

Linear EXT

The Definition of Outdoor Application Flexibility



MADE IN THE
USA

Patents Pending

U.S. ARCHITECTURAL
LIGHTING

Linear EXT Flexibility

Utilizing the Solid-State Source to its Fullest



The efficiency, precision, and longevity of LED's far exceeds the HID illumination sources that preceded them. Even more dynamic than these qualities, LED's allow for optical flexibility heretofore not achievable with any other source.

Linear EXT capitalizes on that flexibility to illuminate the site and roadway in ways only limited by the imagination. Individual optical panel (the PLED Module) rotatability allows for placement of light irrespective of the orientation of the luminaire, thus making aesthetic compatibility distinct from a site's optical needs.

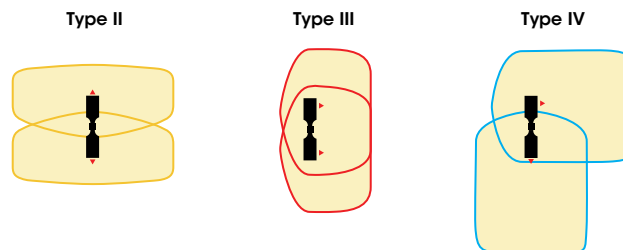
Linear EXT puts a whole new level of control in the hands of the illumination professional relative to fixture placement and lighting patterns. Leveraging the power of LED's is the real story behind Linear EXT.

Site Adaptive Pole Mounting Configurations

The ability to rotate asymmetric optical patterns by 90° increments combines with a wide variety of luminaire mounting configurations to allow complete illumination coverage of any site.



Examples of the flexibility of distribution coverage from twin mount luminaires @ 180°:

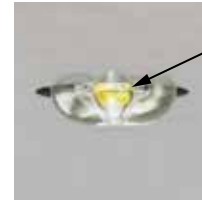


PLED® Optics - The Basics

The U.S. Architectural **PLED**® (Panel LED) System utilizes a micro reflector behind each LED in asymmetric distributions to enhance forward throw and reduce backlight. Each LED is optically controlled by a lens that has its distribution type and direction of light throw molded into it.

The LED's and lenses are arrayed on circuit boards that are field rotatable in 90° increments and field replaceable.

Ultra high performance optics developed by U.S. Architectural



Micro-reflector behind LED enhances forward throw and reduces backlight

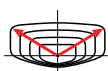


Distribution type and direction of light throw

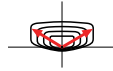


90° field rotatable

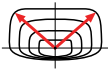
Available Light Distributions



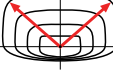
Type II*



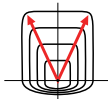
Type II FR*



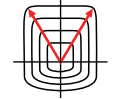
Type III M*



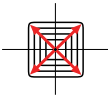
Type III W*



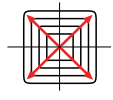
Type IV*



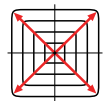
Type IV FT*



Type V Sq. N



Type V Sq. M



Type V Sq. W

*Asymmetric optics field rotatable in 90° increments.

LED Distributions

10 distributions are available to "shape" the output of the LED's to conform to the needs of any roadway or site. Traditional Type II, III, IV, and V - Square patterns are bolstered by variations of those distributions tailored to suit specific needs.

For auto dealerships, the Type II-FR distribution increases illumination on the front row of cars on display and the Type V-SQ-N concentrates more light in a tighter area to enhance the retail effect.

Our Type IV-FT extends the forward throw of illumination to suit the needs of sports facilities (such as tennis courts) by allowing poles to be located outside the field of play.

Standard Type III and Type V-SQ distributions are enhanced with multiple "beamspread" selections (medium and wide Type III's; narrow, medium, and wide Type V-SQ's).

Rotatability of the **PLED**® "panels" allows for the simulation of back-to-back luminaires using only one housing. See the next page "PLED Optics - Flexibility and Rotatability" for an in-depth discussion.

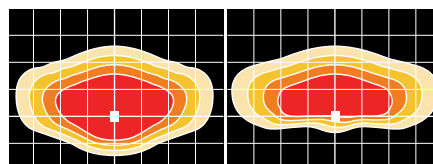
House Side Shield

House side shields are applied to each individual LED in asymmetric distributions and result in outstanding house side cutoff to control property line trespass and unwanted brightness in residential areas.

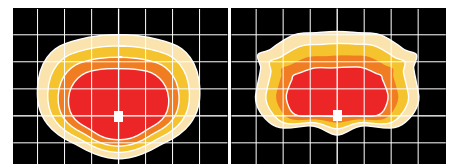
As with standard **PLED**® panels HS **PLED**® panels may be field rotated in 90° increments and are field replaceable.



House Side Shielding cuts off backlight to less than .1fc at 1/2 mounting height behind pole



Type II Standard and with House Side Shield



Type IV Standard and with House Side Shield

Legend for light intensity levels:

- .1 - .2Fc
- .2 - .5Fc
- .5 - 1Fc
- 1Fc and above

PLED® Optics - Flexibility and Rotatability

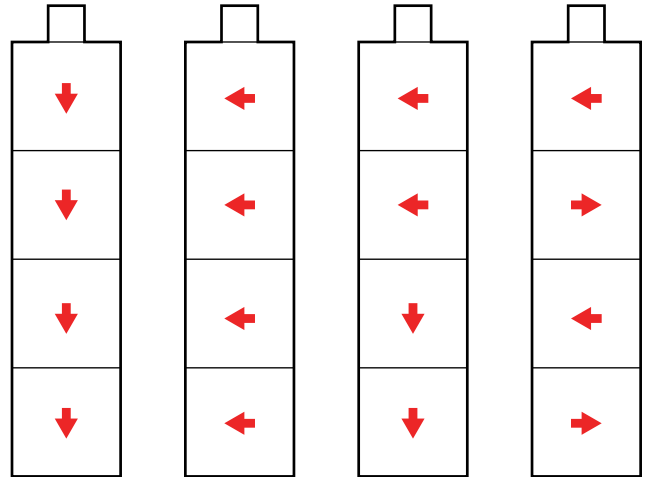
The name **PLED**® Array derives its name from the physical shape of the optical module. First and foremost it is a square panel. Being square instead of a linear array (such as a "lightbar"), the optic is geometrically neutral. Mounting the PLED Array in any of 4 orientations has no impact on its appearance. The same does not apply to a linear array of LED's.

(Graphic showing one **PLED**® board "rotated" in 4 directions versus a linear array - lightbar - rotated in 4 directions)

While both approaches allow the luminaire to be populated with a similar number of LED's, the **PLED**® design makes for a more rigid component that creates more consistent contact with the mounting surface as opposed to a linear source, thus enhances thermal evacuation from the LED's.

(Graphic showing a **PLED**® panel as being in complete surface contact versus a linear component that "warps" between mounting screws)

As applied in Linear EXT, this **PLED**® rotatability allows the panels to be oriented as a unit changing the direction of the distribution pattern without moving the fixture, or the panels may be rotated individually to allow a single fixture to function like a two fixture array on a pole.



View on end from the front.

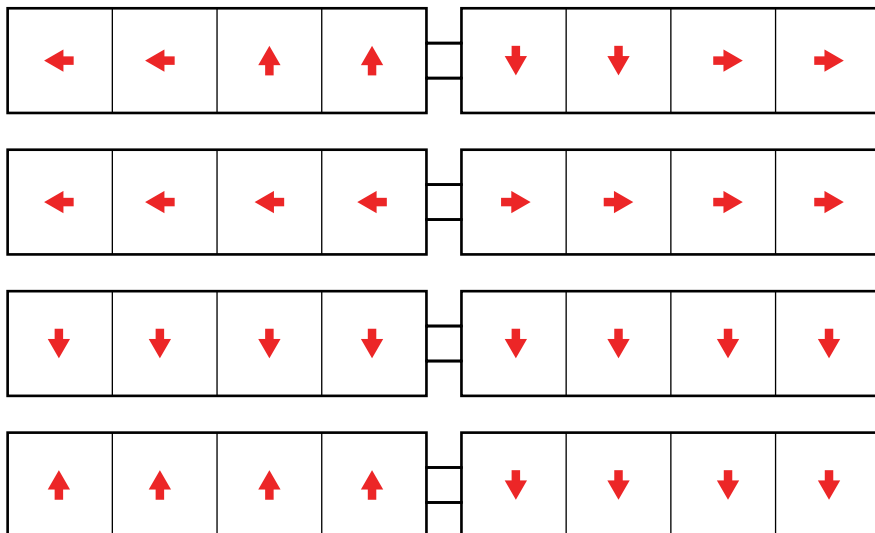
Linear EXT also puts greater control over the LED count in the hands of the specifier due to its design. In a typical square or rectangular luminaire, panel arrays are normally combined in multiples of 2 (2, 4, or 6 panels) to keep visual symmetry of the optical array. The Linear EXT design allows any count from 2 to 6 panels (2, 3, 4, 5, or 6) to be combined in one fixture. The specifier calls out the ideal number of LED's to maintain lumen balance throughout the lighting plan and the most economic LED count by not forcing the use of more LED's than necessary (Why use 120 LED's when 100 would do?)

Further flexibility in Linear EXT is in the adjustability of the entire luminaire assembly. Accessed inside the electrical/mounting compartment, Linear EXT may be rotated $\pm 5^\circ$ around its center axis.

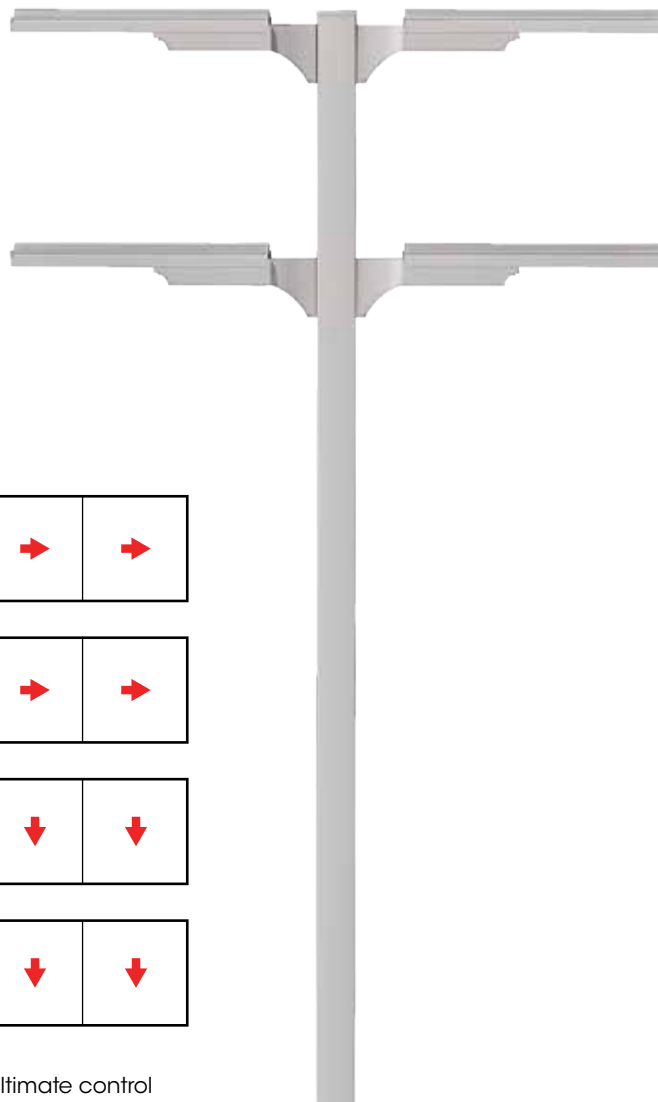
Optics - Flexibility and Rotatability (cont.)

While tilting LED site/area optics like floodlights does not work, the ability to adjust Linear EXT $\pm 5^\circ$ does allow for precise coverage of critical sites and when used in conjunction with the **PLED** House Side Shields provides adjustment of the optics to reduce off-site glare and mitigate light trespass in code sensitive applications.

The unique design and configuration of Linear EXT creates another variant in mounting configurations that no other luminaire can claim. This mounting configuration is referred to as 2 x 2@180°. The "rows" of luminaire may be spaced either 18" or 24" apart vertically and given the **PLED** Array rotatability, hundreds of illumination patterns can be achieved considering the combination of distributions, LED counts, rotation combinations, etc.

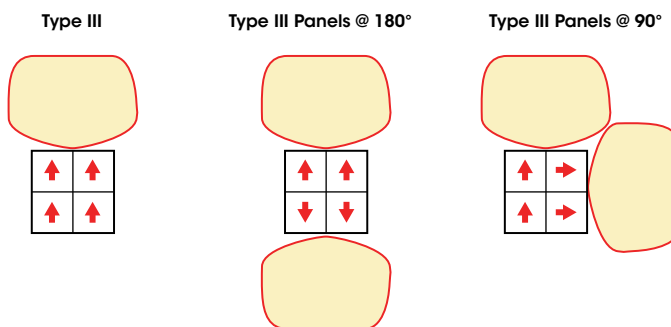


With a very simple set of standard components, Linear EXT puts ultimate control over site/area illumination in the hands of the lighting specifier. Literally hundreds (possibly thousands) of Linear EXT/**PLED** configurations are achievable.



Configuration shown:
2x2 @ 180°

In addition, the individually rotatable panels create the same effect by rotating the panels in a single luminaire independently.



Optical Housing

Low copper (A356 alloy; <0.2% Cu) cast aluminum Optical Housing is over 30% more conductive to heat than most other die cast alloys used today.





PLED Optical Panels

Optical Housing is milled to a flatness of .003" over 12" to provide maximum surface contact with the PLED Optical Panels thereby greatly reducing the junction temperatures of the LED's.

LED Drivers

Drivers are mounted flush against the electrical compartment housing for maximum heat dissipation and held in place by a quick-release slip-bracket for ease of servicing.

Surge Protection



Today's energy efficient products rely heavily on electronic circuitry that requires far less power than was used in the past. The sophistication of these components comes with the challenge of being far more sensitive to power fluctuations than legacy products using transformers or core and winding inductors. Fusing offers a measure of protection to wiring, but fuses react too slowly to properly protect electronic HID ballasts and LED drivers.

Surge protectors react quickly to power spikes, absorbing or completely shunting them away from luminaire components. However, unlike fuses, surge protectors are a perishable item. They are rated according to the number and intensity of spike and surges and when that combination of frequency and intensity are reached, they no longer function to protect components down line and must be replaced. Thus, installing surge protectors in easily accessible locations for future maintenance is the prudent course.

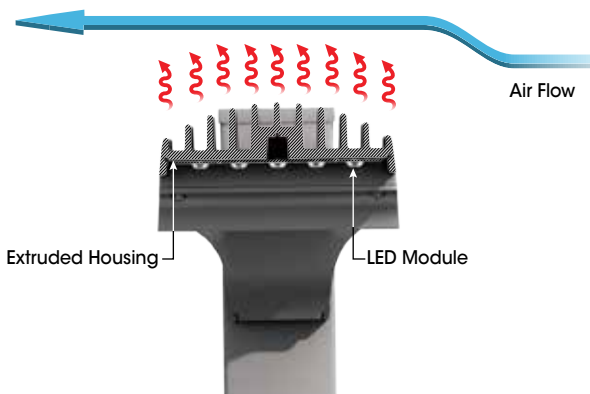
U.S. Architectural Lighting supplies a surge protectors with every Linear EXT luminaire to insure long term performance.

Thermal Management/ Control Options

LED's are affected by heat in 3 key ways:

- The higher the operating temperature, the shorter the effective LED lifespan.
- Phosphors that create the color temperature of LED's shift their color the hotter the LED operates.
- The higher the LED operating temperature, the less efficient the lumen output of the LED.

Keeping the internal temperature of the LED (called the junction temperature) as low as possible, maximizes LED performance in all these areas.



Options for Controlling Linear EXT

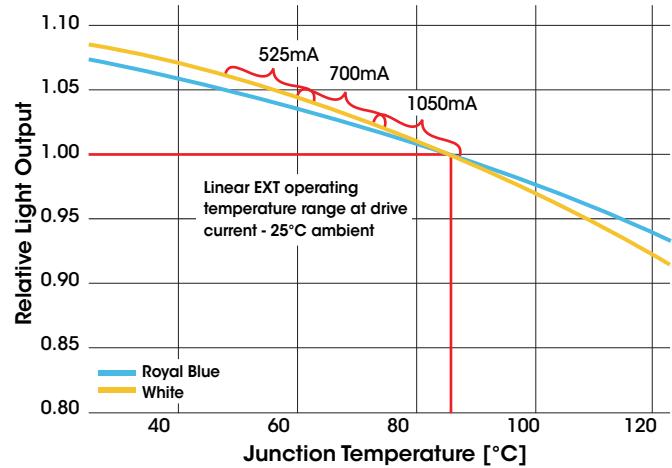
HLSW – Selecting the HLSW option provides an externally switched circuit for step dimming the luminaire from 50% to 100%. The control may be an external timer, an on/off signal from the building automation system, a master motion sensor or any other digital on/off signal.

TPR7 – Selecting the TPR7 option provides a 7-pin ANSI C136.41 dimming receptacle.

MS-F211 – Selecting this option provides a motion sensor pre-programmed to step dim the fixture from 50% to 100%.

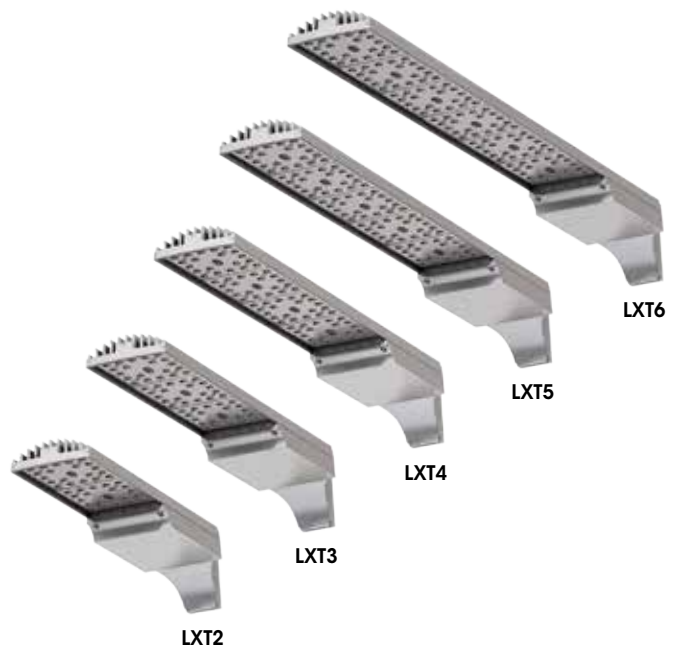
In addition, the Linear EXT Electrical Housing has the capacity to be called out with a wide variety of wireless control systems provided by others.

Lumen Output of LEDs - T_j test = 85°C



Example of Lumen Output Impact as Junction Temperature rises – 100% Output @ 85°C

The Linear EXT Optical Housing utilizes a 6063-T5 aluminum alloy that conducts heat >50% more efficiently than other popular die cast aluminum alloys. In addition, the mounting surface of the **PLED**® Optics is milled to a flatness of .003" over 12" to allow complete contact of the **PLED**® and Optical Housing surfaces promoting outstanding thermal control over the LED's.





Specifications - Linear EXT Site/Area

Optical Housing - Extruded aluminum (6063-T5 alloy) assembly with integral cooling fins. The Optical Panel mounting surface is extruded flat (surface variance $\pm .003"$) to facilitate thermal transfer of heat to the housing and cooling fins. Cooling fins are tapered from bottom to top to promote thermal flow away from the Optical Panel mounting surface. Optical and Electrical Housings are mechanically bonded to form a continuous rigid assembly.

Mounting Arm/Electrical Housing - Heavy wall cast aluminum (A356 Alloy; 0.2% copper) housing with hinged cast door. Closure uses two stainless steel captive hex head screws and silicone gasketing. Two mounting holes allow fixture to be bolted to the pole. The top mounting hole and wiring hole are slotted to allow the fixture to be tilted up to 5 degrees (use degree symbol) along its long axis.

PLED[®] Optical Modules - Emitters (LED's) are arrayed on a metal core PCB panel with each emitter located on a copper thermal transfer pad and enclosed by an LED refractor. In asymmetric distributions, a micro-reflector inside the refractor re-directs the house side emitter output towards the street side and functions as a house side shielding element. Refractors are injection molded H12 acrylic. Each LED refractor is sealed to the PCB over an emitter and all refractors are retained by an aluminum frame. Any one Panel, or group of Panels in a luminaire, have the same optical pattern. LED refractors produce a variety of site/area distributions. Panels are field replaceable and field rotatable in 90° increments.

LED Driver(s) - Constant current electronic with a power factor of $> .90$ and a minimum operating temperature of -22°F . Driver(s) is/are UL and cUL recognized and mounted directly against the Electrical Housing to facilitate thermal transfer, held down by universal clamps to facilitate easy removal. In-line terminal blocks facilitate wiring between the driver and optical arrays. Drivers accept an input of 120-277V or 347-480V, 50/60Hz. (0 - 10V dimmable driver is standard. Driver has a minimum of 3KV internal surge protection. 20KV surge protector supplied for installation by other.)

Finish - Electrostatically applied TGIC Polyester Powder Coat on substrate prepared with 20 PSI power wash at 140°F . Four step media blast and iron phosphate pretreatment for protection and paint adhesion. 400°F bake for maximum hardness and durability. Texture finish is standard.

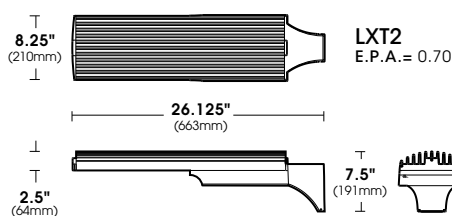
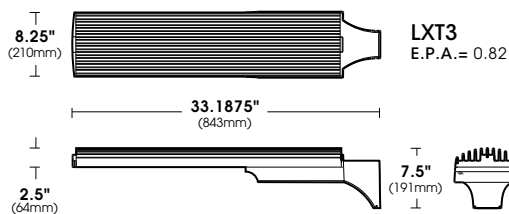
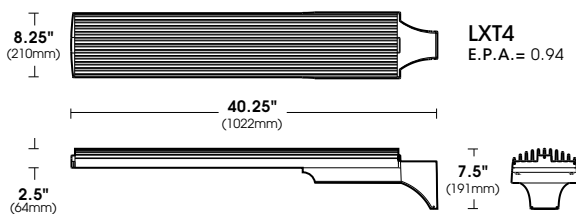
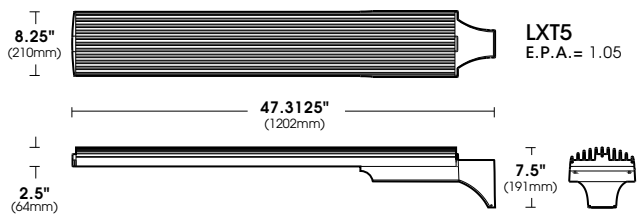
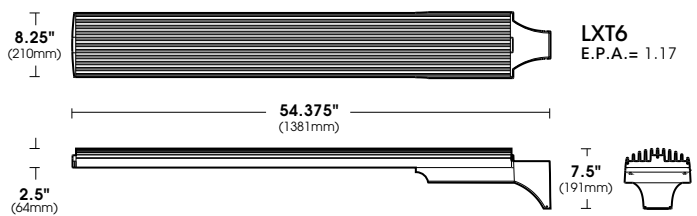
Controlling Options

HLSW - Selecting the HLSW option provides an externally switched circuit for step dimming the luminaire from 50% to 100%. The control may be an external timer, an on/off signal from the building automation system, a master motion sensor or any other digital on/off signal.

TPR7 - Selecting the TPR7 option provides a 7-pin ANSI C136.41 dimming receptacle.

MS-F211 - Selecting this option provides a motion sensor pre-programmed to step dim the fixture from 50% to 100%.

Dimensions

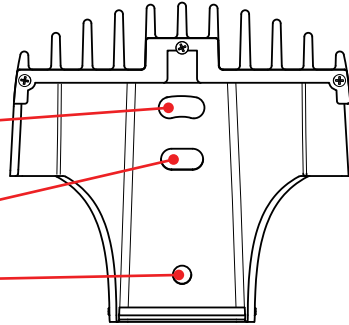


Scale: 1/2" = 1'-0"

Top Mounting Hole
Adjusts fixture 0°, -5° or +5°.

Wireway

Bottom Mounting Hole



Fixture at 0°.



Fixture adjusted +5°.

Site Adaptive Rotatable Adjustability

Two mounting holes allow fixture to be bolted to the pole. The top mounting hole and wiring hole are slotted to allow the fixture to be tilted up to 5° along its long axis.

Spec/Order Example: LXT4/FRO/PLED-III-W/80LED-700mA/CW/277/RAL-8019-S

MODEL	FACTORY ROTATED OPTICS	OPTICS	LED MODE		MOUNTING	FINISH	OPTIONS
<input type="checkbox"/> LXT6	<input type="checkbox"/> FRO	<input type="checkbox"/> TYPE II PLED-II	<input type="checkbox"/> 120LED	<input type="checkbox"/> 350mA	<input type="checkbox"/> 1	<input type="checkbox"/> BLACK RAL-9005-T	<input type="checkbox"/> HIGH-LOW DIMMING FOR HARDWIRED SWITCHING OR NONINTEGRATED MOTION SENSOR HLSW
<input type="checkbox"/> LXT5		<input type="checkbox"/> TYPE II FRONT ROW PLED-II-FR	<input type="checkbox"/> 100LED	<input type="checkbox"/> 525mA	<input type="checkbox"/> 2-180	<input type="checkbox"/> WHITE RAL-9003-T	<input type="checkbox"/> INTERNAL HOUSE SIDE SHIELD . . . HS-PLED
<input type="checkbox"/> LXT4		<input type="checkbox"/> TYPE III MED. PLED-III-M	<input type="checkbox"/> 80LED	<input type="checkbox"/> 700mA	<input type="checkbox"/> 2-90	<input type="checkbox"/> GREY RAL-7004-T	<input type="checkbox"/> PHOTO CELL + VOLTAGE (EXAMPLE: PC120V) . . PC+V
<input type="checkbox"/> LXT3		<input type="checkbox"/> TYPE III WIDE PLED-III-W	<input type="checkbox"/> 60LED	<input type="checkbox"/> 1050mA	<input type="checkbox"/> 3-120	<input type="checkbox"/> DARK BRONZE RAL-8019-T	<input type="checkbox"/> TWIST LOCK PHOTO CELL + VOLTAGE (EXAMPLE: PC120V) . . TPC+V
<input type="checkbox"/> LXT2		<input type="checkbox"/> TYPE IV PLED-IV	<input type="checkbox"/> 40LED		<input type="checkbox"/> 3-90	<input type="checkbox"/> GREEN RAL-6005-T	<input type="checkbox"/> TWIST LOCK RECEPTACLE ONLY . . . TPR
		<input type="checkbox"/> TYPE IV PLED-IV-FT	COLOR TEMP - CCT	VOLTAGE	<input type="checkbox"/> 2X2-180	FOR SMOOTH FINISH REPLACE SUFFIX "T" WITH SUFFIX "S" (EXAMPLE: RAL-9005-S)	<input type="checkbox"/> 7-PIN TWIST LOCK RECEPTACLE ONLY . . . TPR7
		<input type="checkbox"/> TYPE V NARROW PLED-V-SQ-N	<input type="checkbox"/> NW (4000K) *STANDARD	<input type="checkbox"/> 120	<input type="checkbox"/> 4-90	CONSULT FACTORY FOR CUSTOM COLORS	<input type="checkbox"/> SINGLE FUSE (120V, 277V, 347V) . . SF
		<input type="checkbox"/> TYPE V MED. PLED-V-SQ-M	<input type="checkbox"/> CW (5000K)	<input type="checkbox"/> 208			<input type="checkbox"/> DOUBLE FUSE (208V, 240V, 480V) . . DF
		<input type="checkbox"/> TYPE V WIDE PLED-V-SQ-W	<input type="checkbox"/> WW (3000K)	<input type="checkbox"/> 240	WALL MOUNT		<input type="checkbox"/> STEP DIM MOTION SENSOR (PROGRAMMED 50/100) MS-F211
			CONSULT FACTORY FOR OTHER LED COLORS	<input type="checkbox"/> 277	<input type="checkbox"/> WM-2		<input type="checkbox"/> REMOTE MOTION SENSOR CONFIGURATOR MS-FC10
			<input type="checkbox"/> 480	<input type="checkbox"/> 480	<input type="checkbox"/> WM-3		

Linear EXT

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