



**FULHAM**<sup>®</sup>

*Lighting... Global. Intelligent. Sustainable.*

Europe  
Featured Products Catalogue

2017



*Innovative Lighting Solutions  
LED Drivers, Modules, LED Emergency & More*



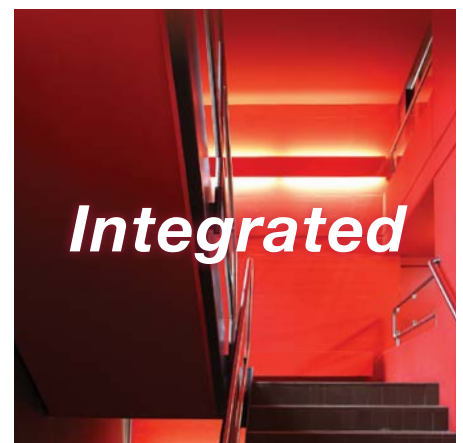
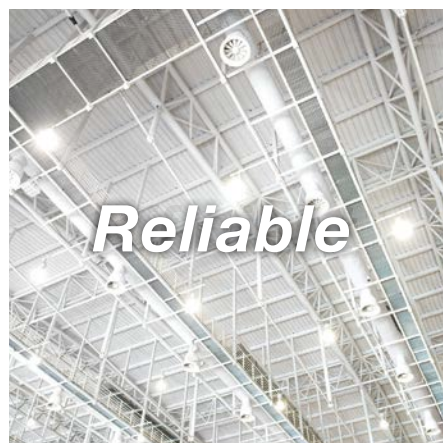
# A Pioneer In Lighting Electronics



Fulham is dedicated to intelligent, sustainable lighting solutions that give our users the power to control their light. Fulham's revered product quality and world-class customer responsiveness make us the preferred, trusted partner to over 3000 lighting manufacturers and distributors worldwide.

## Global Innovation, Global Reach

From our European Design Centre in Alkmaar, Netherlands, and our Los Angeles headquarters, USA, our teams of product managers and engineers work with OEMs and end users to conceive new products, then our global network of engineering experts develops and manufactures the finished products. The result: reliable, cutting edge lighting solutions that bring European and Global innovation to a global market.



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*Can't find what you're looking for? Fulham's industry best Customer Service team can help you find the components you need. Visit **www.fulham.com** or contact Fulham at **+31 72 572 3000** for more information.*

**NEW**

## Universal Mains Dimming LED Driver L1V1230105S-25E (L05023-A)

25W, 3-43Vdc, 100-1050mA

A versatile driver with small form factor and a wide voltage output range ideally suited for COB arrays and LED strips.

- Wide output voltage range 3-43Vdc
- Wide range of current settings 100 – 1050mA
- Mains- (TRIAC, trailing edge and leading edge), 1-10V-, and potentiometer dimming
- Compatible with Fulham SmartSet programming platform (TPSB-100 handheld controller)
- Zero ripple current
- Automatic dim mode detection
- Suitable for warm dimming (natural toning/dim-to-warm) LEDs
- Max inrush current 300 mA
- Thermal protection: dimming instead of switch off
- Open circuit output voltage protection
- High efficiency across a wide range of loads
- Power factor >0.9C
- ENEC certified, SELV



### Specific Technical Data

Model Number	Max Output Power (W)	Mains Dimming	1-10V Dimming	Dipswitch	Programmable	Power Factor at Full Load	Open Circuit Output Voltage	Dimension (L x W x H) (mm)
L1V1230105S-25E (L05023-A)	25	Y	Y	Y	Y	>0.9C	49Vdc	110 x 52 x 23.5

### Inrush Current

**Mains max. peak inrush at full load**

0.150A per driver on phase 60° (average starting angle)\*  
 0.300A per driver on phase 90° (worst case starting angle)\*  
 0.132A per driver on phase 60° (average starting angle)\*\*  
 0.291A per driver on phase 90° (worst case starting angle)\*\*

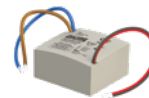
\* Tested at 240 Vac 1 driver connected, with TTI HA1600A analyzer.

\*\* Tested at 240 Vac 10 drivers parallel connected, with TTI HA1600A analyzer.

### Maximum Number of Drivers on Automatic Circuit Breakers

C10	C13	C16	C20	B10	B13	B16	B20
64	83	102	128	64	83	102	128

## L 46 x W 42 x H 22 (mm)



Model Number	Old Reference	Max Watts (W)	Output Current (mA)	Output Voltage (Vdc)	Input Voltage (Vac)
L1MLT0350-5.5C	L05150	5.5	350	3 - 15	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	Old 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)
L1MLT1050-20E	L05013-1050	20	1050	3 - 19	115 - 240 (50/60 Hz)
L1MLT1200-20E	L05013-1200	20	1200	3 - 17	115 - 240 (50/60 Hz)
L1MLT0350-17E	L05013-48350	20	350	3 - 48	115 - 240 (50/60 Hz)
L1MLT0500-20E	L05013-40500	20	500	3 - 40	115 - 240 (50/60 Hz)
L12300700-33E	L05033-48700	33	700	30 - 48	220 - 240 (50/60 Hz)

## L 99 x W 39 x H 23 (mm)



Model Number	Old Reference	Max Watts (W)	Output Current (mA)	Output Current Selection Method	Output Voltage (Vdc)	Input Voltage (Vac)
L1MLT025S-10E	L05020-40250	11	200/250	Output wires	20 - 43	115 - 240 (50/60 Hz)
L1MLT070S-12E	L05020	12	350/700	Output wires	3 - 32	115 - 240 (50/60 Hz)
L1MLT039S-12E	L05020-390	12	270/390	Output wires	3 - 32	115 - 240 (50/60 Hz)
L1MLT050S-12E	L05020-500	12	500/700	Output wires	3 - 24	115 - 240 (50/60 Hz)
L1MLT030S-20E	L05020-40300	12	180/300	Output wires	20 - 43	115 - 240 (50/60 Hz)

## L 110 x W 52 x H 24 (mm)



Model Number	Old 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)
L1MID105S-33E	L05032R	33	500 - 1050	Resistor	15 - 48	180 - 240 (50/60 Hz)

## L 157 x W 42 x H 32 (mm)



Model Number	Old 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)
L1MLT105S-40E	L05049-601000-ND	40	245 - 1050	Resistor	26 - 60	220 - 240 (50/60 Hz)

## L 99 x W 39 x H 23 (mm)



Model Number	Old 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
L1E1230030S-12E	L05021-40300	12	180/300	Output wires	20 - 40	220 - 240 (50/60 Hz)	Mains Dimming
L1E1230070S-12E(Z)	L05021E	12	350/700	Output wires	3 - 32	220 - 240 (50/60 Hz)	Mains Dimming

## L 110 x W 52 x H 24 (mm)



Model Number	Old 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
L1W1MID120D-20E	L05011i2	20	100 - 1200	Dipswitch	6 - 42	180 - 240 (50/60 Hz)	1-10V/pulse
L1W1MLT500S-20E	L05016Ci	20	110 - 500	Potentiometer	3 - 43	110 - 240 (50/60 Hz)	1-10V/pulse
L1W2MLT600S-20E	L05016Cid	20	1 Ch: 200 - 600 2 Ch: 100 - 300 each	Potentiometer	3 - 43	110 - 240 (50/60 Hz)	1-10V/pulse
L1W2MLT100S-20E	L05016i	20	110 - 500	Potentiometer	3 - 33	110 - 240 (50/60 Hz)	1-10V/pulse
L1M2LDC0350-20E	L05035	20	2 Ch: 300 each	N/A	3 - 27	12 - 32 (50/60 Hz)	1-10V/pulse
L1V1230105S-25E	L05023-A	25	100 - 1050	Dipswitch/ TPSB-100	3 - 43	220 - 240 (50/60 Hz)	Mains-, 1-10V-, and Potentiometer dimming
L1M1MID120S-24E	L05011i3	20 24	200 - 1200 600 - 900	Dipswitch	6 - 42	180 - 240 (50/60 Hz)	1-10V
L1P1MID120S-24E	L05011i4	20 24	200 - 1200 600 - 900	Dipswitch	6 - 42	180 - 240 (50/60 Hz)	pulse
L1W1MID140S-30E	L05031	30	100 - 1400	Dipswitch	6 - 42	180 - 240 (50/60 Hz)	1-10V/pulse

## L 157 x W 42 x H 32 (mm)



Model Number	Old 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
L1M1MLT105S-40E	L05049-601000	40	245 - 1050	Resistor	26 - 60	110 - 240 (50/60 Hz)	1-10V
L1M1230200S-60E	L05055	60	400 - 2000	Resistor	22-46	220 - 240 (50/60 Hz)	1-10V
L1M1230140S-60E	L05059	60	280-1400	Resistor	18 - 60	220 - 240 (50/60 Hz)	1-10V

## L 212 x W 76 x H 46 (mm)



Model Number	Old Reference	Max Watts (W)	Output Current (mA)	Output Current Selection Method	Output Voltage (Vdc)	Input Voltage (Vac)	Dimming Type
L1M1MLT280S-100E	L05060	100	700 - 2800	Resistor	20-60	110 - 240 (50/60 Hz)	1-10V
L1M1MLT400S-150E	L05065	150	700 - 4000	Resistor	24-60	90 - 240 (50/60 Hz)	1-10V





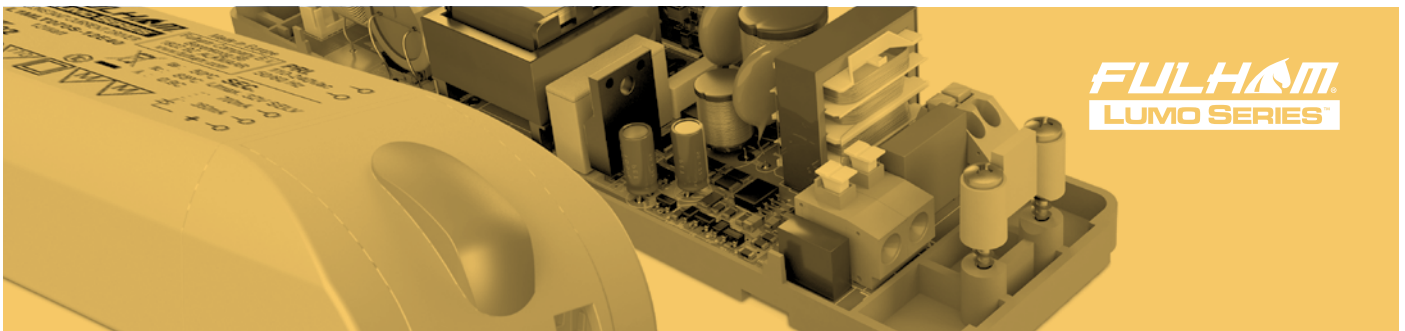
## L 100 x W 52 x H 24 (mm)

Model Number	Old 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 - 32Vdc (50/60 Hz)	Non-Dimming
L1K1MID024V-25E	L05032-24CV1050	25	1050	N/A	24	220 - 240 (50/60 Hz)	Potentiometer



## L 157 x W 42 x H 32 (mm)

Model Number	Old 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
L1230024V-48E	L05058-24CV2000	48	2200	24	220 - 240 (50/60 Hz)	Non-Dimming



## 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

# SmartSet: The Power of Programmability

Fulham's programmable WorkHorse LED and HotSpot LED drivers run on the innovative SmartSet programming platform, an intuitive, flexible system that gives the user the power to create the right driver for any situation. Benefits include SKU reduction and the ability to integrate more efficient LED modules into existing luminaire designs.

- Output current programmable in 1mA increments
- Allows custom dimming curves (for step dimming and dim-to-off)
- Driver does not need to be powered during programming
- One touch Auto-Programming capability for high volume usage
- Programming via handheld controller or PC software

## The right emergency output when it's needed most

Compatible HotSpot LED emergency drivers can be programmed to specific power levels to meet desired emergency lumen outputs and runtimes. Self-diagnostics ensure the drivers will be ready for operation during a power outage.

## More data for better analytics

The SmartSet system provides detailed feedback on driver runtime and temperature, allowing a luminaire manufacturer to better examine usage conditions.

## Thermal feedback protects your investment

Fulham programmable drivers use NTC feedback to monitor the temperature of connected LED modules, lowering the output power if the system gets too hot and protecting the luminaire from costly damage.



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](http://www.fulham.com/smartsetprogramming)  
 One touch Auto-Programming: [www.fulham.com/smartsetauto](http://www.fulham.com/smartsetauto)  
 Programming custom dimming curves: [www.fulham.com/smartsetdimmingcurve](http://www.fulham.com/smartsetdimmingcurve)



## The Smart Solution for Greater LED Efficiency

- One programmable driver replaces over 1600 fixed output driver SKUs
- DALI and 0-10V models, dims to 1% of programmed current
- Output current programmable in 1mA increments
- Power to driver not required during programming
- One touch programming for high volume usage
- Enables integration of more efficient modules in existing luminaire designs



### L 275 x W 31 x H 25 (mm)



Model Number	Output Wattage (W)	Output Current (mA)	Output Voltage (Vdc)	Dimming Type	Case Type	Surge
<b>T1A1UNV105P-40E</b>	40	250 - 1500	10 - 57	0-10V and DALI	Linear w/ End Terminals	10kV



### L 237 x W 40 x H 30 (mm)



Model Number	Output Wattage (W)	Output Current (mA)	Output Voltage (Vdc)	Dimming Type	Case Type	Surge
<b>T1A1UNV105P-60E</b>	60	250 - 1500	10 - 57	0-10V and DALI	Linear w/ End Terminals	10kV



### L 126 x W 76 x H 31 (mm)



Model Number	Output Wattage (W)	Output Current (mA)	Output Voltage (Vdc)	Dimming Type	Case Type	Surge
<b>T1A1UNV105P-60F</b>	60	250 - 1500	10 - 57	0-10V and DALI	Compact w/ End and Back Terminals	10kV
<b>T1A1UNV105P-60G</b>	60	250 - 1500	10 - 57	0-10V and DALI	Compact w/ End and Back Terminals, Back Studs	10kV



Smart, reliable, IP65 components for outdoor and high power applications

- IP65 for robust ingress protection
- DALI and 0-10V dimming options
- Wide programmable current range in 1mA increments
- Advanced programmability of output current and dimming curve
- MCU controlled circuit and health monitoring
- Global input voltage range 120 Vac - 277 Vac (50/60Hz)
- Compatible with Fulham SmartSet Programming Platform and TPSB-100 handheld controller.

## 40W Linear



Model Number	Output Current (mA)	Dimensions (mm)	Output Voltage (Vdc)	Dimming Type	Surge
<b>T1M1UNV150P-40LES</b>	250 - 1500	168 x 50 x 30	10 - 57	0-10V	10kV
<b>T1A1UNV150P-40LES</b>	250 - 1500	168 x 50 x 30	10 - 57	DALI	10kV

## 60W Linear



<b>T1M1UNV210P-60LES</b>	500 - 2100	241 x 43 x 29	10 - 57	0-10V	10kV
<b>T1A1UNV210P-60LES</b>	500 - 2100	241 x 43 x 29	10 - 57	DALI	10kV

## 96W Linear



<b>T1M1UNV240P-96LES</b>	700 - 2400	170 x 60 x 32	30 - 56	0-10V	10kV
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## 100W Compact



<b>T1M1UNV150P-100CES</b>	500 - 1500	151.4 x 90 x 32	50 - 150	0-10V	10kV
<b>T1A1UNV150P-100CES</b>	500 - 1500	151.4 x 90 x 32	50 - 150	DALI	10kV

## 150W Linear



<b>T1M1UNV150P-150LES</b>	500-1500	241 x 59 x 39	70-280	0-10V	10kV
<b>T1A1UNV150P-150LES</b>	500-1500	241 x 59 x 39	70-280	DALI	10kV

## 185W Linear



<b>T1M1UNV500P-185LES</b>	1500 - 5000	222 x 68.1 x 42	30 - 56	0-10V	10kV
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## 200W Linear



<b>T1M1UNV140P-200LES</b>	500 - 1400	225 x 68.9 x 38.5	80 - 280	0-10V	10kV
<b>T1A1UNV140P-200LES</b>	500 - 1400	225 x 68.9 x 38.5	80 - 280	DALI	10kV

The first wireless outdoor drivers with integrated cloud-based IoT management and controls

- All end-point hardware and software integrated directly into driver
- Programmable drivers allow custom output currents and dimming curves, flicker-free dimming and more
- Real-time driver and fixture health monitoring
- Simplified installation and commissioning

## L 150 x W 89 x H 25 (mm)



Model Number	Input Voltage (VAC)	Output Wattage (W)	Output Voltage (Vdc)	Output Current (mA)	Surge
<b>T1R1UNV150P-40CES</b>	120 - 277 (50/60 Hz)	40	10 - 57	250 - 1500	10kV
<b>T1R1UNV210P-60CES</b>	120 - 277 (50/60 Hz)	60	10 - 57	500 - 2100	10kV
<b>T1R1UNV150P-100CES</b>	120 - 277 (50/60 Hz)	100	50 - 150	500 - 1500	10kV

## L 241 x W 59 x H 38 (mm)



Model Number	Input Voltage (VAC)	Output Wattage (W)	Output Voltage (Vdc)	Output Current (mA)	Surge
<b>T1R1UNV150P-150LES</b>	120 - 277 (50/60 Hz)	150	70 - 280	500 - 1500	10kV

## L 226 x W 69 x H 41 (mm)

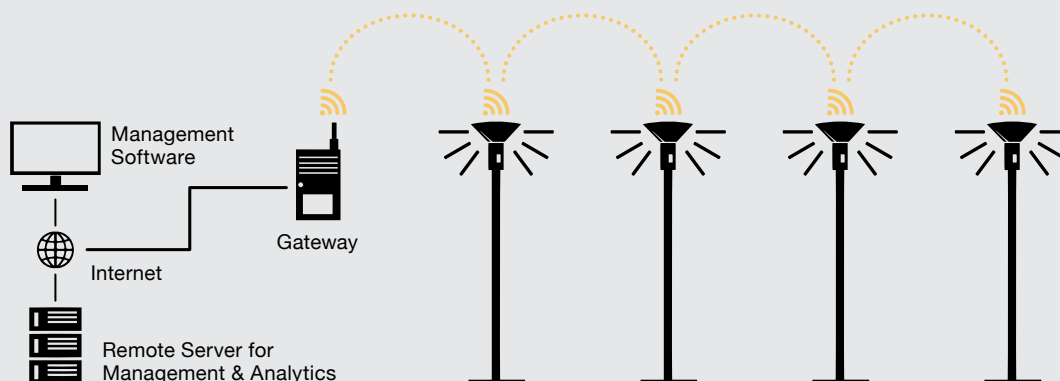


Model Number	Input Voltage (VAC)	Output Wattage (W)	Output Voltage (Vdc)	Output Current (mA)	Surge
<b>T1R1UNV140P-200LES</b>	120 - 277 (50/60 Hz)	200	80 - 280	500 - 1400	10kV



### Revolutionary web-based control software for smart cities

CityManager control management software from Tvilight allows users to monitor and control their entire lighting infrastructure from anywhere through a single dashboard. CityManager provides real-time analytics of the health and conditions of the connected lighting networks, offering tools such as map-based visualizations, automatic status updates and failure reports.



- Wide range of wattages and output currents to meet numerous applications
- Single and multiple channel models, 0-10V or non-dimming
- High efficiency performance ideal for interior luminaires

## Non-Dimming LED Drivers

Watts (W)	Output Current (mA)	Output Voltage (VDC)	Model Number	Input Voltage (VAC)	CH.	IP	Dimensions (mm) (L x W x H)	Case Type
12	350	9-36	<b>TC12300350-12L</b>	220V - 240V	1	Damp	123 x 45x 19	Linear w/End Leads
12	700	3-18	<b>TC12300700-12L</b>	220V - 240V	1	Damp	123 x 45 x 19	Linear w/End Leads
28	700	12-40	<b>T1UNV0700-28BL</b>	120 - 277 (50/60)	1	Damp	80 x 76 x 27	Compact w/Bottom Leads & Mounting Studs
28	700	12-40	<b>T1UNV0700-28C</b>	120 - 277 (50/60)	1	Damp	80 x 76 x 27	Compact w/End Leads
40	700	18-58	<b>T1UNV0700-40C</b>	120 - 277 (50/60)	1	64	95 x 70 x 30	Compact w/End Leads
42	1050	12-40	<b>T1UNV1050-42C</b>	120 - 277 (50/60)	1	64	95 x 70 x 31	Compact w/End Leads
60	350	80-180	<b>T1UNV0350-60L</b>	120 - 277 (50/60)	1	64	196 x 43 x 31	Linear w/End Leads
60	1400	20-43	<b>T1UNV1400-60L</b>	120 - 277 (50/60)	1	64	196 x 43 x 30	Linear w/End Leads
50	350	18-56	<b>TC3MLT0350-50L</b>	120 - 230 (50/60)	3	62	457 x 44 x 30	Linear w/End Leads
55	350	18-56	<b>TCD3MLT0350-55L</b>	120 - 230 (50/60)	3	62	375 x 44 x 30	Linear w/End Leads
80	500	18-56	<b>TC3MLT0500-80L</b>	120 - 230 (50/60)	3	62	457 x 44 x 26	Linear w/End Leads

## Outdoor LED Drivers: Non-Dimming Constant Current

Watts (W)	Output Current (mA)	Output Voltage (VDC)	Model Number	Input Voltage (VAC)	CH.	IP	Dimensions (mm) (L x W x H)	Case Type
33	700	26 - 48V	<b>T1UNV0700-36C</b>	120 - 277 (50/60)	1	66	95 x 70 x 32	Compact w/End Leads
105	1000	75 - 105V	<b>T1UNV1000-105L</b>	120 - 277 (50/60)	1	65	197 x 65 x 38	Linear w/End Leads
200	700	114 - 190V	<b>T1UNV0700-200L</b>	120 - 277 (50/60)	1	65	225 x 68 x 39	Linear w/End Leads
200	1050	114 - 190V	<b>T1UNV1050-200L</b>	120 - 277 (50/60)	1	65	225 x 68 x 39	Linear w/End Leads
210	1000	150 - 210V	<b>T1UNV1000-210L</b>	120 - 277 (50/60)	1	65	197 x 65 x 38	Linear w/End Leads





- Wide range of wattages and output currents to meet numerous applications
- Single and multiple channel models, 0-10V or non-dimming
- High efficiency performance ideal for interior luminaires

## Dimming LED Drivers

Watts (W)	Output Current (mA)	Output Voltage (VDC)	Model Number	Input Voltage (VAC)	CH.	IP	Dimensions (mm) (L x W x H)	Case Type
15	350	21-42	<b>T1M1UNV0350-15F</b>	120 - 277 (50/60)	1	64	81 x 72 x 25	Compact w/Terminals
15	350	21-42	<b>T1M1UNV0350-15L</b>	120 - 277 (50/60)	1	64	100 x 30 x 23	Linear w/End Leads
28	700	12-40 /12	<b>T1M1UNV0700-28C</b>	120 - 277 (50/60)	1	64	80 x 76 x 26	Compact w/End Leads
28	700	12-40 /12	<b>T1M1UNV0700-28BL</b>	120 - 277 (50/60)	1	64	80 x 76 x 26	Compact w/Bottom Leads & Mounting Studs
30	700	21-42	<b>T1M1UNV0700-30F</b>	120 - 277 (50/60)	1	64	72 x 81 x 25	Compact w/Terminals
30	700	21-42	<b>T1M1UNV0700-30L</b>	120 - 277 (50/60)	1	64	118 x 30 x 30	Linear w/End Leads
40	700	18-58 /12	<b>T1M1UNV0700-40C</b>	120 - 277 (50/60)	1	64	120 x 68 x 31	Compact w/End Leads
40	700	18-58 /12	<b>T1M1UNV0700-40V</b>	120 - 277 (50/60)	1	64	120 x 68 x 31	Compact w/Bottom Leads & Mounting Studs
40	900	10-40	<b>T1M1UNV0900-40L</b>	120 - 277 (50/60)	1	64	241 x 33 x 27	Linear w/End Leads
40	1000	10-40	<b>T1M1UNV1000-40L</b>	120 - 277 (50/60)	1	64	241 x 33 x 27	Linear w/End Leads
42	1050	12-40 /12	<b>T1M1UNV1050-42C</b>	120 - 277 (50/60)	1	64	120 x 68 x 31	Compact w/Bottom Leads & Mounting Studs
42	1050	12-40 /12	<b>T1M1UNV1050-42V</b>	120 - 277 (50/60)	1	64	120 x 68 x 31	Linear w/End Leads
60	1400	18-42	<b>T1M1UNV1400-60L</b>	120 - 277 (50/60)	1	Damp	241 x 43 x 31	Linear w/End Leads
88	1680	21-44	<b>T1M1UNV1680-88L</b>	120 - 277 (50/60)	1	64	241 x 43 x 29	Linear w/End Leads
88	2000	21-44	<b>T1M1UNV2000-88L</b>	120 - 277 (50/60)	1	64	241 x 43 x 29	Linear w/End Leads
88	2100	21-42	<b>T1M1UNV2100-88L</b>	120 - 277 (50/60)	1	64	241 x 43 x 29	Linear w/End Leads
100	800	70-150	<b>T1M1UNV0800-100A</b>	120 - 277 (50/60)	1	Dry	213 x 50 x 33	Interconnect Terminals

## Multi-Channel Dimming LED Drivers

Watts (W)	Output Current (mA)	Output Voltage (VDC)	Model Number	Input Voltage (VAC)	CH.	IP	Dimensions (mm) (L x W x H)	Case Type
36	600	23-30	<b>T1M2UNV0600-36L</b>	120 - 277 (50/60)	2	Damp	302 x 38 x 31	Linear w/End Leads
49	700	23-35	<b>T1M2UNV0700-49L</b>	120 - 277 (50/60)	2	Damp	261 x 40 x 30	Linear w/End Leads
56	350	15-40	<b>TCD4UNV0350-56L</b>	120 - 277 (50/60)	4	64	241x 43 x 31.50	Linear w/End Leads



- Constant voltage - 12V, 24V and 48V models
- Optimized high efficiency performance
- Low temperature performance

## Non-Dimming Constant Voltage LED Drivers

Watts (W)	Output Voltage (VDC)	Model Number	Input Voltage (VAC)	CH.	IP	Dimensions (mm) (L x W x H)	Case Type
20	12	<b>T1UNV012V-20L</b>	120 - 277 (50/60)	1	62	160 x 40 x 25	Linear w/End Leads
20	24	<b>T1UNV024V-20L</b>	120 - 277 (50/60)	1	62	160 x 40 x 25	Linear w/End Leads
60	12	<b>T1UNV012V-60LF</b>	120 - 277 (50/60)	1	64	241 x 43 x 31	Linear w/End Leads
60	12	<b>T1UNV012V-60LF</b>	120 - 277 (50/60)	1	66	241 x 43 x 31	Linear w/End Leads
60	24	<b>T1UNV024V-60LF</b>	120 - 277 (50/60)	1	64	241 x 43 x 31	Linear w/End Leads
75	12	<b>T1UNV012V-75L</b>	120 - 277 (50/60)	1	64	241 x 43 x 31	Linear w/End Leads
75	24	<b>T1UNV024V-75L</b>	120 - 277 (50/60)	1	64	241 x 43 x 31	Linear w/End Leads
100	24	<b>T1UNV024V-100LE (4KV/4KV)</b>	120 - 277 (50/60)	1	64	241 x 43 x 31	Linear w/End Leads
100	24	<b>T1UNV024V-100LS (2KV/4KV)</b>	120 - 277 (50/60)	1	66	260 x 43 x 31	Linear w/End Leads
150	48	<b>T1UNV048V-150L</b>	120 - 277 (50/60)	1	67	210 x 65 x 39	Linear w/End Leads

## Outdoor LED Drivers: Dimming (0-10V) Constant Voltage

Watts (W)	Output Voltage (V)	Output Voltage (VDC)	Model Number	Input Voltage (VAC)	Channels	IP	Dimensions (mm) (L x W x H)	Case Type
150	0-6250	24V	<b>T1M1UNV024V-150L</b>	120 - 277 (50/60)	1	67	227 x 43 x 40	Linear w/End Leads



# HotSpot Plus LED Driver & Emergency System

The Power of a Programmable LED Driver, the Dependability of an Integrated LED Battery Backup System

- All-in-one unit combines 0-10V dimming LED driver, emergency LED driver, and replaceable backup battery
- Lowers costs by eliminating need to install separate emergency system
- Simple installation helps reduce assembly line confusion and wiring mistakes
- Output current programmable in 1mA increments using handheld controller
- Programmable dimming curve allows step dimming and dim-to-off
- SmartSet programming platform enables integration of more efficient modules in luminaire designs



## 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) (mm)	Case Type
45	250-1400	11-50	<b>FHSAC1-230-45CE</b>	220 - 240 (50/60)	0-10V	1	229 x 82 x 34	Compact w/ Terminals

## Specifications

<b>Emergency Output</b>	1W - 6W Constant Power Programmable; Factory set for 3W 180 minute runtime
<b>Power Factor</b>	>0.9
<b>THD</b>	<20%
<b>Dimming Range</b>	100% - 1%
<b>Battery Type*</b>	LiFePO4 (Lithium Iron Phosphate – ref. page 16 table)
<b>Recharge Time</b>	12 Hours
<b>Warranty</b>	5 years. See specification sheet for details.
<b>Advanced Features</b>	Illuminated test switch/AC power indicator, switchable self-diagnostics, user-selectable emergency power level

\* Replacement battery available: FHSBATL3-1.5-HSP

## The Power of Programmability

HotSpot Plus LED driver & Emergency System features 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](http://www.fulham.com/smartsetprogramming)

One touch Auto-Programming: [www.fulham.com/smartsetauto](http://www.fulham.com/smartsetauto)

Programming custom dimming curves: [www.fulham.com/smartsetdimmingcurve](http://www.fulham.com/smartsetdimmingcurve)

- Provides programmable, constant power emergency output for LED modules.
- Advanced features include self-diagnostics and detailed data logging.
- Compatible with Fulham SmartSet Programming Platform and TPSB-100 handheld controller.
- Complete system includes emergency driver and emergency battery.



## Specifications

<b>Model Number</b>	<b>FHSCP-UNV-10P-L-SD</b>	<b>RFI/EMI</b>	FCC Part 15A Non-Consumer
<b>Input Voltage</b>	100-277VAC, 50/60Hz	<b>Number of Output Channels</b>	1 Channel
<b>Input Current</b>	0.06A Max.	<b>Output Type</b>	Class 2
<b>Output Power</b>	1-10W	<b>Battery Type</b>	LiFePO4 9.6VDC
<b>Output Current</b>	620mA Max.	<b>Battery Recharge Time</b>	12 Hours
<b>Output Voltage Range</b>	16-55VDC	<b>Dimension</b>	200.4 x 52 x 29.7
<b>Ambient Operating Temperature</b>	10°C to 55°C (50°F to 131°F)	<b>Input Surge Protection</b>	Line-Neutral 2kV, Line & Neutral-Ground 2kV

## HotSpot Constant Power Programmable Battery Packs

Model number	max. load for 90 min	capacity	Dimensions (mm) (L x W x H)
<b>FHSBATL3-1.5-SD</b>	5W	1500mAh	89 x 70 x 25
<b>FHSBATL3-3-SD</b>	10W	3000mAh	112 x 72 x 33
<b>FHSBATL9-.6-SD</b>	6W	1800mAh	191 x 48 x 22
<b>FHSBATL6-1.5L-SD*</b>	10W	3000mAh	200 x 40 x 23

\*Does not include mounting means. Use mounting bracket FHSBATSC6-1.5L

## Why Battery Chemistry Matters

Fulham's HotSpot LED Emergency drivers are designed with safety, reliability, and performance in mind. This is why our newest drivers use LiFePO4 (Lithium Phosphate) batteries. They are non-toxic, contain no heavy metals, and provide the highest levels of safety, efficiency, and high temperature tolerance.

	Lithium Batteries				
Chemistry	LiFePO4	LiMn2O4	LiCoO2	NiMH	NiCd
<b>Voltage</b>	<b>3.2 V</b>	3.7 V	3.6 V	1.2 V	1.2 V
<b>Volume Energy density</b>	<b>290Wh/L</b>	320 Wh/L	500Wh/L	260Wh/L	150Wh/L
<b>Weight Energy density</b>	<b>130Wh/kg</b>	135 Wh/kg	200Wh/kg	80Wh/kg	60Wh/kg
<b>Safety</b>	<b>Good</b>	Acceptable	Bad	Good	Good
<b>Toxic or green</b>	<b>Green</b>	Green	Toxic	Green	Toxic
<b>Tolerance high Tem.</b>	<b>Good</b>	Bad	Acceptable	Acceptable	Good
<b>1C Cycle life(&lt;80%)</b>	<b>&gt;2000</b>	~ 400	~ 500	~ 500	~ 500
<b>Self-discharge / month</b>	<b>5%</b>	8%	8%	35%	30%
<b>Memory effect</b>	<b>no</b>	no	no	no	yes
<b>Energy efficiency</b>	<b>95%</b>	90%	90%	70%	75%





**NEW**

## Linear High Output DC Modules

Efficient, easy-to-install modules for high lumen linear applications

- Constant current, high-efficacy LEDs
- Aluminum extrusion mount for thermal management and quick install
- Suitable replacement for fluorescent T5HO lamps
- 3 SDCM for high color consistency
- Up to 198 lm/W; output range 2,200 lm to 13,310 lm (@4000K/80CRI)
- Available in 90CRI on request

### Specifications



Operating Temperature Range	-40°C to +60°C / -40°F to 140°F
Lumen Maintenance	L70: >54,000Hrs / L90: 46,000Hrs (meets DLC Premium and Standard requirements)
Color Consistency	Binning per ANSI C78.377-2015 @ 25°C; 3 SDCM
PCB Material	CEM3
Warranty	5 years @ Max Tc from the date of manufacture
Safety/compliance	cURus (File # E351548), Class 2 Lighting System, CE, SELV, RoHS Compliant

### LinearHO DC Modules

Model Number / Dimension (mm)	Number of LED	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)
<b>TMU125050CL8xxA</b> L 560 x W 44 x H 10	96	350	33	12	35	12	2245	195
		700	34	24	36	26	4350	182
		1050	35	37	38	40	6210	169
		1250*	36	44	39	49	7130	161
<b>TMU140055CL8xxA</b> L 1120 x W 44 x H 10	108	350	33	11	34	12	2255	196
		700	34	24	36	25	4385	185
		1050	35	36	38	39	6340	174
		1400*	36	50	39	55	8015	161
<b>TMU240095CL8xxA</b> L 1120 x W 44 x H 10	180	350	32	11	34	12	2230	198
		700	33	23	35	24	4480	194
		1050	34	35	36	37	6605	187
		1400	34	48	37	52	8640	180
		2400*	36	85	39	94	13610	159

# TMU125050CL8xxA

#### Color Temperature

- 30 = 3000K
- 40 = 4000K
- 50 = 5000K

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

### Accessories

<b>TLEOPT120-020</b>	Module end caps, 2 pieces
<b>TLEOPT120-004</b>	560mm snap-on lens, 82% transmissivity
<b>TLEOPT120-013</b>	1120mm snap-on lens, 82% transmissivity





- Constant current design for increased efficiency
- 2700K, 3000K, 3500K, 4000K and 5000K CCT choice available
- Dimmable when used with dimming LED driver
- Optional diffusers available



## LED Modules: Linear

NOMINAL WATTS (W)	LUMEN OUTPUT	MODEL NUMBER	MAX INPUT CURRENT (mA)	NOMINAL FORWARD VOLTAGE (VDC)	CCT	CRI	TERMINATION TYPE	BOARD MATERIAL	DIMENSIONS (mm) (L x W)
7	850	<b>TMU075007HL830A</b>	750	9.3	3000	80	Dual Connector	CEM1	279 x 24
7	915	<b>TMU075007HL840A</b>	750	9.3	4000	80	Dual Connector	CEM1	279 x 24
14	1700	<b>TMU075014HL830A</b>	750	18.7	3000	80	Dual Connector	CEM1	559 x 24
14	1830	<b>TMU075014HL840A</b>	750	18.7	4000	80	Dual Connector	CEM1	559 x 24
15	1600	<b>TMU045015HL830A</b>	450	33.8	3000	80	Dual Connector	CEM1	559 x 24
15	1600	<b>TMU045015HL830B</b>	450	33.8	3000	80	Dual Connector	CEM1	581 x 24
15	1875	<b>TMU045018HL830B</b>	450	40	3000	80	Dual Connector	CEM1	581 x 24
18	1875	<b>TMU045018HL830A</b>	450	40	3000	80	Dual Connector	CEM1	559 x 24

## Bespoke / Custom made Modules

Fulham works directly with luminaire manufacturers to design bespoke LED modules that provide the best possible fit, efficiency, light output, reliability and lumen maintenance. Designing modules to match drivers results in low cost base, high specification solutions for luminaire manufacturers, giving them the best commercial advantage.

**To learn more about bespoke LED module solutions, contact Fulham today at +31 72 572 3000 or [sales.eu@fulham.com](mailto:sales.eu@fulham.com)**



# Limited Warranty

## Fulham Co., Inc. Fulham Company B.V.

### 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:

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 Years  
SineHorse™ Ballast - 3 Years  
ThoroLED™ Drivers - 2 to 5 Years  
ThoroLED™ Modules - 3 to 5 Years\*  
ThoroLED™ Retrofit - 5 Years  
ThoroLED™ Luminaire - 5 Years  
WorkHorse™ Electronic Fluorescent Ballast - 5 Years  
WorkHorse LED™ Drivers - 5 Years

\* Covered defects for 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 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 specifications:
  - WorkHorse - Length of the leads
  - HighHorse - 9 feet
  - LongHorse - 20 feet
- \* 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.

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
Fulham Europe	+31 72 572 3000 warranty.eu@fulham.com

**Effective: Aug 25, 2017**

## CONTACT US

Visit [www.fulham.com](http://www.fulham.com) for product information, sales representative contact info, technical documentation, and more.

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