

# MERLIN<sup>®</sup>

## LED MINING SOLUTIONS



Catalogue 2017

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# LED INITIATIVE PROGRAM

## SAFETY

- No effect on human eye or skin: IEC 62471 Photo biological tested
- Reduces operator fatigue: 6000k Color temperature
- Eliminates risk of shock: Low-voltage electronics
- Eliminates touch burns: Thermally-regulated housing
- Reduces near-miss incidents: Increased light output
- Contain no lead or mercury: ROHS Compliant electronics

## PREVENTATIVE MAINTENANCE

- Exceeds half engine life: Long-life LED
- Completely resist vibration: Solid-state components
- Reduces wear on associated components: Low in-rush current at start-up
- Lessens chance of full-fixture failure: Built-in redundancy
- Uninterrupted fixture function and overheat protection: Built-in thermal management
- Superior ingress protection: IP69K-rated housings

## COST SAVINGS

- Reduces associated component wear
- Less expensive than OE and HID options
- Increased reliability and longevity for increased production
- Reduces or removes unscheduled maintenance of lighting
- Increased productivity due to less operator fatigue
- Streamline inventory counts to common solution

## ENVIRONMENTAL

- ROHS-Compliant electronics
- Contains no lead or mercury
- Reduced CO2 emissions
- No hazardous disposal required

# COMPREHENSIVE LIGHTING SYSTEMS

The Lighting Fit Outs are specifically designed for each particular piece of equipment, not just a generic light head. We engineer specific lighting models to reduce or eliminate unscheduled maintenance, reduce amperage draw to minimize wear on associated equipment, and increase light output on the work area while reducing glare to peripheral equipment.

## OPEN PIT

- Haul Trucks
- Rope Shovels
- Hydraulic Shovels
- Dozers
- Drag Lines
- Graders
- Drill Rigs
- Loaders



## STRUCTURAL

- Work Shop
- Wash Bays
- Roadsters
- SX/EW
- Crushers
- Haul Roads
- Exterior Buildings
- Low Bay/Mezzanine

## UNDER GROUND

- Haul Trucks
- Jumbos
- Bolters
- Muckers
- Loaders
- Concrete Sprayers
- Graders
- Utility Carriers



## SUPPORT EQUIPMENT

- Light Plant Retro Fit
- Lube Trucks
- Tire Carriers
- Work Trucks
- Conveyor Systems

# VEHICLE FIT OUT

Our Lighting Solution Fit Outs are configured to the exact needs of your site and equipment.

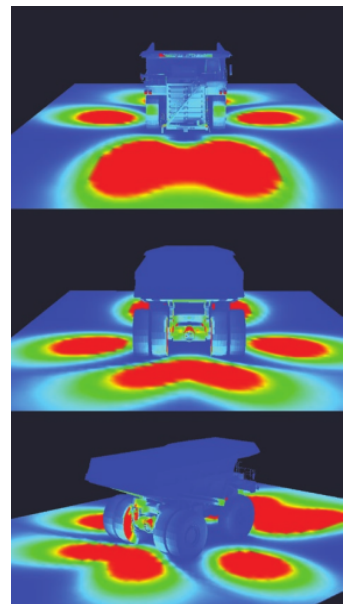
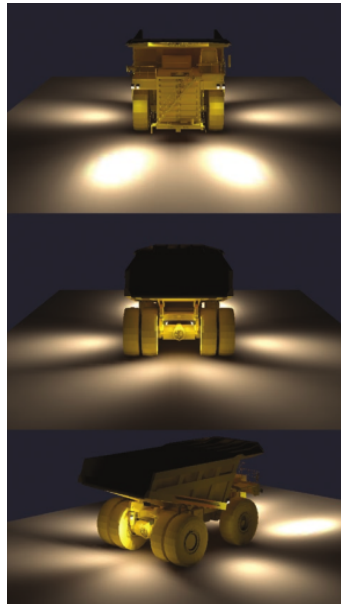
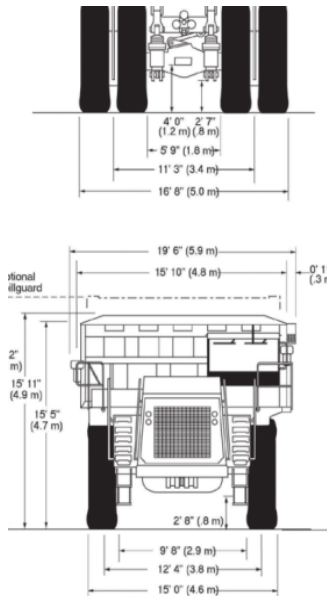


Quantity	Part No.	Orientation	Side	Position
1	MESP-50-01	Forward Facing	Right Side	Top of Mast/boom
2	MESP-50-02	Forward Facing	Right Side	Top of Mast/boom
3	MESP-50-03	Forward Facing	Left Side	Top of Mast/boom
4	MESP-50-04	Forward Facing	Left Side	Top of Mast/boom
5	MESP-50-05	Rear Facing	Right Side	Side of Mast/boom
6	MESP-50-06	Rear Facing	Left Side	Side of Mast/boom
8	MESP-50-07	Rear Facing	Left Side	Below Rear Lift Cylinder (Series with 8)
8	MESP-50-08	Rear Facing	Left Side	Below Rear Lift Cylinder (Series with 7)
8	MESP-50-09	Midplane	Midplane	Midplane, Maximize, angle approx 45°
10	MESP-50-10	Forward Facing	Ahead	Midplane (50)

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## SOLUTION PROCESS

We offers complete lighting solutions tailored to the exact needs of your location This allows you to know prior to purchasing exactly what each light package will do for you. Letting you know in confidence that the lights will meet all the OSHA/MSHA and any other requirements that you may need.



### 2D BLUEPRINT

We begin a project by requesting the list of machines that we will needed to be retrofitted. Then gathering the technical information for those machines

### 3D MODEL

A 3D Model is then built to match the customer exact specifications. This model is then carried over into the rendering.

### SIMULATION RENDER

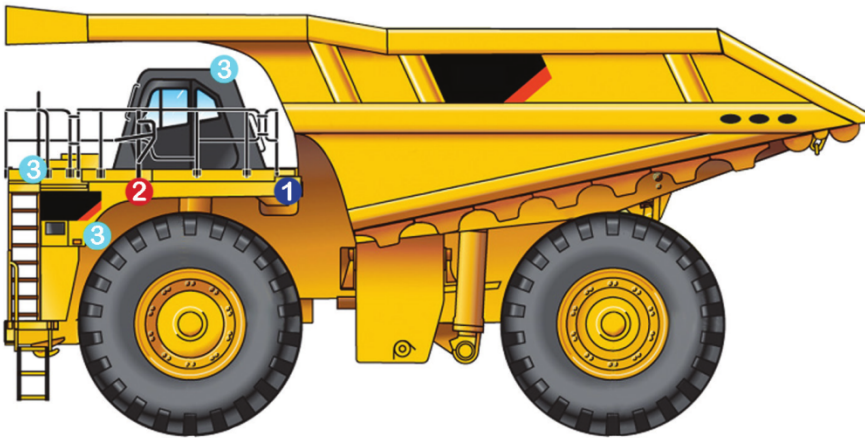
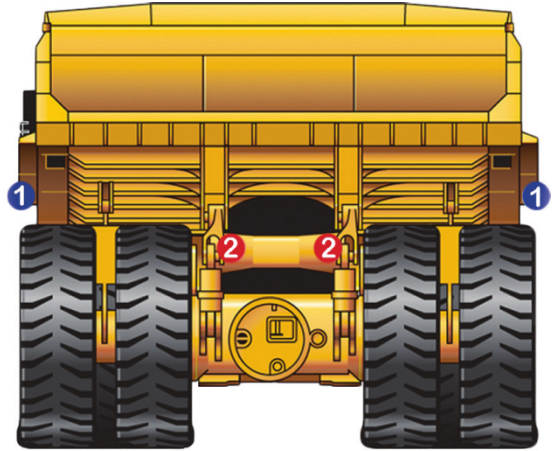
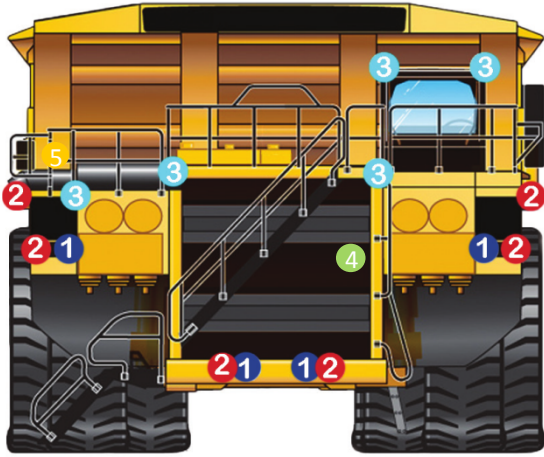
Prior to implementing a lighting solution, we create a simulation rendering of the intended result to help envision if the final product will meet lighting requirement.

### SOLUTION


We create a complete breakdown of what the customer needs to meet their specific requirement for safety.



# CAT 797F DUMP TRUCK




**5** MLHDB-36-A  
HEAVY DUTY  
BEACON LED  
Qty 1  
1x Front Facing  
Possibility for additional



**4** MLNB-02/03  
NUMBER BOARD  
LED  
Qty 1  
1x Front Facing  
Possibility for additional, Side of Dump Truck



**1** MLSP-50-20  
50W Medium LED  
Qty 6  
2x Front Facing (Each top side of radiator grill)  
2x Front Facing (One each side of front bumper bar)  
2x Rear Facing (One either side of access area)



**2** MLSP-50-40  
50W Wide LED  
Qty 8  
2x Front Facing (One on each corner of radiator grill)  
2x Front Facing (One on each side of front bumper bar)  
2x Forward/Side Facing (Either side of access area)  
2x Lower Rear (Facing diagonally under rear of tray)



**3** MLSP-10-40  
10W Wide LED  
Qty 6  
1x Rear Outer Corner of Operator's Cabin (Facing cabin door area)  
2x Top Corners of Radiator Grill (Facing down side stairway / ladder)  
1x Inner Side of Operator's Cabin (Facing access)  
2x Engine Compartment Area (Behind radiator)



# ROI CALCULATIONS & ANALYSIS

## EXAMPLE

### Opportunity

Lighting on P&H Models 2800 and 4100 has been adequate, at best. New LED technology has been designed specifically for these models and addresses issues with current lighting systems.

### Scope of Work

- Direct, one-for-one replacement of OE fixture
- Bypass of OE ballast system allowing 120v AC to flow directly to the light fixture

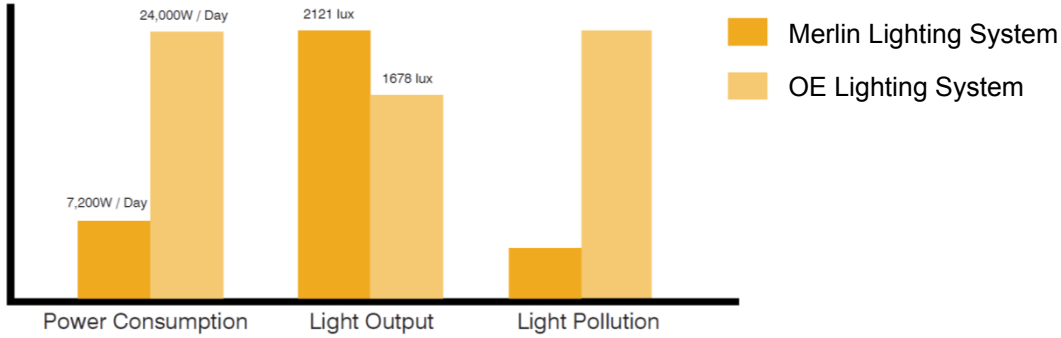
FINANCIAL BENEFITS PER MACHINE PER FIXTURE	OE HPS Fixtures	MLP 300W LED Fixture	CHANGE	CHANGE %
Wattage	1,000 W	300 W	- 700 W	70% Reduction
Amperage (120VAC)	8.33 A	2.50 A	- 5.8 A	70% Reduction
Comprehensive Lux at 12 Locations	1,678 Lux	2,121 Lux	+ 443 Lux	26% Increase
Daily Operating Wh (24 Hours)	24,000 Wh	7,200 Wh	-16,800 Wh	70% Reduction
Monthly Maintenance	0.134	0	1.5	100% Reduction
kWh cost per month (0.40 kWh)	\$ 288.00 USD	\$ 86.40 USD	\$ 201.60 USD	70% Reduction

FINANCIAL BENEFITS PER MACHINE (13 FIXTURES)	OE HPS Fixtures	MLP 300W LED Fixture	CHANGE	CHANGE %
Wattage	13,000 W	3,900 W	- 9,100 W	70% Reduction
Amperage (120VAC)	108.33 A	32.50 A	- 75.80 A	70% Reduction
Comprehensive Lux at 12 Locations	21,814 Lux	27,573 Lux	+ 5,759 Lux	26% Increase
Daily Operating Wh (24 Hours)	312,000 Wh	93,600 Wh	-218,400 Wh	70% Reduction
Monthly Maintenance	1.65	0	1.5	100% Reduction
kWh cost per month (0.40 kWh)	\$ 3,744.00 USD	\$ 1,123.20 USD	- \$ 2,620.80 USD	70% Reduction
Annual kWh Cost	\$ 44,928.00 USD	\$ 13,784.40 USD	- \$ 31,449.60 USD	70% Reduction
10 Year ROI	\$ 449,280.00 USD	\$ 134,784.00 USD	- \$ 314,496.00 USD	70% Reduction
Annual UM Coast (\$60/hr-0.5hr repair)	\$ 630,000.00 USD	-	- \$ 630,000.00 USD	100% Reduction
Annual CO2 Emissions (1.33 lbs/kWh)	151,460	45,438	106,022	70% Reduction

Average Cost to Retrofit	\$ 31,187.00 USD
Annual Energy Savings	\$ 31,449.00 USD
ROI Energy Saving Only	< 1 Year
Annual Unsch. Maintenance Savings	\$ 630,000.00 USD
Total Annual Savings Per Machine	\$ 661,449.60 USD
ROI (Energy and UM Savings)	18.25 Days



## OBJECTIVES ACHIEVED THROUGH LED UPGRADE



- 70% Reduction in power consumption over current OE lighting system
- 26% Increase in light output on effective work area (measured in LUX on work surface in 12 critical points)
- 80% Decrease in light pollution (stray light loss into surrounding hills and into oncoming equipment)
- Built-in redundancy in each light fixture to completely remove unscheduled maintenance
- Serviceable dual-power supply and circuit board during PM
- ROHS-compliant components contain no lead or mercury and require no hazardous disposal

## A GREEN SOLUTION

We ensure that your LED Upgrade will be a solid investment in a sustainable future. The 79,000 kWh saved per year prevents approximately 53 metric tons of greenhouse gas emissions being released into the atmosphere. In addition to our energy efficiency, all our LED fixtures contain no Lead or Mercury, which eliminates the risk to the environment upon disposal and requires no special disposal procedures. What does 53 metric tons of CO2 emissions look like? Well it equates to.

### Greenhouse Gases From...

- 12 Passenger Vehicles
- 129,858 Miles Driven
- 20 Tons of Waste In Landfills

### CO2 Emissions From...

- 6,175 Gallons of Gasoline
- 58,961 lbs of Burned Coal
- 127 Barrels of Oil Consumed

### Carbon Sequestered By...

- 45 Acres of US Forest in 1 Year
- 1,408 Saplings Grown for 1 Year

Energy data pulled from: [www.epa.gov/cleanenergy/energy-resources/calculator.html](http://www.epa.gov/cleanenergy/energy-resources/calculator.html)



# RUBBER TIRE EQUIPMENT LIGHTING

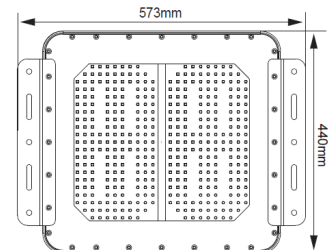
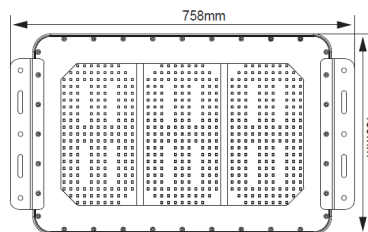


## LED NUMBER BOARD



### FEATURES:

- 195 Crisp LEDs Per Digit
- Engineered for 24/7 Operation
- Magnetic Sensor To Change Digits



ITEM	DIGITS	COLOR
MLNB-02-A	2	AMBER
MLNB-02-R	2	RED
MLNB-03-A	3	AMBER
MLNB-03-R	3	RED



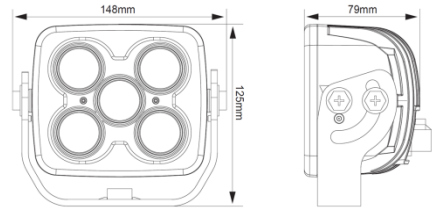
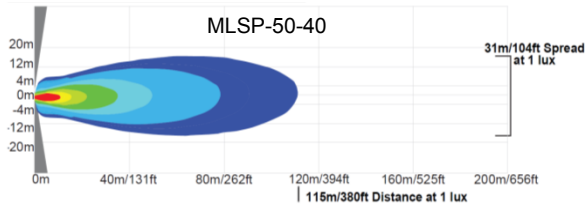


## LED MLSP 50W



TECHNICAL DETAILS	
DIMENSIONS	148 x 125 x 79 mm
RAW LUMENS	5,260 lm
WATTAGE	50 W
WEIGHT	2.05 kg
AMP DRAW	4.17 A @ 12V
VIBRATION RATING	15.6 Grms

ITEM	BEAM
MLSP-50-20	20°
MLSP-50-40	40°



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## HEAVY DUTY LED BEACON



TECHNICAL DETAILS	
DIMENSIONS	135 x 130 x 135mm
AREA OF EFFECT	Full 360° Visibility
WATTAGE	36 W
WEIGHT	1.34 kg
AMP DRAW	3.0 A @ 12V
VIBRATION RATING	15.6 Grms

ITEM	BEAM
MLHDB-36-A	AMBER
MLHDB-36-B	BLUE
MLHDB-36-G	GREEN
MLHDB-36-R	RED
MLHDB-36-W	WHITE

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# GROUND ENGAGING / TRACK TYPE EQUIPMENT LIGHTING

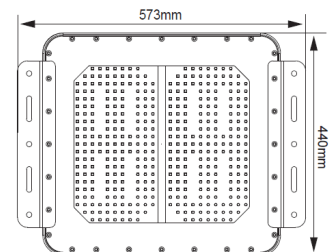
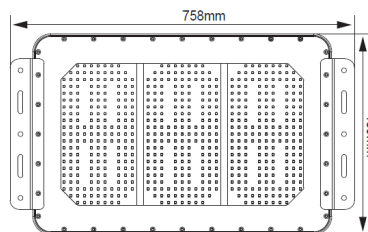


## LED NUMBER BOARD



### FEATURES:

- 195 Crisp LEDs Per Digit
- Engineered for 24/7 Operation
- Magnetic Sensor To Change Digits



ITEM	DIGITS	COLOR
MLNB-02-A	2	AMBER
MLNB-02-R	2	RED
MLNB-03-A	3	AMBER
MLNB-03-R	3	RED



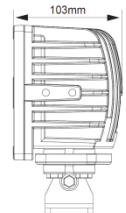
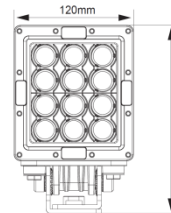
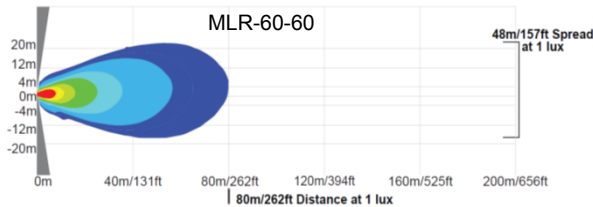


## LED MLR 60W



TECHNICAL DETAILS	
DIMENSIONS	176 x 120 x 103 mm
RAW LUMENS	6,336 lm
WATTAGE	60 W
WEIGHT	2.5 kg
AMP DRAW	5.0 A @ 12V
VIBRATION RATING	60 Grms

ITEM	BEAM
MLR-60-10	10°
MLR-60-40	40°
MLR-60-60	60°
MLR-60-90	90°

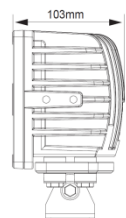
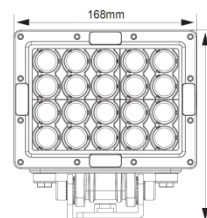
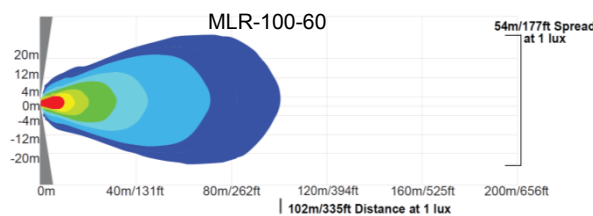


## LED MLR 100W



TECHNICAL DETAILS	
DIMENSIONS	177 x 168 x 103 mm
RAW LUMENS	10,560 lm
WATTAGE	100 W
WEIGHT	3.4 kg
AMP DRAW	8.34 A @ 12V
VIBRATION RATING	60 Grms

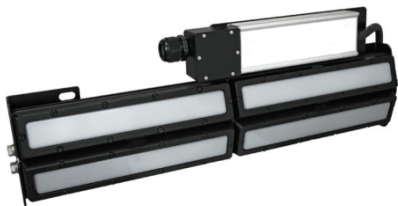
ITEM	BEAM
MLR-100-10	10°
MLR-100-40	40°
MLR-100-60	60°
MLR-100-90	90°



# ROPE / HYDRAULIC SHOVEL LIGHTS

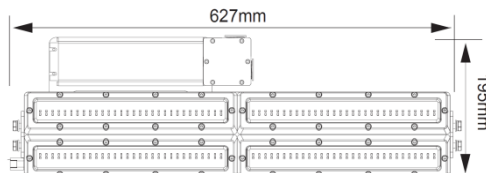


## LED MLSWD 40W



TECHNICAL DETAILS	
DIMENSIONS	627 x 195 x 49 mm
RAW LUMENS	3,500 lm
WATTAGE	40 W
WEIGHT	5.3 kg
AMP DRAW	0.34 A @ 12V
VIBRATION RATING	15.6 Grms

ITEM	Length
MLSWD-40-150-FAC	627 mm



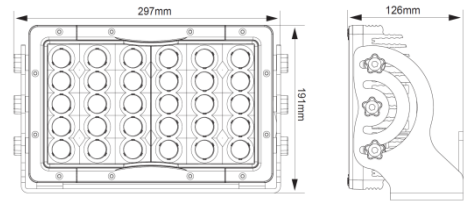
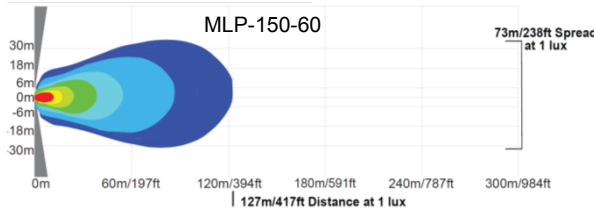


## LED MLP 150W



TECHNICAL DETAILS	
DIMENSIONS	297 x 191 x 126 mm
RAW LUMENS	15,840 lm
WATTAGE	150 W
WEIGHT	5.6 kg
AMP DRAW	1.4 A @ 110V
VIBRATION RATING	60 Grms

ITEM	BEAM
MLP-150-40-STEAC	40°
MLP-150-60-STEAC	60°
MLP-150-90-STEAC	90°

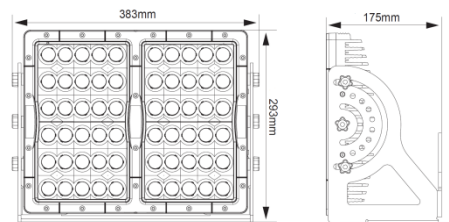
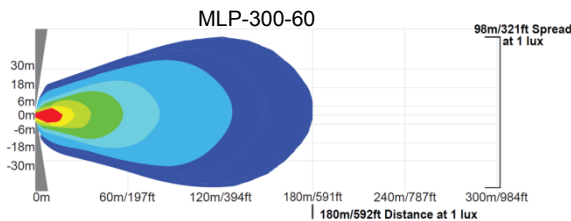


## LED MLP 300W



TECHNICAL DETAILS	
DIMENSIONS	383 x 293 x 175 mm
RAW LUMENS	31,680 lm
WATTAGE	300 W
WEIGHT	12.0 kg
AMP DRAW	2.7 A @ 110V
VIBRATION RATING	60 Grms

ITEM	BEAM
MLP-300-40-STEAC	40°
MLP-300-60-STEAC	60°
MLP-300-90-STEAC	90°





# DRIFT LIGHTING SOLUTIONS

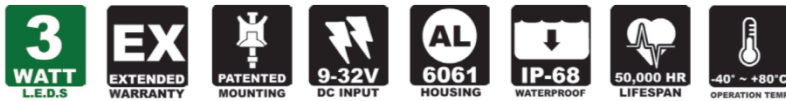
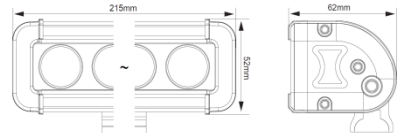


## LED DRIFT STROBE



TECHNICAL DETAILS	
DIMENSIONS	215 x 52 x 62 mm
RAW LUMENS	684 lm
WATTAGE	9 W
WEIGHT	0.9 kg
AMP DRAW	0.6 A @ 12V
VIBRATION RATING	15.6 Grms

ITEM	LED
MLLB-S-9-DSB	BLUE



## LED STROBE BEACON



TECHNICAL DETAILS	
DIMENSIONS	133 x 97 x 73 mm
AREA OF EFFECT	Full 360° Visibility
WATTAGE	7.2 W
WEIGHT	0.2 kg
AMP DRAW	0.8 A @ 12V
VIBRATION RATING	15.6 Grms

ITEM	LED
MLSB-7.2-A	AMBER
MLSB-7.2-B	BLUE
MLSB-7.2-G	GREEN
MLSB-7.2-R	RED
MLSB-7.2-W	WHITE
MLSB-7.2-RGB	RGB



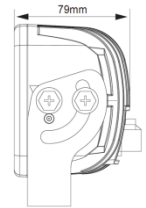
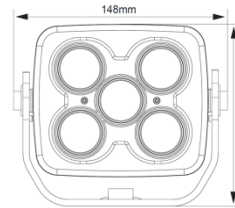
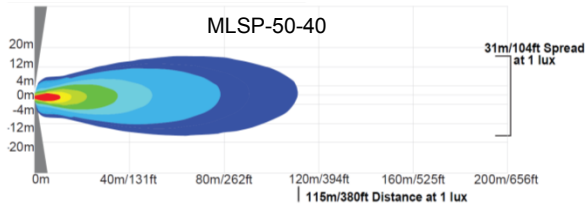


## LED MLSP 50W



TECHNICAL DETAILS	
DIMENSIONS	148 x 125 x 79 mm
RAW LUMENS	5,260 lm
WATTAGE	50 W
WEIGHT	2.05 kg
AMP DRAW	4.17 A @ 12V
VIBRATION RATING	15.6 Grms

ITEM	BEAM
MLSP-50-20	20°
MLSP-50-40	40°

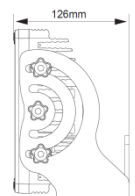
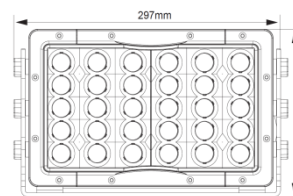
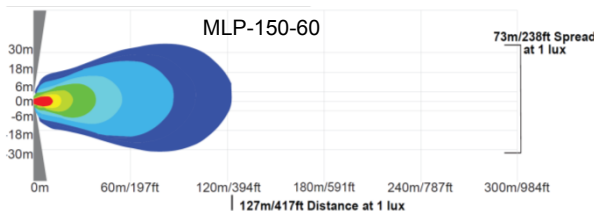


## LED MLP 150W



TECHNICAL DETAILS	
DIMENSIONS	297 x 191 x 126 mm
RAW LUMENS	15,840 lm
WATTAGE	150 W
WEIGHT	5.6 kg
AMP DRAW	1.4 A @ 110V
VIBRATION RATING	60 Grms

ITEM	BEAM
MLP-150-40-STEAC	40°
MLP-150-60-STEAC	60°
MLP-150-90-STEAC	90°





# HEAVY DUTY LIGHT SERIES



## FEATURES

- Forward rake trunnion bracket
- Reverse polarity protection
- Aiming system located on bracket

## DIRECT METAL HALIDE/HALOGEN REPLACEMENT

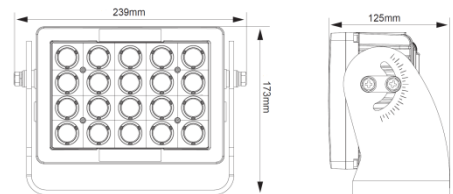
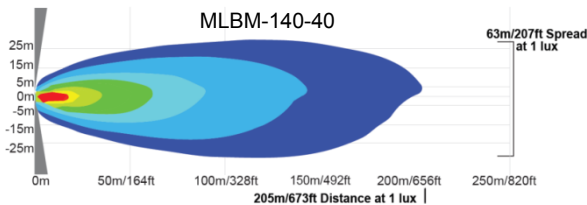
- MLBM 140W - 400/500 watt halide equivalent
- MLBM 84W - 1000 watt halogen equivalent
- MLBM 63W - 700 watt halogen equivalent
- MLBM 35W - 400 watt halogen equivalent

## LED MLBM 140W



TECHNICAL DETAILS	
DIMENSIONS	239 x 173 x 125 mm
RAW LUMENS	16,000 lm
WATTAGE	140 W
WEIGHT	4.2 kg
AMP DRAW	11.7 A @ 12V
VIBRATION RATING	60 Grms

ITEM	BEAM
MLBM-140-25	25°
MLBM-140-40	40°
MLBM-140-60	60°
MLBM-140-90	90°

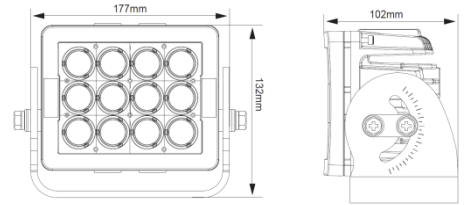
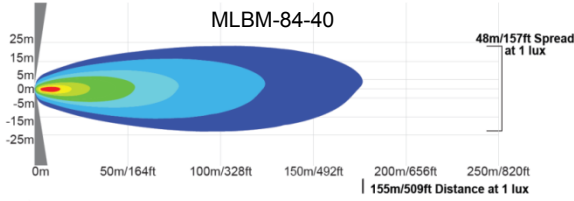


## LED MLBM 84W



TECHNICAL DETAILS	
DIMENSIONS	177 x 132 x 102mm
RAW LUMENS	9,600 lm
WATTAGE	84 W
WEIGHT	2.25 kg
AMP DRAW	7.0 A @ 12V
VIBRATION RATING	60 Grms

ITEM	BEAM
MLBM-84-25	25°
MLBM-84-40	40°
MLBM-84-60	60°
MLBM-84-90	90°

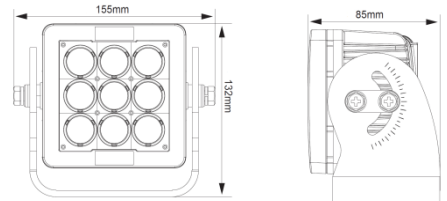
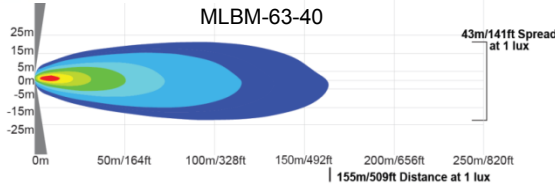


## LED MLBM 63W



TECHNICAL DETAILS	
DIMENSIONS	154 x 132 x 85mm
RAW LUMENS	7,200 lm
WATTAGE	63 W
WEIGHT	1.8 kg
AMP DRAW	5.26 A @ 12V
VIBRATION RATING	60 Grms

ITEM	BEAM
MLBM-63-25	25°
MLBM-63-40	40°
MLBM-63-60	60°
MLBM-63-90	90°

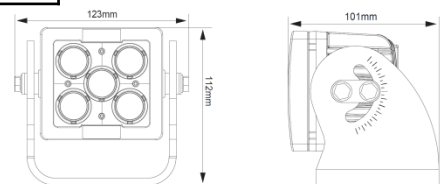
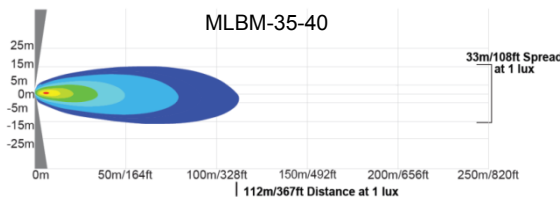


## LED MLBM 35W



TECHNICAL DETAILS	
DIMENSIONS	123 x 112 x 101mm
RAW LUMENS	4,000 lm
WATTAGE	35 W
WEIGHT	1.0 kg
AMP DRAW	2.9 A @ 12V
VIBRATION RATING	60 Grms

ITEM	BEAM
MLBM-35-25	25°
MLBM-35-40	40°
MLBM-35-60	60°
MLBM-35-90	90°



# WHITE IRON LIGHTING SOLUTIONS



## LED STROBE BEACON



TECHNICAL DETAILS	
DIMENSIONS	133 x 97 x 73 mm
AREA OF EFFECT	Full 360° Visibility
WATTAGE	7.2 W
WEIGHT	0.2 kg
AMP DRAW	0.8 A @ 12V
VIBRATION RATING	15.6 Grms

ITEM	LED
MLSB-7.2-A	AMBER
MLSB-7.2-B	BLUE
MLSB-7.2-G	GREEN
MLSB-7.2-R	RED
MLSB-7.2-W	WHITE
MLSB-7.2-RGB	RGB

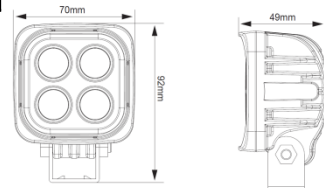
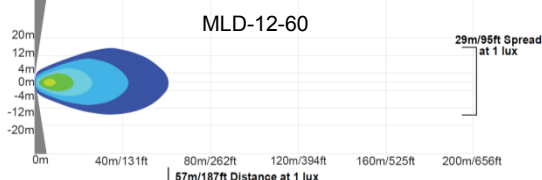


## LED MLD 12W



TECHNICAL DETAILS	
DIMENSIONS	70 x 92 x 49 mm
RAW LUMENS	2,000 lm
WATTAGE	12 W
WEIGHT	0.4 kg
AMP DRAW	1 A @ 12V
VIBRATION RATING	15.6 Grms

ITEM	LED
MLD-12-60	60°



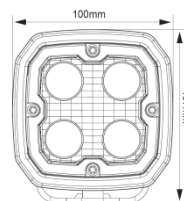
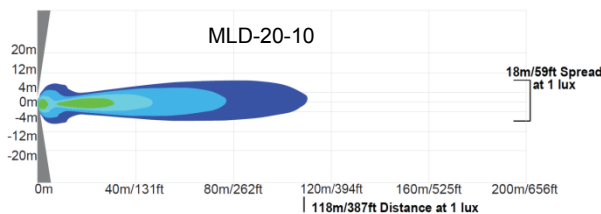


## LED MLD 20W



TECHNICAL DETAILS	
DIMENSIONS	120 x 160 x 80 mm
RAW LUMENS	2,112 lm
WATTAGE	20 W
WEIGHT	0.68 kg
AMP DRAW	1.6 A @ 12V
VIBRATION RATING	15.6 Grms

ITEM	BEAM
MLD-20-10	10°
MLD-20-40	40°
MLD-20-60	60°

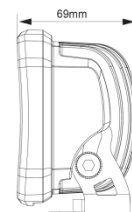
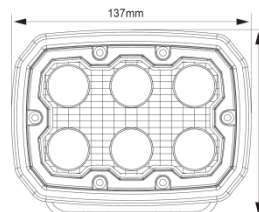
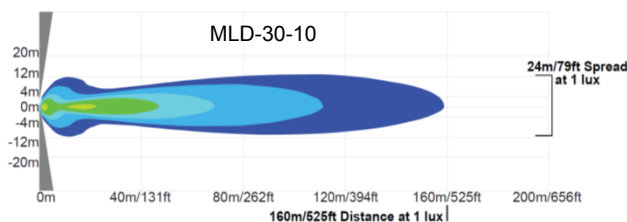


## LED MLD 30W



TECHNICAL DETAILS	
DIMENSIONS	137 x 109 x 65 mm
RAW LUMENS	3,696 lm
WATTAGE	30 W
WEIGHT	1.2 kg
AMP DRAW	2.5 A @ 12V
VIBRATION RATING	15.6 Grms

ITEM	BEAM
MLD-30-40	40°
MLD-30-60	60°
MLD-30-90	90°



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