LED TUBE SYSTEM

THE HIGH PERFORMANCE

LED Replacement Series for Fluorescent Tubes, High Bays, and Parking Garages.

KEY FEATURES INCLUDE:

- **Advanced Thermal Management**
  Industry Leading Deep Fin Heat Sinks with Aircraft Grade Aluminum and 9” (23 cm) [min] of perimeter conductive surface.

- **Multiple Color Options**
  Three color options ensure that the new lighting will match your current aesthetics, and allows for custom color options.

- **10 Year Warranty**
  Industry Leading 10 Year Warranty up to 60,000 hours of operation on all LED Tubes and external drivers.

- **Manufactured in America**
  With domestic and imported components. Factory: Southeastern PA. Higher quality control, faster delivery times, and new domestic job creation.

- **Long Lasting LED Chips**
  Surface Mounted Diodes (SMDs) last longer than their Dual In-Line (DIP) predecessors.

- **Modular Design**
  12” modular PC Boards allow for a wide range of sizes to be cost-effectively manufactured.

- **High Color Rendering**
  Colors are enhanced due to the use of LEDs selected directly on the black body curve.

- **Independent Class II Driver**
  Safety, improved thermal management, and extended lifetime are gained by locating the driver remote from the LED Tube.
24/7 APPLICATIONS

PARKING
Structures, surface and underground garages

STAIRWELL
24/7 fire stairs for any property type

HALLWAY
Hotels, hospitals, multi-family & dorms

INDUSTRIAL HIGH BAYS
Factories, warehouses & distribution centers
# LED TUBE SYSTEM

## Specification Table

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lamp Type</strong></td>
<td>Linear LED Tube</td>
</tr>
<tr>
<td><strong>Base</strong></td>
<td>Bi-Pin (G13), Single (Fa8), HO (R17d)</td>
</tr>
<tr>
<td><strong>Environmental</strong></td>
<td>Dry or damp locations only</td>
</tr>
<tr>
<td><strong>Operation</strong></td>
<td>V1: -4°F to 140°F (-20°C to 60°C); V2: -25°F to &gt;158°F (-31°C to &gt;70°C); V3: -4°F to &gt;122°F (-31°C to &gt;50°C)</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td>-25°F to &gt;185°F (-31°C to &gt;85°C)</td>
</tr>
<tr>
<td><strong>Wattage</strong></td>
<td>See chart below</td>
</tr>
<tr>
<td><strong>Input Voltage (nominal)</strong></td>
<td>V1: 100-277VAC 50/60Hz 32.18A; V2: 100-277VAC 50/60Hz 8.3A; V3: [120-430VDC]</td>
</tr>
<tr>
<td><strong>Power Factor (PF)</strong></td>
<td>&gt;0.9</td>
</tr>
<tr>
<td><strong>Total Harmonic Distortion (ATHD)</strong></td>
<td>&lt;20%</td>
</tr>
<tr>
<td><strong>Life Time</strong></td>
<td>Retro-Fit Kit Rated Life: &gt;60khrs; LED Tube per TM-21: Calculated L70(6k) = 58khrs; Reported L70(6k) &gt;36khrs</td>
</tr>
<tr>
<td><strong>LED Driver</strong></td>
<td>MBTF2 - V1: 360khrs 120VAC, 80% load, 25°C; V2: &gt;320hrs 120VAC, 80% load, 25°C; V3: &gt;90hrs 120VAC, 80% load, 60°C</td>
</tr>
<tr>
<td><strong>Energy Consumption [nominal]</strong></td>
<td>16 kWh/1000 h</td>
</tr>
<tr>
<td><strong>Certifications</strong></td>
<td>cUL, UL, FCC, ABS, CE, DLC</td>
</tr>
<tr>
<td><strong>Warranty</strong></td>
<td>LED Driver: 10 years; LED Tube: 10 years up to 60khrs</td>
</tr>
<tr>
<td><strong>Dimming</strong></td>
<td>V1, V2, V3: &lt;20%-100% (See table below)</td>
</tr>
<tr>
<td><strong>Tube (nominal)</strong></td>
<td>T10/1.25 (31.75)</td>
</tr>
<tr>
<td><strong>Off State Power Consumption</strong></td>
<td>0 Watts</td>
</tr>
<tr>
<td><strong>On State</strong></td>
<td>Instantaneous</td>
</tr>
<tr>
<td><strong>Tube Driver Distance</strong></td>
<td>16” (400mm) standard Up to 12ft (3.5m)</td>
</tr>
</tbody>
</table>

## Output Wattage Options
See table below.

- **3500K, 4000K, 5000K ANSI BINNED**
- **COLOR RENDERING INDEX (CRI)** >70, 85, (90 AVAILABLE)
- **DRIVER OPTIONS**: DIMMING STANDARD
- **MULTI TUBE DRIVER**: - 1, 2, 3, 4

## Package Information

<table>
<thead>
<tr>
<th>Standard Package</th>
<th>Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>12 LED Tubes</td>
</tr>
<tr>
<td>Sales Units</td>
<td>Varies</td>
</tr>
<tr>
<td>Package Items</td>
<td>LED Tubes and Drivers, Installation Kit and Instructions</td>
</tr>
<tr>
<td>Weight lbs(kg)</td>
<td>2ft(600mm) 18 (8) 4ft(1200mm) 28 (13)</td>
</tr>
</tbody>
</table>

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INDEPENDENCE LED TUBE

Philadelphia Headquarters: 487 Devon Park Drive, Suite 204, Wayne, PA 19087

www.independenceLED.com (484) 588-5401

2011 GREEN BUSINESS OF THE YEAR

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LED TUBE SYSTEM

Accessories:
Attachment Clip (PN: 125-1000100)
In line battery backup (Consult Factory)

Most Popular:
R2-21140K-85-CB2-V1[DIM]  
R2-21540K-85-FB2-V2DIM  
R2-41640K-85-CB2-V2DIM

Number of Tubes
1 = 1 tube
2 = 2 tubes
3 = 3 tubes
4 = 4 tubes

Wattage
(See table below)

LED Driver
(See table below)

CRI
70 > 70
85 = 80-85

Dimming
[] = No Dimming
DIM = Dimming (See table below)

Length
2 = 2' (600mm)
4 = 4'(1200mm)
x = (See table below)

Product Category
R - RetroFit

ANSI Color Bin
35K = 3500K
40K = 4000K
50K = 5000K

Base
1 = Single Pin (Fa8)
2 = Dual Pin (G13)
3 = HO (R17d)

Number of Tubes
1 = 1 tube
2 = 2 tubes
3 = 3 tubes
4 = 4 tubes

Wattage
(See table below)

Lens Type
F = Frosted
C = Clear

LED Driver
(See table below)

Custom

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**Length ft (mm)** | **Wattage** | **LED Driver:** | **Lumens** | **CRI**
--- | --- | --- | --- | ---
5 (1500) | 16 | V1DIM | 1600 | 85 | 1850 | 70 |
| 23 | V1DIM | 2300 | 2525 |
| 30 | V1DIM | 3000 | 3300 |
6 (1800) | 16 | V1DIM | 1600 | 85 | 1850 | 70 |
| 23 | V1DIM | 2300 | 2525 |
| 30 | V1DIM | 3000 | 3300 |
7’ (2100) | 25 | V1DIM | 2500 | 85 | 2750 | 70 |
| 34 | V2DIM | 3400 | 85 | 3750 | 70 |
| 45 | V2DIM | 4500 | 85 | 4950 | 70 |

### Notes
1. Not all model combinations are available
2. MBTF per MIL-HDBK-217F
3. Extended lead times and minimums maybe required for some models
4. Frosted lens has 3% lower lumens than clear lens
5. Other ANSI Color bins available
6. Operation to -40°F/-40°C is available
7. Extended warranties are available
8. Non-UL applications (Some Models)
9. 70 and 85 are standard and can be produced with any color
10. Specifications and availability subject to change without notice
11. Some models can use ELV Dimming with a special order, consult factory
12. Varies depending on color temperature, CRI, LED driver and lens (±10%)
13. Patent Pending: USA +40 Countries
14. EPAct -179d tax incentive ready product given dimming bi-level switching requirements
15. Worst case temperature for R2-429 @25°C
16. Certain chemicals that may exist in end-user locations release airborne contaminants that can impact the integrity and safety of key fixture components that contain acrylic or polycarbonate material
17. Consult website for further details

Compliance Standards

UL 1993 - Self-Ballasted Lamps and Lamp Adapters, Ed. 4: 2012
UL 1598 - Luminaires
UL 1598C - Light-Emitting Diode (LED) Retrofit Luminaria Conversion Kits
CSA C22.2 No. 250.13 - Light emitting diode (LED) equipment for lighting applications, Ed. 122012
EN 62471:2008 - Photo Biological Safety of Lamps and Lamp Systems
EN 62031:2008 - LED modules for general lighting. Safety specifications
EN 61347-1:2008 - Lamp controlgear. General and safety requirements
EN 55015:2006 - Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
EN 61347-2-13:2006 - Lamp controlgear. Particular requirements for d.c. or a.c. supplied electronic control gear for LED modules
EN 61000-3-2:2006 - Electromagnetic compatibility (EMC). Limits. Limits for harmonic current emissions
EN 61000-3-3:2008 - Electromagnetic compatibility (EMC). Limits. Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems
EN 60598-1:2008 - Luminaires. General requirements and tests
EN 61547:2009 - Equipment for general lighting purposes. EMC immunity requirements
FCC Part 15, Subpart B, Class B -
ANSI/ANSI G 78.1-2010 - Electric Lamps-Double-Capped Fluorescent Lamps-Dimensional and Electrical Characteristics
ISO-9001:2008 Certification - The International Organization for Standardization fosters consistency in product delivery and quality assurance
IEC 60529-2004 - Degrees of Protection Provided by Enclosures (IP Code)

Specification, LED Driver, V1
Dimensions may vary
LED TUBE SYSTEM

Parameter
(Values and options may vary consult factory)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute Maximum Voltage on the 0-10V Wire</td>
<td>-2V</td>
<td>15V</td>
<td></td>
</tr>
<tr>
<td>0-10V Wire Current Sourcing Capability</td>
<td>100µA</td>
<td>150µA</td>
<td>200µA</td>
</tr>
<tr>
<td>12V output voltage (Vaux)</td>
<td>10.5</td>
<td>12V</td>
<td>12.5V</td>
</tr>
<tr>
<td>12V source current (Vaux)</td>
<td></td>
<td>6mA</td>
<td></td>
</tr>
</tbody>
</table>

Example:
- Lutron Power Pak PP-277H
- Lutron Diva DVT (0-10V LED Dimmer)
- Leviton AWRMG-7DW

Specification, LED Driver, V2

Parameter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute Maximum Voltage on the 0-10V Wire</td>
<td></td>
<td></td>
<td>15V</td>
</tr>
<tr>
<td>0-10V Wire Current Sourcing Capability</td>
<td></td>
<td>200µA</td>
<td></td>
</tr>
<tr>
<td>12V output voltage (Vaux)</td>
<td>10.8V</td>
<td>12V</td>
<td>13.2V</td>
</tr>
<tr>
<td>12V source current (Vaux)</td>
<td></td>
<td>20mA</td>
<td></td>
</tr>
</tbody>
</table>

Implementation 1: DC Input

Output Current vs. Dimming Voltage

Normalized Output Current

Normalized Dimming Voltage

Implementation 2: AC Input

Normalized Output Current

Normalized Dimming Voltage

Example:
- Lutron Power Pak PP-277H
- Lutron Diva DVT (0-10V LED Dimmer)
- Leviton AWRMG-7DW


**Specification, LED Driver, V3**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Phase - trailing edge compatible</td>
<td></td>
</tr>
<tr>
<td>Electronic Low Voltage (ELV)</td>
<td></td>
</tr>
<tr>
<td>Example: Lutron DVELV-300P</td>
<td></td>
</tr>
<tr>
<td>Leviton 6615-P</td>
<td></td>
</tr>
</tbody>
</table>