FULHAM THOROLED

TET120021RDXX-X1, TET120025RDXX-X1
TKT120021RDXX-X1, TKT120025RDXX-X1
TEMUNV021RDXX-X1, TEMUNV025RDXX-X1
TKMUNV021RDXX-X1, TKMUNV025RDXX-X1

CLASSIFIED c UL us c UL us RoHS COMPLIANT

120VAC / Universal Input Round LED DC Engines and LED DC Engine Retrofit Kits

- High Density, high brightness chip array
- Suitable for open or fully enclosed luminaires
- Suitable for luminaires with plastic and glass lenses
- Constant Current module design for maximum efficacy
- Class 2 Lighting System
- 120VAC dedicated or UNV options
- No Flicker
- TRIAC/ELV or 0-10V Dimmable
- Full CCT Option Available (Standard CCT's: 3000K,4000K)
- 80 CRI standard and 90 CRI available
- UL Recognized (DC Engine option)
- UL Classified (DC Engine Retrofit Kit option)
- Suitable for DLC and Energy Star compliant luminaires
- Listed in Energy Star Certified Subcomponent Database (for rebate programs)

General Ratings

Input Voltage	TET/TKT: 120VAC;50/60 Hz	TEM/TKM: 120~277VAC;50/60Hz
Input Current	21RD = 0.175A Max @120VAC	25RD = 0.208A Max @120VAC
	21RD = 0.075A Max @277VAC	25RD = 0.090A Max @120VAC
Max. Input Power (UL)	21RD = 20.1W	25RD = 24.8W
Energy Star Input Power (Measured)	21RD = 19.1W	25RD = 23.5W
Max Lumen Output @ Full Power (80CRI*)	21RD = 2305 lumens @ 4000K	25RD = 2880 lumens @ 4000K
Power Factor	>.96	
THD	<20%	
Dimming Type/Range	Leading Edge (TRIAC) or Trailing Edge (ELV) or 0-10V / 100% ~ 10%	
Beam Angle	120°	
CRI	80 (Standard), 90 available	
Operating Ambient Temperature Range (Ta)	Engine: -35 to +50°C / -31 to +122ºF; Kit: -35 to +45°C / -31 to +113ºF	
Maximum Driver Case Temperature (Tc driver)	TET/TKT: 80°C TEM/TKM: 86°C	
Maximum Module Case Temperature (Tc mod)	L70 = 90°C (Ts = 95°C)	L90 = 85°C (Ts = 90°C)
Estimated Lumen Maintenance at Max.	L70 = 50,000 hours	L90 = 40,000 hours
Color Consistency	Binning per ANSI C78.377-2011; 7 SDCM	
Overall Size	9" diameter x 1.2" H	
Weight	TET/TKT: 320g TEM/TKM: 330g	
Maximum Screw Installation Torque	35 inch - ounces	
Safety/Compliance	DC Engines: cURus (File # E351548: PTL123X20www**; Driver File # E342838)	
	DC Engines Retrofit Kits: cULus File # E365124	
	Class 2 Lighting System	
	RoHS Compliant	
	Energy Star Listed CSD	
Nominal Operating Voltage	21RD: 24.2VDC	25RD: 30.2VDC
Driver Part Number	TET/TKT: T1T11200700-30L	TEM/TKM: T1M1UNV0700-30L
DC Module Part Number	21RD: TM64RD05XX-2X1	25RD: TM80RD05XX-2X1
Warranty	5 years	

* At Tc mod = 25ºC
** www = PCB Rev #

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Part Numbering Matrix

T E T 120 021 RD 40 - 0 1

Compliance	Control †	Engine Input Voltage	Engine Input Power	Color Temperature	Configuration
E = LED DC Engines (UL Recognize)	**T***** = TRIAC/ELV	**120***** = 120VAC	**021***** = 21W	**27** = 2700K	**0***** = 80 CRI
******K** = DC Engine Retrofit Kit (UL Classified)	**M***** = 0-10V	**UNV***** = 120~277VAC	**025***** = 25W	**30*****=3000K	**1** = 90 CRI
				35 = 3500K	**2** = 80 CRI + Conf Coat
				40***=4000K	**3** = 90 CRI + Conf Coat
				50 = 5000K	

*** Indicates standard engine options. All others are built to order.
**** LED Engine Retrofit Kit includes mounting hardware, retrofit labels, and installation instructions.
† TET/TKT: TRIAC/ELV Dimmable available only in 120VAC Input, TEM/TKM: 0-10V Dimmable available only in Universal Input.

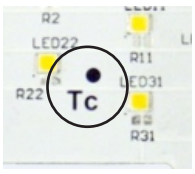
Electrical and Optical Specifications

Color Temperature	Part Number	Input Power	Nominal Luminous Flux @ 90 CRI	Nominal Luminous Flux @ 80 CRI	Efficacy @ 80 CRI
3000K	TET120021RD30-x1 TKT120021RD30-x1 TEMUNV021RD30-x1 TKMUNV021RD30-x1	19.1W	1710 lumens	2140 lumens	110 lm/W
	TET120025RD30-x1 TKT120025RD30-x1 TEMUNV025RD30-x1 TKMUNV025RD30-x1	23.5W	2085 lumens	2605 lumens	110 lm/W
4000K	TET120021RD40-x1 TKT120021RD40-x1 TEMUNV021RD40-x1 TKMUNV021RD40-x1	19.1W	1840 lumens	2300 lumens	120 lm/W
	TET120025RD40-x1 TKT120025RD40-x1 TEMUNV025RD40-x1 TKMUNV025RD40-x1	23.5W	2240 lumens	2800 lumens	119 lm/W

1) Electrical and optical specifications are based on a 2700K model and at Energy Star elevated case temperature.
2) Nominal lumen output and efficacies for standard models are calculated. Reference CCT vs Lumen Output chart for other CCT's.
3) Specifications are subject to change without notice.
4) Nominal luminous flux at 90 CRI are calculated values, not measured.
5) Refer to Energy Star CSD for actual measurements on specific part numbers.
6) Performance for these components have been tested in accordance with Energy Star.

Thermal Specifications

	LED Engine	LED Engine Retrofit Kit*****
Storage Temperature Range	-35°C to 100°C / -31°F to 212°F	-35°C to 100°C / -31°F to 212°F
Operating Ambient Temperature Range	-35°C to 50°C / -31°F to 122°F	-35°C to 45°C / -31°F to 113°F
Maximum Case Temperature (Tc)	Module : 90°C; Driver: 88°C/90°C	Module : 90°C; Driver: 88°C/90°C



Tc located on module

Tc located on driver

LED Engine Retrofit Kit only: Hardware and Labels

*****Suitable for wall sconce luminaire with minimum dimensions: 10.5" diameter with a height of 1.3".

Refer to LED Engine Retrofit Kit Installation Instructions for further detail.
This LED Engine Kit can retrofit any luminaire with a length/height greater or equal to the minimum dimensions shown on the Installation Instructions.
This LED Engine Kit can be used with luminaires similar to the one illustrated on the Installation Instructions.

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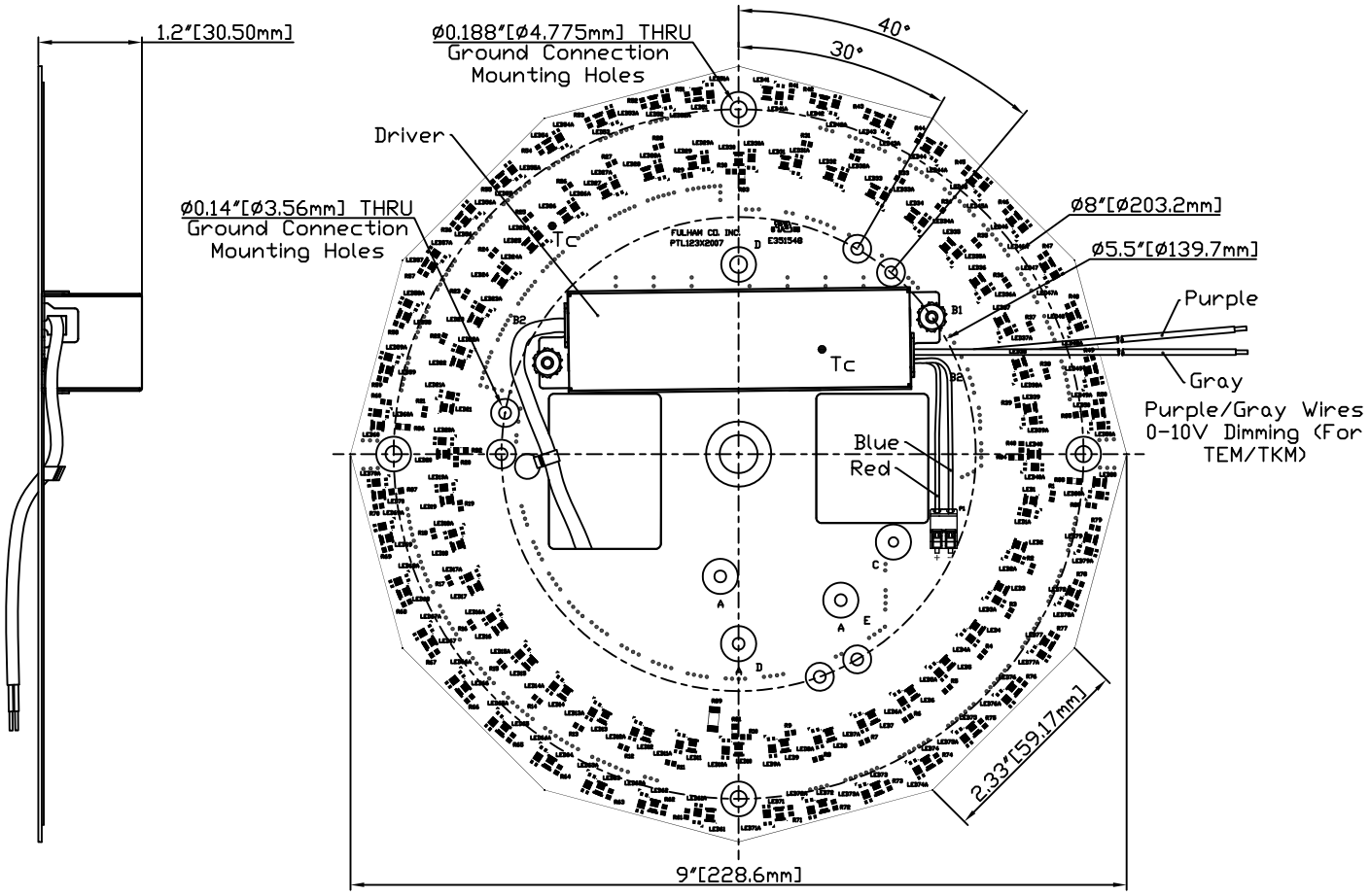
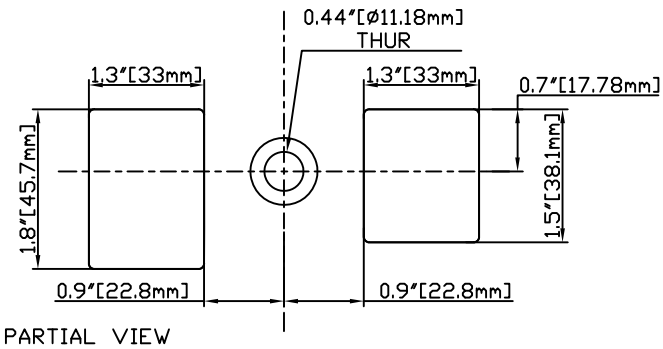
RoHS COMPLIANT

Mechanical Drawings

Wire Length - Inches

AC Input - Black / White	12
0-10V Dimming - Purple (10V+) / Gray (10V-)	12





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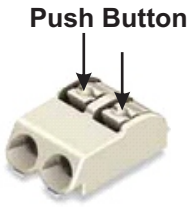
RoHS COMPLIANT

Termination Notes

- If connectors are used, use solid wire size 24 – 18 AWG, rated at a minimum 50V, minimum 105°C, and stripped to length between 6-7 mm (0.24-0.28 inches).
- Push button for insertion of conductor and for easy removal of wires.
- Connector not for multiple use



Fastening Notes

- If fastening by screw hole, use any screw with diameter less than 0.185 in (4.7mm). Use all available screw holes to ensure good contact between back side of module and mounting surface. Refer to max specified torque for installation. Suggested screw sizes: #6 or M4 Pan Head screw.
- If fastening using double-sided tape, start with clean, dust-free surface. Peel backing and place LED module on mounting surface. Firmly press down on the module to ensure good adherence. Follow the double-side tape manufacturer's installation instructions.

Environmental Rating

- LED DC Engines Modules are rated for dry locations, unless option for conformal coating is requested.
- Conformal coating is Acrylic/RTV based and rated for Environment and Moisture Protection per IPC-CC-830.

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.
- Use of thermal grease, paste, pad, or other material interface is highly recommended.

Polarity Notes

- LED Modules are polarity sensitive.
- Ensure that "positive" from LED Driver is connected to "positive" of LED modules and that "negative" from LED Driver is connected to "negative" of LED modules.
- Polarities of LED modules are marked with "+" for positive and "-" for negative.

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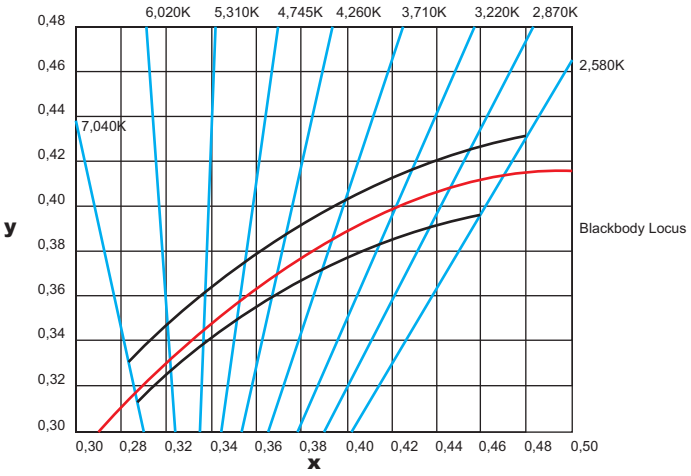
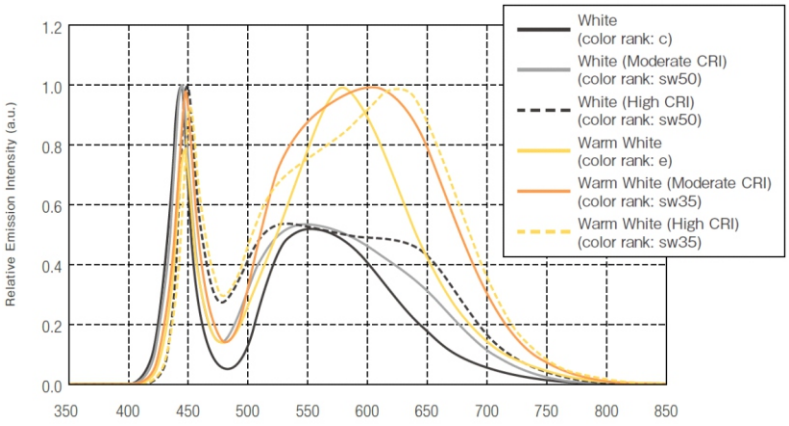
Color and Binning



Ref. Nichia
Chromaticity Diagram for ANSI bins
For reference only. For more detailed info, contact factory.

Optical Spectrum††



†† Value varies depending on product type and color rank
Ref. Nichia
LED Catalogue 2013
For reference only. For more detailed info, contact factory.

Thermal De-Rating

Ambient Temperature (Ta)	Thermal De-rating Multiplier
25ºC	1
30ºC	0.991
35ºC	0.989
40ºC	0.980
45ºC	0.975
50ºC	0.970
55ºC	0.960
60ºC	0.950

CCT vs Luminous Flux

CCT	Luminous Flux Ratio
2700K	0.87
3000K	0.93
3500K	0.96
4000K	1.00
5000K	1.07

Ref. Nichia
LED757 Spec Sheet
For reference only. For more detailed info, contact factory.

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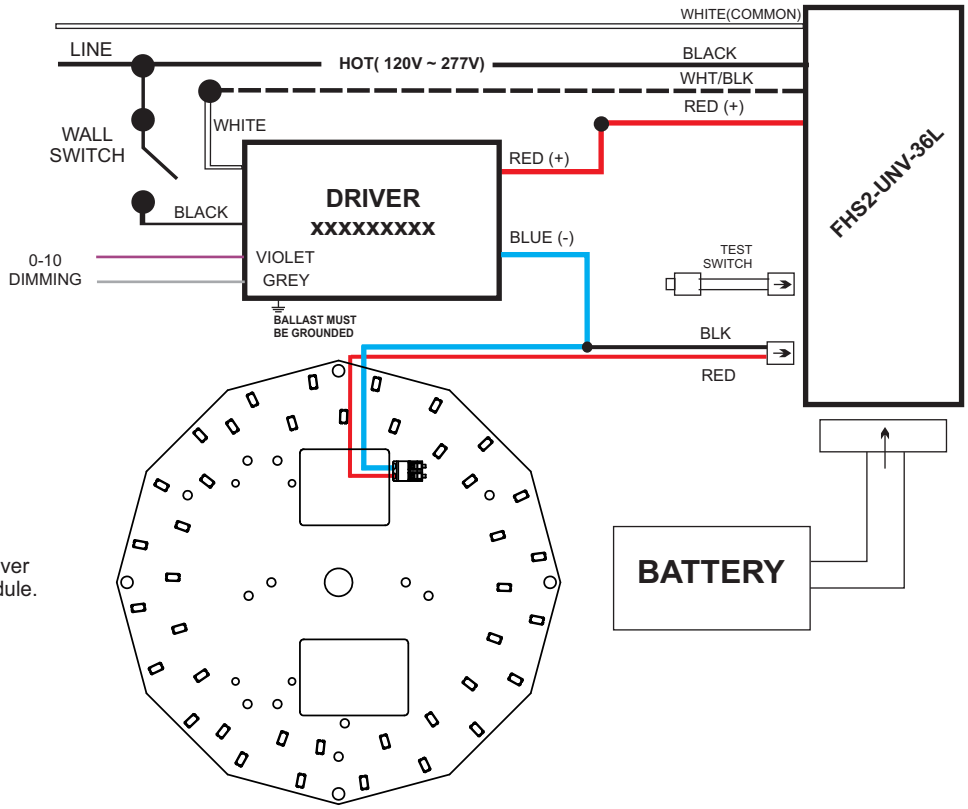
WIRING DIAGRAM (TYP)



NOTE: For illustration purposes, LED driver is shown separate from LED module.

DC ENGINES/KITS WITH EMERGENCY OPTIONS

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

Engine/Kit Part Number	Emer. Driver Part Number	Wattage	Battery Part Number	Harness (mA)	Total Vf (V)	Total Power (W)	Total Lum. Output (lm)*	Eff. (lm/W)
TET120021RDxx-01	FHS2-UNV-36L	4W	FHSBATT8-AA9 FHSBATL3-1	FHS-HARNESS-100	21.7	3.3	525	162
TKT120021RDxx-01								
TEMUNV021RDxx-01		6W	FHSBATL6-.6	FHS-HARNESS-250	21.9	5.5	870	159
TKMUNV021RDxx-01		8W	FHSBATL3-1.5 FHSBATL3-1.5S	FHS-HARNESS-350	22.2	7.8	1215	156
TET120025RDxx-01	FHS2-UNV-36L	4W	FHSBATT8-AA9 FHSBATL3-1	FHS-HARNESS-100	26.9	2.7	440	164
TKT120025RDxx-01								
TEMUNV025RDxx-01		6W	FHSBATL6-.6	FHS-HARNESS-200	27.2	5.4	875	161
TKMUNV025RDxx-01		8W	FHSBATL3-1.5 FHSBATL3-1.5S	FHS-HARNESS-250	27.4	6.9	1090	159

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RoHS COMPLIANT

DC Engine Equivalency Chart

DC Engine/Kit (9" Round)				CFL					
Engine/Kit Part Number	**System Wattage**	**Lumen Output**	**Efficacy**	**CFL Style**	**Lamp Wattage**	**# of Lamps**	**Total Wattage**	**Lumen Output**	**Efficacy**
TET120021RDxx-01	19.1W	2300 lm (4K/80CRI)	120 lm/W	Quad	13W	3	39W	2325 lm	59 lm/W
TKT120021RDxx-01					18W	2	36W	2150 lm	59 lm/W
TEMUNV021RDxx-01				Triple	13W	3	39W	2475 lm	59 lm/W
					18W	2	36W	2040 lm	56 lm/W
TKMUNV021RDxx-01					32W	1	32W	2040 lm	63 lm/W
				Circline T9	32W	1	32W	1500 lm	46 lm/W
TET120025RDxx-01	23.5W	2800 lm (4K/80CRI)	119 lm/W	Triple	42W	1	42W	2720 lm	64 lm/W
TKT120025RDxx-01									
TEMUNV025RDxx-01				Circline T9	40W	1	40W	1975 lm	49 lm/W
TKMUNV025RDxx-01									

For reference only, several factors apply.

Certification Chart

Model / Classification	TxT120021RDxx-x1 TxMUNV021RDxx-x1	TxT120025RDxx-x1 TxMUNV025RDxx-x1
RoHS COMPLIANT	YES	YES
cULus	YES	YES
cULus Classified	YES	YES
ENERGY STAR	YES	YES

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