



# TJTUNV023ACxxxB



## 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 2.0 Listed (for rebate programs) <sup>①</sup>
- Energy Star Luminaire CSD <sup>①</sup>

### General Specifications

Input Voltage / Frequency <sup>②</sup>	120~277VAC (+/- 10%) / 50-60Hertz		
Input Current <sup>②</sup>	~0.192A @120V	~0.100A @230V	~0.083A @277V
Input Power <sup>②</sup>	23W (+/- 1W)		
Input PF	>0.98		
THD	<20%		
Operating Frequency	120Hz		
Max Lumen Output @ Full Power <sup>②</sup>	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= >18,000 hours		
Color Consistency	Binning per ANSI C78.377-2015 @25°C; 3 SDCM		
Overall Size	6.97" diameter x 0.71" 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 2.0 Listed <sup>①</sup> Energy Star Luminaire CSD <sup>①</sup>		
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%		
PCB Material	MCPCB		
Warranty	5 years @ Max. Tc from the date of manufacture		
Electrolytic Capacitor Rating	>60,000 hours		

<sup>①</sup> See page #4 "Certification Chart" for exact models.

<sup>②</sup> 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	1970 lumens	86 lm/W	2280 lumens	99 lm/W
3000K	TJTUNV023ACx30B	23W	2065 lumens	90 lm/W	2400 lumens	104 lm/W
3500K	TJTUNV023ACx35B	23W	2065 lumens	90 lm/W	2400 lumens	104 lm/W
4000K	TJTUNV023ACx40B	23W	2185 lumens	95 lm/W	2540 lumens	110 lm/W
5000K	TJTUNV023ACx50B	23W	2185 lumens	95 lm/W	2540 lumens	110 lm/W

## Luminous Flux De-Rating: CCT and CRI Multipliers

CCT \ CRI	2700K	3000K	3500K	4000K	5000K
80(R9>0)	0.90	0.94	0.94	1.00	1.00
90(R9>50)	0.78	0.81	0.81	0.86	0.86

### 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.



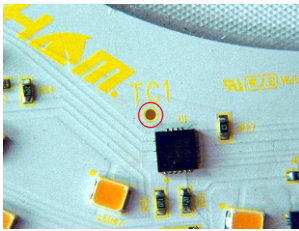
# TJTUNV023ACxxxB



## Thermal Specifications

### DirectAC Engine Retrofit Kit (B)

Storage Temperature Range	-35°C(-31°F) to 100°C(212°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	1.000
35°C	0.991
40°C	0.972
45°C	0.963
50°C	0.953
55°C	0.944
60°C	0.935
65°C	0.925
70°C	0.916
75°C	0.897
80°C	0.888
85°C	0.879
90°C	0.869
95°C	0.850
100°C	0.841

### 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.

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



## TJTUNV023ACxxxB



### Certification Chart

Model	TJTUNV023ACxxxB
<b>Classification</b>	
	YES
	TJTUNV023ACxxxA
	TJTUNV023ACxxxB
	YES (80/90CRI)
	YES (80/90CRI)

### Energy Star<sup>™</sup> TM-21 Calculator Data

Tc Module	Reported L70	Reported L90
50°C	>54,000 Hrs	>18,000 Hrs
80°C	>54,000 Hrs	>18,000 Hrs
100°C	>54,000 Hrs	18,000 Hrs
Tc Module	Calculated L70	Calculated L90
50°C	>62,000 Hrs	>18,000 Hrs
80°C	>62,000 Hrs	>18,000 Hrs
100°C	62,000 Hrs	18,000 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 LAMPS IN THIS LUMINAIRE.

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.



Installation Instructions

### NOTES:

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

1) Energy Star CSD:

[https://www.energystar.gov/products/lighting\\_fans/certified\\_lighting\\_subcomponent\\_database\\_csd](https://www.energystar.gov/products/lighting_fans/certified_lighting_subcomponent_database_csd)

2) 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](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)

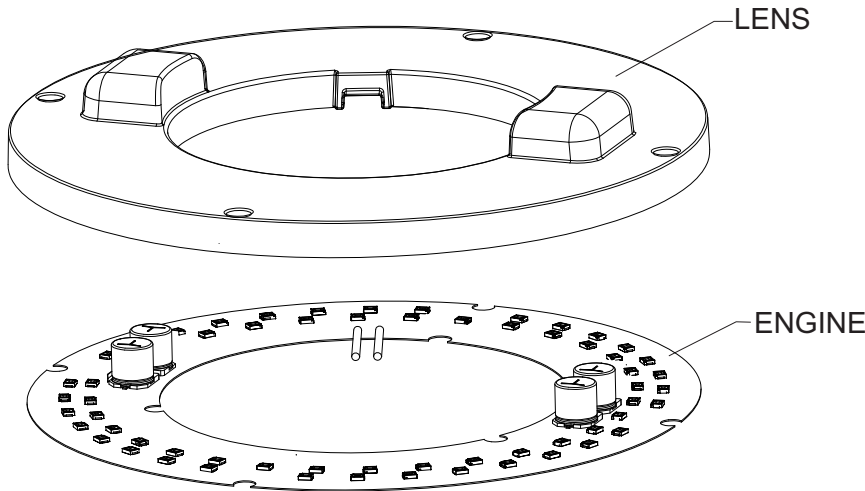


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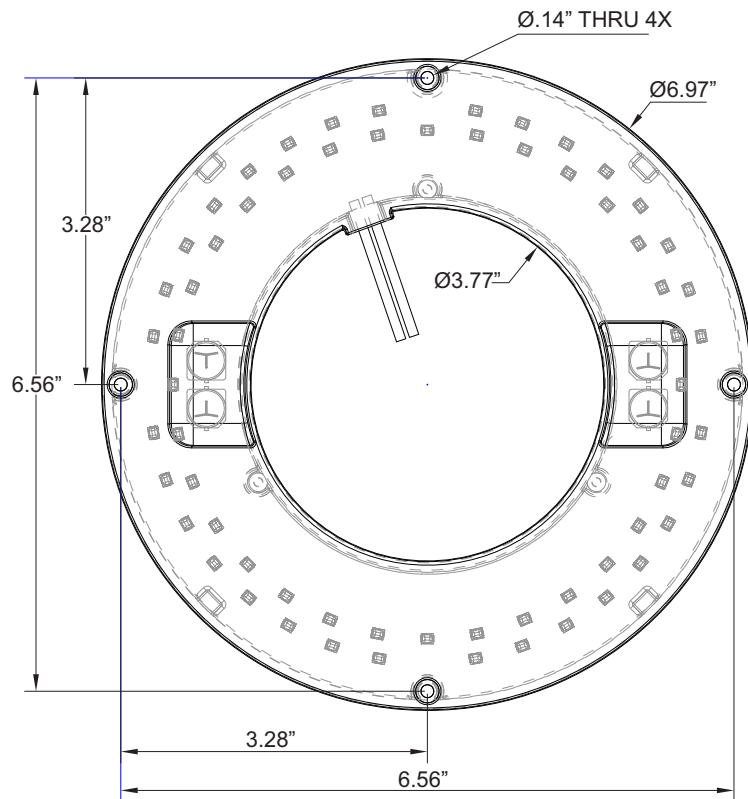
**Mechanical Drawings**

(Scale 13 : 20)

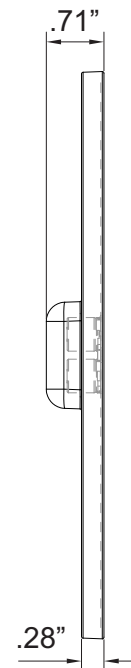


Overall Dimensions	
Diameter	6.97" [177.04mm]
Height	0.71" [18.03mm]
Wire Length AC Input (Black / White)	12" [304.8mm]

**Exploded View**



**Top View**



**Side View**



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## 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](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

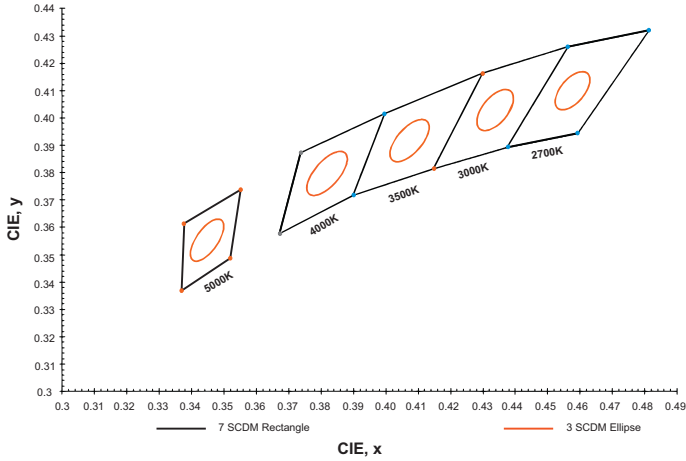
- Intended for 120~277V application ONLY.
- Connect the Black wire from the DirectAC Engine to the building Line by using the proper connectors or wire nuts.
- Connect the White wire from the DirectAC Engine to the building/source Neutral by using the proper connectors or wire nuts.
- DirectAC Engine does not need grounding, but the luminaire must be grounded.



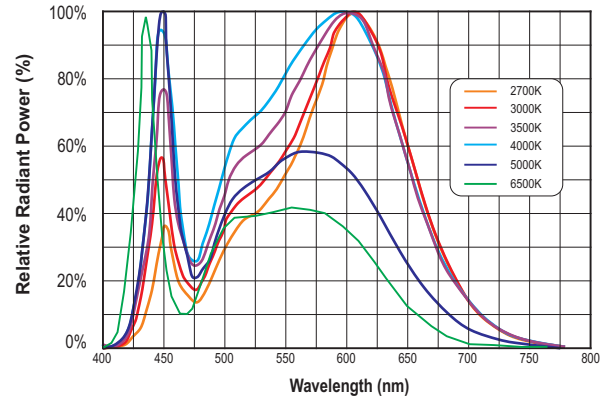
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Color and Binning



Optical Spectrum



NOTES:

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



# TJTUNV023ACxxxB



## 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.



**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					

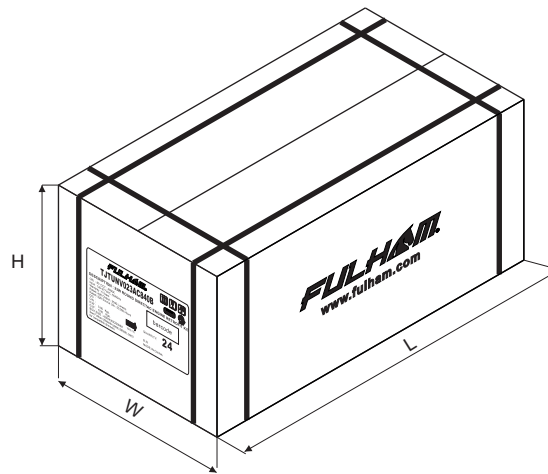


TJTUNV023ACxxxB



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.