LaneLight

The Most Trusted Name in LED Road Warning Systems

PRODUCT MANUAL

MK10 System Controller

Let's Get Home SAFE

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6	Changes to the configuration menu	P. Smale	P. Smale	2021-03-12

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1 WELCOME TO LANELIGHT

Thank you for choosing LaneLight. To help ensure many years of trouble-free operation, read this manual carefully and follow its instructions and recommendations. All of us at LaneLight have a continuing interest in road and pedestrian safety and in your full satisfaction with our products.

1.1 WARRANTY

LaneLight provides a 5-year limited warranty on the supplied equipment (excluding batteries) **only if** the warranty report is completed correctly, signed, and received by LaneLight. To activate your warranty, complete a warranty registration form and fax it or email a scanned copy or photo of it to LaneLight.

Email: info@lanelight.com
Fax: 250-381-4830

NOTE: The warranty period begins from the date of product **delivery**, not the date the registration form is received.

1.2 CUSTOMER RESPONSIBILITY

The customer (or authorized representative) is responsible for the following:

- ensuring any electrical devices are installed correctly, safely, and as per industry standards.
- complying with all standards applicable to the project and the work site
- performing all system maintenance and operation
- addressing any unit damage caused by improper installation and incorrect wiring
- reading all instructions and requirements in this manual before going to the installation site
- contacting LaneLight if there is confusion regarding, disagreement with, or inability to perform any given instruction in this manual

Always keep a copy of this product manual on site.

1.3 SAFETY SYMBOLS

Watch for these important symbols within this manual:

WARNING: **This symbol indicates that serious bodily harm or death may result from failure to adhere to precautions.**

CAUTION: This symbol indicates that damage to equipment may result if the instructions are not followed.

NOTE: This paragraph indicates additional information or suggests optimal conditions under which the equipment will operate the most efficiently.

1.4 SAFETY NOTICES

WARNING:	**Batteries are shipped fully charged and can generate short circuit currents. Use caution with tools and remove all metal accessories/jewelry before handling the batteries.**
WARNING:	**Solar panels produce DC electricity when exposed to light (natural or artificial) and have the potential to generate enough electricity to shock or burn. To mitigate this risk, cap or insulate the solar panel's wire ends until power from the panel is required.**
WARNING:	**Ensure that all equipment is disconnected from any power source during the installation and wiring of the system.**
WARNING:	**When working with AC power systems, ONLY qualified electricians should make connections between the controller and the AC power source.**

CAUTION: Inspect all wiring for correct polarity before energizing the system.

CAUTION: If the system installed is equipped with a surge suppressor, ensure that the surge suppressor's ground terminal is connected directly to ground; follow appropriate local electrical grounding practices. Use AWG12 wire (minimum) and label the wire accordingly. Do not bend sharply or break the conductors of the grounding wire. Consult the wiring diagram included with the system.

1.5 ABOUT THIS DOCUMENT

1.5.1 Contents

Product manuals may contain any or all of the following information, depending on the product/system:

- System description
- Safety notices
- Preparation information, including required tools and equipment
- Installation instructions
- Configuration and setup instructions
- Operation instructions
- Maintenance schedule and tasks
- Troubleshooting information

1.5.2 Purpose and Scope

The purpose of this manual is to provide the following information for the MK10 controller:

- Unit/system description
- Installation procedures
- Operating procedures
- Troubleshooting procedures

1.5.3 Assumptions

It is assumed that the reader and user of this manual and the hardware described herein are authorized by the local traffic governing body to work in and around traffic cabinets. The reader should be familiar with the operation and wiring of traffic control cabinets in their area, and must be aware of, and follow, all safety and other operational protocols of the local traffic agency.

2 SYSTEM OVERVIEW

2.1 MK10 SYSTEM CONTROLLER

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 software menu.

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 vertically and is designed for integration into panel mount traffic cabinets.

Figure 1: MK10- system controller

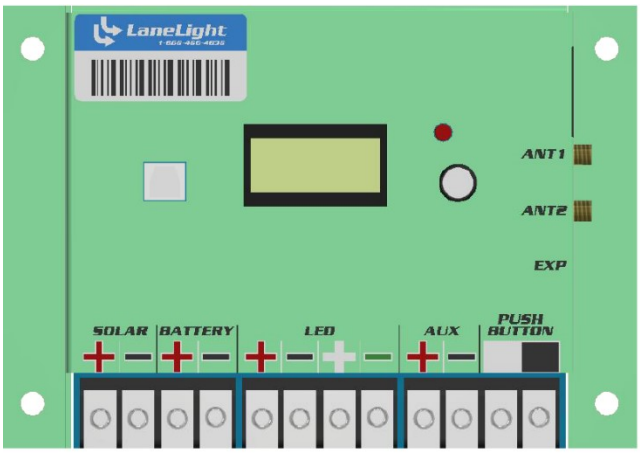


Table 1: MK10 panel connections

Label	Description
SOLAR	Connection to solar panel
BATTERY	Connection to battery
RRFB	Output ports to RRFB devices
AUX	Closed when device is activated; stays closed when flash pattern is executed; can be used for activating additional devices or controllers
PUSH BUTTON	Input port for contact closure activation device
ANT1	Antenna (Controller Network)
ANT2	Antenna (Cloud Service)
EXP	Output port for extension modules e.g. LaneLight MLK150 In-Road Warning Lights (IRWL) or a light sensor

Additional Notes:

- The controller can be monitored and configured via the LCD screen and the multi-function menu rotary dial/pushbutton located on the front of the unit.
- The controller can also be configured via a utility program installed on a laptop. A USB type A to B connection cable is required for this method. The USB connection is disabled as long as the controller in sleeping state.
- When activated, the output voltage is 0.7 – 1.0 V below the supply voltage.
- The controller will reset the flasher activation time if a second activation signal is received during the crossing cycle. For example, if a pedestrian activates a pushbutton while another pedestrian is crossing, the controller will reset the flasher activation time to allow the second pedestrian the full activation time to cross.

2.2 MK10 DRIVER EXTENSION FOR MLK150 LANELIGHTS (OPTIONAL)

Figure 2:MK10 Driver Extension for MLK150 LaneLights

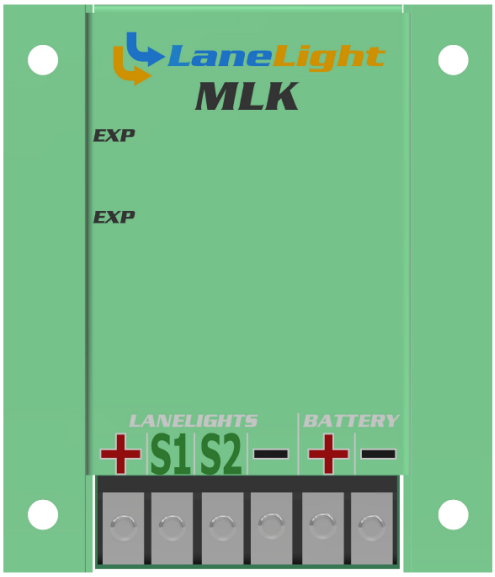


Table 2: MK10 Driver Extension connections

Label	Description
EXP1	Input port from the MK10 controller
EXP2	Output for modules connected downstream
LANELIGHTS	'+' & '-' power for MLK IPLs S1: Sync output 1 S2: Sync output 2
BATTERY	Separate connection to battery in parallel

The optional LaneLight™ MK10 LaneLight driver extension is designed for use with the MK10 system controller in systems that also use LaneLight MLK150 In-Road Warning Lights (IRWLs).

If the driver extension is connected to the MK10 system controller via the EXP port, the controller will detect the device during start up. The MLK EXT menu item will appear in the configuration menu of the controller, which will display the status of the MLK150 LaneLights connected to the driver output.

The MK10 driver extension interprets output signals from the MK10 system controller. Upon detection of a trigger event from the system controller, the driver extension unit outputs 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.

3 INSTALLATION

3.1 EQUIPMENT/TOOLS REQUIRED

The following tools/equipment are required to install the MK10 LaneLight controller into an existing control cabinet:

- Philips screwdriver
- 4 x stainless steel machine screws ¼ in. (supplied)
- 4 x stainless steel washers, ¼ in. (supplied)
  NOTE: The MK10 is normally shipped pre-mounted within a LaneLight control cabinet.

The following tools/equipment may be required for installing solar panels, LaneLight control cabinets, and flasher devices:

- Ladder or bucket truck
- Wrench assortment from 5/16 – 11/16
- BAND-IT® tool with minimum 1/2 in. stainless steel banding (3/4 in. recommended)
- Drill with step bit from1/2 in.-1 in.
- Flat head and Philips screwdriver assortment sizes 00 – 1
- Fish tape

NOTE: Installation procedures for the MLK 150 In-Road LED-Illuminate Markers are described in a separate manual.

3.2 WARNINGS AND NOTIFICATIONS

WARNING:	**The enclosure must be properly grounded when installing the controller.**
WARNING:	**If mounting the LaneLight controller (LLC) on a non-conductive panel, provide a separate grounding wire (minimum AWG #14) that runs from the enclosure to the system ground.**
WARNING:	**All electrical connections must be made in accordance with governmental and local codes for electrical installations.**
WARNING:	**Ensure that all equipment is disconnected from any power source during the installation and initial wiring of the system.**

CAUTION: Inspect all wiring for correct polarity before energizing the system.

NOTE: The MK10 controller contains a supercapacitor, which powers the internal Real Time Clock (RTC). Memory is flash based and does not require power to retain information.

3.3 INSTALLATION OVERVIEW

The MK10 system controller is typically part of an overall system and is normally pre-mounted within a LaneLight control cabinet.

This section describes general installation guidelines and procedures for installing typical system assemblies, including a solar panel (if applicable) and the control cabinet.

WARNING: DO NOT make any electrical connections until instructed to do so.

NOTE: This section contains general installation instructions only. Actual installation procedures may vary depending on site conditions and equipment installed.

1. Determine the pole locations (if required).
2. Determine the mounting locations on the poles for all equipment.
3. Drill and prepare access holes for mounting and/or cabling as required in the poles.
4. Install any flasher devices as applicable.
5. Install activation devices (e.g. pushbuttons, bollards).
6. Install the solar panel (if applicable).
7. Install the control cabinet.
8. Make all required device connections at the control cabinet.

3.4 DETERMINE EQUIPMENT MOUNTING LOCATIONS AND REQUIREMENTS

Refer to site plans and engineering documents.

3.4.1 Pole Location Guidelines

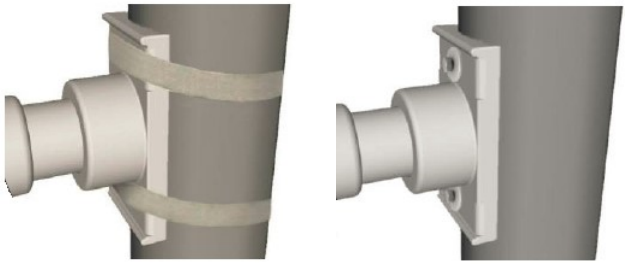
- When determining **pole locations**, consider the following factors:
  - For solar powered systems, ensure that the solar panel, when installed, will not be obstructed by trees, hills, buildings, walls, poles or other objects that will block sunlight. **The solar panels require direct sunlight to operate efficiently.**
  - Consult appropriate traffic signage regulations for placement locations.

3.4.2 Equipment Mounting Location Guidelines

- When planning the **equipment mounting locations on the poles**, consider the following factors:
  - Determine the type of mounting method to be used for each piece of equipment.
  - Determine the equipment mounting locations for all assemblies before drilling holes for mounting hardware (if applicable) and access holes for the cables.
  - To help prevent vandalism, mount equipment 8 ft. or higher where possible and appropriate.

How equipment is mounted may vary depending on local requirements and site conditions.

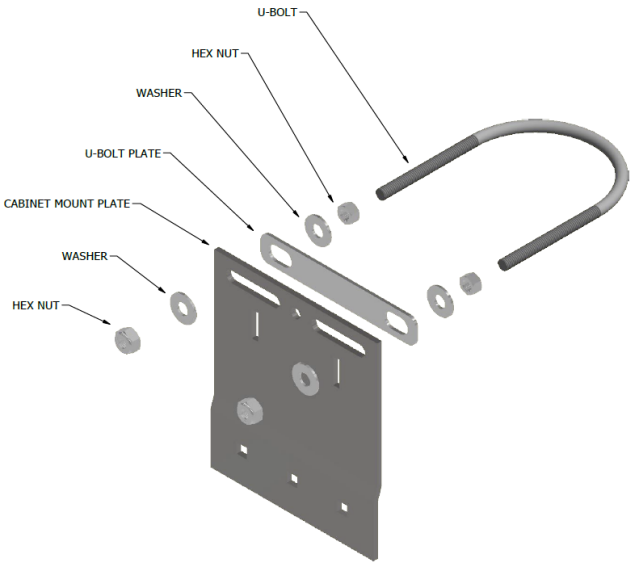
Figure 3: Hub plate mounting options



Metal banding Bolts

NOTE: If using metal banding, use a BAND-IT® tool with minimum 1/2 in. stainless steel banding (3/4 in. recommended). Consult BAND-IT resources for usage of the tool as that is beyond the scope of this manual (https://www.band-it-idex.com).

Figure 4: U-bolt mounting option



Some LaneLight assemblies, i.e. solar panels and some models of control cabinets, are shipped with U-bolt mounting hardware.

NOTE: Backup nuts and washers are required to prevent deformation of the bracket.

Figure 5: Top of pole solar panel control cabinet mounting options – round poles

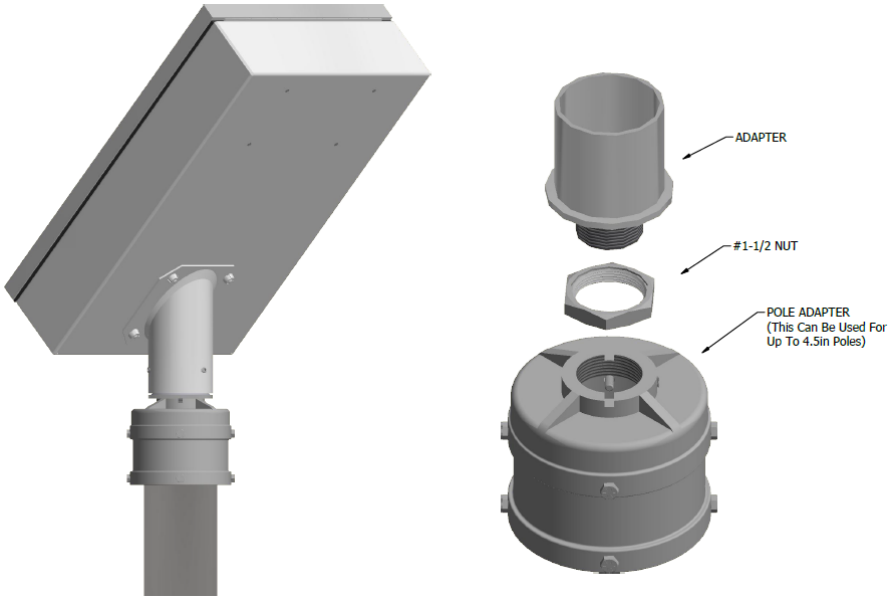
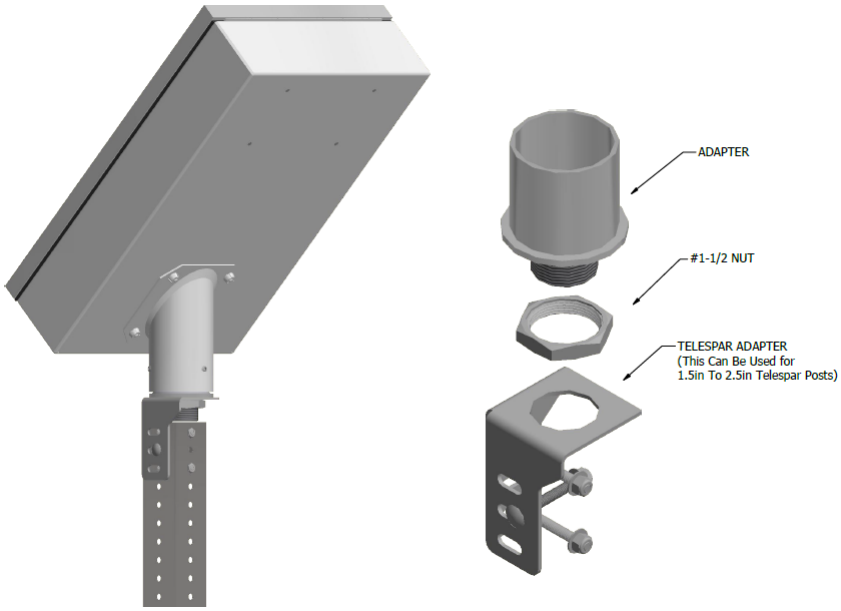


Figure 6: Top of pole solar panel control cabinet mounting options – Telespar poles



3.5 MARK AND DRILL HOLES FOR CABLES AND MOUNTING HARDWARE

This section assumes that the equipment location and mounting requirements have been determined.

This section applies only when equipment will be installed on round poles.

NOTE: Whenever possible, run all cables into the rear of the control cabinet from inside the pole. A standard control cabinet has at least two (2) conduit blanks, and more can be added at this time if required to accommodate additional cables if access at the rear cabinet is not available.

NOTE: Run cables through conduit.

1. **AS REQUIRED:** Mark and drill 3/4 in. cable access holes in the pole(s) for the power/control cables for all assemblies to be installed and connected to the MK10 system controller.
   This will vary depending on the number and type of equipment assemblies to be installed.
2. Deburr the edges of the hole and install a conduit fitting or grommet as appropriate to prevent sharp edges from damaging the cables.
3. **AS REQUIRED:** Mark and tap holes for mounting hardware; sizes will vary.

3.6 INSTALL FLASHER AND ACTIVATION DEVICES

If required, consult product manuals for the devices to be installed.

1. Install flasher devices as required.
2. Install activation devices as required.
3. Run all equipment assembly cables through the pole to the control cabinet access hole.
4. (Side of pole installation) Seal the cable holes in the pole with appropriate sealant so there is no gap between the hole's edges and the cable.
5. Verify that cables have not been pinched or crushed during installation procedures.

3.7 SIDE OF POLE – INSTALL THE SOLAR PANEL (IF REQUIRED)

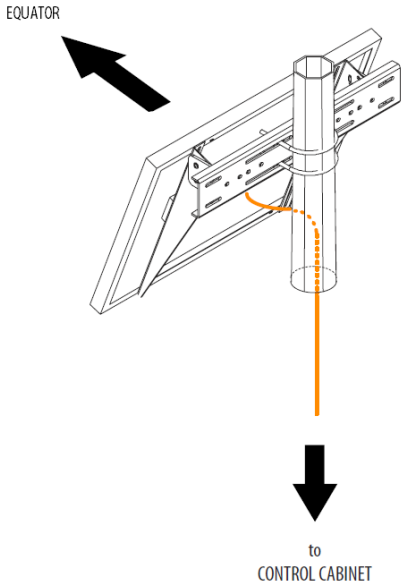
WARNING: **Solar panels produce DC electricity when exposed to light (natural or artificial) and have the potential to generate enough electricity to shock or burn. To mitigate this risk, cap or insulate the solar panel's wire ends until power from the panel is required.**

CAUTION: Ensure that the solar panel, when installed, will not be obstructed by trees, buildings, walls, poles or other objects that will block the sun. The solar panels require direct sunlight to operate efficiently.

NOTE: This procedure assumes that the mounting location for the control cabinet has been determined and that any access holes have been drilled and prepared appropriately.

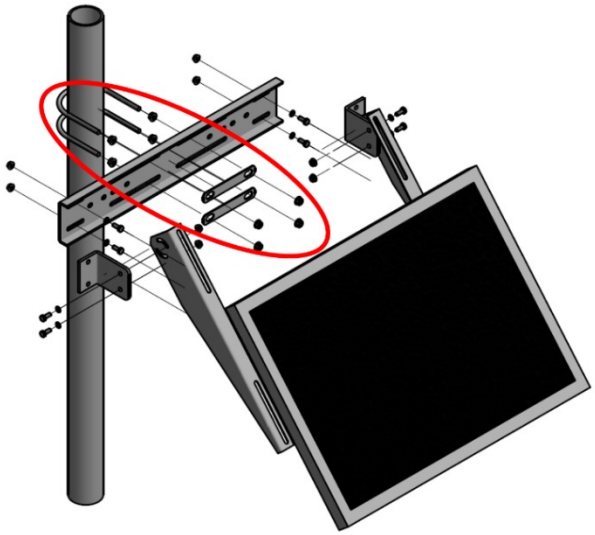
1. Orient the solar panel assembly so that it faces the equator.
   Northern hemisphere installation = panel faces south
   Southern hemisphere installation = panel faces north

Figure 7: Solar panel orientation



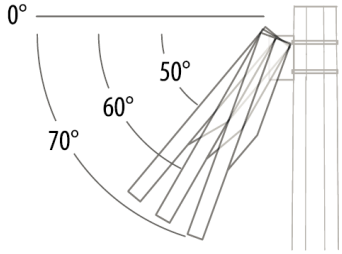
2. Secure the solar panel to the pole.
   NOTE: Solar panels may vary depending on site conditions and customer requirements.
   Standard LaneLight solar panels are shipped with U-bolt mounting hardware. For U-bolt installation:
   a. Install the backup nuts and washers on both U-bolts. Set one aside.
   b. Place the solar panel mounting bracket against the pole.
   c. Slide the upper U-bolt through the upper slot on the solar panel's mounting bracket. Install the flat plate, then the fastening washer and nut. Tighten the fastening nuts to hand-tight.
   d. Still supporting the panel, insert the lower U-bolt through the lower slot on the panel's mounting bracket. Install the flat plate, then the fastening washers and nuts. Tighten all fastening nuts fully.
   CAUTION: Do not over-tighten the fastening bolts. The flat plate should not bend or deform.
   CAUTION: AVOID using metal banding to mount the solar panel assembly.

Figure 8: Solar panel assembly with U-bolt fasteners



3. Support the weight of the solar panel, then loosen the bolts at the **hinges** of the solar panel assembly.
4. Set the tilt angle of the solar panel.

Figure 9: Solar panel angles



Set the tilt angle based on the geographic location of the installation to maximize winter solar collection.

ANGLE	LAT	EXAMPLE CITY
55°	35	Los Angeles, CA
60°	40	New York, NY
65°	45	Portland, OR
70°	50	Vancouver, BC
75°	55	Grande Prairie, AB
80°	60	Whitehorse, YK

5. Tighten the hinge bolts securely. **DO NOT OVERTIGHTEN.**

3.8 SIDE OF POLE – INSTALL THE CONTROL CABINET

This procedure assumes that the mounting location for the control cabinet has been determined and that any cable access holes have been drilled and prepared appropriately.

NOTE: If possible and practical, install the control cabinet on the pole BEFORE running cables through the pole to the control cabinet access hole. This will reduce the risk of crushing or pinching cables when installing the cabinet.

3.8.1 Universal Hub Plate Mounts

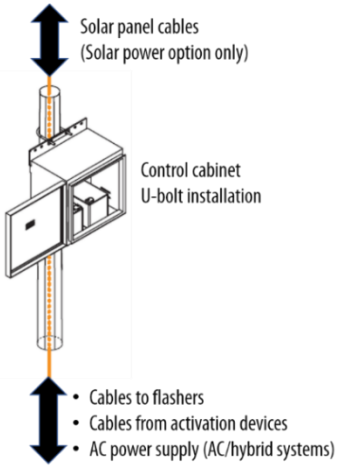
For control cabinets with universal hub plate mounts, use metal banding or bolts as appropriate for the site. See section *3.4.2 Equipment Mounting Location Guidelines* on page 8.

3.8.2 U-Bolt Mount

1. If not done previously, carefully feed the wires from the flasher and activation units into the control cabinet through the access hole.
2. Install the backup nuts and washers on the U-bolt.
3. Place the control cabinet against the pole.
4. Supporting the cabinet, slide the U-bolt through the mounting plate, install the flat plate, then install the fastening washers and nuts. Tighten the fastening nuts fully to support the cabinet's weight.

CAUTION: Do not over-tighten the U-bolt mounting bolts. The flat plate should not bend or deform.

Figure 10: Control cabinet U-bolt installation



3.9 SIDE OF POLE – CONNECT CABLES

WARNING: **Batteries are shipped fully charged and can generate short circuit currents. Use caution with tools and remove all metal accessories/jewelry before handling the batteries.**

Solar panels produce DC electricity when exposed to light (natural or artificial) and have the potential to generate enough electricity to shock or burn. To mitigate this risk, cap or insulate the solar panel's wire ends until power from the panel is required.

Ensure that all equipment is disconnected from any power source during the installation and wiring of the system.

When working with AC power systems, ONLY qualified electricians should make connections between the controller and the AC power source.

CAUTION: Inspect all wiring for correct polarity before energizing the system.

CAUTION: If the system installed is equipped with a surge suppressor, ensure that the surge suppressor's ground terminal is connected directly to ground; follow appropriate local electrical grounding practices. Use AWG12 wire (minimum) and label the wire accordingly. Do not bend sharply or break the conductors of the grounding wire. Consult the wiring diagram included with the system.

This procedure assumes that all required cables for flasher and activation devices and the solar panel and battery (if applicable) have been run through the pole to the traffic controller cabinet and are ready to be connected.

NOTE: Consult the wiring diagram for the specific installation. This should be located inside the control cabinet door. Cables for flasher and activation devices and the solar panel and battery (if applicable) are typically connected to terminal blocks in the control cabinet instead of directly to the system controller.

1. Ensure all breakers in the control cabinet are set to OFF.
2. Connect the activation signal input devices to the appropriate terminal blocks in the control cabinet.
3. (Optional) If the system includes an MLK150 driver extension, connect the LaneLight In-Road Warning Lights (IRWLs) to the appropriate terminal blocks in the control cabinet.
4. Connect other flasher devices, if applicable.

   CAUTION: Use caution when connecting the solar panel (if applicable) and the battery cables. Unless the solar panel is covered by an opaque material, there will be power at the wires. Batteries are shipped fully charged.

5. Connect solar panel cables to the appropriate terminal blocks in the control cabinet, if applicable.
6. Connect battery cables to the appropriate terminal blocks in the control cabinet, if applicable.
7. Set the breakers in the control cabinet to ON.
   This enables power to the controller and all devices connected to the control cabinet.
8. Configure and test the system. Refer to section 4 System Configuration.

3.10 TOP OF POLE – INSTALL THE CONTROL CABINET AND CONNECT EQUIPMENT

This section assumes that cables for all of the crosswalk equipment have been run to the top of the pole and are ready to be connected to the system controller.

NOTE: Consult the wiring diagram for the specific installation. This should be located inside the control cabinet.

CAUTION: Ensure the inline fuse in the battery connector cable has been removed before you start the installation.

3.10.1 Install the Battery Unit(s)

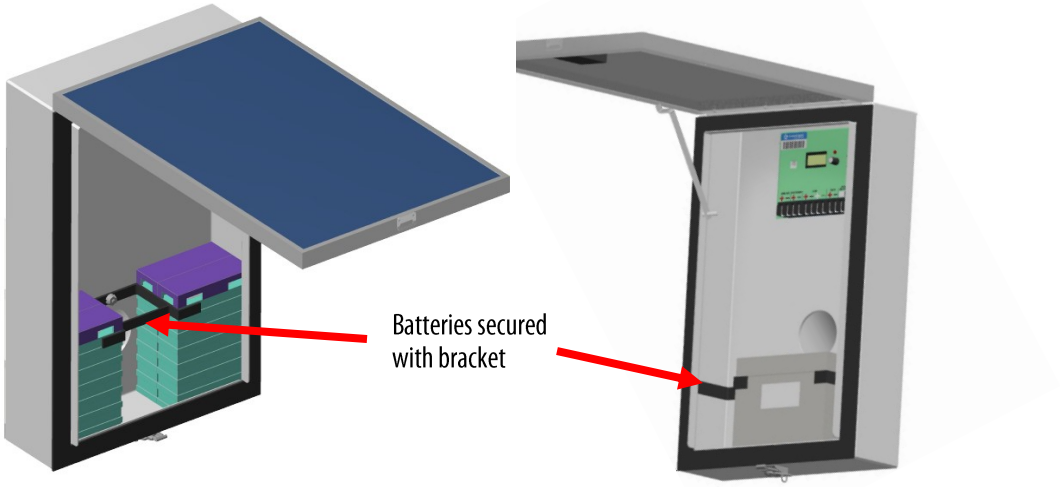
IMPORTANT: Battery weight and the ability to handle them must be considered before determining whether to install the batteries in the cabinet on the ground or after the cabinet is mounted to the top of the pole.

CAUTION: Ensure the inline fuse in the battery connector cable has been removed before you install the batteries.

1. Lift the hinged solar panel/lid until it is fully open. Use the fold-out support strut to secure the lid in position.
2. Carefully unpack the batteries.

   CAUTION: Do not remove the plastic sleeves from the battery contacts during installation.
3. In the cabinet, loosen the nuts on the battery support bracket until it can move freely.
4. Carefully lay the battery pack(s) in the cabinet with the contacts facing the system controller.

   CAUTION: Ensure none of the battery wires touch any metal parts.



5. Secure the battery pack(s) with the bracket.
6. Connect the battery wires (– wire first) to the system controller battery terminals.

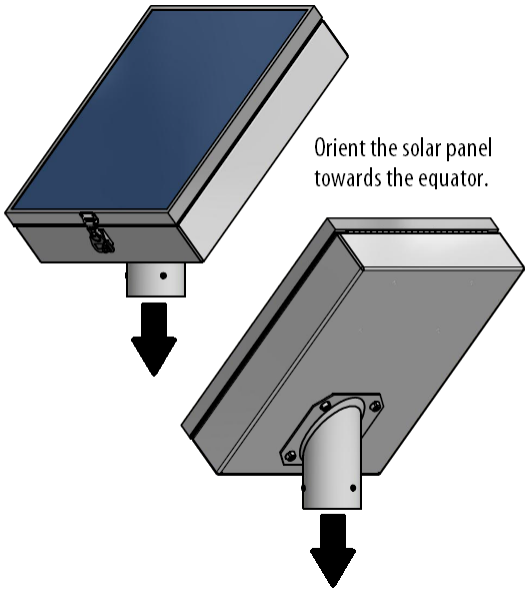
   CAUTION: Do not insert the fuses yet.
7. Repeat this procedure for all control cabinet units.

3.10.2 Mount the Control Cabinet

This section assumes all flasher and activation devices have been installed and the wiring has been run to the top of the pole. For battery installation, see section *3.10.1 Install the Battery Unit(s)*.

1. Feed the cables through the access tube on the bottom of the control cabinet.
2. Seat the control cabinet carefully on the top of the pole.

   CAUTION: Be careful not to crush or pinch any wires when mounting the cabinet onto the pole.
3. Rotate the control cabinet to face the equator. A simple guideline is to orient the solar panel for maximum exposure to sunlight at approximately 12:30 p.m. local time.



4. Secure the cabinet in position with the security bolts supplied in the installation kit.
   a. Align any mounting holes as required.
   b. Install the supplied mounting bolts.
      CAUTION: Do not over-tighten the fastening bolts.
      CAUTION: AVOID using metal banding to mount the top of pole control cabinet.
5. Connect the flasher and activation device wires to the system controller terminals and inspect each connection.
6. Repeat this procedure for each control cabinet in the network.
7. Insert the inline fuse into the battery connectors for each control cabinet in the network.
8. Wait for the system controllers to cycle through the self-check and connection processes.
9. Activate the system from each of the push button stations to verify system operation.

4 SYSTEM CONFIGURATION

The MK10 LaneLight controller (LLC) can be configured using either of the following methods:

- Manually on site via the LCD screen and Menu pushbutton/dial on the front of the controller (*4.1.3 LCD Menu Configuration Procedure* on page 21)
- Set at the factory before shipping.
- LaneLight Utility program
- LaneLightConnect Cloud-Based access (optional)

4.1 LCD MENU

4.1.1 LCD Interface Overview

After powering up, the MK10 controller goes through a startup process that takes approximately 30 seconds. During this time, the system checks to see what devices are connected. When boot up is complete, the LCD screen displays the model and version number of the controller. Please reference this information when calling LaneLight's tech support phone number.

The LCD screen comprises two lines of text of eight characters each that display the following information after the initial startup process is complete:

Table 3: LCD screen layout, RUN mode

Line	Information	Example
1	System controller model	MK10 V000
2	Version number	

The LCD screen, in conjunction with the Menu pushbutton/dial, allows users to access the MK10's configuration menu.

See section *4.1.2 Parameter Descriptions and Options* on page 18 and section *4.1.3 LCD Menu Configuration Procedure* on page 21 for more information regarding configuration parameters and procedures using the LCD screen.

4.1.2 Parameter Descriptions and Options

Figure 11: Configuration menu layout– LCD

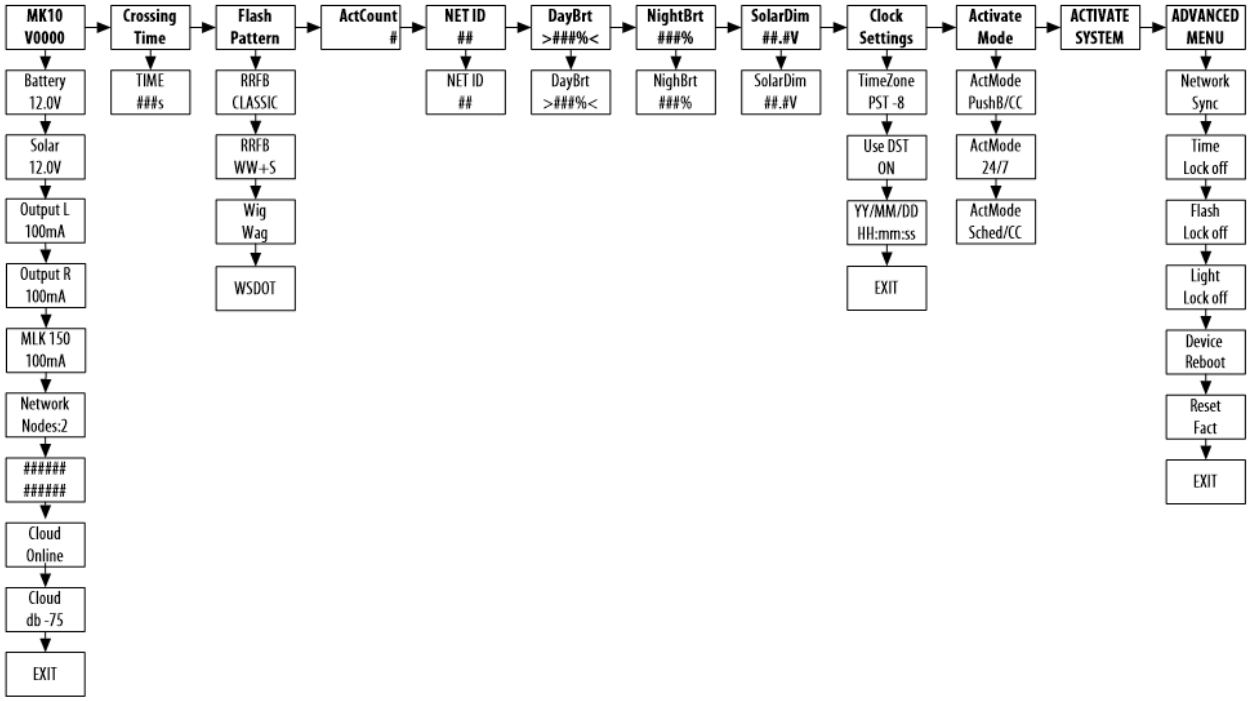


Figure 11 shows the order in which the menu items will appear when configuring the controller via the LCD menu. The main menu items are shown in the top row, with sub menu items and/or options listed below. Some sub menu items will be displayed or not depending on the devices that are connected. The following table describes the format and options for each parameter.

Menu Item	Sub Menu	Options and Details
MK10 V000 (main display menu)	Display	Main menu, displays model and version number, displays status messages within sub menus Displays parameters during configuration
	Battery	Battery voltage
	Solar	Solar panel voltage; pressing enter will show the system charging state
	Output L	Current on output port 1 in mA Displays OPEN if no devices are connected. Displays SHORT if in short circuit state; if a short circuit is detected, the system will check the circuit periodically to see if the state has changed. If devices are connected and functional, displays the last max value read by the controller.
	Output R	Current on output port 2 in mA Displays OPEN if no devices are connected. Displays SHORT if in short circuit state; if a short circuit is detected, the system will check the circuit periodically to see if the state has changed. If devices are connected and functional, displays the last max value read by the controller.
	MLK 150	Appears only if the MK10 is connected to an MLK driver extension unit. Displays the status of the MLK150 LaneLights connected to the driver output.
	Network Nodes	If Network is present, the number of neighboring devices connected to the controller will be displayed. Press the menu dial (ENTER) to scan devices.

Menu Item	Sub Menu	Options and Details
	########## ##########	64 bit address for the MK10 system controller
	Cloud Online/Offline	Indicates if the MK10 controller is online, uploading or offline Press the menu dial (ENTER) to force upload.
	Cloud Db -##	Signal strength of the cellular signal
	EXIT	Exits the current menu
Crossing Time	TIME	Sets the activation time in seconds, up to 120 s.
Flash Pattern[1]	Displays current flash pattern	RRFB Classic
		RRFB WW+S
		Wig Wag
		WSDOT
ActCount #	#########	Displays the total number of activations since the last reset of the MK10 controller. To clear the activation count, reset the MK10 system controller.
NET ID	NET ID	Sets the NET ID. This value is used by all connected devices (configured at each individual device). NOTE: MK10 units can communicate over ranges of 1.6 km (1 mi), When multiple systems are deployed in an area, ensure each system group uses a different NET ID to minimize interference and prevent unexpected activations.
DayBrt %	DayBrt %	Sets the daytime flasher brightness as a percentage. (100 = full brightness)
NightBrt%	NightBrt %	Sets the nighttime flasher brightness (dimming) as a percentage of full brightness.
SolarDim V	SolarDim V	Sets the solar panel voltage threshold for switching between day and night brightness setting. Default threshold value: 8V
Clock Settings	Time Zone	Sets the time zone; displays time zone text abbreviation and time offset from UTC.
	Use DST	ON: Adjusts for daylight savings time for time zone. OFF: Uses standard time for time zone.
	Date and time	Allows user to manually set the date and time for the controller and all connected devices. Format: YY/MM/DD, HH:mm:ss (Military Time Format)
	EXIT	Exits the current menu.
Activate Mode	Act Mode PushB/CC	Accepts activation from a push button or other user triggered device Normally open (NO) external contact closure circuit
	Act Mode 24/7	Runs 24/7 internal activation
	Act Mode Sched/CC	Runs currently defined activation schedule Currently set at the factory
ACTIVATE SYSTEM	Push menu dial to activate	Activates system for testing activation Time and Flash Pattern settings.
ADVANCED MENU	Network Sync	Broadcasts device settings to all other connected devices. Can be used to quick sync a new device added to the network.
	Time Lock	ON/OFF Locks the activation time to the selected device. When ON, the device will not send or receive new timing settings from other connected devices.

[1] See Table 6: Flash Patterns on page 21 for details.

Menu Item	Sub Menu	Options and Details
	Flash Lock	ON/OFF Locks the selected flash pattern to the selected device. When ON, the device will not send or receive new flash pattern from other connected devices. Example: Lock a Wig-Wag pattern at the controller for advance beacon devices.
	Light Lock	ON/OFF Affects DayBrt, NightBrt and LightDim settings for the selected device. When ON, the device will not send or receive daytime, nighttime dimming settings from other connected devices.
	Device Reboot	Reboots the MK10 system controller.
	Reset Fact	Resets the system controller to factory settings.
	EXIT	Exits the current menu.

4.1.3 LCD Menu Configuration Procedure

Setting parameters on the LaneLight controller's LCD screen involves both **turning** and **pressing** the Menu integrated rotary dial/pushbutton. For simplicity, the Menu integrated rotary dial/pushbutton will be referred to as 'the Menu dial' in the following procedure. The Menu dial 'clicks' as it is turned.

- Flashing text on the LCD indicates that turning the Menu dial now will change the selected parameter.
- **Turn** the Menu dial to **change** the selected parameter/value (when text flashes) or **advance** to the next parameter in the active menu.
  - Clockwise: **Increases** a value or moves to the **next** parameter in the active menu.
  - Counter-clockwise: **Decreases** a value or moves to the **previous** parameter in the active menu.
- **Press** the Menu dial to **select** or **set** the displayed parameter/value.

1. For efficiency, determine how the parameters will be set before beginning this procedure.
   Refer to section *4.1.2 Parameter Descriptions and Options* on page 18 for information regarding parameter options/values.
2. **Press** the menu dial to activate the LCD backlight if it is not already visible.
3. **Turn** the menu dial until the required menu item appears.
4. **Press** the menu dial to select the menu.
5. **Turn** the menu dial until the required sub menu item appears.
6. **Press** the menu dial to select the sub menu, then **turn** the dial until the required value appears.
7. **Press** the menu dial to save the setting.
8. Use the Menu dial to navigate/change the rest of the menu options.
   - **Turn** the menu dial to change a value (if it is flashing) or to advance to the next parameter/value.
   - **Press** the menu dial to select or set a parameter/value.

   Settings are saved as you proceed through the menu items.
   If no further action is taken, the controller will dim the LCD backlight and return to the default menu display.
   Settings are saved automatically as you proceed. When you exit the current menu, those settings are sent to all connected systems. At this point, all system settings are synchronized.

4.2 FACTORY SET

The MK10 configuration can be set at the factory if required.

4.3 LANELIGHT UTILITY PROGRAM

The MK10 can be configured using the LaneLight Utility program. Refer to the LaneLight Utility Program manual for details.

5 MAINTENANCE

5.1 ACTIVITIES AND SCHEDULES

This section describes the recommended maintenance activities and schedules.

Table 4: Maintenance activities and schedules

Interval	Maintenance Activity
As available	Update controller firmware

5.2 MAINTENANCE PROCEDURES

There are no specific maintenance procedures for the MK10.

6 TROUBLESHOOTING

This section describes possible issues and recommended actions/solutions.

6.1 GENERAL TROUBLESHOOTING

Table 5: General troubleshooting matrix

Symptom/Problem	Actions/Solutions
General	iew the system controller status information. The most common status types are OPEN or HORT for the output ports 1 and 2. Ensure the system is receiving the correct voltage and that there is no unusual current draw.
onstant flasher activation	Check the Activation Mode setting. Check the Activate System menu. Check the device circuit at the controller.
Unexpected flasher activation	If multiple systems are deployed in an area, ensure that each system group is using a different NET ID.
No flasher activation	Check for power to the system. Check if output circuits are in OPEN or SHORT state. Check the power circuit for the flasher devices. Check the activation device connections.
One device not synching with other devices in the network	Check to see if Network is present at the controller for the device that is not synching and that the number of devices displayed matches the number of neighboring devices. Check the NET ID setting. Check to see if Flash Lock, Time Lock and/or Dim Lock is set for the device that is not syncing.
SHORT or OPEN message appears at the controller	Check the connections on each flasher device. Check for crushed wires. Check for water in the junction boxes. Check for improperly crimped wires. It might be necessary to disconnect flasher devices one at a time until the source of the problem is located.

Table 6: Flash Patterns

Pattern			
Wig Wag	**RRFB Classic**	**RRFB WW+S**	**WSDOT**
500, 1	124,1	50, 1	25, 1
500, 2	76, 0	50, 0	25, 0
0, 0	124, 1	50, 2	25, 2
	300, 0	50, 0	25, 0
	25, 2	50, 1	1000, 1
	25, 0	50, 0	1000, 2
	25, 2	50, 2	0, 0
	25, 0	50, 0	
	25, 2	50, 3	
	25, 0	50, 0	
	25, 2	50, 3	
	25, 0	250, 0	
	200, 2	0, 0	
	200, 0		
	0, 0		

Legend

(time), (output)

0, Outputs none

1, Left output

2, Right output

3, Both outputs

*time is in milliseconds

7 TECHNICAL SUPPORT

7.1 PROOF OF WARRANTY

LaneLight requires a physical copy, scanned copy, photo or fax of your warranty report to be submitted before technical support can be provided.

Fax: 250-381-4830
Email: info@lanelight.com

Attempt the instructions provided in the Troubleshooting section of the product manual before contacting LaneLight.

7.2 SERVICE TICKETS

The simplest way to contact LaneLight for support is by creating a service ticket online:

1. Access the LaneLight online ticket system.
   https://ticket.lanelight.com/
2. Create a user name.
3. Provide the project number and firmware version (if applicable).
   This is usually located on a label on the inside of the main battery box.
   Example: 0001.012.0123 City, State/Province
4. Submit a copy of your warranty report.
5. Provide a brief description of the problem, steps taken to solve the problem, and pictures of related equipment.

7.3 REPLACEMENT UNITS

Contact LaneLight for replacement units.

1-866-466-4836

7.4 TECHNICAL SUPPORT

LaneLight can provide technical support via phone to a technician who is working on site, however, you must have a qualified representative present at the site location with a multimeter and appropriate tools. A LaneLight representative may guide you through a series of diagnostic steps to understand the problem and assist you in solving the issue.

Contact LaneLight to discuss details and requirements regarding technical support.

1-866-466-4836

Thank you for choosing LaneLight

