



TJTUNV023ACxxxB

JA8-2016



DirectAC UNV Retrofit Kit Engines

- Integrated AC Direct Drive (No DC Driver)
- Universal Voltage (120~277) AC Engine
- Suitable for open or fully enclosed luminaires
- Suitable for luminaires with plastic and glass lenses
- All 90CRI product meets CEC Title 24 requirement
- cULus Classified 1598C
- cULus Recognized 8750
- Energy Star Luminaire 2.1 Listed (for rebate programs)^①
- Energy Star Luminaire CSD^①

General Specifications

| | |
|--|---|
| Input Voltage / Frequency ^② | 120~277VAC (+/- 10%) / 50-60Hertz |
| Input Current ^② | ~0.192A @120V ~0.100A @230V ~0.083A @277V |
| Input Power ^② | 23W (+/- 1W) |
| Input PF | >0.98 |
| THD | <20% |
| Operating Frequency | 120Hz |
| Max Lumen Output @ Full Power ^② | 2540 lumens @ 4000K / 80 CRI |
| Dimming Type/Range @120V ONLY | Leading Edge (TRIAC) or Trailing Edge (ELV) /100% ~ 10% |
| Beam Angle | 120° |
| CRI | 80 (standard), 90 available (MTO) |
| Operating Temperature Range (Ta) | -35 to 50°C / -31°F to 122°F |
| Maximum Engine Case Temperature | L70: Tc max=80°C (Ts=85°C) / L90: Tc max=80°C (Ts=85°C) |
| Maximum Lens Temperature | Lens: 90°C / 194°F |
| Estimated Lumen Maintenance (at Max Tc) | L70= >54,000 hours / L90= >21,000 hours |
| Color Consistency | Binning per ANSI C78.377-2015 @25°C; 3 SDCM |
| Overall Size | 6.97" diameter x 0.71" H (177.04mm Dia. x 18.03mm H) |
| Wire Type/ Length | 18AWG / 12" Black and White wires |
| LED Quantity | 64 Pcs. |
| Weight | 195.5g / 0.43lbs. |
| Packaging: Master Carton | 24pcs |
| Maximum Screw Installation Torque | 60in-lb (960in-ozf) |
| Safety/Compliance | DirectAC Engines: cURus (File # E486778) TATUNV023AxxxxA DirectAC Retrofit Kits: cULus (File # E486779) TJTUNV023AxxxxB RoHS Compliant Dry and Damp Location IC Over Temperature Control Energy Star Luminaire 2.1 Listed ^① Energy Star Luminaire CSD ^① CEC JA8-2016 |
| RFI/EMI | FCC Part 15B Consumer, EN55015 |
| Input Surge Test | 2.5kV Common and Differential mode (Per ES Ring Wave Test) |
| Sound Rating / Noise | A / <24 dBA |
| Percent Flicker / Flicker Index | <25% / <0.0706 |
| Protective Lens/Enclosure | High Voltage Barrier / 2.5mm Clear Polycarbonate 5VA Flame rated |
| Lens Transmittance | >92.5% |
| PCB Material | MCPCB |
| Warranty | 5 years @ 80°C / 176°F Tc from the date of manufacture |
| Electrolytic Capacitor Rating | >60,000 hours |

^① See page #4 "Certification Chart" for exact models.

^② Measured electrical data per UL file



TJTUNV023ACxxxB



Part Number Matrix

T J T UNV 023 A C 8 40 B

ⓐ J= Engine Type: DirectAC Engine Retrofit Kit (Classified)
 T= Dimming: TRIAC/ELV
 Input Voltage: UNV = 120V~277V
 Input Power: 023 = 23W
 Material: A=MCPCB+wire
 ⓐ Shape: C=Circular
 ⓐ CRI: 8 = 80, 9 = 90
 ⓐ Color Temperature: 27 = 2700K, 30 = 3000K, 35 = 3500K, 40 = 4000K, 50 = 5000K
 ⓐ B = Option: DirectAC Engine +Lens (Retrofit Kit)

Electrical and Optical Specifications

| Color Temperature | DirectAC Engine Part Number | Input Power | Nominal Luminous Flux @ 90 CRI | Engine Efficacy @ 90 CRI | Nominal Luminous Flux @ 80 CRI | Engine Efficacy @ 80 CRI |
|-------------------|-----------------------------|-------------|--------------------------------|--------------------------|--------------------------------|--------------------------|
| 2700K | TJTUNV023ACx27B | 23W | 1981 lumens | 86 lm/W | 2311 lumens | 100 lm/W |
| 3000K | TJTUNV023ACx30B | 23W | 2057 lumens | 89 lm/W | 2413 lumens | 105 lm/W |
| 3500K | TJTUNV023ACx35B | 23W | 2083 lumens | 91 lm/W | 2438 lumens | 106 lm/W |
| 4000K | TJTUNV023ACx40B | 23W | 2159 lumens | 94 lm/W | 2540 lumens | 110 lm/W |
| 5000K | TJTUNV023ACx50B | 23W | 2210 lumens | 96 lm/W | 2591 lumens | 113 lm/W |

Luminous Flux De-Rating: CCT and CRI Multipliers

| CCT \ CRI | 2700K | 3000K | 3500K | 4000K | 5000K |
|-----------|-------|-------|-------|-------|-------|
| 80(R9>0) | 0.91 | 0.95 | 0.97 | 1.00 | 1.02 |
| 90(R9>50) | 0.78 | 0.81 | 0.83 | 0.85 | 0.87 |

NOTES:

- 1) DirectAC Engines standard model "B" comes with engine and lens.
- 2) Nominal luminous flux includes a 7.5% loss due to lens. Use a 1.075 multiplier when lens is removed.
- 3) Electrical and optical specifications are based on Tc mod = 25°C. Reference Amb. Temp. vs Rel. Lum. Flux for other temperatures.
- 4) Specifications are subject to change without notice.
- 5) All 90CRI product meets CEC Title 24 requirement.

ⓐ Standard Product offering, in addition to 90CRI / 3000K (All other options are made to order with MOQ and lead time).

ⓐ LED Engine Retrofit Kit includes mounting hardware, retrofit labels, and installation instructions.



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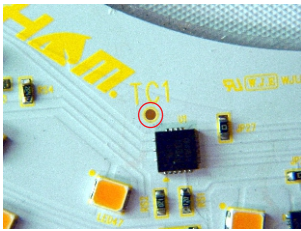
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Thermal Specifications

③ DirectAC Engine Retrofit Kit (B)

| | |
|--------------------------------------|---|
| Storage Temperature Range | -40°C(-40°F) to 80°C(176°F) |
| Operating Ambient Temperature Range | -35°C(-31°F) to 50°C(122°F) |
| Maximum Engine Case Temperature (Tc) | L70: Tc max=80°C (Ts=85°C) / L90: Tc max=80°C (Ts=85°C) |
| Maximum Lens Temperature | 90°C (194°F) |



Tc located on module

Thermal De-Rating: Tc vs. Luminous Flux

| Module Case Temperature (Tc) | Luminous Flux Multiplier |
|------------------------------|--------------------------|
| 25°C | 1.000 |
| 30°C | 0.991 |
| 35°C | 0.982 |
| 40°C | 0.974 |
| 45°C | 0.965 |
| 50°C | 0.956 |
| 55°C | 0.947 |
| 60°C | 0.939 |
| 65°C | 0.921 |
| 70°C | 0.912 |
| 75°C | 0.904 |
| 80°C | 0.895 |
| 85°C | 0.886 |
| 90°C | 0.877 |
| 95°C | 0.868 |
| 100°C | 0.860 |

NOTES:

- 1) Refer to LED Engine Retrofit Kit Installation Instructions for further detail.
- 2) This LED Engine Kit can retrofit any luminaire with a dimension/volume greater or equal to the minimum dimensions shown below and on the Installation Instructions.
- 3) This LED Engine Kit can be used with luminaires similar to the one illustrated on the Installation Instructions.

③ Suitable for surface mounted luminaire with minimum dimensions or volume: 8.5" Dia. x 4.75" H or 173.92 cubic inches



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Certification Chart

| Model | TJTUNV023ACxxxB |
|-----------------------|-------------------|
| Classification | |
| | YES |
| | TJTUNV023ACxxxA |
| | TJTUNV023ACxxxB |
| | YES (80/90CRI) |
| | YES (80/90CRI) |

Energy Star™ TM-21 Calculator Data

| Tc Module | Reported L70 | Reported L90 |
|-----------|--------------|--------------|
| 50°C | >54,000 Hrs | 34,000 Hrs |
| 80°C | >54,000 Hrs | 26,000 Hrs |
| 100°C | >54,000 Hrs | 21,000 Hrs |

| Tc Module | Calculated L70 | Calculated L90 |
|-----------|----------------|----------------|
| 50°C | 112,000 Hrs | 34,000 Hrs |
| 80°C | 84,000 Hrs | 26,000 Hrs |
| 100°C | 70,000 Hrs | 21,000 Hrs |

Product Image: 23W Round AC Engine Kit

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CAUTION: THIS LUMINAIRE HAS BEEN MODIFIED TO OPERATE LED LAMPS. DO NOT ATTEMPT TO INSTALL OR OPERATE FLUORESCENT, INCANDESCENT LAMPS IN THIS LUMINAIRE. Min. 75°C SUPPLY CONDUCTORS.

NOTICE: THIS LUMINAIRE HAS BEEN MODIFIED AND CAN NO LONGER OPERATE THE ORIGINALLY INTENDED LAMP. (WITH RESPECT TO FIRE AND SHOCK ONLY) FOR USE ONLY WITH PRODUCTS DESCRIBED AND INSTALLED IN ACCORDANCE WITH THE INSTRUCTION PROVIDED WITH THIS RETROFIT KIT.



Hardware Kit: TLC-HW10



Installation Instructions

NOTES:

- Energy Star CSD:
https://www.energystar.gov/products/lighting_fans/certified_lighting_subcomponent_database_csd
- Energy Star Listed:
https://www.energystar.gov/productfinder/product/certified-light-fixtures/results?scrollTo=342&search_text=fulham&fixture_type_isopen=&markets_filter=United+States&zip_code_filter=&product_types=Select+a+Product+Category&sort_by=light_output_lumens&sort_direction=asc&page_number=0&lastpage=0

DirectAC UNV Retrofit Kit Engines:
Hardware, Quick disconnect, Labels & Installation Instructions



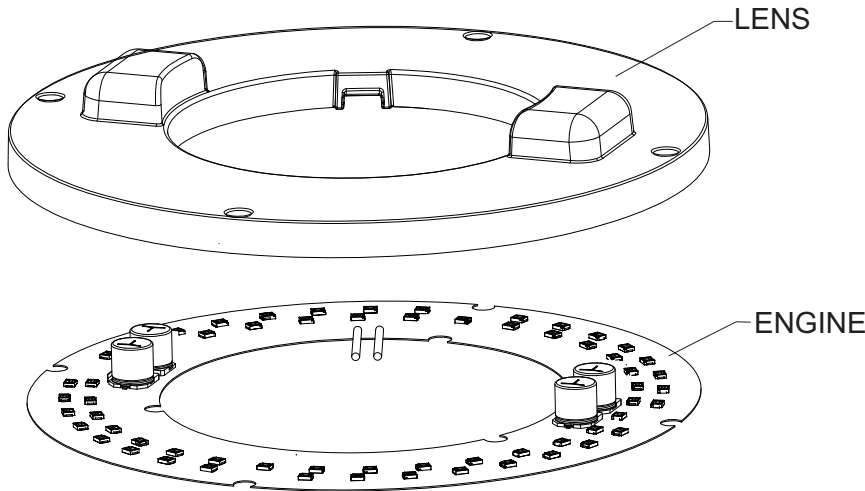
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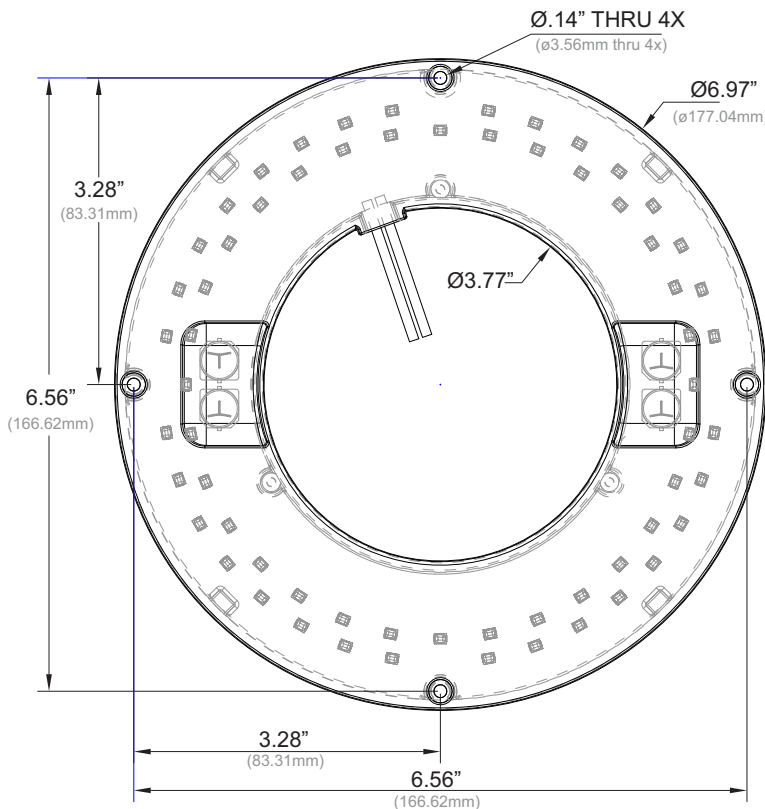
Mechanical Drawings

(Scale 13 : 20)

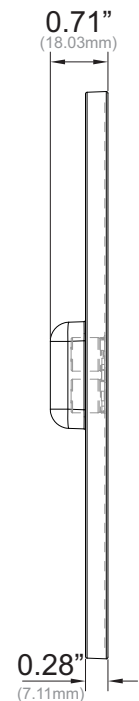


| Overall Dimensions | |
|--|---------------------|
| Diameter | 6.97" [177.04mm] |
| Height | 0.71" [18.03mm] |
| Wire Length AC Input (Black / White) | 12" [304.8mm] |

Exploded View



Top View



Side View



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Compatible Tested Dimmers

(Contact Fulham for other alternatives)

(TRIAC or ELV Dimmers)

| Manufacture | Model | Type |
|-------------|--------------|---|
| Core | SI061BR-PTA | TRIAC (Leading Edge) Incandescent Analog |
| Legrand | ADTP703TUM4 | Universal |
| Legrand | RH703PTC | TRIAC (Leading Edge) Incandescent Analog |
| Legrand | RH703PTUTC | TRIAC (Leading Edge) Incandescent Analog |
| Leviton | 002-6633-PLW | TRIAC (Leading Edge) Incandescent Analog |
| Leviton | DDE06-BLZ | ELV (Trailing Edge) |
| Leviton | IPL06-10Z | TRIAC (Leading Edge) |
| Leviton | R62-6674-P0W | CFL / LED |
| Leviton | R70-6631-1LW | TRIAC (Leading Edge) Incandescent Analog |
| Leviton | RDL06-10Z | TRIAC (Leading Edge) |
| Lutron | CT-600P | TRIAC (Leading Edge) |
| Lutron | DV-600P | TRIAC (Leading Edge) |
| Lutron | LG-600P | TRIAC (Leading Edge) |
| Lutron | NTLV-600 | TRIAC (Leading Edge) |
| Lutron | D-600R | TRIAC (Leading Edge) Incandescent Analog |
| Lutron | SELV-303P | ELV (Trailing Edge) |
| Lutron | S-600 | TRIAC (Leading Edge) |
| Lutron | S-603P | TRIAC (Leading Edge) Incandescent Analog |



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DirectAC Engine Equivalency Chart

| DirectAC Engine/Kit (23W) | | | | CFL | | | | | | |
|---------------------------|----------------|-----------------------|----------|-------------|--------------|------------|---------------|--------------|----------|---------|
| Engine/Kit Part Number | System Wattage | Lumen Output | Efficacy | CFL Style | Lamp Wattage | # of Lamps | Total Wattage | Lumen Output | Efficacy | |
| TJTUNV023AC8xxB | 23W | 2540 lm (4K/80CRI) | 110 lm/W | Quad | 13W | 3 | 39W | 2475 lm | 59 lm/W | |
| | | | | | 18W | 2 | 36W | 2150 lm | | |
| | | | | Triple | 13W | 3 | 39W | 2535 lm | 59 lm/W | |
| | | | | | 18W | 2 | 36W | 2040 lm | | |
| | | | | | 32W | 1 | 32W | 2040 lm | | 63 lm/W |
| | | | | | 42W | 1 | 42W | 2720 lm | | 64 lm/W |
| | | | | Circline T9 | 32W | 1 | 32W | 1500 lm | 46 lm/W | |
| | | | | | 40W | 1 | 40W | 1975 lm | | 49 lm/W |

NOTES:

- 1) For reference only, several factors apply.
- 2) Emergency systems are not UL classified for field installation.



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RoHS COMPLIANT

Flicker Test Data Summary

(Test performed by third party lab using, Lutron S-600P dimmer)

With Dimmer at 100%

| 100% Light Output Percent Amplitude Modulation | | | | | |
|--|-------|--------------------------------------|-----------------|--------|---------|
| No Filter | 40 Hz | 90 Hz | 200 Hz | 400 Hz | 1000 Hz |
| 24.65% | 0.29% | 1.78% | 23.07% | 23.76% | 23.92% |
| Measurement Period: 2.000 sec | | | Noise: 20.4 dBA | | |
| Recording Interval: 4.00E-05 | | Fraction of rated light output: 100% | | | |
| Flicker Index: 0.0706 | | | | | |

With Dimmer at 20%

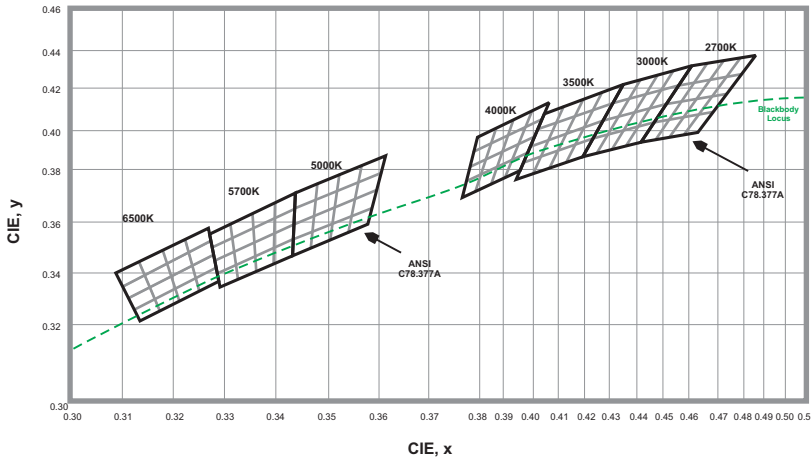
| 20% Light Output Percent Amplitude Modulation | | | | | |
|---|-------|-------------------------------------|-----------------|--------|---------|
| No Filter | 40 Hz | 90 Hz | 200 Hz | 400 Hz | 1000 Hz |
| 24.17% | 0.92% | 2.65% | 17.35% | 21.53% | 23.08% |
| Measurement Period: 2.000 sec | | | Noise: 19.9 dBA | | |
| Recording Interval: 4.00E-05 sec | | Fraction of rated light output: 19% | | | |
| Flicker Index: 0.0571 | | | | | |

With Dimmer at Minimum Light Output

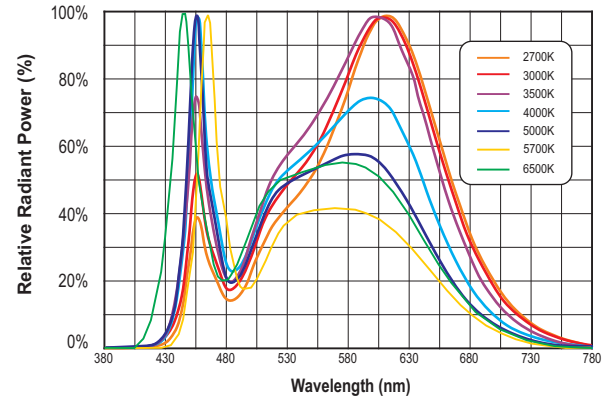
| Minimum Light Output Percent Amplitude Modulation | | | | | |
|---|-------|------------------------------------|-----------------|--------|---------|
| No Filter | 40 Hz | 90 Hz | 200 Hz | 400 Hz | 1000 Hz |
| 20.18% | 0.80% | 1.65% | 13.20% | 16.88% | 17.58% |
| Measurement Period: 2.000 sec | | | Noise: 20.5 dBA | | |
| Recording Interval: 4.00E-05 sec | | Fraction of rated light output: 9% | | | |
| Flicker Index: 0.0411 | | | | | |



Color and Binning



Optical Spectrum



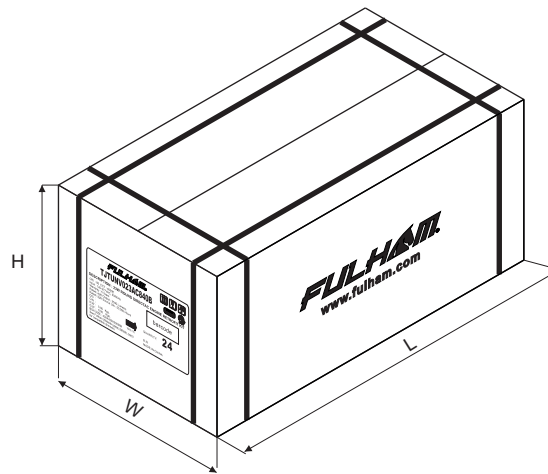
NOTES:

- 1) The Color and Binning and Optical Spectrum charts are for reference only. For more detailed info, contact factory.
- 2) Reference Samsung 2835 LM283B Series. Binning per ANSI C78.377-2015 @ 25°C; 3 SDCM.
- 3) The Optical Spectrum values vary depending on product type and color rank.



Packaging

Master Carton



Twenty-Four (24) Individual DirectAC LED Engine bags inside each Master Carton.

| OUTER DIMENSION | | |
|------------------------|------------------------|--------------|
| L | W | H |
| 16.92"(430mm) | 16.92"(430mm) | 8.07"(205mm) |
| Net Weight | Gross Weight | QUANTITY |
| 11.02 lbs. (5.00kg) | 13.22 lbs. (6.00kg) | 24pcs. |



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Guidelines

Reduced Flicker Operation Feature

- DirectAC Engine models have added circuitry to help reduce the Flicker when operated on the 50/60Hz power lines. The Flicker percentage on these models is below 30% when operated at line voltage, per CEC requirement. Dimming by line voltage devices may increase the Flicker percentage as the power levels are reduced.

Hi-Pot Testing (Caution)

- All DirectAC Engine models are Hi-Pot tested on the Fulham production line. We advise NOT to apply AC Hi-voltage Dielectric test to LED products as this may damage the sensitive electronic components as well as the LEDs. Please inspect the connection wires for any nicks or cuts in the insulation during and after installation.

Termination Notes

- A luminaire disconnect UL listed connector is included, as part of Fulham's retrofit kit only, to meet Energy Star requirements.
- Use solid wire size 18AWG/12" per pole, rated at max 600V load and 105°C operating temperature.
- Strip wires to 11-13mm (0.47in.).
- Connector not for multiple use.
- For additional information on Wago's 873 Series Lumi-Nuts® connector, please visit: http://www.wago.com/infomaterial/wago_ebook/51261593/flipviewerxpress.html



Environmental Rating

- DirectAC Engines are rated for dry and damp locations.

IC Over Temperature Control

- DirectAC Engine models have built in Thermal management, if the unit experiences higher than normal ambient temperatures the circuit by design will reduce the drive current to the LED there by reducing the thermal impact on the LED's.

Fastening to Luminaire

- When installing by "mounting thru holes" (recommended), use any screw with diameter less than 0.13in. [3.4mm]. Mount on a flat surface and use all 4 mounting holes to ensure good contact between back side of Engine and mounting surface. Refer to max specified torque for installation. Suggested screw sizes: #5 or M3 Pan/Flat Head screw. Fulham provides four 6-20 X 5/8" Flat Head Self Drilling Screws, see instruction sheets for further details.

Electrostatic Sensitive Product (ESD)

- Fulham LED products should be handled with proper measures to protect against any potential ESD damage.
- When servicing, personnel should be ground and direct contact with LED should be avoided.

Thermal Management

- Proper thermal management should be employed to ensure life and reliability of product.

Wiring

- Intended for 120~277V application ONLY.
- Connect the Black wire from the DirectAC Engine to the building Line by using the proper connectors or wire nuts.
- Connect the White wire from the DirectAC Engine to the building/source Neutral by using the proper connectors or wire nuts.
- DirectAC Engine does not need grounding, but the luminaire must be grounded.
- Intended to be wired on dedicated lighting branch circuit.
- Do not wire on same branch circuit as motors, heating elements, inductive type loads or heavy machinery which may introduce spikes, noise and other abnormalities onto the Line. Doing so may result in damage to the unit or abnormal lighting conditions.