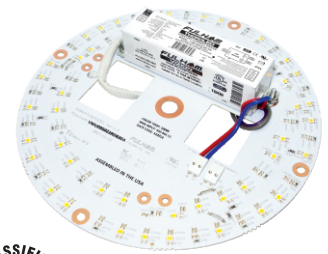




VKMUNV018RDxxxA



UNV DC Engines Retrofit Kits with 0-10V Dimming

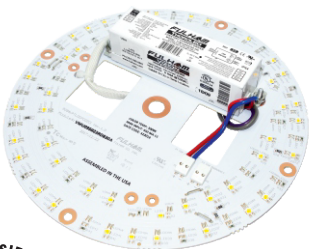
- Universal Voltage (120~277) DC Engine
- Suitable for open or fully enclosed luminaires
- Suitable for luminaires with plastic and glass lenses
- Class 2 design 141lm/W at system level
- cULus Classified 1598C
- cULus Recognized 8750
- Energy Star Luminaire 2.1 Listed and CSD ^①

General Specifications

Input Voltage ^②	120~277VAC (+/- 10%)
Input Current ^②	~0.166A @120V ~0.072A @277V
Input Power ^②	20W
Input PF	>0.98
THD	<20%
Input Frequency	50/60Hz
Module Operating Voltage	23.1VDC
Max Lumen Output @ Full Power ^②	2675 lumens @ 4000K / 80 CRI
Dimming Type/Range	0-10V / 100% ~ 10%
Beam Angle	120°
CRI	80 (standard), 90 available (MTO)
Storage Temperature Range	-35°C to 100°C / -31°F to 212°F
Operating Ambient Temperature Range (Ta)	-35°C to 60°C / -31°F to 140°F
Maximum Driver Case Temperature: per UL/ 5 year warranty	90°C (194°F) / 76°C (176°F)
Maximum Module Case Temperature	L70: Tc max=105°C (Ts=110°C) / L90: Tc max=105°C (Ts=110°C)
Estimated Lumen Maintenance (at Max Tc)	L70= >60,000 hours / L90= 40,000 hours
Color Consistency	Binning per ANSI C78.377-2015 @25°C; 3 SDCM
Inrush Current / Duration	20A @ 277V / 250us
Line Regulation / Load Regulation	<1% @100% Load / <3% @100% Load
Total Overall Ripple LF (<300Hz) / HF(<40kHz) peak to peak	<5% @100% Load
Low Frequency Ripple (120Hz ripple peak to peak)	<5% @100% Load
Flicker Percentage	<7% @100% - 20% Dimming Range <5% @<20% Dimming Range
Start-up Time / Standby Power	<500ms / <0.5W No Load
Overall Size	7.83"Dia. x 1.18"H (199mm Dia. x 29.89mm H)
Wire Type/ Length	18AWG / 12" Black and White wires (Input 120~277VAC) 18AWG / 12" Gray and Purple wires (Dimming 0-10VDC)
LED Quantity	48 Pcs.
Driver Part Number	T1M1UNV0700-30L
Module Part Number	VMU095023RDxxxA
Weight	320g / 0.71lbs.
Packaging: Master Carton	20pcs
Maximum Screw Installation Torque	35in-lb (560in-ozf)
Safety/Compliance	Component: cURus Module File #E351548; Driver File #E342838 DC Engines Retrofit Kits: cULus Classified 1598C File # E365124 RoHS Compliant Dry and Damp Location Energy Star Luminaire 2.1 Listed and CSD ^①
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
Output Type	Class 2 (approved for luminaires glass or plastic lenses)
PCB Material / Connector Qty / Em. Connection	CEM1 / 2 / Yes
Warranty	5 years @ Max. Tc 105°C (module) and 76°C (Driver) from the date of manufacture

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

^② Measured electrical data per UL file



Typical Characteristics Graphs: Dimming and Thermal

Figure 1

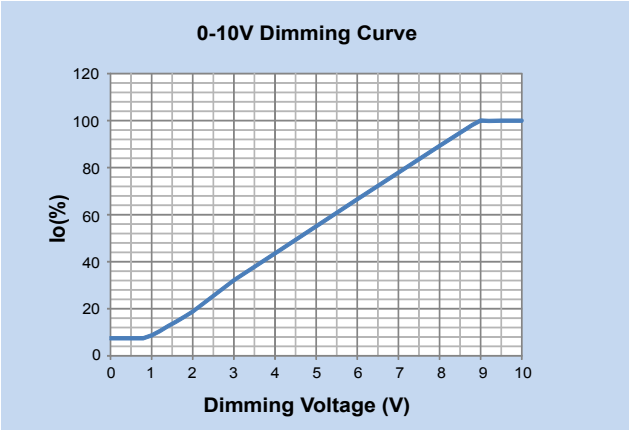
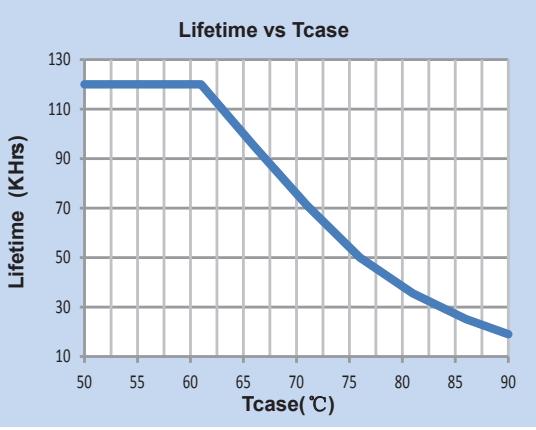
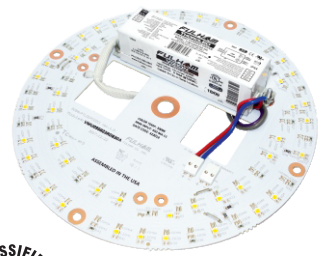


Figure 2



Failure Rate Info based upon MTBF modeling:
90% survivals at end of life @ ≤Tc lifetime rating



VKMUNV018RDxxxA

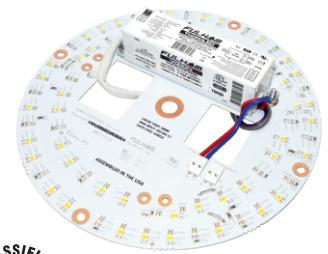


Electrical and Optical Specifications

Color Temperature	DC Engine Retrofit Kit Part Number	Input Power	Nominal Luminous Flux @ 90 CRI	Engine Efficacy @ 90 CRI	Nominal Luminous Flux @ 80 CRI	Engine Efficacy @ 80 CRI
2700K	VKMUNV018RD827A	20W	2180 lumens	109 lm/W	2600 lumens	130 lm/W
3000K	VKMUNV018RD830A	20W	2360 lumens	118 lm/W	2680 lumens	134 lm/W
3500K	VKMUNV018RD835A	20W	2340 lumens	117 lm/W	2720 lumens	136 lm/W
4000K	VKMUNV018RD840A	20W	2400 lumens	120 lm/W	2820 lumens	141 lm/W
5000K	VKMUNV018RD850A	20W	2440 lumens	122 lm/W	2860 lumens	143 lm/W
5700K	VKMUNV018RD857A	20W	2440 lumens	122 lm/W	2860 lumens	143 lm/W
6500K	VKMUNV018RD865A	20W	2400 lumens	120 lm/W	2820 lumens	141 lm/W

NOTES:

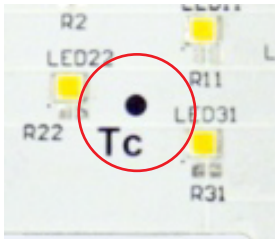
- 1) Electrical and optical specifications are based on Tc mod = 25°C. Reference Amb. Temp. vs Rel. Lum. Flux for other temperatures.
- 2) Nominal luminous flux at 90 CRI are calculated values, not measured.
- 3) Performance for these components have been tested in accordance with Energy Star.
- 4) Refer to Energy Star CSD or Luminaires 2.1 for actual measurements on specific part numbers. Energy Star testing is done at elevated case temperature.
- 5) Specifications are subject to change without notice.
- 6) 70CRI is NOT available.



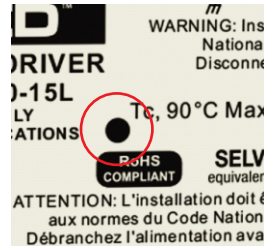
Thermal Specifications

③ DC Engine Retrofit Kit (A)

Storage Temperature Range	-35°C to 100°C / -31°F to 212°F
Operating Ambient Temperature Range	-35°C to 60°C / -31°F to 140°F
Maximum Driver Case Temperature	90°C / 194°F
Maximum Module Case Temperature	L70 = 105°C (221°F) / L90 = 105°C (221°F)



Tc located on module



Tc located on driver

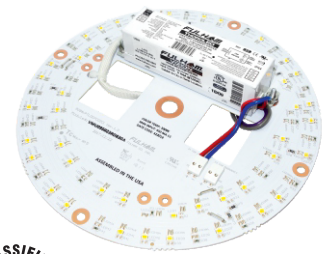
Thermal De-Rating: Tc vs. Luminous Flux

Module Case Temperature (Tc)	Total Vf Multiplier	Luminous Flux Multiplier
25°C	1.000	1.000
30°C	1.000	0.991
35°C	0.997	0.982
40°C	0.993	0.973
45°C	0.993	0.964
50°C	0.990	0.953
55°C	0.987	0.944
60°C	0.987	0.935
65°C	0.984	0.926
70°C	0.984	0.917
75°C	0.980	0.908
80°C	0.977	0.899
85°C	0.977	0.889
90°C	0.974	0.880
95°C	0.970	0.862
100°C	0.967	0.853

NOTES:

- 1) Refer to DC Engine Retrofit Kit Installation Instructions for further detail.
- 2) This DC 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 DC Engine Retrofit 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: 10" diameter with a height of 3" or 30 cubic inches



VKMUNV018RDxxxA



Certification Chart

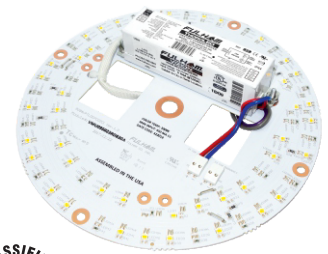
Energy Star™ TM-21 Calculator Data

Model	VKMUNV018RDxxxA
Classification	
RoHS COMPLIANT	YES
cULUS	YES (Driver & Module)
CLASSIFIED cULUS	YES
ENERGY STAR Listed	YES
ENERGY STAR CSD	YES

Tc Module	Reported L70	Reported L90
55°C	>60,000 Hrs	>54,000 Hrs
85°C	>60,000 Hrs	46,000 Hrs
105°C	>60,000 Hrs	40,000 Hrs
Tc Module	Calculated L70	Calculated L90
55°C	180,000 Hrs	54,000 Hrs
85°C	154,000 Hrs	46,000 Hrs
105°C	133,000 Hrs	40,000 Hrs

NOTES:

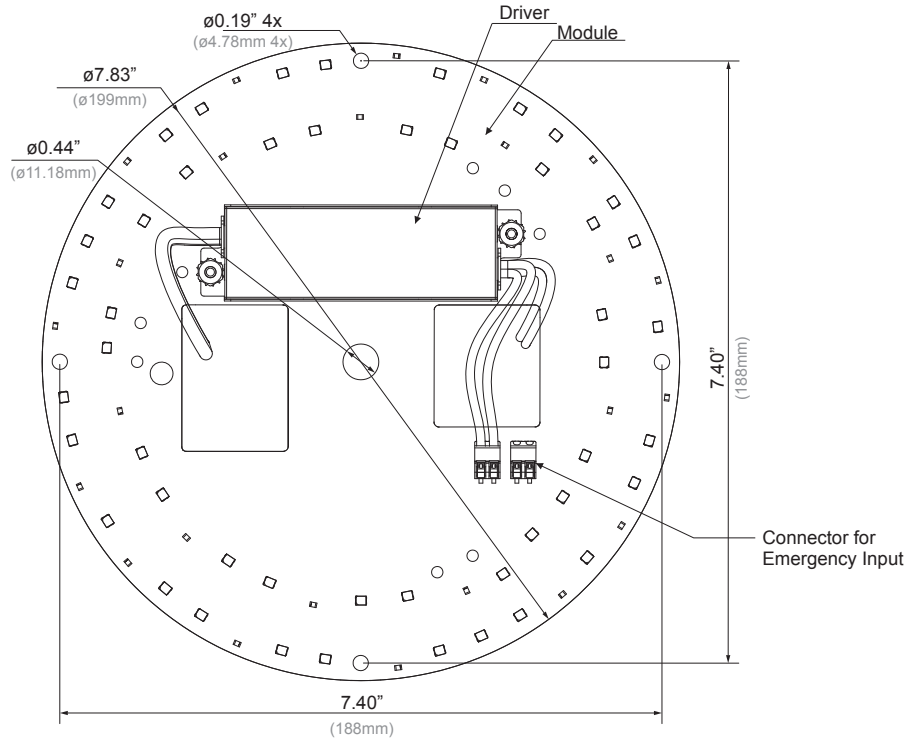
- 1) Energy Star CSD:
https://www.energystar.gov/products/lighting_fans/certified_lighting_subcomponent_database_csd
- 2) Energy Star Listed:
https://www.energystar.gov/productfinder/product/certified-light-fixtures/results?scrollTo=342&search_text=fulham&fixture_type_isopen=&markets_filter=United+States&zip_code_filter=&product_types=Select+a+Product+Category&s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



Mechanical Drawings

(Scale 3 : 5)

TOP VIEW



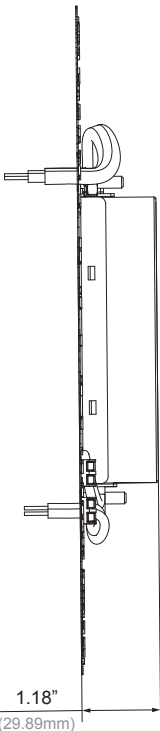
Overall Dimensions

Diameter	7.83" [199mm]
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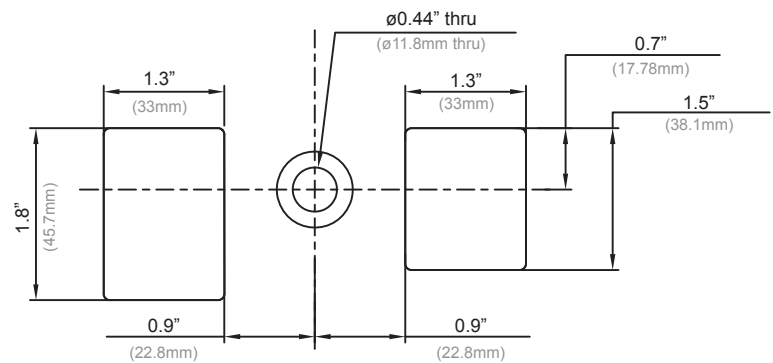
Height	1.18" [29.89mm]
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Wire Length

AC Input (Black / White)	12" [304.8mm]
0-10V Dimming Purple (10V+) Gray (10V-)	12" [304.8mm]



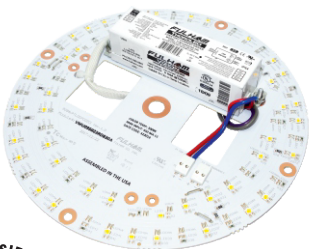
SIDE VIEW



PARTIAL VIEW



VKMUNV018RDxxxA

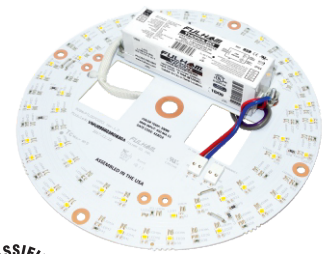


DC Engine Retrofit Kit Equivalency Chart: FLUO to LED

DC Engine Retrofit Kit (7.83" Round)				CFL					
DC Engine Retrofit Kit Part Number	System Wattage	Lumen Output	Efficacy	CFL Style	Lamp Wattage	# of Lamps	Total Wattage	Lumen Output	Efficacy
VKMUNV018RDxxxA	18W	2820 lm (4K/80CRI)	141 lm/W	Quad	13W	1	13W	775 lm	59 lm/W
					18W	1	18W	1075 lm	
				Triple	13W	1	13W	825 lm	63 lm/W
					18W	1	18W	1020 lm	56 lm/W
				Quad	13W	2	26W	1550 lm	59 lm/W
					26W	1	26W		
				Triple	13W	2	26W	1650 lm	63 lm/W
					26W	1	26W	1536 lm	59 lm/W
				Circline T5	22W	1	22W	1530 lm	69 lm/W
				Circline T9	22W	1	22W	775 lm	35 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.



VKMUNV018RDxxxA



DC Engine Retrofit Kit with Emergency Options

NOTE: Emergency systems are not UL classified for field installation.

DC Engine Retrofit Kit Part Number	Emer. Driver Part Number	Battery Wattage	Battery Part Number	Harness (mA)	LED Vf (V)	LED If (mA)	Total Power (W)	Total Lum. Output (lm)	Eff. (lm/W)
VKMUNV018RD840A	FHS2-UNV-36L/ FHS2-UNV-56S	4W	FHSBATT8-AA9 FHSBATL3-1	FHS-HARNESS-175	21.5	175	3.8	720 ^⑤	191
	FHSCP-UNV-5WL	5W	N/A	N/A	21.8	228	5.0	934	187
	FHSCP-UNV-10P-L-SD	5W	FHSBATL3-1.5-SD	N/A	21.8	228	5.0	934	187
	FHS2-UNV-36L	6W	FHSBATL6-.6	FHS-HARNESS-250	21.8	250	5.5	1022 ^⑤	187
	FHSCP-UNV-10P-L-SD	6W	FHSBATL9-.6-SD	N/A	21.9	368	6.0	1124	187
	FHSCP-UNV-7.8WL	7.8W	N/A	N/A	22.2	354	7.8	1428	183
	FHS2-UNV-36L/ FHS2-UNV-56S	8W	FHSBATL3-1.5 FHSBATL3-1.5S	FHS-HARNESS-350	22.2	350	7.8	1412 ^⑤	182
	FHS2-UNV-36L	10W	FHSBATL9-.6	FHS-HARNESS-450	22.4	450	10.1	1791 ^⑤	178
	FHSCP-UNV-10P-L-SD	10W	FHSBATL3-3-SD FHSBATL6-1.5L-SD ^⑤	N/A	22.4	444	10.0	1769	177
	FHSCP-UNV-10.7WL	10.7W	N/A	N/A	22.5	474	10.7	1880	176
	FHSCP-UNV-13.7WL	13.7W	N/A	N/A	22.8	600	13.7	2328	170
	FHS2-UNV-36L/ FHS2-UNV-56S	16W	FHSBATL3-3	FHS-HARNESS-650	22.9	650	14.9	2496 ^⑤	168
	FHSCP-UNV-17WL	17W	N/A	N/A	23.1	735	17.0	2772	163

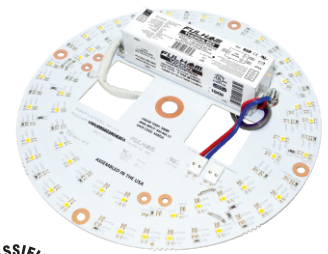
NOTES:

1) For reference only, several factors apply.

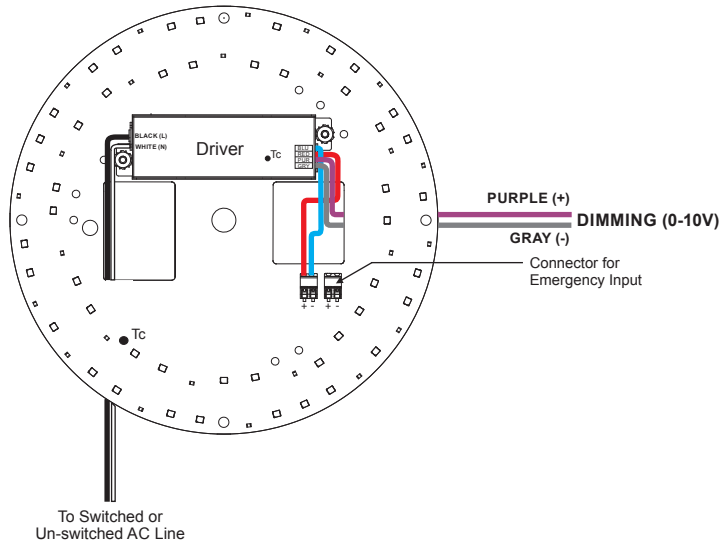
2) Emergency systems are not UL classified for field installation.

⑤ These batteries do not include mounting means, separate mounting brackets are available

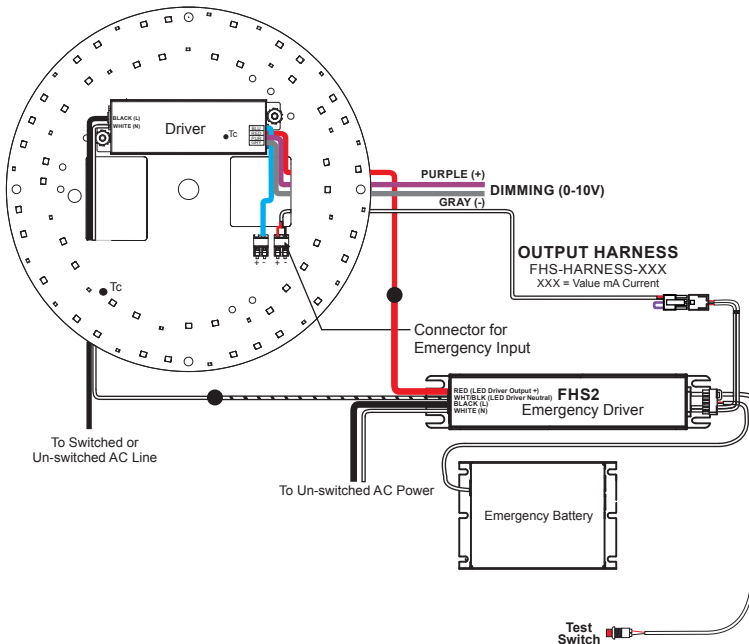
⑥ Initial lumen output. Will reduce to no less than ~65% of total lumen output.



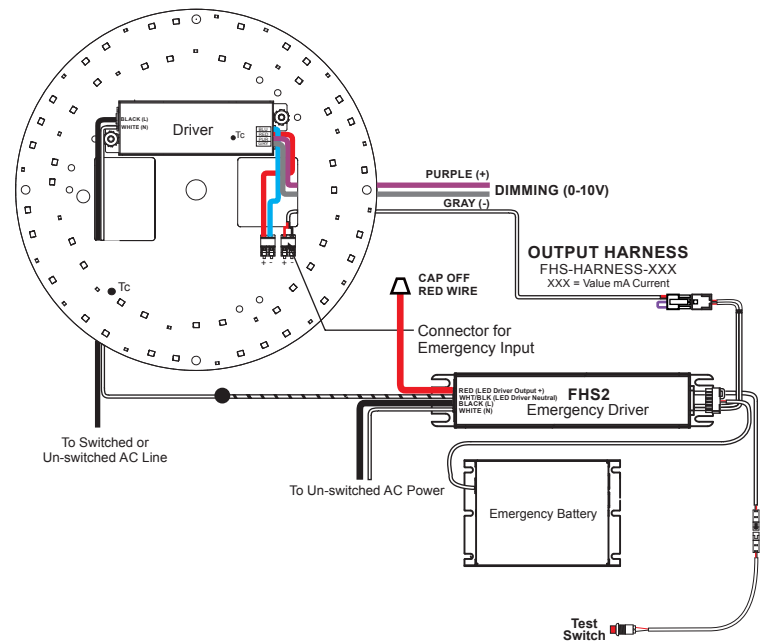
Wiring Diagram: Standard Option



Wiring Diagram: HotSpot2 (FHS2) EM- Pass Through (Recommended for non-Fulham LED EM)

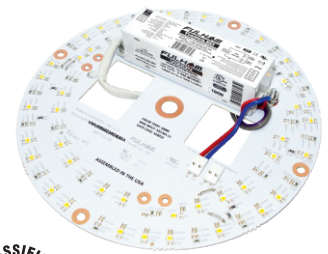


Wiring Diagram: HotSpot2 (FHS2) EM- In Parallel (Recommended for Fulham LED EM)

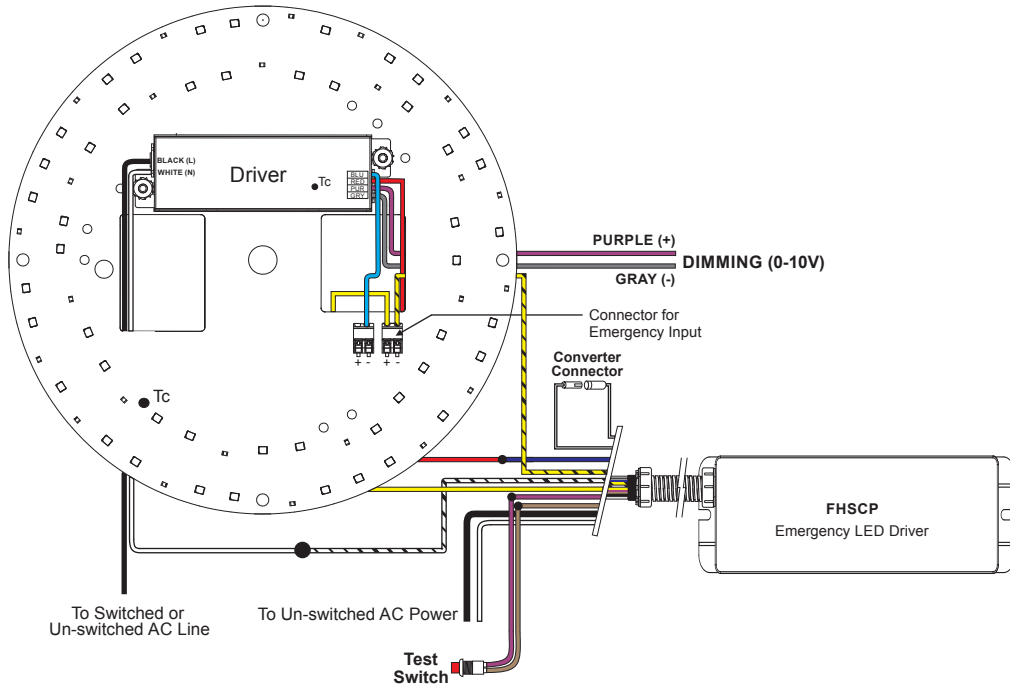


NOTES:

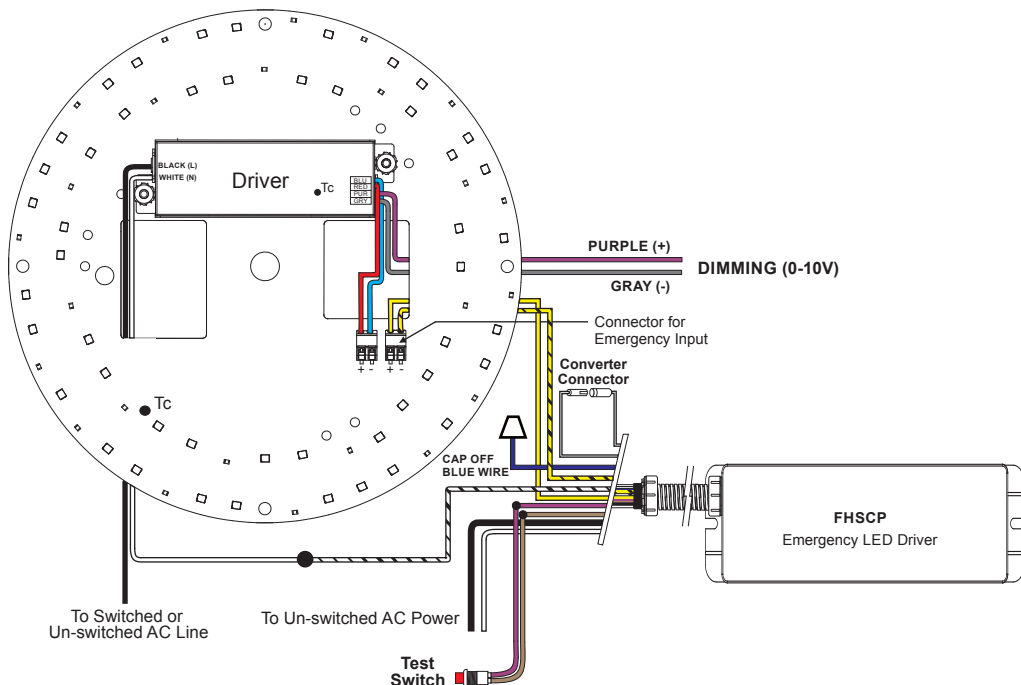
- 1) For reference only, several factors apply.
- 2) Emergency systems are not UL classified for field installation.



Wiring Diagram: Constant Power with conduit (FHSCP) EM- Pass Through (Recommended for non-Fulham LED EM)



Wiring Diagram: Constant Power with conduit (FHSCP) EM- In Parallel (Recommended for Fulham LED EM)



NOTES:

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