P850
Next Generation LED Luminaire
with AeroFlow® Cooling System
P850 is a ground-breaking main road luminaire that perfectly combines innovations in heat management, optical performance and energy saving in a beautifully simple aesthetic exterior. The P850 incorporates very low thermal resistance LEDs that give exceptionally low lumen depreciation over life.

P850 offers the ultimate solution to replace traditional HID sources with versatility and reliability. The sleek, low profile appearance and low weight allows the P850 to be safely installed on most existing infrastructures.

Exceptional thermal management is achieved through the innovative AeroFlow® Cooling System, creating even heat dissipation and maximising luminaire life.

P850 represents the state-of-the-art in the design of high power LED luminaires at a surprisingly affordable price.

This luminaire complies with ETL guidelines for White Light Emitting Diode Lighting Units and is eligible for the Enhanced Capital Allowance (ECA) scheme.

EXTERIOR LUMINAIRE OF THE YEAR 2013

“Judges were impressed by the elegant design and efficient heat management of CU Phosco’s latest LED road lantern...” - Lux Magazine

BENEFITS

- Slim, elegant and state-of-the-art design
- Next generation high flux density and efficacy LED
- Superior luminaire efficacy up to 122 lm / W
- AeroFlow® Cooling System
- L90 > 100,000 hrs ( 350mA, Ta = 25°C )
- L85 > 100,000 hrs ( 700mA, Ta = 25°C )
- Maximised savings on energy and maintenance costs
- Minimal total cost of ownership (TCO)
- Up to ME1 lighting class applications
- G6 glare rating. Dark sky friendly, no upward light
- Flexible and intelligent lighting control options
- Lightweight and low windage allowing retrofit onto most existing columns
- IP66 ingress protection
- 100% recyclable, low carbon footprint

FLEXIBLE MOUNTING OPTIONS

Choice of side entry spigots Ø34-42mm or Ø42-60mm and post top spigots Ø42-60mm or Ø76mm (nominal diameters) providing -10°, -5°, 0°, +5° and +10° tilt in both post top and side entry arrangements with permanent indication on the luminaire.
REFLECTOR TECHNOLOGY
Each luminaire incorporates up to three reflector-groups manufactured from high-spec 95% total reflectance aluminium. Reflectors can be individually selected from a range of distributions to build a combined photometric output to suit the most challenging scheme.

EXCEPTIONAL OPTICAL PERFORMANCE
- Standard Neutral White LEDs (CCT = 4000K)
- Colour Rendering Index > 70
- Improved mesopic vision
- Exceptional uniformity
- Dark sky friendly (zero upward light)
- Minimal glare (G6)

<table>
<thead>
<tr>
<th>Luminaire Luminous Flux</th>
<th>10600 – 31700 lm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luminaire Efficacy</td>
<td>up to 122 lm/W</td>
</tr>
</tbody>
</table>
**HEAT DISSIPATION RIM**
- Dissipates heat evenly
- Aesthetically pleasing
- Easy handling for operatives

**LUXEON® M LEDs**
- Superior light output
- High flux density & efficacy
- Proven reliability
- Tight CCT control

**FLAT GLASS**
- Vandal resistant toughened glass
- IP66 sealed, easy cleaning
- Full cut-off distribution
- Dark sky friendly
- Low glare
- Pollution friendly

**LIGHT ENGINE**
- Thermal path is designed to optimise the heat transfer away from the LEDs, for low lumen depreciation
- Metal core PCB with LUXEON® M LEDs (standard)

**HOUSING**
- High pressure die cast aluminum
- Unique design has capacity to spread heat uniformly
- Corrosion resistant
- Sustainable and recyclable

**LONGITUDINAL THERMAL DISTRIBUTION**

Most high power luminaires that use modular LED panels have issues of centralised heating. LEDs in the centre of the luminaire cannot be cooled as effectively as those near the edge, with a shorter lifetime and faster depreciation of performance.

P850 addresses this problem elegantly by using linear PCBs on the sides. Fewer high powered LEDs, placed strategically along the luminaire, allows the unique geometry of the housing to maintain all LEDs at an even low temperature.
HIGH EFFICIENCY REFLECTORS
- >95% Total Reflectance
- Highly specular surface

HIGH EFFICIENCY REFLECTORS

THERMAL BARRIER
- Gear and optical compartments are separated for optimised thermal management

PROGRAMMABLE LED DRIVER
- Long lifetime and robust protection against temperature, moisture and vibration
- Module Temperature Protection (MTP)
- Integrated Dynadimmer, 1 - 10V or DALI dimming inputs
- Adjustable Output Current (AOC)
- Constant Light Output (CLO)

ACCESS PANEL
- Spacious and secure access area
- IP66 sealed

INTERFACING FINS
- Dissipate driver's heat into housing
- Increase driver's life and reliability

SPIGOT CAP
- Side Entry Ø34 - 42mm and Ø42 - 60mm
- Post Top Ø42 - 60mm and Ø76mm

AeroFlow® COOLING SYSTEM
Unique aerodynamic vents created by the vertical fins and the outer rim are designed to accelerate natural convection through the heatsink. Each airway is heated and the rising hot air draws cold air in from the bottom, immediately cooling the LEDs. On leaving the vents, the hot air converges smoothly into a laminar flow, quickly removing heat from the luminaire.
DYNADIMMER

The Xitanium electronic driver incorporates the Dynadimmer feature, a programmable 5-step dimming system which will generate substantial energy savings by providing the precise amount of light at the right time.

The times and light levels are fully flexible to suit the lighting profile required.

The driver is able to calculate the virtual clock time by analysing the duration of operation of the driver from the previous 3 days and sets the times of 5 light level steps accordingly.

CONSTANT LIGHT OUTPUT (CLO)

All light sources experience lumen depreciation - a reduction in light output over time, which means the system would consume more power than necessary to meet the required light levels at the end of the lamp’s useful life (e.g. L80). The drivers of the P850 can be programmed to ensure that the LEDs will always deliver the necessary light level, by increasing the operating current over time to compensate for the LED lumen depreciation. Over-lighting at the beginning is taken away and this feature can produce extra energy saving and extend the lifetime of the system.

ENERGY EFFICIENCY

The exceptional thermal management in P850 together with the high performing LEDs and optics deliver a flexible range of solutions for your street lighting project. Solutions can be selected to meet the various lighting class requirements, with significant maintenance and energy savings over conventional luminaires.

<table>
<thead>
<tr>
<th>Class</th>
<th>HID Lamp</th>
<th>System Power</th>
<th>Luminaire Efficacy</th>
<th>Typical P850 Replacement</th>
<th>System Power</th>
<th>Energy Savings</th>
<th>Luminaire Efficacy</th>
<th>System Power</th>
<th>Energy Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME1</td>
<td>400W SON</td>
<td>449W</td>
<td>102 lm/W</td>
<td>31,700 lm @700mA</td>
<td>320W</td>
<td>33%</td>
<td>105 lm/W</td>
<td>279W</td>
<td>38%</td>
</tr>
<tr>
<td></td>
<td>315W CDM</td>
<td>341W</td>
<td>89 lm/W</td>
<td>28,000 lm @600mA</td>
<td>259W</td>
<td>24%</td>
<td>108 lm/W</td>
<td>239W</td>
<td>30%</td>
</tr>
<tr>
<td>ME2</td>
<td>315W CDM</td>
<td>341W</td>
<td>89 lm/W</td>
<td>22,000 lm @450mA</td>
<td>195W</td>
<td>43%</td>
<td>113 lm/W</td>
<td>180W</td>
<td>47%</td>
</tr>
<tr>
<td></td>
<td>250W SON</td>
<td>301W</td>
<td>90 lm/W</td>
<td>17,600 lm @350mA</td>
<td>151W</td>
<td>50%</td>
<td>117 lm/W</td>
<td>140W</td>
<td>54%</td>
</tr>
<tr>
<td>ME3</td>
<td>150W SON</td>
<td>180W</td>
<td>80 lm/W</td>
<td>13,000 lm @250mA</td>
<td>108W</td>
<td>40%</td>
<td>120 lm/W</td>
<td>102W</td>
<td>43%</td>
</tr>
</tbody>
</table>

1 HID Luminaire LOR = 75%
2 Average power consumption with CLO is based on UMS charge code power
PROGRAMMABLE LIGHTING CONTROLS

The Xitanium driver enables CU Phosco Lighting to adjust the light level to match a specific application with optimised energy savings. The various control options offer different levels of energy savings, from simple stand-alone controls to more advanced networked Central Management Systems (CMS).

P850 is currently compatible with the following CMS:
- Ask Controls RMS
- Harvard LeafNut
- Mayflower
- Philips Starsense
- Telensa PLANet
- Zodion Vizion

<table>
<thead>
<tr>
<th>CONTROL SYSTEM</th>
<th>BENEFITS</th>
<th>FUNCTIONALITY</th>
<th>RELATIVE SAVING</th>
<th>With CLO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photocell</td>
<td>Standard control</td>
<td>Switch on/off with ambient light level</td>
<td>0%</td>
<td>up to 10%</td>
</tr>
<tr>
<td>Dynadimmer</td>
<td>Substantial energy saving</td>
<td>Programmable dimming (5 steps)</td>
<td>up to 20%</td>
<td>up to 30%</td>
</tr>
<tr>
<td>Wireless CMS</td>
<td>Full control and monitoring of each individual luminaire</td>
<td>DALI and 1-10V dimming inputs with full CMS functionality</td>
<td>up to 40%</td>
<td>up to 50%</td>
</tr>
</tbody>
</table>

SCHEME EXAMPLE  Road refurbishment ME2 lighting class (EN13201)

Luminaire replacement on dual carriage way with existing column at 40m spacing, 12m height and opposite arrangement.

Result: P850 can replace a conventional 250W HPS luminaire with better performance (improved uniformity, less glare). 20-60% energy savings are achievable depending on column spacing, road configuration and lighting class with the added comfort of white light. Further savings can be achieved using controls like LumiStep, Dynadimmer or a Central Management System.

<table>
<thead>
<tr>
<th></th>
<th>( \text{Lav} \text{ (cd/m}^2) )</th>
<th>( \text{U_0} )</th>
<th>( \text{U_I} )</th>
<th>( \text{Ti} \text{ (%)} )</th>
<th>( \text{SR} )</th>
<th>( \text{W (System)} )</th>
<th>( \text{W / km} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target (ME2)</td>
<td>1.5</td>
<td>0.4</td>
<td>0.70</td>
<td>10</td>
<td>0.5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>250W HPS Luminaire</td>
<td>2.6</td>
<td>0.71</td>
<td>0.70</td>
<td>9.8</td>
<td>0.68</td>
<td>301</td>
<td>7525</td>
</tr>
<tr>
<td>P850</td>
<td>1.5</td>
<td>0.81</td>
<td>0.82</td>
<td>6.6</td>
<td>0.81</td>
<td>151</td>
<td>3775</td>
</tr>
<tr>
<td>P850 (with CLO)</td>
<td>1.5</td>
<td>0.81</td>
<td>0.82</td>
<td>6.6</td>
<td>0.81</td>
<td>140</td>
<td>3500</td>
</tr>
</tbody>
</table>

TOTAL COST OF OWNERSHIP

While HID technology has low initial cost, it requires frequent maintenance that results in a high total cost of ownership.

P850 with dimming and CLO options delivers an attractive total cost of ownership package making it extremely competitive for invest-to-save scenarios.

*Based on example above, 20 years lifetime
<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Source</td>
<td>Philips Lumileds LUXEON® M LEDs</td>
</tr>
<tr>
<td>Number of LEDs</td>
<td>36</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>89 ~ 302W</td>
</tr>
<tr>
<td>Correlated Colour Temperature</td>
<td>Neutral white, 4000K</td>
</tr>
<tr>
<td>Glare Rating</td>
<td>G6</td>
</tr>
<tr>
<td>Colour Rendering Index</td>
<td>&gt; 70</td>
</tr>
<tr>
<td>Optical Cover</td>
<td>FIat Glass</td>
</tr>
<tr>
<td>Luminaire Luminous Flux</td>
<td>10,600 ~ 31,700 lm</td>
</tr>
<tr>
<td>Luminaire Efficacy</td>
<td>Up to 122 lm/W</td>
</tr>
<tr>
<td>Electrical Class</td>
<td>I</td>
</tr>
<tr>
<td>Control System Input</td>
<td>1-10V and DALI</td>
</tr>
<tr>
<td>Lumen Maintenance Output</td>
<td>L85 &gt; 100,000 hours (700mA, Ta = 25°C)</td>
</tr>
<tr>
<td>Driver Current</td>
<td>L90 &gt; 100,000 hours (350mA, Ta = 25°C)</td>
</tr>
<tr>
<td>Surge Protection</td>
<td>200mA ~ 700mA (in 50mA steps)</td>
</tr>
<tr>
<td>Dimming Control</td>
<td>8 kV Comm. Mode 6 kV Diff. Mode to IEC 61000-4-5; 10 kV Single Pulse</td>
</tr>
<tr>
<td>Lighting Regulation</td>
<td>Dynadimmer</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>Mini Photocell • NEMA Socket • Wireless CMS options</td>
</tr>
<tr>
<td>Installation Height</td>
<td>-40°C to +25°C (700mA)</td>
</tr>
<tr>
<td>Installation</td>
<td>-40°C to +40°C (350mA)</td>
</tr>
<tr>
<td>Installation</td>
<td>8 ~ 18m</td>
</tr>
<tr>
<td>Post Top / Side Entry Tilt</td>
<td>SE Ø 34-42 Ø 42-60, PT Ø 42-60 Ø 76 mm</td>
</tr>
<tr>
<td>Material</td>
<td>-10°, -5°, 0°, 5°, 10°</td>
</tr>
<tr>
<td>Finish</td>
<td>High pressure die cast aluminium (housing)</td>
</tr>
<tr>
<td>Colours</td>
<td>Polyester powder coat cured under heat</td>
</tr>
<tr>
<td>Ingress Protection</td>
<td>Iron grey (RAL 7011), other RAL colours available on request</td>
</tr>
<tr>
<td>Wind Area (SCx)</td>
<td>IP66</td>
</tr>
<tr>
<td>Weight (Total)</td>
<td>0.052m²</td>
</tr>
<tr>
<td></td>
<td>15kg</td>
</tr>
</tbody>
</table>

CU Phosco Ltd.
Charles House, Great Amwell
Ware, Hertfordshire. SG12 9TA, UK
T  +44 (0) 1920 860600
F  +44 (0) 1920 485915
E  sales@cuphosco.co.uk
W  www.cuphosco.com

Copyright© 2016 CU Phosco Ltd. Due to constant product development, details in this brochure are subject to change at any time. Consult us for the latest information.

05/2016