FULHAM PRESENTS THE 2021

ASIA PACIFIC LIGHTING GUIDE

A RESOURCE FOR PAST & PRESENT LIGHTING INNOVATIONS & SOLUTIONS

FULHAM
Harness the Horsepower

WHAT'S NEXT? POSITRONIC IMPLANTS? TELEKINESIS?

From the dawn of time, we humans have strived to manipulate our surroundings through innovation. From the humblest beginnings – merely trying to lengthen our days with artificial light – to present day Wireless Connectivity, we've been obsessed with controlling our lighting. Our ability to do so has evolved thorugh the dogged effort and ingenuity of generations of curious, brilliant humans.

Light itself is a physical phenomenon. Electromagnetic radiation. Light is a universal raw material: photons, wavelengths, particles, optical receptors – remember Science 101? But Lighting is the conscious manipulation of Light, developed over thousands of years.

The latest development is Wireless Connectivity – producing and managing the most efficient lighting conditions possible, from anyplace at any time with the touch of a button on a hand-held device or per preset schedules. We owe this latest technology to the effort and ingenuity of centuries of gifted scientists. (What's left? Mind control?) In these pages, we review Wireless Connectivity and the strides we've made along the way.

THE SUN, MOON & STARS

This was Square One. But life couldn't come to a grinding halt just because the sun went down...

FIRE

Fire was good. It was humanity's first stab at producing light on demand. Fire sparked our entry into controlled lighting. Over the ages, it led to candles, oil lamps and gas lighting. Although fire produced cheery light, it did have its dark side, like accidentally burning down the house. Still, it was generally agreed that fire was… hot!

INCANDESCENT

The incandescent lamp ("light bulb") came into widespread use roughly a century ago. Light is produced by a heated, glowing filament sealed in a gas-filled (or vacuum) tube. Electricity surges in; a filament heats up; the bulb glows, produces light.

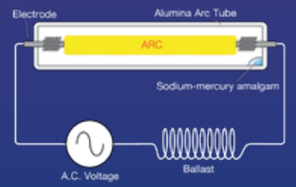
HALOGEN

Halogen lamps are souped-up incandescent bulbs with a tungsten filament. The filament is engulfed in inert gas, spiked with one of the halogen group of gases. When the tungsten heats up, its interaction with the gases triggers a chemical reaction.

During this halogen cycle, tungsten atoms stream from the bulb's inside surface and back onto the tungsten filament. The lamp can run safely at higher temperatures, can last longer, and has the added benefit of shining brighter per unit of electricity flowing through it.

HID

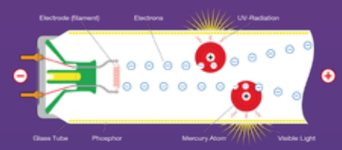
High Intensity Discharge (HID) lamps fall into the gas discharge lamp category. Their light output comes from electricity coursing between tungsten electrodes inside a tube filled with gas and metal salts.



Sparking the arc charges the salts into a "plasma" that glows intensely -- hence the word "intensity." Despite their brilliance, HID lamps consume less energy than incandescent or fluorescent lamps, delivering more lumens per watt.

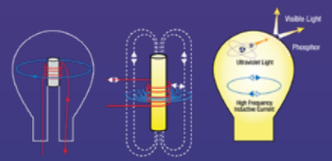
FLUORESCENT

Fluorescent lights are basically airtight tubes full of reactive gases that light up when electricity charges up their atoms, which then become... fluorescent. We even adapted this technology for specialty applications, such as UV germicidal purposes for purifying air and water, via modified lamps to kill germs. (See UV Germicidal Ballasts on page 47.)



Compact Fluorescent Lamps (CFLs) are often either pin-based replacement lamps or self-ballasted, screw-based lamps that operate using fluorescent technology in various residential and commercial applications, due to their relatively small sizes and lesser energy draw versus incandescent.

ELECTRODELESS TECHNOLOGIES



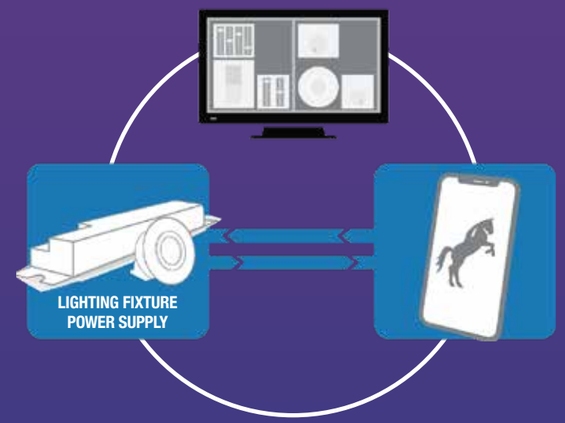
Induction

Plasma

Induction is essentially an offshoot of fluorescent technology but whose light-generating reaction uses an external electromagnetic field, rather than electrodes. It lasts longer than standard fluorescent, but as the cost of LEDs fell, the utility of Induction severely diminished. Plasma was dubbed electrodeless HID. Plasma is created by heat or streamed electromagnetism. Radiating microwaves transform certain gases and other materials into light-emitting plasma. This technology delivers remarkable illumination from tiny lamps, but the cost of these fixtures has made commercial adoption impractical.

LED

Light Emitting Diodes (LEDs) operate by electroluminescence – an optical phenomenon in which electrical current triggers light emission as it passes through semiconductor material. An LED light fixture is comprised of a fixture body, a diffuser lens, and an LED Light Engine. The LED Light Engine generally consists of an array of white (or color) LEDs placed on a printed circuit board (PCB) which is powered by an LED driver, an electronic component which precisely controls the flow of electricity through the LEDs to ensure both quality of light and long life. LED Light Engines are generally tailored to specific fixtures in order to meet efficiency, aesthetics, color consistency and life requirements.



WIRELESSLY CONNECTED LIGHTING CONTROL

Wireless Connectivity is to light what advanced music systems are to sound. Just as acoustic scientists created precise technologies to faithfully record, fine tune, control and distribute music within sound environments, today's lighting engineers have made equivalent advances in visual environments. Now one simple "smart" device can control a full range of lighting situations. You can program lighting to automatically manage a great variety of scenes, locally or remotely, by computer – even over the internet – from any place at any time with a handheld device.

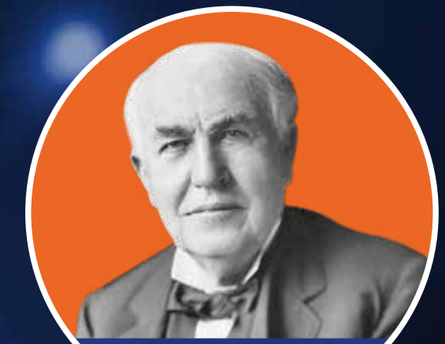
ON THE SHOULDERS OF GIANTS

According to the ancient parable he was citing, even a dwarf can see further than a giant if he stands on the giant's shoulders. Sir Isaac -- indisputably an intellectual giant himself -- modestly credited the "shoulders of giants" for his success. The expression acknowledges the contribution of earlier workers for one's own achievements, since knowledge advances on the basis of previous knowledge.

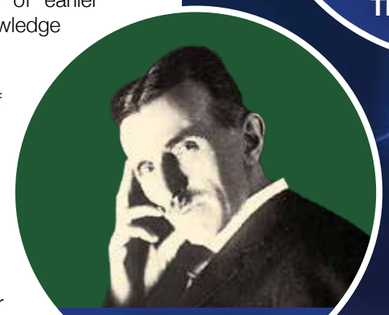
But sometimes giants stand upon the shoulders of other giants. Consider the sequence of advances made by "giants" like Michael Faraday, James Maxwell, Nikola Tesla and Thomas Edison.

The solitary work of individual geniuses created a series of inspired lighting inventions. This established the foundation for a universe of practical applications, developed by later generations of scientists and technicians. The lonely eccentric's makeshift workshop has given way to extravagantly equipped lab complexes staffed with teams of trained researchers. Nowadays it is common to see close collaboration among colleagues half a world apart; speaking different languages; people from vastly divergent cultural backgrounds -- all working together in the common interest.

Technological and production advances will always be driven by inspired individual efforts. But in general, progress in our industry is the result of solid teamwork. Nowhere is trans-national teamwork more evident than at Fulham. We are a worldwide company in manufacturing, marketing, sales and distribution. We also have world class R&D facilities in Asia, India and at our U.S. Headquarters, Our international research team includes some of the best brains in the industry from many diverse backgrounds. All are united in Fulham's dedication to exceeding customer expectations. This commitment has grown us into a company that is truly trusted worldwide for cost efficient, innovative, reliable, relevant lighting solutions.

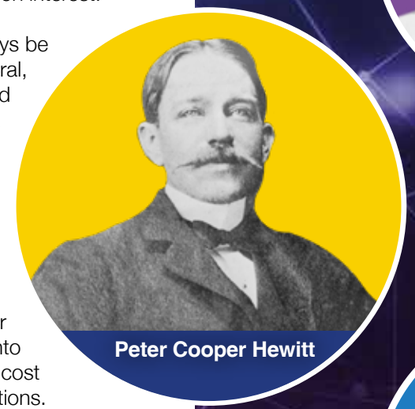


Thomas Edison



Nikola Tesla

Charles Steinmetz



Peter Cooper Hewitt

Elmer Fridich

If I have seen further than other men, it is because I have stood upon the shoulders of giants.

-- Sir Isaac Newton (1642 - 1727)

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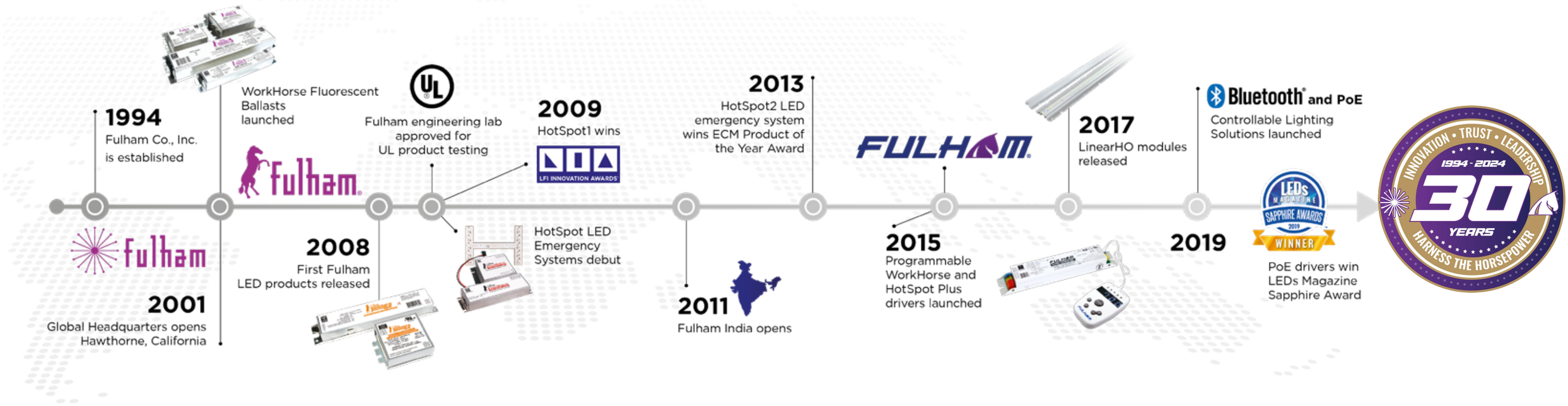
EMERGENCY

FLUORESCENT

A Pioneer in Lighting Electronics

From its beginnings in 1994, Fulham has been dedicated to creative, sustainable lighting programs that give our users the power to build or install smart, differentiated, versatile lighting. Fulham's revered product quality and world-class customer responsiveness make us the preferred partner to over 3,000 lighting manufacturers and distributors worldwide.

From our headquarters in Los Angeles and design centers in China and India, our teams of product managers and engineers work with our customers to conceive, design, manufacture and supply reliable, sustainable lighting solutions that bring cutting-edge, relevant innovation to a global market.



EliteControl

FULHAM

Jaap Haartsen

Founder of Bluetooth®

THE ARCHITECT OF THE CONNECTED REVOLUTION

The pioneering Dutch electrical engineer Jaap Haartsen (b. 1963) was a ground-breaking researcher, inventor and entrepreneur who spearheaded the design of the standard that would later be known as Bluetooth® Wireless Technology, enabling connections between a seemingly endless array of devices.

It was in the summer of 1994, during his tenure at mobile phone maker Ericsson in Sweden, when his eureka moment arrived. Little did he know, however, what an essential and ubiquitous technology Bluetooth would become. His discovery turned out to be so unforeseeably revolutionary that, over 20 years later, it continues to have an enormous impact on not only the global lighting industry, but also a large breadth of technological sectors.

An inductee into the Consumer Technology Association Hall of Fame, Haartsen remains steadfast in his commitment to driving the Bluetooth standard forward, still working on its development over a quarter century after designing the initial Bluetooth version 1.0.

DID YOU KNOW?

Bluetooth is named after Danish Viking king Harald "Blåtand" Gormsson, whose uncanny ability to bring people together in non-violent negotiations through effective communication resembled the connectivity of the modern wireless protocol.

SIG Qualified Bluetooth® Mesh Lighting Control System

Bluetooth mesh is an emerging platform for connected lighting that is paving the way to IoT smart lighting. It provides fast, reliable performance, unmatched scalability, high-level security and out-of-the-box interoperability, creating opportunities for larger, more efficient lighting networks.

- **Wireless** High speed communication at distances of over 300 feet, creating massive savings on installation and wiring
- **Scalable** Start small with a single room, or connect thousands of devices in a building-wide installation
- **Secure** Advanced encryption standards with multiple authentication keys for maximum protection
- **Reliable** Self-healing network prevents communication losses and allows devices to be added or removed without disruption
- **Interoperable** All SIG Qualified Bluetooth mesh devices can communicate seamlessly, regardless of manufacturer

Fulham eliteBlue Commissioning Software

Fulham's eliteBlue commissioning software provides an intuitive set of tools for commissioning and monitoring qualified Bluetooth mesh lighting devices. Using simple web and iOS apps, users can easily customize lighting control parameters in accordance with site-specific needs and building energy codes.

- **Web portal**
  Used off site to manage lighting installation projects and plan commissioning, including mapping zones within a building, setting up control scenarios for zones and managing users collaborating on the project.
  Try it at eliteblue.fulham.com
- **Mobile app for iOS**
  Used onsite to commission devices and fine-tune installations. No specialized training or lighting control expertise is needed- the intuitive interface lets you add Bluetooth mesh lighting devices to a wireless network in no time.

Download on the App Store

Connected Driver

A 40W, 0-10V constant current driver with the unique ability to add Bluetooth mesh connectivity by attaching an intelligent Bluetooth antenna. Compatible with third-party sensors, wall switches, and other devices, the connected driver serves as the core component for powerful, easy-to-expand connected systems.

- 0-10V dimming standard. Add Bluetooth dimming with optional ESLI01HB01 SmartLink
- Compatible with Fulham's SmartSet programming platform

Specifications

Model Number	Input Voltage (VAC)	Watts	Output Voltage (VDC)	Dimensions (L x W x H)	Case Type	Case Qty.
T2C1UNV150P-40L	UNV (120-277)	40	10-57	6.61" x 1.97" x 1.18"	Compact w/End Leads	30

Bluetooth to 0-10V SmartBridge

A simple, easy-to-install component that connects to an existing 0-10V driver to add SIG Qualified Bluetooth mesh capability. The SmartBridge is an ideal solution for manufacturers looking to develop their Bluetooth product lines or contractors seeking to provide wireless lighting options in the field.

2018 PROGRESS Report SELECTION

EC&M Product of the Year 2019 Category Winner

Specifications

Model Number	Max Load (W)	Max Input Current (A)	Input Voltage (VAC)	IP	Features	Dimensions (L x W x H)	Case Qty.
CTBRCB02JM02	600	5	UNV (120-277)	66	On / Off, 0-10V Dimming Control, Sensor Input	5.17" x 2.26" x 1.29"	30
CTBRCB03JM03-PC					On / Off, 0-10V Dimming Control, Sensor Input, Color Control, Power Metering		

Bluetooth Accessories

Model Number	Description
ESLTOPJX00SR	Short-range PIR occupancy, daylight harvesting sensor and Bluetooth Radio for connected LED driver
ESLTOPJX00LR	Long-range PIR occupancy, daylight harvesting sensor and Bluetooth Radio for connected LED driver
ESLI01HB01	Bluetooth SmartLink (attaches to T2C1UNV150P-40L to provide Bluetooth capability)
ELIOPJX00SR	Short-range PIR occupancy and daylight harvesting sensor for SmartBridge
ELIOPJX00LR	Long-range PIR occupancy and daylight harvesting sensor for SmartBridge
ESRPB-W-EO	Single Rocker EnOcean Switch
EDRPB-W-EO	Double Rocker EnOcean Switch

Bluetooth Mesh Lab Kit *The simple way to get started with Bluetooth*

Part number: BLEM-KIT1

Ready to take the first step with Bluetooth mesh? There's no better way than to experience it yourself. Fulham's complete Bluetooth mesh lab kit has everything you need to launch your implementation. In just than 30 minutes, you'll be testing Bluetooth mesh in your lab and planning your future.

Bluetooth Mesh Lab Kit Contents:

Bluetooth SmartBridge | iPad® with eliteBlue Commissioning app | EnOcean Double Rocker switch | 9W Vizion LED Engine | Documentation

Contact Fulham to order your Bluetooth Mesh Lab Kit today

paul-lo@fulham.com.hk +852 2314 4801 www.fulham.com

Michael Faraday
Scientist

ELECTROMAGNETISM, EMBRYO

Not many scientists can claim to have had their picture displayed on the wall of renowned physicist Albert Einstein's study, but such was his notoriety in scientific circles, that inspiring English physicist and chemist Michael Faraday was one of them.

In a time when science was usually the preserve of people born into wealthy families, the inspiring Faraday (1791-1867) – who himself came from a very poor family – emerged as one of the greatest experimental scientists in history.

His work proved the relationship between magnetism and electricity, laying the foundation for electromagnetic theory, and led to the development of electric motors, the generator, and thus to the practical use of electrical power for home, industry and technology. He even brought the terms electrode, cathode, anode, diode and others to the popular vocabulary.

DID YOU KNOW?

Programmable LED Drivers allow designers and assembly lines to customize key output characteristics, including the output power in any configuration required for customers.

WorkHorse LED - IP20 Programmable Drivers

- 250mA - 1500mA programmable output current
- 0-10V and DALI dimming
- Handheld programmer or SmartSet software
- Programmable dimming curve allows step dimming and dim-to-off
- Advanced programmability of output current and thermal temperature protection (NTC)

0 - 10V Dimming

Model Number	Output Watts (W)	Output Current (mA)	Output Voltage (VDC)	Input Voltage (VAC)	Dimming Type	Surge Protection L-N	Surge Protection L&N-G	IP	Dimensions (L x W x H)	Case Type
T1M1UNV105P-40E	40	250 - 1050	10 - 57	120-277; 50/60Hz	0 - 10V	2kV	4kV	20	10.83” x 1.22” x 0.98”	Linear w/End Terminals
T1M1UNV105P-60E	60	250 - 1050	10 - 57	120-277; 50/60Hz	0 - 10V	2kV	4kV	20	9.33” x 1.59” x 1.18”	Linear w/End Terminals
T1M1UNV105P-60F	60	250 - 1050	10 - 57	120-277; 50/60Hz	0 - 10V	2kV	4kV	20	4.98” x 2.99” x 1.22”	Compact w/ End & Back Terminals
T2C1UNV150P-40L	40	250 - 1500	10 - 57	120-277; 50/60Hz	0 - 10V or Bluetooth	2.5kV	2.5kV	20	6.61” x 1.97” x 1.18”	Compact w/End Leads

DALI Dimming

Model Number	Output Watts (W)	Output Current (mA)	Output Voltage (VDC)	Input Voltage (VAC)	Dimming Type	Surge Protection L-N	Surge Protection L&N-G	IP	Dimensions (L x W x H)	Case Type
T1A1UNV105P-40E	40	250 - 1050	10 - 57	120-277; 50/60Hz	DALI	2kV	4kV	20	10.83” x 1.22” x 0.98”	Linear w/End Terminals

The Power of Programmability

All WorkHorse LED drivers feature Fulham’s innovative SmartSet programming platform, which gives the user the power to create the right driver for any situation.

- **Auto-Programming capability for high volume usage**
- **Driver does not need to be powered during programming**
- **Programming via handheld controller or PC software**

TPSB-100 SmartSet Controller

SmartSet Software

To see the Fulham SmartSet programming platform in action visit the links below:

Overview of basic programming features: ***www.fulham.com/smartsetprogramming***
One touch Auto-Programming: ***www.fulham.com/smartsetauto***
Programming custom dimming curves: ***www.fulham.com/smartsetdimmingcurve***

WorkHorse LED - IP65 Programmable Drivers

- IP65 for harsh, demanding environments
- 0-10V, DALI, and wireless dimming options
- Wide programmable current range in 1mA increments
- Handheld programmer or SmartSet software
- Advanced programmability of output current and thermal temperature protection (NTC)

XP Series: Programmable output current, dimming curves, and NTC profile

Model Number	Output Watts (W)	Output Current (mA)	Output Voltage (VDC)	Input Voltage (VAC)	Dimming Type	Surge Protection L-N	Surge Protection L&N-G	IP	Dimensions (L x W x H)	Case Type
T1M1UNV210P-60L	60	500-2100	10-57	120-277; 50/60Hz	0-10V	4kV	6kV	65	9.49” x 1.69” x 1.14”	Linear w/End Leads
T1M1UNV150P-150L	150	500-1500	70-280	120-277; 50/60Hz	0-10V	4kV	6kV	65	9.47” x 2.33” x 1.52”	Linear w/End Leads
T1M1UNV140P-200L	200	500-1400	80-280	120-277; 50/60Hz	0-10V	4kV	6kV	65	8.86” x 2.71” x 1.52”	Linear w/End Leads

Certifications 120-277V models: cULus Class P, CE, ENEC, CB Scheme, RoHS, FCC (for wireless models)

XE Series: Programmable output current

Model Number	Output Watts (W)	Output Current (mA)	Output Voltage (VDC)	Input Voltage (VAC)	Dimming Type	Surge Protection L-N	Surge Protection L&N-G	IP	Dimensions (L x W x H)	Case Type
T1M1UNV240P-96L	96	700-2400	30-56	120-277V; 50/60Hz	0-10V	4kV	6kV	65	6.69” x 2.56” x 1.26”	Linear w/End Leads
T1M1UNV500P-185L	185	1500-5000	30-56	120-277V; 50/60Hz	0-10V	4kV	6kV	65	8.74” x 2.68” x 1.65”	Linear w/End Leads

Certifications cULus Class P, RoHS

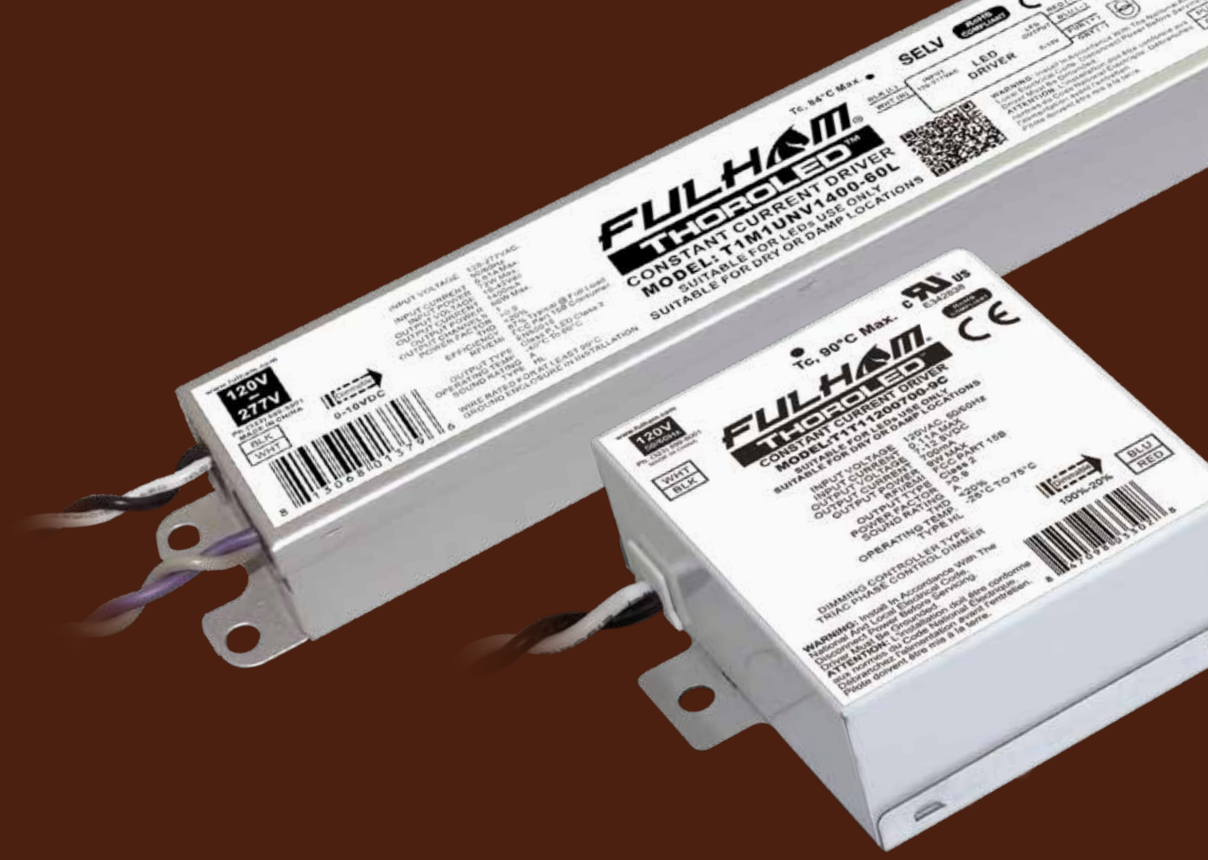
THOROLED
FULHAM

Nick Holonyak
American Engineer

“THE FATHER OF THE LED”

A visionary leader of his generation, Nick Holonyak, Ph.D. (b.1928) is credited for the invention of a new age of energy efficient technology in 1962, the Light Emitting Diode (LED). Dubbed “the father of the LED” by many, Holonyak has a total of 41 patents to his name, having also been responsible for development of other innovative creations such as the dimmer switch, as well as the red-light semiconductor laser (laser diode) which is used in CD, DVD and cell phones.

While he was not recognized for his invention of the original LED – missing out on the Nobel Prize in physics, which went to Isamu Akasaki, Hiroshi Amano, and Shuji Nakamura for the development of the blue light-emitting diode – Holonyak remains an inspiration to inventors everywhere.



DID YOU KNOW?

The shapes in our ThoroLED logo are circuitry diagrams for LEDs. They represent the anode – the terminal where current flows in from outside – and the cathode of a device where current flows out (as well as two small arrows denoting light emission).

Dimmable Dedicated Constant Current LED Drivers

- Smooth dimming: 100% to 10% models
- Dedicated output, single channel
- Wide range of output currents and voltages
- Compatible with leading dimmer brands
- Compact and linear case types to fit numerous applications

Dimmable Dedicated Constant Current LED Drivers: 0-10V

Model Number	Output Watts (W)	Output Current (mA)	Output Voltage (VDC)	Input Voltage (VAC)	Surge Protection L-N	Surge Protection L&N-G	IP	Dimensions (L x W x H)	Case Type	cULus Class P
T1M1UNV0350-15L	15	350	18 - 45	120-277; 50/60Hz	1kV	2kV	64	3.94” x 1.18” x 0.91”	Linear w/End Leads	✓
T1M1UNV0700-30L	30	700	18 - 45	120-277; 50/60Hz	1kV	2kV	64	4.65” x 1.18” x 1.16”	Linear w/End Leads	✓
T1M1UNV0900-40L	40	900	10 - 45	120-277; 50/60Hz	1kV	2kV	64	9.49” x 1.3” x 1.06”	Linear w/End Leads	
T1M1UNV1400-60L	60	1400	10 - 43	120-277; 50/60Hz	2kV	4kV	64	9.49” x 1.69” x 1.21”	Linear w/End Leads	✓
T1M1UNV0800-100Z	100	800	70 - 130	120-277; 50/60Hz	2kV	3kV	Dry	8.40” x 1.97” x 1.42”	Interconnect Terminals	

Dimmable Dedicated Constant Current LED Drivers: TRIAC

T1T11200350-15L	15	350	20 - 42	120	1kV	2kV	64	3.94” x 1.18” x 0.91”	Linear w/End Leads
T1T11200700-30C	30	700	21 - 42	120	1kV	2kV	64	3.35” x 2.56” x 0.75”	Compact w/End Leads
T1T11200700-30L	30	700	21 - 42	120	1kV	2kV	64	4.65” x 1.18” x 1.16”	Linear w/End Leads

DID YOU KNOW?

There are 2 different approaches to the electrical interconnection between LED driver and modules: Constant Current and Constant Voltage

Factors considered when deciding whether to use Constant Current or Constant Voltage include how the system will be installed, how it will be configured, and overall system efficiency requirements.

With Constant Current, the LED driver feeds a steady current through all LEDs on the module. Since each individual LED requires a certain voltage for the current to flow (known as Vf), the driver must provide enough voltage to equal the sum total of all the voltages of that module’s LEDs. Note that, while the LED module is frequently designed with all LEDs connected in one continuous serial electrical chain, it is also possible to create branches that split the current flowing through the module. So it’s essential to understand the design of the module’s circuitry, and the electrical rating of the LEDs themselves when connecting a Constant Current driver to Constant Current LED modules. Constant Current architectures offer higher operating efficiency than Constant Voltage, but less flexibility in connecting different modules and LEDs to the driver.

With Constant Voltage, the LED driver provides a steady voltage supply that enables power to flow through all LEDs connected. Since any given current flow requires a specific amount of voltage for each individual LED, it is necessary to buffer or regulate the voltage with a resistor (or equivalent component) in line with the connected LEDs. With proper resistance selection, the series connected LEDs receive proper -- never excessive -- voltage to regulate the current inflow. The Constant Voltage approach is most commonly used when the number of LED modules varies widely from different installations or product designs.

Non-Dimmable Dedicated Constant Current LED Drivers

- Optimized for high efficiency performance
- Dedicated output, single channel
- Wide range of output currents and voltages
- Compact and linear case types to fit numerous applications

Non-Dimmable Dedicated Constant Current LED Drivers

Model Number	Output Watts (W)	Output Current (mA)	Output Voltage (VDC)	Input Voltage (VAC)	Surge Protection L-N	Surge Protection L&N-G	IP	Dimensions (L x W x H)	Case Type
TC11200350-15C	17.5	350	24-50	120; 50/60Hz	2kV	4kV	Damp	2.57” x 1.77” x 0.98”	Compact w/End Leads
T1UNV1400-60L	60	1400	20 - 43	120-277; 50/60Hz	2kV	4kV	64	7.72” x 1.69” x 1.18”	Linear w/End Leads

Dont see it? Ask for it!

A distinct advantage of Fulham is that we are the actual design engineers. Fulham is not merely a buyer / multiple-lister / re-brander and reseller.

Come to us with your specific application details and requirements. We’ll get back to you with the feasibility of producing a custom solution!

Non-Dimmable Dedicated Constant Current LED Drivers

- Optimized for high efficiency performance
- Dedicated output, single channel
- Wide range of output currents and voltages
- Compact and linear case types to fit numerous applications

Non-Dimmable Dedicated Constant Current LED Drivers

Model Number	Output Current (mA)	Forward Voltage (V)	Max Watts (W)	THD %	Power Factor	Surge Protection	Dimensions (mm) (L x W x H)
T12400350-06F	350	9-18	6	60	0.85	3KV	80 x 40 x 27
T12400200-08F	200	21-42	8	60	0.85	3KV	80 x 40 x 27
T12400700-08F	700	7-12	8	60	0.85	3KV	80 x 40 x 27
T12400250-10F	250	22-42	10	60	0.85	3KV	80 x 40 x 27
T12400300-13F	300	21-42	13	60	0.85	3KV	80 x 40 x 27
T12400640-13F	640	12-21	13	60	0.85	3KV	80 x 40 x 27
T12400350-15F	350	21-42	15	60	0.85	3KV	80 x 40 x 27
T12400700-15F	700	12-21	15	60	0.85	3KV	80 x 40 x 27
T12400400-17F	400	21-42	17	60	0.85	3KV	80 x 40 x 27
T12400450-16C	450	24-36	16	60	0.85	3KV	81 x 41 x 31
T12400500-19C	500	30-38	19	10	0.95	4KV	87 x 46 x 32
T12400500-18C-R	500	22-36	18	10	0.95	4KV	94 x 53 x 35
T12400610-22C	610	24-37	22	10	0.95	4KV	94 x 53 x 35
T12400700-25C	700	24-36	25	10	0.98	4KV	94 X 53 X 35
T12400500-25C-R	500	30-50	25	10	0.95	4KV	94 X 53 X 35
T12400750-28C	750	24-36	28	10	0.98	4KV	94 X 53 X 35
T12400800-30C-R	800	24-37	30	10	0.95	4KV	94 X 53 X 35
T12400900-33C-R	900	24-37	33	10	0.95	4KV	94 X 53 X 35
T12400700-35C-R	700	40-50	35	10	0.95	4KV	97 X 64 X 38
T12401000-38C-R	1000	24-38	38	10	0.95	4KV	97 X 64 X 38
T12400610-22E10	610	18-36	22	10	0.97	4KV	150 x 40 x 28
T12400700-25E10	700	18-36	25	10	0.97	4KV	150 x 40 x 28
T12400500-25E10	500	24-50	25	10	0.97	4KV	150 x 40 x 28
T12400350-25E10	350	42-72	25	10	0.97	4KV	150 x 40 x 28
T12400550-28E10	550	30-50	28	10	0.98	4KV	150 x 40 x 28
T12400750-28E10	750	18-37	28	10	0.98	4KV	150 x 40 x 28
T12400800-30E10	800	21-38	30	10	0.98	4KV	150 x 40 x 28
T12401120-31ES	1120	20-28	31	10	0.98	4KV	150 x 40 x 28
T12400850-32E10	850	21-38	32	10	0.98	4KV	150 x 40 x 28
T12400900-33E10	900	24-37	33	10	0.98	4KV	150 x 40 x 28
T12400700-35E10	700	36-50	35	10	0.98	4KV	210 x 40 x 30
T12401000-36E10S	1000	24-36	36	10	0.98	4KV	150 x 40 x 28
T12401000-38E10S	1000	30-38	38	10	0.98	4KV	150 x 40 x 28
T12401000-42L	1000	21-42	42	10	0.98	4KV	280 x 30 x 28
T12401200-46L	1200	24-38	46	10	0.98	4KV	280 x 30 x 28

Outdoor Rated LED Drivers

- Harsh / wet location rated drivers for use in outdoor luminaires
- Potted Drivers
- IP 67 versions available

Outdoor Rated LED Drivers

Model Number	Output Current (mA)	Forward Voltage (V)	Max Watts (W)	THD %	Power Factor	Surge Protection		Dimensions (mm) (L x W x H)
						CM	DM	
T12400350-15P10E	350	46-42	33	10	0.96	-	4KV	81 x 41 x 31
T12400700-15P10	700	12-21	34	10	0.96	-	4KV	81 x 41 x 31
T12400430-16C10	430	30-38	34	10	0.96	-	4KV	87 x 46 x 32
T12400700-17P10B	700	18-24	38	10	0.98	-	4KV	87 x 46 x 32
T12400700-25PB	700	24-36	38	10	0.98	-	4KV	94 x 53 x 35
T12400800-30C10	800	30-38	40	10	0.96	-	4KV	94 x 53 x 35
T12400750-31P10B	750	30-42	40	10	0.98	-	4KV	94 x 53 x 35
T12400860-33C10	860	30-38	42	10	0.96	-	4KV	94 x 53 x 35
T12400950-34CB	950	28-36	40	10	0.96	-	4KV	94 x 53 x 35
T12400800-34PB	800	30-42	42	10	0.98	-	4KV	94 x 53 x 35
T12401050-38CB	1050	28-36	38	10	0.96	-	4KV	94 x 53 x 35
T12400900-38PB	900	30-42	38	10	0.98	-	4KV	94 x 53 x 35
T12400670-40PB	670	40-60	40	10	0.98	-	4KV	94 x 53 x 35
T12401000-40P10B	1000	30-40	40	10	0.98	-	4KV	94 x 53 x 35
T12400700-42PB	700	40-60	42	10	0.98	-	4KV	94 x 53 x 35
T12400700-40PB-R	700	40-57	40	10	0.98	-	4KV	97 x 64 x 38
T12400700-42PB-R	700	40-60	42	10	0.98	-	4KV	97 x 64 x 38
T12400900-38PB-R	900	30-42	38	10	0.98	-	4KV	97 x 64 x 38
T12401000-40PB-R	1000	30-40	40	10	0.98	-	4KV	97 x 64 x 38
T12401050-38PB-R	1050	28-36	38	10	0.98	-	4KV	97 x 64 x 38
T12401400-53C10	1400	24-38	53	10	0.99	4KV	4KV	150 x 68 x 38
T12401400-59C10	1400	28-42	59	10	0.97	4KV	4KV	150 x 68 x 38
T1M1UNV1200-69PB	1200	40-57	69	10	0.98	5KV	5KV	197 x 75 x 40
T1M12400700-75CBE	700	60-108	75	10	0.98	5KV	5KV	160 x 60 x 36
T12400700-75CO	700	60-108	75	10	0.98	5KV	5KV	160 x 60 x 36
T1240070P-75CB	500-700	60-110	75	10	0.98	5KV	5KV	160 x 60 x 36
T1240078P-83CB	750-780	65-106	83	10	0.98	5KV	5KV	160 x 60 x 36
T1M1UNV1400-80C	1400	36-57	80	10	0.98	5KV	5KV	172 x 68 x 40
T12401000-105PB	1000	75-105	105	10	0.98	4KV	4KV	197 x 75 x 40
T1UNV0990-150P	990	110-152	150	10	0.98	6KV	6KV	244 x 75 x 40
T1M12400700-150LBE	700	144-214	150	10	0.95	5KV	5KV	205 x 63 x 36
T12400700-150LO	700	140-214	150	10	0.95	5KV	5KV	205 x 63 x 36
T1M1UNV1050-160P	1050	110-152	160	10	0.98	6KV	6KV	244 x 75 x 40
T1M1UNV1200-180PE	1200	110-150	180	10	0.98	6KV	6KV	244 x 75 x 40

Dimmable Constant Voltage LED Drivers

- 12VDC or 24VDC Output
- 0-10V Dimming; 100% -10%
- Linear form factor
- Surge protection, overload protection
- Low temperature performance
- Ideal for signage, cove, and niche applications

Dimmable Constant Voltage LED Drivers

Model Number	Output Watts (W)	Output Current (mA)	Output Voltage (VDC)	Input Voltage (VAC)	Ch.	Surge Protection		IP	Dimensions (L x W x H)	Case Type
						L-N	L&N-G			
T1M1UNV012V-75L	75	6250	12	100-277; 50/60Hz	1	2kV	4kV	64	9.49” x 1.69” x 1.22”	Linear w/End Leads
T1M1UNV024V-75L	75	3125	24	100-277; 50/60Hz	1	2kV	4kV	64	9.49” x 1.69” x 1.22”	Linear w/End Leads
T1M1UNV024V-150L	150	6250	24	100-277; 50/60Hz	1	4kV	6kV	67	8.94” x 2.66” x 1.56”	Linear w/End Leads

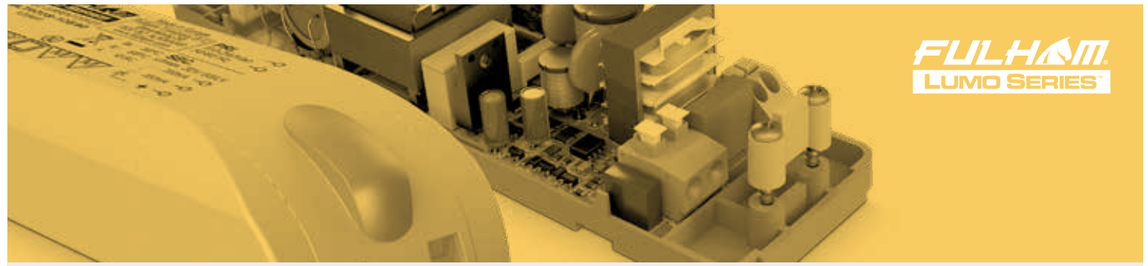
Non-Dimmable Constant Voltage LED Drivers

- 12VDC or 24VDC Output
- Linear form factor
- Surge protection, overload protection
- Low temperature performance

Non-Dimmable Constant Voltage LED Drivers

Model Number	Output Watts (W)	Output Current (mA)	Output Voltage (VDC)	Input Voltage (VAC)	Ch.	Surge Protection		IP	Dimensions (L x W x H)	Case Type
						L-N	L&N-G			
THCV1UNV024V-100L	100	4100	24	100-277; 50/60Hz	1	2kV	4kV	64	10.47” x 1.69” x 0.96”	Linear w/End Leads

LED DRIVERS



Reaching New Heights in Engineering Excellence

Fulham Lumo Series drivers are built on core engineering design principles for exceptional standards of performance and reliability in LED systems. Highest grade critical components together with design features for thermal management ensure excellent reliability. Low ripple designs create flicker-free lighting and perfectly smooth dimming. Simplicity of specification and installation is a key characteristic of all Fulham Lumo Series drivers, hence the wide voltage and current ranges and industry leading low inrush current.

Engineered for Performance

- Industry leading efficiency
- Multiple dimming options and output currents
- Very high power factor

Engineered for Reliability

- Low inrush current
- Thermal, overload, short circuit and overvoltage protection
- Flicker-free light

Engineered for Simplicity

- Future-proof flexibility industry leading voltage and current range enabling seamless support of LED generations and minimizing supply chain complexity

FULHAM LUMO SERIES

Constant Voltage Output

L 100 x W 52 x H 24 (mm)

Model Number	Alternate Reference	Max Watts (W)	Max Current (mA)	Output Current Selection Method	Output Voltage (Vdc)	Input Voltage (Vac)	Dimming Type
L1M1MLT105S-20E	L05011i	20	1050	Dipswitch	10/12/24	220 - 240 (50/60 Hz)	1-10V/pulse
L1W1MID120D-20E	L05011i2	20	1200	Dipswitch	6 - 42 options	220 - 240 (50/60 Hz)	1-10V/pulse
L1LDC070S-20E*	L05030	20	1200	Dipswitch	4 - 24 options	17 - 32 Vdc (50/60 Hz)	Non-Dimming

L 157 x W 42 x H 32 (mm)

Model Number	Alternate Reference	Max Watts (W)	Max Current (mA)	Output Voltage (Vdc)	Input Voltage (Vac)	Dimming Type
L1MLT024V-36E*	L05046	36	1500	24	110 - 240 (50/60 Hz)	Non-Dimming

* Contact Fulham for lead time and availability

FULHAM LUMO SERIES

Dimming Multiple Output, Constant Current

L 99 x W 39 x H 23 (mm)

Model Number	Alternate Reference	Max Watts (W)	Output Current (mA)	Output Current Selection Method	Output Voltage (Vdc)	Input Voltage (Vac)	Dimming Type
L1E1230025S-10E	L05021-40250	10	200/250	Output wires	20 - 40	220 - 240 (50/60 Hz)	Mains Dimming
L1E1230070S-12E	L05021	12	350/700	Output wires	3 - 32	220 - 240 (50/60 Hz)	Mains Dimming
L1E1230070P-12E	L05121	12	250-700	Output wires	6 - 40	220 - 240 (50/60 Hz)	Mains Dimming
L1E1230030S-12E	L05021-40300	12	180/300	Output wires	20 - 40	220 - 240 (50/60 Hz)	Mains Dimming

L 110 x W 52 x H 24 (mm)

Model Number	Alternate Reference	Max Watts (W)	Output Current (mA)	Output Current Selection Method	Output Voltage (Vdc)	Input Voltage (Vac)	Dimming Type
L1M1MLT105S-20E	L05011i	20	350/700/1050	Dipswitch	3 - 33	110 - 240 (50/60 Hz)	1-10V/Pulse/Pot
L1W1MID120D-20E	L05011i2	20	100 - 1200	Dipswitch	6 - 42	180 - 240 (50/60 Hz)	1-10V/Pulse/Pot
L1W1MLT500S-20E	L05011Ci	20	110 - 500	Potentiometer	3 - 43	110 - 240 (50/60 Hz)	1-10V/Pulse/Pot
L1W2MLT100S-20E	L05016i	20	1x 250-1000 2x 250-500	Potentiometer	3 - 33	110 - 240 (50/60 Hz)	1-10V/Pulse/Pot
L1V1230105S-25E	L05023-A	25	100 - 1050	Dipswitch/ TPSB-100EU	3 - 43	220 - 240 (50/60 Hz)	Mains Dimming
L1M1MID120S-24E	L05011i3	20	100 - 1200	Dipswitch	6 - 42	180 - 240 (50/60 Hz)	1-10V/Pot
		24	600 - 900				
L1W1MID140S-30E	L05031	30	100 - 1400	Dipswitch	6 - 42	180 - 240 (50/60 Hz)	1-10V/Pulse/Pot

L 157 x W 42 x H 32 (mm)

Model Number	Alternate Reference	Max Watts (W)	Output Current (mA)	Output Current Selection Method	Output Voltage (Vdc)	Input Voltage (Vac)	Dimming Type
L1A1MID100S-30E	L05025	30	100 - 1000	Resistor	7 - 43	160 - 240 (50/60 Hz)	DALI
L1A1MID100S-40E	L05040	40	100 - 1000	Resistor	7 - 55	160 - 240 (50/60 Hz)	DALI
L1M1MLT140S-40E*	L05045	40	300 - 1400	Resistor	15 - 32	110 - 240 (50/60 Hz)	1-10V/Pot
L1M1MLT105S-40E	L05049-601000	40	245 - 1050	Resistor	26 - 60	110 - 240 (50/60 Hz)	1-10V/Pot
L1M1230200S-60E*	L05055	60	700 - 2000	Resistor	22 - 46	220 - 240 (50/60 Hz)	1-10V/Pot
L1M1230140S-60E*	L05059	60	280 - 1400	Resistor	18 - 60	220 - 240 (50/60 Hz)	1-10V/Pot

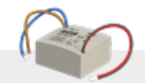
L 212 x W 76 x H 46 (mm)

Model Number	Alternate Reference	Max Watts (W)	Output Current (mA)	Output Current Selection Method	Output Voltage (Vdc)	Input Voltage (Vac)	Dimming Type
L1M1MLT400S-150E	L05065	150	700 - 4000	Resistor	24 - 60	90 - 240 (50/60 Hz)	1-10V

* Contact Fulham for lead time and availability

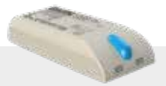
FULHAM LUMO SERIES

Non-Dimming Single Output, Constant Current



L 46 x W 42 x H 22 (mm)

Model Number	Alternate Reference	Max Watts (W)	Output Current (mA)	Output Voltage (Vdc)	Input Voltage (Vac)
L1MLT0350-5.5C	L05150	5.5	350	3 - 16	100 - 240 (50/60 Hz)
L1MLT0680-6.5C	L05050	6.5	680	3 - 12	100 - 240 (50/60 Hz)

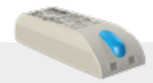


L 110 x W 52 x H 24 (mm)

Model Number	Alternate Reference	Max Watts (W)	Output Current (mA)	Output Voltage (Vdc)	Input Voltage (Vac)
L1MLT0700-20E	L05013	20	700	3 - 33	115 - 240 (50/60 Hz)

FULHAM LUMO SERIES

Non-Dimming Multiple Output, Constant Current



L 99 x W 39 x H 23 (mm)

Model Number	Alternate Reference	Max Watts (W)	Output Current (mA)	Output Current Selection Method	Output Voltage (Vdc)	Input Voltage (Vac)
L1MLT020S-10E48	L05020-1248200	12	150/200	Output wires	20 - 48	115 - 240 (50/60 Hz)
L1MLT030S-12E48	L05020-1248300	12	250/300	Output wires	20 - 48	115 - 240 (50/60 Hz)
L1MLT070S-12E40	L05020-1240700	12	350/700	Output wires	20 - 40	115 - 240 (50/60 Hz)
L1MLT050S-12E40	L05020-1240500	12	400/500	Output wires	20 - 40	115 - 240 (50/60 Hz)
L1MLT082S-12E24	L05020-1224825	12	600/825	Output wires	20 - 24	115 - 240 (50/60 Hz)

L 99 x W 39 x H 23 (mm)

Model Number	Alternate Reference	Max Watts (W)	Output Current (mA)	Output Current Selection Method	Output Voltage (Vdc)	Input Voltage (Vac)
L1MLT140S-20E	L05012	20	350 - 1400	Potentiometer	3 - 33	115 - 240 (50/60 Hz)

L 157 x W 42 x H 32 (mm)

Model Number	Alternate Reference	Max Watts (W)	Output Current (mA)	Output Current Selection Method	Output Voltage (Vdc)	Input Voltage (Vac)
L1MLT140S-40E	L05044	40	300 - 1400	Resistor	15 - 32	110 - 240 (50/60 Hz)

VIZION FULHAM

FARMHORSE FULHAM

Shuji Nakamura
American-Japanese Engineer

A NOBEL ACHIEVEMENT

When Japanese-born American materials scientist Shuji Nakamura (b. 1954) entered the office of Nichia's CEO, Ogawa Nobuo, in 1998 demanding more than $3 million (U.S. dollars) to fund his research into semiconductors for the blue LED, he was wholly unaware of the journey it would take him on and the Nobel-prize lauded invention it would result in.

In fact, his pioneering work on the development of the blue light-emitting diode – alongside Isamu Akasaki and Hiroshi Amano – resulted in the first truly marketable GaN LED capable of emitting bright blue light in the early 1990s, a major breakthrough in lighting technology. Such was its impact that the trio were recipients of the Nobel Prize in physics in 2014.

DID YOU KNOW?

Unlike conventional light bulbs that rely on filaments, LED modules rely on electrically charged semiconductors that are grown in a series of layers upon a crystalline substance called substrate.

450mA ECO Series DC LED Modules

- Range of common lengths and wattages to fit a variety of luminaires
- High efficacy: up to 150 lm/W @ 350mA, 4000K/90 CRI
- On board connectors allow easy wire connections and end-to-end board linking
- 3 SDCM for high color consistency
- CRI90 Standard, meets CEC Title 24 requirement

Specifications

Beam Angle	120°
Operating Temperature Range	-35°C to +45°C (-31°F to 113°F)
Lumen Maintenance	L70 = 60,000hrs @ Tc=105°C / L90 = 40,000hrs @ Tc=105°C
Color Consistency	Binning per ANSI C78.377-2008; 4 SDCM
PCB Material	FR-4
Warranty	5 years @ Max Tc from the date of manufacture
Safety/compliance	cURus (File # E351548), Class 2 Lighting System, RoHS Compliant

Product Models

Model Number	Number of LEDs	Nominal Input Current* (mA)	Forward Voltage (VDC)	Nominal Power (W)	Dimensions (L x W) (including connector)	Lumens @4000K/80CRI (lm)	Nom. Efficacy @4000K / 80 CRI (lm/W)
VMU045005EC9xxA	12	350	11.5	4.0	1.5” x 0.94” x 0.22”	554	138
VMU045005EC9xxB	12	350	11.5	4.0	5” x 0.71” x 0.22”	605	150
VMU045010EC9xxA	24	350	23.0	8.1		1096	136
VMU045010EC9xxB	24	350	23.0	8.1	11” x 0.71” x 0.22”	1172	145
VMU045010EC9xxC	24	350	23.0	8.1	17” x 0.71” x 0.22”	1172	145

* Max input current 450mA. See specification sheets for detailed information on input current levels.

Part Numbering Key

V M U 045 015 E C 9 30 A

CRI
Standard: 9 = 90

Color Temperature
Standard: 30 = 3000K, 35 = 3500K, 40 = 4000K
Made-to-order: 27 = 2700K, 50 = 5000K

Accessories for Low Profile Linear HO & Linear HO Output DC Modules (Pertaining to items on next page)

Model Number	Description	Model Number	Description
TLE-OPT-120-002	5.5” snap-on lens, 82% transmissivity	**TLE-OPT-120-021**	58” snap-on lens, 82% transmissivity
TLE-OPT-120-003	11” snap-on lens, 82% transmissivity	**TLE-OPT-120-020**	Standard LinearHO module end caps (2 pieces)
TLE-OPT-120-004	22” snap-on lens, 82% transmissivity	**VLE-OPT-120-012**	Low Profile LinearHO module end caps (2 pieces)
VLE-OPT-120-033D	33” snap-on lens, 82% transmissivity	**TLC-HN02**	22” wire harness for 1 or 2 modules in parallel
TLE-OPT-120-013	44” snap-on lens, 82% transmissivity	**TLC-HN04**	22” wire harness for 3 or 4 modules in parallel
TLE-OPT-120-014	46” snap-on lens, 82% transmissivity		

Low Profile Linear High Output DC LED Modules

- Ideal replacement for T5HO in linear highbays, water/vapor proof, and recessed and wall luminaires
- Aluminium extrusion mount provides superior thermal management
- Low profile design for use in smaller luminaires
- Constant current, high-efficacy LEDs, 3 SDCM for high color consistency
- Up to 219 lm/W; output range 234 lm to 14,699 lm (@4000K/80CRI)
- Optional lenses snap on in seconds (See page 25)

Specifications

Operating Temp. Range	-40°C to 55°C / -40°F to 131°F	**PCB Material**	MCPCB (Aluminium Clad)
Color Consistency	Binning per ANSI C78.377-2015 @ 25°C; 3 SDCM	**Warranty**	5 years @ 105°C Tc from the date of manufacture
Lumen Maintenance	L70: >60,000Hrs / L90: 40,000Hrs (meets DLC Premium and Standard requirements)	**Safety/compliance**	cURus (File # E351548), UL Class 2 Lighting System, CE, SELV, RoHS Compliant

Product Models

Model Number / Dimension (L x W x H)	Number of LEDs	Input Current (mA)	Nom.Fwd. Voltage (VDC)	Nom. Rated Power (W)	Max. Fwd. Voltage (V)	Max. Rated Power (W)	Nom. Lum. @4000K/80CRI (lm)	Nom. Efficacy @4000K/80CRI (lm/W)
VMU048012LPyxxA 5.51” x 1.26” x 0.29” (140mm x 32mm x 7.4mm)	24	175	22.3	3.9	25	4	799	205
		350	23.1	8.1	25	9	1518	187
		480*	23.8	11.40	26	12	1959	172
VMU064025LPyxxA 10.94” x 1.26” x 0.29” (278mm x 32mm x 7.4mm)	48	350	34.0	11.9	37	13	2347	197
		450	34.7	15.6	38	17	2942	189
		640*	35.6	22.8	39	25	3919	172
VMU080030LPyxxA 22.01” x 1.26” x 0.29” (559mm x 32mm x 7.4mm)	60	350	33.7	11.8	37	13	2380	202
		700	35.1	24.6	39	27	4418	180
		800*	35.6	28.5	39	31	4899	172
VMU125050LPyxxA 22.01” x 1.26” x 0.29” (559mm x 32mm x 7.4mm)	96	350	32.9	11.5	35	12	2425	211
		700	34.1	23.9	36	26	4698	197
		1250*	35.5	44.4	38	49	7700	173
VMU140055LPyxxB† 33.07” x 1.26” x 0.29” (840mm x 32mm x 7.4mm)	108	700	33.8	23.7	36	25	4736	200
		1050	34.7	36.4	38	39	6847	188
		1400*	35.5	49.7	39	55	8656	174
VMU140055LPyxxA 44.13” x 1.26” x 0.29” (1121mm x 32mm x 7.4mm)	108	700	33.8	23.7	36	25	4736	200
		1050	34.7	36.4	38	39	6847	188
		1400*	35.5	49.7	39	55	8656	174
VMU140055LPyxxC† 45.98” x 1.26” x 0.29” (1168mm x 32mm x 7.4mm)	108	700	33.8	23.7	36	25	4736	200
		1050	34.7	36.4	38	39	6847	188
		1400*	35.5	49.7	39	55	8656	174
VMU240095LPyxxA 44.13” x 1.26” x 0.29” (1121mm x 32mm x 7.4mm)	180	700	33.0	23.1	35	24	4838	209
		1400	34.2	47.9	37	52	9331	195
		2400*	35.6	85.4	39	94	14,699	172
VMU240095LPyxxC† 57.95” x 1.26” x 0.29” (1472mm x 32mm x 7.4mm)	180	700	33.0	23.1	35	24	4838	209
		1400	34.2	47.9	37	52	9331	195
		2400*	35.6	85.4	39	94	14,699	172

May be operated at a current less than or equal to this value, below the Tc rating. † Made to order. Minimum order quantity applies.

Part Numbering Key

V M U 240 095 LP 8 30 A

CRI
Standard: 8 = 80
Made-to-order: 9 = 90

Color Temperature
Standard: 30 = 3000K, 35 = 3500K, 40 = 4000K, 50 = 5000K
Made-to-order: 27 = 2700K, 57 = 5700K, 65 = 6500K

UVA LED Products

- Ideal UVA light source for curing, Photo-catalyst and detecting applications
- Near-UV (UVA) and visible light range, harmless to human body or eyes
- Available in 365nm and 395nm peak wavelength options
- Available in flexible tape and rigid 11” & 22” strip
- For use in UL Class 2 lighting systems

Specifications

Operating Temp. Range	-20°C to 55°C / -4°F to 131°F	**Max. Tc temperature**	80°C / 176°F
Warranty	5 years @ 80°C Tc from the date of manufacture	**Safety/compliance**	cURus (File # E351548), UL Class 2 Lighting System, RoHS Compliant

Product Models

Model Number	Number of LEDs	Dimension (L x W x H)	Type	Peak Wavelength (nm)	Input Current* (mA)	Forward Voltage (VDC)	Nominal Power (W)	Radiation Power (W)
VUU24V015KB365A	60/m	196.8” x 0.39” x 0.079” (5000 x 10 x 2mm)	Constant Voltage (Flex. Tape)	365 - 370	625/m	24.0	15/m	0.29/m
VUU24V015KB395A				395 - 400	625/m	24.0	15/m	4.38/m
VUU064025LP365A	48	10.94” x 1.26” x 0.29” (278 x 32 x 7.4mm)	Constant Current	365 - 370	640*	38.8	24.8	0.60
VUU064025LP395A				395 - 400	640*	38.8	24.8	8.97
VUU125050LP365A	96	22.01” x 1.26” x 0.29” (559 x 32 x 7.4mm)	Constant Current	365 - 370	1250*	38.9	48.6	1.17
VUU125050LP395A				395 - 400	1250*	38.9	48.6	17.53

* Indicates maximum rated current. Modules may be operated at a current less than or equal to this value, below the Tc rating.

UVC LED Products

- High efficiency germicidal UVC radiation, 270nm peak wavelength
- 395nm UVA + 270nm UVC in-one LED package, visual indicator when UVC is on
- 8”L x 1.26” W rigid strip with aluminum extrusion, superior thermal management
- 24VDC constant voltage input, for use in UL Class 2 lighting systems

Specifications

Operating Temp. Range	-20°C to 45°C / -4°F to 113°F	**Max. Tc temperature**	50°C / 122°F
Warranty	3 years @ 50°C Tc from the date of manufacture	**Safety/compliance**	cURus (File # E351548), UL Class 2 Lighting System, RoHS Compliant

Product Models

Model Number	Number of LEDs	Dimension (L x W x H)	Type	Peak Wavelength (nm)	Input Current* (mA)	Input Voltage (VDC)	Nominal Power (W)	UVC Radiation Power (mW)
VUU24V003LP270C-8	9	8” x 1.26” x 0.29” (203 x 32 x 7.4mm)	Constant Voltage	UVC: 270 - 280 UVA: 390 - 400	145	24.0	3.5	45

Highbay and Lowbay LED Modules

- 13” diameter round constant current DC modules
- Suitable for high output high bay and low bay applications
- 3 SDCM for high color consistency
- Options for dual-channel 200W max. and single-channel 100W max.
- Each channel for use in UL Class 2 lighting system
- High efficacy up to 200lm/W; output range 3,000 lm to 32,000lm

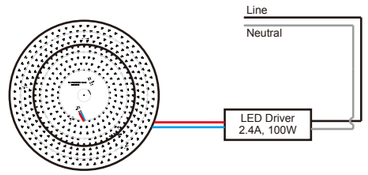
Specifications

Operating Temp. Range	-40°C to 55°C / -40°F to 131°F	**PCB Material**	MCPCB (Aluminium Clad)
Color Consistency	Binning per ANSI C78.377-2015 @ 25°C; 3 SDCM	**Warranty**	5 years @ 105°C Tc from the date of manufacture
Lumen Maintenance	L70: >60,000Hrs / L90: 40,000Hrs (meets DLC Premium and Standard requirements)	**Safety/compliance**	cURus (File # E351548), UL Class 2 Lighting System, RoHS Compliant

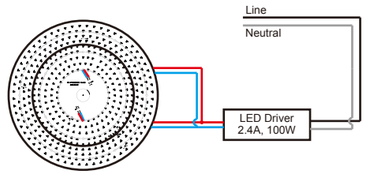
Product Models

Model Number	Number of LEDs	Number of Input Channels	Wiring Diagram	Input Current* (mA)	Forward Voltage (VDC)	Nominal Power (W)	Lumens @4000K/80CRI (lm)	Nom. Efficacy @4000K / 80 CRI (lm/W)
VMU240095HB8xxA	208	1	#1	1200	36.4	43.7	8085	185
				2400	38.2	98.7	14701	160
VMU240095HB8xxB	312	1	#1	1200	35.8	42.9	8416	196
				2400	37.0	88.9	16074	181
VM2240190HB8xxA	416	2	#2	1200	35.4	42.4	8320	196
				2400	36.5	87.4	16170	185
			#3	1200*2	36.4	87.4	16170	185
				2400*2	38.2	183.4	29401	160
VMU2240190HB8xxB	624	2	#2	1200	34.9	41.8	8549	204
				2400	35.8	85.8	16833	196
			#3	1200*2	35.8	85.8	16833	196
				2400*2	37.0	177.8	32149	181

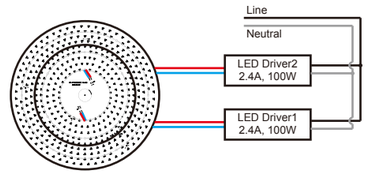
* Max input current 2400mA. See specification sheets for detailed information on input current levels.



Wiring Diagram #1



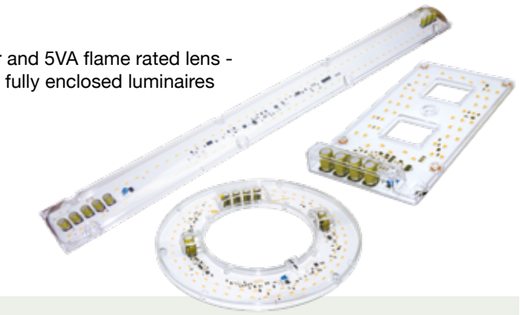
Wiring Diagram #2



Wiring Diagram #3

DirectAC LED Retrofit Kits

- Very low flicker, meets Title 24 requirements
- DirectAC Drive with integrated LED board
- Smooth TRIAC/ELV dimming down to 10%
- Kits include installation hardware and labels
- High voltage barrier and 5VA flame rated lens - suitable for open or fully enclosed luminaires
- JA8 Compliant



Specifications

Input Voltage	UNV (120-277VAC)
Beam Angle	120°
Estimated Lumen Maintenance (L70)	Round and Rectangular models: L70 > 54,000hrs / L90 = 20,000hrs Linear models: L90 = 35,000hrs
Flicker Percentage	<30%
Operating Ambient Temp. Range (Ta)	-35°C to +50°C
PCB Material / Lens Material	MCPCB (superior thermal management) / Optical Grade Polycarbonate (5VA Flame rated)
Safety/Compliance	cULus Classified, cURus, RoHS, JA8 Compliant (2700K - 4000K @90CRI)
Protections	Surge 2.5kV; Over temperature control
Warranty	5 Years @ Max Tc from the date of manufacture

Product Models

Model Number	Input Power	Max Lumens @4000K**	CRI	Available CCT	Shape	Dimensions (Inches)
TJTUNV010ACyxxB	10W	1065	80/90†	Standard options: 2700K, 3000K, 3500K, 4000K Made-to-order: 5000K	Round	3.11 Dia. x 0.71 H
VJTUNV010LNyxxB05	10W	1087	90		Linear	5.52 L x 2.21 W x 0.67 H
VJTUNV015LNyxxB11	15W	1644	90		Linear	11.03 L x 2.21 W x 0.67 H
TJTUNV015ACyxxB	15W	1680	80/90†		Round	5.08 Dia. x 0.75 H
TJTUNV015ARyxxB	15W	1725	80/90†		Rectangular	7.40 L x 4.00 W x 0.71 H
TJTUNV023ACyxxB	23W	2540	80/90†		Round	6.97 Dia. x 0.71 H
VJTUNV030LNyxxB22	30W	3235	90		Linear	22.06 L x 2.21 W x 0.67 H
TJTUNV034ACyxxB	34W	3685	90		Round	9.55 Dia. x 0.81 H

Part Numbering Key

V J T UNV 030 LN 9 30 B 22

CRI

Round & Rectangular models
Standard: 9 = 90

Linear models
Standard: 9 = 90

Color Temperature

Standard: 27 = 2700K
30 = 3000K
35 = 3500K
40 = 4000K

Made-to-order: 50 = 5000K

Low Profile Horticultural Modules

- Multiple color options: Full Spectrum, White + Red, Blue + Red
- Extruded aluminum material for superior thermal protection
- Low profile design for direct mounting to luminaire housing
- PPF/W up to 2.5 umol/j at hot state
- 22” or 44” lengths

Product Models

Model Number	Colors	CRI	K
VHU125050LPFLSA	Full spectrum	90	4000
VHU240095LPFLSA			
VHU125050LPFWRA	White + Red (5:1 ratio)	90	6500
VHU240095LPFWRA			
VHU125050LPNBRA	Blue + Red (1:3 ratio)	-	-
VHU240095LPNBRA			

Dont see it? Ask for it!

A distinct advantage of Fulham is that we are the actual design engineers. Fulham is not merely a buyer / multiple-lister / re-brander and reseller.

Come to us with your specific application details and requirements. We’ll get back to you with the feasibility of producing a custom solution!

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HOTSPOT FULHAM

FIREHORSE FULHAM

Let's admit it. Deep down, we're all afraid of the dark. This is especially true in emergencies, when bad things can happen in the dark, even in familiar places. That's why, in modern times, we created emergency backup lighting, designed to kick in automatically when the main system goes down. This is usually a secondary generator or battery system that provides temporary illumination until a location is vacated, or the lights go back on. Until recently, backup lighting was noticeably inferior to the main system. It was, after all, designed to be just a stopgap measure, like those dinky 25-mile emergency spare tires. But now, based on increasingly stringent safety code requirements, the lighting industry has developed a variety of reliable, long-lasting and brighter-burning emergency systems. Explore on!

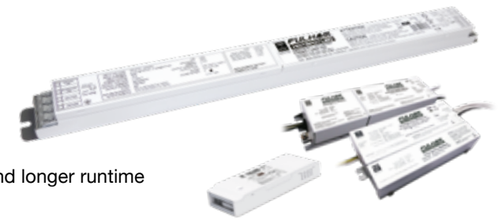
DID YOU KNOW?

A 1-foot model of Fulham's FireHorse "FirePumper" has been on display as part of the Fire Museum of Maryland's permanent collection since 2013.

HotSpot Plus LED Driver & Emergency System

The revolutionary HotSpot Plus LED Driver & Emergency System combines the functions of a dimmable, programmable LED driver, emergency LED driver, and replaceable backup battery in a single compact unit. Under normal conditions this all-in-one solution operates as a constant current driver; during a power outage the integrated battery automatically activates, providing reliable emergency illumination for safe building egress. Benefits include smaller size, simplified installation, and the ability to bring emergency LED capability to smaller luminaires.

- Programmable output current in 1mA increments
- UL 924 Self-Diagnostics
- Selectable emergency output:
  - 40W models: 5W for 180 minutes or 10W for 90 minutes
  - 70W model: 7W for 90 minutes, programmable for lower power and longer runtime
- Compact size and simple installation for maximum flexibility



HotSpot Plus LED Driver and Emergency System

Watts	Output Current (mA)	Output Voltage (VDC)	Model Number	Input Voltage (VAC)	Dimming Type	Ch.	Dimensions (L x W x H)	Case Type
40	250-1400	11-55	**FHSAC1-UNV-40BLS**	120-277; 50/60Hz	0-10V	1	6.37” x 3.13” x 1.54”	Compact w/ Bottom Leads
40	250-1400	11-55	**FHSAC1-UNV-40C**	120-277; 50/60Hz	0-10V	1	6.32” x 3.13” x 1.14”	Compact w/ End Leads
40	250-1400	11-55	**FHSAC1-UNV-40L**	120-277; 50/60Hz	0-10V	1	9.49” x 2.40” x 1.34”	Linear w/ End Leads
70	350-2400	11-55	**FHSAC1-UNV-70S**	120-277; 50/60Hz	0-10V	1	16.70” x 1.18” x 1.00”	Linear w/ Terminals

HotSpot Plus Accessories

FHS-TSTWL-BC	IP67, bicolor LED Indicator / test switch for use in exposed, outdoor-rated luminaires for 40W models
FHS-TSTWL-BC-S	IP67, bicolor LED Indicator / test switch for use in exposed, outdoor-rated luminaires for 70W model
FHS-EXT-48-TST	48” test switch extension cable

The Power of Programmability

All HotSpot LED drivers feature Fulham’s innovative SmartSet programming platform, which gives the user the power to create the right driver for any situation.

- **Auto-Programming capability for high volume usage**
- **Driver does not need to be powered during programming**
- **Programming via handheld controller or PC software**

TPSB-100
SmartSet Controller

SmartSet Software

To see the Fulham SmartSet programming platform in action visit the links below:

Overview of basic programming features: ***www.fulham.com/smartsetprogramming***
One touch Auto-Programming: ***www.fulham.com/smartsetauto***
Programming custom dimming curves: ***www.fulham.com/smartsetdimmingcurve***

HotSpot Constant Power Programmable LED Emergency Driver

Provides programmable, constant power emergency output for existing LED modules. Advanced features include self-diagnostics and detailed data logging. Meets CEC Title 20 battery charger requirements. Complete system includes emergency driver and emergency battery.

Specifications

Model Number	**FHSCP-UNV-10P-L-SD**	**Output Type**	Class 2
Input Voltage	100-277VAC, 50/60Hz	**RFI/EMI**	FCC Part 15A Non-Consumer
Input Current	0.06A Max.	**Ambient Operating Temperature Range**	10°C to 55°C (50°F to 131°F)
Output Power	1-10W	**Dimensions (L x W x H)**	7.89” x 2.05” x 1.17”
Output Current	620mA Max.	**Battery Type / Recharge Time**	LiFePO4 9.6VDC / 12 Hours
Output Voltage Range	16-55VDC	**Input Surge Protection**	Line-Neutral 2kV, Line & Neutral-Ground 2kV
Number of Output Channels	1	**Warranty**	5 years
Self-Diagnostics	Factory-enabled by default, can be disabled by luminaire manufacturer		
Bicolor LED Indicator	Included LED indicator/test switch provides automatic system status updates		

HotSpot Constant Power Programmable Battery Packs

Model Number	Max. Load for 90 Min	Capacity	Battery Voltage	Battery Type	RoHS	Recharge Time	Dimensions (L x W x H)
FHSBATL3-1.5-SD	5W	1500mAh	9.6V	LiFePO4	Compliant	12 hours	3.48” x 2.87” x 0.96”
FHSBATL9-.6-SD	6W	1800mAh					7.52” x 1.87” x 0.79”
FHSBATL3-3-SD	10W	3000mAh					4.39” x 2.92” x 1.30”
FHSBATL6-1.5L-SD	10W	3000mAh					9.13” x 1.63” x 0.97”
FHSBATT8-C3L-SD	10W	3000mAh		NiCd	Exempt	24 hours	9.25” x 2.11” x 1.21”

HotSpot Constant Power LED Emergency Drivers

Adds field-installable emergency capability to LED luminaires. Provides backup power to the luminaire’s LED modules for at least 90 minutes. The cULus Classified driver is designed for flexibility, with multiple mounting options, a conduit feed, and an illuminated test switch.

Specifications

Input Voltage	120-277V (UNV)	**Recharge Time**	24 Hours	**Illumination Time**	Minimum 90 minutes
Output Voltage	10-55VDC	**Ambient Temperature**	0°C - 50°C	**RFI/EMI**	FCC Part 15A Non-Consumer
Surge Protection	Per C62.41 (TVS)	**Output Type**	Class 2		

HotSpot Constant Power LED Emergency Drivers

Model Number (CEC Title 20)	Output Power (W)	Output Lumens*	Output Current (mA)	Dimensions (L x W x H)
FHSCP-UNV-5WL	5	800	90-500	11.5” x 2.6” x 1.5”
FHSCP-UNV-7.8WL	7.8	1250	140-780	15.4” x 2.6” x 1.5”
FHSCP-UNV-10.7WL	10.7	1700	195-1007	15.4” x 2.6” x 1.5”
FHSCP-UNV-13.7WL	13.7	2200	250-1370	19.2” x 3.03” x 1.63”
FHSCP-UNV-17WL	17	2700	300-1700	19.2” x 3.03” x 1.63”

* Based on 160 lumens/Watt light source

FHSCP-UNV-4W-L

The Lighting Industry's Smallest 4W Emergency Constant Power LED Driver

Provides constant power emergency output for existing LED modules. Meets CEC Title 20 battery charger requirements. This system includes emergency driver and integrated battery.

Specifications

Model Number	FHSCP-UNV-4W-L	Output Type	Class 2
Input Voltage	120-277VAC, 50/60Hz	RFI/EMI	FCC Part 15A Non-Consumer
Input Current	0.1A Max.	Ambient Operating Temperature Range	5°C to 55°C (41°F to 131°F)
Output Power	4W	Dimensions (L x W x H)	5.34" x 1.69" x 1.01"
Output Current	333mA Max.	Battery Type / Recharge Time	LiFePO4 6.4VDC / 12 Hours
Output Voltage Range	12-55VDC	Input Surge Protection	Line-Neutral 1kV, Line & Neutral-Ground 2kV
Number of Output Channels	1	Warranty	5 years

FHSCP-UNV-10P-S-SD

10W Slim Emergency System Approximately 50% smaller than competition

Provides programmable, constant power emergency output for existing LED modules. Advanced features include self-diagnostics and detailed data logging. Meets CEC Title 20 battery charger requirements. This system includes emergency driver and integrated battery.

Specifications

Model Number	FHSCP-UNV-10P-S-SD	Output Type	Class 2
Input Voltage	120-277VAC, 50/60Hz	RFI/EMI	FCC Part 15A Non-Consumer
Input Current	0.1A Max.	Ambient Operating Temperature Range	0°C to 55°C (32°F to 131°F)
Output Power	3-10W	Dimensions (L x W x H)	16.7" x 1.18" x 1.00"
Output Current	666mA Max.	Battery Type / Recharge Time	Lithium 11.1VDC / 12 Hours
Output Voltage Range	15-55VDC	Input Surge Protection	Line-Neutral 1kV, Line & Neutral-Ground 2kV
Number of Output Channels	1	Warranty	5 years
Self-Diagnostics	Factory-enabled by default, can be disabled by luminaire manufacturer		
Bicolor LED Indicator	Included LED indicator/test switch provides automatic system status updates		

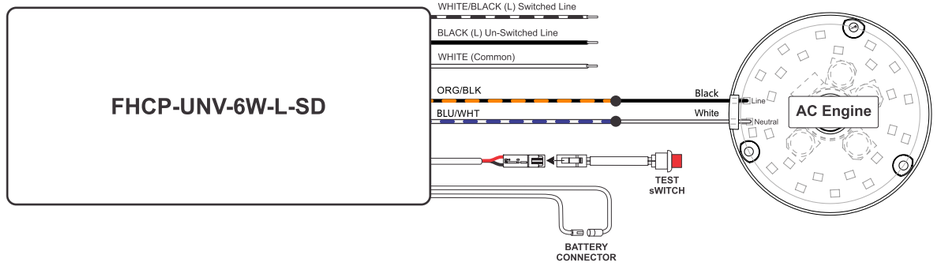
FHSCP-UNV-6W-L-SD

Field-Installable 6 Watt Emergency Driver for AC Engines

Most cost-effective emergency solution designed to operate Fulham AC LED engines (Ex. linear, round, rectangular)

Specifications

Model Number	FHSCP-UNV-6W-L-SD	Output Type	Class 1
Input Voltage	120-277VAC, 50/60Hz	RFI/EMI	FCC Part 15A
Input Current	0.85A Max.	Ambient Operating Temperature Range	0°C to 50°C (32°F to 122°F)
Output Power	6W	Dimensions (L x W x H)	9.5" x 2.4" x 1.49"
Normal Output Voltage Range	120-277VAC	Battery Type / Recharge Time	Ternary Lithium Battery 11.1VDC / 12 Hours
Emergency Output Voltage Range	60-230VDC	Input Surge Protection	Line-Neutral 1kV, Line & Neutral-Ground 2kV
Number of Output Channels	1	Warranty	5 years
Self-Diagnostics	Factory-enabled by default, can be disabled in the field		
Bicolor LED Indicator	Included LED Indicator/test switch provides automatic system status updates		



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25W Micro-Inverter / Emergency Power Supply

Works with any fixture(s) ≤150W for 25W of Constant Emergency Power for 90 minutes

Fulham's innovative, new Micro-Inverter offers the ability to power any fixture in emergency mode at 25W for a period of 90 minutes.

Its uniqueness stems from its ability to run a fixture GREATER than 25W by using built-in 0-10V dimming wires. For example, the unit will scale down the power of a 150W fixture to 25W in Emergency Mode, allowing customers to use this inverter in high output applications where previously a costly inverter was the only solution.

The FHUPS1-UNV-25L-SD can support one fixture rated for 150W or multiple fixtures whose system wattage adds up to 150W in normal operation (although anything greater exceeds the input power rating of the unit.) This reduces the number of SKUs needed for emergency fixtures to save money.

- Uninterrupted Power Supply
- UL listed and CEC Title 20 compliant
- Dims luminaires of up to 150W down to 25W(45VA) in emergency with 0-10V dimming; 25W(45VA) max without 0-10V dimming
- Conduit for leads
- Under voltage protection, short circuit protection, overload protection

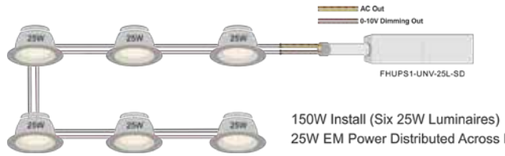
- Easy installation time: no need to open up a luminaire to connect this device to the driver.
- Can be used with luminaires where the driver is not accessible, e.g. UFO high bays
- Saves money: higher wattage fixtures previously required a higher wattage/higher cost inverter
- Self diagnostic standard
- RJ11 port allows Bluetooth compatibility

Specifications

Model Number	**FHUPS1-UNV-25L-SD**	**Output Type**	Class 1
Input Voltage	120-277VAC, 50/60Hz	**RFI/EMI**	FCC Part 15A
Input Current	0.12A Max.	**Ambient Operating Temperature Range**	0°C to 50°C (32°F to 122°F)
Input Power	11W	**AC Drive Input Power**	150W Max (0-10V dimming required past 25W)
Output Power	25W (45Va) Max	**Dimensions (L x W x H)**	15.3" x 2.9" x 1.5"
Normal Output Voltage Range	120-277VAC.	**Battery Type / Recharge Time**	LiFoPo4 3600mAh / 12 Hours
Emergency Output Voltage Range	120/220/277VAC	**Input Surge Protection**	Line-Neutral 1kV, Line & Neutral-Ground 2kV
Number of Output Channels	1	**Warranty**	5 years
Self-Diagnostics	Factory-enabled by default, can be disabled in the field		
Bicolor LED Indicator	Included LED Indicator/test switch provides automatic system status updates		

Wiring one single luminaire without 0-10V dimming

Wiring multiple luminaires with 0-10V dimming



Fluorescent Emergency Ballasts

- Wide range of lamp and ballast compatibility
- CEC Title 20 Compliant models available
- UL listed for damp locations
- Integrated LED power indicator/test switch

Specifications

Operating Voltage	UNV 120 - 277V	**Fixture Wiring**	Switched or Unswitched
		Minimum Emergency Operation	90 Mins.
Frequency	50/60Hz	**Min. Required Charging Time**	24 Hours
Regulatory Compliance	Meets or Exceeds N.E.C./LSC	**Test Switch / Indicator**	LED Push Button
Battery Type	High Temp. Long Life Rechargeable NiCd	**Optional Wall Plate: FHSWLPWH**	Used for remote mounting of test switch

FireHorse Ballast Models

Model Number	AC Input (W)	Standby Power Rating (W)	Max Charge Current (120VAC)		Battery Voltage (VDC)	Battery Rating (Wh)	Dimensions (L x W x H)	Weight (lbs)	Warranty (Yrs.)
FH7-UNV-500L-CEC*	3	0.7	50mA	30mA	6.0	12.0	9.60" x 2.16" x 1.13"	1.7	5
FH11-UNV-750L-CEC*	4	0.4	50mA	30mA	3.6	14.4	9.37" x 2.33" x 1.53"	2.0	
FH11-UNV-750L-CEC-A*†	4	0.4	50mA	30mA	3.6	14.4	9.37" x 2.33" x 1.53"	2.0	
FH12-UNV-1400L-CEC*	4	0.7	60mA	40mA	12.0	24.0	14.58" x 2.17" x 1.23"	1.7	

* California Energy Commission Small Battery Charging Title 20 compliant † Conduit feed

FireHorse Lamp Operation | **Also works with TLEDs.** Check lamp manufacturers' specifications for compatibility.

LAMP APPLICATIONS	FH7	FH11	FH12
FT - 4 pin			
FT18W	1	2	
FT24W	1	1 or 2	2
FT27W	1	1 or 2	
FT36W	1	1	1 or 2
FT39W	1	1	
FT40W	1	1	1
FT50W		1	
FT55W		1	1
CFQ - 4 pin			
CFQ13W	1	2	
CFQ18W	1		2
CFQ26W	1	1	2
CFTR - 4 pin			
CFTR13W	1	2	
CFTR18W	1	2	
CFTR26W	1	2	
CFTR32W	1	1	2
CFTR42W	1	1	
Circular-FCRT5			
22WCRT5	1	1	
40WCRT5	1		1
55WCRT5		1	
Circular-FCRT9			
32WCRT9	1	1	
40WCRT9	1	1	

LAMP APPLICATIONS	FH7	FH11	FH12
2D - 4 pin			
2D21W	1		
2D28W	1	1 or 2	1 or 2
2D - 4 pin			
2D38W	1	1 or 2	1 or 2
T5-Standard			
F14T5	1	1	2
F21T5	1	1	1
F28T5	1	1	1
F35T5		1	1
T5-HO High Output			
F24T5HO	1	1	2
F39T5HO	1	1	1 or 2
F49T5HO			1
F54T5HO (49W)	1	1	
F54T5HO	1	1	1
T8- Standard			
F17T8	1	2	2
F25T8	1	1 or 2	2
FB29T8			1
FBO31T8			1
F32T8 (25W)	1	1	
F32T8 (28W)	1	1	2
F32T8 (30W)	1	1	
F32T8 (32W)	1	1	1 or 2
F40T8	1	1	1

LAMP APPLICATIONS	FH7	FH11	FH12
T8- Standard (continued)			
F58T8		1	1
F70T8		1	1
T8-HO High Output			
F60T8HO		1	1
F72T8HO		1	1
T8-SL Slim Line			
F96T8SL			1
T12-Standard			
F20T12	1	2	2
F30T12		2	2
FB34T12	1 or 2		
F40T12		1 or 2	2
F40T12 ES (34W)	1 or 2		
F75T12, F85T12	1		
F85T12	1		
T12-HO High Output			
F48T12HO		1	
F60T12HO		1	1
F72T12HO			1
F96T12HO (95W)		1	
F96T12HO (110W)		1	1
T12-SL Slim Line			
F60T12SL		1	
F96T12SL		1	1

HotSpot2 LED Emergency System

Unlike the HoSpot1 LED Emergency System that comes equipped with separate LED modules, the HotSpot2 system operates a fixture's existing LED modules in emergency mode. HotSpot2 is a CEC-compliant, UL924 recognized emergency lighting system for use with LED modules driven by a constant current source.

The battery charger automatically adjusts to the connected battery, and output current can be set by a wiring harness or Fulham's SmartSet programming software, allowing a wide range of lumen outputs and runtimes. Self-diagnostic capability reduces liability and maintenance costs.

HotSpot2 LED Emergency System

The HotSpot2 emergency lighting system drives existing constant current LED modules during power outages. A complete system is composed of an emergency driver, emergency battery, and output wire harness. A wide range of lumen output and run times are available.

HotSpot2 Drivers

Model Number (CEC Title 20)	FHS2-UNV-36L	FHS2-UNV-56S
Input Voltage	100-277VAC	
Input Frequency	50/60Hz	
Input Current	0.1A Max	
LED Currents	100mA - 700mA	
Standby Input Power	<0.8W	
Total LED Power	20W	
Input Surge Protection	2.5KV Ring Wave	
Over Current Protection	Fuse	
Illumination Time	90 - 350 Min	
LED Connection	Series	
LED Output Protection	Self Resetting PTC	
Output Classification	UL1310/Class 2	
Bicolor LED Indicator	Included LED indicator / test switch provides automatic system status updates	
Output Voltage	12 - 55VDC	12 - 56VDC
Dimension (L x W x H)	5.3" x 1.7" x .93"	9.5" x 1.19" x 1"

HotSpot2 Emergency Battery Packs

Model Number	Dimensions (L x W x H)	Chemistry	Capacity (mAh)	Battery Count	Recharge Time	Max. Load for 90 min. (W)	
						-36L	-56S
FHSBATT8-AA.9	5.23" x 2.5" x 0.7"	NiCd	900	8 Cells	24Hrs	4	4
FHSBATL3-1	3.48" x 2.35" x 0.99"	LiFePO4	1000	3 Cells	24Hrs	4	4
FHSBATL6-.6	5.23" x 1.87" x 0.85"	LiFePO4	1200	6 Cells	24Hrs	6	4
FHSBATL3-1.5	3.48" x 2.76" x 0.99"	LiFePO4	1500	3 Cells	24Hrs	8	8
FHSBATL3-1.5S	8.87" x 1.11" x 0.96"	LiFePO4	1500	3 Cells	24Hrs	8	8
FHSBATL9-.6	7.52" x 1.87" x 0.85"	LiFePO4	1800	9 Cells	24Hrs	10	8
FHSBATTCC3-3†	6.00" x 3.60" x 1.55"	LiFePO4	3000	3 Cells	24Hrs	14*	14*
FHSBATL6-1.5	5.70" x 2.76" x 0.99"	LiFePO4	3000	6 Cells	24Hrs	16	14
FHSBATL6-1.5L (with optional mounting bracket)	7.89" x 1.56" x 0.92"	LiFePO4	3000	6 Cells	24Hrs	16	14
	9.07" x 1.63" x 0.93"		3000	6 Cells	24Hrs	16	14
FHSBATL6-1.5S	16.67" x 1.11" x 0.96"	LiFePO4					
FHSBATT8-C3	4.15" x 3.29" x 2.11"	NiCd	3000	8 Cells	24Hrs	16	16
FHSBATT8-C3L (with optional mounting bracket)	7.89" x 2.17" x 1.04"	NiCd	3000	8 Cells	24Hrs	16	16
	9.07" x 2.18" x 1.07"						
FHSBATL3-3	4.39" x 2.82" x 1.3"	LiFePO4	3000	3 Cells	24Hrs	16	16
FHSBATT8-D4	4.89" x 3.84" x 2.72"	NiCd	4000	8 Cells	24Hrs	20	20
FHSBATL6-3	7.52" x 2.82" x 1.3"	LiFePO4	6000	6 Cells	32Hrs	20**	20**
FHSBATL6-3L (with optional mounting bracket)	7.94" x 2.17" x 1.21"	LiFePO4	6000	6 Cells	32Hrs	20**	20**
	9.13" x 2.21" x 1.28"						

† Cold Pack Battery: -20°C minimum operating temperature * Rated 10W for Canada ** Rated 16W for Canada

HotSpot2 Accessories

Wiring harnesses:

Used to set the output current to the LED module during emergency operation. Using lower current will allow longer run times.

Model Number	mA	Model Number	mA	Model Number	mA
FHS-HARNESS-100	100	FHS-HARNESS-250	250	FHS-HARNESS-550	550
FHS-HARNESS-125	125	FHS-HARNESS-300	300	FHS-HARNESS-600	600
FHS-HARNESS-150	150	FHS-HARNESS-350	350	FHS-HARNESS-650	650
FHS-HARNESS-175	175	FHS-HARNESS-400	400	FHS-HARNESS-700	700
FHS-HARNESS-200	200	FHS-HARNESS-450	450		
FHS-HARNESS-225	225	FHS-HARNESS-500	500		

FHS-TSTWL-BC	IP67, bicolor LED Indicator / test switch for use in exposed, outdoor-rated luminaires
FHS-EXT12M	12" battery extension cable
FHS-EXT-48-TST	48" test switch extension cable

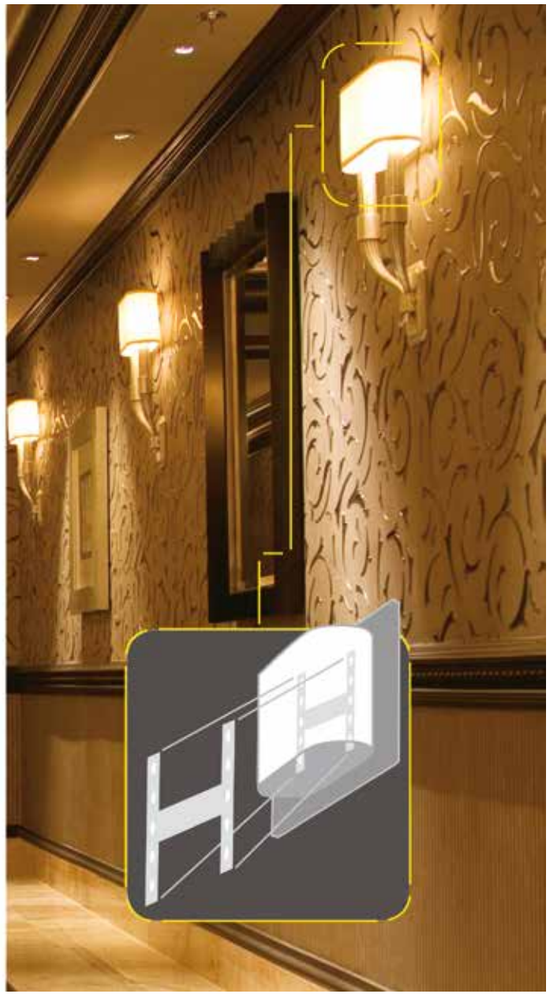
Also available: battery mounting brackets and wallplates. For more information, visit www.fulham.com

HotSpot1 LED Emergency System

Seamlessly add inconspicuous emergency lighting capability to existing non-emergency fixtures, such as recessed lighting and wall sconces, with the HotSpot1 modular LED systems.

A wide choice of lumen output levels, run times, discrete size, universal input voltage, and plug-n-play low voltage output wiring provide extreme adaptability, low cost of installation, and a high level of safety during operation.

Linear



H-configuration

HotSpot1 LED Emergency System

HotSpot1 systems add LED emergency lighting capability to existing luminaires, including TLED luminaires and retrofit projects. UL Classified kits are approved for field installation and are ideal for both fluorescent and Type A and B LED tubes. A complete kit includes an emergency driver, module, battery, installation instructions, and all necessary hardware and labels. The system operates independently of the luminaire's light source, ensuring compatibility with many types of luminaires.

HotSpot1 Emergency Driver

Model Number	**FHS1-UNV-3.6L**
Input Voltage	100-277VAC (UNV)
Input Frequency	50/60Hz
Input Current	0.06 A Max.
Input Wattage	10W Max.
Standby Input Power	<0.8W
Compatible Batteries	NiCd, 3.6 VDC
Battery Capacities	3AH, 4AH, 8AH
Total LED Power	1-10W
Illumination Time	90 - 360 Min.
Surge Protection	C62.41 (TVS)
Over Current Protection	Fuse
Recharge Time	32 - 48 Hrs
LED Connection	Parallel
LED Output Protection	Self Resetting PTC
Output Classification	UL1310/Class 2

HotSpot1 Emergency Modules

Model Number	Watts	Shape	Applications
FHS6-AR-3WL	3	Linear	Wall sconce, ceiling flush mount, low level lighting
FHS1-AR4-WL	4	Linear	Wall sconce, ceiling flush mount, low level lighting
FHS3-AR-6W-SH	6	Small-H	Wall sconce, ceiling flush mount
FHS4-AR-8W-LH	8	Large-H	Wall sconce, ceiling flush mount
FHS3-AR-10W-SH	10	Small-H	Wall sconce, ceiling flush mount
FHS4-AR-10W-LH	10	Large-H	Wall sconce, ceiling flush mount

HotSpot1 Emergency Battery Packs

Model Number	Battery Qty/Type	Operation Duration	Output Power/Time	Dimensions (L x W x H)
FHSBATT3-C3	3/C	3 Amp/Hrs	4W: 145min, 6W: 90min	3.1" x 2.00" x 1.00"
FHSBATT3-D4	3/D	4 Amp/Hrs	4W: 200min, 6W: 125min, 8W: 90min	4.00" x 2.50" x 1.35"
FHSBATT3-F7	3/F	8 Amp/Hrs	4W: 360min, 6W: 235min, 8W: 175min, 10W: 135min	4.00" x 3.60" x 1.35"
FHSBATT3-F7L	3/F	8 Amp/Hrs	4W: 360min, 6W: 235min, 8W: 175min, 10W: 135min	11.75" x 1.56" x 1.37"

HotSpot1 LED Emergency Retrofit Kits

Model Number	Watts	Lumen Output	Comparable Fluorescent Lumen Output	Estimated Run Time (Mins)	Module Dimensions (L x W)	Case Qty.
			Linear Module			
FHSKITT03LNC	3	450	720	145	4.68" x 0.82"	10
FHSKITT03LND	3	450	720	200	4.68" x 0.82"	10
FHSKITT03LNF	3	450	720	360	4.68" x 0.82"	20
FHSKITT03LNFL*	3	450	720	360	4.68" x 0.82"	20
FHSKITT04LNC	4	500	800	145	4.68" x 0.82"	10
FHSKITT04LND	4	500	800	200	4.68" x 0.82"	10
FHSKITT04LNF	4	500	800	360	4.68" x 0.82"	20
			Linked Linear (2 Modules)			
FHSKITT07LND	7	900	1440	100	4.68" x 0.82"	10
FHSKITT07LNF	7	900	1440	180	4.68" x 0.82"	20
FHSKITT07LNFL*	7	900	1440	180	4.68" x 0.82"	20
			Linked Linear (3 Modules)			
FHSKITT10LNF	10	1350	2160	120	4.68" x 0.82"	20
FHSKITT10LNFL*	10	1350	2160	120	4.68" x 0.82"	20
			Small-H Module			
FHSKITT06SHC	6	750	1200	90	3.54" x 3.93"	10
FHSKITT06SHD	6	750	1200	125	3.54" x 3.93"	10
FHSKITT06SHF	6	750	1200	235	3.54" x 3.93"	20
FHSKITT10SHF	10	1250	2000	135	3.54" x 3.93"	20
			Large-H Module			
FHSKITT08LHD	8	1000	1600	90	5.71" x 3.93"	10
FHSKITT08LHF	8	1000	1600	175	5.71" x 3.93"	20
FHSKITT10LHF	10	1250	2000	135	5.71" x 3.93"	20

* Linear battery

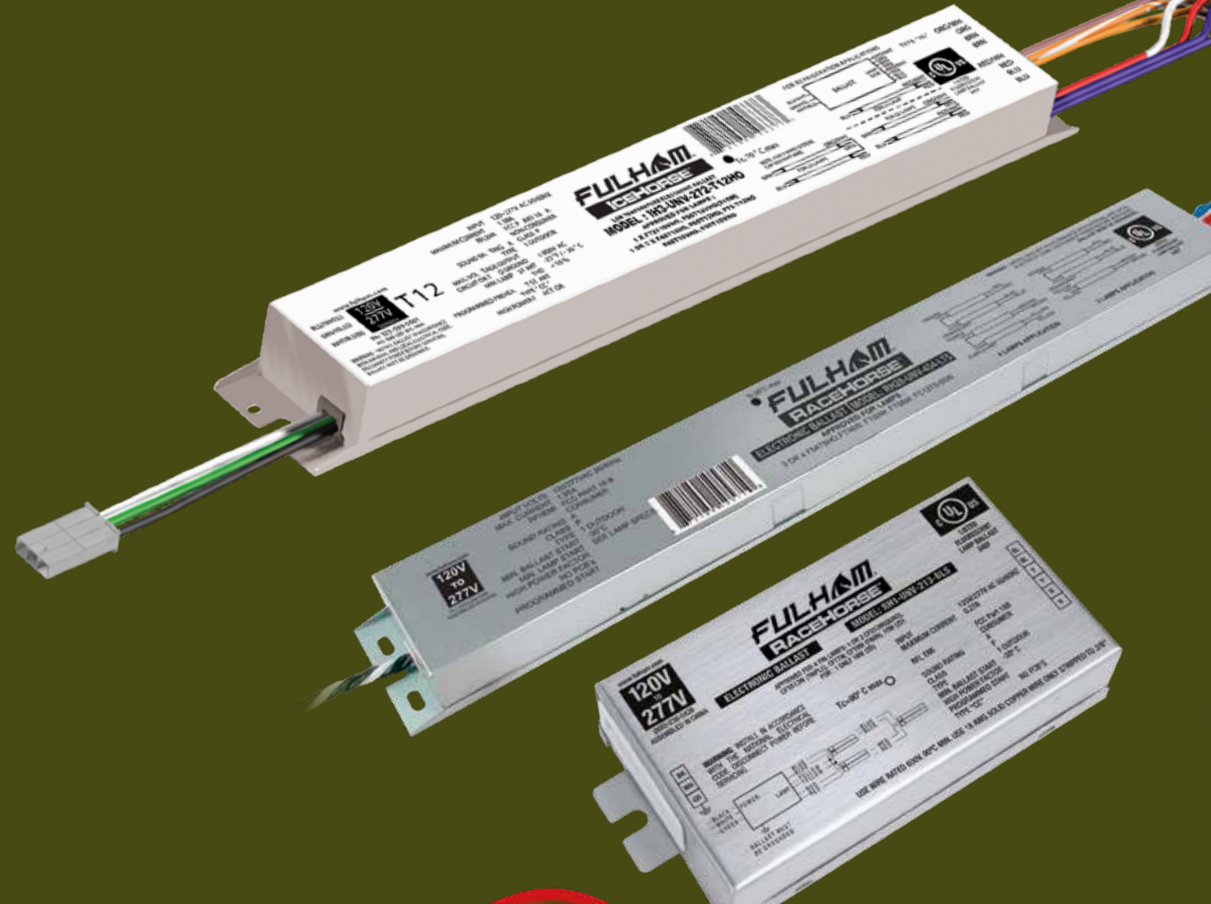
SUNHORSE FULHAM
WORKHORSE FULHAM
ICEHORSE FULHAM
PONY FULHAM
RACEHORSE FULHAM
SUGAR CUBE FULHAM
LONGHORSE

Edward E. Hammer
Engineer

TWISTED LOGIC: THE CFL WAS BORN!

When the energy crisis struck large parts of the Western world in the 1970s, particularly the United States, it spurred a need for measures to conserve energy and led to a remarkable fluorescent breakthrough by electrical engineer Edward E. Hammer (1931 - 2012).

It was during this challenging period that Hammer led the development of a pioneering energy-efficient fluorescent lamp in 1973, which directly led to the invention of the compact fluorescent lamp (CFL) in 1976.



DID YOU KNOW?

The American Journal of Infection Control indicates that fluorescent UV light eliminates ≤ 97.7% of pathogens in operating rooms, and researchers at Boston University confirm that UVC kills SARS-CoV-2, the virus causing COVID-19.

SUNHORSE FULHAM

UV Germicidal & Tanning Ballasts

for air and water purification purposes

Standard Electronic UV Ballasts

Model Number	Operating Voltage (VAC)	Max. Input Current (A)	Rated Max. Load (W)	Min. Operating Temp.	Max Case Temp.	Dimensions (L x W x H)	cULus	CE
SHS2-MLT-L	120-240	0.33	41	0°C (32°F)	75°C (167°F)	6.45" x 1.49" x 0.96"	✓	✓
SHS3-MLT-L	120-240	0.29	58	0°C (32°F)	75°C (167°F)	6.45" x 1.49" x 0.96"	✓	✓
SHS1-UNV-C-I	120-277	0.408	45	0°C (32°F)	75°C (167°F)	5.05" x 2.36" x 1.00"	✓	
SHS5-024-C	24	2.59	41	0°C (32°F)	75°C (167°F)	3.64" x 3.12" x 1.01"	✓	
SHS10-UNV-H	120-277	1.25	150	0°C (32°F)	70°C (158°F)	10" x 2.6" x 1.26"	✓	✓
SHS14-UNV-H	120-277	1.6	150	0°C (32°F)	70°C (158°F)	10" x 2.6" x 1.26"	✓	✓
SHS11-UNV-H	120-277	1.35	190	-20°C (-4°F)	70°C (158°F)	10" x 2.6" x 1.26"	✓	✓
SHS15-UNV-H	120-277	2.9	320	0°C (32°F)	75°C (167°F)	10" x 2.8" x 1.79"	✓	✓
FEP-120-600-L	120	2.86	320	-18°C (0°F)	70°C (158°F)	19.25" x 3" x 1.25"	✓	
FEP-230-600-L	230	1.50	320	0°C (32°F)	70°C (158°F)	19.25" x 3" x 1.25"	✓	
SHGS1 MID 2 200 L	208-240	1.85	380	0°C (32°F)	75°C (167°F)	12" x 3.11" x 1.73"	✓	

Dimmable Electronic UV Ballasts For UV & Tanning

SHD21-230-L-I	230	1.64	320	0°C (32°F)	70°C (158°F)	16.69" x 1.72" x 1.18"	✓	

ICEHORSE FULHAM

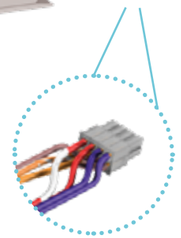
Low Temperature Ballasts

that automatically adjust in cold temperatures to provide optimal light output.

MINIMUM STARTING TEMPERATURE

-30°C -22°F

Operates T8, T10 & T12 Lamps



REACTIVE CIRCUIT INSIDE

Standard Molex® Connectors

for Plug-n-Play commercial refrigeration applications

Specifications

Input Voltage	120V-277V; 50/60Hz
High Power Factor	> 0.98
ATHD	< 10%
Lamp Operation Mode	Programmed Start
Ignition Method	Programmed Pre-Heat Start
Min. Operating Temperature	-30°C (-22°F)

Fluorescent Low Temperature Electronic Ballasts

Model Number	Max. Current (A)	Max. Power (W)	Dimensions (L x W x H)	Weight (lbs)	Case Qty. (pcs.)
IH1-UNV-232-T8	.85	100	12.03" x 1.71" x 1"	1.4	25
IH2-UNV-270-T8	1.35	155		1.5	25
IH3-UNV-272T12HO	1.38	150		1.4	25

Lamp Operation

Model Number	# of Lamps	Lamp Type / Designation
IH1-UNV-232-T8	1 or 2	F25 / F32 / F40 T8
IH2-UNV-270-T8	1 or 2	F58 / F70 T8
IH3-UNV 272 T12HO	1 or 2	F48 / F60 T8HO, F48 / F60 T10VHO, F48 / F60 / F72 T12HO
	1	F72T8HO, F72T10VHO, F96T12VHO

Molex is a registered trademark of Molex Incorporated.

RACEHORSE FULHAM

Compact Fluorescent (CFL) Electronic Ballasts

Specifications

Operating Voltage	120V-277V; 50/60Hz
ATHD	< 10%
Over Current	Fuse
Transient Protection	C62.41 Class A 7 strikes
Regulatory Approvals	UL & cULus Listed Type 1 Outdoor
EMI	FCC CFR Title 47 Part 18 non-consumer
High Power Factor	> .98
Ballast Maximum Case Temp.	167°F (75°C) - 5 Year Warranty
Ballast Maximum Case Temp.	194°F (90°C) - 3 Year Warranty
Lamp Starting Mode	Program Start
Inherent Thermal Protection	Class P

CFL Ballasts & Kits

Model Number	Max Load	Max. Current	Dimensions (L x W x H)	Weight	Case Quantity
RHA-UNV-226-C	57W	.52 A	5.1" x 2.4" x 1" (4.3" L case)	5.2 oz.	**C Models:** 50 pcs/ case **Kits (K):** 20 pcs/ case
RHA-UNV-242-C	84W	.752 A	5.1" x 3" x 1.3" (4.3" L case)	7 oz.	**C Models:** 50 pcs/ case

RACEHORSE FULHAM

T5HO & T5HE Fluorescent Electronic Ballasts

T5HO & T5HE Fluorescent Ballasts

Model Number	Max. Load (W)	Max. Current (A)	Dimensions (L x W x H)	Connector Type	Case Qty (pcs.)
RHA-UNV-254-LT5	120W	1.0 A	9.53" x 1.32" x 1.05"	Leads	25
RHA-UNV-454-LT5†	240W	2.0 A	16.88" x 1.69" x 1.18"	Leads	20

† Made to order. Minimum order quantity applies.

Fluorescent Ballasts

Universal Voltage (120-277V)

Model Number	Dimensions (L x W x H)	Input Current	Master Carton Qty.
WH41-UNV-L	9.48” x 1.41” x 1.02”	0.496A	25
WH43-UNV-L	9.48” x 1.41” x 1.02”	0.88A	25
WH44-UNV-L	9.48” x 1.41” x 1.02”	0.496A	25

Dedicated Voltage (120, 230, and 277V)

Series	Model Number	Input Voltage (V)	Max Power (W)	Max Current (Amp)	Dimensions (L x W x H)	Configuration	Case Qty.
WORKHORSE 1	**WH1-120-L**	120	28	.10	5.92” x 0.94” x .76”	Linear case, side leads	90
WORKHORSE 2	**WH2-120-L**	120	35	.33	5.52” x 1.25” x 1.02”	Linear case, side leads	50
	WH2-120-C	120		.33	3.36” x 1.84” x 1.01”	Compact case, side leads	40
	WH2-277-L	277		.15	5.52” x 1.25” x 0.99”	Linear case, side leads	50
	WH2-277-C	277		.15	3.37” x 2.32” x 1”	Compact case, side leads	40
WORKHORSE 22	**WH22-120-L**	120	35	.25	5.52” x 1.25” x 1.02”	Linear case, side leads	50
	WH22-120-C	120		.25	3.36” x 1.84” x 1.01”	Compact case, side leads	50
WORKHORSE 3	**WH3-120-L**	120	64	.56	6.48” x 1.50” x 1.02”	Linear case, side leads	50
	WH3-120-C	120		.56	3.8” x 2.5” x 1.01”	Compact case, side leads	60
	WH3-230-L	230		.29	6.45” x 1.5” x 1”	Linear case, side leads	50
	WH3-277-L	277		.24	6.48” x 1.5” x 1.02”	Linear case, side leads	50
	WH3-277-C	277		.24	3.83” x 3.11” x 1.01”	Compact case, side leads	60
WORKHORSE 33	**WH33-120-L**	120	64	.53	6.48” x 1.5” x 1.02”	Linear case, side leads	50
	WH33-120-C	120		.53	3.64” x 3.12” x 1.01”	Compact case, side leads	60
WORKHORSE 4	**WH4-120-L**	120	70	.56	6.48” x 1.5” x 1.02”	Linear case, side leads	50
WORKHORSE 5	**WH5-120-L**	120	128	1.15	8.5” x 1.73” x 1.01”	Linear case, side leads	50
	WH5-230-L	230		0.57	9.5” x 1.73” x 1.01”	Linear case, side leads	50
	WH5-277-L	277		0.48	9.5” x 1.73” x 1.01”	Linear case, side leads	50
WORKHORSE 6	**WH6-120-L**	120	140	1.04	8.5” x 1.73” x 1.01”	Linear case, side leads	50
	WH6-277-L	277		0.50	9.5” x 1.73” x 1.01”	Linear case, side leads	50
WORKHORSE 7	**WH7-120-L**	120	220	1.82	19.24” x 1.72” x 1.03”	Linear case, side leads	25
	WH7-120-H	120		1.82	11.73” x 3.23” x 1.23”	H can w/ magnetic footprint	16
	WH7-230-L	230		1.10	19.24” x 1.72” x 1.03”	Linear case, side leads	25
WORKHORSE 8	**WH8-120-L**	120	220	1.8	19.24” x 1.72” x 1.03”	Linear case, side leads	25

Find WorkHorse and LongHorse wiring diagrams here:
https://www.fulham.com/contact-us/wiring-diagrams/

Or scan this QR Code with your SmartPhone’s camera >

Scan Me with Your Phone’s Camera!

Fluorescent Specifier Grade Ballasts

Specifier Grade T8/T12 Specifications

Power Factor	98.5% Min.
ATHD	Less than 10%
EMI	FCC CFR Title 47 Part 18 non-consumer
Ballast Factor	>.87
Starting Method	**T8:** Instant Start **T12HO:** Modified Rapid Start
Regulatory Approvals	UL & cULus Listed Type 1 or Type 2
Inherent Thermal Protection	Class P
Transient Protection	C62.41 Class A 7 strikes
Dimensions (L x W x H)	**T8:** 9.5” x 1.3” x 1.0” **T12HO:** 9.5” x 2.3” x 1.6”
Lamp CF	< 1.7
Min. Starting Temp.	0°F (-18°C)
Weight	**T8:** 1.5 lbs. (700g) **T12HO:** 2.4lb. (1.09 kg)

Specifier Grade T8/T12 Ballasts

Model Number	Input Voltage (VAC)	Input Power (W)	Max. Current (A)	Black/White Wires	Red Wires	Blue Wires	Yellow Wires	Case Qty (pcs.)	CEE
WHSG2-UNV-T8-IS	120-277; 50/60Hz	59	.50	25”	46”	31”	N/A	25	CEE
WHSG3-UNV-T8-IS	120-277; 50/60Hz	85	.71	25”	46”	31”	N/A	25	CEE
WHSG4-UNV-T8-IS	120-277; 50/60Hz	112	.93	25”	31”	31”	46”	25	CEE

Remote Mount Electronic Ballasts

Specifications

Power Factor	>0.9
THD	<34.6%
EMI/RFI Compliance	FCC Part 18-A
Sound Rating	“A”
Ballast Type	Instant Start
Voltage Transients	ANSI C82.11 - 1993
Input / Protection	FUSE
Remote Mounting	20ft Max
Min. Operating Temp	-30°C (-20°F)
Max. Case Temp	70°C (158°F)
Approvals / Class	UL Listed, Class “P”, 1 or 2 Outdoor

- Operates up to 20ft. from lamp
- Versatile
- High Power Factor
- Energy Saving
- Lightweight
- Solid-State Electronics

Fluorescent Low Temperature Electronic Ballasts

Model Number	Lamp Watts / Type	Lamps Operated	Input Watts	Line Current	Ballast Factor	Efficacy Factor
LH4-120L	F28T5	2	55	0.48	1.0	1.7

Pony Electronic Ballasts

Pony Electronic Ballasts

Model	Model Number	Operates Lamps	Dimensions (Inches)
Pony for CFL	NPY-120-118-BL	1 x 13CFT/E, 18CFQ/E, 18CFTR/E	H 1”, W 1.77”, L 3.34”
	NPY-120-126-CFL	1 x 18CFT/E, 24/27CFT/E, 26CFQ/E, 26CFQ/E, 26CFTR/E, 32CFTR/E, 22CRT9	H 1.02”, W 2.39”, L 3.36”
	NPY-120-218-CFL	2 x 13CFT/E, 18CFQ/E, 18CFTR/E	H 1.02”, W 2.39”, L 3.36”

SugarCube Ballasts

Pony Electronic Ballasts

Model	Model Number	Operates Lamps	Dimensions (Inches)
For T5 / T8 / T12	SC-120-108-LT5	1 x F6T5, F8T5	H 4.76”, W 1.05”, L .76”
	SC-120-213-LT5	1 x F21T5, F8T5 + F13T5; 2 x F13T5, F14T12	H 5.53”, W 1.27”, L 1.01”
	SC-120-115-CT8	1 x F14T8, F15T8, F17T8, F14T12, F15T12	H 3.09”, W 1.45”, L 1”
	SC-120-132-T8XL	1 x F15T8, F17T8, F25T8, F32T8	H 6.3”, W 1.08”, L 1.01”
For CFL & Circle	SC-120-113-CFL	1 x 13CFQ/E, F15T8, F17T8, 13W Spiral	H 3.09”, W 1.45” L 1”
For UV Lamps	SC-120-287-CUV	1 x 180mm T5 UV, 287mm T5 UV	H 3.07”, W 1.46”, L 1”
	SC-230-287-CUV	1 x 180mm T5 UV, 287mm T5 UV	H 3.07”, W 1.46”, L 1”
For 230V	SC-230-113-CFL	1 x Quad (CFQ/E), 4 Pin 13W; 1 x Triple (CFTR/E), 4 Pin 13W	H 3.09”, W 1.45”, L 1”

U.S INNOVATION BY FULHAM

Fulham has a rich history of developing innovative, award-winning lighting solutions. From Fulham’s U.S. Headquarters near Los Angeles, California, Fulham Product Managers, Engineers, Salespeople and Marketers team up to develop innovative, new product ideas that are then researched, designed and manufactured by Fulham’s own factories abroad. This all occurs under Fulham’s direct supervision as a Prime Manufacturer, thus guaranteeing the extremely high quality upon which Fulham has built its reputation for over 25 years.

Our global lighting programs include:

- Wireless Control Systems
- Programmable LED Drivers
- Standard LED Modules & Drivers
- Horticulture Modules
- Everyday Electronic Fluorescent Ballasts
- Specialty Ballasts such as UV/Germicidal, Refrigeration, or Remote Mount
- Electronic halogen transformers
- Emergency lighting
- Custom solutions
- And more...

A Special Thank You to Fulham’s Warehouse Staff

Throughout this trying time, as the world grapples with this horrible pandemic, Fulham’s warehouse staff have been our “everyday heroes.” They have worked carefully and tirelessly to ensure that Fulham remains OPEN FOR BUSINESS and completely incident-free. Measures were implemented early on to operate with social distancing and proper personal protective equipment – a conservative model to follow wherever you are!

Fulham is proud of these dedicated colleagues who’ve helped us do our part delivering essential Germicidal UV ballasts, Refrigeration ballasts, and all kinds of replacement power supplies for crucial facility maintenance and new construction.

From your fellow colleagues, and on behalf of all of Fulham’s valued customers around the globe, Thank You Very Much.

WHY CHOOSE FULHAM?

- **Known and Trusted Worldwide:**
  Successful Global Operation
- **Stable:**
  25 Year Legacy, Stand Behind Our Products
- **Reputation for Quality:**
  Minimal In-Field Service or Re-installations Required
- **Always Growing and Innovating:**
  We are the Engineers (Not Just Buyers and Resellers)
- **Relevant:**
  Strong foothold with new items in emerging markets; ongoing sales of legacy goods
- **Essential:**
  60% revenue from essential items; forecasted at >70% in 5yrs
- **Diversified in Technologies Served:**
  Powered Light, Emergency and Control all under one roof
- **Varied Solutions (General & Specialty):**
  20 Year Germicidal UV Program, Programs in Refrigeration, Horticulture and more
- **Resilient:**
  Diverse Customer Base
- **Differentiated:**
  Unique Sales and Marketing Approaches, broad product offering not reliant on one technology
- **Leading:**
  #1 Independent Innovator of globally-mandated Emergency Lighting Solutions
- **Insulated:**
  Redundant Sources of Supply (both India and Asia manufacturing)

LIMITED WARRANTY

Length of Warranty and Coverage

Warranty period will be determined from the date of manufacture as indicated by the date code stamped on each product and will be covered as follows:

EliteControl™ – 5 Years
FarmHorse Modules – 5 Years*
FireHorse™ - 2 to 5 Years
FREELITE™ - 5 Years
HighHorse™ Electronic HID Ballast - 3 Years
HighHorse™ Induction - 5 to 7 Years (If installed per instructions)
HotSpot™ - 3 to 5 Years*
IceHorse™ Ballast - 3 Years
LongHorse™ Electronic Remote Fluorescent Ballast - 5 Years
LumoSeries™ - 5 Years
PONY™ Electronic Ballast - 2 Years
PONY™ Electronic SugarCube™ - 2 Years
PONY™ Electronic Transformer - 2 Years
RaceHorse™ Electronic Ballast – 70°C 5 Years, 90°C 3 Years
SunHorse™ Ballast - 3 to 5 Years (depending on the model)
SineHorse™ Ballast - 3 Years
ThoroLED™ Drivers - 2 to 5 Years
ThoroLED™ Modules/Engines - 3 to 5 Years*
ThoroLED™ Retrofit - 5 Years*
ThoroLED™ Luminaire - 5 Years*
Vizion™ Modules/Engines - 5 Years*
Vizion™ Retrofit - 5 Years*
Vizion™ Luminaire - 5 Years*
WorkHorse™ Electronic Fluorescent Ballast - 5 Years
WorkHorse LED™ Drivers - 5 Years

* Covered defects for FarmHorse, Vizion, ThoroLED, and HotSpot LED modules. For purposes of this limited warranty, a defect in a module shall be defined as one or more individual LEDs dark at initial installation or greater than 10% of individual LEDs dark during the Warranty Period. Replacement and/or repair of individual Vizion, ThoroLED, or HotSpot LED Modules does not extend this limited warranty beyond the original Warranty Period.

Warranty Conditions

Fulham extends this express limited warranty only to the original purchaser or to the first user. This constitutes the complete warranty for the product. Fulham is not responsible for any auxiliary equipment not furnished by Fulham, which is used in connection with or attached to the product, or for operation of the product with any auxiliary equipment. Damage to all such equipment is expressly excluded from this warranty. In addition, Fulham is not responsible for any damage to the product resulting from the use of auxiliary equipment not supplied by Fulham.

Warranty Conditions Not Covered

This warranty is not applicable to any product manufactured by Fulham not installed and operated in accordance with:

* Underwriters Laboratories Inc. (UL)
* National Electrical Code (NEC)
* Standards set by the International Electrotechnical Commission (IEC)
* European Norms Electrical Certification (ENEC)
* Applicable international federal, state and local codes
* Remote applications beyond maximum distance noted on product specification sheet. If maximum distance is not provided, remote application is not covered.
* Fulham specific, most recent instructions and application guidelines provided for installation of the product

Additionally, this warranty is not applicable to Fulham manufactured products that have been subjected to excessive stress including, but not limited to, operating temperatures exceeding the recommended maximum temperature on any part of the product.

Obtaining Warranty Service

If within the warranty period it appears that the installed product does not meet the warranty conditions specified, the purchaser must notify Fulham of its warranty claim. Fulham or its authorized service company will provide warranty service directly to you.

General Provisions

All responsibilities regarding the product are set forth by this warranty. Replacement or repairs of the product is your exclusive remedy. For purposes of clarity, “replacement or repairs of the product” does not include any removal or reinstallation costs or expenses, including, without limitation, any labor costs or expenses, shipping costs to return non-conforming products or any damages that may occur during the return of product to Fulham. If Fulham chooses to replace the product and is not able to do so because it has been discontinued or is not available, Fulham may replace it with a comparable product. Fulham reserves the right to use new, reconditioned, refurbished, repaired or remanufactured products or parts in the repair or replacement of any product covered by this warranty. If no replacement product is available, Fulham, solely at its discretion, may issue a credit for the product, prorated for its remaining warranty life.

This warranty is given in lieu of all other express warranties. Implied warranties, including those without limitation, warranties of merchant ability and fitness for a particular purpose, are limited to the duration of this limited warranty. Fulham shall in no event be liable for damages in excess of the purchase price of the product, for any loss of use, loss of time, inconvenience, commercial loss, lost profits or savings or other incidental, special or consequential damages arising out of the use or inability to use such product, to the full extent such may be claimed by law.

Local Exceptions

Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, or limitations on how long an implied warranty lasts, therefore the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and purchasers may have other rights that vary by jurisdiction.

Returned Materials Authorizations (RMA)

Customers shall contact Fulham directly for all RMA’s.

After receiving the RMA, the user shall promptly return the product at the user’s expense to Fulham after receiving instructions as to when and where to ship product. Failure to follow this procedure shall void this warranty. Should the number of pieces received by Fulham differ from the RMA either +/-, the customer will be notified and adjustments will be made at that time.

Fulham reserves the right to examine all failed products to determine the cause of failure and patterns of usage and reserves the right to be the sole judge as to whether any products are defective and covered under this warranty.

Contact Information

Fulham North America	+1 323 599 5001 warranty@fulham.com
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Effective: August 1st, 2018

FULHAM®

Harness the Horsepower

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