when dimming to 50%
- Two beam shapes for desired uniformity or optimal efficacy
- The range comes in 200-400V (520W) and 277-400V (645-780W) light recipes



Use Philips GreenPower LED toplighting compact for:

- Tomatoes
- Cucumbers
- Lettuce
- Leafy greens
- Strawberries
- Medicinal cannabis

Product specifications

Product GreenPower LED toplighting compact 200-400V

Beam	Spectral version		Deep Red/Blue types (DRB)					Deep Red/White types (DRW)			Deep Red/White/Far Red types (DRWFR) ¹		
	Spectral code		LB			LB		2_LB	MB	VSN2	FR_1	FR_RSE	FR_5
Standard beam	Typical photon flux	μmol/s	1900			1800		1850	1750	1610	1650	1650	1850
	Power consumption (max)	W	520			520		520	520	600	520	520	520
	Efficacy	μmol/J	3.7			3.5		3.6	3.4	2.7	3.2	3.2	3.6
	Efficacy at 50% (dimmed)	μmol/J	4.0			3.8		3.8	3.7	3.0	3.5	3.5	3.7
Wide beam	Typical photon flux	μmol/s	1800			1700		1700	1650		1600		
	Power consumption (max)	W	520			520		520	520		520		
	Efficacy	μmol/J	3.5			3.3		3.3	3.2		3.1		
	Efficacy at 50% (dimmed)	μmol/J	3.8			3.6		3.5	3.5		3.4		

Philips GreenPower LED toplighting compact 277-400V

Beam	Spectral version		Deep Red/Blue types (DRB)									Deep Red/White types (DRW)					Deep Red/White/Far Red types (DRWFR) ¹				
	Spectral code		LB			LB			2_LB	MB					FR_1	FR_3	FR_RSE	FR_5			
Standard beam	Typical photon flux	μmol/s	2650	2400	2200	2600	2350	2150	2500	2550	2350	2100	2250	2050	2100	2250	2500				
	Power consumption (max)	W	780	700	645	770	720	645	750	780	730	645	710	660	700	710	755				
	Efficacy	μmol/J	3.4	3.4	3.4	3.4	3.3	3.3	3.3	3.3	3.2	3.3	3.2	3.1	3.0	3.2	3.3				
	Efficacy at 50% (dimmed)	μmol/J	3.7	3.7	3.7	3.7	3.6	3.6	3.7	3.6	3.5	3.6	3.5	3.4	3.3	3.5	3.7				
Wide beam	Typical photon flux	μmol/s	2250			2100			2100	2075			1900								
	Power consumption (max)	W	710			680			680	675			635								
	Efficacy	μmol/J	3.2			3.1			3.1	3.1			3.0								
	Efficacy at 50% (dimmed)	μmol/J	3.5			3.4			3.5	3.4			3.3								

Light distribution		Standard Beam: beam angle 120° Wide Beam: beam angle 150°
Dimmable ²		10% - 100%
Input voltage (50-60 Hz)	VAC	200 - 400 V 277 - 400 V
Dimensions	cm	Length: 72 Width: 24 Height: 9
Weight	kg	10.5 (incl. module brackets)

Power factor		0.98
Total Harmonic Distortion	%	< 15
Rated Average Lifetime ³	uur	36.000 - L95
Ingress protection rating		IP66
Cooling		Passively cooled
Approval marks		CE, ENEC, RoHS, UL/CSA, EAC, RCM, PSE
Connector		Wieland RST20i3 Green

Notes

¹ The published value represents the total photon flux from 400-800nm

² All products are dimmable to 10% of the photon flux/power consumption when combined with a GrowWise control system.

³ Lifetime and maintenance values are given at ambient temperature of 25°C / 77°F.

All measured lifetimes are industry standard measurements indicating average length of operation and not a performance claim specific to any individual product.

Legend

DR = Deep Red

B = Blue

W = White

FR = Far Red

LB = Low Blue

2_LB = white 2_Low Blue

MB = Medium Blue

VSN2 = Vision - broad spectrum

FR_1 ...5 = Far Red 1...5

FR_RSE = Rose Module



...and:

- Chrysanthemums
- Cut roses
- Potted roses
- Lysianthus
- Orchids

*The price upon request

More light, less heat, better control

New greenhouse or renovation

Due to our broad assortment and dimming opportunities, you will be able to install any light level in a new greenhouse connecting 2, 3, or 4 Philips GreenPower LED toplighting compact on a trellis or use C-profiles instead. You can opt for a 645 to 780W grow light with an optimized performance, balancing light output and efficacy. Or you can choose one of our 520W solutions, utilizing half the power consumption of an HPS system.

Philips GreenPower LED toplighting compact has been designed for easy installation. Specific snap brackets are available for safe operation distance from your screens. Philips GreenPower LED toplighting compact has no inrush current when switched on, this simplifies installation of the electrical cabinet. The high powerfactor of 0.98 reduces the load on cabling and transformers.

1-to-1 HPS replacement

Philips GreenPower LED toplighting compact fits seamlessly in existing HPS infrastructure and trellis constructions; even between sprinklers. There are two smart options: either you choose to replace your existing HPS installation with a similar light output and consume 50% less power, or you choose to utilize the maximum CHP power available and increase your light output to 150% compared to current light level. In all cases you can make the easy switch to full LED toplighting or create a hybrid LED and HPS lighting system on your current set-up.

Philips GreenPower LED toplighting compact comes in a standard and wide beam. It provides optimal efficacy and excellent light distribution and uniformity in most greenhouse configurations including high wire-crops. The passively cooled grow light produces much less radiant heat, putting you in control over your greenhouse climate. The compact, white housing intercepts little sunlight and comes with an IP66 ingress protection rating.

GrowWise Control System enables dimming

Philips GreenPower LED toplighting compact can be dimmed to 10% of its maximal photosynthetic photonflux in combination with the GrowWise Control System to improve the efficacy. This allows growers to dim the lighting for reasons of additional energy saving during peak hours or to mimic the dusk to dawn interval and enhance results for specific crops.

Dimming will work reliable without the need of specific control cables. The GrowWise Control System can be used standalone or can be connected and controlled via your climate computer.



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Horticulture LED

GreenPower
LED toplighting linear



Full flexibility for optimal uniformity

Whether you want to increase yields, move to predictable year-round production, improve quality or shorten growth cycles, you can achieve it with the Philips GreenPower LED toplighting linear.

GreenPower LED toplighting linear is the product optimized for photonflux density values [PPFD] of $<75 \mu\text{mol}/\text{m}^2$. It is also the optimal grow-light solution for lower greenhouse constructions, still reaching your desired light uniformity. It offers full flexibility in mounting the lights by using a separate c-profile. The result is optimal vertical light distribution and horizontal uniformity in cases where crop heights are limited or lower light levels are required. The linear range's efficacy boosts up to $3.3 \mu\text{mol}/\text{J}$ and has an option to dim the lights to let you set and adjust the light levels when you need to.

Successful projects were installed in:

- High wire vegetables: tomatoes, cucumbers and peppers
- Leafy greens and herbs: lettuce and basil
- Soft fruits: strawberries
- Floriculture: cut flowers, potted plants, bedding plants, annuals and perennials
- Propagation for floriculture and vegetables

Key benefits

- Can be installed in any greenhouse situation, including in cases of lower light levels or limited height
- Maximal horizontal light uniformity and vertical light distribution to ensure uniform growth
- Efficacy up to $3.3 \mu\text{mol}/\text{J}$
- Dimmability lets you set the proper light level at any given time and increase efficacy.
- Uses 50% less energy than HPS lights

Power up when flexibility is key

Uniform crops and convenient installation

The advanced LED technology in our GreenPower LED toplighting linear delivers maximal horizontal light uniformity and vertical light distribution. This ensures uniform growth for every plant in your greenhouse to help you realize a higher return on each crop. The grow light can be easily mounted on a C profile which allows you to position the lighting exactly where you need it. Simply click the modules into each other with or without spaces between them, to get the right set-up for your crops.

GrowWise Control System enables dimming

GreenPower LED toplighting linear can be dimmed to 10% of its maximal photosynthetic photonflux in combination with the GrowWise Control System to improve the efficacy. This allows growers to dim the lighting for reasons of additional energy saving during peak hours or to mimic the dusk to dawn interval and enhance results for specific crop.

Dimming will work reliable without the need of specific control cables. The GrowWise Control System can be used standalone or can be connected and controlled via your climate computer.

Efficient output

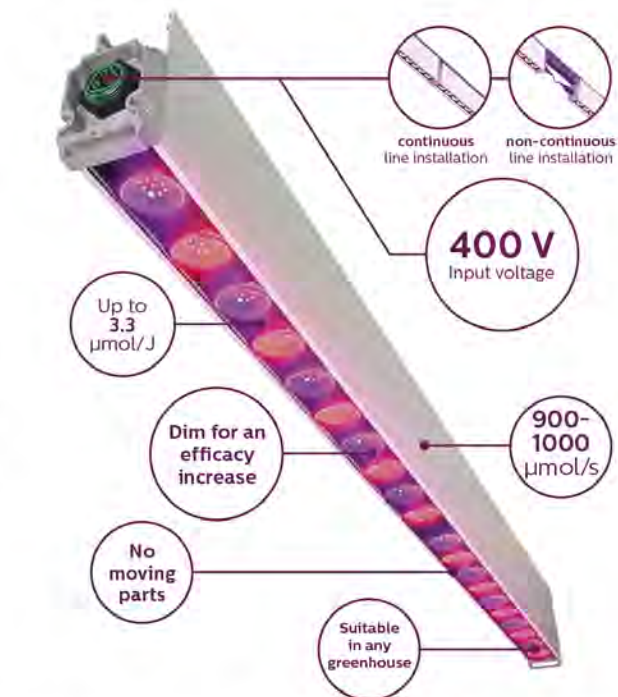
Our GreenPower LED toplighting linear offers adjustable light output levels between 100 and 1000 $\mu\text{mol/s}$ when connected to

Product specifications

Spectral version		Deep Red/Blue types (DR/B)		Deep Red/White types (DR/W)		Deep Red/White/Far Red types (DR/W/FR) ¹	
Spectral code		LB	LB	MB	HB	LB	RSE
Typical photon flux	$\mu\text{mol/s}$	1000	1000	1000	1000	900	900
Power consumption (max.)	W	305	315	325	325	285	285
Efficacy	$\mu\text{mol/J}$	3.3	3.2	3.1	3.1	3.2	3.2
Efficacy at 50% (dimmed)	$\mu\text{mol/J}$	3.8	3.6	3.5	3.5	3.6	3.6

Light distribution		Standard Beam -> beam angle 120°
Dimmable		10%-100% - Coded Mains Dim (i.c.w. GWCS)
Input voltage ²	VAC	400V

Dimensions ³	cm	Length: 127 Width: 5 Height: 11
Weight	kg	3.65
Power factor		0.95
Rated Average Lifetime ⁴	hrs	L90 : 36.000
Ingress protection rating		IP66
Cooling		Passively air-cooled
Approval marks		CE, RoHS, ENEC, RCM, EAC
Connector		Wieland RST2013 Green
Accessories		Full range of brackets available for easy and quick installation



a GrowWise control system (90-900 $\mu\text{mol/s}$ for specific FR light spectra). The 3.3 $\mu\text{mol/J}$ efficacy makes this proposition a highly efficient replacement and energy-efficient supplement for traditional lighting systems.

Reliable, low-maintenance design

The GreenPower LED toplighting linear uses passive cooling without moving parts, so it performs robustly and reliably and is easy to install. The module is designed to dissipate heat efficiently, which greatly extends its lifetime.

Legend

LB = Low Blue
HB = High Blue
MB = Medium blue
RSE = Rose spectrum

Notes:

- ¹ The published value represents the total photon flux from 400-800nm.
- ² 50-60Hz.
- ³ Including mounting profile integration of 40x40mm profile.
- ⁴ Lifetime and maintenance values are given at ambient temperature of 25°C / 77°F. All measured lifetimes are industry standard measurements indicating average length of operation and not a performance claim specific to any individual product.



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Full control and flexibility to optimize multilayer crop cultivation

Whether you use a multilayer system to grow the crispiest lettuce, the tastiest basil, or other vegetables or fruits, the GreenPower LED production module 3.1 enables you to optimize your lighting for every single crop to reach your business goals. Gain an edge in your market by tuning our dedicated light recipes to accommodate different growth stages, pre-harvest treatments, new crops. Thanks to the wide beam optics and high light output, this robust all-round module will prove to be a very economic investment.

Our GreenPower LED production module 3.1 has been developed for growers who are looking for more flexible and cost-efficient ways to use LED grow lights to improve crop results and operational efficiency in closed, climate-controlled cultivation facilities. This module is ideal for multilayer systems to grow:

- Lettuce and other leafy greens
- Herbs
- Strawberries and other soft fruits
- Young plants

The best light for every crop

With our solution you can easily adapt the color spectra and light levels of various dedicated light recipes to meet the needs of different crops and growth phases. By optimizing these parameters, you can improve the quality, consistency and yield of your fresh produce. You can also steer specific plant characteristics, such as compactness, color intensity and taste to fit local customer and market requirements. This can be easily managed via the Philips GrowWise Control System on your PC, tablet or smartphone.

Key benefits

- Adjust color and light level to optimize the growth cycle
- Less modules needed due to wide beam optics
- Provides high light output to maximize crop growth

Make the most of your lighting

Full flexibility

The production module 3.1 is available in different versions and lengths to fit your preferences. The standard on-off modules come with our proven light recipes. Once connected to the GrowWise Control System (GWCS) these modules become controllable allowing adjustments of color and light levels. This gives you full flexibility to create and control of your own time-based recipes.

More choice of flexible and cost effective solutions

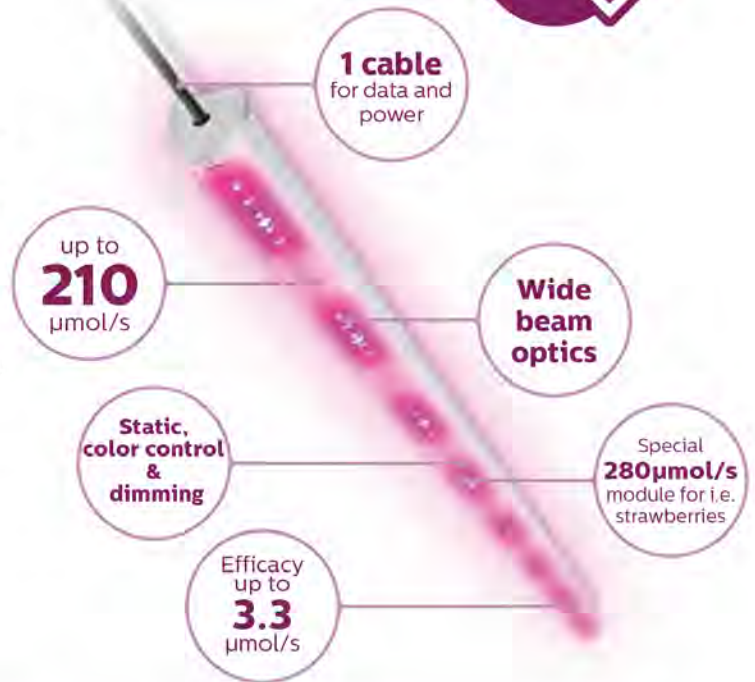
The new C4 production modules offer you the choice between cost effective C4 modules and Research versions offering more flexibility at a high efficacy. Operational costs are now lower thanks to the increased efficiency and continued robust design, high light output and long lifetime. You can count on consistent production with the very high light uniformity - day after day.

Easy installation

The modules are compatible with standard Wieland connectors, which can be easily connected and disconnected and comply with IP66 and UL ratings for wet conditions. We offer 3 standard mounting brackets for easy installation in any multilayer set-up.

Expert support

Your Philips LED lighting solution is backed by expert know-how and support to help you achieve the best results and maximum profit for your specific situation. You benefit from our unique light recipes for a variety of crops, which are the result of years of research by our plant specialists collaborations with leading horticultural research facilities.



Product specifications EU/APR/JP

Spectrum	DRB				DR/B/FR			DR/W			DR/W/FR			DR/B/W/FR			DR/B/W/FR_R			DR/B/W/FR
Length (cm)	120		150		120	150	240	120	150	240	120	150	240	120	150	240	120	150	150	
Blue level	LB	HB	LB	HB	LB	LB	LB	LB	LB	LB	LB	LB	LB	-	-	-	-	-	-	
Type	Static & Colour Control													C4	C4	C4	C4-R	C4-R	SB	
Typical photon flux	µmol/s	168	168	210	210	168	210	210	168	210	210	168	210	210	168	210	210	168	210	280
Power nominal static vs colour control	W	51/70	56/70	64/88	70/88	51/70	64/88	66/88	58/70	73/88	76/88	58/70	73/88	75/88	0-70	0-88	0-88	0-70	0-88	88/88
Efficacy nominal static	µmol/J	3.3	3.0	3.3	3.0	3.3	3.3	3.2	2.9	2.9	2.8	2.9	2.9	2.8	< 3.2	< 3.2	< 3.2	< 3.3	< 3.3	3.2

		120	150	240
Length	cm	120	150	240
Weight (driver included)	kg	1.25	1.45	2.05
Typical photon flux	µmol/s	168	210	210
Power (nominal max.)	W	51-58 70	64-73 88	66-76 88
Efficacy	µmol/J	Up to 3.3		
Beam width		140°		
Power input ¹	V AC	120-277		
Power factor		> 0.9 at full load		
Rated average lifetime ²	hrs	L90, 36,000 hrs		
Ingress protection rating		IP66		
Cooling		Passively air-cooled		
Approval marks		CE, RCM, PSE		
Warranty		3 years		
Accessories		Comprehensive range of accessories available for easy and quick installation		

Legend

DR = Deep Red
 B = Blue
 FR = Far Red
 W = White
 LB = Low Blue
 HB = High Blue
 R = Research

¹ 50-60 Hz.

² Lifetime and maintenance values are given at an ambient temperature of 25 °C | 77 °F. All measured lifetimes are industry standard measurements indicating average length of operation and not a performance claim specific to any individual product.



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Horticulture LED

GreenPower LED
flowering lamp 2.1



The proven way to **boost growth and cut costs**

Based on input from growers around the world, our Philips GreenPower LED flowering lamp allows you to grow better crops and save energy. Our proven technology is highly robust and cuts your energy usage by up to 90% versus conventional lamps. Two versions are available with dedicated light recipes to boost your crop results by preventing budding, promoting elongation or expediting flowering.

The GreenPower LED flowering lamp is the effective, energy-efficient solution for photoperiodic lighting in greenhouses that cultivate:

- Cut flowers
- Annuals/perennials
- Mother stock
- Strawberries

Key benefits

- Energy savings of up to 90% compared to conventional lamps
- Dedicated recipes to optimize photoperiodic lighting
- Large surface area coverage due to high light output and optimal distribution
- Safe and robust design, using no glass materials

The right light for your crop

The Philips GreenPower LED flowering lamp is available in two different spectral versions: one offers a combination of deep red and white (DR/W) and the other offers a combination of deep red, white and far red (DR/W/FR). Short-day and long-day plants, as their names indicate, flower most rapidly under short or long days, respectively. During naturally short days, nighttime lighting can delay flowering of short-day plants to stimulate vegetative growth, or promote flowering of long-day plants. The DR/W version inhibits flowering of short-day plants prevents budding of mother stock of chrysanthemums, dahlias, poinsettias and others. The DR/W/FR version is ideal for photoperiodic lighting of summer flowers, like gypsophila, aster, hypericum, solidago, as well as potted plants, annuals and perennials. It can extend the day or interrupt the night cycle to promote elongation of the stems of strawberries and stimulate flowering.



Product specifications

Spectral version		DR/W	DR/W/FR
Photon flux	μmol/s	25	20
Power	W	10	9,3
Efficacy	μmol/J	2,5	2,2
Dimensions	mm/in	H: 164 / 6,46	W: 127 / 5,00
Cap-base		E26 / E27	
Bulb		Plastic, white frosted	
Lamp weight	kg / lb	0,170 kg / 0,375	
Ingress protection	IP / UL	IP44 / Dry and damp locations	
Rated average lifetime ¹	hrs	L90: 25,000	
Switching cycle		35,000 times	
Power factor	VAC	> 0,9	
Input voltage ²	VAC	120-240 VAC (50-60 Hz)	
Approbations		UL/CSA, IEC (CE)	
Beam angle		110°	
THD		< 29%	



Promote flowering

Philips dedicated light spectra for the GreenPower LED flowering lamp are optimized for photoperiodic lighting. They promote flowering of long-day plants, which results in higher and healthier yields.

Prevent budding

Our flowering lamp helps you effectively prevent flowering for mother stock. With the right recipe you can stimulate vegetative growth and combat flowering in the cuttings.

Promote elongation of strawberry stems

You can use the flowering lamp to improve stem elongation and thereby achieve earlier and higher yields of strawberry crops.

Economic and robust installation

This is a safe and robust solution for photoperiodic lighting. The lamp can withstand up to 35,000 switching cycles (as designed for a usability profile to achieve 8 switches per day for 12 years). It is highly efficient with a power factor of > 0.9, which is crucial when working with generators. The lamp is also well protected against voltage fluctuations (120-240 VAC +/- 10%) due to its unique electrical design. Thanks to its robust design and excellent optical performance, the GreenPower LED flowering lamp will allow you to make the most economical and reliable lighting installation for your cultivation facility in any location – even outdoors – when you choose the appropriate luminaire.

¹ Lifetime and maintenance values are given at an ambient temperature of 25 °C / 77 °F. All measured lifetimes are industry standard measurements indicating average length of operation and not a performance claim specific to any individual product.



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