

VJT120020AC9TWB



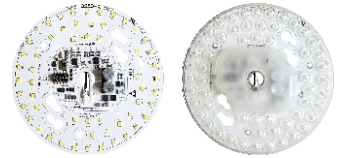
VividHorse 120VAC Power & CCT Selectable AC Engine Retrofit Kit

- Dedicated 120V input AC Engine Retrofit Kit
- Power Selectable: 15W & 20W
- CCT Selectable: 2700K, 3000K, 3500K, 4000K, 5000K
- CRI90 standard, meet CEC Title 24 requirement
- Potassium Fluorosilicate (PFS) phosphor LEDs to achieve as high efficacy as today's CRI80 LEDs
- 5VA flame rated multi-lens included
- Suitable for open or fully enclosed luminaires
- Suitable for luminaires with plastic and glass lenses
- cULus Classified 1598C as a Retrofit Kit
- Energy Star Luminaire 2.2 Listed and CSD

General Specifications

Input Voltage / Frequency ①	120VAC (+/- 10%), 50/60Hz
Input Current ①	~0.14A / 0.20A
Input Power ①	Typ. 15W / 20W selectable without dimmer; Max. 16W / 21W with TRIAC dimmer
Input PF	>0.9
THD	<40%
Operating Frequency per Energy Star @120V/60Hz	120Hz
Max Lumen Output @ 4000K/90CRI	15W: 1500 lumens, 20W: 2000 lumens
Dimming Type/Range	Leading Edge (TRIAC) or Trailing Edge (ELV) / 100% ~ 10%
Beam Angle	140° with lens
Color Rendering Index	CRI (Ra)>=90 / R9>=50 / TM-30 R _a >=85 / TM-30 R _s >=100
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	Safety: 105°C(221°F) / L70(>72Khrs): 105°C(221°F) / L90(36Khrs): 90°C(194°F)
Estimated Lumen Maintenance	L70= >72,000 hours @ Tc max 105°C / L90= 36,000 hours @ Tc max 90°C
Color Consistency	Binning per ANSI C78.377-2015 @25°C; Typ. 3 SDCM, Max. 5 SDCM
Flicker Percentage per CEC JA10	<15% with 200Hz cut-off
Flicker P _{st} / SVM @50% Dimming Level per NEMA 77-2017	P _{st} : 1.32 SVM: 0.46
Start-up Time	<15ms
Overall Size with optical lens	5.12"Dia. x 0.654"H (130mm Dia. x 16.6mm H)
Wire Type / Length	18AWG / 12" Black & White wires
LED Quantity	28pcs. CW + 28pcs. WW
Weight	115g / 0.254lbs.
Packaging: Master Carton	60pcs
Maximum Screw Installation Torque	35in-lb (560in-ozf)
Safety/Compliance	DirectAC Module (without lens): cURus File # E351548, VAT120020AC9TWA DirectAC Retrofit Kits: cULus Classified File # E365124, VJT120020AC9TWB RoHS Compliant Dry and Damp Location Energy Star Luminaire 2.2 Listed and CSD 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
Protective Lens / Enclosure	High Voltage Barrier / 3mm Polycarbonate 5VA flame rated
Lens Transmittance	>94%
PCB Material	MCPCB
Warranty	5 years @ Max. Tc 90°C (194°F) from the date of manufacture

① Measured electrical data per UL file



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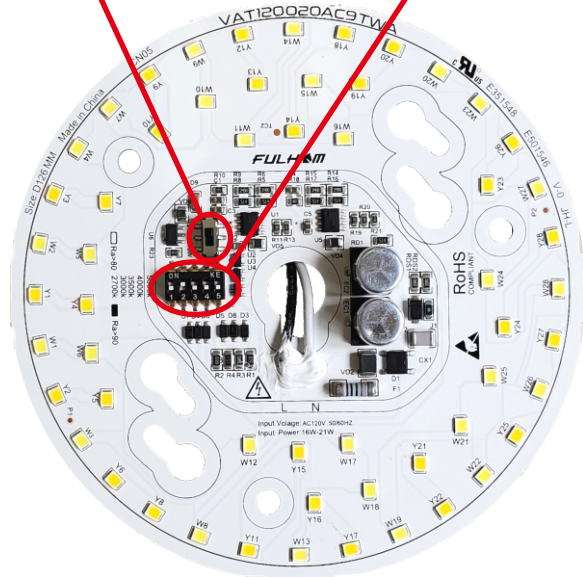
Power & CCT Selection Indication

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 position to "ON" (1~5) to set the desired CCT level.
5. Setting all CCT dip switches to the "OFF" position will result in no light output.

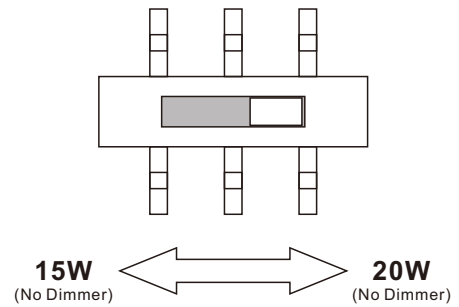
NOTE: ONLY keep one CCT dip switch in the "ON" position; failing to do so may result in an undesired CCT.

Power Selection Dip Switch

CCT Selection Dip Switch

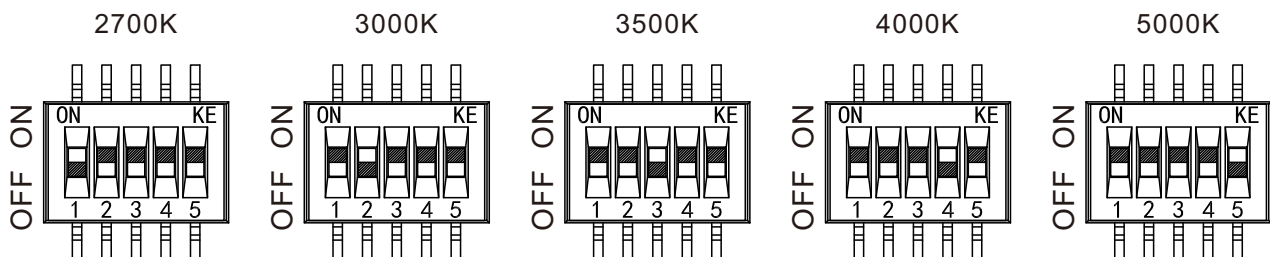


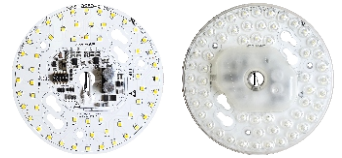
Power Indication



CCT Indication

	1	2	3	4	5
2700K	ON	OFF	OFF	OFF	OFF
3000K	OFF	ON	OFF	OFF	OFF
3500K	OFF	OFF	ON	OFF	OFF
4000K	OFF	OFF	OFF	ON	OFF
5000K	OFF	OFF	OFF	OFF	ON
No Light	OFF	OFF	OFF	OFF	OFF





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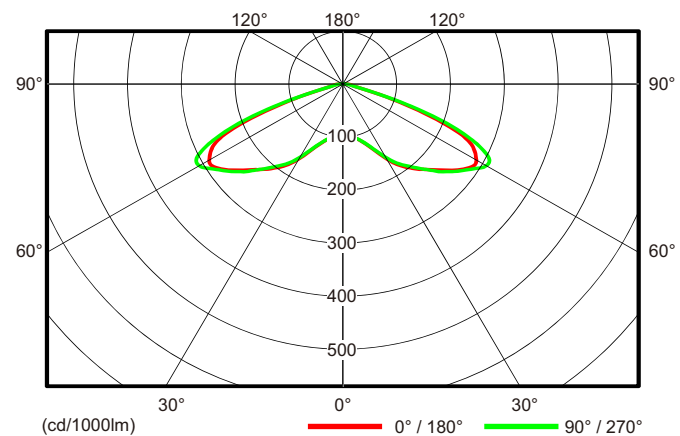


Electrical and Optical Specifications

CRI	DirectAC Retrofit Kit Part Number	Selected Input Power	Selected CCT	Nominal Luminous Flux @ 90 CRI	Engine Efficacy @ 90 CRI
90	VJT120020AC9TWB	15W (No Dimmer)	2700K	1410 lumens	94 lm/W
			3000K	1470 lumens	98 lm/W
			3500K	1500 lumens	100 lm/W
			4000K	1500 lumens	100 lm/W
			5000K	1455 lumens	97 lm/W
		20W (No Dimmer)	2700K	1880 lumens	94 lm/W
			3000K	1960 lumens	98 lm/W
			3500K	2000 lumens	100 lm/W
			4000K	2000 lumens	100 lm/W
			5000K	1940 lumens	97 lm/W

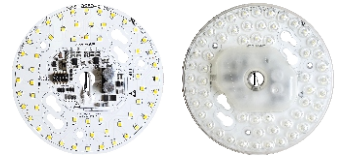
Light Distribution

Zone	Zone Flux	Zone Flux%	Sum Zone Flux	Sum Zone Flux%
0 ~ 10	18.1	0.9%	18.1	0.9%
10 ~ 20	59.5	3.1%	77.6	4.0%
20 ~ 30	123.3	6.4%	200.9	10.4%
30 ~ 40	224.8	11.7%	425.7	22.1%
40 ~ 50	344.6	17.9%	770.3	40.0%
50 ~ 60	482.9	25.1%	1253.2	65.0%
60 ~ 70	491.5	25.5%	1744.7	90.5%
70 ~ 80	141.5	7.3%	1886.1	97.9%
80 ~ 90	29.6	1.5%	1915.7	99.4%
90 ~ 180	11.3	0.6%	1927.0	100.0%



NOTES:

- Nominal luminous flux includes a 8% loss due to lens. Use a 1.06 multiplier when lens is removed.
- Electrical and optical specifications are based on Tc mod = 25°C. Reference Amb. Temp. vs Rel. Lum. Flux for other temperatures.
- Performance for these components have been tested in accordance with Energy Star.
- Refer to Energy Star CSD or Luminaires 2.2 for actual measurements on specific part numbers. Energy Star testing is done at elevated case temperature.
- Specifications are subject to change without notice.
- 70CRI & 80CRI are NOT available.



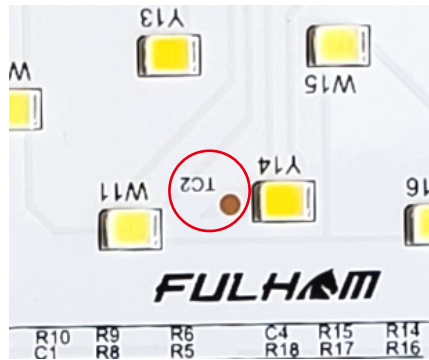
VJT120020AC9TWB



Thermal Specifications

© 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	105°C / 221°F



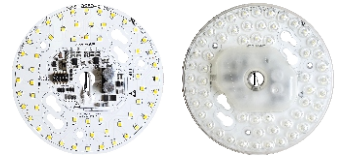
Tc located on module

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.
- © Suitable for surface mounted luminaire with minimum dimensions or volume: 8.5" diameter with a height of 4.75" or 173.92 cubic inches. All target luminaires shall conclude a metal back plate at size diameter 5.2" or larger with grounding means.



VJT120020AC9TWB



Certification Chart

Classification	Model	VJT120020AC9TWB
		YES
		YES (Module: VAT120020AC9TWA)
		YES
		YES
		YES

Energy Star™ TM-21 Calculator Data

Tc Module	Reported L70	Reported L90
85°C	>72,000 Hrs	37,000 Hrs
90°C	>72,000 Hrs	36,000 Hrs
105°C	>72,000 Hrs	33,000 Hrs
Tc Module	Calculated L70	Calculated L90
85°C	117,000 Hrs	37,000 Hrs
90°C	114,000 Hrs	36,000 Hrs
105°C	105,000 Hrs	33,000 Hrs

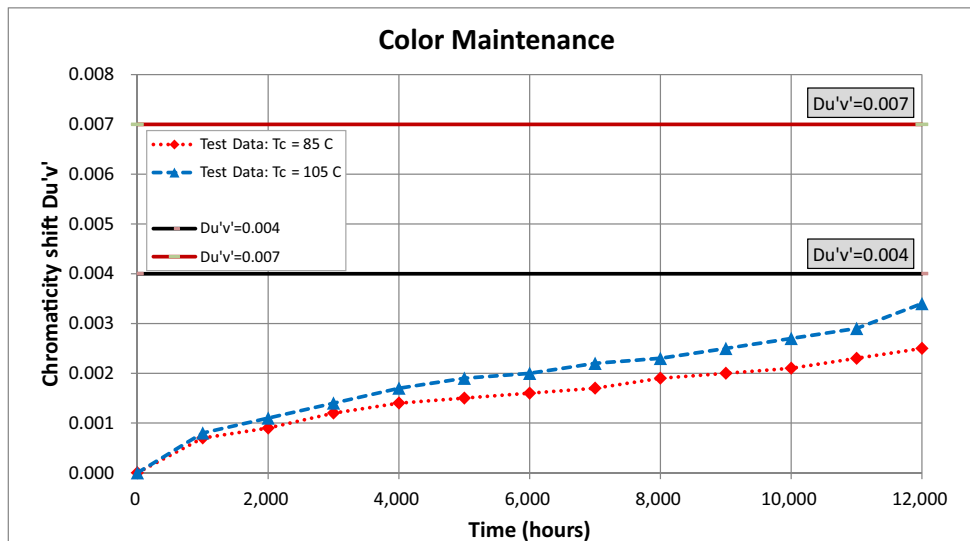
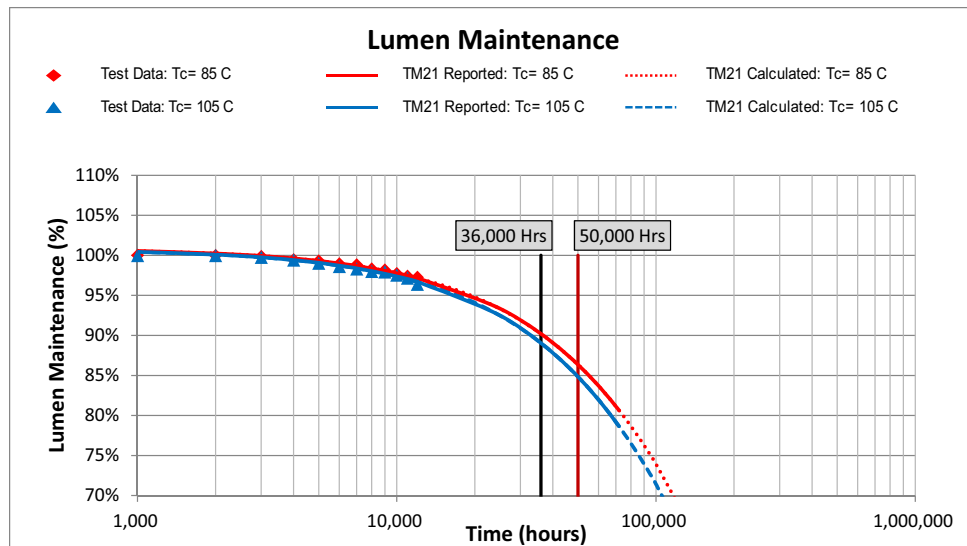
1) Energy Star CSD:

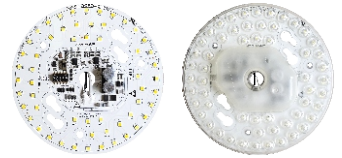
https://www.energystar.gov/products/lighting_fans/certified_lighting_subcomponent_database_csd

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

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





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Compatible Tested Dimmers (TRIAC or ELV Dimmers)

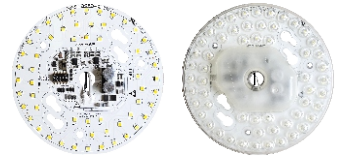
(Contact Fulham for other alternatives)

Manufacture	Model	Type
Leviton	DDE06-BLZ	ELV (Trailing Edge)
Leviton	IPL06-10Z	TRIAC (Leading Edge)
Leviton	R62-6674-P0W	TRIAC (Leading Edge)
Leviton	R70-6631-1LW	TRIAC (Leading Edge)
Lutron	MACL-153M	TRIAC (Leading Edge)
Lutron	SCL-153P	TRIAC (Leading Edge)
Lutron	S-600	TRIAC (Leading Edge)
Lutron	PD-10NXD	TRIAC (Leading Edge)
Lutron	MSCL-OP153M	TRIAC (Leading Edge)
Lutron	D-600R	TRIAC (Leading Edge)
Lutron	SELV-303P	ELV (Trailing Edge)

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

Test Condition	Input Voltage(V)	Power(W)	Light Output(lx)	Pst	SVM	Flicker% (200Hz cut-off)
No Dimmer	120.0	19.87	454.6	0.62	0.43	5.738%
Dimmer Max. LO	120.0	21.62	509.1	0.55	0.50	N/A
Dimmer 50%	120.0	10.84	254.3	1.32	0.46	N/A
Dimmer Min. LO	120.0	1.22	15.27	3.81	0.00	N/A

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



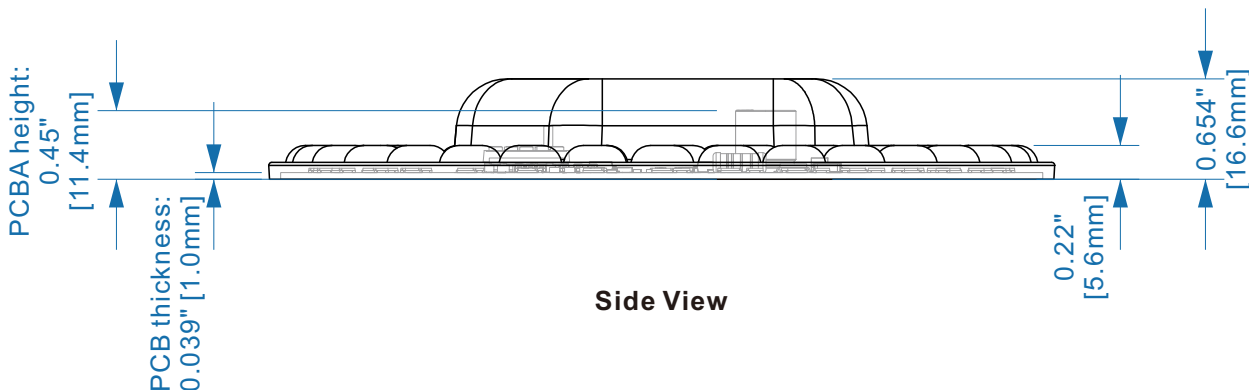
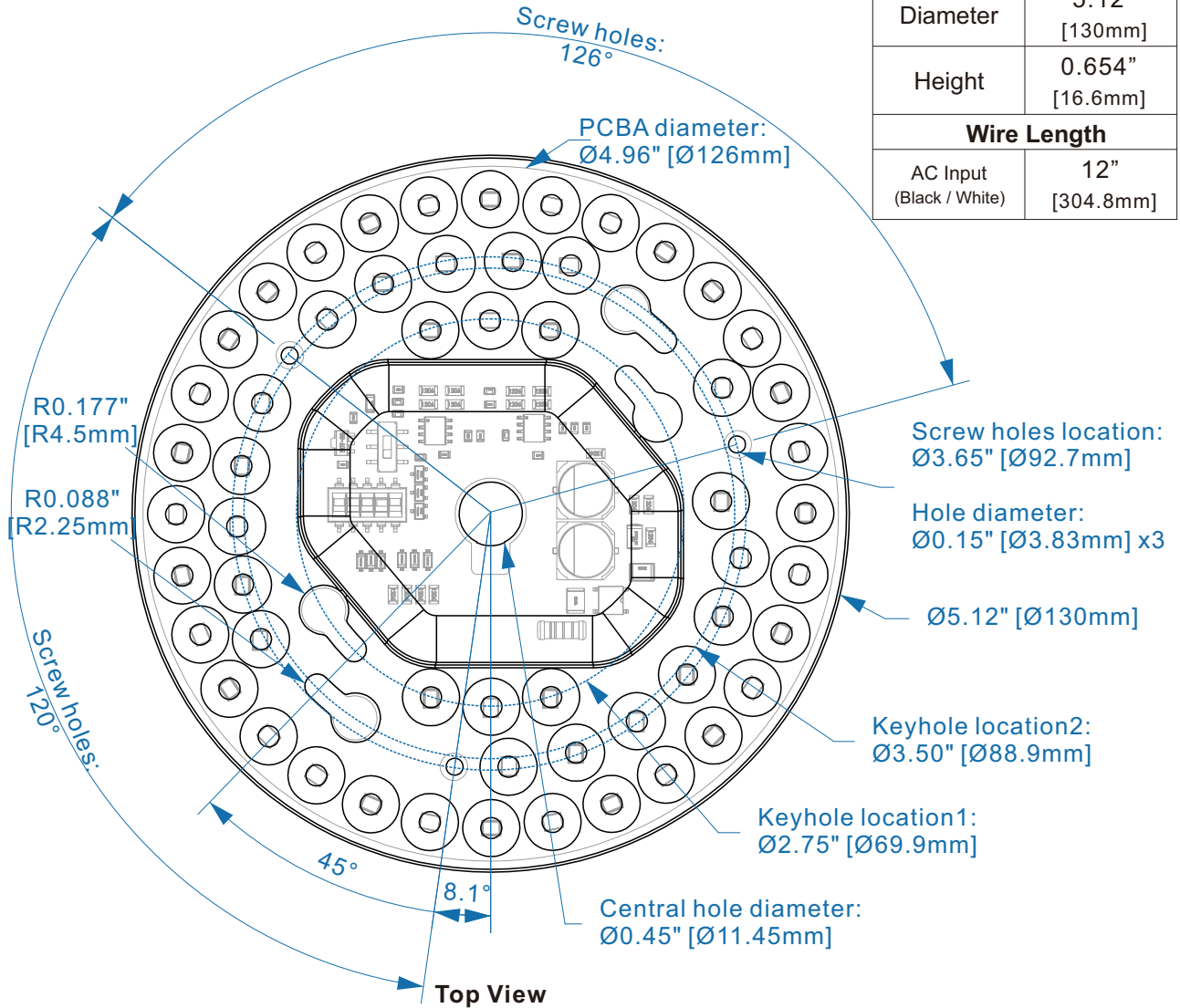
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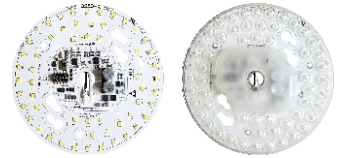


Mechanical Drawings

Φ5.12" [130mm]

Overall Dimensions with 5VA Lens	
Diameter	5.12" [130mm]
Height	0.654" [16.6mm]
Wire Length	
AC Input (Black / White)	12" [304.8mm]





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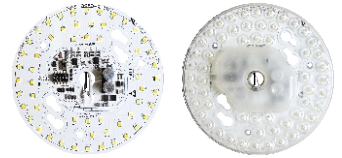
DirectAC Engine Retrofit Kit Equivalency Chart: FLUO to LED

DirectAC Engine/Kit (15W)				CFL					
Engine/Kit Part Number	System Wattage	Lumen Output	Efficacy	CFL Style	Lamp Wattage	# of Lamps	Total Wattage	Lumen Output	Efficacy
VJT120020AC9TWB	15W	1500 lm (4K/90CRI)	100 lm/W	Quad	13W	2	26W	1550 lm	59 lm/W
					18W	1	18W	1075 lm	
					26W	1	26W	1550 lm	
				Triple	13W	2	26W	1650 lm	63 lm/W
					18W	1	18W	1020 lm	56 lm/W
					26W	1	26W	1536 lm	59 lm/W
				Circline T9	22W	1	22W	775 lm	35 lm/W
				Circline T5	22W	1	22W	1530 lm	69 lm/W

DirectAC Engine/Kit (20W)				CFL					
Engine/Kit Part Number	System Wattage	Lumen Output	Efficacy	CFL Style	Lamp Wattage	# of Lamps	Total Wattage	Lumen Output	Efficacy
VJT120020AC9TWB	20W	2000 lm (4K/90CRI)	100 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	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.



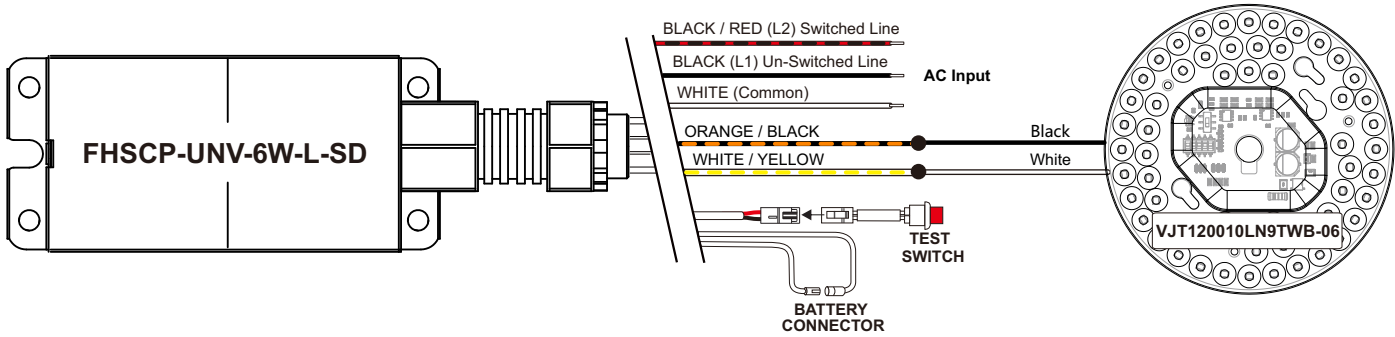
VJT120020AC9TWB



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

Single Luminaire

FHSCP-UNV-6W-L-SD can only connect one(1x) VJT120020AC9TWB engine.

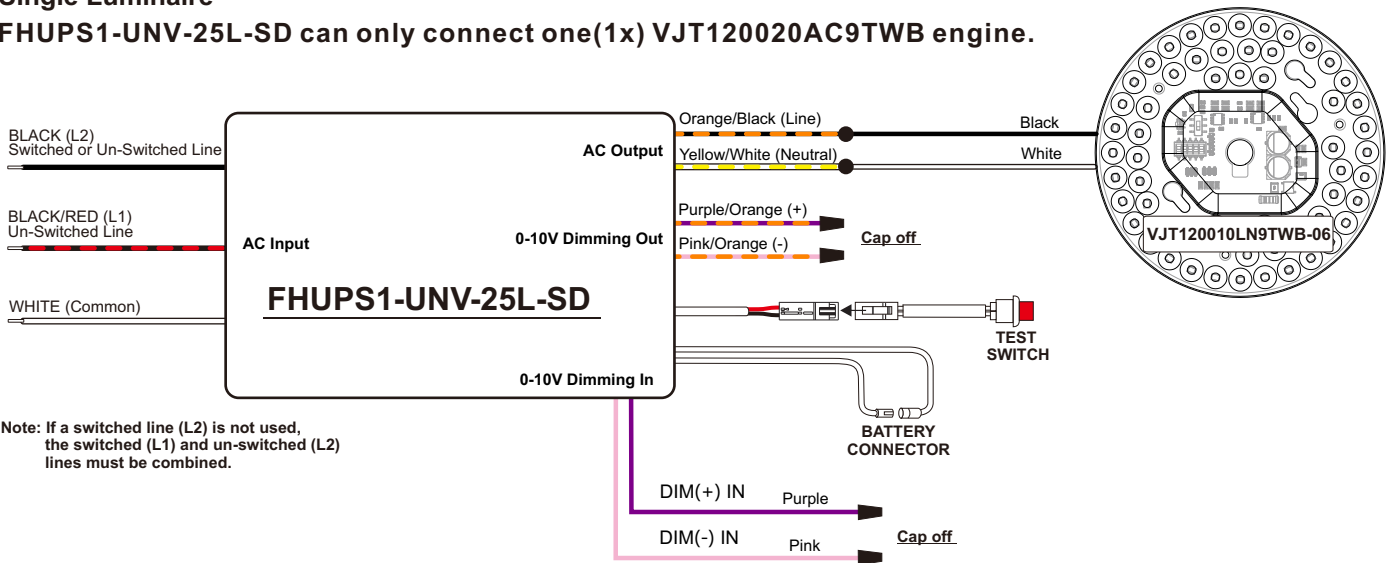


Note: If a switched line (L2) is not used, the switched (L1) and un-switched (L2) lines must be combined.

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

Single Luminaire

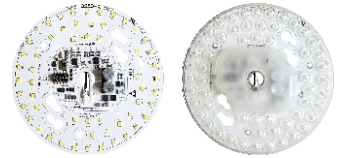
FHUPS1-UNV-25L-SD can only connect one(1x) VJT120020AC9TWB engine.



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

NOTES:

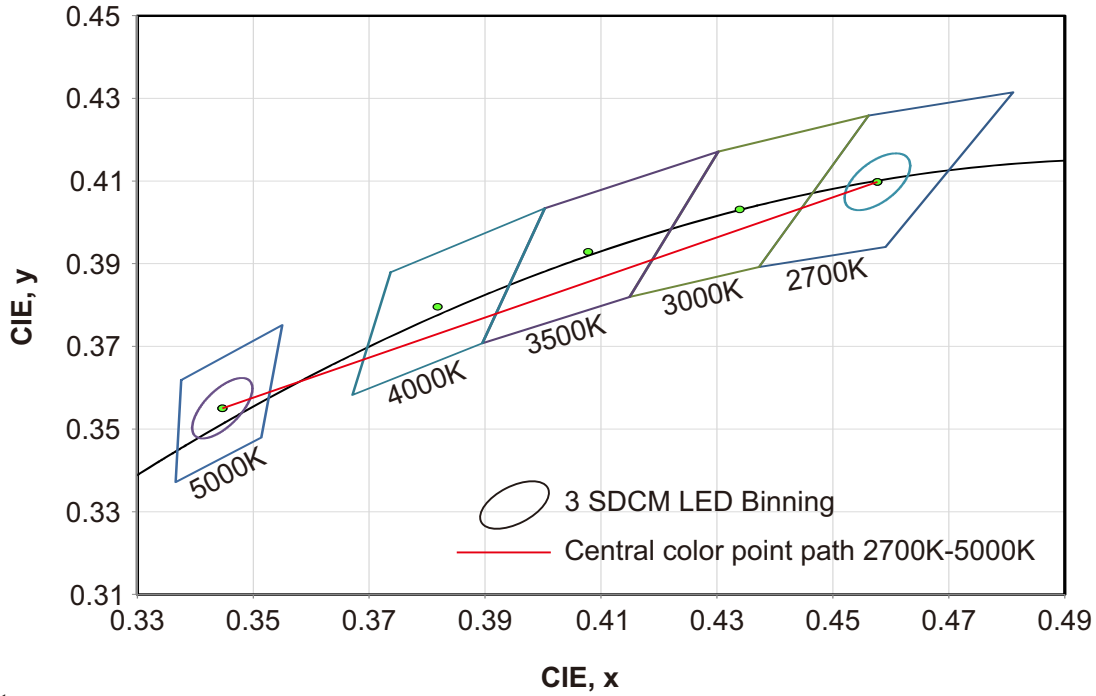
- 1) For reference only, several factors apply.
- 2) Emergency systems are not UL classified for field installation.



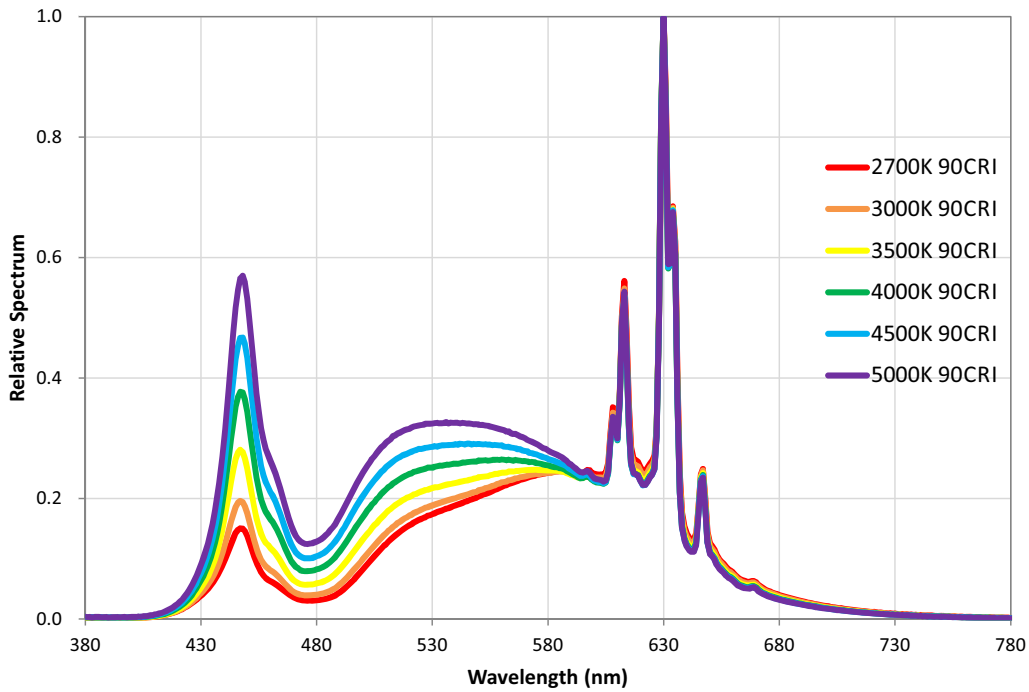
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Color and Binning

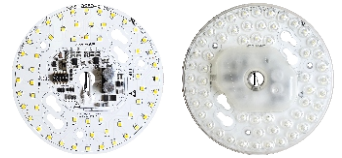


Optical Spectrum



NOTES:

- 1) The Color and Binning and Optical Spectrum charts are for reference only. For more detailed info, contact factory.
- 2) Reference Samsung 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.



VJT120020AC9TWB



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 DC Engine Retrofit Kit 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 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)

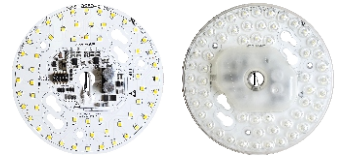
- Fulham LED products should be handled with proper measures to protect against any potential ESD damage.
- When servicing, personnel should be ground and direct contact with LED should be avoided.

Thermal Management

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

Wiring

- Intended for 120VAC (+/-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.



VJT120020AC9TWB



Part Number Matrix

V J T 120 020 AC 9 TW B

Product Line
V = VividHorse

Compliance
ⓐJ= DirectAC Retrofit Kit (cULus Classified)

Dimming
T = TRIAC

Input Voltage
120 = 120VAC

Estimated Power
020 = 20W (20W, 15W Selectable) Factory Default 20W

Shape
AC=Circular

CRI
ⓐ9 = 90

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

ⓐ Standard Product offering. Default Power setting is 20W, default CCT setting is 3000K.

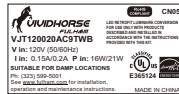
ⓐ DirectAC Engine Retrofit Kit includes mounting hardware, retrofit labels, and installation instructions.

Product Image: 20W Round AC Engine Kit

VJT120020AC9TWB



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.: VJT120020AC9TWB
Ce luminaire a été modifié et ne peut plus utiliser la lampe prévue à l'origine.
REPLACER UNIQUEMENT AVEC FULHAM ELECTRONIC CO.: VJT120020AC9TWB

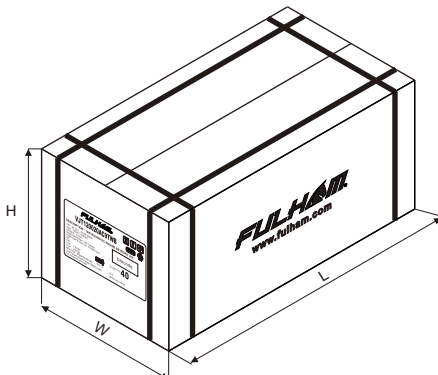


Hardware Kit: TLC-HW08

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

Packaging

Master Carton



OUTER DIMENSION		
L	W	H
19.69"(500mm)	12.20"(310mm)	13.19"(335mm)
Net Weight	Gross Weight	QUANTITY
15.21 lbs. (6.9 kg)	18.98 lbs. (8.61 kg)	60pcs.