
PHILIPS
Horticulture
LED Solutions
GreenPower LED
research module
LED
Tune the light
to meet the specific
needs of each crop
Develop and discover new opportunities
for optimal growth

Philips GreenPower **LED research module**

“Designed for multilayer cultivation and research.”

With the Philips GreenPower LED research module, we continue our tradition of developing reliable lighting solutions for horticultural applications. Specially designed for multilayer cultivation and research, it allows you to use light as a tool to control plant growth and development. Any desired light intensity and color ratio can be selected. In the near future, this will make large-scale multilayer production in conditioned environments a viable and attractive proposition.

For the best possible results, plants require dedicated lighting at different stages of growth and at different times of the day. The Philips GreenPower LED research module is available in red, blue, white and far-red versions. Red, blue and white are the most important colors for crop growth, while far-red – barely visible to the human eye – influences the development of specific plant characteristics. With modules in these four colors, it is now possible to apply the optimum light recipe at every stage of a crop’s growth.

Every plant receives the same level and quality of light

Tune the light
With the GreenPower LED research modules, you can decide for yourself how much red, how much blue, how much white and how much far red light you want at any given moment. And the module's dimming capability allows you to set exactly the level of light you require. With this flexibility, you can truly tune the light to meet the specific needs of each crop.

Consistent quality
The GreenPower LED research module's specially developed optics ensure a uniform light distribution across the shelves, which means that every plant receives the same level and quality of light.

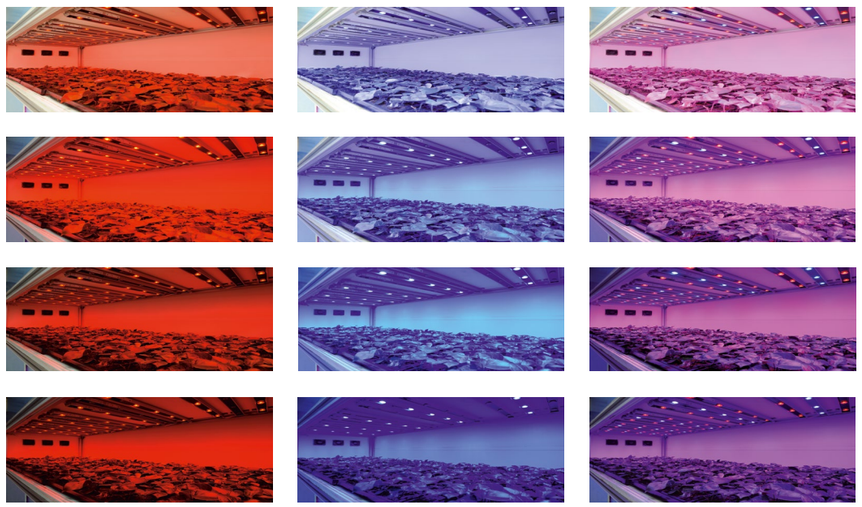
Efficient heat management
Thanks to the LED technology and optimized thermal design, the GreenPower LED research module radiates very little heat toward the plants. It can accommodate additional forms of cooling (e.g. air, water) for even more efficient heat management.

Reliable solution
The GreenPower LED research module is robust, waterproof and safe (low voltage). Combined with its long service life, this means little or no maintenance.

Application areas*
- Multilayer plant production, especially young plants
- Plant research
- Conditioned environments, including climate cabinets and production units

* The typical GrowthLight is between 50 and 150 µmol/s/m². Depending on the configuration, higher or lower lighting levels are possible.

Tune the light



Proof positive – experience with field tests

Since light is an important production tool for growers and breeders and a key factor in plant research, Philips has conducted several field tests together with horticultural firms and experts from the research community. These tests prove the versatility and cost-effective potential of LED solutions to optimize crop yield and quality.

LED4CROPS at STC
Yorkshire, UK

As LED technology progresses, the potential benefits in terms of advancing vertical farming are tremendous. 'LED technology opens the door to the concept of urban farming. You can grow crops in multi-storey warehouses, close to point of consumption'. LEDs will offer growers great flexibility, he adds. 'You can schedule the crops. If you want to bring them on, you can do so. If you want to slow them down, you can reduce power.' According to his colleague, STC CEO Graham Ward, the prospects for growers are bright: 'A normal lettuce grower can produce five crops a year. With urban farming, we can grow fifteen'.

"LED technology opens the door to the concept of urban farming"

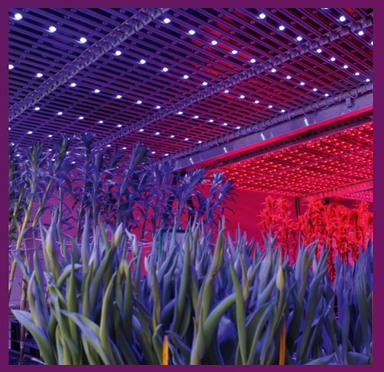
Dr Martin McPherson

Purdue University
West Lafayette, Indiana, USA
University

Although the four-year project started in 2010 and is currently ongoing, the energy-saving benefits are clear: to enable an HPS lamp to provide the correct amount of light in the wavelengths required, it needs 6.42 kWh per day. For the same amount of light in the correct wavelengths, an LED lamp needs only 2.83 kWh per day – a saving of 56%! In addition, future research at Purdue will determine if it is possible to propagate bedding plants in multilayer environments without any daylight. This could mean: reduced cultivation time, better-controlled cultivation processes, better plant quality and uniformity, continuous delivery all year round, and more efficient use of space.

"With LED lighting technologies, we are able to provide light that plants can utilize for photosynthesis and potentially save on energy."

Dr. Roberto Lopez



Wageningen University
The Netherlands

Wageningen University and Research Centre has conducted many tests with Philips LEDs in the past and has plans for further tests, reflecting the belief that LED technology will open up new methods of plant cultivation in the years to come.

"We require reliable products that can be used flexibly for various tests with different starting points. The GreenPower LED research module is clear and reliable in its specifications and gives us a great deal of freedom when working with it."

Dr Wim van Ieperen

Philips GreenPower LED research module

Tune the light

With the GreenPower LED research modules, you can decide for yourself how much red, how much blue and how much far red light you want at any given moment.

25,000
hours lifetime

Tunable LED

Robust

25,000 hours lifetime
Based on specially developed LEDs for Horticulture applications.

Tunable LED
Create the perfect light recipe by tuning the different LED research modules to the needs of your specific research and crop.

Robust
Because of a clever design, the modules require very little to no maintenance.

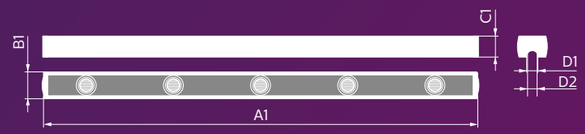
Ingress protection rating: IP66
Power factor: 0.95 cos φ
Input voltage: 400 VAC

Specifications and ordering information

Specifications

Product	Photon flux (typical)	Power consumption (typical)	Quantity of LED research modules per 100 W LED power driver
	µmol/s	W	
GreenPower LED research module deep red	16	10	10
GreenPower LED research module far red	13	10	10
GreenPower LED research module blue	15	14	7
GreenPower LED research module white	14	14	7

* Lifetime and maintenance values are given at an ambient temperature of 25 °C.
** The GreenPower LED research module is designed for a shelf distance of 50 cm.



Mechanical dimensions

Dimensions in mm	A1	B1	C1	D1	D2
GreenPower LED research module	485	33	20	12	3/8”

Dimensions in mm	A1	B1	C1
LGM dimming unit	50	20	15

Ordering information
Philips GreenPower LED research module is designed to operate with the Philips LED power driver to ensure optimal performance. Please contact your local sales office for more information.

Compliances
Approval mark ENEC
RoHS-compliant
Quality standard ISO 9001-2000
Environmental standard ISO 14001

Product	12NC (ordering code)
Philips GreenPower LED research module	
GreenPower LED research module deep red	9290 006 32003
GreenPower LED research module far red	9290 006 32103
GreenPower LED research module blue	9290 006 32203
GreenPower LED research module white	9290 008 43003
Accessories	
LGM mounting bracket shelf	9290 004 83903
LGM mounting bracket cooling pipe 3/8”	9290 004 64803
LGM mounting bracket cooling pipe 12 mm	9290 004 64903
Connector Xtend	9290 004 86203
Connector End Cap	9290 004 86603
LS Extension cable 4 Wg 24 - 50 m	9290 004 62603
Dimming unit	
LGM dimming unit	9290 004 79003
Controls *)	
- Basic	
DDLEDC605-GL LED Controller PWM 6 x 5A	9137 030 61209
DDTC 001 Dynalite Timeclock	9137 030 74009
DKT 622-USB-J (only required for basic)	9137 030 90209
- Remote control	
DDRC 420FR 4 x 20A Relay Controller	9137 030 51009
DNG 100BT Network Gateway	9137 030 82009
LED power driver	
100W-24V 100/240V	9137 006 21091
LED power driver (USA and Canada)	
100W-24V 100/240V	9137 102 99702

*) Controls (Basic and Remote control) are not available in USA and Canada

More than a product, it's a complete solution

The Philips GreenPower LED research modules offers all the proven benefits of LED technology and – as a complete solution – much more besides.

- Quick and easy installation
- Support and advice from technical experts
- Advice on which lighting strategies are best for your situation

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Data subject to change

For more information about Philips horticulture LED Solutions visit:
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