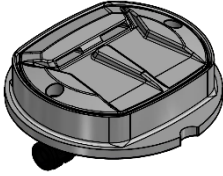


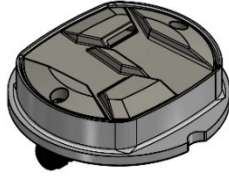
MLK150 LED-Illuminated In-Road Markers (LaneLights™)

CONFIGURATIONS

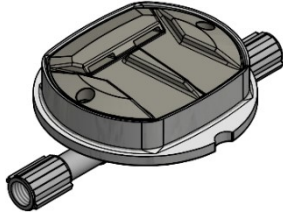
Asphalt Uni-Directional



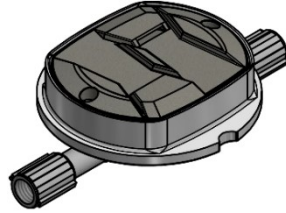
Asphalt Bi-Directional



Concrete Uni-Directional

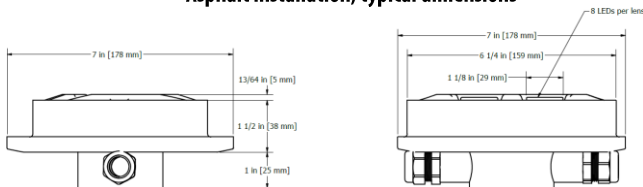


Concrete Bi-Directional

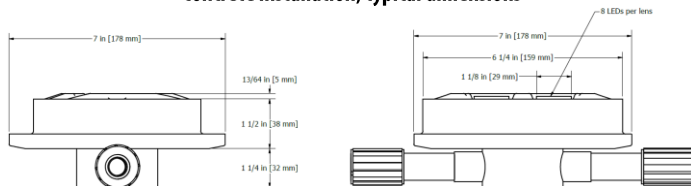


DIMENSIONS

Asphalt installation, typical dimensions

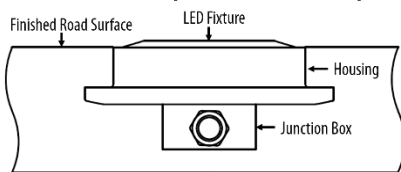


Concrete installation, typical dimensions



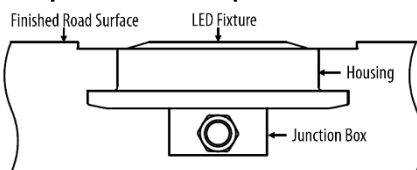
IN-ROAD PROFILES

Standard, non-snow-plowable installation profile



In locations without snow plow activity, the MLK150 is installed with the top of the housing flush with the finished road surface and the LED fixture protruding above the finished road surface.

Snow-plowable installation profile



In locations with snow plow activity, the MLK150 is installed with the housing recessed below the level of the finished roadway and the top of the LED fixture flush with the finished road surface.

SPECIFICATIONS

Technology	LED
Lower Housing Dimensions, including junction box	Ø 7 x 2.5 in. [Ø 175 x 66 mm]
Lower Housing Material	Aluminum, sea water grade
Upper Housing Dimensions, LED module	5.9 in. x 4.92 in. x 1.2 in. [150 x 125 x 30.5mm]
Upper Housing Material	Stainless steel (304)
In-Road Profiles	Standard: 13/64 in. [5 mm] above road surface Optional: 1/8 in. [3mm] above road surface Snow Plow: 0 in. [0mm] above road surface
Snowplow Compatible	Yes, with flush mount installation
IP Code	IP68
Load Rating	11,000 lb. [5,000 kg] compression
Operating Temperature	-13°F to +167°F [-25°C to +75°C]
LED Face	Uni-directional or bi-directional options
LEDs Per Unit	16 (8 LEDs per lens)
Beam Trajectory	V: +/- 4 degrees; H: +/- 15 degrees
LED Colour	Yellow, red, green, blue, white or bi-colour
Light Intensity	Over 3,500,000 cd/m2
Daytime Visibility	3000 ft. [914m] Dimmable by PWM at night
Operating Voltage	12-48 VDC or 9-36 VAC
Power Consumption	2.5W (nominal)
Wiring	3-wire VDC; 2-wire VAC DIN 72551 part 6: ISO 6722 class D, thin-wall ISO 6722: DIN 72551 part 5 (1993) DIN EN 13602, Cu-ETP1-A (CW003A): LV 112
Controller	LaneLight Mk4, Mk5, Mk6, or MK10 system controllers
Lens	Borosilicate glass
MUTCD Compliance	YES
Warranty	5 year limited warranty for defects in manufacturing, factory assembly and materials only; excludes batteries and damage caused by vehicles or vandalism

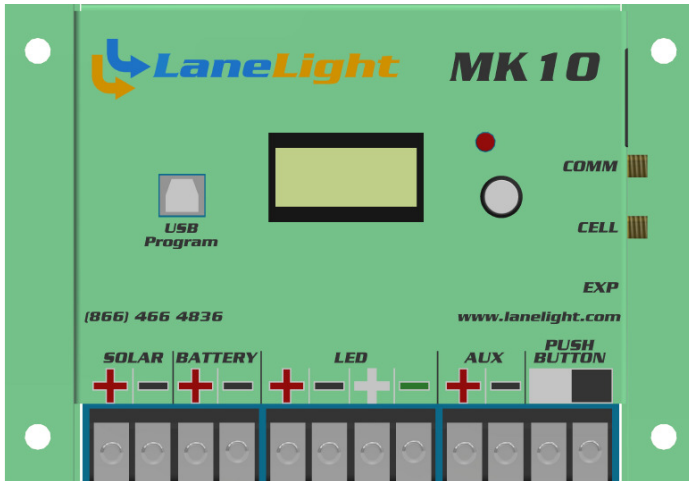
CONTACT INFORMATION

To order, or for more information, contact ITEM/LaneLight:

Unit 16 – 755 Vanalman Avenue
Victoria, BC V8Z 3B8 Canada
Toll-Free: 1-866-466-4836
Fax: 250-381-4830
info@lanelight.com
www.lanelight.com



LaneLight Mk10 System Controller



OVERVIEW

The LaneLight™ MK10 Panel Mounted Controller is a solid-state programmable controller designed for use with RRFB bars and beacons. With the addition of the MLK driver extension, the MK10 can be used with MLK150 LED in-road markers as well. The controller monitors the output currents to protect the system against damage.

The MK10 controller contains the required hardware and software to interpret output signals from standard contact closure switches. Upon detection of a trigger event, the controller can output activation signals to RRFB fixtures according to the parameters defined in the controller's configuration menu. Activation signals to RRFB fixtures can also be managed by the onboard scheduler, which can be programmed at the factory to match site requirements.

The MK10 can also be provided in a version that can interpret activation signals from an external 120VAC power source, i.e. typical traffic signal interface controller. In this case, inputs are connected to the load relays that drive the signal heads on the poles and activate the controller in conjunction with the required signal phase (red, green, or amber).

The MK10 controller mounts horizontally or vertically and is designed for integration into LaneLight side of pole or top of pole control cabinets, and it can be mounted in most traffic cabinets due to its small footprint.

Configuration and diagnostics are managed through menu options selectable on the MK10 LCD display. Access to programming and diagnostics by serial port connection via USB is standard; Bluetooth™ is optional.

The MK10 controller incorporates an internal MPPT solar charge regulator, factory configured to charge lithium iron polymer (LiFePO4) batteries from a solar panel (up to 55 Watt panel). A sealed lead acid (SLA) configuration of this internal charger is available.

The MK10 manages the dynamic brightness adjustment of the LED load by detecting the ambient light level from the solar panel or from a connected photosensor (in AC applications), then adjusting the LED brightness based on the configuration settings.

SPECIFICATIONS

Dimensions	5.097 x 7.350 x 1.540 in. (129.45 x 186.69 x 39.12 mm)
Mounting	Panel mount, horizontal or vertical orientation
Material	Anodized Aluminum enclosure
Operating Voltage	12VDC (10.0V – 14.6V)
Power Source Options	DC/Battery or 80-264VAC with optional AC/DC converter
Power Consumption	Active: Depends on system load Idle system: 0.18W With MLK extension: Adds activation load Idle system with cloud: 0.96W
Maximum Load	12A per output channel
Surge Protection	External
Solar Charge Controller	Internal MPPT solar charge controller, factory configured to charge LiFePO4 batteries (max. 55W solar panel) Optional sealed lead acid battery configuration available
LED Brightness Control	Ambient light detection via the solar panel or photosensor for AC applications
Configuration and Diagnostics	2x8 character LCD display, easy menu access with pushbutton dial Standard USB-B port access with external computer. Optional Bluetooth™
Communication Options	Stand-alone, hard-wired to flasher devices Unit to unit wireless communication: Frequency: ISM-B and 2.4GHz (standard) or 900MHz (optional)/Range: Up to 1 km (3200 ft) with line of sight Number of comm IDs/channels: 24 Optional GPS receiver for time and location Optional cellular network connectivity for LaneLightConnect service
Environment	Operating temp: -30°F to 165°F [-30°C to +74°C] Storage temp: -50°F to 200°F [-45.5°C to +93.3°C] Operating RH: 0% to 95% non-condensing
Standards Compliance	NEMA TS2
Microprocessor	16-Bit RISC-CPU (Extreme Low Power)
Input Circuits	External contact closure (mechanical or electronic switch) Input Impedance: >1kΩ ESD protection MIL-STD-883H (HBM)
Output Circuits	2 x high side switched, open and short circuit detection 1 auxiliary relay dry contact, rating 60VDC/400mA, selectable NO or NC during activation
Scheduler Activation	Optional activation via onboard scheduler for school zones or similar applications
Activation Time	1 – 120 seconds
Warranty	5 year limited warranty for defects in manufacturing, factory assembly and materials only; excludes batteries and damage caused by vehicles or vandalism

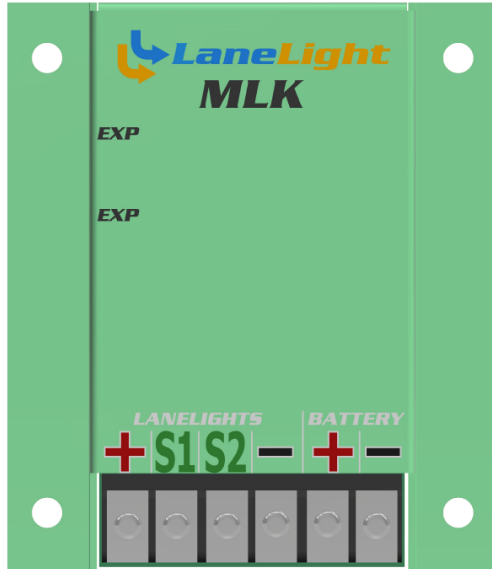
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LaneLight MK10 Driver Extension for MLK150 LED In-Road Warning Lights



SPECIFICATIONS

Dimensions (LxWxH)	4.4 x 1.06 x 5.12 in (112 x 27 x 130 mm) nominal
Mounting	Panel mount, horizontal or vertical orientation
Material	Anodized Aluminum enclosure
Operating Voltage	12VDC (10.0V – 14.6V)
Power Consumption	Idle system: 0.18W
Maximum Load	4A
Output Voltage	24V
Surge Protection	External
LED Brightness Control	Managed at the MK10 system controller
Configuration and Diagnostics	Managed at the MK10 system controller
Communication	Expansion bus
Environment	Operating temp: -30°F to 165°F [-30°C to +74°C] Storage temp: -50°F to 200°F [-45.5°C to +93.3°C] Operating RH: 0% to 95% non-condensing
Standards Compliance	NEMA TS2
Input Circuits	RJ-45 standard jack
Output Circuits	Screw terminals (2x battery, 4x in-pavement lights)
Warranty	5 year limited warranty for defects in manufacturing, factory assembly and materials only; excludes batteries and damage caused by vehicles or vandalism

OVERVIEW

The LaneLight™ MK10 LaneLight driver extension is designed for use with the MK10 system controller in systems that also use LaneLight MLK150 LED in-road markers.

The MK10 driver extension mounts horizontally or vertically and is designed for integration into LaneLight side of pole or top of pole control cabinets, and it can be mounted in most traffic cabinets due to its small footprint.

If an MK10 driver extension is connected to the MK10 system controller via the EXP port, the controller will detect the driver extension device during start up, and an MLK EXT menu item will appear in the configuration menu of the controller, which will display the status of the MLK150 in-road markers connected to the driver output. The MK10 driver extension contains the required hardware and software to interpret output signals from the MK10 system controller. Upon detection of a trigger event from the system controller, the driver extension unit can output activation signals to MLK150 fixtures according to the parameters defined in the controller's configuration menu. Dimming settings and flash patterns are managed by the MK10 system controller. The driver extension should be used with the RRFB Classic pattern selected at the system controller.

The drive extension has two control channels, S1 and S2, that correspond to the left and right outputs from the system controller.

CONTACT INFORMATION

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Toll-Free: 1-866-466-4836

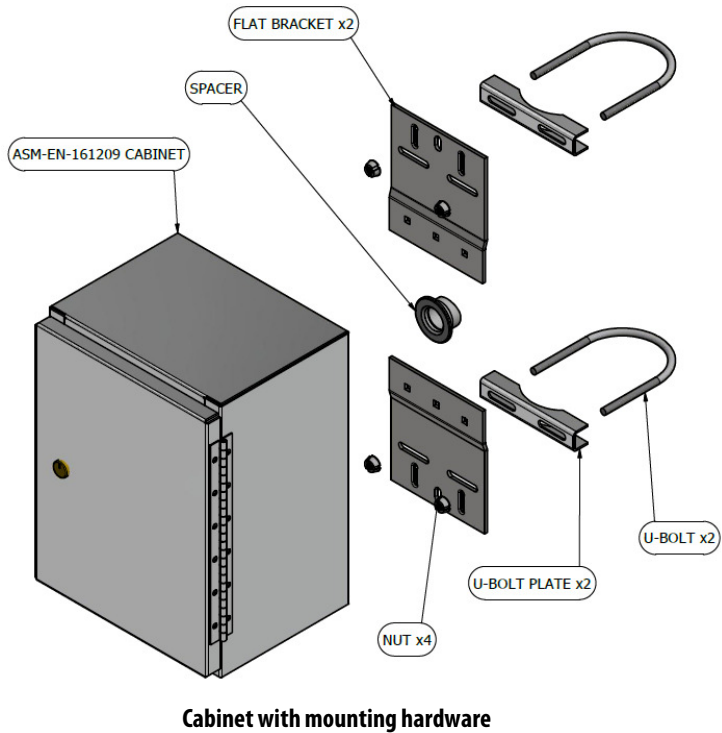
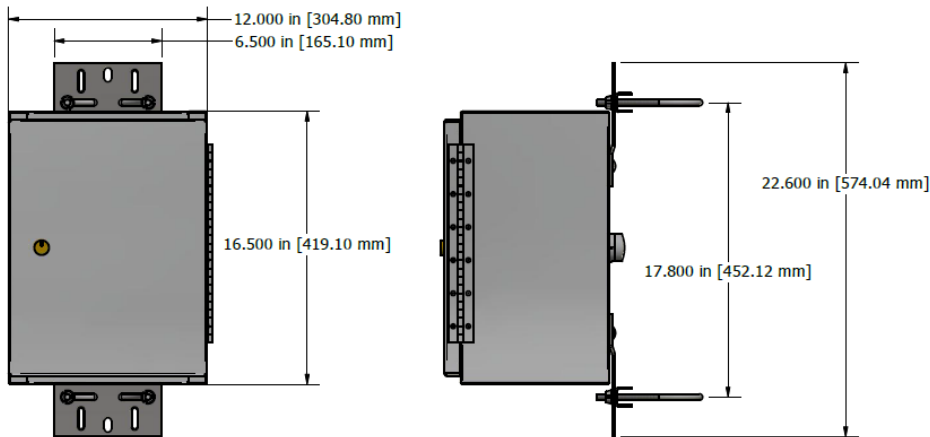
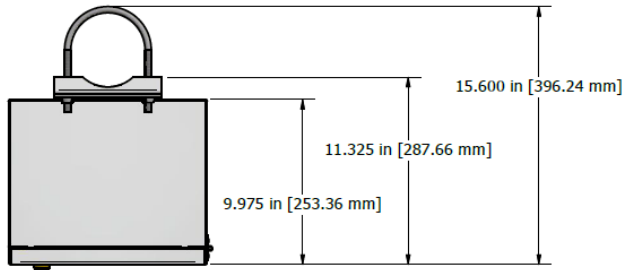
Fax: 250-381-4830

info@lanelight.com

www.lanelight.com



Control Cabinet, ASM-EN-161209



SPECIFICATIONS

Material	0.125 in. 5052 Aluminum
Dimensions	Refer to drawings
Construction	Welded construction, sealed seams Neoprene P&S Weather Strip
Hardware	#2 cabinet lock with 2 keys
Mounting Options	Pole mount, U-bolt hardware included, ID 4.5 in. Band mount capable (banding not included) Bolt slots for Telespar
Weight	13 lb
Standards Compliance	UL Listed Manufactured to NEMA 3R specifications

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Battery, 40Ah LiFePO4



The 40Ah LiFePO4 (Lithium iron phosphate) battery comprises four 3.2V 40 Ah cells in a 4S configuration with an aluminum panel, nylon handle, and plastic top cover. LiFePO4 batteries have a life span 10 times longer than that of traditional lead acid batteries, and they recharge faster, weigh about 25% less, and can tolerate greater variations in temperature. LiFePO4 batteries are environmentally friendly and safe for use in any system. Other advantages of LiFePO4 technology include upper and lower voltage protection, dead short and reverse polarity protection, and flame-retardant chemistry. Overall, they provide twice the battery capacity in the same amount of space as a traditional lead acid battery.

Figure 1: Capacity at C100

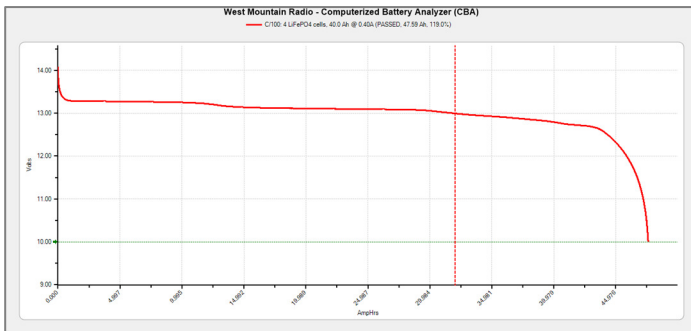
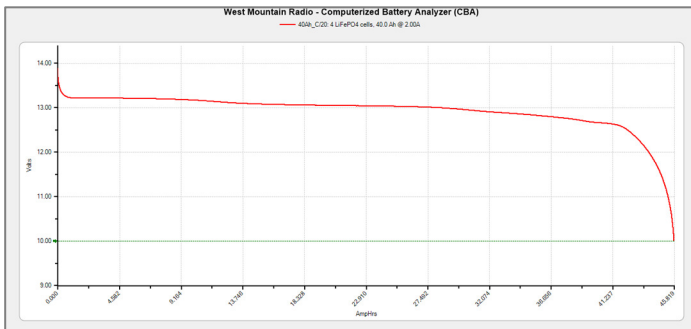


Figure 2: Capacity at C20



SPECIFICATIONS

Voltage	Working: 12.8V Peak: 14.6V Cutoff: 11.2V
Capacity at C100	48 Ah
Capacity at C20	40 Ah
Internal Resistance	≤2.5mΩ
Current Range	Up to 3C (120A) continuous current for charging and discharging Up to 10C (400A) impulse (≤10 seconds) discharge current Recommended charging and discharging current: 0.5C (20A)
Energy Density	Pack: 77.57 Wh/kg, cell: 91.4Wh/kg
Cycle Life	> 1500 cycles (80% of initial capacity @ 0.2C rate, IEC Standard) Cell: ≥2000 cycles at 80% DOD at room temperature Pack: ≥1500 cycles at 80% DOD at room temperature
Charging Rate	0.5C rate (20A) Recommended 3C rate (120A) Maximum charging rate
Discharging Rate	Constant discharge current: 120A (3C rate) Impulse discharge current (<10sec): 400A (10C rate)
Self-Discharge	Less than 3% per month
Weight	6.6 Kg (14.55 lbs)
Dimensions LxWxH	126x198x190mm (5x7.6x7.5 inches)
Chemistry	LiFeMnPO4
Terminals	Nickel plated, threaded
Container/Cover	Nylon
Operating Temperature	Charge: 0°C to 65 °C (32F to 149F) Discharge: -20°C to 65 °C (-4F to 149F) Temperature Durability of Case: ≤135 °C (275F)
Certifications	UN38.3

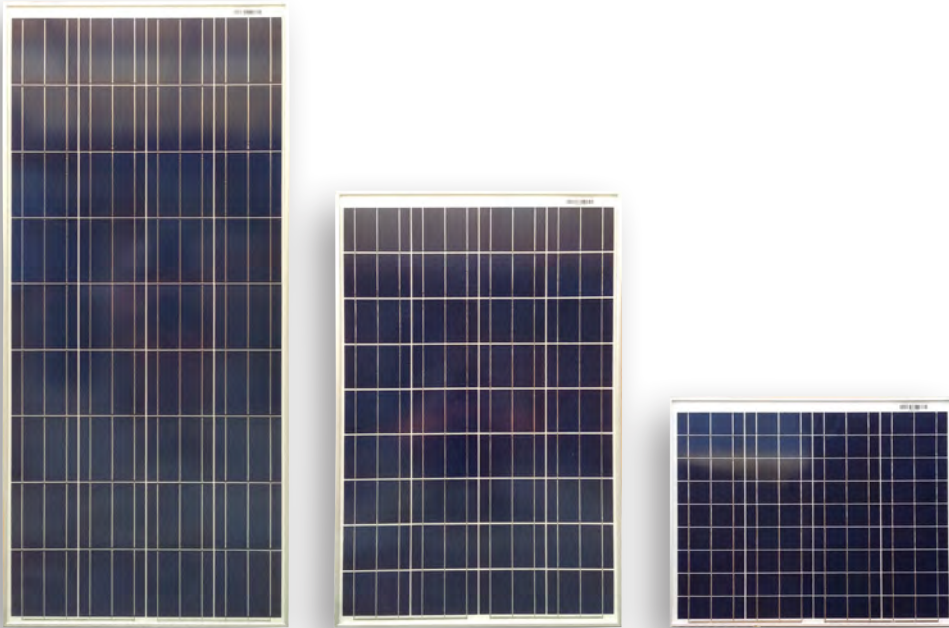
CONTACT INFORMATION

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Victoria, BC V8Z 3B8 Canada
Toll-Free: 1-866-466-4836
Fax: 250-381-4830
info@lanelight.com
www.lanelight.com



HES PV HES – Small Area Solar Modules // HES-10 · HES-20 · HES-50 · HES-100 · HES-165



HES PV SMALL AREA SOLAR MODULES

Offer reliable battery charging in all Canadian climates. Their rugged design makes them a popular choice for industrial systems, remote homes, and RV battery charging systems.

BUILT TOUGH FOR CANADA'S TOUGHEST CLIMATES

HES-50, 100, & 165 feature cUL certifications to offer reliable battery charging in all Canadian climates. They also include MC 4 type connectors for ease of installation.

MECHANICAL STRENGTH

The anodized aluminium frame mates with the Fast-Rack pole, roof, and ground mounts for a strong and secure solar system. Modules may be installed in portrait or landscape.

RELIABLE

10 year mechanical warranty and 25 year power output warranty ensure your solar system delivers power to your load.



www.hespv.ca





HES – Small Area Solar Modules //

HES-10 · HES-20 · HES-50 · HES-100 · HES-165

ELECTRICAL CHARACTERISTICS					
Module	HES-10-40PV	HES-20-40PV	HES-50-36PV	HES-100-36PV	HES-165-36PV
Max Power (Pmax)	10 W	20 W	50 W	100 W	165 W
Open Circuit Voltage (Voc)	19.8 V	20.1 V	20.4 V	20.6 V	21.2 V
Maximum Power Voltage (Vpm)	17.6 V	17.9 V	18.5 V	18.2 V	18.6 V
Short Circuit Current (Isc)	0.65 A	1.26 A	3.15 A	6.23 A	9.86 A
Maximum Power Current (Ipm)	0.57 A	1.12 A	2.77 A	5.5 A	8.87 A
Max Series Fuse Rating	10 A	10 A	10 A	10 A	10 A

STC - Standard Test Conditions: Irradiation 1000 W/m² - Air mass AM 1.5 - Cell temperature 25°C
Calculated using maximum power.

MECHANICAL CHARACTERISTICS					
Module	HES-10-40PV	HES-20-40PV	HES-50-36PV	HES-100-36PV	HES-165-36PV
Dimensions (H x W x D)	250 x 356 x 17 mm 9.8 x 14 x 0.6"	450 x 356 x 20 mm 17.7 x 14 x .8"	670 x 540 x 25 mm 26.3 x 21.2 x 1"	1020 x 670 x 30 mm 40 x 26.3 x 1.2"	1480 x 670 x 35 mm 58.3 x 26.3 x 1.3"
Output Interconnect Cable	1 Meter Sunlight Resistant Cables	1 Meter Sunlight Resistant Cables	MC 4 Type	MC 4 Type	MC 4 Type
Operating Temperature	-40 to 85°C / -40 to 185°F				

WARRANTY & CERTIFICATIONS					
Module	HES-10-40PV	HES-20-40PV	HES-50-36PV	HES-100-36PV	HES-165-36PV
	CE	CE	cUL & CE	cUL & CE	cUL & CE
	10 Year limited warranty on material and workmanship				
	25 Year Power Guarantee				
	Years 0 - 10 > 90%				
	Years 10 - 25 > 80%				



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www.hespv.ca

Rectangular Rapid Flashing Beacon (RRFB) Light Bars

OVERVIEW

LaneLight™ RRFB light bars feature large LED arrays that meet or exceed MUTCD requirements for crosswalk warning systems. When activated, the main LED arrays flash a MUTCD compliant pattern, and side-mounted LED arrays flash simultaneously to advise pedestrians that the main RRFBs have been activated and are visible to drivers approaching the crosswalk.

CONFIGURATIONS AND DIMENSIONS

Figure 1: Front elevation

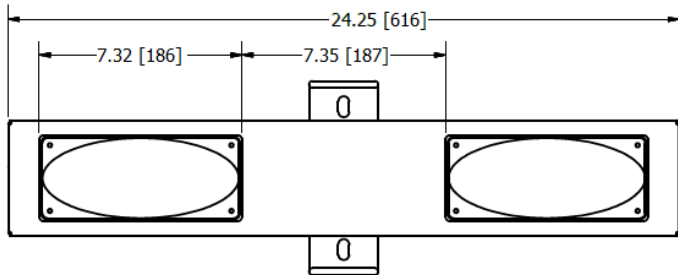
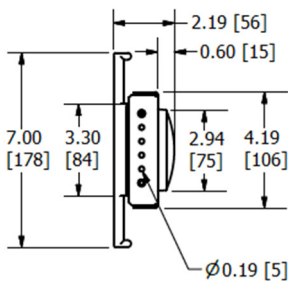


Figure 2: Side elevation



Dimensions shown as in. [mm].

SPECIFICATIONS

Operating Voltage	10 – 30VDC; max current 1.25A per beacon
Power Consumption	13W unregulated, 6W regulated
Flash Pattern	MUTCD compliant (WW+S, Classic RRFB)
LED Intensity	Meets or exceeds SAE J595 class 1
LED Chromaticity	Meets SAE J578
LED Color	Amber; Red available for custom applications
LED Light Distribution	120° horizontal, 30° vertical
LED Brightness Control	>600Lux day; >380Lux night Optional unregulated 1200Lux
LED Lens Material	Clear polycarbonate, UV and abrasion resistant
LED Lightbar Material	Aluminum, powder coated black finish; custom colours available
Pedestrian LEDs	4 standard end-mounted \varnothing 1/4 in. pedestrian notification LEDs
Weight	4.8 lbs. [2.2 kg]
Operating Temperature	-40°F to +165°F [-40°C to +74°C]
Mounting	Bolting or banding onto standard traffic poles Will mount onto poles as small as telespar
Warranty	Five year limited warranty for defects in manufacturing, factory assembly and materials only; the warranty excludes damage caused by vehicles or vandalism

CONTACT INFORMATION

To order, or for more information, contact ITEM/LaneLight:

Unit 16 – 755 Vanalman Avenue

Victoria, BC V8Z 3B8 Canada

Toll-Free: 1-866-466-4836

Fax: 250-381-4830

info@lanelight.com

www.lanelight.com



LLWBPB18/4: 18 AWG 4 Conductor Unshielded 300V Control Tray Cable

SPECIFICATIONS

Usage

Low voltage, water-blocked cable for use in underground ducts, PLTC, FPL, intercom, sound and audio applications.

Physical Characteristics

Number of Conductors	4 conductor
AWG	18 AWG
Stranding	7 x 27
Conductor Material	TC – Tinned copper
Insulation Material	Polyvinyl chloride
Outer Shield Material	Unshielded
Outer Jacket Material	Polyvinyl chloride
Cable Color Code	1-Blue, 2-Yellow, 3-Brown, 4-Gray
Cabling Separator	Water blocking tape
Nominal Diameter	0.254 in.

Mechanical Characteristics

Operating Temp. Range	-30° to +105°C
UL Temp. Rating	105°C
Bulk Cable Weight	40 lbs. per 1000 ft.
Max. Recommended Pulling Tension	89 lbs.
Min. Bend Radius/Minor Axis	2.750 in.

Electrical Characteristics

Nominal Capacitance Conductor to Conductor	
Capacitance (pF/ft.)	30.00
Nominal Conductor DC Resistance	
DCR @ 20° C (Ohm/1000 ft.)	5.9
Maximum Operating Voltage	
Voltage	300 V RMS
Maximum Recommended Current	
Current	7.2 Amps per conductor @ 25°C

Markings

Type	Surface inkjet print
Legend	BELDEN WATERBLOCK Y62470 E34972(-PLANT ID) 4C18 (UL) CMG 105C OR FPL OR PLTC-ER SUN RES DIR BUR OR C(UL) CMG – FT4 IEEE 1202 INDOOR/OUTDOOR – LANELIGHT ACTIVATION (2FT, 7 DIGIT_SEQUENTIAL FOOTAGE MARKS) FEET

ALL SPECIFIED PARAMETERS ARE NOMINAL AND SUBJECT TO VERIFICATION

Applicable Specifications and Agency Compliance

Applicable Standards and Environmental Programs	
NEC(UL)	CMG, FPL, PLTC-ER
CEC/C(UL)	CMG
EU Directive 2011/65/EU (ROHS II)	YES
EU CE Mark	YES
EU Directive 2000/53/EC (ELV)	YES
EU Directive 2002/95/EC (RoHS)	YES
EU RoHS Compliance Date	11/06/2006
EU Directive 2002/96/EC (WEEE)	YES
EU Directive 2003/11/EC (BFR)	YES
CA Prop 65 (CJ for Wire & Cable)	YES
MII Order #39 (China RoHS)	YES
Flame Test	
UL Flame Test	UL1685 FT4/IEEE 1202 Vertical Tray Flame Test
CSA Flame Test	FT4
Suitability	
Indoor	YES
Outdoor	YES
Burial	YES
Sunlight Resistance	YES
Plenum (Y/N)	NO

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BDL3 - Bulldog III Series Vandal Resistant ADA Push Button

This button is a highly vandal resistant button with essentially no moving parts. It is pressure activated, but can withstand an impact from a baseball bat or hammer. When the switch activates, you hear a beep and the LED either flashes (Momentary Mode) or lights and stays on until the walk cycle (Latching Mode).

Body Material: Aluminum, Powder Coated

Button Material:

Standard: 316 Stainless Steel
Arrow Button: Anodized 6061 Aluminum, Nickel Plated
Black Powder Coat on area surrounding arrow

Piezo Driven Solid State Switch:

Operating Force: 3.0 lbs. Maximum
Operating Temperature: -30°F to 165°F (-34°C to 74°C)
Operating Voltage: 12-36 VDC, 9-25 VAC RMA (18 VDC Typ.)
MTBF: 8,800,000 hours Typ.
Switch Operating Life: Greater than 300 million operations.
"Off" Current: 15µA Typ.
"On" Resistance: 40Ω Typ. (Momentary)
Maximum "On" Current: 30 mA (over-current protection) Typ.
Maximum "On" Time: 11 sec. Typ.
Debounce Time: 85 ms. Typ.

LED Operating Modes:

Momentary: Approx 0.025 sec. LED flash each time button is pressed.
Latching: LED activates only during non-walk phases and stays on until the beginning of the walk phase.

LED Specifications:

Luminous Intensity: 0.3 Lux @ 1 meter Minimum (Red)
Viewing Angle: 155° Typical

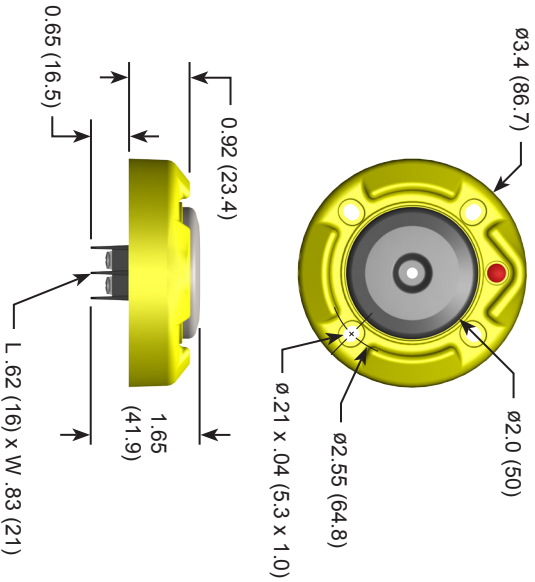
Beeper:

Volume: 68dB @ 1 meter Typ.
Beep on Press: 2.6KHz
Beep on Release: 2.3KHz
Beep Length: 50ms Typ.

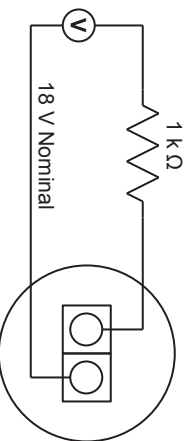
Terminal screws include washers (clamping plates) intended for bare wire. Crimp terminals are not recommended.

Warranty: 5 Years, free from manufacturers defects

See page 2 for additional design compliance and accessory information.



Suggested Test Circuit
(Momentary Mode Only)



BDL3-Y model shown.
Dimensions are in inches (millimeters).