PHILIPS

Horticulture
LED Solutions

GreenPower
LED toplighting

Application Guide

A unique way to apply grow light above your plants, based on state-of-the-art LED technology designed together with growers for growers

September 2018

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Introduction

Especially designed for your growth system, the GreenPower LED toplighting module is the best solution for new or existing installations. Due to its high energy efficiency and long lifetime, the GreenPower LED toplighting module is the cost-effective way to improve climate and crop control for greenhouse applications.

The GreenPower LED toplighting module is available in 7 spectral versions, this range has three High Output and seven Regular Output modules, which are outlined in the next chapter.

For each type of installation, Trellis or C-profile mounted, continuous (interconnected modules) or non continuous line, dedicated accessories are available for an easy and quick installation.

This application guide describes all important technical and safety information of the GreenPower LED toplighting module.

Product information

Technical specifications

Regular Output

	Photon flux (µmol/s)	Power (W)	Efficacy typical[1] (µmol/J)
DR/B LB	550	170	3.2
DR/B MB	550	175	3.1
DR/B HB	520	175	3.0
DR/W LB	520	170	3.1
DR/W MB	520	175	3.0
DR/W HB	520	180	2.9
DR/W/FR_2 MB	500	185	2.7

High Output

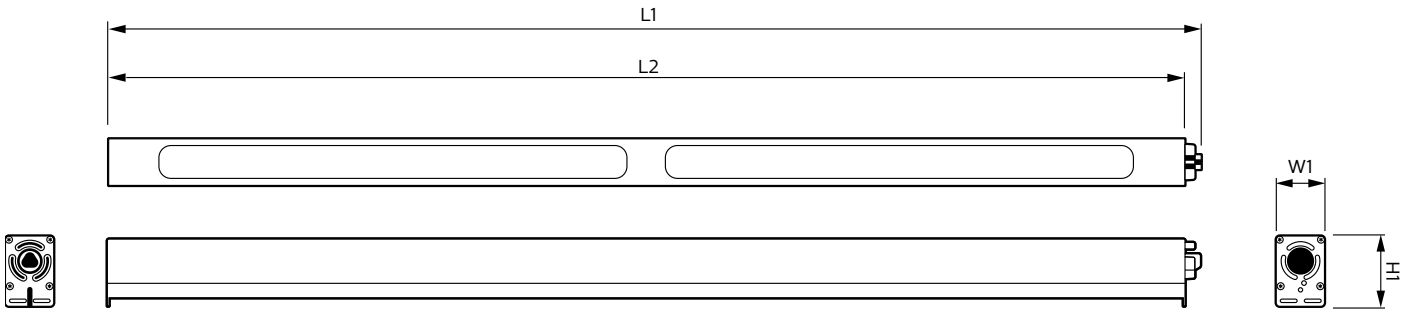
	Photon flux (µmol/s)	Power (W)	Efficacy typical[1] (µmol/J)
DR/B LB HO	800	265	3.0
DR/W LB HO	800	275	2.9
DR/W MB HO	800	285	2.8

Specifications		
Optical		
Rated average lifetime[1,2]	35.000 hrs, L90B50 (90% photon flux maintenance)	
Electrical		
Input voltage RO modules	200-400 V~, 50/60Hz	
Input voltage HO modules	277-400 V~, 50/60Hz	
Power factor	> 0.95	
Inrush current	< I nominal, negligable	
Environment		
Ambient storage temperature	-40 - 85 °C ($T_{storage}$)	-40 - 185 °F ($T_{storage}$)
Ambient operating temperature	0 - 40 °C ($T_{operating}$)	32 - 104 °F ($T_{operating}$)
Max. case temperature[1]	65 °C (T_{case})	149 °F (T_{case})
Cooling	Passively air-cooled	
Relative humidity	5 - 95% RH, no condensation allowed during storage, operation and application	
Ingress protection rating	IP66	
Photobiological hazard[3]		
Radiation hazard - Retinal Blue	Risk Group 2	
Minimum viewing distance[4]	3.5 m, all versions	
All other radiation hazards[5]	Exempt group	

[1] Efficacy typical, Rated average lifetime and Max. case temperature, at $T_{ambient}$ = 25 °C / 77 °F.
[2] All measured lifetimes are industry standard measurements indicating average length of operation and not a performance claim specific to any individual product.
[3] For more information about photobiological hazard see page 5.
[4] The luminaire should be positioned at minimum viewing distance, so that prolonged staring into the light source is not expected.
[5] Near ultraviolet hazard, Retinal thermal hazard and Infrared radiation hazard.

Legend:
DR = Deep Red
B = Blue
W = White
FR = Far Red
LB = Low Blue
MB = Medium Blue
HB = High Blue
HO = High Output
RO = Regular Output

Dimensions



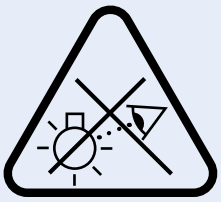
Product name	Product dimensions (mm)				Product weight (kg)
	L1	L2	W1	H1	
GP LED toplighting module	1264	1248	55	80	3.23

Important

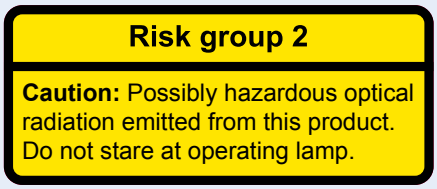
Influencing factors of light output
As ambient temperature increases, both the photon flux and the photon flux maintenance will decrease. Pollution or damage of optics will also impact the light output.

Thermal protection
The GreenPower LED toplighting module has a built-in thermal protection device. If the temperature of the module becomes too high, the module will shut down. After cooling down, the module will switch on again automatically (results in blinking).

Photobiological hazard
Photobiological safety of lamps and lamp systems (EN 62471).
This International Standard describes the photobiological safety of lamps and lamp systems including luminaires.



Risk Group 2:
Do not stare at the operating light source.
The philosophical basis for this classification is that the lamp does not pose a hazard due to the aversion response to very bright light sources or due to the thermal discomfort.



Mind the minimum safe viewing distance or wear approved protection glasses, which filter out blue radiation.

Light source not replaceable
The light source of this fixture is not replaceable. When the light source reaches its end-of-life, the whole fixture needs to be replaced.

Not for outdoor use
Modules are not suited to outdoor use (UV effects on material, discoloring) and are not intended to be installed in stairways and horizontal travel paths.

Installation of the system

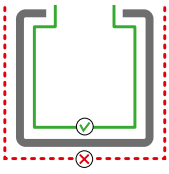
The GreenPower LED toplighting can be fitted very easily without the need for any tools and has been designed together with installers and growers to achieve a simple and quick installation. The module can be fixed to the greenhouse structure using the prescribed accessoires that is used for greenhouse installations.

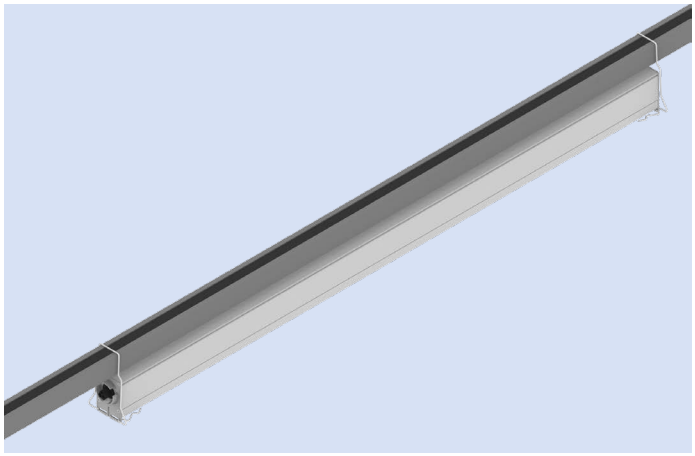
When the GreenPower LED toplighting is mounted between existing light or heating installations always check the heat dissipation and distance from the existing installation towards the GreenPower LED toplighting. Depending on the required photon flux density (µmol/s/m²) and the installation height, the GreenPower LED toplighting can be mounted in a continuous line, or a non-continuous line and it must always be installed in a horizontal position above the plant.

The GreenPower LED toplighting can be mounted on a standard C-profile of 40x40 mm or directly to the trellis of the greenhouse structure. Thanks to the head-to-tail interconnection, a stress free connector construction and the stainless steel clips, it is virtually a plug-and-play installation method.

C-profile

Mount the 40x40 mm C-profiles to the greenhouse structure at the required height. During assembly use a fixation which only uses the inside of the C-profile (solid green line). Make sure that the deflection of the mounting profile is max 10 mm. **Do not use hooks mounted around the profile (dotted red line). Use the specific bracket (A)** (see Accessory information) **to mount the modules on the C-profile to avoid damage to the LED surface!**

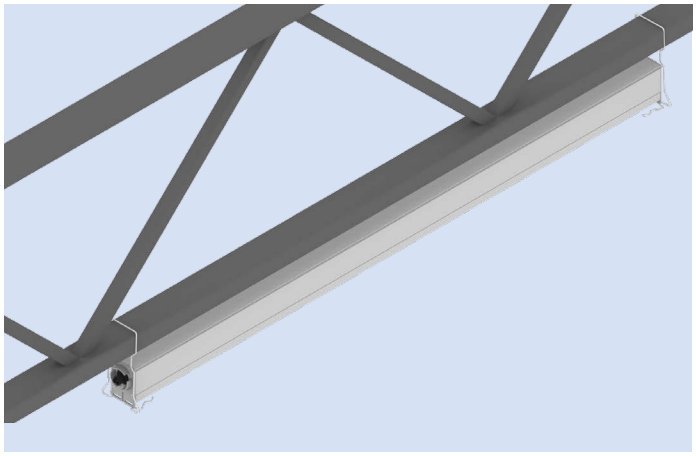




C-profile

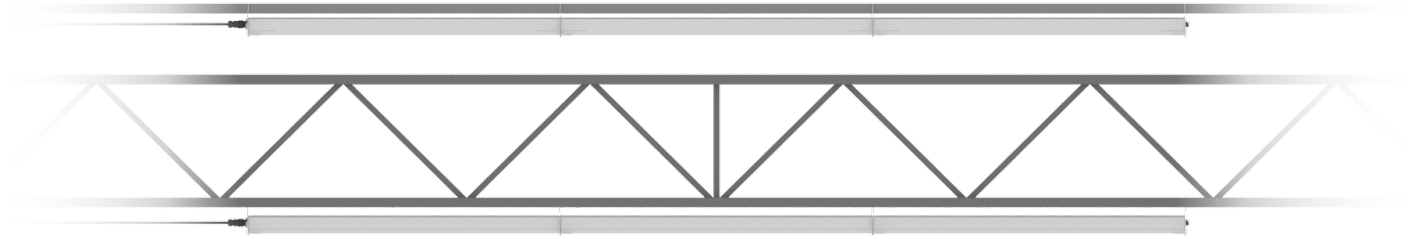
Trellis

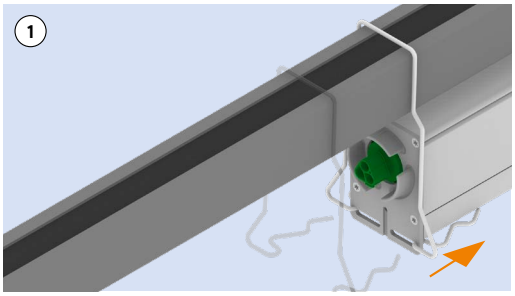
The width of the rectangular profile must be known, in order to choose the correct trellis mounting bracket (see Accessory information). There are two mounting brackets available, one for mounting on a 50mm (**B**) and one for mounting on a 60mm (**C**) trellis rectangular steel profile. The steps to take for a continuous and non-continuous line installation are explained for mounting on a C-profile and also apply for the trellis rectangular steel profile.



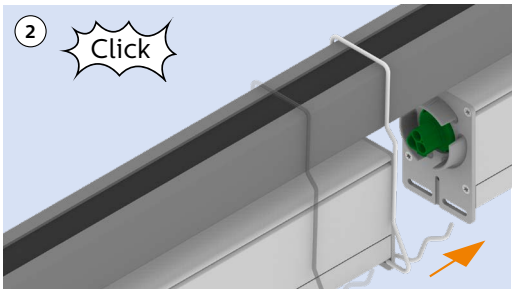
Trellis

Continuous line installation

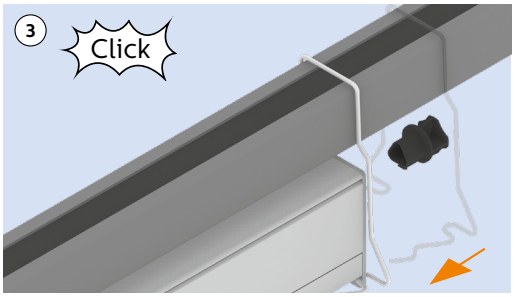




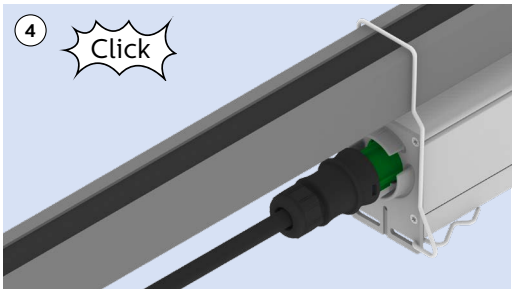
1) Hook on 2 mounting brackets (**A and A**) onto the C-profile at 1.25 m pitch. Put the 1st module against the C-profile. Slide both brackets horizontal into both metal end caps of the module.



2) Hook the next bracket (**A**) onto the C-profile at 1.25 m distance. Put the 2nd module against the C-profile. Slide the 2nd module over bracket (**A**). Connect both modules, verify that these 2 modules are snapped together correctly (click) and check if bracket (**A**) snaps into both end caps of the modules.

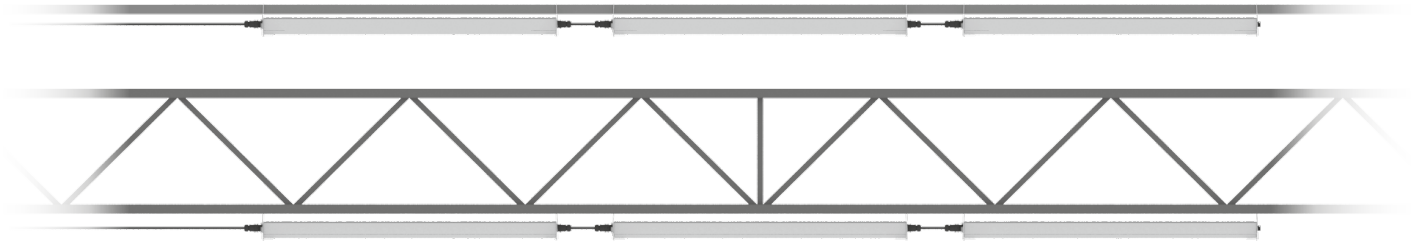


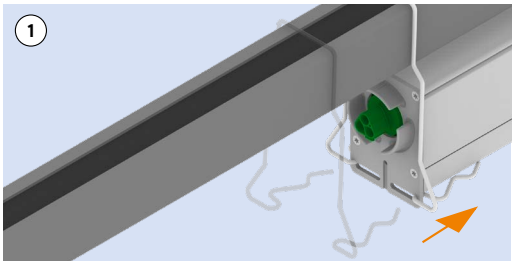
3) Repeat step 2 until the maximum permissible number of modules is reached. **For the maximum number of modules allowed per phase,** see page 10**.** Slide mounting bracket (**A**) into the last module. **IMPORTANT:** Put the plastic end cap at the end of a through wire line (click) to comply to IP66, no dewing allowed.



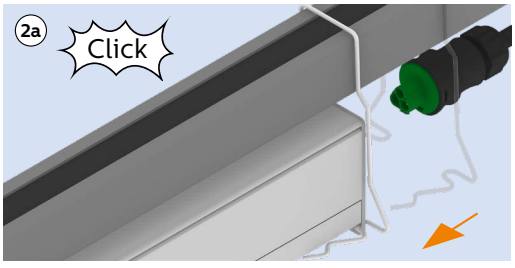
4) Connect the female connector to the main power cable (click) and connect this main power cable to the power grid.

Non-continuous line installation

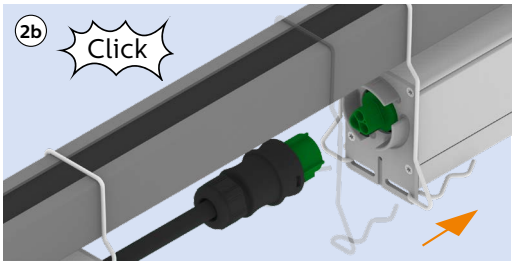


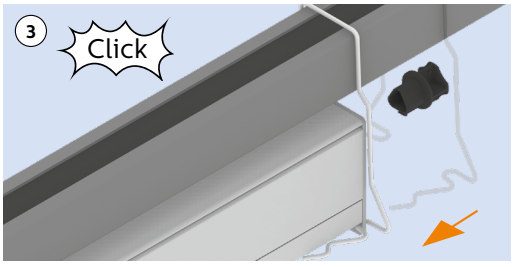


1) Hook on 2 mounting brackets (**A and A**) onto the C-profile. Put the 1st module against the C-profile. Slide the 1st bracket (**A**) horizontal into both metal end caps of the module.

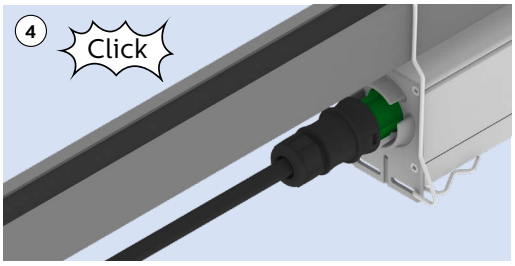


2) Slide the 2nd bracket (**A**) into the end cap of the 1st module. Hook the 3rd and 4th bracket (**A**) onto the C-profile. Put the 2nd module against the C-profile. Slide the 3rd and 4th bracket (**A**) into the end caps of the 2nd module. Connect both modules, using a jumper cable assembly and verify that the jumper cable is snapped onto the connectors correctly (click).

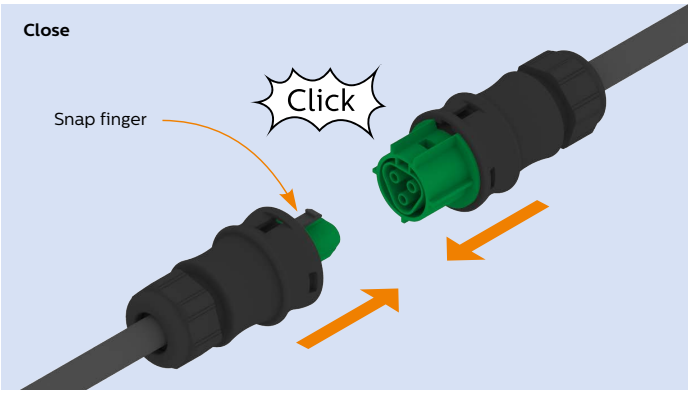




3) Repeat step 2 until the maximum permissible number of modules is reached. **For the maximum number of modules allowed per phase,** see page 10**.** Slide the 4th bracket (**A**) into the last module.
IMPORTANT: Put the plastic end cap into the female connector (click) of every last module, to comply to IP66, no dewing allowed.

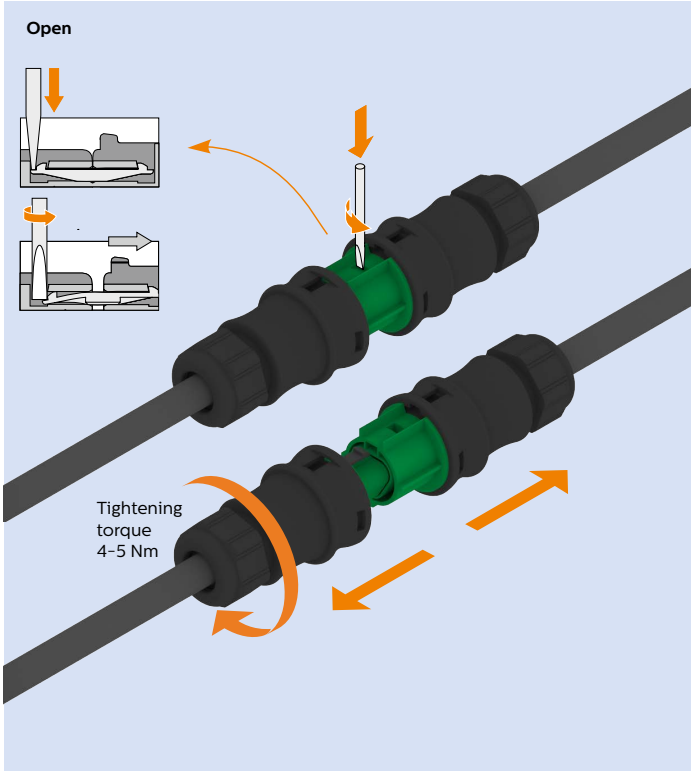


4) Connect the female connector to the main power cable (click) and connect this main power cable to the power grid.



Use of the connector

The connectors lock automatically when plugged together and give the user clear feedback on the correct end position. Plug and push both connectors until it clicks. Ensure that it clicks to guarantee a correct electrical connection and ingress protection.

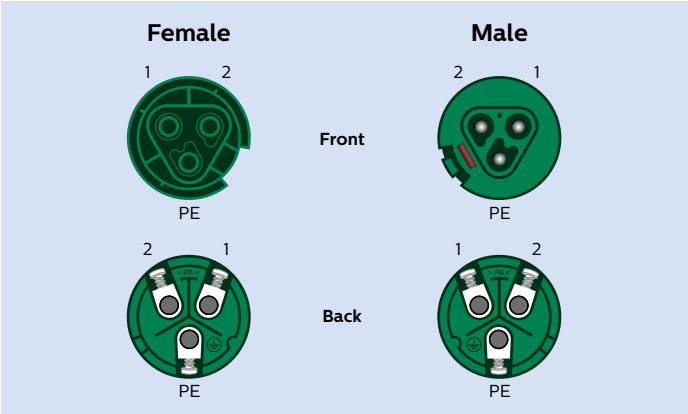


For unlocking the connectors (and plastic end caps), press and twist the snap finger, by means of a DIN 5264A, 3.5 mm screwdriver. For unlocking modules when interconnected, pull both modules in opposite direction. The snap fingers supplied with the male connector of the modules are designed to do this easily with a small pull force.

Wiring connectors and custom cables

The housing of the connector has been designed in three parts. In case of assembling a field installable jumper cable assembly, use cable diameters 10-14 mm. Always keep ingess protection IP66 in mind, this also needs to be secured during assembly. Related technical information (see table) and installation instructions are available from the connector supplier Wieland Electric GmbH - www.wieland-electric.com

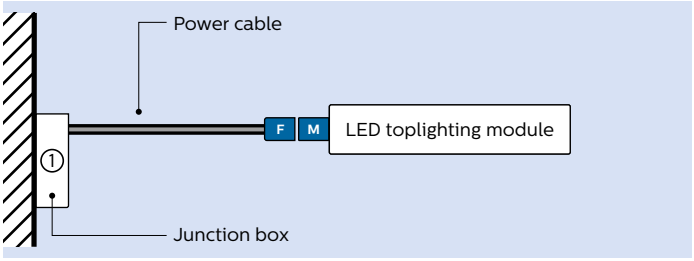
RST20i 3-pole			
	IES	UR (Screw connection only)	CSA
Cable ø	6 - 10 mm / 10 - 14 / 13 - 18 mm		
Voltage	400 V	600 V	600 V
Current	16 A	20 A	20 A
Wire size	0.25 - 1.5 mm²	16 - 10 AWG	20 - 12 AWG



For Line to Line and Line to Neutral voltage configurations, several options are presented with respect to the pins of the female and male RST20i 3-pole connector.

Pin	Line to Line voltage			Line to Neutral voltage		
1	L1	L1	L2	L1	L2	L3
2	L2	L3	L3	N	N	N

Legend:
L = Line
N = Neutral



Connecting the system

Legend
F = Female connector of the power cable
M = Male connector of the first module

Connecting the system

Connect all power cables to a junction box, rated for wet or damp locations. Make sure all junction boxes are mounted to a rigid structure. Cables must be secured by a cord grip / strain relief. Use a cord grip suitable for use with three conductor and type off cord suitable for the trade size of the junction box provided by others, if needed.
Any unused connector must be secured and sealed with an end cap (see ordering data). Otherwise the IP66 rating will be void.

Examples of max. number of interconnected modules

There are several options for connecting the Regular Output and High Output modules to the mains, 200-400V~ for Regular Output modules and 277-400V~ for High Output modules, and determining the maximum number of modules, which depend on the power consumption of the LED module, the type of installation (continuous or non continuous line), the number of circuit breakers, the circuit breaker type (1-pole/2-pole/3-pole or 4-pole), the connection cable diameters, the total length of the cable conductors and the use of an earth leakage protection (RCD)[1]. Examples for the maximum number of interconnected modules (continuous line), are presented below. For continuous and non-continuous line installations, always check the maximum allowed/protected cable length[1].

USA/Canada

Mains Voltage (V~)	Power (W)	System	Max # of modules per phase pair		
			15A Circuit breaker[2]		
			1x3P	3x2P	1x4P
208	170	P-P	8	14	NA
	175	P-P	8	14	NA
	180	P-P	8	13	NA
	185	P-P	7	13	NA
240	170	P-P	9	16	NA
	175	P-P	9	16	NA
	180	P-P	9	16	NA
	185	P-P	8	15	NA
277	170	P-N	19	NA	19
	175	P-N	18	NA	18
	180	P-N	18	NA	18
	185	P-N	17	NA	17
	265	P-N	12	NA	12
	275	P-N	12	NA	12
	285	P-N	11	NA	11
347	170	P-N	24	NA	24
	175	P-N	23	NA	23
	180	P-N	23	NA	23
	185	P-N	22	NA	22
	265	P-N	15	NA	15
	275	P-N	15	NA	15
	285	P-N	14	NA	14

Legend:
P = Phase
N = Neutral
NA = Not Applicable
2P = 2 Pole breaker type
3P = 3 Pole breaker type
4P = 3 Pole + Neutral breaker type

[1] A multiplication factor of √3 can be used for determining the maximum protected cable length, if short circuit between Line-Protective Earth or Line-Earth is not possible (IEC60364).
[2] A 15A Circuit breaker is mandatory in the US, according to the National Electrical Code.

EU/ROW

Mains Voltage (V~)	Power (W)	System	Max # of modules per phase pair			
			16A C-type		20A B-type	
			1x3P	3x2P	1x3P	3x2P
220	170	P-N	16	NA	20	NA
	175	P-N	16	NA	20	NA
	180	P-N	15	NA	19	NA
	185	P-N	15	NA	19	NA
230	170	P-N	17	NA	21	NA
	175	P-N	16	NA	21	NA
	180	P-N	16	NA	20	NA
	185	P-N	15	NA	19	NA
380	170	P-P	16	28	20	35
	175	P-P	16	27	20	34
	180	P-P	15	27	19	33
	185	P-P	15	26	18	32
	265	P-P	10	18	13	22
	275	P-P	10	17	12	22
	285	P-P	9	17	12	21
400	170	P-P	17	30	21	37
	175	P-P	16	29	21	36
	180	P-P	16	28	20	35
	185	P-P	15	27	19	34
	265	P-P	11	19	13	24
	285	P-P	10	17	12	22

Japan

Mains Voltage (V~)	Power (W)	System	Max # of modules per phase pair			
			16A C-type		20A B-type	
			1x3P	3x2P	1x3P	3x2P
200	170	P-P	8	15	10	18
	175	P-P	8	14	10	18
	180	P-P	8	14	10	17
	185	P-P	7	13	9	17
400	170	P-P	17	30	21	37
	175	P-P	16	29	21	36
	180	P-P	16	28	20	35
	185	P-P	15	27	19	34
	265	P-P	11	19	13	24
	285	P-P	10	17	12	22

Legend:
P = Phase
N = Neutral
NA = Not Applicable
2P = 2 Pole breaker type
3P = 3 Pole breaker type
4P = 3 Pole + Neutral breaker type

Important

Connection of power grid to first module:
Wieland female connector should apply with H07RN-F 3x2.5 mm^2 power cable with a diameter > 10 mm. In case of not using a Philips jumper cable with factory-made crimp and sleeve connectors, be aware of the following: H07RN-F 3x2.5 mm^2 power cable with a diameter > 10 mm applies when creating a through-wiring by using a Wieland male and female field installable connector. Please follow Wieland's instructions, if not, the LED system warranty will be void!

IP66
Make sure the connection to the power is made in such a way it is suitable for wet conditions (e.g. use a wet-rated (IP66) junction box).

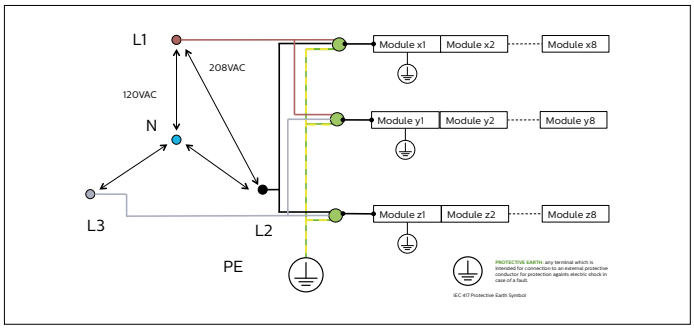
NEC
A 15A Circuit breaker is mandatory in the US, according to the National Electrical Code.

Turn off and disconnect the power before installation.
Installation must be performed by a qualified electrician in accordance with all national and local electrical and construction codes and regulations.

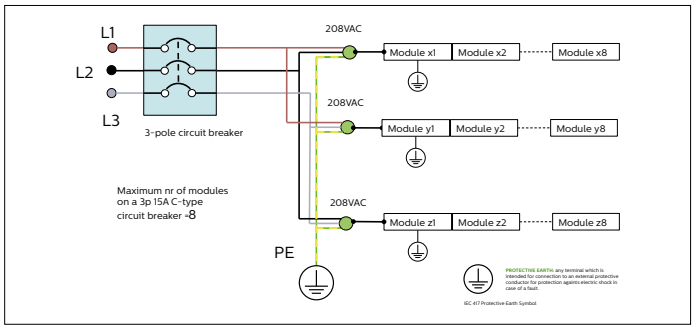
- Make sure that power cords are routed in a manner that will prevent incidental damage.
- Use wet-rated (IP66) junction boxes which are also suitable for the power cords used in the application.
- Use a strain-relief or power cord grip if needed.
- Use a cord grip suitable for use with three conductor and type off cord suitable for the trade size of the junction box provided by others, if needed.
- **DO NOT** connect to live power until installation is complete.
- **DO NOT** attempt to install or use until you have read and understood the installation instructions of this product contained in the Quick Installation Guide, this Application Guide and safety labels.
- **DO NOT** modify or alter the product; doing so will void the warranty.

Connection schemes for continuous line installations (examples)

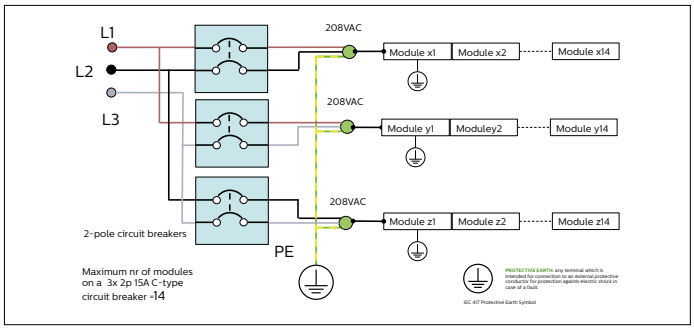
USA/Canada



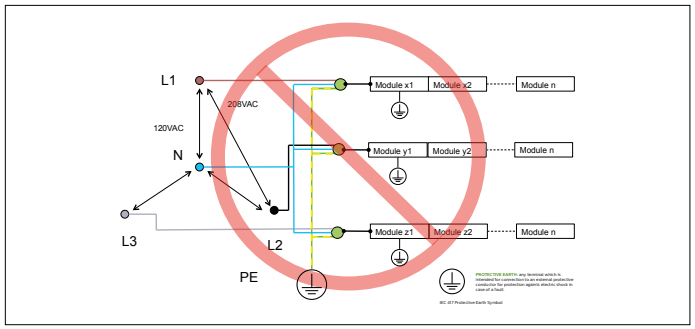
208V~ connection between phases (208V~ power grid)



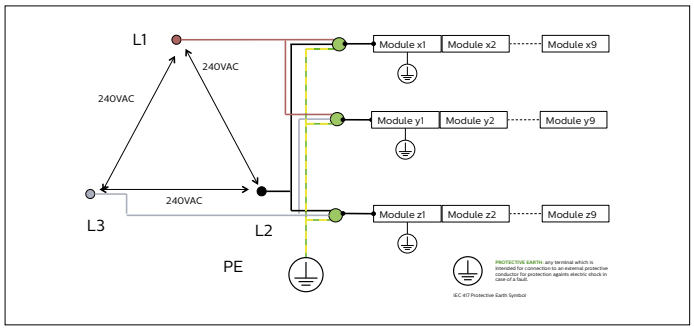
208V~ connection between phases (208V~ power grid)



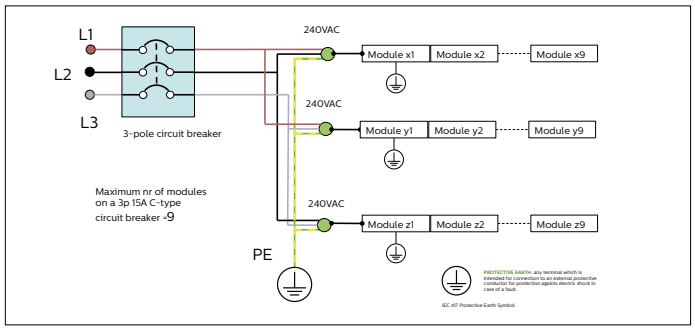
208V~ connection between phases (208V~ power grid)



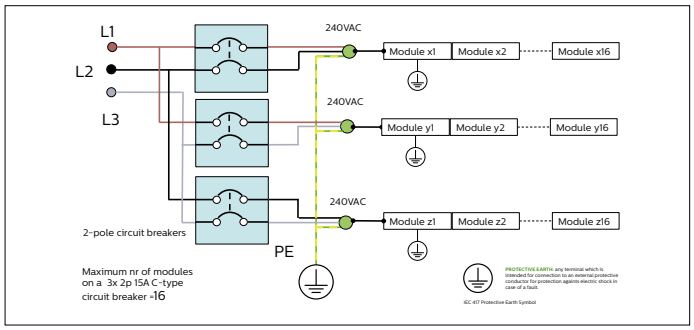
120V~ connection between neutral and phase (208V~ power grid)



240V~ connection between phases (240V~ power grid)

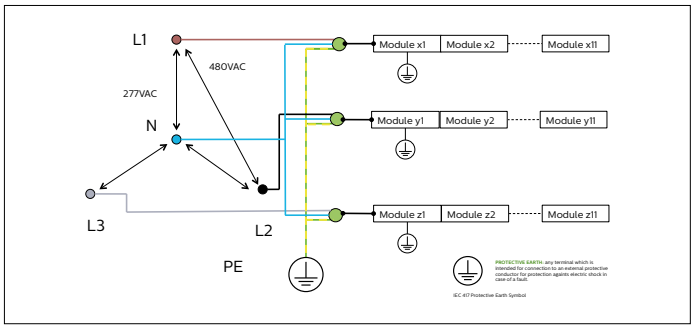


240V~ connection between phases (240V~ power grid)

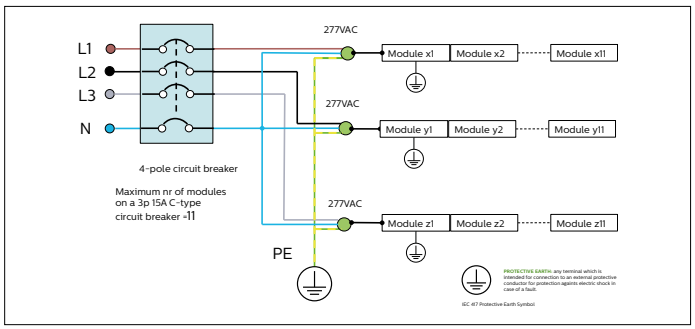


240V~ connection between phases (240V~ power grid)

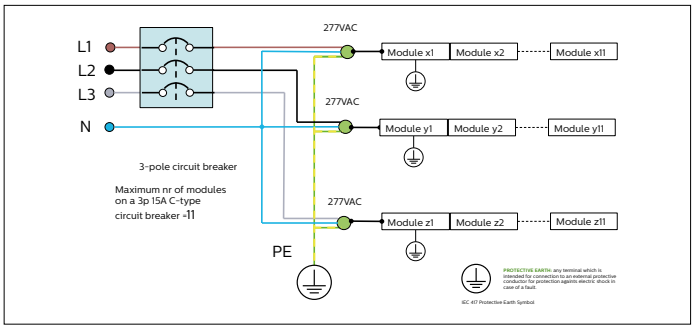
Note:
- All connections schemes represent the DR/B LB 200-400V RO or the DR/W LB 200-400V RO (170W) module. For detailed examples per module, see page 10
- The High Output modules operate between 277-400V, thus the schemes for 208V~ and 240V~ are not applicable to the High Output modules.



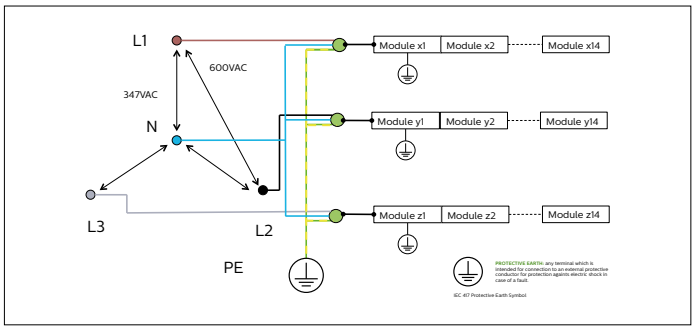
277V~ connection between phase and neutral (480V~ power grid)



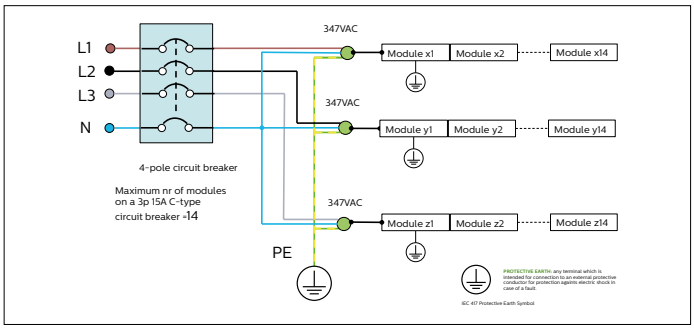
277V~ connection between phase and neutral (480V~ power grid)



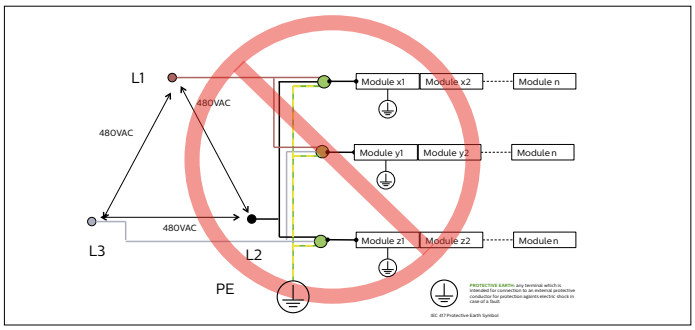
277V~ connection between phase and neutral (480V~ power grid)



347V~ connection between phase and neutral (600V~ power grid)



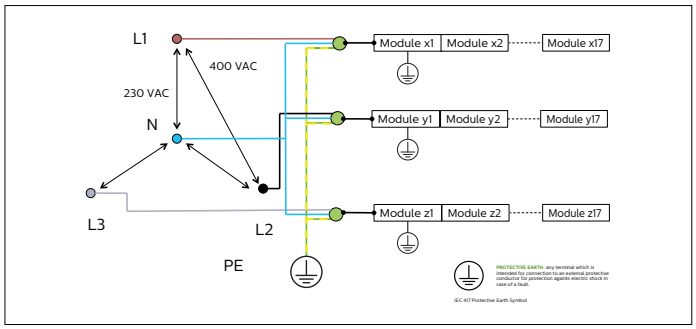
347V~ connection between phase and neutral (600V~ power grid)



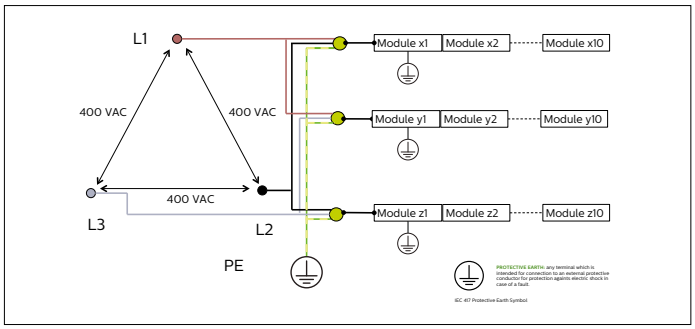
480V~ connection between phases (480V~ power grid)

Note: All connections schemes represent the DR/W MB HO (285W) module. For detailed examples per module, see page 10

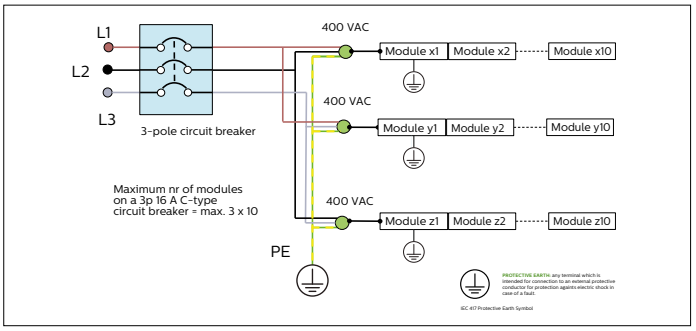
EU/ROW



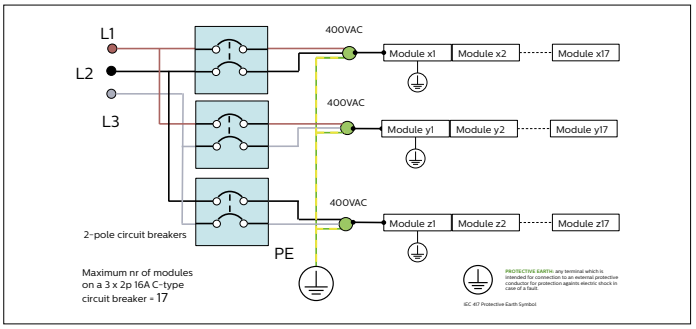
230 V~ connection between neutral and phase (400 V~ power grid), based on the DR/B LB 200-400V RO or the DR/W LB 200-400V RO (170W) module. For this grid, High Output modules are not applicable.



400 V~ connection between phases (400 V~ power grid), based on the DR/W MB 277-400V HO modules.

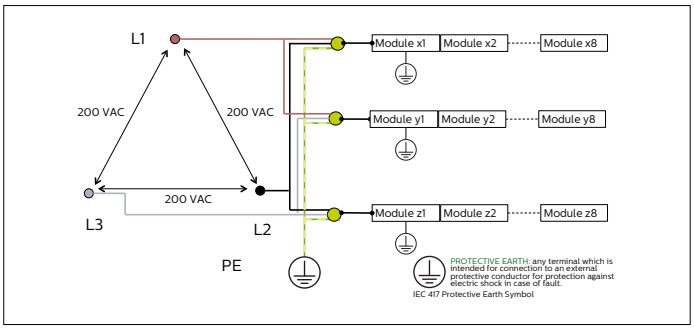


400 V~ connection between phases (400 V~ power grid), based on the DR/W MB 277-400V HO modules.

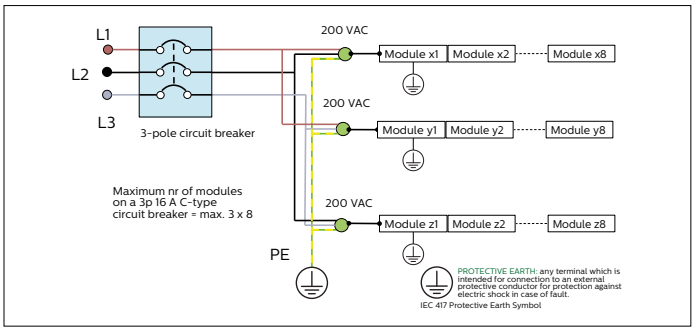


400 V~ connection between phases (400 V~ power grid), based on the DR/W MB 277-400V HO modules.

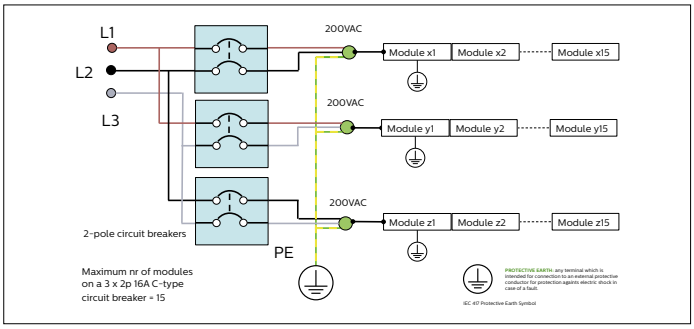
Japan



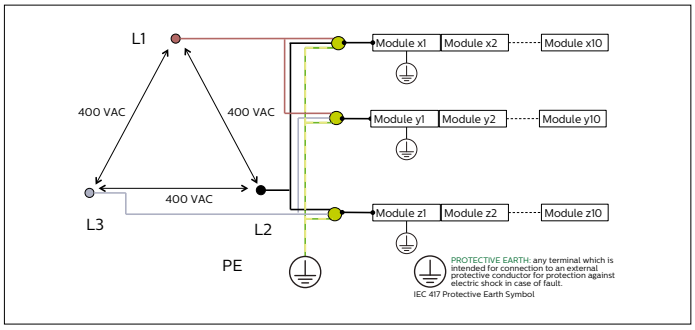
200 V~ connection between phases (200 V~ power grid) based on the DR/B LB 200-400V RO or the DR/W LB 200-400V RO (170W) module. For this grid, High Output modules are not applicable.



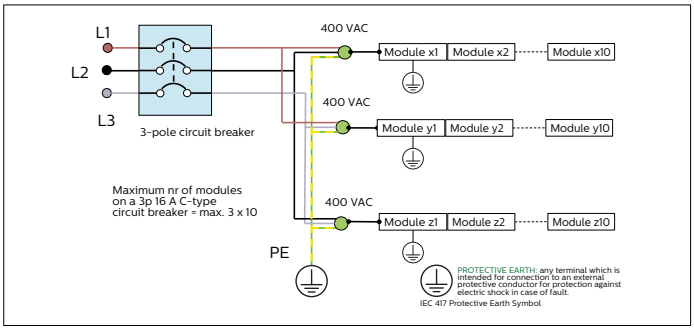
200 V~ connection between phases (200 V~ power grid) based on the DR/B LB 200-400V RO or the DR/W LB 200-400V RO (170W) module. For this grid, High Output modules are not applicable.



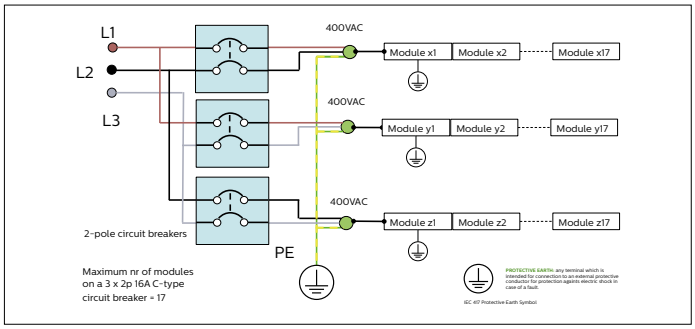
200 V~ connection between phases (200 V~ power grid) based on the DR/B LB 200-400V RO or the DR/W LB 200-400V RO (170W) module. For this grid, High Output modules are not applicable.



400 V~ connection between phases (400 V~ power grid), based on the DR/W MB 277-400V HO modules.



400 V~ connection between phases (400 V~ power grid), based on the DR/W MB 277-400V HO modules.



400 V~ connection between phases (400 V~ power grid), based on the DR/W MB 277-400V HO modules.

Important

- Use of 690 V~ systems is prohibited because the safety isolation is not designed for these high voltages!
- If interconnection cables are used the total length of the conductors will be limiting.
- The circuit breaker type needed and maximum number of modules depend on connection cable diameters and total protected length.
  - The connection wires used inside the module: diameter = 2.08mm^2 , AWG14
  - The jumper cables EU/Rest of world: diameter = 1.5mm^2
  - The jumper cables US/Canada: diameter = 2.08mm^2 , AWG14

Ordering data US/Canada

Modules

Product description	12 NC	6 NC
Regular Output		
Deep red/blue (DR/B)		
GPL toplight_2.1 DR/B LB 200-400V RO	9290 016 59206	343160
GPL toplight_2.1 DR/B MB 200-400V RO	9290 016 59306	343178
GPL toplight_2.1 DR/B HB 200-400V RO	9290 016 59406	343210
Deep red/white (DR/W)		
GPL toplight_2.1 DR/W LB 200-400V RO	9290 016 59506	343228
GPL toplight_2.1 DR/W MB 200-400V RO	9290 016 59606	343236
GPL toplight_2.1 DR/W HB 200-400V RO	9290 016 59706	343244
Deep red/white/far red (DR/W/FR)		
GPL toplight_2.1 DR/W/FR_2 MB 200-400V RO	9290 016 59806	343251
High Output		
Deep red/blue (DR/B)		
GPL toplight_2.1 DR/B LB 277-400V HO	9290 016 60006	343269
Deep red/white (DR/W)		
GPL toplight_2.1 DR/W LB 277-400V HO	9290 016 58706	343277
GPL toplight_2.1 DR/W MB 277-400V HO	9290 016 58806	343285

Accessories US/Canada

Product description	12 NC	6 NC
Mounting bracket for module		
GPL bracket toplight NAM[1]	9290 015 08106	303925
GPL bracket toplight_2.0/2.1 TRE 50[1,2]	9290 016 79306	343327
GPL bracket toplight_2.0/2.1 TRE 60[1,3]	9290 016 79406	343345
Power connector for module		
GPL toplighting male connector	9290 009 15406	
GPL toplighting female connector	9290 009 15506	
Power cable for module, US/Canada		
GPL toplighting main power cable	9290 015 16206	304188
GPL toplighting jumper NAM 6.6ft[4]	9290 015 08206	303933
GPL toplighting jumper NAM 3.3ft[4]	9290 015 55806	324061
End cap		
GreenPower LED toplighting end cap[5]	9290 009 15606	303966

Packaging toplighting 2.1

Box dimensions	Pcs per box	Pallet dimensions	Pcs per pallet
1.35 m x 0.77 m x 0.12 m	4	1.35 m x 0.77 m x 1.255 m	144 (4 boxes per layer / 9 layers per pallet)

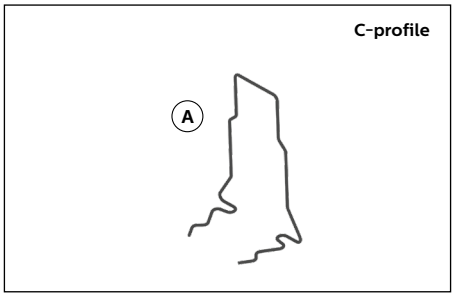
Legend:

GPL = GreenPower LED
DR = Deep Red
B = Blue
W = White
FR = Far Red
LB = Low Blue
MB = Medium Blue
HB = High Blue
RO = Regular Output
HO = High Output
TRE = Trellis

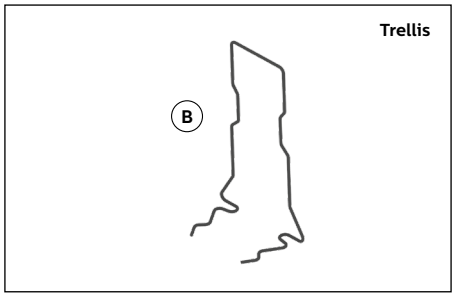
[1] Stainless steel ø2.5 mm wire bracket.
[2] Suitable for trellis rectangular steel profiles; 50 x 25, 50 x 30, 50 x 40 mm.
[3] Suitable for trellis rectangular steel profiles; 60 x 25, 60 x 30, 60 x 40 mm.
[4] 3 x 2.08 mm² (AWG14) wire conductors
[5] To ensure IP66 compliance for every single mounted or last module in a continuous or non-continuous line!

Accessory information US/Canada

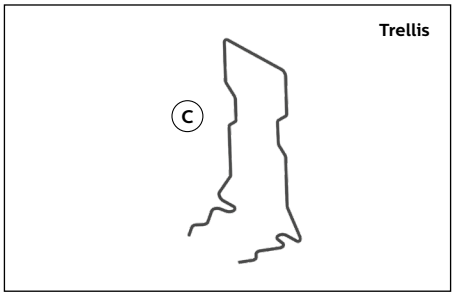
Accessories for module



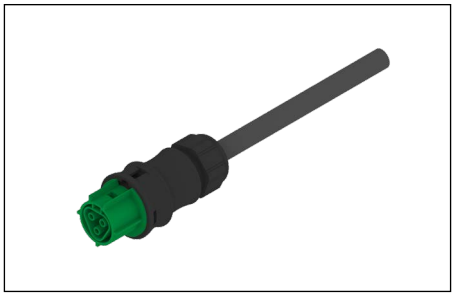
GPL bracket toplighting NAM

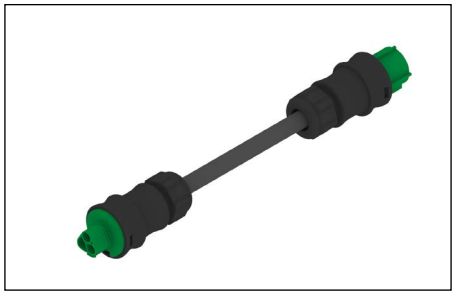


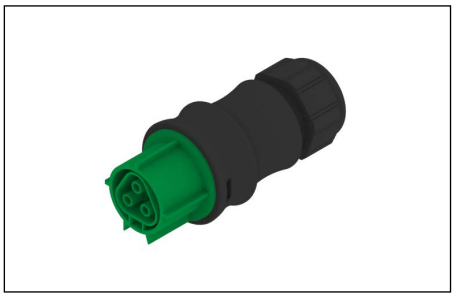
GPL bracket toplight_2.0/2.1 TRE 50

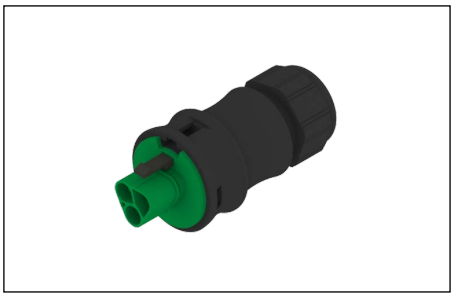


GPL bracket toplight_2.0/2.1 TRE 60


GPL toplighting main power cable


GPL toplighting jumper NAM 3.3ft/6.6ft


GPL toplighting female connector


GPL toplighting male connector


End cap

Ordering data EU/ROW

Modules

Product description	12 NC
High Output	
Deep red/blue (DR/B)	
GPL toplight_2.1 DR/B LB 277-400V HO	9290 016 60006
Deep red/white (DR/W)	
GPL toplight_2.1 DR/W LB 277-400V HO	9290 016 58706
GPL toplight_2.1 DR/W MB 277-400V HO	9290 016 58806

Accessories EU/Rest of world

Product description	12 NC
Mounting bracket for module	
GPL bracket toplight NAM[1]	9290 015 08106
GPL bracket toplight_2.0/2.1 TRE 50[1,2]	9290 016 79306
GPL bracket toplight_2.0/2.1 TRE 60[1,3]	9290 016 79406
Power connector for module	
GPL toplighting male connector	9290 009 15406
GPL toplighting female connector	9290 009 15506
Power cable for module, EU/CEE	
GreenPower LED toplighting jumper cable (1.0 mtr)[4]	9290 009 15306
GreenPower LED toplighting jumper cable (2.0 mtr)[4]	9290 009 16006
End cap	
GreenPower LED toplighting end cap[5]	9290 009 15606

Packaging toplighting 2.1

Box dimensions	Pcs per box	Pallet dimensions	Pcs per pallet
1.35 m x 0.77 m x 0.12 m	4	1.35 m x 0.77 m x 1.255 m	144 (4 boxes per layer / 9 layers per pallet)

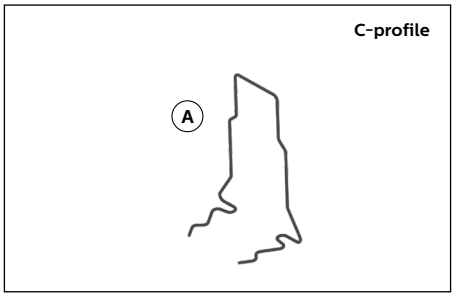
Legend:

GPL	= GreenPower LED	MB	= Medium Blue
DR	= Deep Red	HB	= High Blue
B	= Blue	RO	= Regular Output
W	= White	HO	= High Output
FR	= Far Red	TRE	= Trellis
LB	= Low Blue		

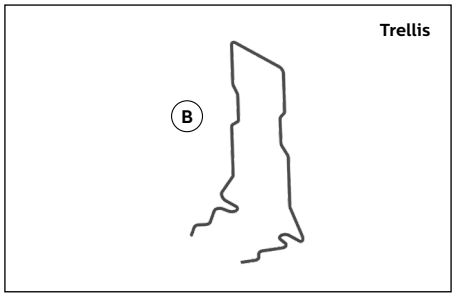
[1] Stainless steel ø2.5 mm wire bracket.
[2] Suitable for trellis rectangular steel profiles; 50 x 25, 50 x 30, 50 x 40 mm.
[3] Suitable for trellis rectangular steel profiles; 60 x 25, 60 x 30, 60 x 40 mm.
[4] 3 x 1.5 mm² conductors, 2-sided 'male / female connector.
[5] To ensure IP66 compliance for every single mounted or last module in a continuous or non-continuous line!

Accessory information EU/ROW

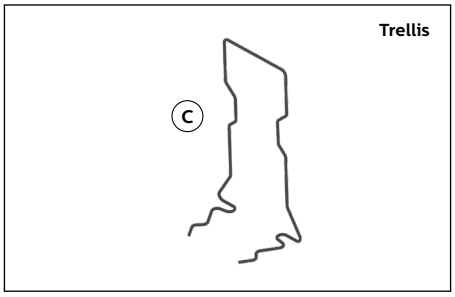
Accessories for module



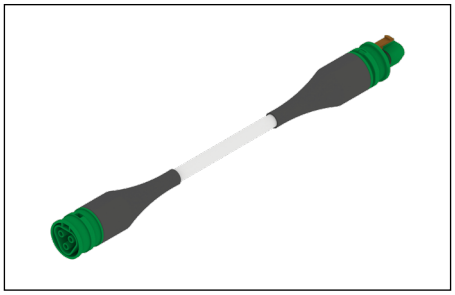
GPL bracket toplighting NAM



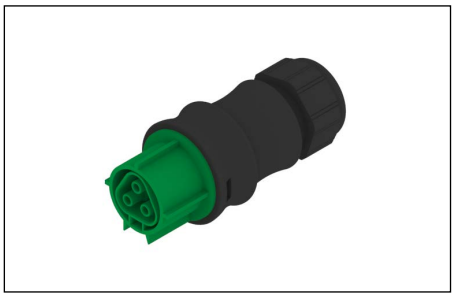
GPL bracket toplight_2.0/2.1 TRE 50



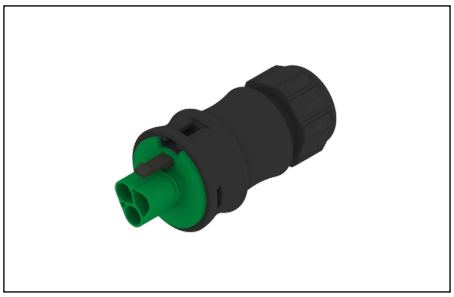
GPL bracket toplight_2.0/2.1 TRE 60



GPL toplighting jumper EU



GPL toplighting female connector



GPL toplighting male connector

End cap

Crop protection and cleaning products

Use of cleaning agents, crop protection products and other chemicals

Philips Horticulture GreenPower LED products are engineered to meet the highest standards in daily usage and are compatible with the most commonly used crop protection products and cleaning products in the field. However, there are some crop protection products and cleaning agents that may damage the protective surfaces of the GreenPower LED products and should be avoided.

Please ensure that you take the following instructions into account when cleaning the GreenPower LED products, your facility, or when using crop protectors.

Cleaning GreenPower LED products

- Turn off and disconnect the power before cleaning the product.
- Use a soft damp cloth to remove dust or dirt from the GreenPower LED product.
- Do not use rough or coarse-grained materials, scouring pads, bleach or solvents.
- The use of a non-approved cleaning product or solvent could scratch or damage the GreenPower LED product.
- Do not wipe the GreenPower LED product with a dirty cloth as this may leave a residue, scratch the lenses or reduce the light output.

Compliance with international standards

The GreenPower LED toplighting module has been tested for and complies with the following international standards:

Test	Stress type	Standard
Mechanical integrity	Static cable pull	
	Dynamic cable pull	
	Bump test	IEC 68-2-29 Eb
	Vibration variable test	IEC 68-2-6
Endurance	Cold temperature storage	IEC 68-2-1 Ab
	High temperature storage	IEC 68-2-2 Bb
	Damp heat (temp. humidity)	IEC 68-2-30 Db
	Temperature shock	IEC 68-2-14 Nb
	Ingress protection	IEC 60529 IP66
Quality / Environment	Environmental standard	ISO 14001
	Toxic materials	RoHS
EMC	Generated disturbances to the environment	EN 55015
		IEC 61000-3-2
		IEC 61000-3-3
	Immunity	IEC 61547
Safety		IEC 60598
		IEC 62471
		UL 8800
		CSA c22.2 No. 250.0-08
Approval marks	Approval marks GreenPower LED toplighting	ENEC
	Declaration of conformity	CE
		cULus
		FCC

Document order number: 4422 944 05672 A
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Data subject to change

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