

Tunable**GROW**[™] Horticultural Lighting System

- Replacement For HPS
- Tunable, 4-Channel Adjustment
- Factory Configurable
- Typically, 1.9 $\mu\text{moles/s/W}$ (PPF/W)

A photograph of a field of lettuce plants, likely in a greenhouse or grow room. The plants are arranged in rows and are illuminated with a rainbow-colored light gradient that transitions from purple on the left to red on the right. The text "The first true LED alternative to double-ended HPS for commercial growing." is overlaid in white, bold font across the bottom half of the image.

**The first true LED alternative to
double-ended HPS for commercial
growing.**



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Product Overview

Hailux Lighting's TunableGROW Horticultural System is a 4-channel tunable, 420W (HPS 1000W equivalent), factory configurable LED Grow Light.

The factory standard TunableGROW is delivered with a combination of:

- Red/Near IR (600nm-750nm)
- Hailux HPS Spectrum (400nm-750nm)
- Blue (400nm-500nm)
- UV (380nm-400nm)

...Chip-On-Board (COB) LEDs optimized for a plants photosynthesis process, with each being tunable to match the different phases of a plant's growth cycle.

Hailux Lighting's engineering team developed the TGS-1000 Horticultural System to solve several problems faced by commercial indoor horticultural growers, as the industry transitions from double-ended HPS lighting to the more efficient, and more productive, LED horticultural lights.

1: Retrofittable: Replacement for Existing HPS Installations

Historically, the most common light source currently used in the indoor farming industry is High-Pressure Sodium (HPS). However, due to HPS's high-power consumption, excess heat and the need to remove that excess heat from the growing area; this, combined with the inability to adjust the light spectrum renders HPS an inefficient solution for indoor farming in comparison to LED technology.

HPS lights are, typically, installed 4' to 20' above the grow bed and are, typically, not adjusted in hanging height during crop growth.

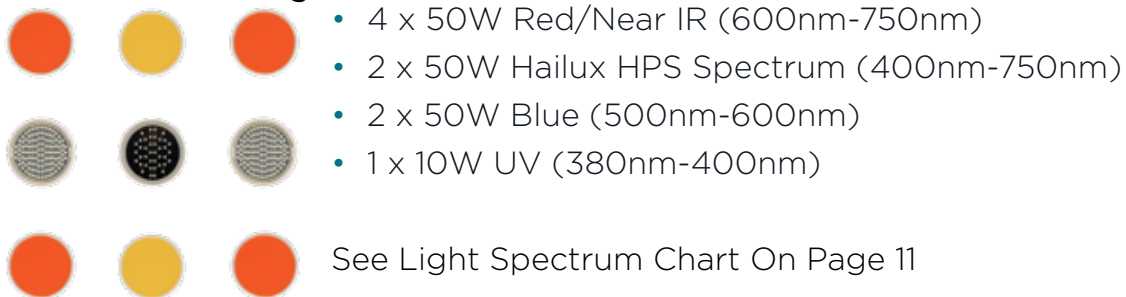
The TGS-1000 Series (4 individual models) are replacements for HPS lights, for applications up to 20' above the grow bed, simply remove the HPS light and replace it with the model of TunableGROW that matches the height of the HPS light installation. Each TunableGROW model will provide the same received-light grow-bed footprint and desired PPFD (Photosynthetic Photon Flux Density) for their specified hanging height, of between 4' and 20' depending on product model.

Product Overview

2: Configurable: The Mix of LEDs Can Be Changed To Match Each Grower's Preferences

Not every grow light meets the requirements of every indoor grower out-of-the-box. The TGS-1000 series is factory configurable, where the LED color combination can be changed to the grower's specifications.

Standard LED Configuration



However, this combination can be readily changed (at the factory, pre-delivery, order minimums apply).

If a grower has their own unique 'light recipe,' the TunableGROW can be configured accordingly.

3: Tunable: Adjust the Ratio Of Each Of The Color Channels To Match The Plant's Growth Cycle.

A plant's photosynthesis process has different light requirements throughout the plant's growth cycle, and different growers have differing needs from their grow lights.

The power (PAR levels) of each of the channels can be adjusted, via on lamp controls, to meet the needs of each plant's growth cycle to maximize productivity or to meet the particular needs of a grower.



Product Overview

4: One Grow Light, Multiple Applications.

The TunableGROW Horticultural Series comprises of four products:

- TGS-1000W is a direct replacement for a 1000W HPS light installed at a maximum of 4' above the grow bed
- TGS-1000H1 is a direct replacement for a 1000W HPS light installed at the height of 4' to 8' above the grow bed
- TGS-1000H2 is a direct replacement for a 1000W HPS light installed at the height of 8' to 16' above the grow bed
- TGS-1000H3 is a direct replacement for a 1000W HPS light installed at the height of 16' to 20' above the grow bed

In addition to solving these issues which have plagued the fledgling industry, the TunableGROW Horticultural Lighting System is lightweight, reliable and will increase plant productivity while reducing energy costs.

Features

- 420W, 1000W HPS equivalent
- 65% to 70% more efficient than HPS
- Tunable, 4-channel adjustment - each color channel can be adjusted independently of each other
- 1.9 $\mu\text{moles}/\text{sec}/\text{W}$ (PPF/W) at the light fixture from 2.1 $\mu\text{moles}/\text{sec}/\text{W}$ (PPF/W) at the LED light source. The reduction in PPF/W between the source and the fixture is due to LED driver efficiency.
- LED color combination is factory configurable
- Designed for compliance to UL1598 (Pending)
- 5 year warranty
- Drop-in replacement for existing HPS installations
- Four different models

To have the TunableGROW configured to your requirements (see example on page 11), please call (401.415.0222) or email our sales team (sales@HailuxLighting.com); and we will configure a TunableGROW with you preferred light recipe.



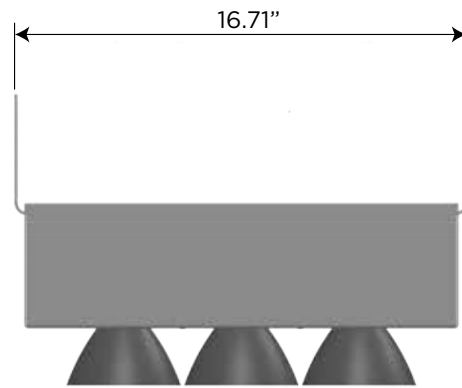
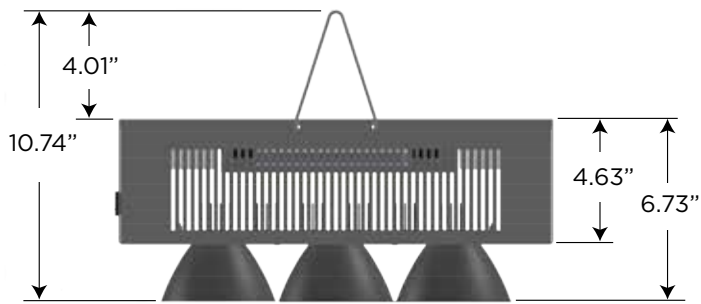
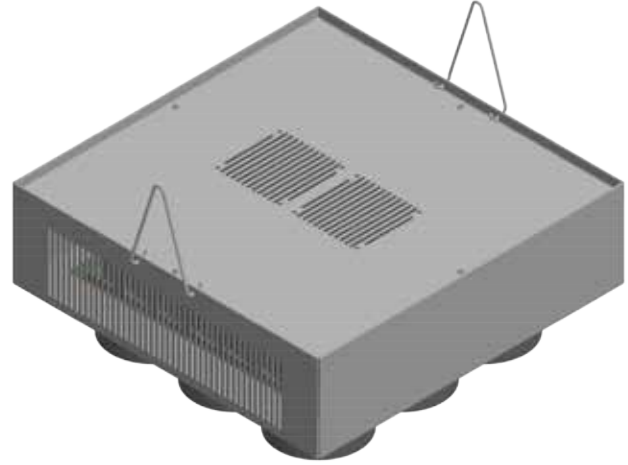
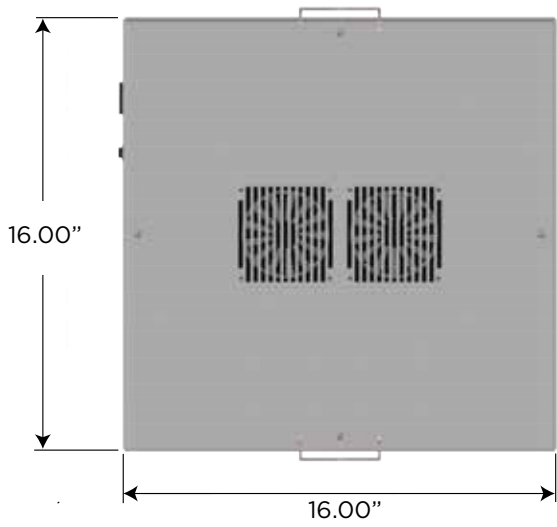
Ordering Information

Description	Order Number
Direct replacement for a 1000W HPS light installed at a maximum of 4' above the grow bed. No reflectors are installed.	TSG-1000W
Direct replacement for a 1000W HPS light installed at height of 4' to 8' above the grow bed. 38° reflectors are installed.	TSG-1000H1
Direct replacement for a 1000W HPS light installed at height of 8' to 16' above the grow bed. 23° reflectors are installed.	TSG-1000H2
Direct replacement for a 1000W HPS light installed at height of 16' to 20' above the grow bed. 10° reflectors are installed.	TSG-1000H3
TunabeGROW configured to your color specifications	Contact Sales
50' Length Power Cord, 240Vac	TSG-240-25-Cord
50' Length Power Cord, 110Vac	TSG-110-25-Cord

What's Included?

- TunableGROW Horticultural Lighting System
- Hangers, corrosion resistant
- 10' 110V Power Cord

Mechanical Data



Weight

25 lbs



Performance Specifications

Description	Min.	Typical	Max
Operating Voltage (Note 1)	100Vac		277Vac
Power Consumption	340W	420 Watts (1000W HPS Equiv.)	540W
Operating Current @ 120Vac		3.5 Amps	
Operating Frequency +/-5%	50		60
Power Factor		0.95	
EMI Compliance		FCC Part 15 Compliant	
Operating Ambient Temp.	0°		40°
Max. Continuous Relative Humidity (%)			70
Safety Compliance		UL1598 (Pending)	

Note 1: Unit can be operated safely as low as 90V (near brownout condition) but not recommended for continual operation.

Description	Min.	Typical	Max
Active Photo Flux (PPF) Total		800	
Photosynthetic Photon Flux Per Watt (PPF/W), Full Power		1.9 MicroMoles/m ² /s	
Emission Beam Angle		120°	
Light Output Power Adjust (With Potentiometer)	0%	Grower defined	100%
Heat Output			1300 BTU/hr (.4KW)
Spectrum Curves		See Page 11	

Glossary

Active PPF

Is a measure of the PPF produced by the TunableGROW that is used for photosynthesis using light in the 400nm to 500nm (Blue Light) and 600nm to 700nm (Red Light) only.

Unit of Measure: $\mu\text{moles}/\text{sec}$

CCT

A measure of the color temperature of light measured in Kelvin (K). Warm white is generally 2700-3500K and cool white is generally above 6000K.

HPS

High Pressure Sodium

PAR

Photosynthetic Active Radiation (PAR) this is a measure of light in the 400nm to 700nm wavelength range responsible for photosynthesis.

PPF

Photosynthetic Photon Flux (PPF) and is a measure of the PAR produced by a light for each second. Unit of measure: $\mu\text{moles}/\text{sec}$.

PPFD

Photosynthetic Photon Flux density, this is a measure of PPF over an area of 1m². Unit of Measure: $\mu\text{moles}/\text{m}^2/\text{sec}$

Why Replace My HPS Lighting System With The TGS-1000

- **Energy Efficient Cost Savings.** The TGS-1000 series is 65% to 70% more energy efficient than a typical HPS 1000W grow light considering the operating efficiency of the light and the HVAC system required to cool an HPS installation.

Industry Highest Active PPF. Active PPF is the PPF light energy that falls on the plant in the necessary 400nm to 500nm and 600nm to 700nm wavelength ranges. Active PPF is much more useful metric than the typical 'Overall' PPF metric which is used to measure HPS grow lights and all other LED grow lights.

- **Life Expectancy/Maintenance Costs.** Typically, HPS lights must be replaced every 18 months whereas the TGS-1000 will maintain productive light output and stable spectrum for 10 years, based on typical facility lighting on/off times.

- **Improved Harvest Rates.** More than 50% of the PPF produced by an HPS light in the green, yellow and Infra-Red spectrum has little impact on the growth cycle of a plant whereas 100% of the light energy produced by the TGS-1000 is effective.

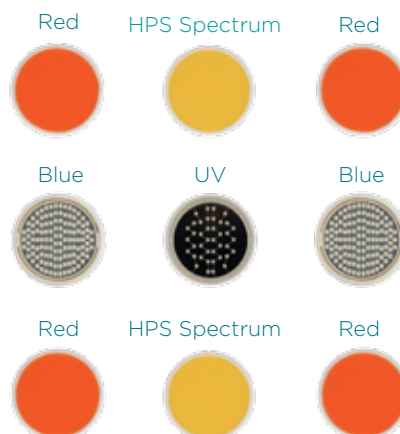
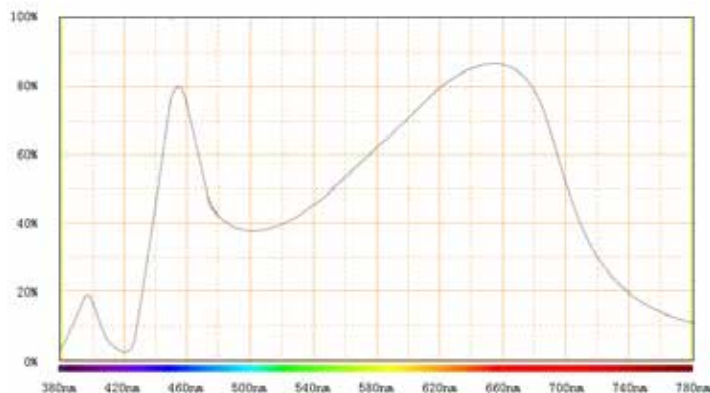
- **Tunability.** HPS lamps cannot be adjusted to promote optimum plant growth.

- **Vertical Farming.** HPS installations are incompatible with vertical farming installations.

- **Low Operating Temperature.** HPS lights have a surface temperature of approx. 250C° and cannot be placed close to plants unless used in conjunction with a high power HVAC system to extract heat.

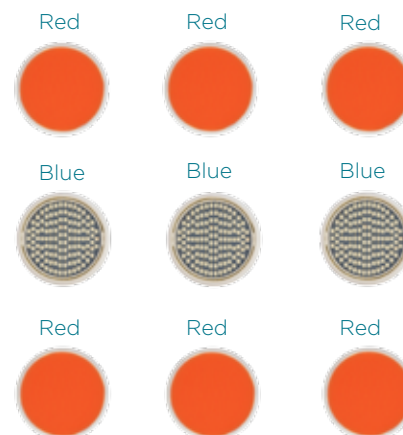
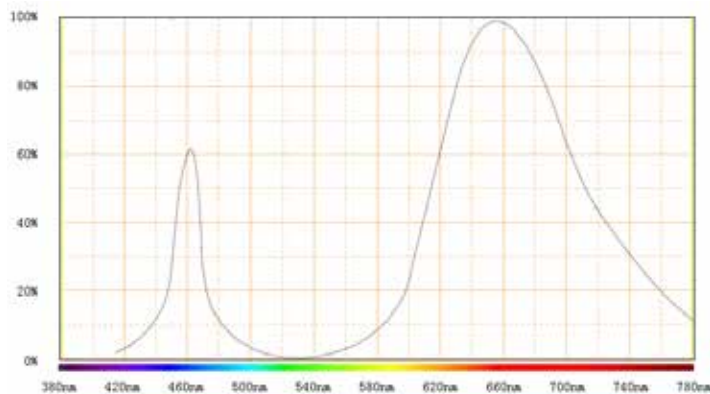
Spectrum Charts

Standard Configuration



This curve is produced when the standard TunableGROW's four channels are set to their maximum positions. If you need, for example, less UV, adjust the UV channel downwards, or all the way to zero, if desired. Each channel, red, blue, UV and the Hailux HPS spectrum can be adjusted independently of each other.

Example Of A TunableGROW Shipped With A Special Factory Configuration



TunableGROW's innovative, modular, design permits it to be 'factory configured' to meet the unique requirements of some growers by changing the combination of LEDs and LED drivers. If you need a different light combination, we will modify the TunableGROW's light spectrum.

In this example, the grower required red and blue wavelengths only. The factory configured the TunableGROW with red and blue 40W COB LEDs, in a 2:1 ratio, with three channel control. Two channels for red and one for blue.