

VJTUNV023AC9TWB



7" Round VividHorse 120/230/277VAC Power & CCT Selectable AC Engine Retrofit Kit

- 120/230/277V input AC Engine Retrofit Kit
- Power Selectable: 18W/20W/23W (Factory Default 23W)
- CCT Selectable: 2700K, 3000K(Default), 3500K, 4000K, 5000K
- CRI90 standard
- Potassium Fluorosilicate (PFS) phosphor LEDs to achieve as high efficacy as today's CRI80 LEDs
- 5VA flame rated lens included
- cULus Classified Retrofit Kit per UL1598C standard
- Compatible with Fulham emergency solutions
- Suitable for closed type luminaires
- Suitable for luminaires with plastic and glass lenses

General Specifications

Input Voltage / Frequency ^①	120/230/277VAC, 50/60Hz
Input Current ^①	120VAC: ~0.158A / 0.176A / 0.202A 230VAC: ~0.065A / 0.074A / 0.083A 277VAC: ~0.069A / 0.077A / 0.088A
Input Power ^①	120VAC: 18W / 20W / 23W Selectable 230VAC: 14W / 16W / 18W Selectable 277VAC: 18W / 20W / 23W Selectable
Input PF	>0.9
THD	<45%
Max Lumen Output @ 4000K/90CRI	120VAC: 1890lm / 2070lm / 2350lm 230VAC: 1470lm / 1660lm / 1900lm 277VAC: 1760lm / 1920lm / 2140lm
Dimming Type/Range	Leading Edge (TRIAC) or Trailing Edge (ELV) @120VAC only / 100% ~ 10% ^②
Beam Angle	120° with lens
Color Rendering Index	CRI (Ra)>=90 / R9>=50 / TM-30 R_g>=85 / TM-30 R_f>=95
Storage Temperature Range	-35°C to 100°C / -31°F to 212°F
Operating Ambient Temperature Range (Ta)	-35°C to 50°C / -31°F to 122°F
Maximum Module Case Temperature	85°C(185°F)
Estimated Lumen Maintenance	L70= >72,000 hours @ Tc max 85°C / L90= 37,000 hours @ Tc max 85°C
Color Consistency (Color Center@25°C)	2700K (0.458, 0.410); 3000K (0.431, 0.397); 3500K (0.405, 0.384) 4000K (0.380, 0.372); 5000K (0.345, 0.335), Typ. 5 SDCM, Max. 6 SDCM
Flicker Percentage per CEC JA10	<30% with 200Hz cut-off
Flicker P_{st} / SVM	P_{st} =0.628 SVM: =0.462
Start-up Time	Typ. 30ms
Overall Size with optical lens	6.97"Dia. x 0.84"H (177mm Dia. x 21.4mm H)
Wire Type / Length	18AWG / 12" Black & White wires
LED Quantity	42pcs. CW + 42pcs. WW
Weight	208g / 0.46lbs.
Packaging: Master Carton	24pcs
Maximum Screw Installation Torque	35in-lb (560in-ozf)
Safety	DirectAC Module (without lens): cURus File # E351548, VATUNV023AC9TWB DirectAC Retrofit Kits: cULus Classified File # E365124, VJTUNV023AC9TWB
Compliance	RoHS Compliant Dry and Damp Location
RFI/EMI	FCC Part15 Class B, EN55015
Input Surge Test	1KV / 2KV combined wave; 2.5KV ring wave
Sound Rating / Noise	A / <24 dBA
Protective Lens / Enclosure	High Voltage Barrier / 3mm clear Polycarbonate 5VA flame rated
Lens Transmittance	>92%
PCB Material	MCPCB
Warranty	5 years @ Max. Tc 85°C (185°F) from the date of manufacture

① Measured electrical data per UL file

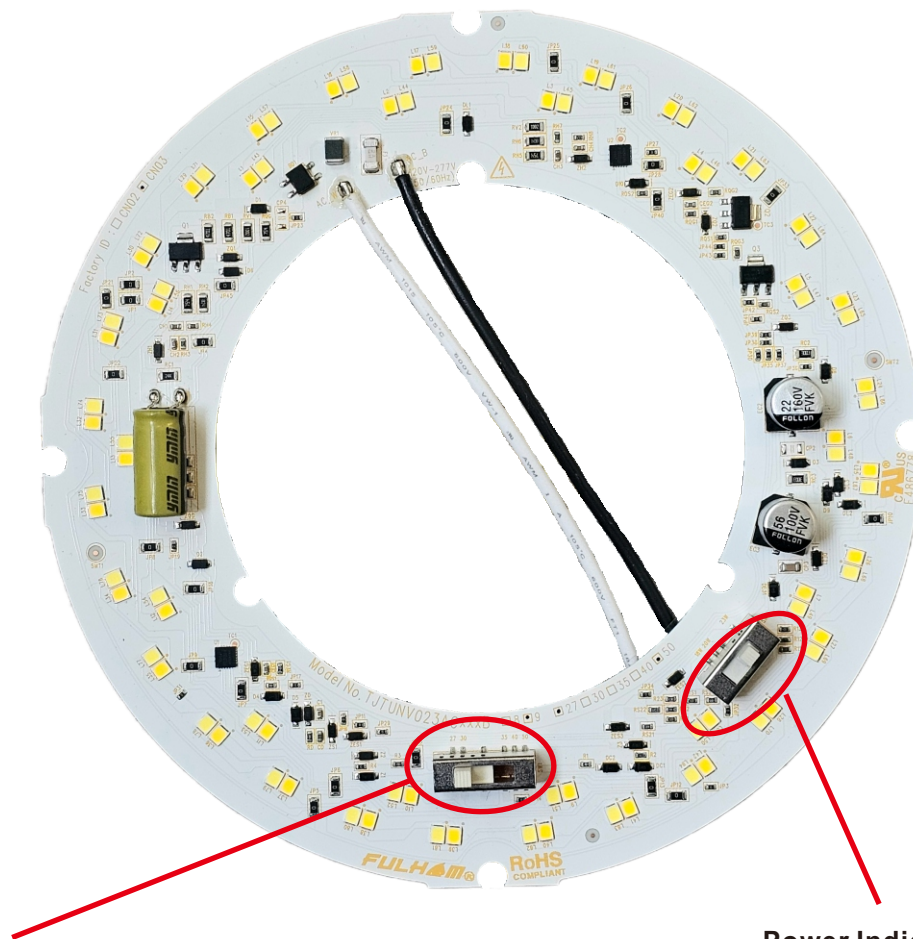
② With some phase cut dimmers, the engine will be dimmed to off



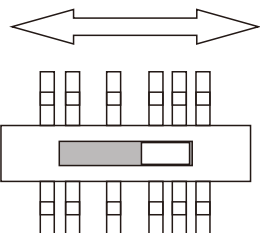
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Power & CCT Selection Indication

1. The VividHorse DirectAC Engine Retrofit Kit is a dual-channel LED product that allows for Power & CCT selection via dip switches on the PCB. Available CCTs include 2700K, 3000K, 3500K, 4000K and 5000K.
2. A pre-set Power & CCT will come from the factory. Check the product label or packaging to see the pre-set level.
3. Change the Power dip switch for desired power level.
4. Change the CCT dip switch for desired CCT level.



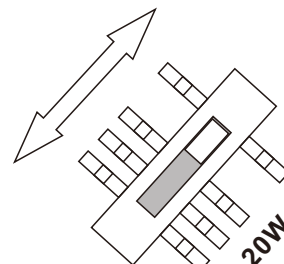
CCT Indication



2700K 3000K 3500K 4000K 5000K

Factory Default: 3000K

Power Indication



18W 20W 23W(Factory Default)



VJTUNV023AC9TWB

Electrical and Optical Specifications

CRI	DirectAC Retrofit Kit Part Number	Input Voltage	Selected Power	Selected CCT	Nominal Luminous Flux @ 90 CRI	Engine Efficacy @ 90 CRI
90	VJTUNV023AC9TWB	120VAC	18W	2700K	1680 lumens	95 lm/W
				3000K	1790 lumens	101 lm/W
				3500K	1830 lumens	103 lm/W
				4000K	1890 lumens	107 lm/W
				5000K	1780 lumens	101 lm/W
			20W	2700K	1880 lumens	94 lm/W
				3000K	1960 lumens	98 lm/W
				3500K	2070 lumens	104 lm/W
				4000K	2070 lumens	104 lm/W
				5000K	1980 lumens	99 lm/W
			23W	2700K	2100 lumens	93 lm/W
				3000K	2250 lumens	100 lm/W
				3500K	2420 lumens	107 lm/W
				4000K	2350 lumens	104 lm/W
				5000K	2230 lumens	99 lm/W
		230VAC	14W	2700K	1370 lumens	96 lm/W
				3000K	1420 lumens	99 lm/W
				3500K	1470 lumens	104 lm/W
				4000K	1470 lumens	104 lm/W
				5000K	1440 lumens	101 lm/W
			16W	2700K	1540 lumens	95 lm/W
				3000K	1590 lumens	99 lm/W
				3500K	1650 lumens	102 lm/W
				4000K	1660 lumens	102 lm/W
				5000K	1610 lumens	100 lm/W
			18W	2700K	1750 lumens	94 lm/W
				3000K	1810 lumens	98 lm/W
				3500K	1890 lumens	102 lm/W
				4000K	1900 lumens	102 lm/W
				5000K	1840 lumens	99 lm/W

NOTES:

- 1) Nominal luminous flux includes a 8% loss due to lens. Use a 1.08 multiplier when lens is removed.
- 2) Electrical and optical specifications are based on Tc mod = 25°C. Reference Amb. Temp. vs Rel. Lum. Flux for other temperatures.
- 3) Performance for these components have been tested in accordance with UL8750
- 4) Specifications are subject to change without notice.
- 5) 70CRI & 80CRI are NOT available.



VJTUNV023AC9TWB

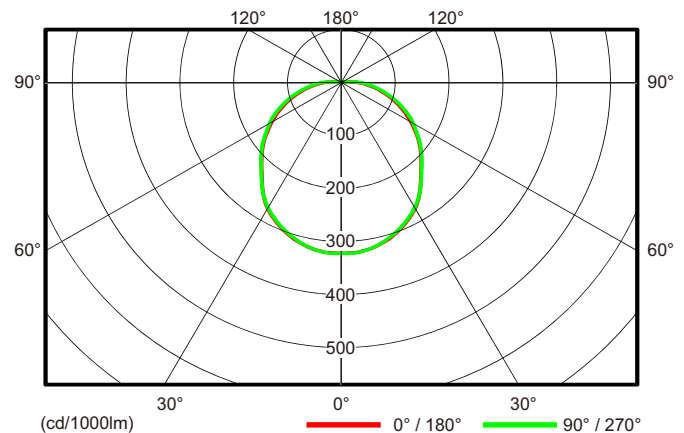


Electrical and Optical Specifications

CRI	DirectAC Retrofit Kit Part Number	Input Voltage	Selected Power	Selected CCT	Nominal Luminous Flux @ 90 CRI	Engine Efficacy @ 90 CRI
90	VJTUNV023AC9TWB	277VAC	18W	2700K	1630 lumens	94 lm/W
				3000K	1680 lumens	97 lm/W
				3500K	1750 lumens	101 lm/W
				4000K	1760 lumens	102 lm/W
				5000K	1710 lumens	99 lm/W
			20W	2700K	1790 lumens	93 lm/W
				3000K	1840 lumens	95 lm/W
				3500K	1910 lumens	99 lm/W
				4000K	1920 lumens	99 lm/W
				5000K	1880 lumens	97 lm/W
			23W	2700K	1970 lumens	90 lm/W
				3000K	2070 lumens	95 lm/W
				3500K	2140 lumens	98 lm/W
				4000K	2140 lumens	98 lm/W
				5000K	2070 lumens	95 lm/W

Light Distribution

Zone	Zone Flux%	Sum Zone Flux%
0 ~ 10	3.1%	3.1%
10 ~ 20	8.7%	11.8%
20 ~ 30	13.2%	25.0%
30 ~ 40	15.7%	40.8%
40 ~ 50	16.1%	56.8%
50 ~ 60	15.1%	72.0%
60 ~ 70	12.7%	84.6%
70 ~ 80	8.8%	93.5%
80 ~ 90	5.0%	98.4%
90 ~ 180	1.6%	100.0%



NOTES:

- 1) Nominal luminous flux includes a 8% loss due to lens. Use a 1.08 multiplier when lens is removed.
- 2) Electrical and optical specifications are based on Tc mod = 25°C. Reference Amb. Temp. vs Rel. Lum. Flux for other temperatures.
- 3) Performance for these components have been tested in accordance with UL8750
- 4) Specifications are subject to change without notice.
- 5) 70CRI & 80CRI are NOT available.

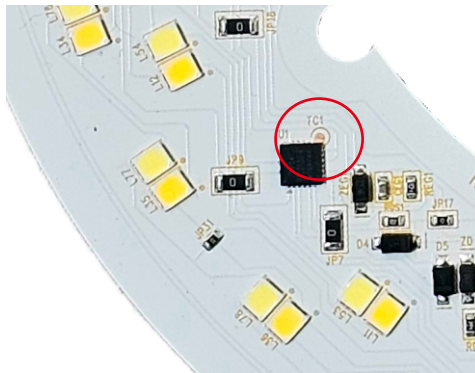


VJTUNV023AC9TWB

Thermal Specifications

② DirectAC Engine Retrofit Kit

Storage Temperature Range	-35°C to 100°C / -31°F to 212°F
Operating Ambient Temperature Range	-35°C to 50°C / -31°F to 122°F
Maximum Module Case Temperature	85°C / 185°F



Tc located on module

Thermal De-Rating: Tc vs. Luminous Flux

Module Case Temperature (Tc)	Total Vf Multiplier	Luminous Flux Multiplier
25°C	1.000	1.000
30°C	0.998	0.992
35°C	0.995	0.984
40°C	0.993	0.976
45°C	0.990	0.967
50°C	0.988	0.958
55°C	0.986	0.949
60°C	0.984	0.940
65°C	0.982	0.931
70°C	0.980	0.922
75°C	0.978	0.913
80°C	0.977	0.904
85°C	0.976	0.895
90°C	0.974	0.886
95°C	0.973	0.877
100°C	0.971	0.867
105°C	0.969	0.858

NOTES:

- 1) Refer to DirectAC Engine Retrofit Kit Installation Instructions for further detail.
 - 2) This AC Engine Retrofit 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 AC Engine Retrofit Kit can be used with luminaires similar to the one illustrated on the Installation Instructions.
- ② Suitable for surface mounted luminaire with minimum dimensions or volume: 10" diameter with a height of 3.5" or 275 cubic inches.
All target luminaires shall conclude a metal back plate at size diameter 10" or larger with grounding means.



VJTUNV023AC9TWB



Certification Chart

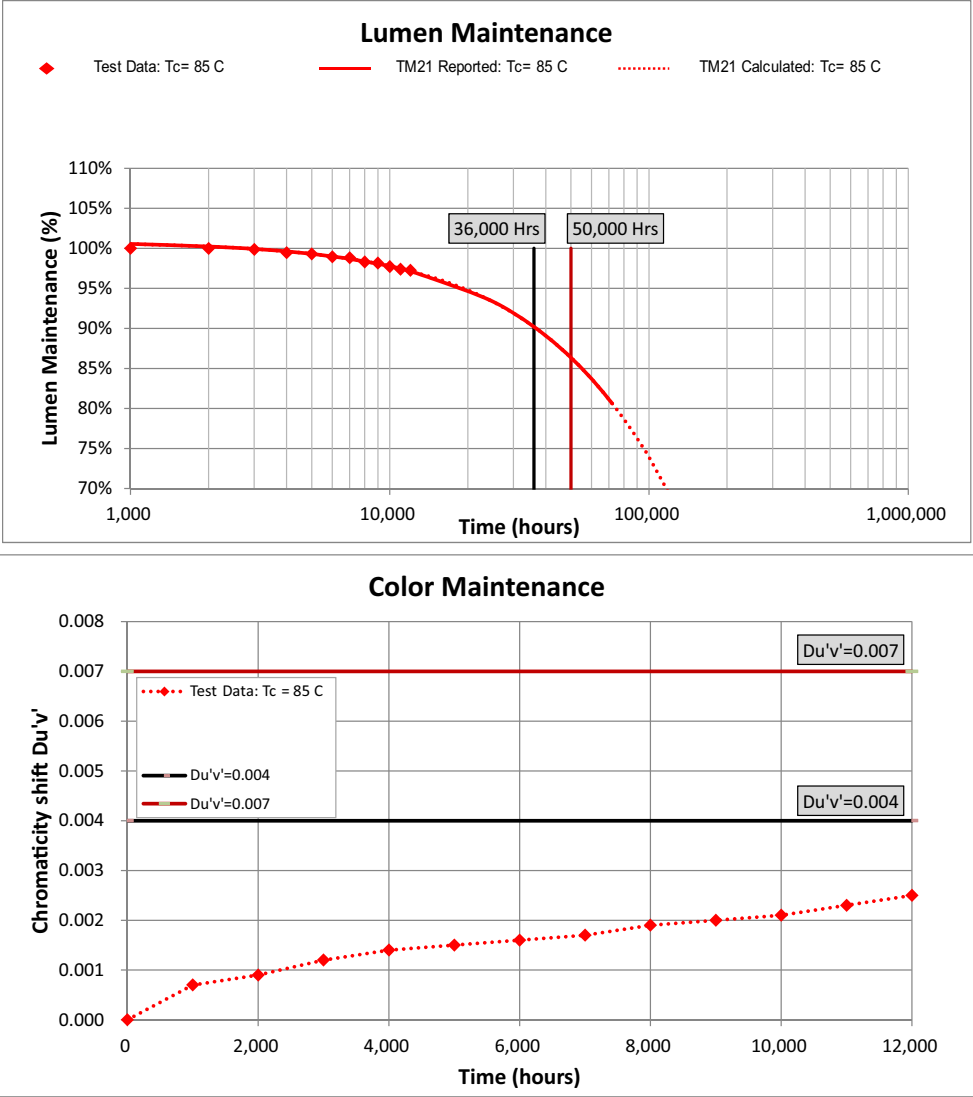
Energy Star™ TM-21 Calculator Data

Classification	Model	VJTUNV023AC9TWB
RoHS COMPLIANT		YES
UL US		YES
CLASSIFIED		YES

Tc Module	Reported L70	Reported L90
85°C	>72,000 Hrs	37,000 Hrs

Tc Module	Calculated L70	Calculated L90
85°C	117,000 Hrs	37,000 Hrs

LED Lumen & Color Maintenance Data per LM-80 report and TM-21 Calculator





VJTUNV023AC9TWB

Compatible Tested Dimmers (TRIAC or ELV Dimmers)

(Contact Fulham for other alternatives)

(TRIAC or ELV Dimmers)

Manufacture	Model	Type	Manufacture	Model	Type
Lutron	S-600	TRIAC (Leading Edge)	Eaton	SUT7	TRIAC (Leading Edge)
Lutron	S-603P	TRIAC (Leading Edge)			

NOTES:

- 1) The dimming compatibility is tested under 100%-10% dimming range.
- 2) A low-end trim adjustment on the dimmer is recommended to avoid flickering at low end dimming range.
- 3) Contact Fulham for other alternative dimmers.

Flicker Test Results per EnergyStar (NEMA77-2017 Test Methods)

Test Condition	Input Voltage(V)	Power(W)	Pst	SVM	Flicker% (200Hz cut-off)
120VAC No Dimmer	120	23	0.628	0.462	15%

Note: Flicker Percent Amplitude Modulation is no longer required by EnergyStar.
The test data per CEC JA10-2016 are from Fulham internal lab.

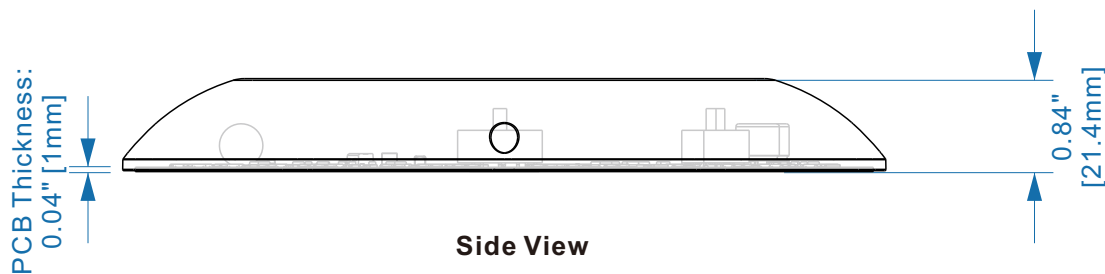
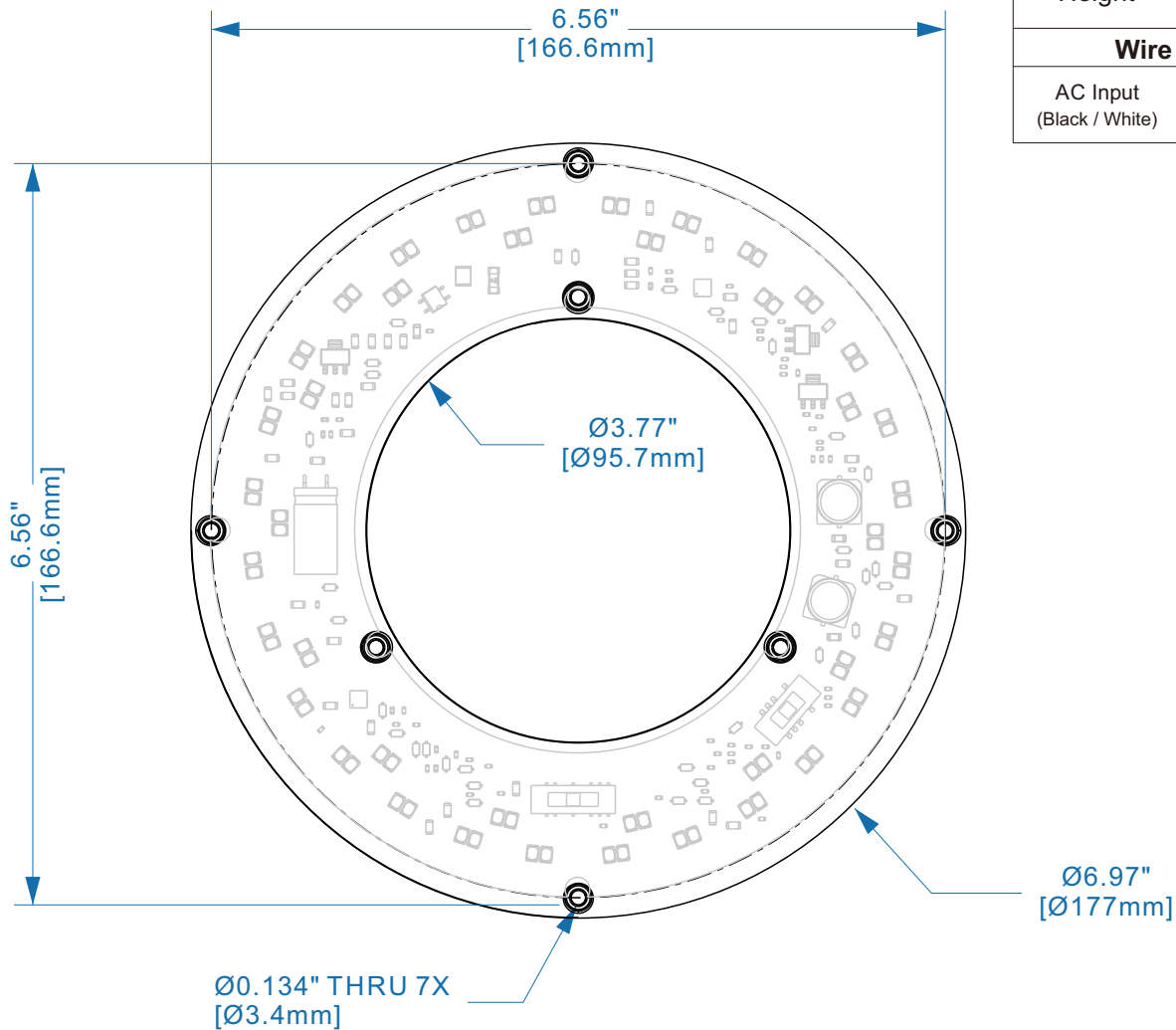


VJTUNV023AC9TWB

Mechanical Drawings

Φ6.97" [177mm]

Overall Dimensions with 5VA Lens	
Diameter	6.97" [177.0mm]
Height	0.84" [21.4mm]
Wire Length	
AC Input (Black / White)	12" [304.8mm]





VJTUNV023AC9TWB

DirectAC Engine Retrofit Kit Equivalency Chart: FLUO to LED

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
VJTUNV023AC9TWB	23W	2159 lm (4K/90CRI)	94 lm/W	Quad	13W	3	39W	2475 lm	59 lm/W
					18W	2	36W	2150 lm	59 lm/W
				Triple	13W	3	39W	2535 lm	59 lm/W
					18W	2	36W	2040 lm	56 lm/W
					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

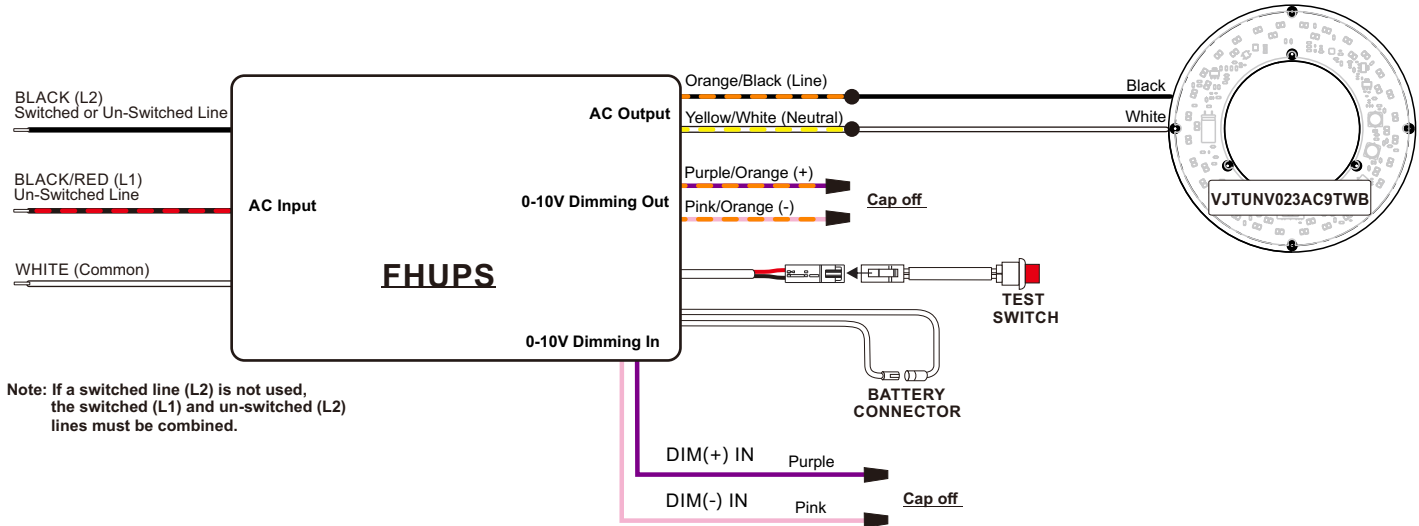
NOTES:

- 1) LED is a point source and FLUO is 360, there is more light lost with FLUO especially during the reflection. Therefore it is recommended to use a 65 percent of the original light source total lumens when converting FLUO to LED. For example original FLUO lumens of 2000 x .65% = 1300 LED lumens. This is only a recommendation, and the installer should consider other factors for the application.
- 2) For reference only, several factors apply.

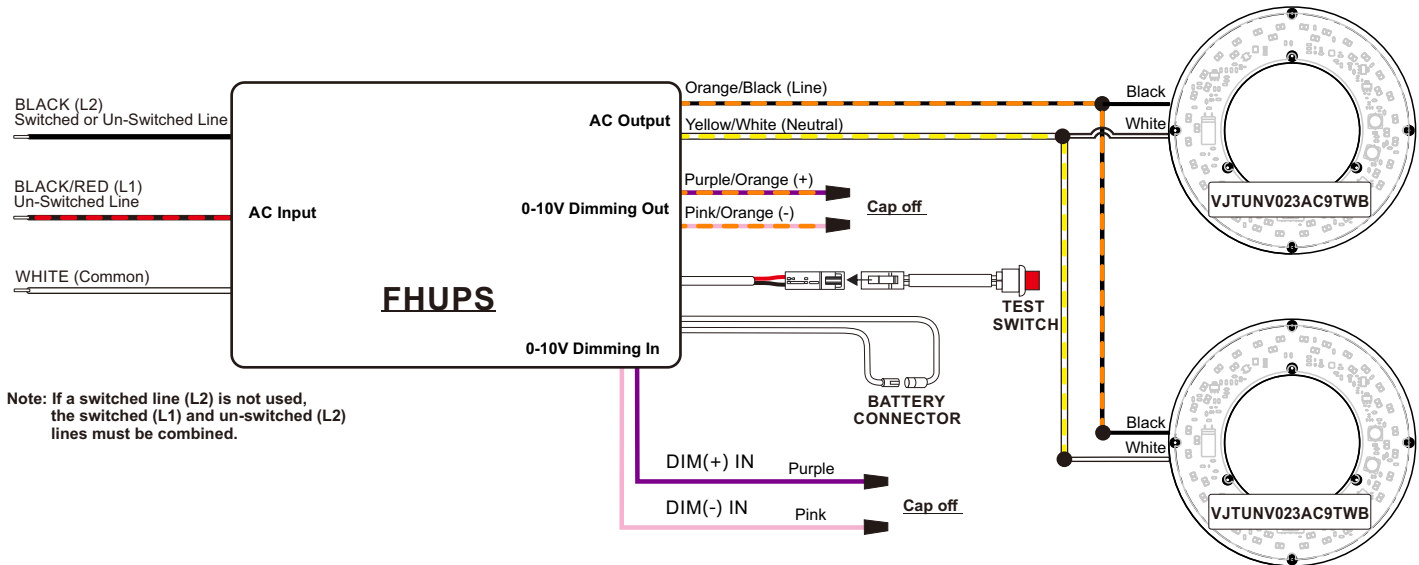


Wiring Diagram with Fulham Emergency Micro Inverter: FHUPS1-UNV-12L/25L/50L-SD

Single Luminaire



Multiple Luminaires



Max. Qty.	VJTUNV023AC9TWB		
	Select to 18W	Select to 20W	Select to 23W
Inverter PN#			
FHUPS1-UNV-12L-SD	1 pcs	1 pcs	1 pcs
FHUPS1-UNV-25L-SD	1 pcs	1 pcs	1 pcs
FHUPS1-UNV-50L-SD	2 pcs	2 pcs	2 pcs

1) For reference only, several factors apply.

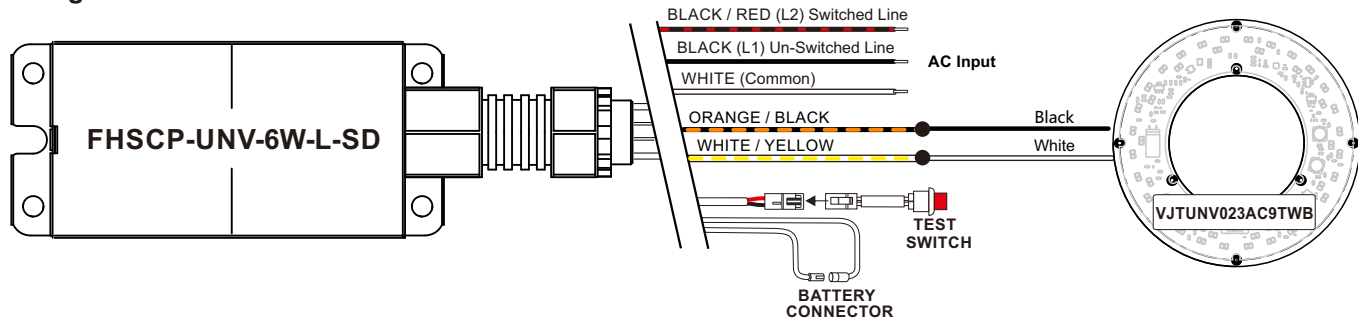
2) Emergency systems are not UL classified for field installation.



VJTUNV023AC9TWB

Wiring Diagram with Fulham Emergency Driver: FHSCP-UNV-6W-L-SD

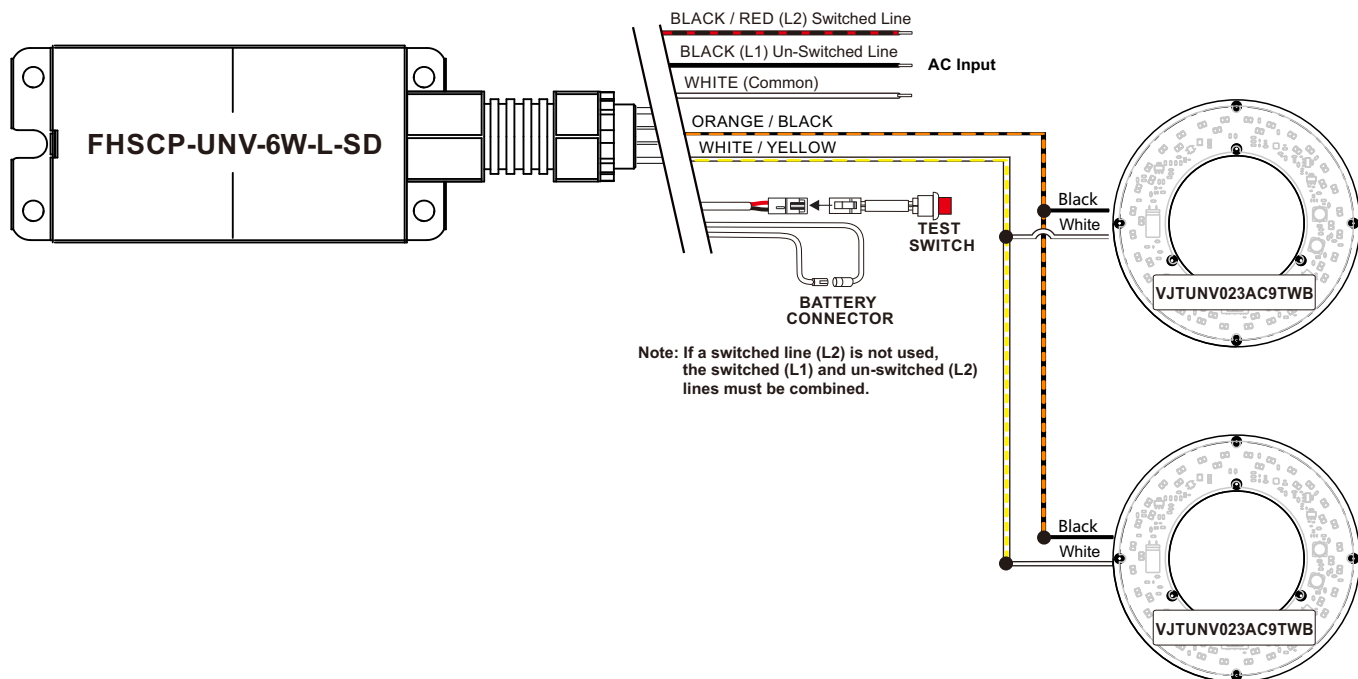
Single Luminaire



Note: If a switched line (L2) is not used, the switched (L1) and un-switched (L2) lines must be combined.

Multiple Luminaires

FHSCP-UNV-6W-L-SD can connect up to one(1x) VJTUNV023AC9TWB engines.



Note: If a switched line (L2) is not used, the switched (L1) and un-switched (L2) lines must be combined.

NOTES:

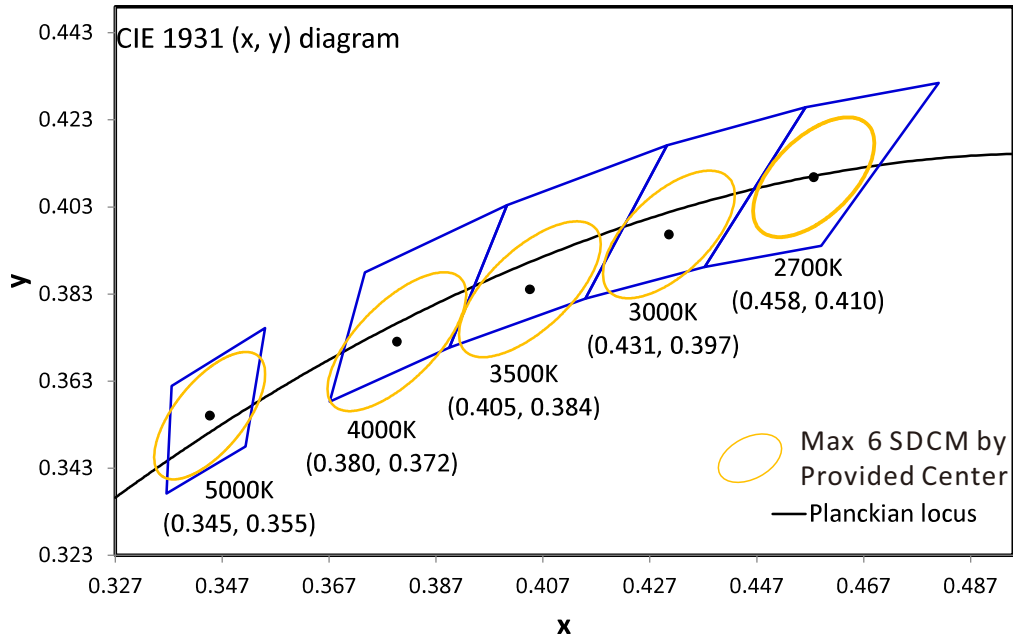
- 1) For reference only, several factors apply.
- 2) Emergency systems are not UL classified for field installation.



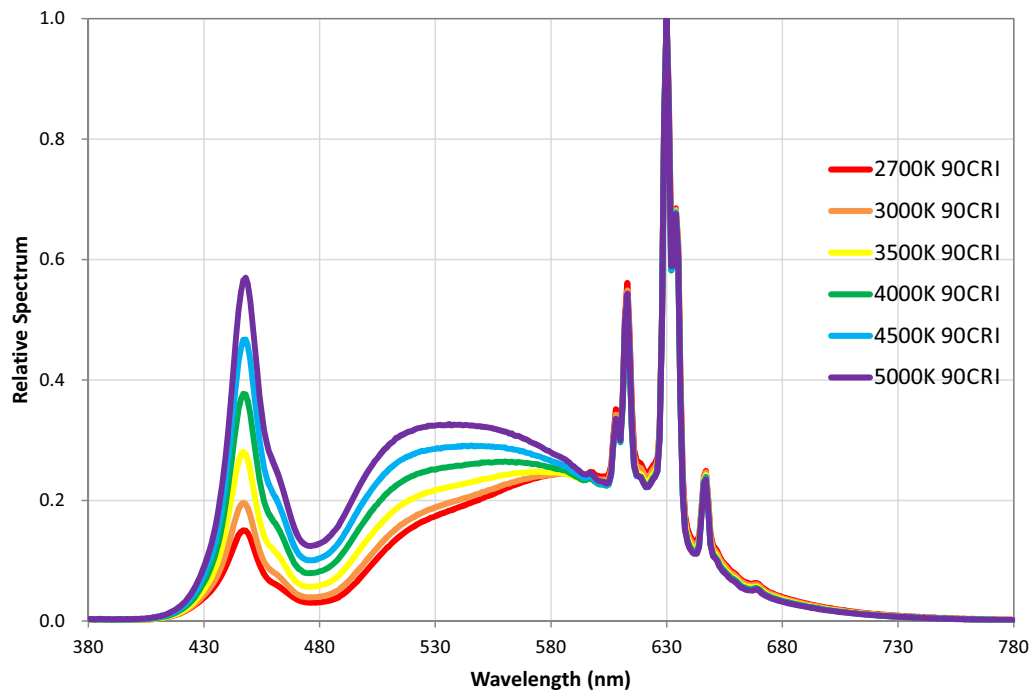
VJTUNV023AC9TWB



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 Chromaticity Diagram for Color and Binning. Binning per given center point@ 25°C; Max. 6 SDCM.
- 3) The Optical Spectrum values vary depending on product type and color rank.

VJTUNV023AC9TWB

Guidelines

Reduced Flicker Operation Feature

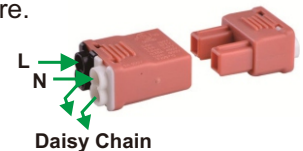
- DirectAC Engine models have added circuitry to help reduce the Flicker when operated on the 50/60Hz power lines. The Flicker percentage on these models is below 30% when operated at line voltage, per CEC requirement.
- Dimming by line voltage devices may increase the Flicker Percentage as the power 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.
- Use solid wire size 18-12 AWG per pole, rated at min. 300V load and 105°C operating temperature.
- Strip wires to 10mm (0.39in.).
- Connector not for multiple use.
- Connector Max. rating (including daisy-chain connection): 3.0A@120VAC; 1.3A@277VAC



Environmental Rating

- DirectAC Engine Retrofit Kits 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 temperature, the circuit will reduce the drive current to the LED there by reducing the thermal impact on the product.

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 mounting holes to ensure good contact between back side of DirectAC Engine Retrofit Kit and mounting surface.
- Refer to max specified torque for installation. Suggested screw sizes: #6 or M3 Pan Head screw. Fulham provides three 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 120V/230V/277VAC (+/-10%) application ONLY.
- Connect the Black wire from the DirectAC Engine Retrofit Kit to the building Line by using the proper connectors or wire nuts.
- Connect the White wire from the DirectAC Engine Retrofit Kit 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.
- Do not wire on same branch circuit as motors, 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.



VJTUNV023AC9TWB

Part Number Matrix

V J T UNV 023 AC 9 TW B

Product Line
V = VividHorse

Compliance
①J= DirectAC
Retrofit Kit
(cULus Classified)

Dimming
T = TRIAC

Input Voltage
UNV = 120/230/277VAC

Estimated Power
023 = 23W
(23/20/18W Selectable)
Factory Default 23W

Shape
AC= Circular

CRI
⑨9 = 90

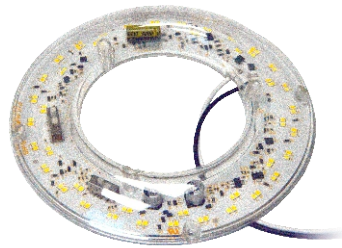
Color Temperature
②TW = 2700-5000K
CCT Selectable,
Factory Default 3000K

③ Standard Product offering. Default Power setting is 23W, default CCT setting is 3000K.

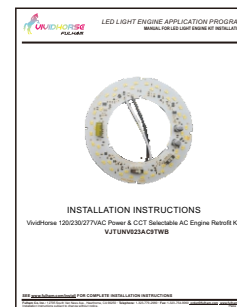
④ DirectAC Engine Retrofit Kit includes mounting hardware, retrofit labels, and installation instructions.

Product Image: 23W Round AC Engine Kit

VJTUNV023AC9TWB



This luminaire has been modified to operate LED lamps. Do not attempt to install or operate original lamps in this luminaire.
REPLACE ONLY WITH FULHAM ELECTRONIC CO.: VJTUNV023AC9TWB
Ce luminaire a été modifié et ne peut plus utiliser la lampe prévue à l'origine.
REMPLACER UNIQUEMENT AVEC FULHAM ELECTRONIC CO.: VJTUNV023AC9TWB

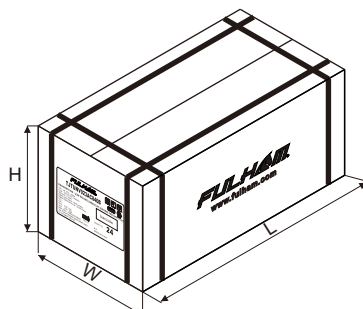


Hardware Kit: TLC-HW08

120/230/277V DirectAC Engine Retrofit Kits:
Hardware, Quick disconnect, Labels & Installation Instructions

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.