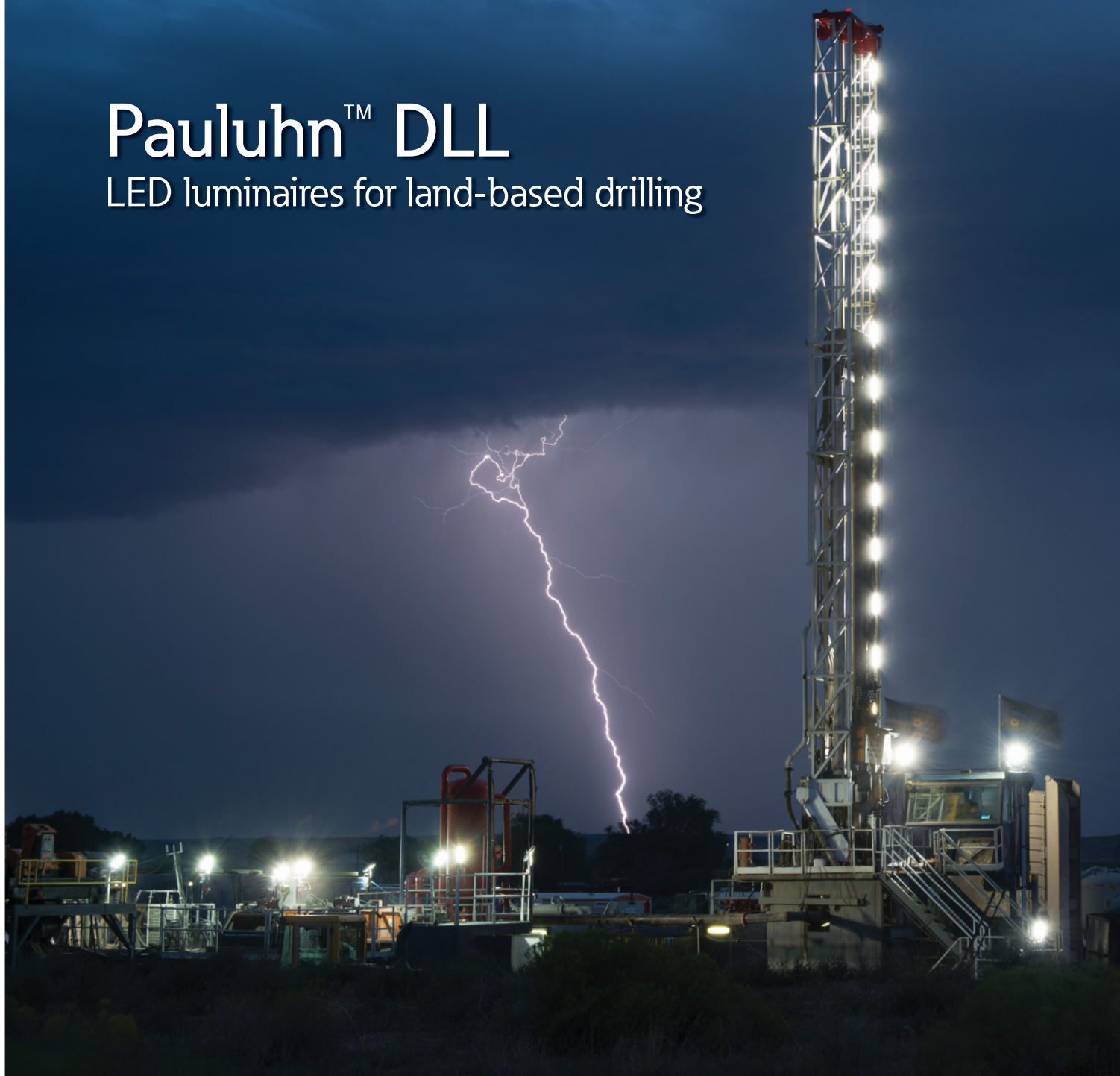


**LED lighting for land-based rigs**  
Pauluhn™ DLL LED Luminaires

**CROUSE-HINDS**  
SERIES

# Pauluhn™ DLL

LED luminaires for land-based drilling



**EAT•N**

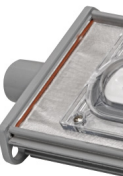
*Powering Business Worldwide*



Pauluhn™ DLL Series LEDs

# Safe. Reliable. Efficient.

Featuring the industry's broadest range of LED luminaires for harsh and hazardous environments, Eaton's Crouse-Hinds can deliver a lighting solution that performs reliably in even the worst operating conditions. All the while reducing your energy, maintenance and manpower costs.



## Why LED?

### Useful life

Rated life is up to 60,000 hours of maintenance-free and safe operation

### Energy efficiency

LED average energy consumption is 65% less than T12, T8 and T5HO fluorescent fixtures

### Start/restart time

Instant illumination vs. 10 minute restrike time for fluorescent

### Light quality

Higher color rendering and color temperature compared to fluorescent

### Environmental benefits

Mercury-free LED eliminates disposal costs and lower energy consumption for a smaller carbon footprint

## Why Crouse-Hinds?

### Industry-best reliability

Built to withstand extreme temperatures, vibration, water and dust

### Thermal management

Effective heat sinking ensures longer life

### Quality of light

Custom optics designed to maximize light distribution and intensity

### Retrofit compatibility

LED fixtures are compatible with Pauluhn DuraPro, MagnaPro, Rig-A-Lite™ and Snelson® fluorescent fixtures

## Ensign Rig 89

LOCATION: Gillette, Wyoming

DETAILS: Rig retrofit with Pauluhn DLL4 LEDs



# Why Pauluhn™ DLL LED?

**Designed for drilling.** Pauluhn DLL linear LED luminaires are engineered to stand up to the demanding conditions faced on land-based drilling rigs. The DLL stands up to high vibration, hose down, shock and impact, while delivering long life and high lumen performance for up to 20 years.

## Custom optics:

- Standard wide (120°) beam spread for control room and indoor application maximizes illumination on wall panels
- Narrow (80°) beam spread option for high mast/derrick application avoids spillage and light loss

## Comprehensive certification:

- Single model certified for use in Class I, Division 2 and Class II, Division 1 harsh and hazardous applications

## Quick & easy installation:

- Easy access to drivers and wiring
- No custom brackets or hardware needed
- Seven mounting options available
- Easily retrofit to Pauluhn DuraPro and MagnaPro, Rig-A-Lite and Snelson



## Slim profile:

- 2.7" fixture height (excluding mounting brackets)
- Perfect for mounting in confined or low height areas

## Built to last:

- Ingress protection from hose down water or diesel fuel in harsh operational conditions – passed 2,000 psi high pressure test
- Vibration-, impact- and shock-resistant – passed 5G, 3-axis vibration test
- 60,000 hour lifetime @ 55°C ambient



## Case study: land-rig retrofit

### Location:

Ensign Rig 122, Vernal, Utah

### Challenge:

Ensign was looking for a rugged, low maintenance solution to replace existing Pauluhn DuraPro fluorescent fixtures on a drilling rig.

### Solution:

Install Pauluhn DLL 2 foot linear LED luminaires

### Results:

Ensign was easily able to replace 21 DuraPro fixtures with 14 DLLs in only about an hour by using the existing DuraPro brackets. Ensign saw better light quality on the mast and deck, while reducing amperage load and eliminating lamp maintenance.



# Pauluhn™ DLL Series LED Luminaires

The Pauluhn DLL Linear LED by Eaton's Crouse-Hinds is specifically designed to replace fluorescent T12, T8 and T5HO lighting on land-based and offshore drilling platforms. The rugged and durable design features the industry's most versatile and flexible mounting options. The Pauluhn DLL is the ideal solution for high vibration, impact and hose down in drilling applications.

## Applications:

Land-based and offshore rigs; areas include: derrick, mast, SCR house, top drive, operator's house, power and pump stations.

## Key features & benefits:

- Industry-leading efficacy: up to 130 LPW
- -40°C to +65°C ambient operating temperature
- Low profile fixture (<3" height)
- Versatile ceiling/swivel, wall, flush, pole and pendant mounting options
- Wide and narrow optics for uniform illumination in control room and drill mast
- Four points of secondary retention
- 2,000 psi high pressure hose rated
- High vibration resistance (up to 5Gs)
- Emergency battery back-up (90 minutes) and surge protection options (up to 10kV)‡
- DesignLights Consortium® Qualified (some models are not DLC qualified)\*
- 5 year fixture warranty†



‡ One year warranty

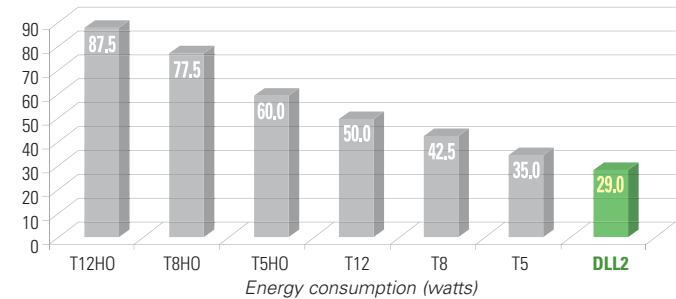
\* Refer to [www.designlights.org](http://www.designlights.org) Qualified Products List under Family Models for full listing details. Not all models are approved for all application categories.

† Refer to page 2 of the D-0915 authorized distributor price book for Crouse-Hinds standard Terms and Conditions.



## Energy consumption comparison

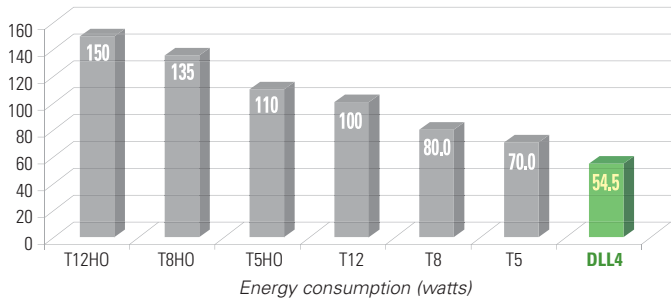
2 foot DLL linear LED vs. fluorescent



Model	Typical lumens	Wattage	Lumens per watt	Equivalent HID luminaire	Typical energy savings / lifetime
DLL2	3,600	29	124	T12HO	Up to 67%
				T8HO	Up to 63%
				T5HO	Up to 52%
				T12	Up to 42%
				T8	Up to 32%
				T5	Up to 17%

All luminaires in the comparison are 2 lamp, 2 foot

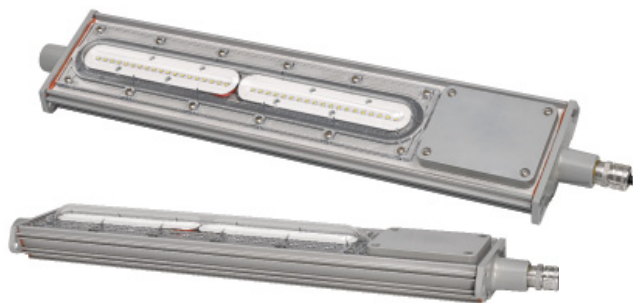
4 foot DLL linear LED vs. fluorescent



Model	Typical lumens	Wattage	Lumens per watt	Equivalent HID luminaire	Typical energy savings / lifetime
DLL4	7,100	54.5	130	T12HO	Up to 64%
				T8HO	Up to 60%
				T5HO	Up to 50%
				T12	Up to 46%
				T8	Up to 32%
				T5	Up to 22%

All luminaires in the comparison are 2 lamp, 4 foot

# Specifications



## Certifications:

### NEC standards:

- Class I, Division 2, Groups A, B, C, D
- Class II, Division 1, Groups F, G – CEC (CSA/cUL) for glass lens only
- Class I, Zone 2
- Class III
- NEMA 4X; IP66
- Marine and wet locations

### UL standards:

- UL844 Electrical Fixture Hangers for Hazardous Locations
- UL1598 Luminaire
- UL1598A Luminaire for Installation on Marine Vessels
- UL924 for Emergency Lighting

### CSA standard:

- C22.2 No. 137

### Additional certifications:

- ABS design assessed

## Materials:

### Housing:

- Copper-free aluminum
- Optional Corro-free™ epoxy powder coat

### Lens:

- Glass or polycarbonate
- Diffused glass or polycarbonate

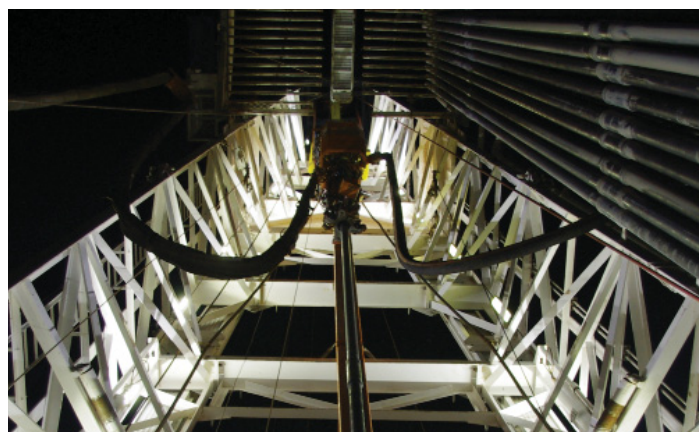
## Mounting:

### Versatile mounting options:

- Flush back mount
- Swivel/ceiling back mount
- Offset ceiling mount
- Offset wall mount
- Pole mount
- Pendant mount

### Easily retrofit to:

- Existing Pauluhn DuraPro and MagnaPro fluorescent light fixtures
- Rig-A-Lite and Snelson C1D2 fluorescent lighting fixtures



## Electrical ratings:

	DLL2	DLL4
<b>Lumen output</b>	3,600	7,100
<b>Frequency</b>	50/60 Hz	50/60 Hz
<b>Voltage</b>	100-277 VAC/108-250 VDC; 347-480 VAC	

Model	Voltage	Current (A)	Wattage (W)	Power Factor	THD
<b>DLL2/UNV1</b>	100	0.28	28.2	0.97	<20%
<b>DLL2/UNV1</b>	277	0.12	29.4	0.97	<20%
<b>DLL2/UNV34</b>	347	0.09	29.2	0.97	<20%
<b>DLL2/UNV34</b>	480	0.07	30.1	0.97	<20%
<b>DLL4/UNV1</b>	100	0.55	55.0	0.95	<20%
<b>DLL4/UNV1</b>	277	0.20	54.5	0.95	<20%
<b>DLL4/UNV34</b>	347	0.16	55.8	0.95	<20%
<b>DLL4/UNV34</b>	480	0.12	56.2	0.95	<20%

## Temperature codes:

Ambient temperature	Min. temp. wire supply	Class I, Div. 2	Class II, Div. 1	Simultaneous rating Class I, Div. 2, Div. 1
40°C	60°C	T6	T6	T6
55°C	75°C	T5	T5	T5
65°C	90°C	T5	T5	T5

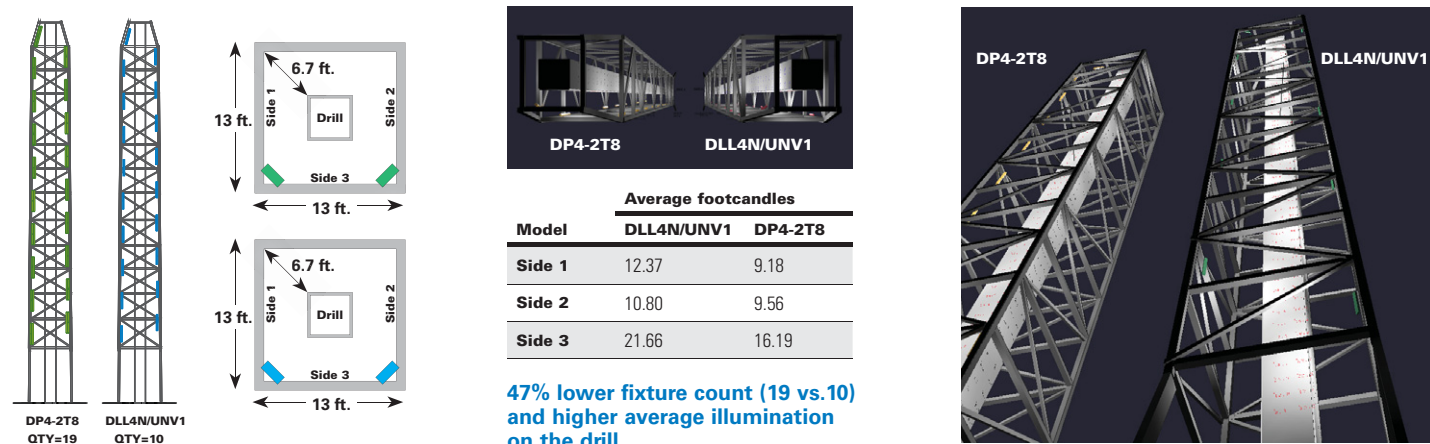
## Weights:

Luminaire	lbs.	kg.
<b>DLL2</b>	12.5	5.7
<b>DLL4</b>	22.5	10.2

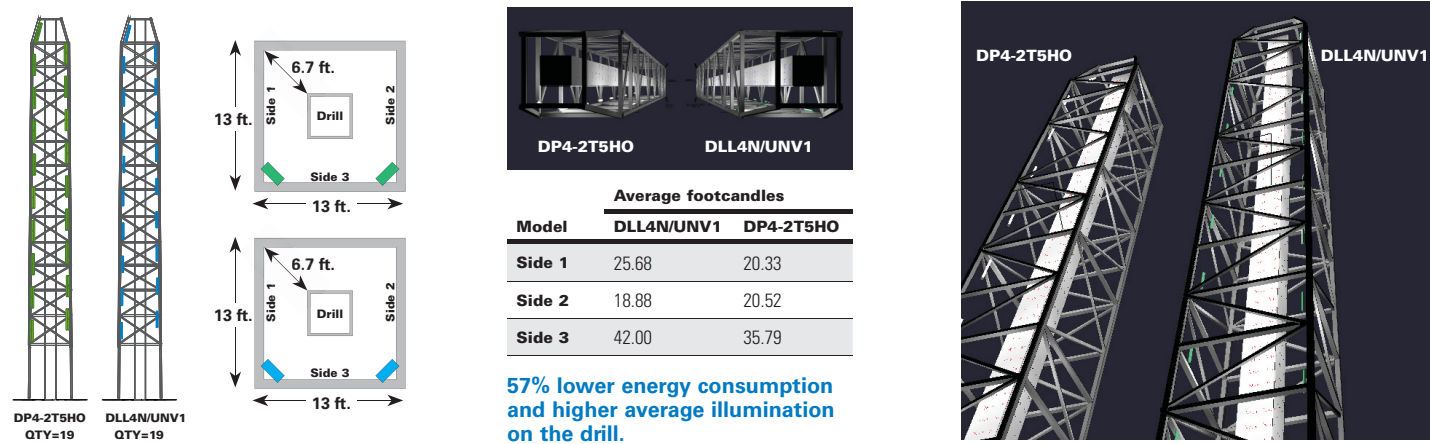


# Photometrics: high mast derrick

4 foot DLL LED with 80° optics vs. 4 foot 2 lamp T8 DuraPro

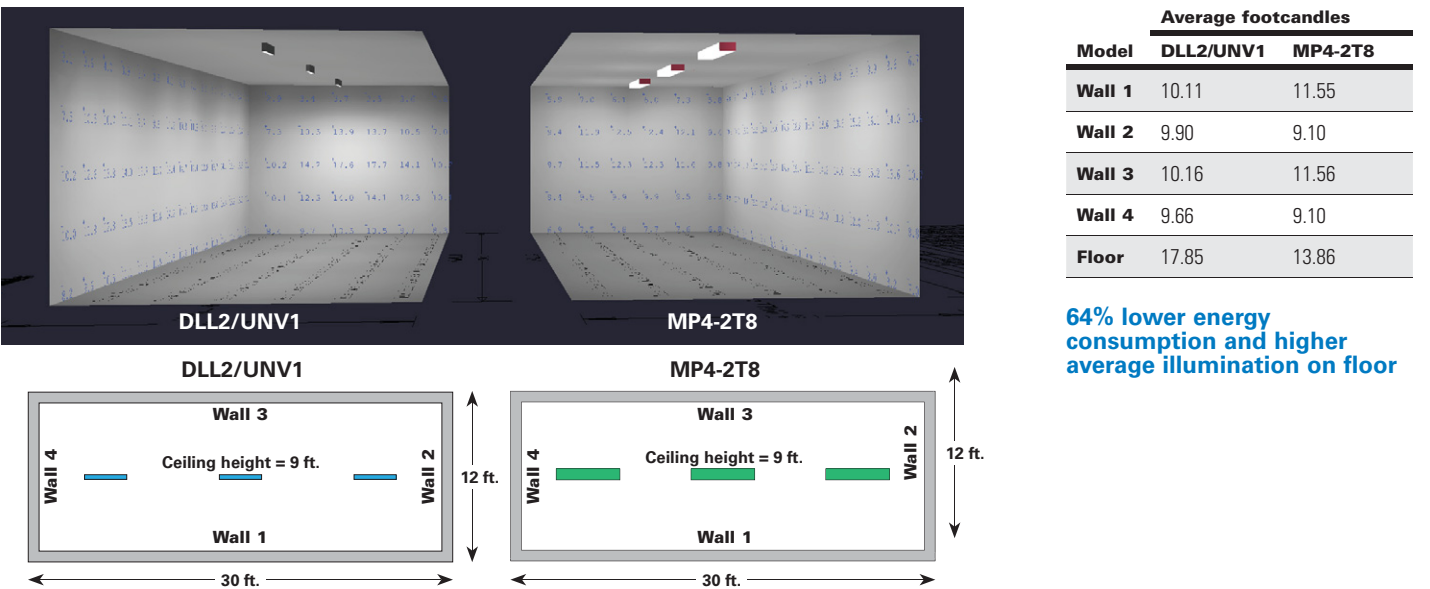


4 foot DLL LED with 80° optics vs. 4 foot. 2 lamp T5HO DuraPro



# Photometrics: control room/pump shed

2 foot DLL LED with 120° optics vs. 4 foot 2 lamp T8 MagnaPro



# Ordering information

## Part number example

### DLL4N/UNV1 S903 TF P EM

DLL series linear LED, cool white, 4 foot, ½" hubs, 80° narrow light pattern, 100-277 VAC driver, polycarbonate lens, through feed hubs, painted, battery back-up

Series	Optics	Lens	Emergency backup
<b>DLL</b>	<b>BLANK</b> Wide (120°)	<b>BLANK</b> Glass	<b>EM*</b> Emergency battery back-up kit
	<b>N</b> Narrow (80°)	<b>S891</b> Diffused glass	* One year warranty
		<b>S903</b> Polycarbonate	
		<b>S903D</b> Diffused polycarbonate	
Length/lumens	Voltage	Finish	Options
<b>4</b> 4 foot length, 7,100 lumens	<b>/UNV1</b> 100-277 VAC; 108-250 VDC	<b>BLANK</b> Natural aluminum	<b>TF</b> Pull wire included in fixture
<b>2</b> 2 foot length, 3,600 lumens	<b>/UNV34</b> 347-480 VAC	<b>P</b> Painted (gray, epoxy)	
		<b>WH</b> Painted (white, epoxy)	

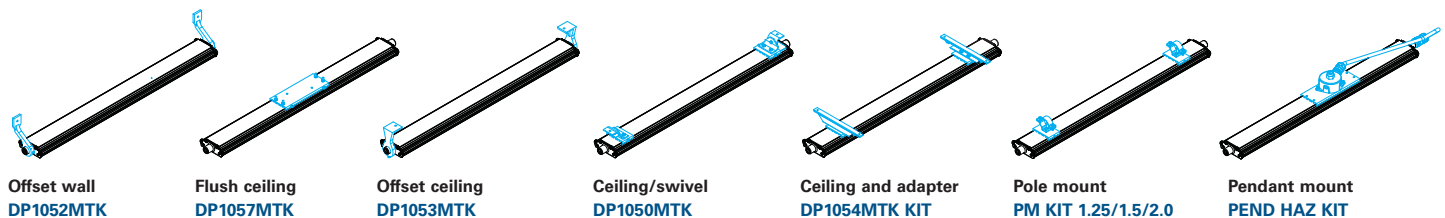
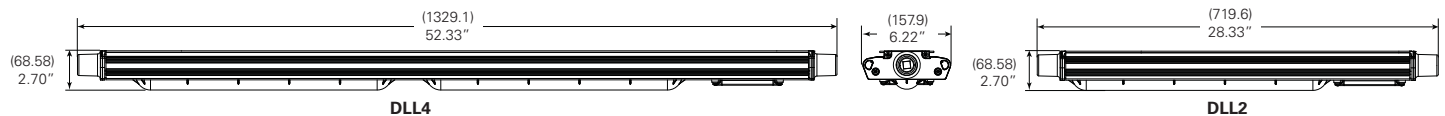
#### Accessories (ordered separately)

<b>DP1057MTK</b>	Flush/back mount back plate ( <i>compatible with DuraPro</i> )
<b>DP1050MTK</b>	Ceiling/swivel mount ( <i>compatible with DuraPro</i> )
<b>DP1053MTK</b>	Ceiling/wall mount offset ( <i>compatible with DuraPro</i> )
<b>DP1054MTK KIT</b>	Ceiling mount bracket and adapter kit ( <i>compatible with MagnaPro</i> )
<b>DP1052MTK</b>	Offset wall mount ( <i>compatible with DuraPro</i> )
<b>PM KIT 1.25</b>	Pole mount kit, 1.25" conduit
<b>PM KIT 1.5</b>	Pole mount kit, 1.50" conduit
<b>PM KIT 2.0</b>	Pole mount kit, 2.00" conduit

#### Accessories (ordered separately)

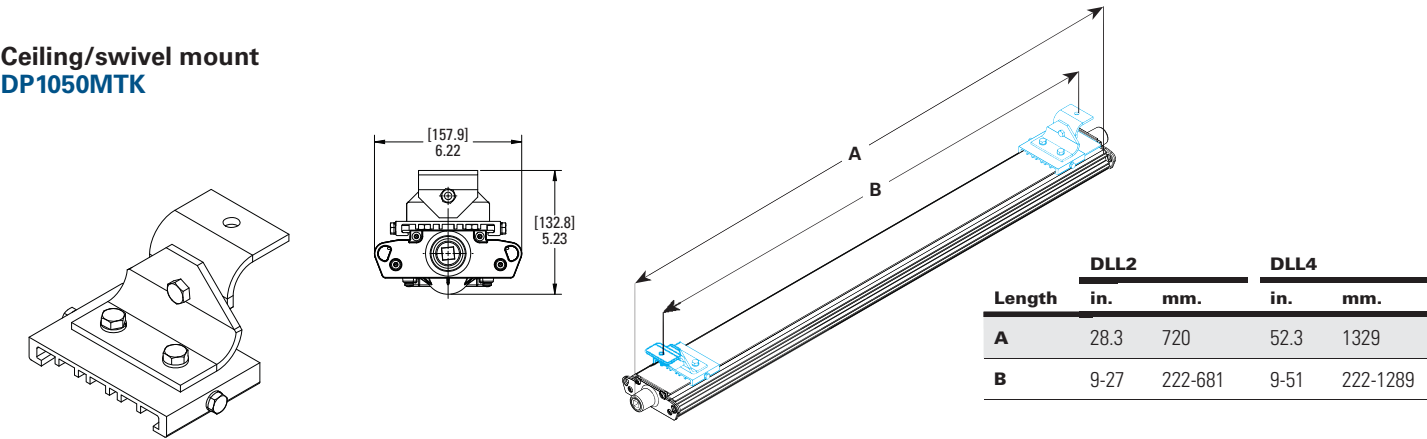
<b>PEND HAZ KIT</b>	Pendant mount kit
<b>SS KIT</b>	Safety chain kit
<b>VMVL/UNV1 80W 1A KIT</b>	1 amp driver replacement kit 100-277 VAC for 4 ft. linear
<b>VMVL/UNV34 80W 1A KIT</b>	1 amp driver replacement kit 347-480 VAC for 4 ft. linear
<b>VMVL/UNV1 80W 0.5A KIT</b>	0.5 amp driver replacement kit 100-277 VAC for 2 ft. linear
<b>VMVL/UNV34 80W 0.5A KIT</b>	0.5 amp driver replacement kit 347-480 VAC for 2 ft. linear

## Dimensions & mounting options:

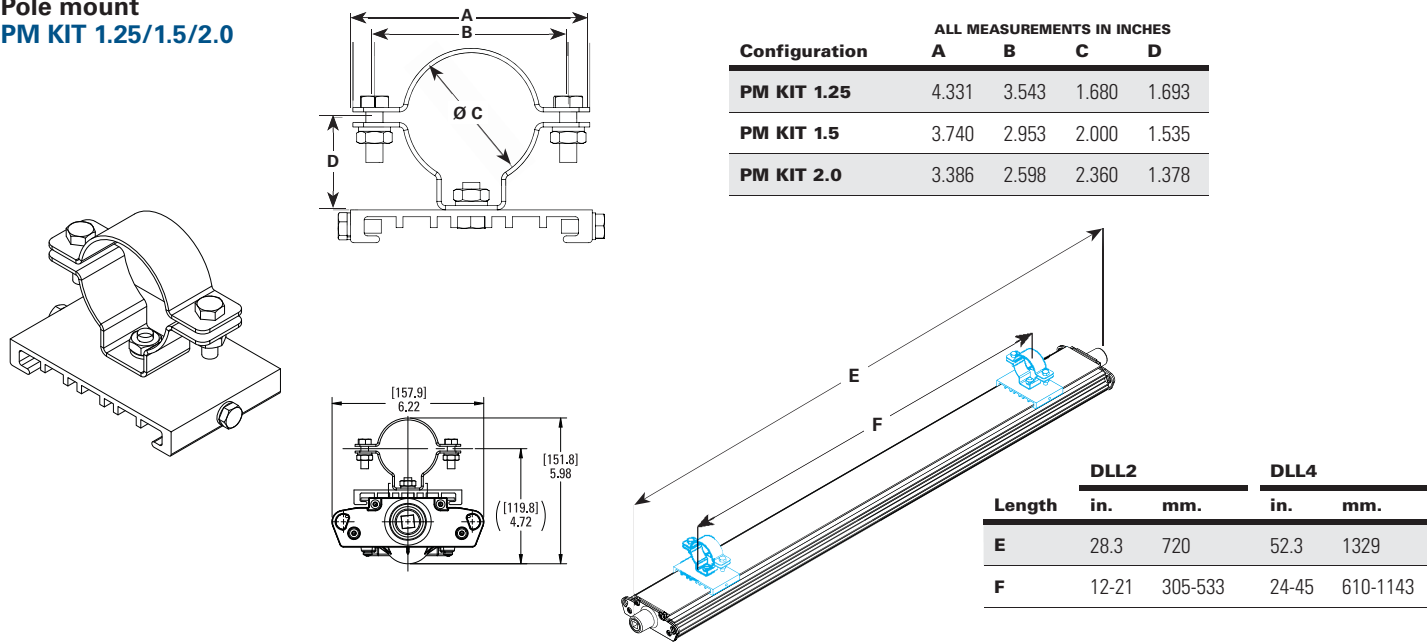


# Mounting options

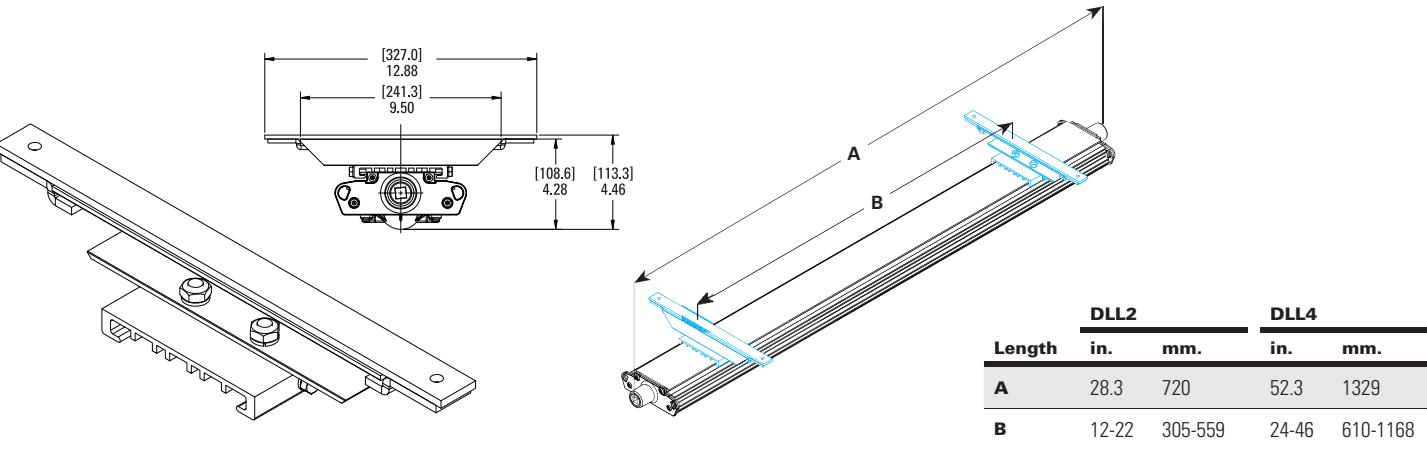
## Ceiling/swivel mount DP1050MTK



## Pole mount PM KIT 1.25/1.5/2.0



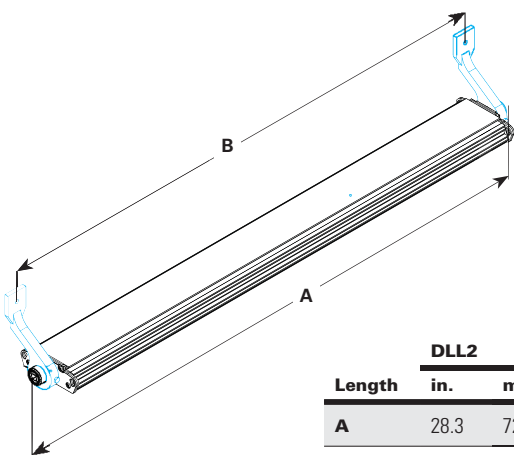
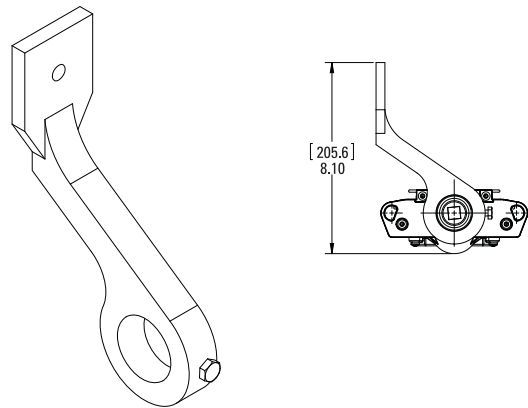
## MagnaPro mount DP1054MTK KIT





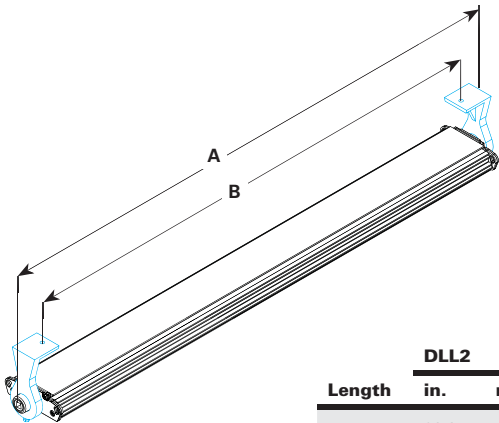
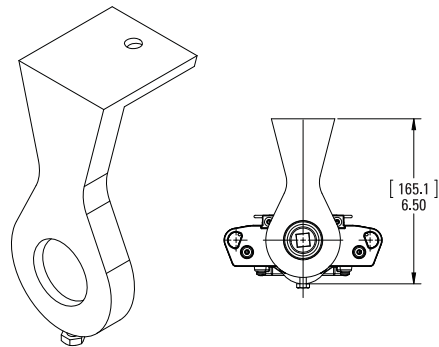
# Mounting options

## Offset wall DP1052MTK



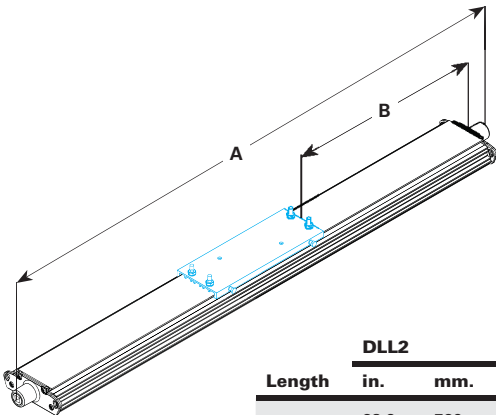
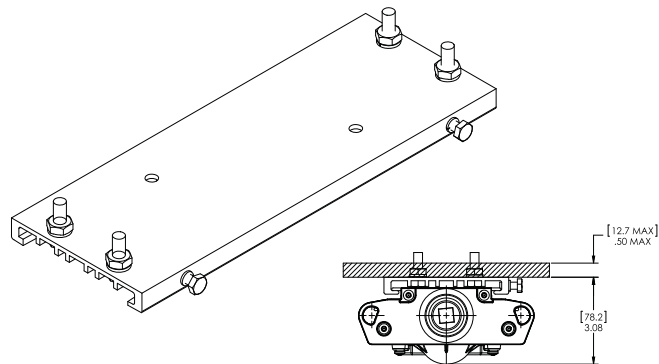
Length	DLL2		DLL4	
	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	26.3	669	50.3	1278

## Offset ceiling/wall mount DP1053MTK



Length	DLL2		DLL4	
	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	26.3	584	47.0	1194

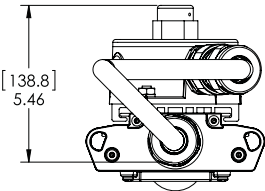
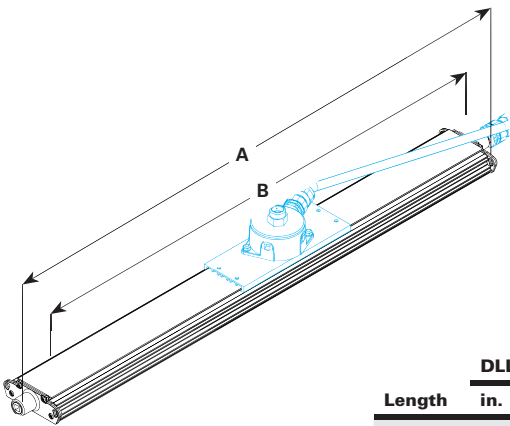
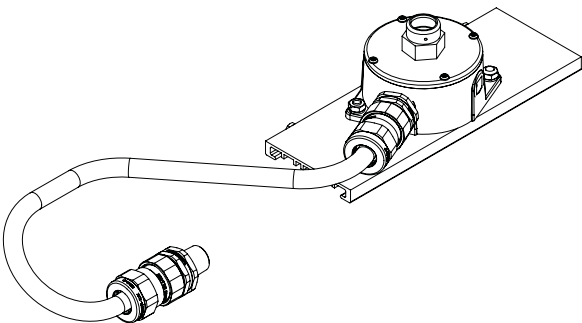
## Flush ceiling DP1057MTK



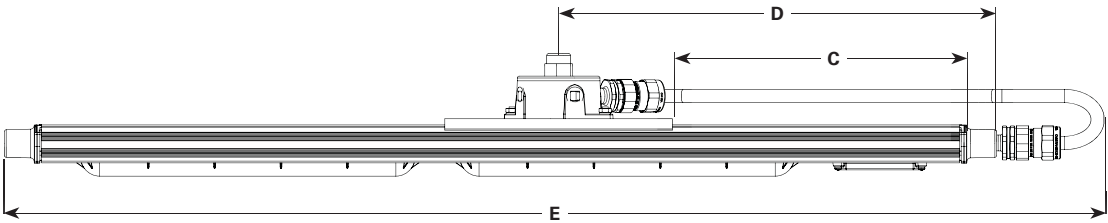
Length	DLL2		DLL4	
	in.	mm.	in.	mm.
A	28.3	720	52.3	1329
B	6.2	157.5	18.2	462

# Mounting options

Pendant mount - Class I, Div. 2 only  
PEND HAZ KIT



Length	DLL2		DLL4	
	in.	mm.	in.	mm.
A	31.7	805	55.8	1418
B	28.3	720	52.3	1329
C	4.2	108	16.0	406
D	12.2	310	24.0	610
E	34.9	886	58.9	1495



# Battery back-up



## Applications:

- Egress and emergency lighting for areas requiring uninterrupted lighting during power failure
- Hazardous area indoor and outdoor emergency lighting in land and marine drilling, manufacturing plants, heavy industrial, chemical and petrochemical facilities, platforms and loading docks

## Key features:

- Wall or ceiling remote mount options up to a cable distance of 50 feet from the LED luminaire
- Operating ambient: -20°C to +55°C
- 90-minute run time in emergency mode
- 1,000 lumen output
- 50,000 hours rated life @ 55°C
- IP66 rated enclosure
- Provision of LED indicator and manual test switch to check battery operation

## Certifications and compliances:

### NEC/CEC

- Class I, Division 2, Groups B, C, D
- Class II, Division 2, Groups F, G
- Wet locations, Type 4X, IP66

### UL Standards

- UL844 Hazardous (Classified)
- UL1598 Luminaires, UL1598A Marine
- UL924 Emergency Lighting

### CSA Standard

- CSA C22.2 Nos. 250, 137, 141

## Electrical ratings:

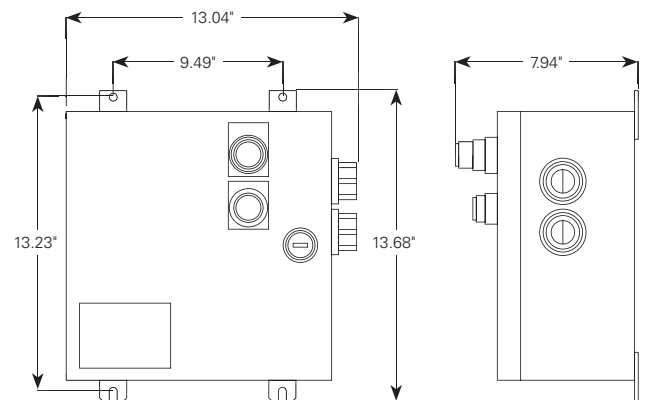
Model	2 ft.	4 ft.
<b>Voltage</b>	100-277 VAC/108-250 VDC; 347-480 VAC	
<b>Amperage @ 120VAC</b>	0.34	0.58
<b>Wattage @ 120VAC</b>	37	68
<b>Lumen output</b>	1,000	1,000
<b>Frequency</b>	50/60 Hz	50/60 Hz
<b>Power factor @ 100 VAC</b>	0.90	0.95
<b>THD</b>	<20%	<20%

Model	EM output	Normal output
<b>DLL2/UNV1 EM</b>	1,000 lumens	3,600 (100-277V)
<b>DLL2/UNV34 EM</b>	1,000 lumens	3,600 (347-480V)
<b>DLL4/UNV1 EM</b>	1,000 lumens	7,100 (100-277V)
<b>DLL4/UNV34 EM</b>	1,000 lumens	7,100 (347-480V)

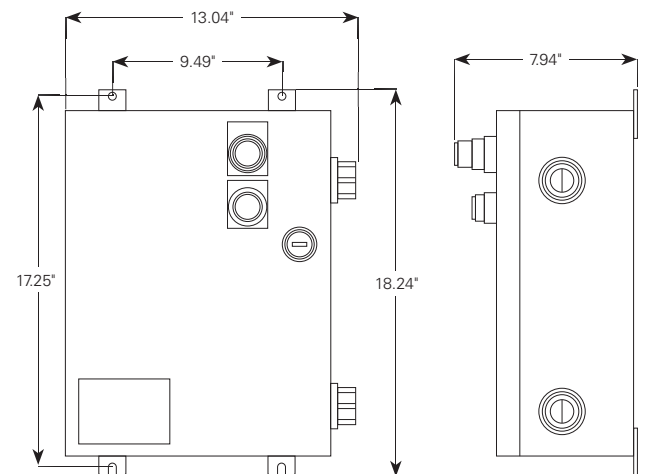
\* 2 ft. LED fixture wired to 0.5A driver/charger remote battery module

\*\* 4 ft. LED fixture wired to 1A driver/charger remote battery module

## Dimensions:



**EM UNV1**



**EM UNV34**



**U.S. (global headquarters):  
Eaton's Crouse-Hinds business**

1201 Wolf Street  
Syracuse, NY 13208

(866) 764-5454  
FAX: (315) 477-5179  
FAX Orders Only:  
(866) 653-0640

[crousecustomerctr@eaton.com](mailto:crousecustomerctr@eaton.com)

**For more information:**

If further assistance is  
required, please contact  
an authorized Eaton  
Distributor, Sales Office,  
or Customer Service  
Department.

**Canada**

Toll Free: 800-265-0502  
FAX: (800) 263-9504  
FAX Orders only: (866) 653-0645

**Mexico/Latin America/Caribbean**

52-555-804-4000  
FAX: 52-555-804-4020  
[ventascentromex@eaton.com](mailto:ventascentromex@eaton.com)

**Europe (Germany)**

49 (0) 6271 806-500  
49 (0) 6271 806-476  
[sales.CCH.de@cooperindustries.com](mailto:sales.CCH.de@cooperindustries.com)

**Middle East**

971 4 8066100  
FAX: 971 4 8894813  
[chmesales@eaton.com](mailto:chmesales@eaton.com)

**Singapore**

65-6645-9888  
FAX: 65-6297-4819  
[chsi-sales@cooperindustries.com](mailto:chsi-sales@cooperindustries.com)

**China**

86-21-2899-3600  
FAX: 86-21-2899-4055  
[cchsales@cooperindustries.com](mailto:cchsales@cooperindustries.com)

**Korea**

82-2-3484-6783  
82-2-3484-6778  
[CCHK-sales@cooperindustries.com](mailto:CCHK-sales@cooperindustries.com)

**Australia**

61-2-8787-2777  
FAX: 61-2-9609-2342  
[CEASales@cooperindustries.com](mailto:CEASales@cooperindustries.com)

**India**

91-124-4683888  
FAX: 91-124-4683899  
[cchindia@cooperindustries.com](mailto:cchindia@cooperindustries.com)

**Eaton**  
1000 Eaton Boulevard  
Cleveland, OH 44122  
United States  
[Eaton.com](http://Eaton.com)

© 2015 Eaton  
All Rights Reserved  
Printed in USA  
Publication No. 5172-1215  
December 2015

Eaton is a registered trademark.

All other trademarks are property  
of their respective owners.