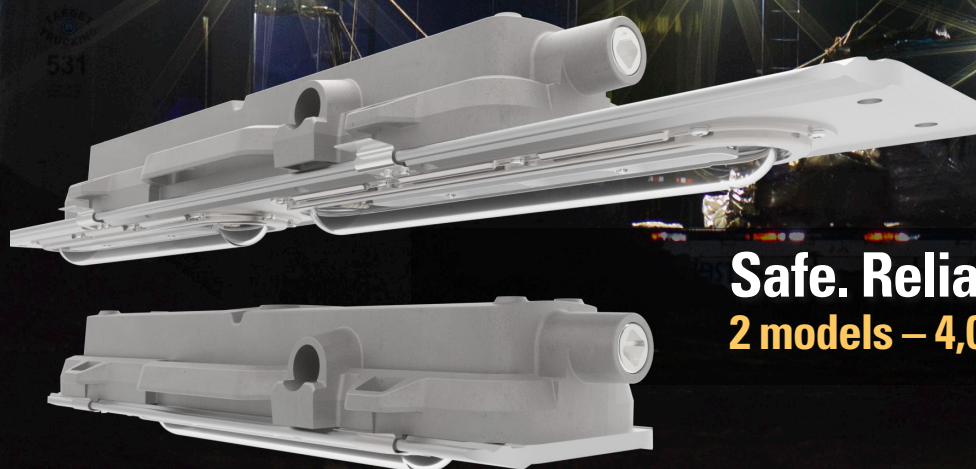


LED lighting for land based drilling

CROUSE-HINDS
SERIES

Pauluhn DLLA

LED lighting for land based drilling



Safe. Reliable. Efficient.
2 models – 4,000 & 8,000 lumens

EATON

Powering Business Worldwide

Pauluhn DLLA linear LEDs

Safe. Reliable. Efficient.

Featuring a broad range of LED luminaires for harsh and hazardous environments, Eaton's Crouse-Hinds delivers lighting solutions that perform reliably in even the worst operating conditions. **This reduces 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

Versatile mounting options

Five mounting options for maximum ease of installation

Servicable drivers

Easy access to drivers for service or replacement

Design features

High efficacy:

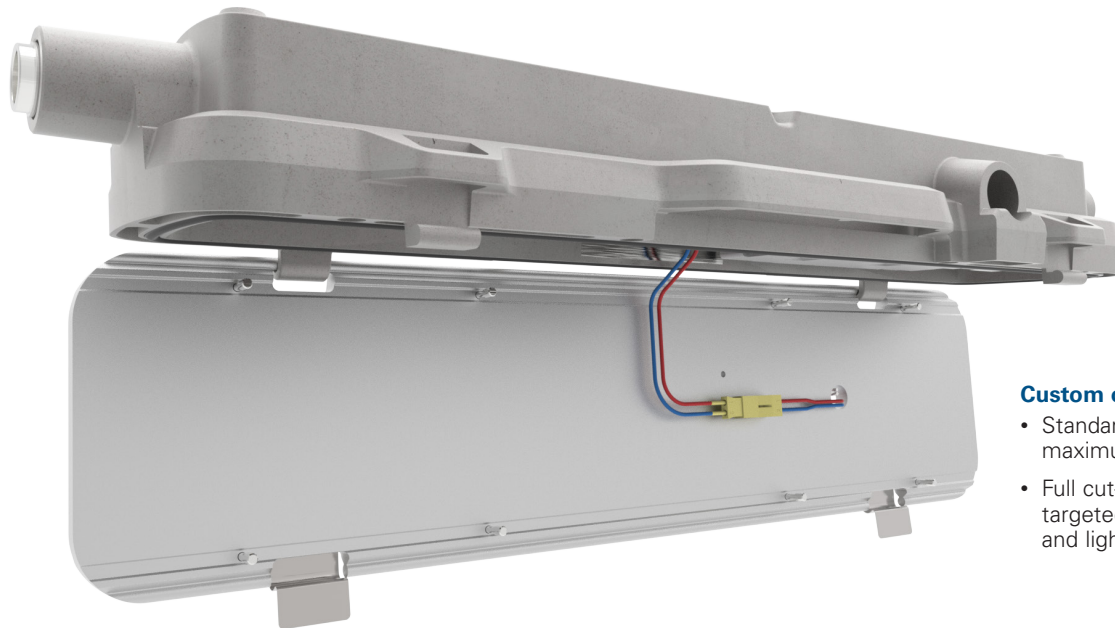
- Up to 134 lumens per watt (DLLA2 with UNV1 driver)

Quick & easy installation:

- Easy access to drivers and wiring
- No custom brackets or hardware needed

Comprehensive certification:

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



Custom optics:

- Standard wide beam spread for maximum illumination on wall panels
- Full cut-off beam spread option for targeted illumination; avoids spillage and light loss

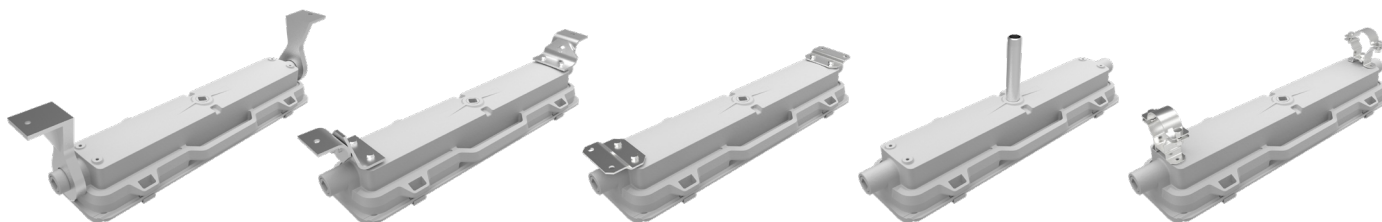
Slim profile:

- 4.4" 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

Versatile mounting options:



Offset ceiling/wall

Offset ceiling swivel

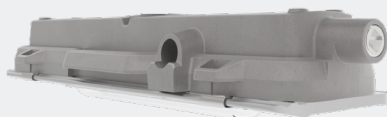
Flush mount (standard)

Pendant (standard)

Pole mount

Why choose Pauluhn DLLA LEDs?

Reliable lighting. DLLA LED luminaires are engineered to deliver high lumen output and maintenance-free long life in the toughest conditions.



DLLA2 vs. 2-lamp T5HO



59%
ENERGY EFFICIENCY



64%
TOTAL COST OF OWNERSHIP



100%
MAINTENANCE REDUCTION

Assumptions: Calculations based on overall life of the LED system. Energy cost of \$.09 per kilowatt; 24 hour per day operation; labor rate of \$75 each for 2 workers; average time for fixture maintenance of 1 hour.

Pauluhn™ DLLA linear LED luminaires

The Pauluhn DLLA 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 DLLA is the ideal solution for high vibration, impact and hose down in drilling applications.

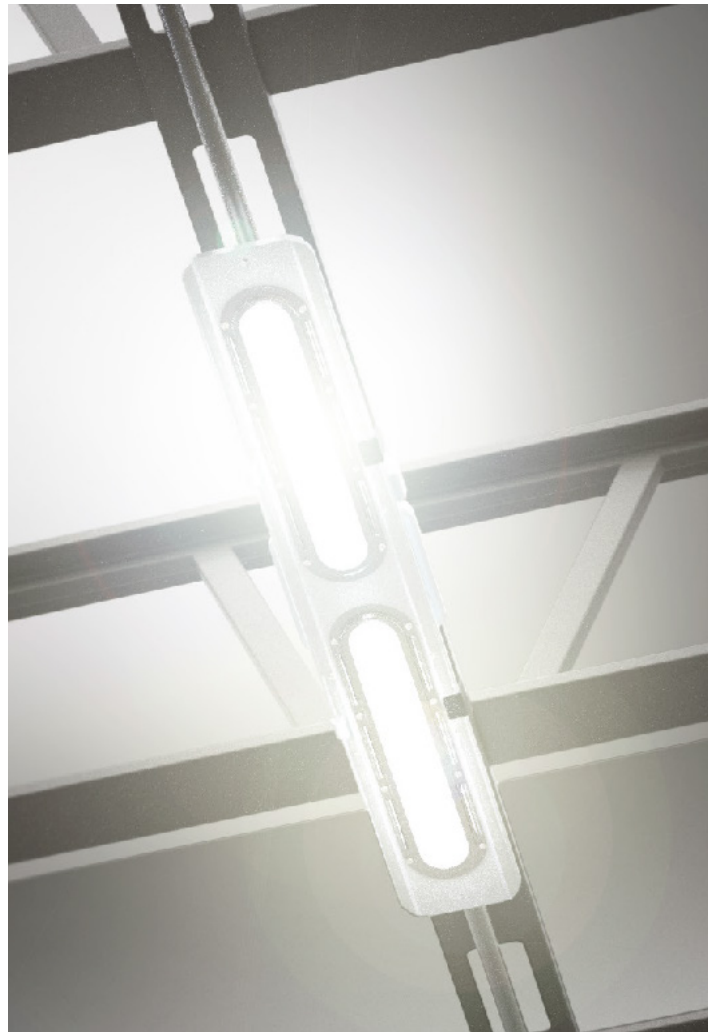
Applications:

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

Key features & benefits:

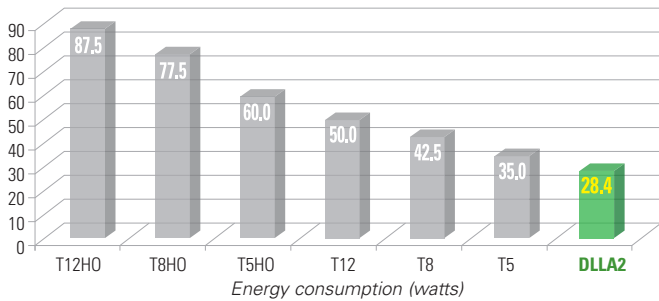
- High efficacy: up to 134 LPW (DLLA2 with UNV1 driver)
- Dimmable driver, 0-10V
- -40°C to +65°C ambient operating temperature (standard model)
- 0°C to +40°C ambient operating temperature (emergency battery back-up model)
- Integral emergency battery back-up: 90 minute run-time and ≥1,000 lumens (all models)
- Low profile (~4" height)
- Ceiling/swivel, wall, flush, pole and pendant mounting options
- Wide and narrow optics for uniform illumination
- Four points of secondary retention
- 2,000 psi high pressure hose rated
- High vibration resistance
- Surge protection (Standard): 4kV line to line, 6kV line to earth
- Surge protection (with SRG1 or SRG3 suffix): ≥10kV line to line, ≥10kV line to earth
- 5 year fixture warranty†

† Refer to the authorized distributor price book for Eaton's Crouse-Hinds series standard Terms and Conditions.



Energy consumption comparison

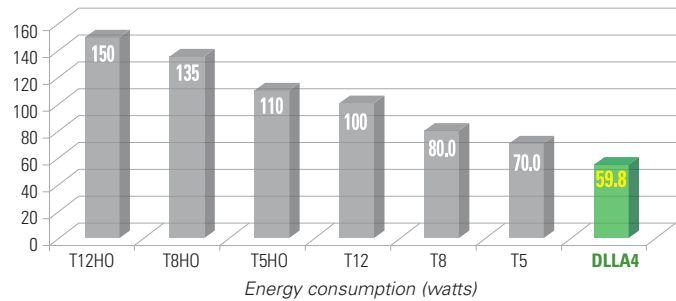
2 foot DLLA linear LED vs. fluorescent



Model	Typical lumens	Wattage	Lumens per watt	Equivalent HID luminaire	Typical energy savings / lifetime
DLLA2	4,000	30.3	132	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, UNV1

4 foot DLLA linear LED vs. fluorescent



Model	Typical lumens	Wattage	Lumens per watt	Equivalent HID luminaire	Typical energy savings / lifetime
DLLA4	8,000	58.9	135	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, UNV1

Specifications

Certifications:

NEC/CEC standards:

- Class I, Division 2, Groups A, B, C, D
- Class I, Zone 2
- Class II, Division 2, Groups F, G
- Class III
- Type 4X; IP66/67
- Marine and Wet Locations

UL standards:

- UL844 Electrical Fixture Hangers for Hazardous Locations
- UL924 for Emergency Lighting Equipment (EM model)
- UL1598 Luminaire
- UL1598A Luminaire for Installation on Marine Vessels
- UL 8750 Standard for Light Emitting Diode (LED) Equipment for Use in Lighting Products

CSA standard:

- C22.2 No. 137, 141 and 250

Electrical ratings:

UNV1	Input power (watts)	Input amps at 120-277 VAC
DLLA2	30.3	0.25
DLLA4	58.9	0.49

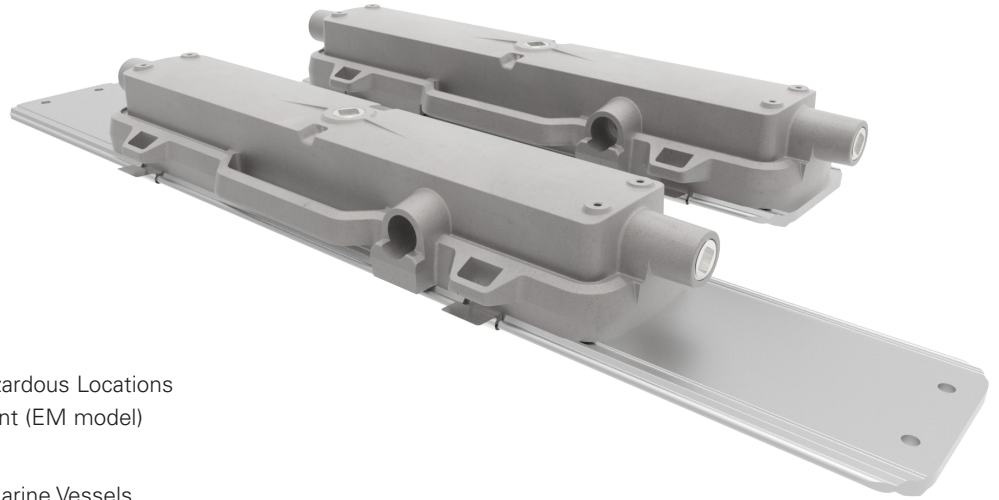
UNV1	
Voltage range, VAC	120-277V at 50/60 Hz
Voltage range, VDC	127/250V

UNV1	Power factor	THD
DLLA2	>0.92	<6.5%
DLLA4	>0.94	<6.2%

UNV34	Input power (watts)	Input amps at 347-480 VAC
DLLA2	31.1	0.09
DLLA4	54.6	0.16

UNV34	
Voltage range, VAC	347-480V at 50/60 Hz

UNV34	Power factor	THD
DLLA2	>0.95	<18%
DLLA4	>0.98	<10%



Mounting:

Versatile mounting options:

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

Materials:

Housing:

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

Lens:

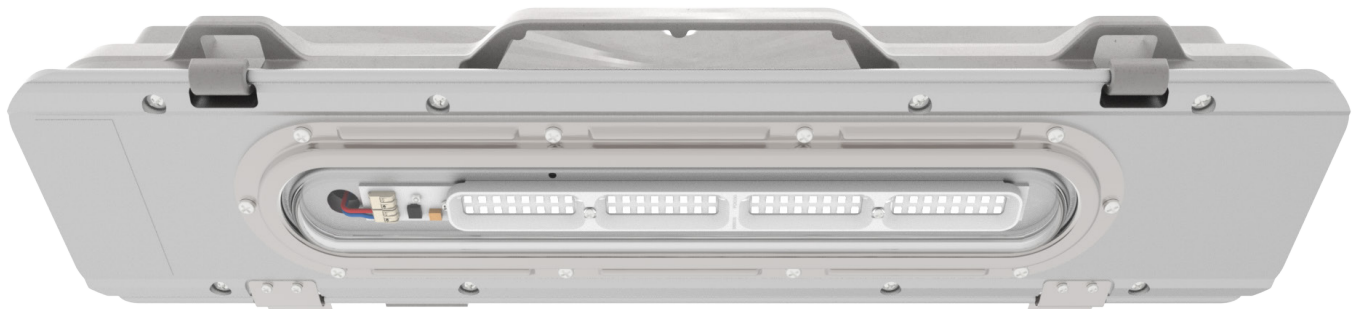
- Clear glass or polycarbonate
- Diffused glass or polycarbonate

Temperature codes:

Ambient temperature	Min. temp. wire supply	Class I, Div. 2	Class II, Div. 2	Simultaneous rating
				Class I, Div. 2, Class II, Div. 2
40°C	75°C	T6	T6	T6
55°C	75°C	T5	T5	T5
65°C	90°C	T4A	T4A	T4A

Weights:

Luminaire	lbs.	kg.
DLLA2	15.1	6.8
DLLA4	19.5	8.9



Ordering information

Part number example

DLLAW4NCS-UNV1-S903-1R-SRG1-EM1-P-M2

Pauluhn DLLA-M2 linear LED, warm white, 4 foot, full cut off optics, ceiling/swivel mount, 120-277 VAC driver, clear polycarbonate lens, 3/4" hubs with 1/2" reducers, integrated 10kV surge protection module, integral emergency battery back-up, gray epoxy paint

DLLA W 4 N CS – UNV1 – S903 – 1R – SRG1 – EM1 – P – M2

Series	Voltage	Entries	Finish
DLLA Pauluhn DLLA LED	UNV1 120-277 VAC; 127/250 VDC	BLANK 3/4" NPT entries	BLANK Natural aluminum
W Warm white, 3000K, 80 CRI	UNV34 347-480 VAC	1R 3/4" NPT entries with 1/2" reducers	P Painted (gray, epoxy)
4 4 ft. length, 8,000 lumens	Lens	Enhanced surge	EM1 Integral emergency battery back-up
N Neutral white, 4000K, 80 CRI	BLANK Clear glass	SRG1 120-277 VAC integrated 10kV surge protection module	
CS Ceiling/swivel mount	S891 Diffused glass	SRG3 347-480 VAC integrated 10kV surge protection module	
2 2 ft. length, 4,000 lumens	S903 Clear polycarbonate		
Optics*	S903D Diffused polycarbonate		
BLANK Standard	Mounts*		
N Full cut off	BLANK Flush ceiling/wall mount		

*Full cutoff option available with clear lens options only.

*Pendant mount is integral to fixture and available on all models regardless of mounting option chosen. (see page 13 for details)

Mounting kits (ordered separately)

M2-FLUSH-MT-KIT	Flush ceiling/wall mount
M2-CEILING-SWIVEL-KIT	Ceiling/swivel mount
M2-CEILING-WALL-KIT	Ceiling/wall mount offset
M2-PM-KIT-1.25	Pole mount kit, 1.25" diameter
M2-PM-KIT-1.5	Pole mount kit, 1.50" diameter
M2-PM-KIT-2.0	Pole mount kit, 2.00" diameter
SS KIT	Safety chain kit

Note: Conduit entry plugs and mounting kits are shipped with the fixture based on the mounting type selected within the catalog structure. Individual mounting kits are also available, should you wish to change the mounting style in the field.

Replacement driver kits (ordered separately)

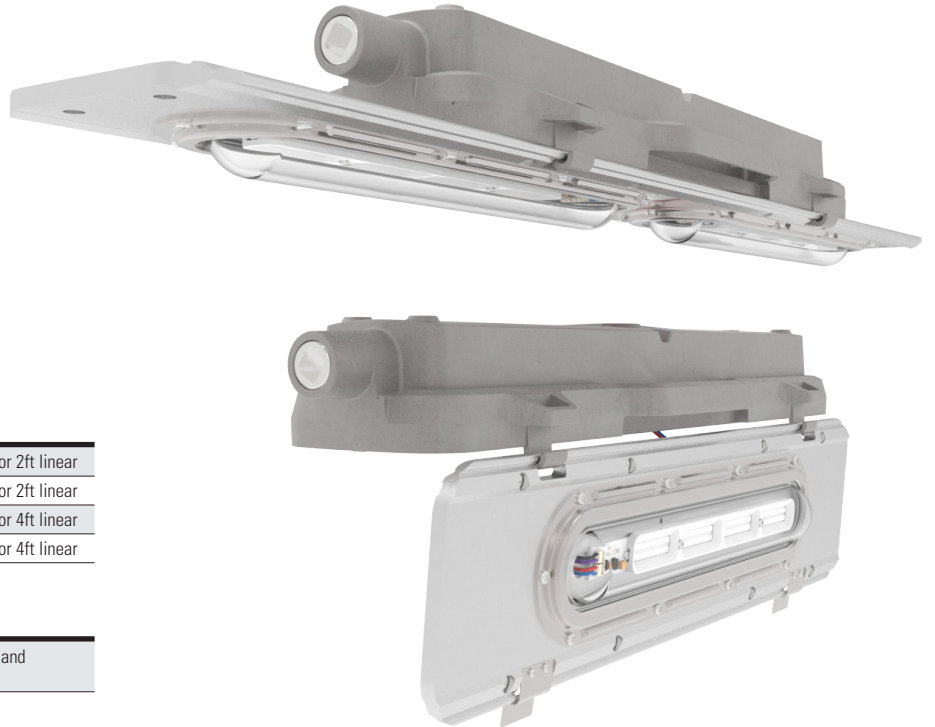
M2-MLLA2-UNV1-DRIVER-KIT	120-277 VAC driver replacement for 2ft linear
M2-MLLA2-UNV34-DRIVER-KIT	347-480 VAC driver replacement for 2ft linear
M2-MLLA4-UNV1-DRIVER-KIT	120-277 VAC driver replacement for 4ft linear
M2-MLLA4-UNV34-DRIVER-KIT	347-480 VAC driver replacement for 4ft linear

Replacement battery back-up kit (ordered separately)

MLLA-EM1-M2-KIT	Replacement battery, emergency driver, gasket and mounting hardware
------------------------	---

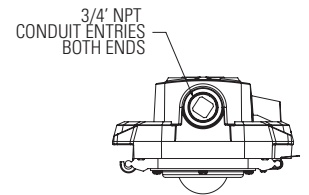
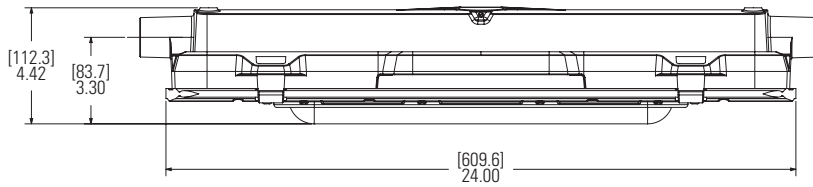
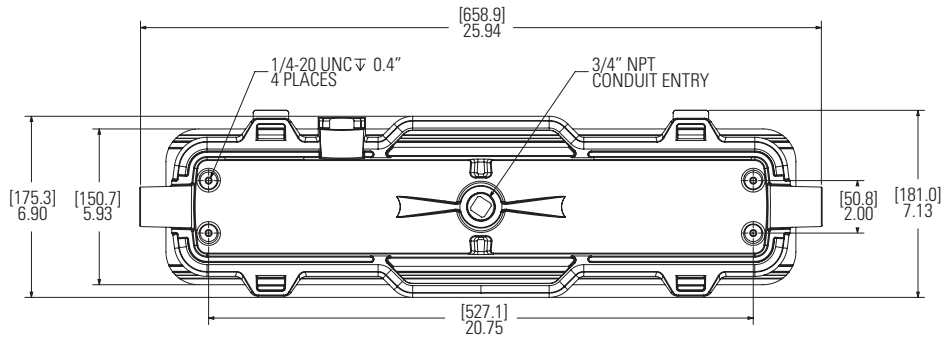
Replacement surge module kits (ordered separately)

M2-MLLA-SRG1-KIT	Replacement UNV1 surge module, bracket, wiring terminals and mounting hardware
M2-MLLA-SRG3-KIT	Replacement UNV34 surge module, bracket, wiring terminals and mounting hardware

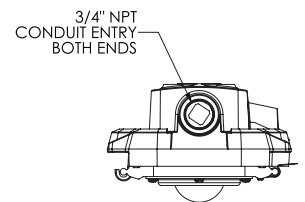
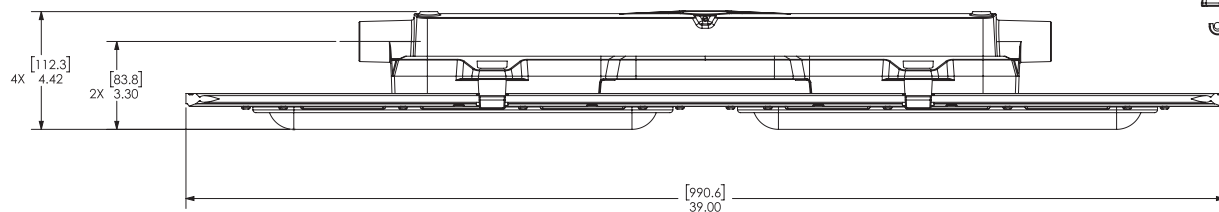
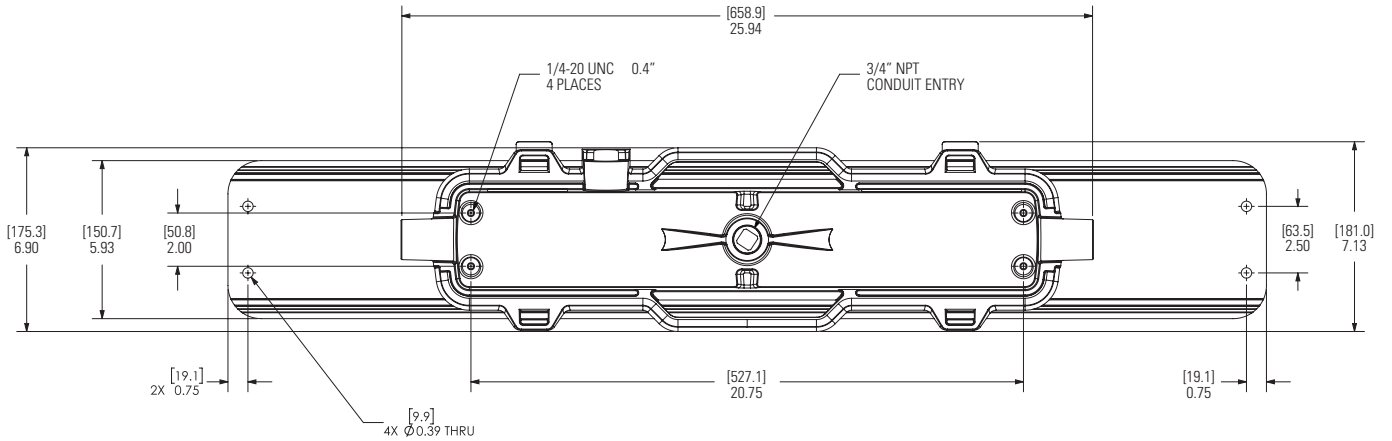


Dimensions

DLA2-M2

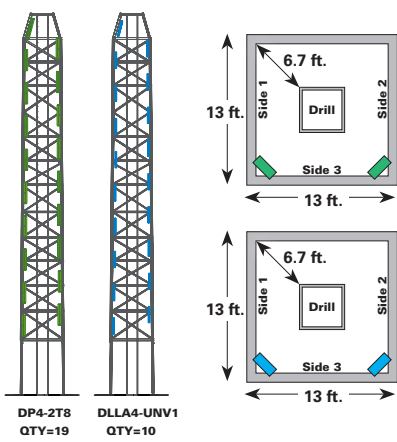


DLA4-M2



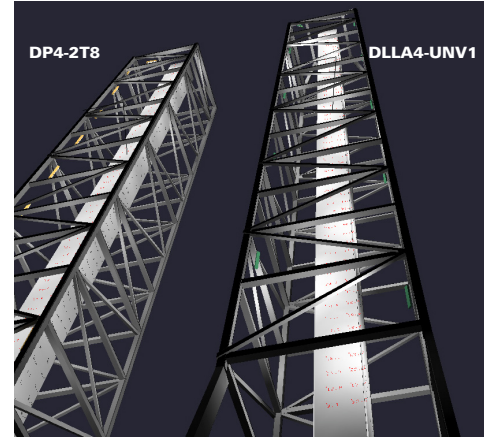
Photometrics: high mast derrick

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

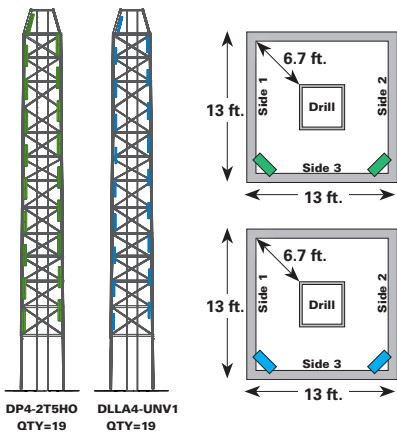


Model	Average footcandles	
	DLLA4-UNV1	DP4-2T8
Side 1	12.37	9.18
Side 2	10.80	9.56
Side 3	21.66	16.19

47% lower fixture count (19 vs.10) and higher average illumination on the drill.

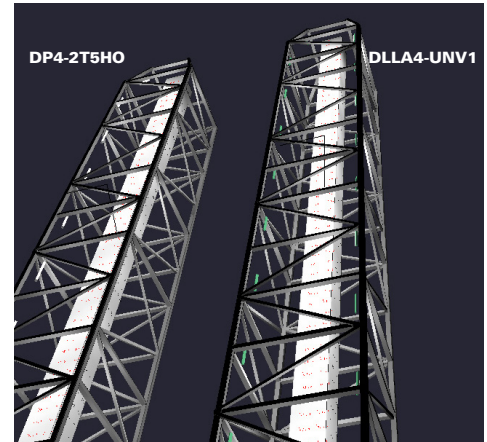


4 foot DLLA LED with 80° optics vs. 4 foot 2 lamp T5HO DuraPro



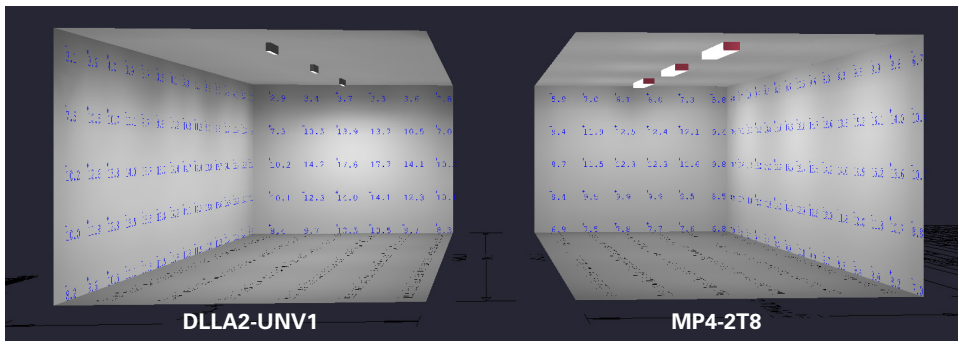
Model	Average footcandles	
	DLLA4-UNV1	DP4-2T5HO
Side 1	25.68	20.33
Side 2	18.88	20.52
Side 3	42.00	35.79

57% lower energy consumption and higher average illumination on the drill.



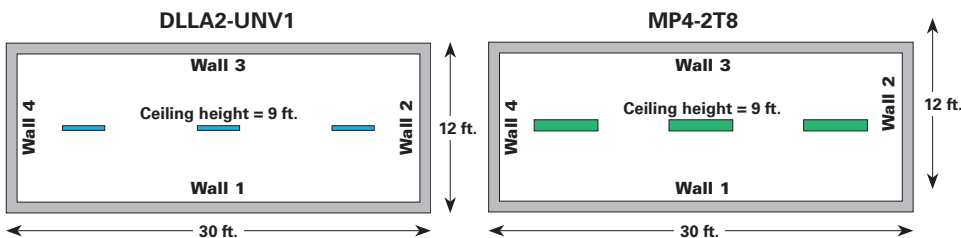
Photometrics: control room/pump shed

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



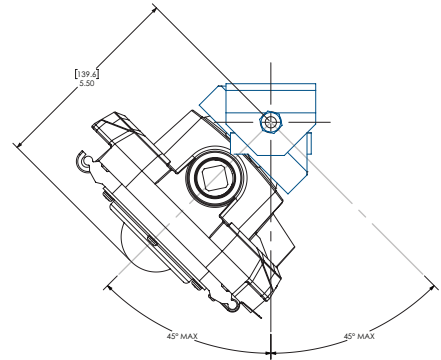
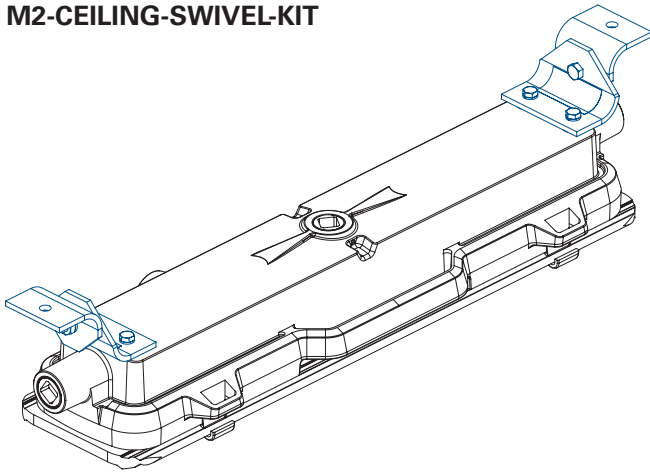
Model	Average footcandles	
	DLLA2-UNV1	MP4-2T8
Wall 1	10.11	11.55
Wall 2	9.90	9.10
Wall 3	10.16	11.56
Wall 4	9.66	9.10
Floor	17.85	13.86

64% lower energy consumption and higher average illumination on floor

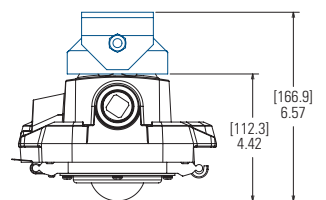
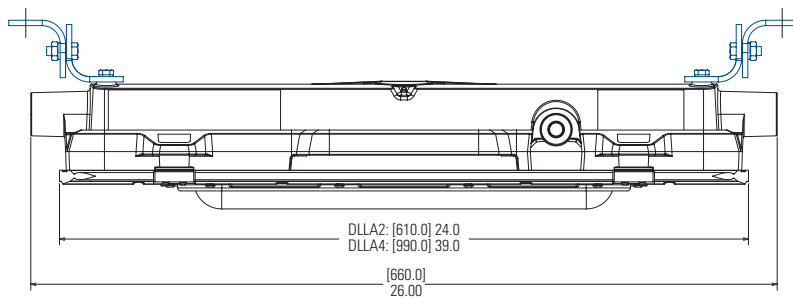
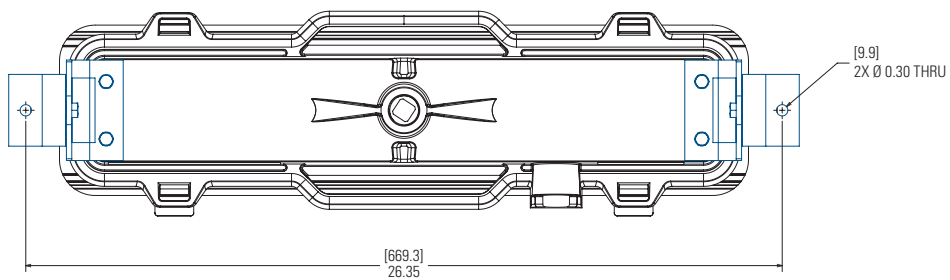


Mounting options

Ceiling mount swivel kit M2-CEILING-SWIVEL-KIT

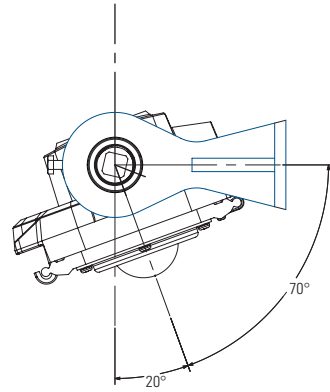
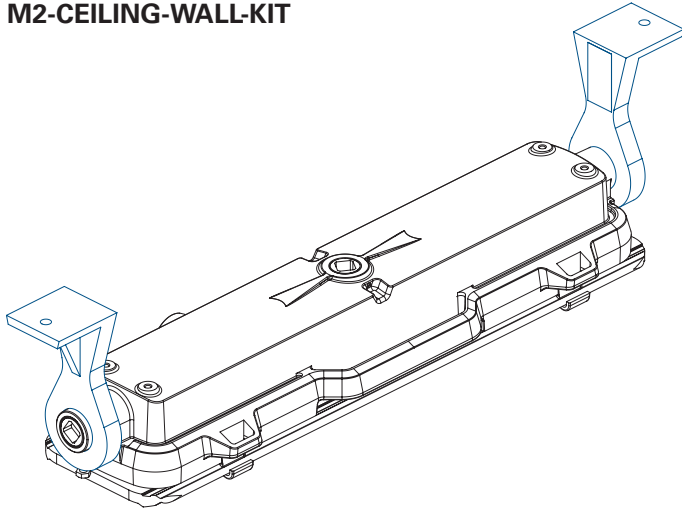


MAXIMUM ROTATION, CEILING SWIVEL MOUNT

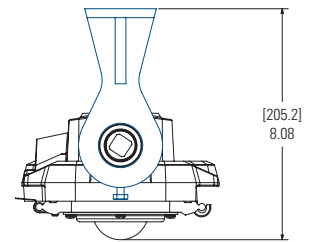
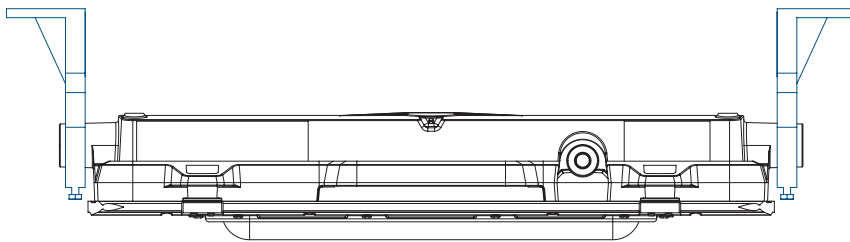
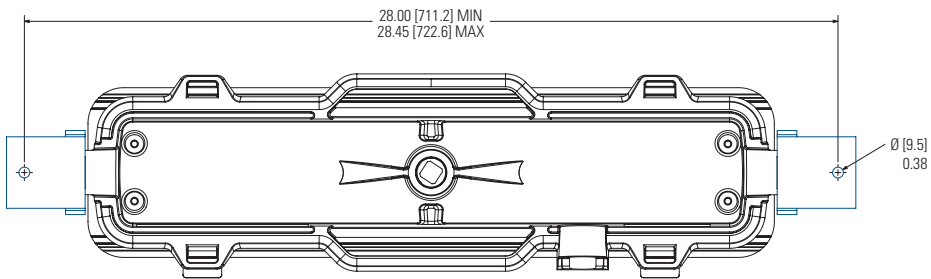


Mounting options

Ceiling/wall mount kit M2-CEILING-WALL-KIT

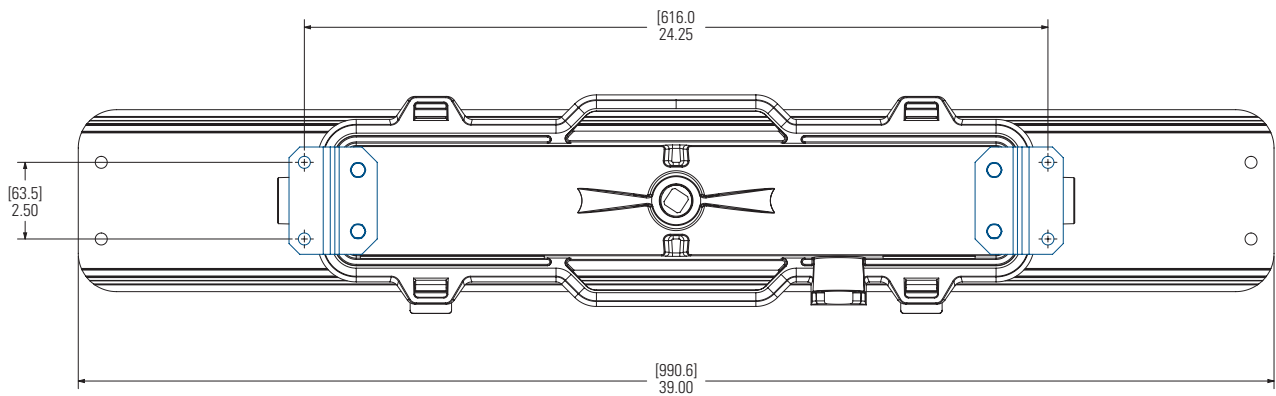
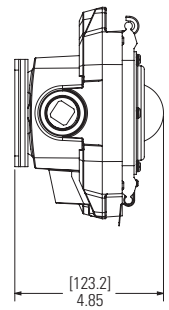
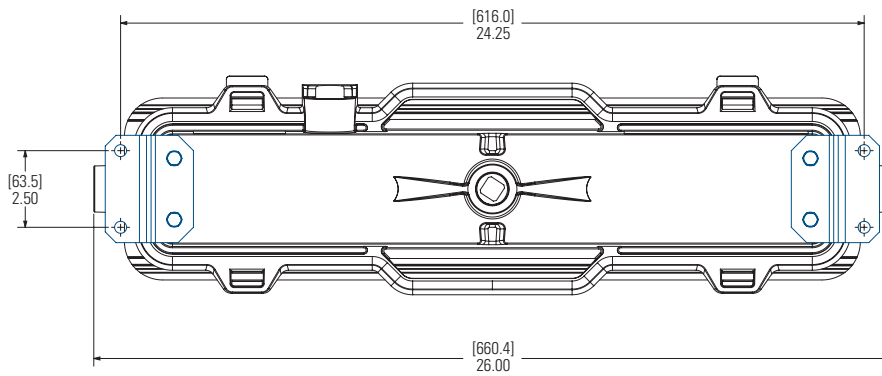
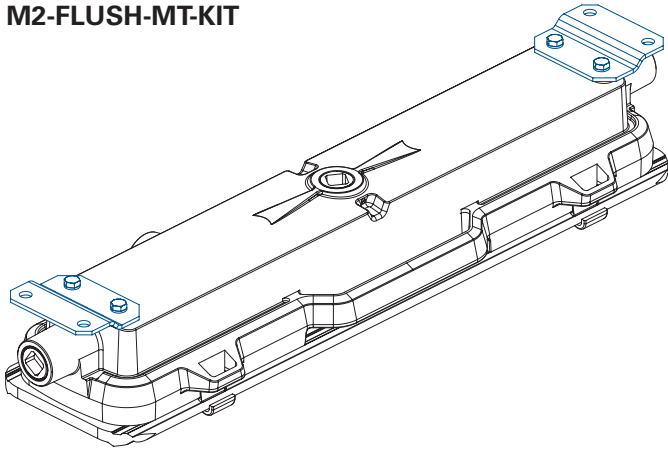


MAXIMUM ROTATION, WALL MOUNTING



Mounting options

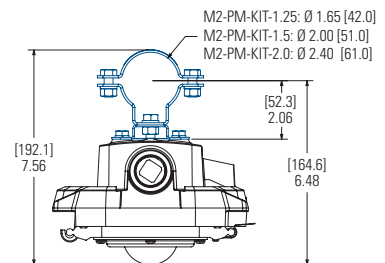
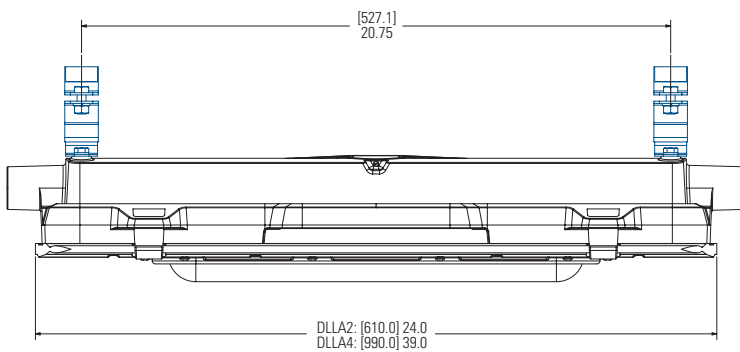
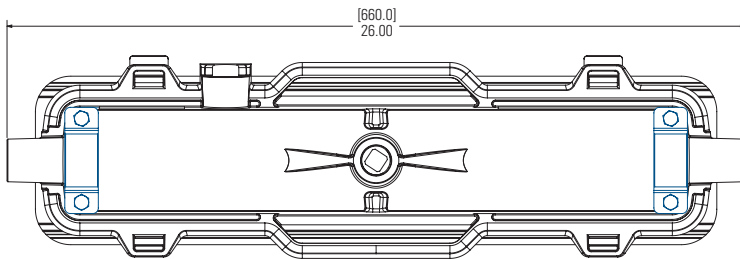
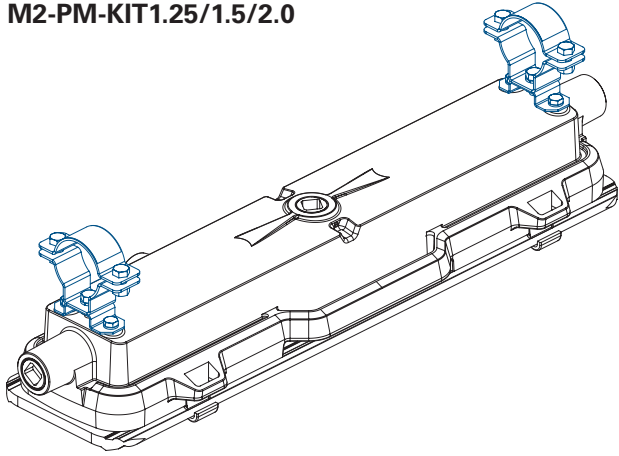
Flush mount kit M2-FLUSH-MT-KIT



Mounting options

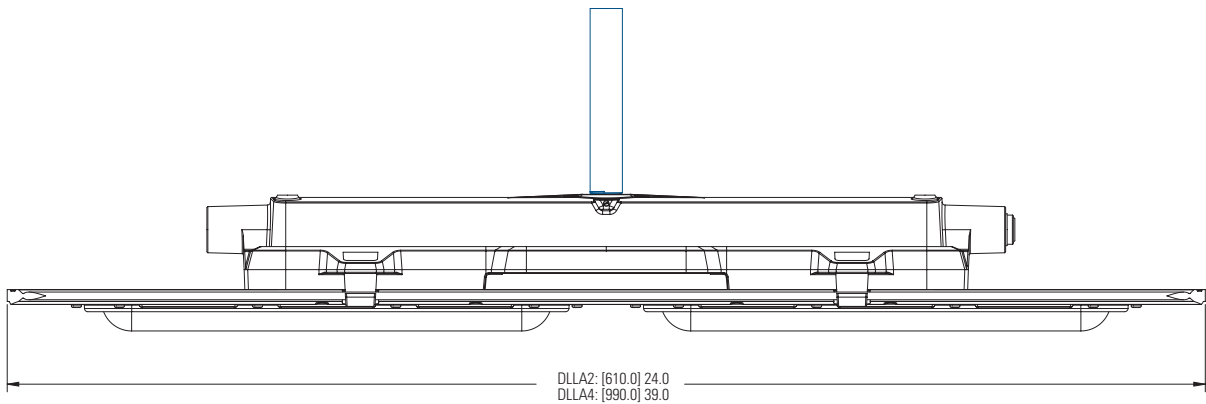
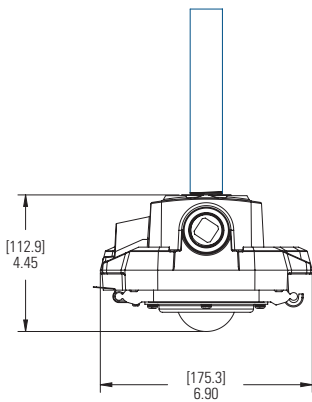
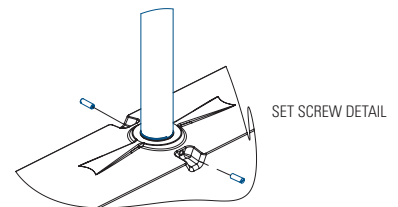
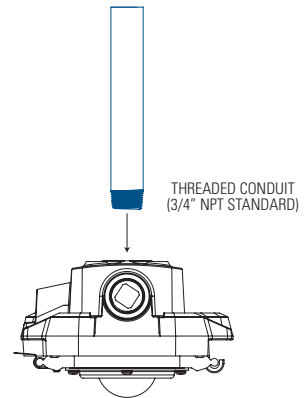
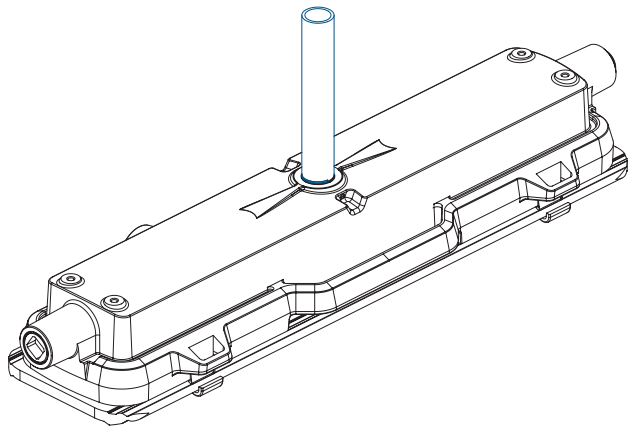
Pole mount kit

M2-PM-KIT1.25/1.5/2.0



Mounting options

Pendant mount



**U.S. (global headquarters):
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