HYPERION
Grow Lights

Hyperion Installation & Maintenance Manual 2018

HYPERION
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Introduction

Plessey's Hyperion 1750 LED Horticultural Grow light fixture is designed to provide plants with Photosynthetically Active Radiation (PAR). This is achieved by supplementing or replacing natural daylight with an LED generated light spectrum proven to enhance plant growth rates and yields. The product is suitable for large scale commercial greenhouse, hydroponic and research installations and is 1:1 equivalent to a 1000W HPS grow light

The fixture is constructed from die cast aluminium with a corrosion proof white powder coating. The light engine is made up of state of the art LEDs arranged to maximize output and uniformity. With externally mounted driver and easily removable fan the fixture has been designed to last and is backed up with a 5 year/25k hour warranty.

Specification Summary

Value	Data
Input Voltage	200 – 480V AC@ 50/60 Hz
Input Current	1.7 Amps(1)
Power Consumption	600 - 700W
Power Factor	>0.95
Inrush current (Startup)	40A (twidth=1100µS measured @ 50% Ipeak)
Wavelength Range	450 nm to 730 nm
Working Temperature	0° to 35°C
Fixture Temperature	50°C(2)
PPF + NIR	1600-1800 µmol/s
Efficacy	2.4 – 2.9 µmol/j
Warranty	Up to 5 years/25000 hrs
Fixture Weight	18.95kg(3)

Notes: *@ 400V AC Input Voltage (1)*
@ 25°C Ambient (2)
Based on standard bracket specification. Alternative designs will vary (3)

The values in the table above are provided as typical values, and not a performance claim specific to any individual product. Performance will be dependent on spectrum and customer specific options.

Photosynthetic Photon Flux and connected electrical load are subject to tolerance of +/- 10%. For the purposes of this document Photosynthetic Photon Flux is measured between 380nm – 780nm with each wavelength weighted equally.

The Hyperion 1750 has been tested by an accredited independent laboratory to LM-79-08, (BS) EN 13032-4:2015 and CIE S025:2015 test standards. Information can be supplied upon request.

⚠ Safety ⚠

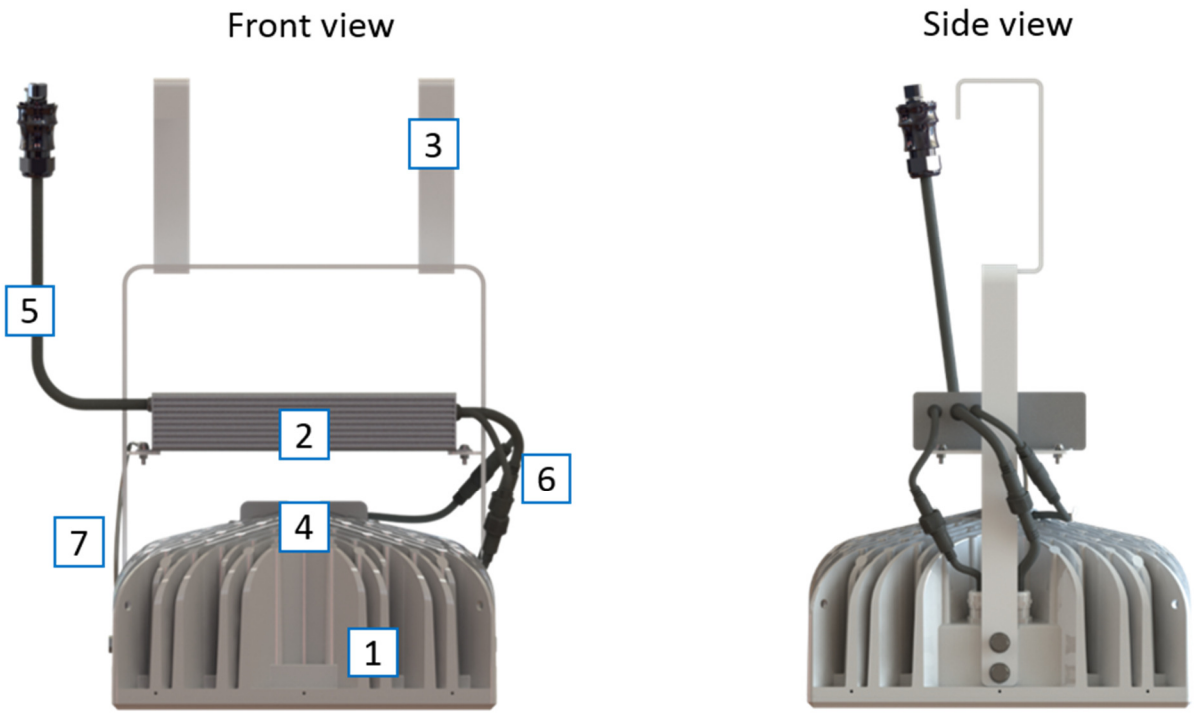
The Hyperion fixture does not radiate harmful wavelengths of light but like many high power artificial lights, users should not look directly at the fixture whilst the light is on.

Care must be taken when assembling, fitting or handling to prevent personal injury or damage to the product. This light fitting must be installed by a competent person in accordance with the local Building and Electrical Regulations.

Plessey cannot accept any liability for loss, damage or premature failure resulting from inappropriate use. Plessey can advise on installation requirements including how to achieve the desired amount of light and uniformity.

Should the fan fail or the fixtures ability to actively cool be inhibited the LED Printed Circuit Board (PCB) will run hotter. This increase in temperature is registered and fed back to the driver. Upon hitting a certain safety threshold the driver will reduce the power to the PCB. This causes a noticeable drop in light output to approx. 1000umol/s depending on spectrum and protects the fixture from overheating. The driver has a built-in thermal protection so should it overheat the power will be cut.

Fixture Components



1. Hyperion fixture/lamp
2. User replaceable driver assembly mounted on mounting hook
3. Fixture bracket arm with mounting hook
4. User replaceable IP68 rated fan with power cable
5. Main supply input cable with green or black male Wieland plug. Power supply cables need to be fitted with matching Wieland female plug (green or black).
6. Driver output power and control cables. Control cables allow feedback to monitor fan status and dim driver to 1000 µmol/s if fan fails
7. Driver earth harness

Light Spectrum / Intensity

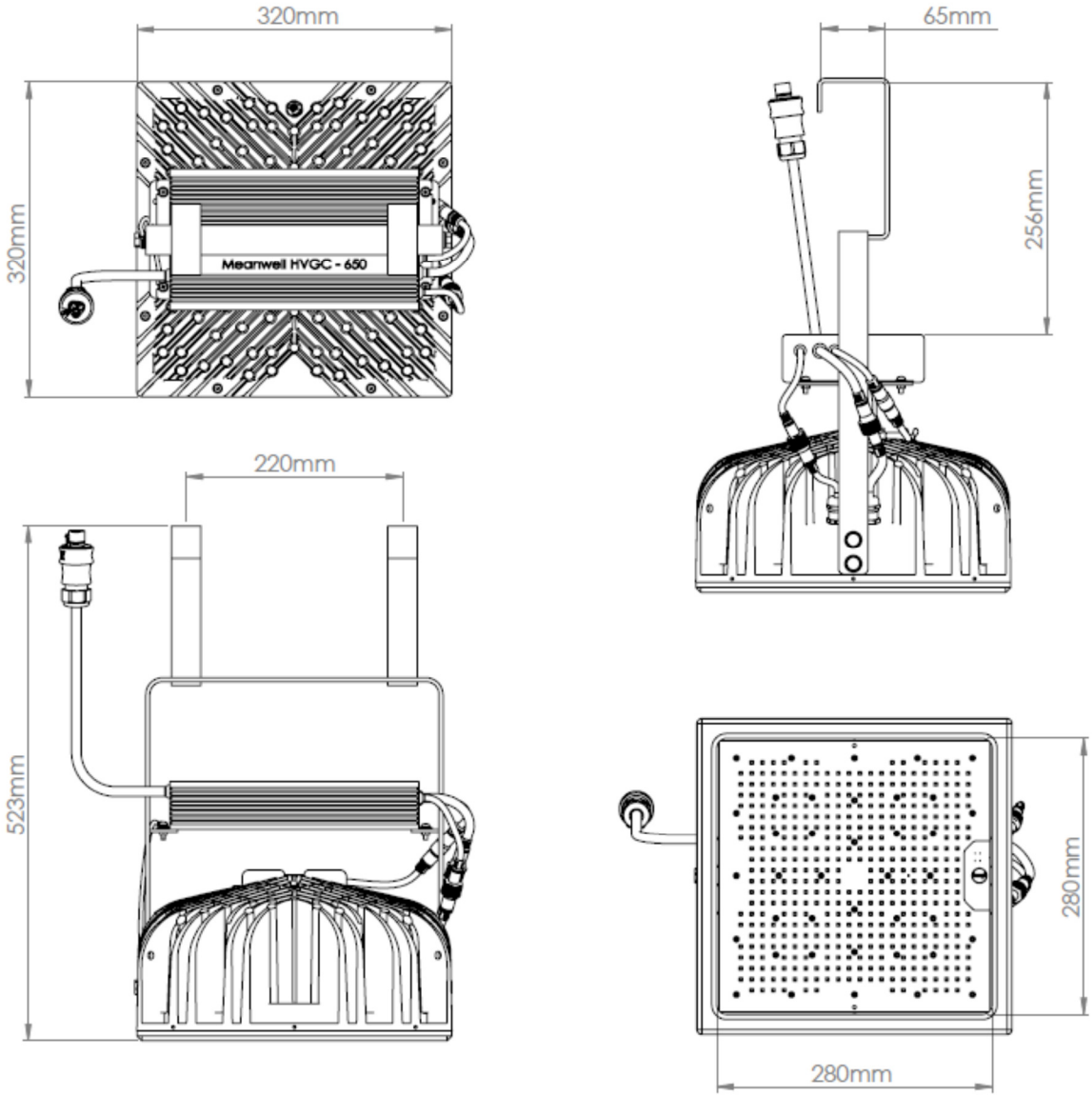
The Hyperion comes with a set of standard Spectrums which cover most commercial greenhouse applications. Plessey will provide Agronomy support to ensure the optimum spectrum is selected for any given crop. Plessey can also provide customised spectrums for volume orders should this be required.

High Red Spectrum			High Red + White			High Red + High White		
LED Colour	Wavelength	%	LED Colour	Wavelength	%	LED Colour	Wavelength	%
Far Red	730nm	2	Far Red	730nm	2	Far Red	730nm	4
Red	660nm	96	Red	660nm	91	Red	660nm	84
Blue	460nm	2	Blue	460nm	2	Blue	460nm	2
			White	4000K	5	White	4000K	10

The intensity of light received by the crop is very important in achieving optimum growth. The number of lights and their distance from the crop will affect this significantly. Plessey's agronomy & engineering support will recommend an intensity level based on the client's crop and growing environment.

Dimensions

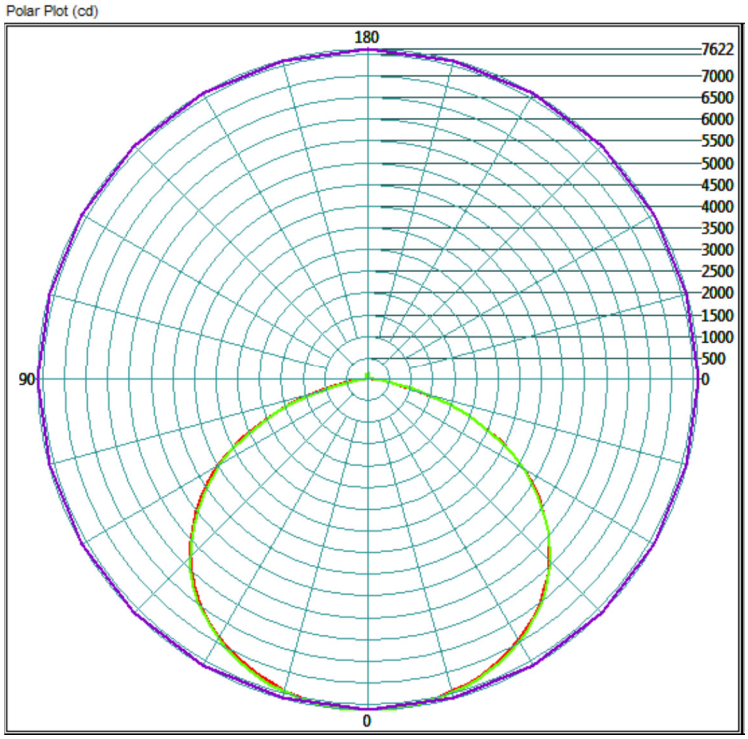
Below image of standard fixture including primary bracket. It is important clients provide relevant safety information on equipment and material within close proximity to the installed fixtures. Energy, light and other greenhouse screens could affect the safe mounting height of the fixture so its important brackets allows for this in its design.



Mounting Position / Uniformity

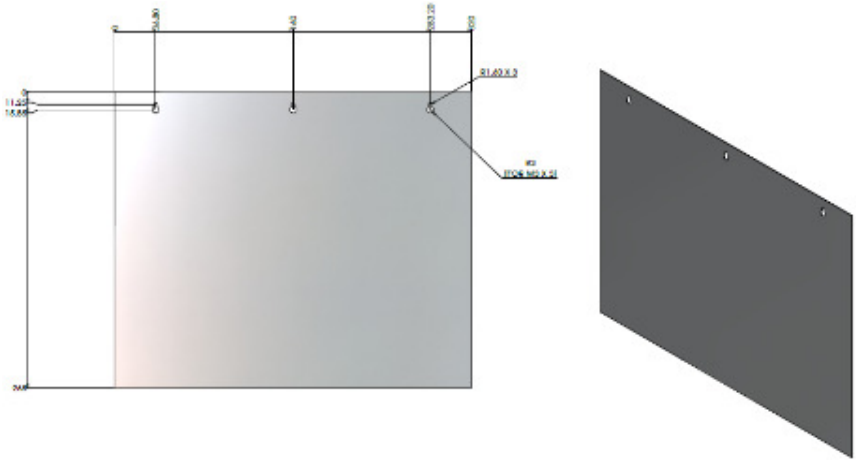
Plessey has adopted a similar approach to conventional HPS light fixtures with the fixture being designed to work well from existing greenhouse structures like Trellis sections. Choosing to fit Hyperion fixtures to trellis offers significant advantages by reducing shading, reducing install costs and providing containment for wiring. The dimensions of a client's greenhouse and in particular bays contained within it will affect the uniformity. Hyperion can also be mounted to C Profile or other metal work which provides growers greater flexibility.

The Hyperion product range contains LEDs with a wide 120 degree beam angle (FWHM) which works very well at distributing light over large areas. Based on the determination of Spectrum / Intensity and preferred mounting position Plessey will create a lighting simulation which will determine the number and position of the fixtures.



As an option, Hyperion can be fitted with a reflector on any of the 4 sides of the unit.

The reflector can be attached to units at the edges of an installation to reflect the light back into the main lit area, avoiding light spilling outside the glasshouse or into a different compartment/area. This helps maintain light uniformity over the whole lit area



Mechanical Considerations

Once the position and quantity of the fixtures has been decided the client must check with greenhouse installers and engineers that the integrity of the structure can withstand the overall and point load brought to bear by the installation of the fixtures.

A suitable means should be chosen to mount the fixture. Below are illustrations of common mounting methods Plessey has provided to its customers. These can be adjusted and modified to meet customer requirements. Consideration should be given to existing or planned glasshouse infrastructure like light and energy screens, watering systems and automation equipment.

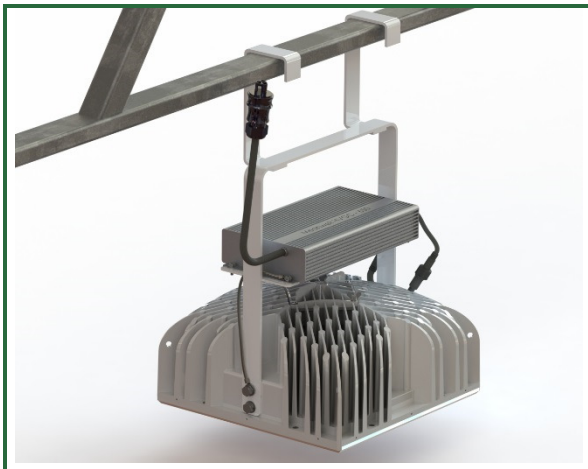


Fig.1 – Hook Configuration

Fig. 2 Bolt through Configuration

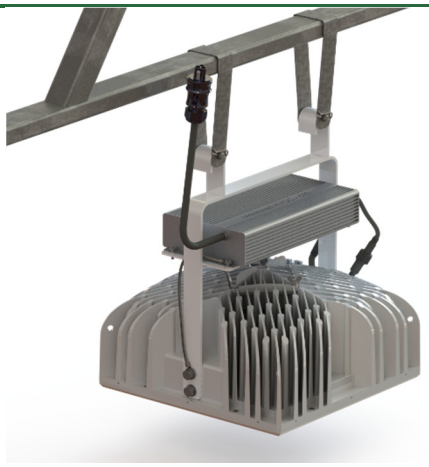


Fig.3 – Customised Strap Configuration

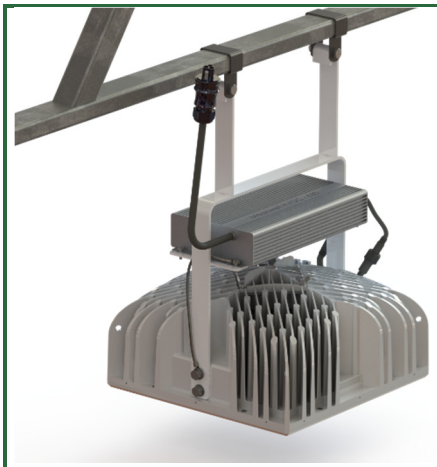
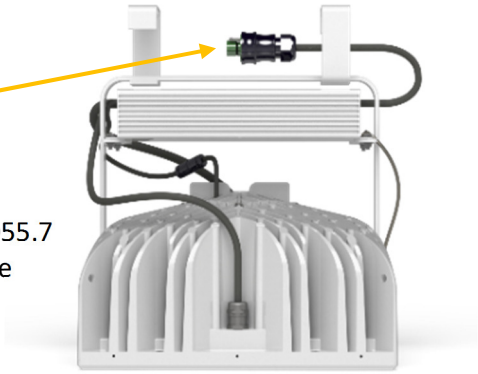


Fig. 4 Third Party Bracket configuration

Electrical Connection Considerations

The Hyperion grow light is supplied with an external driver which is mounted on the hanging bracket supplied with the fixture. The fixture has been optimized to run on a two phase input from a 3 phase 400V supply. However, the product can operate within a wide range of supply voltages. Ask for more details.

The fixture is prewired with a Wieland male connector for attaching to the greenhouse lighting supply wiring as per the customers requirement. See image opposite.



For new Installations Plessey recommends the Wieland (Green) 96.032.4055.7 However, for HPS replacement a Wieland (Black) 96.032.4053.1 may be more suitable.

The greenhouse lighting supply wiring should be terminated with the corresponding connector which is Wieland RST20i3 400v 3 pole female connector (green) to plug into the driver Wieland part no. 96.031.4055.7 or 96.031.4053.1 if using the Wieland (Black) connector system. See image opposite. The position of the female connector should be in close proximity to the position of the fixture and provide adequate strain relief / support for the fixture wiring.

For new build large installations, it is recommended that a pluggable wiring system is pre-installed. Pre-made lengths of power cable with a female connector are available. Wieland part number 96.232.1035.7 through to 96.232.8035.7 (8x variants from 1m to 8m) See image opposite for an example of a pre-made cable.

Plessey can assist installers with cabling determinations and supply requirements.

⚠ Important Information ⚠

The Ingress Protection of any termination performed by the client must preserve the ingress protection of the fixture in order to maintain product warranty.

It is important in large installations that the pairs of phases are swapped and evenly distributed throughout the installation to avoid overloading one phase of the supply.

Once installed, free from all packaging materials and connected to the fixed wring system the product can be switched on with no further commissioning.

Electrical Design Considerations

Running Current = Input Power / Supply Voltage

For example if supply voltage is 400V

684 / 400 = 1.71A

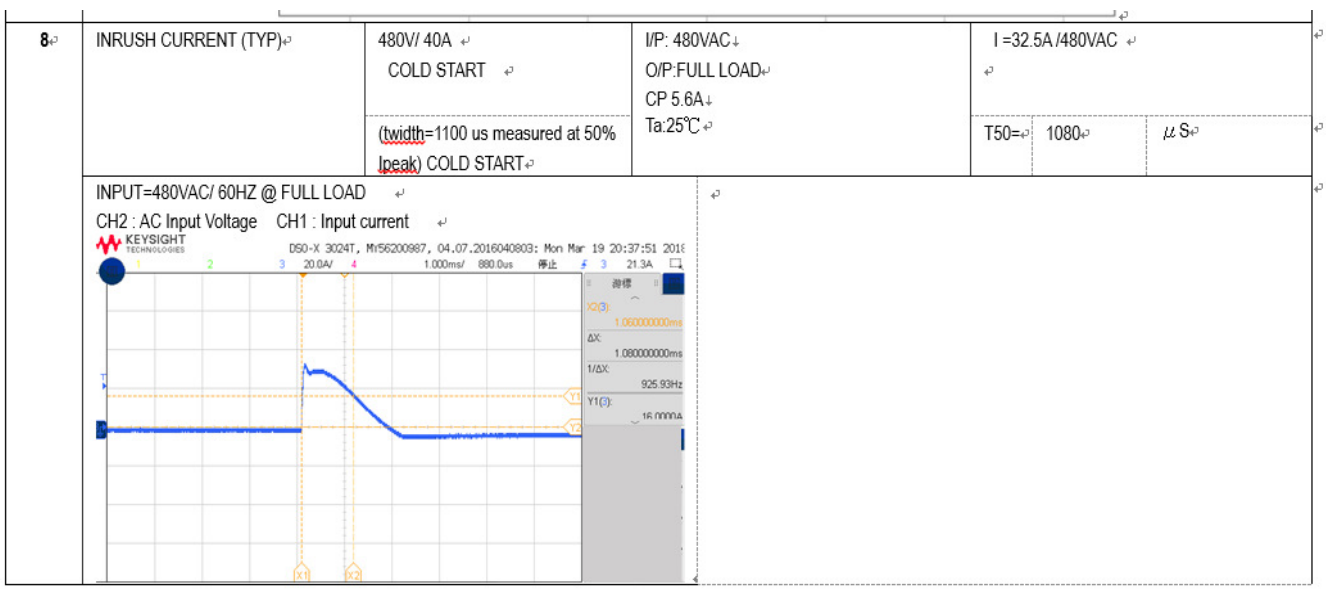
A corrective device and supply cable should be chosen by applying

It > In > Ib

Where,

It = Cable current carrying capacity, In = Protective device rating, Ib = Circuit design current

Hyperion's are supplied with a state of the art Power Supply referred to as a driver. The primary job of the driver is to convert the high voltage ac supply into a lower voltage dc supply suitable for the Light Emitting Diode's (LED's). It is important that it does this efficiently so the driver has circuitry which corrects power factor. The consequence of this power factor correction is that the fixture has substantial capacitance which causes a very short but significant inrush current on start up. This can be up to 40A for 1100 µS measured at 50% of peak. See below.

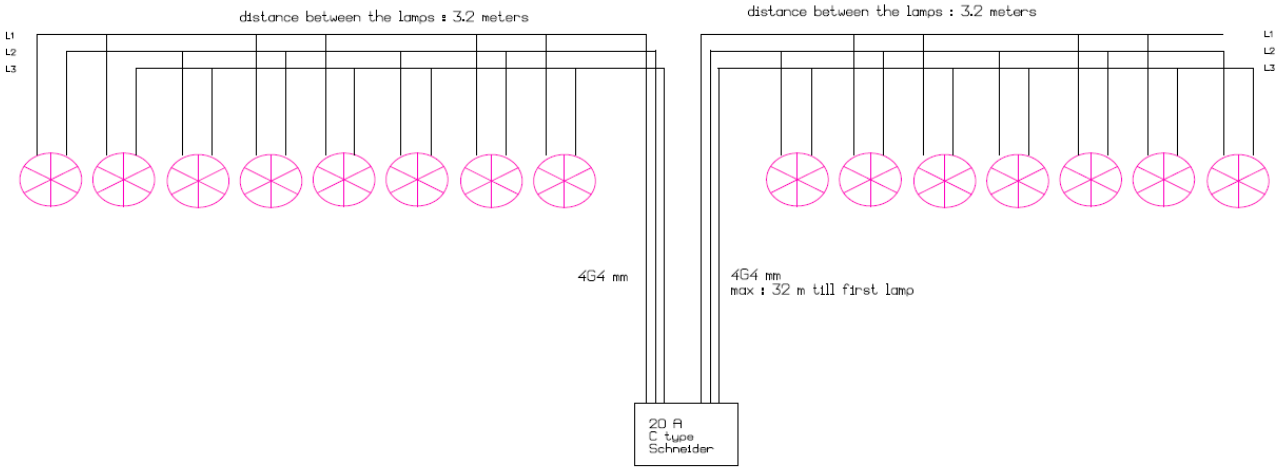


Hyperion Inrush current waveform

It is important therefore when determining which circuit breaker to use that it is suitable for the number of fixtures it is going to protect.

The following example is representative of a typical electrical lighting circuit for a greenhouse. In this example the chosen circuit protection is a three phase MCB 20A Type C from Schneider Electric.

The circuit has 15 fixtures wired across 3 phases as detailed below



Example final circuit design

In this configuration one 3 phase MCB is protecting 3 circuits so we can treat the inrush problem as 5 fixtures per phase.
However, we need to work out (Ib) per phase

$$\text{Ib per phase} = \frac{\text{Fixture x Current per Fixture}}{\sqrt{3}}$$

$$\text{Ib} = \frac{15 \times 1.71}{\sqrt{3}}$$

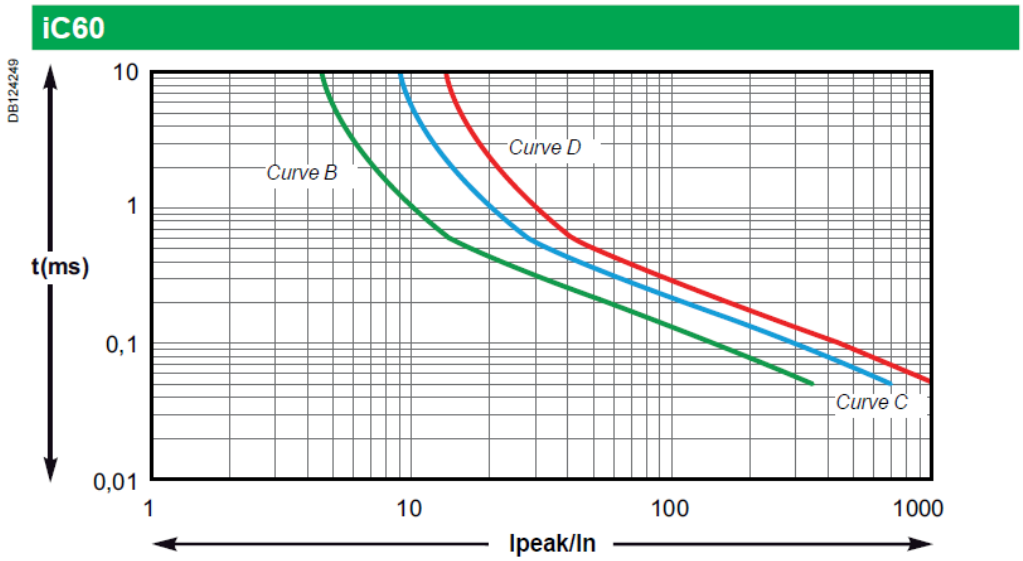
In per Phase = 14.8A

Therefore, a 20A MCB is suitable to protect the design load. Providing the cable has suitable current carrying capacity.

Manufacturers for protective devices provide documents relating to tripping curves under IEC/EN 60898-1 and IEC/EN 60947-2 standards. However, due to the very brief nature of capacitive inrush currents these standard curves do not provide sufficient detail about the magnetic portion of the trip.

Installers should request manufacturers provide tripping curves for high inrush currents that appear during the first milliseconds of operation.

The response of the 20A Schneider Electric MCB can be evaluated from the following graph.



MCB Manufacturers instantaneous response curve

The fixture has a potential inrush of 40A for 1100 µS therefore the circuit has a potential inrush of 5*40A = 200A for 1100 µS per phase. It would suggest that a 20A 3 phase MCB with type C curve is capable of handling up to 19*40 = 760A in this time period.

This is an example and should not be treated as the rule. It is very important that installers check with circuit protection manufacturers that the chosen circuit protection is suitable for their design.

It is also important that installers consider volt drop when determining loads on cables and cable size.
This is particularly important in greenhouse installations where the potential for circuits covering long distances is common.

Hyperion drivers are capable of working with a wide range of voltages but installers should design to local regulations and limits. IEC 60364 provides guidance and limits on volt drop provision.

Hyperion Drivers have been independently tested and comply with following Electromagnetic Compliance legislation;

EMC Emissions Compliance to EN55015, EN61000-3-2 Class C (@ load≧50%); EN61000-3-3, FCC Part 15 class B
EMC Immunity Compliance to EN61000-4-2,3,4,5,6,8,11, EN61547, light industry level (surge immunity Line-Earth 8KV, Line-Line 4KV)

Note: The above steps are intended to provide guidance to installers but different installations in different regions may require alternative approaches. Plessey will make every effort to assist in establishing a feasible design.

Installation

The erection method for any Hyperion variant will ultimately depend on the bracket solution but the hanging concepts are broadly the same. The fixtures arrive boxed / crated. It is recommended that the polythene bag is kept on the fixture until the point of installation.

They should be removed from the crate and placed facing down on a smooth soft surface. Use the Polystyrene insert provided to avoid collecting scratches and detritus on the lens. Each fixture should be inspected to check for condition and shipping damage.

Due to the fixtures weight it is recommended that they are installed with the aid of powered access and work platforms. Fixtures with brackets of the simplest form can simply be raised and hooked onto the trellis section. If energy and light screens are an issue installers may need to use option 3 /4 which requires a first fix of the secondary strap bracket. Then the fixture can be simply hooked onto it.

In all cases the input plug should then be connected to the supply wiring. Where possible it is recommended that cables are not secured on the fixture side of the plug. This will help should the fixture need to come down or if the driver needs changing in the future. All packaging materials must be removed before switching the units on.

Maintenance

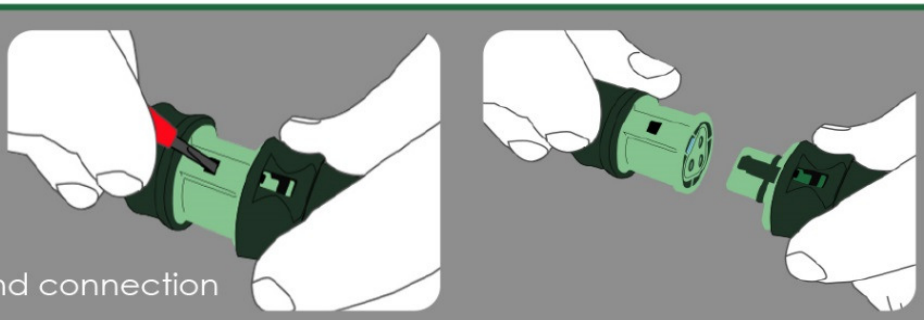
The Hyperion 1750 has been designed so that both the driver and fan are user replaceable.

HYPERION FAN REPLACEMENT

THE FOLLOWING STEPS DESCRIBE HOW TO REPLACE THE FAN

① Isolate supply.

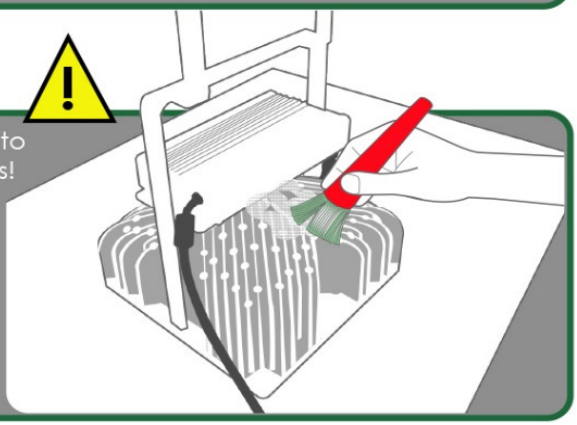
Unplug Wieland connection

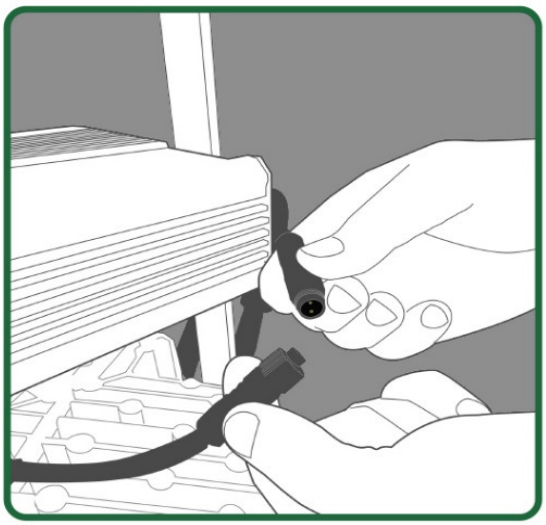


IMPORTANT

Care taken Not to scratch the glass!

② Take down the Hyperion and place on a flat workable surface. Clean and remove any detritus from heatsink and fan area.

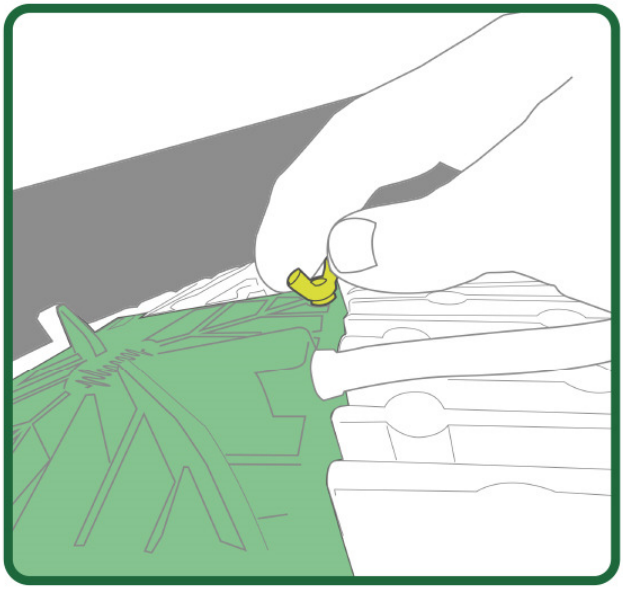




③ Unscrew plug securing nut and pull firmly on both ends to separate.

Note: Each output plug and socket assembly is unique so only the correct plug can fit any given socket.

HYPERION FAN REPLACEMENT CONTINUED



4

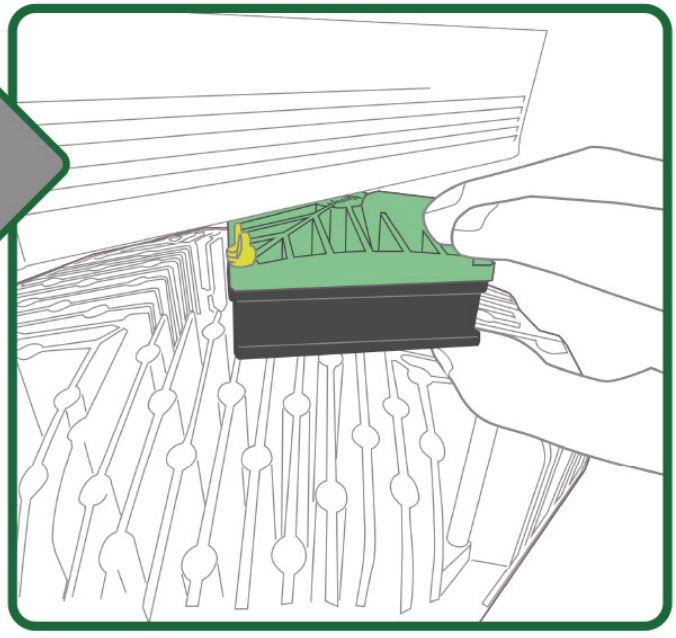
Unscrew all wing bolts.

Note: Careful not to lose the washers.

5

Firmly pull on fan cover and the fan assembly will lift out of the heatsink recess.

Slide fan out between driver and heatsink.



Replacement is the reverse of the above (Ensure correct orientation of plug and cable before re-securing).
It is also suggested that the opportunity to clean the lens is taken whilst performing maintenance.

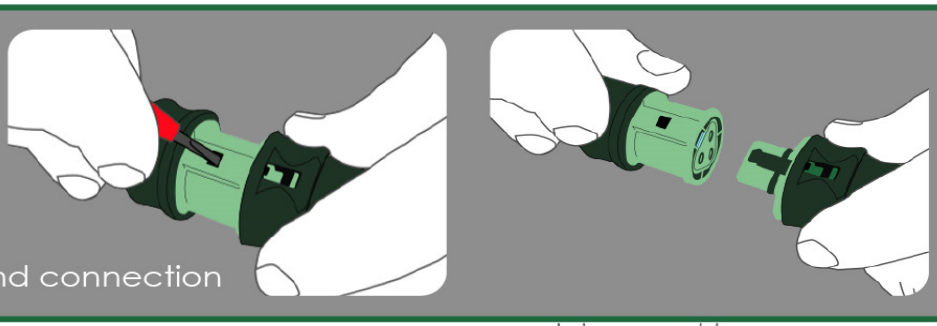
Hyperion has been designed to have its LED driver externally mounted. This has a number of benefits including cooling, lifetime and allowing it to be user replaceable. Typical symptoms of driver failure include fixture not turning on, fixtures turning on for a short while then turning off or fixtures flashing on and off.

HYPERION DRIVER REPLACEMENT

If the Driver needs to be replaced and the fixture has been in operation for a long time, it is recommended that the fan is replaced at the same time.

① Isolate supply.

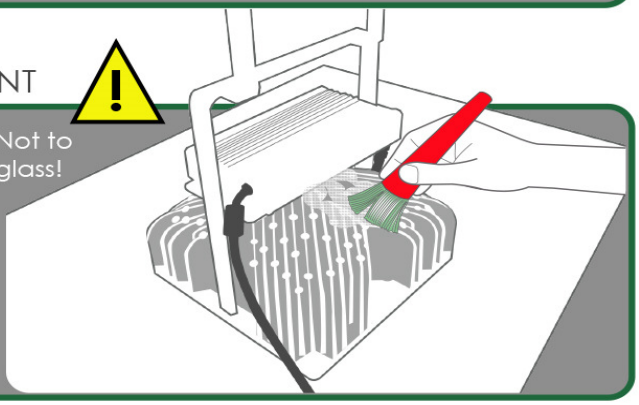
Unplug Wieland connection

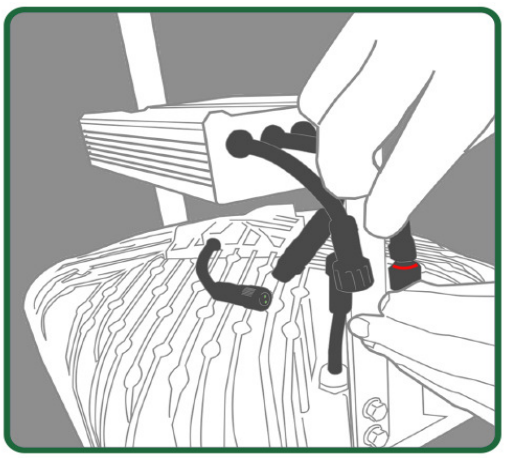


IMPORTANT

Care taken Not to scratch the glass!

② Take down the Hyperion and place on a flat workable surface. Clean and remove any detritus from heatsink and fan area.



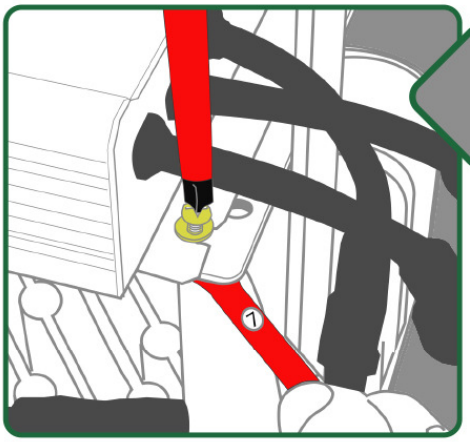


③

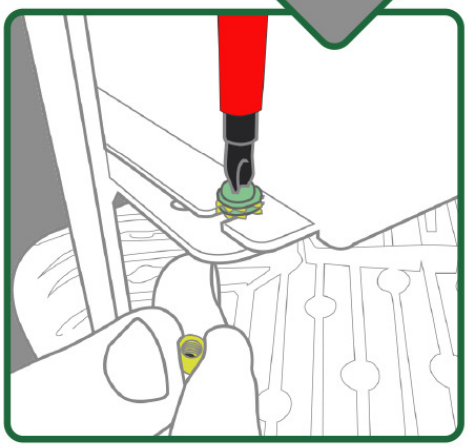
Unscrew plug securing nut on all output cables and pull firmly on both ends to separate each one.

Note: Each output plug and socket assembly is unique so only the correct plug can fit any given socket.

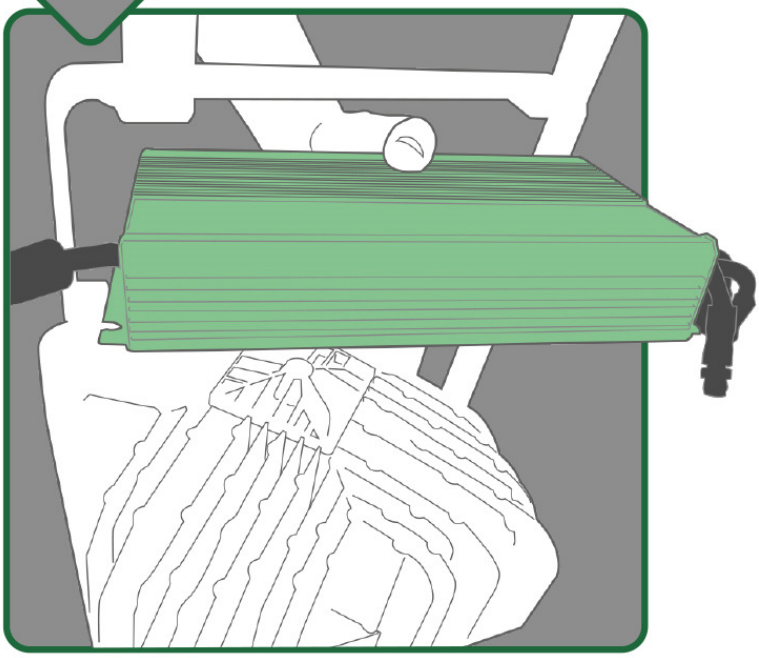
DRIVER REPLACEMENT CONTINUED

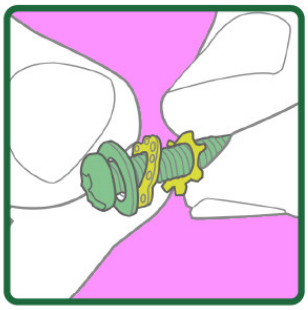


Unscrew all screws securing the driver to the bracket mounting plates. ④

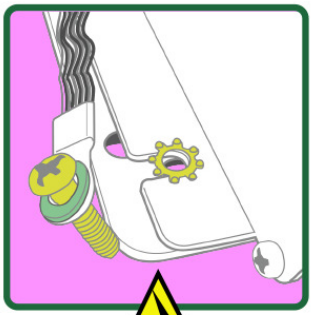


⑤ Lift out driver





Note: Please ensure the washers are arranged in order shown. Careful not to lose fastenings.



Note: Replacement is a reversal of removal.

IMPORTANT

The earth harness must be reattached for purposes of product safety.

Other Failures

The design of the Hyperion LED Printed Circuit Board provides for an element of fault tolerance. If a single LED were to fail the remaining LEDs will be able to operate normally with minimal impact on fixture output.
Several LEDs failing on a fixture would suggest the fixture is not operating correctly and should be turned off.
The PCB is not a user replaceable part. It is screwed to the heatsink and is protected with the glass cover and surrounding bezel. This assembly forms the IP66 protection for the PCB. Entering this space would invalidate customer warranty and could potentially damage the fixture further.

PCBs can be repaired or replaced by Plessey. Fixtures will need to be returned whole for this to be done. Contact Plessey customer care for assistance.

Cleaning

It is very important that in order to maintain product performance and lifetime that the fixture is kept clean. Plessey recommends lights are cleaned every 3 months depending on environment.
The fixtures can be hosed clean from ground level. The fixtures should not be running when doing this and they should be allowed to drip dry before turning on again.

It is recommended fixtures should have a more thorough annual inspection and clean. Detritus should be removed from the heatsink fins and fan cover. Lenses should be wiped clean to remove any ingrained dirt.
Greenhouses can be hot and humid environments. Pesticides, cleaners and fertilizers have the potential to degrade the lifetime of the light fixture. Regular cleaning helps reduce the build-up of these materials and maintain the manufactured corrosion protection.

When using harsh cleaning chemicals to disinfect the green house ensure the lights are protected and rinsed clean afterwards.

Disposal

When the light fitting comes to the end of its life please do not dispose of it within the general waste, please recycle where facilities exist. When you need to dispose of this fitting, check with your distributor or local authority for suitable options. New regulations require the recycling of Waste from Electrical and Electronic Equipment (European “WEEE Directive” effective August 2005—UK WEEE Regulations effective 2nd January 2007). Environment Agency Registered Producer: WEE/MM3672AA.

Warranty

It is expected that the customer maintains the fixture during the warranty period by following the maintenance and cleaning details within this document. Should a failure occur, Plessey will repair/replace the fixture promptly.

Legal Notice

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