

PHILIPS

Horticulture LED Solutions

Philips GreenPower LED
toplighting force 2.0



Unlock lighting intelligence to steer your crop and energy consumption

Dynamic crop steering for improved business results

The GreenPower LED toplighting force 2.0 (TLF 2.0) is designed to optimize your business results. The advanced LED light offers a very high light output, precision steering in combination with the Philips GrowWise control system and has an excellent light efficacy. Whether you want to steer your crop based on its optimal light requirements, or you want to manage your energy consumption; the TLF 2.0 offers the best options today, and opens new opportunities for the future. Seamlessly integrated with your existing climate computer, the tailored light recipes safeguard steering based on external factors like the amount of sunlight or fast changing energy prices. Manage your energy consumption and yield and adapt to the specific needs of the crop and its development stage. The Quadro Beam lens ensures uniformity in all directions even at high light outputs. This enables fewer fixtures for the same surface, reducing installation costs and maximizing light efficiency.

When you want to generate the highest optimized light level with the fewest grow lights possible, the Philips GreenPower TLF 2.0 is a smart LED investment for dynamic light control. In addition to the 1040W program, we are introducing new power ranges such as 1170W and 1400W, unlocking new flexibility in light-plan design, specifically when you are building a new installation. By combining the TLF 2.0 with a Philips GrowWise Control System, you have the flexibility to create dynamic light recipes to achieve the next level in crop optimization. With a light output of up to 5150 $\mu\text{mol/s}$ and an efficacy of 4.3 μmol at 50% or up to 3.9 μmol at 100% light output, the TLF 2.0 is ideal for crops that need a lot of light.

Key benefits

- Quadro Beam optics for superior light uniformity
- Color control to steer crop development and energy consumption
- Wired or wireless control possible with proven technology
- Maximum plug power utilization 1040W, 1170W or 1400W
- Maximum light output of 5150 $\mu\text{mol/s}$ with an energy efficacy up to 3.9 $\mu\text{mol/s}$ at 100% light output.

High light output combined with Quadro Beam lens for superior light uniformity

The TLF 2.0 introduces new high light output options, up to 5150 µmol/s. The newly developed Quadro beam lens ensures uniformity in all directions even at high light outputs. This enables fewer fixtures for the same surface, reducing

installation costs. The rectangular beam shape also provides a highly uniform light distribution at shorter distances between the LED module and head of the crop. The new flat glass cover makes cleaning extremely easy, reducing your maintenance costs.

Light recipe setpoints example

Create your dynamic light recipe over time using GrowWise Control System and adapt to the specific needs of your crop and its development stage.



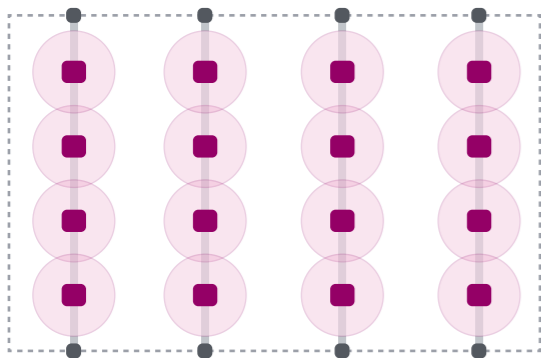
Deep Red White

Deep Red White Far Red

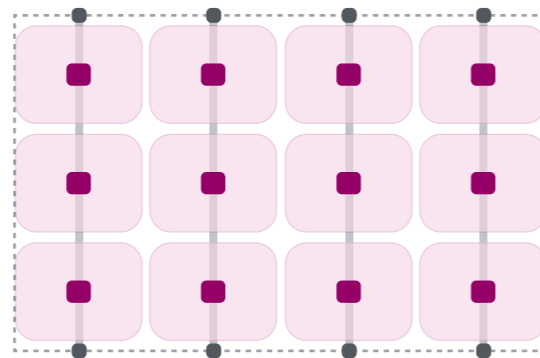
Far Red

White

Top view greenhouse



Standard Beam for optimal output/ efficiency



Quadro Beam for optimal uniformity with fewer grow lights/m² (reduced investment cost) and at lower distances between the grow light and head of the crop.

Wired or wireless control

Next to the existing wired control, the Philips GreenPower LED toplighting force 2.0 allows for wireless control integration. In both cases, wired and wireless, no additional control cables are required, simplifying installation and maintenance. The wireless controls option offers control of each compartment in the

greenhouse separately to match the growth phase of the crop. Even after installation it gives flexibility in changing the division of control areas. A wireless installation also lowers installation costs for renovation of existing installations.

Wired communication

- Easy Installation**
No need for extra wiring, use existing power line
- Reliable operation**
Proven system in many projects worldwide
- Future proof**
Expandable with wireless system

Wireless communication

- Lower installation cost**
- Flexible**
Create multiple control areas
- Future proof**
Allow bidirectional feedback communication

Dynamic multi-channel color control

The multi-channel color controllability in combination with the Philips GrowWise control system allows growers to adjust the light spectrum dynamically for precision control in crop development and morphology and optimizes light output. Seamlessly integrated with existing climate computers, the tailored light recipes safeguards steering based on external factors like the amount of sunlight or fast changing energy prices to manage energy consumption and yield and adapt to the specific needs of the crop and its development stage.

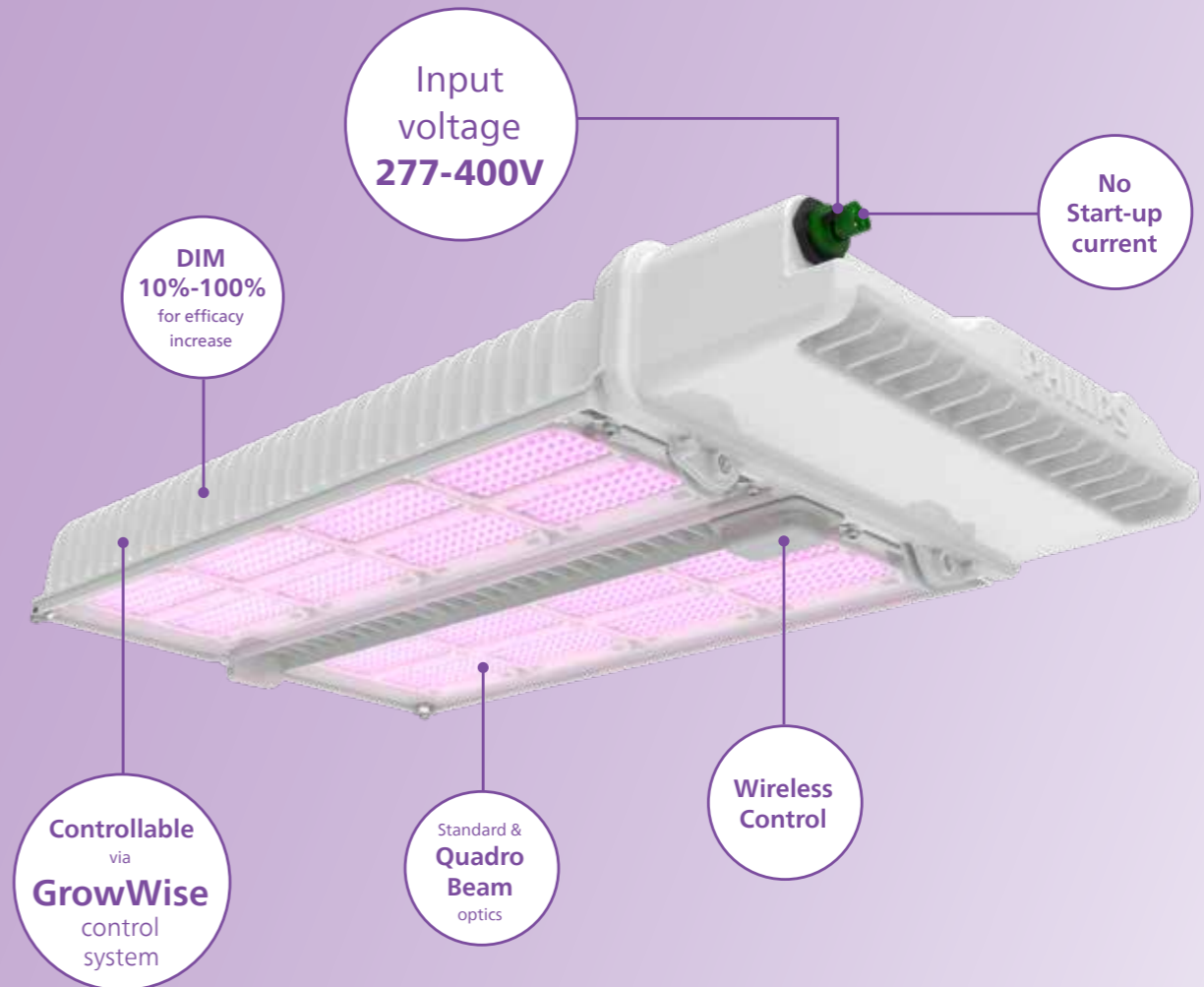
Growers can independently control far-red light for special end-of-day treatments, or switch to the most energy-efficient spectrum when less efficient parts of the spectrum are not required. This flexibility is particularly useful for crops that have highly variable light demands like cucumber, chrysanthemum or strawberries, or for young plant production where specific light conditions during the darker seasons are vital.

The TLF 2.0 gives you dynamic light steering capabilities to improve your crop quality and reduce energy consumption

when needed. It operates in combination with the GrowWise control system, where setpoints can be programmed over a 24-hour cycle-time.

The product range has a separate channel that enables you to control far-red light independently from a basic light recipe. This feature is needed for end-of-day far-red light treatment. For some crops, like Chrysanthemum and Lisianthus, stretching can also be a challenge in the darker season when growing under full LED. The controllable far-red is a welcome feature to address this. When far-red is no longer needed you can use the full power of the module to apply more efficient parts of the spectrum.

The toplighting force 2.0 portfolio also covers specific 2-channel products, which allow you to control specific white or blue, offering the possibility to adapt to the most efficient energy setting. With these specific products, you can grow using 100% deep-red (being the most efficient wavelength) and choose to set your own blue for crop steering purposes or set your own white light for crop inspection.



Product specification setpoints data

Beam	Spectral version		Deep Red/Blue*	Deep Red/White types						
	Spectral code		Low blue	Low blue				2_LB	Medium blue	
Standard beam	Typical photon flux	μmol/s	4010	4010	3800	3600	4280	5150	3600	3700
	Power consumption (max)	W	1040	1040	1040	1040	1170	1408	1040	1040
	Efficacy @ max power	μmol/J	3,9	3,9	3,7	3,5	3,7	3,7	3,5	3,6
	Efficacy at 50% (dimmed)	μmol/J	t.b.d.	4,3	4,2	4,0	4,2	t.b.d.	t.b.d.	t.b.d.
Quadro Beam	Typical photon flux	μmol/s	3900	3900	3700	3500	4160	5000	3500	3600
	Power consumption (max)	W	1040	1040	1040	1040	1170	1408	1040	1040
	Efficacy @ max power	μmol/J	3,8	3,8	3,6	3,4	3,6	3,6	3,4	3,5
	Efficacy at 50% (dimmed)	μmol/J	t.b.d.	4,2	4,0	3,9	4,1	t.b.d.	t.b.d.	t.b.d.

Beam	Spectral version		Deep Red/White/Far Red types ¹				
	Spectral code		FR_1/5a	FR_6			
Standard beam	Typical photon flux	μmol/s	3600	3800		4170	5050
	Power consumption (max)	W	1040	1040		1170	1408
	Efficacy @ max power	μmol/J	3,5	3,7		3,6	3,6
	Efficacy at 50% (dimmed)	μmol/J	3,9	4,1		4,1	4,0
Quadro Beam	Typical photon flux	μmol/s	3500	3700		4060	4900
	Power consumption (max)	W	1040	1040		1170	1408
	Efficacy @ max power	μmol/J	3,4	3,6		3,5	3,5
	Efficacy at 50% (dimmed)	μmol/J	3,8	4,0		4,0	3,9

Light distribution		Standard Beam - beam angle 120° Quadro Beam - beam angle 150x135°
Color control		10% - 100% (controllable per module channel ²)
Input voltage ²	VAC	277-400V
Dimensions	1040/1170W 1400W	cm cm
Weight	1040/ 1170W 1400W	kg kg
Power factor		0.98
Total Harmonic Distortion	%	< 10
Operating temperature	°C	0-40
Rated Average Lifetime ³	hrs	36.000 - Q95
Ingress protection rating		IP66 / wet locations
Cooling		Passively cooled
Approval marks		CE, ENEC, UL/CSA, RCM, PSE
Mains connector		Wieland RST203 Green

Legend

2_LB Higher white and low blue light recipe
FR 1/5a Far Red light recipes 1 or 5 (backwards compatible setpoint product)
FR 6 Deep-red, white and far-red light recipe

Notes

- The published value represents the total photon flux from 400-800nm
 - 50 - 60 Hz
 - Lifetime and maintenance values are given at an ambient temperature of 25°C / 77°F.
 - In combination with GrowWise control system Version 4.0 or higher.
Dimming the light output increases the efficacy of the product
- * Available on specific request



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