For the SC315-G, R820-G, R829-G, and R247-G flashing beacons

84776_QSG_TRA_G-Series_RevF

1.1 Safety Precautions

ELECTRICAL SHOCK HAZARD. DO NOT ALLOW THE BATTERY TERMINALS COME INTO CONTACT WITH ANY EXPOSED METAL.

Product can have sharp edges. Accidental movement of hinged components can cause injury.

Batteries are shipped fully charged. Use extreme caution when handling the batteries as they can generate hazardous short-circuit currents. Remove all jewelry (bracelets, metal-strap watches, etc.) before handling the batteries.

Solar panels produce DC electricity when exposed to light and can therefore cab produce an electrical shock or burn. To render solar panels inoperative, remove them from sunlight or fully cover their front surface with an opaque material.

Before lifting any heavy or bulky equipment, ensure the load is secured so moving parts do not shift, and that it can be lifted as far as needed without back strain or loss of grip. Installation may require more than one person.

Ensure the equipment is not energized during installation.

Recheck all completed wiring for proper polarity prior to energizing the system.

Perform all installation, wiring, grounding, and maintenance in conformance with local building and electrical codes. Adherence to the National Electrical Code (NEC) is mandatory to comply with any certification markings. Non-adherence to code may void the warranty.

Changes or modifications to Carmanah equipment not expressly approved by Carmanah could void both the user's authority to operate the equipment and warranty.

For solar applications, ensure the installation location has an unobstructed view of the sun's path. Obstructions such as trees or buildings could significantly reduce the amount of sunlight on the solar panel. Shade analysis is highly recommended to understand how shadows will change according to the time of year. Contact Carmanah for a detailed examination and solar simulations for your site.

NOTE **This quick start guide is not a replacement for the complete product user manual.**

Visit support.carmanah.com to download the complete product user manual.

2.1   Tools and Materials Required

The following tools and materials may be required to mount your Carmanah flashing beacon depending on the G Series model and configuration:

|	
a. Imperial socket set	h. Drill and drill bits
b. Crescent wrench	i. Fine tip felt marker
c. Tap set	j. Multi-bit screwdriver
d. Imperial Allen-Wrench set	k. Pelco Roger-Wrench (Optional)
e. Fish tape	l. Ladder or lift device
f. Level	m. Lithium grease
g. Compass or pre-determined equatorial direction	n. Electrical Multi-meter (Optional)

3.1 Commissioning

After installing and programming the G Series flashing beacon system, the following commissioning verification checklist helps ensure that everything is working as intended:

- ☐ EMS settings are correct.
- ☐ No LED fault message on the EMS.
- ☐ For single or triple fixture systems, ensure the flash pattern is set for unison 0.5U or 0.5A3.
  Fixtures flash properly:
- ☐ Use "TEST" at the EMS user interface to check functionality of LED fixtures.
- ☐ All fixtures are mounted securely and pointed in the correct direction toward oncoming traffic lanes.
- ☐ For school zone systems, retrieved calendar from R829-G is confirmed to be accurate.
- ☐ Solar panel pointed South (or as per specific instructions provided by Carmanah).
  - Not applicable for AC powered models.
- ☐ Override box (if equipped) correctly activates or deactivates the flashing (depending on model input setting).
- ☐ The solar panel is properly mounted, and the mount is secure.
  - Not applicable for AC powered models.
- ☐ No debris covering the photosensor window on top of the solar engine.
- ☐ Vents are clear, and screens are intact.
- ☐ Sealing gaskets on door are intact.
- ☐ Solar panel is producing voltage in sunlight (use EMS "Solar" user interface menu item).
  - Not applicable for AC powered models.
- ☐ System has clear-sky access, and no removal of obstructions is required.
  - Not applicable for AC powered models.
- ☐ Note the possibility for nearby foliage to eventually shade the solar panel at a different time of year. If so, set a reminder to inspect later.
  - Not applicable for AC powered models.
- ☐ Battery voltage is healthy (use either a voltmeter or EMS "Battery" user interface menu item).
  - Not applicable for AC powered models.
- ☐ Verify both fuses are intact (use voltmeter to confirm fuse continuity).
- ☐ RRFB light bar flashing starts with left LED module first.
- ☐ Remote systems are turning on and off correctly via wireless control.
- ☐ For RRFB systems, verify the indicator LEDs on the ends of light bars can be seen by pedestrians across the street.
- ☐ Ensure cabinet door is fully closed and latched.

4.1 Solar Panel Mounting (Side of Pole)

1. Mark position of solar panel mount on pole and drill a suitable hole for the solar panel wires. Follow instructions supplied with mount. Install using 45° tilt angle. Ensure solar panel is facing South (for Northern Hemisphere locations).
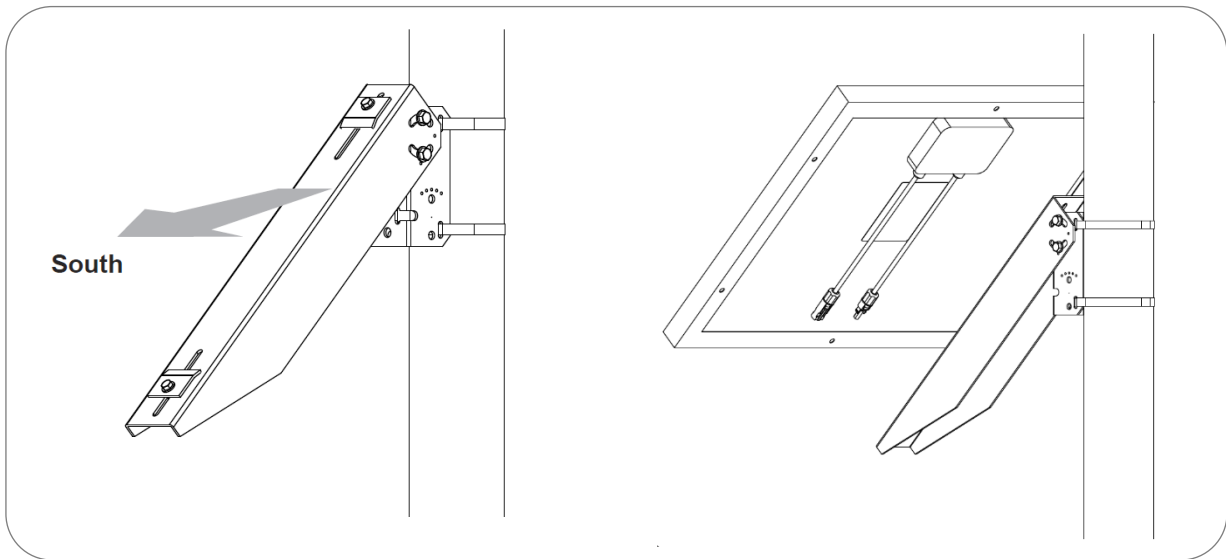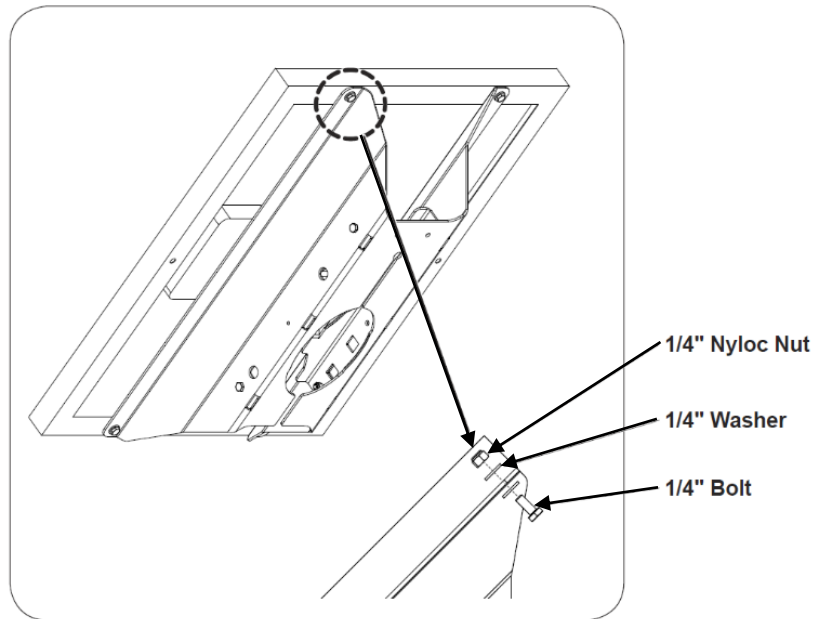

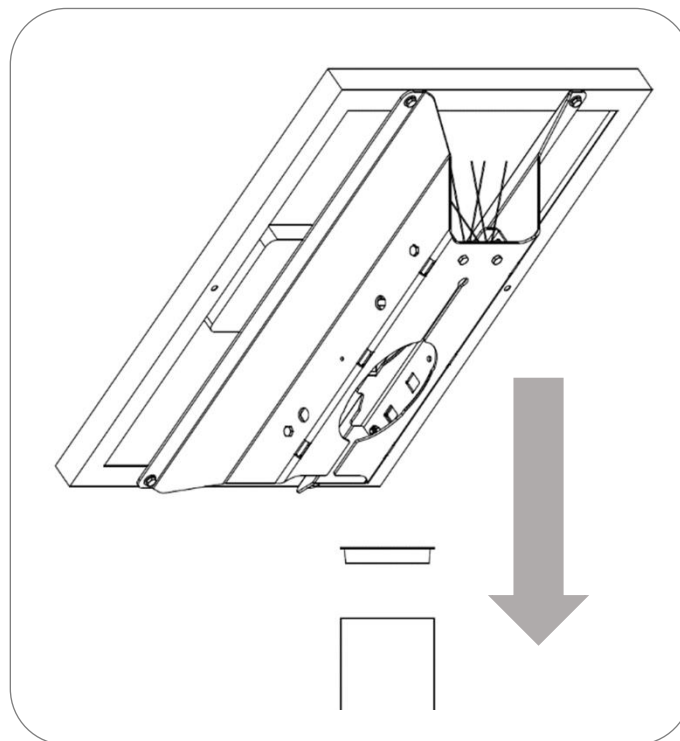2. Route supplied solar panel wires down pole and through hole for cabinet conduit nipple.

Hole drilled for cabinet nipple
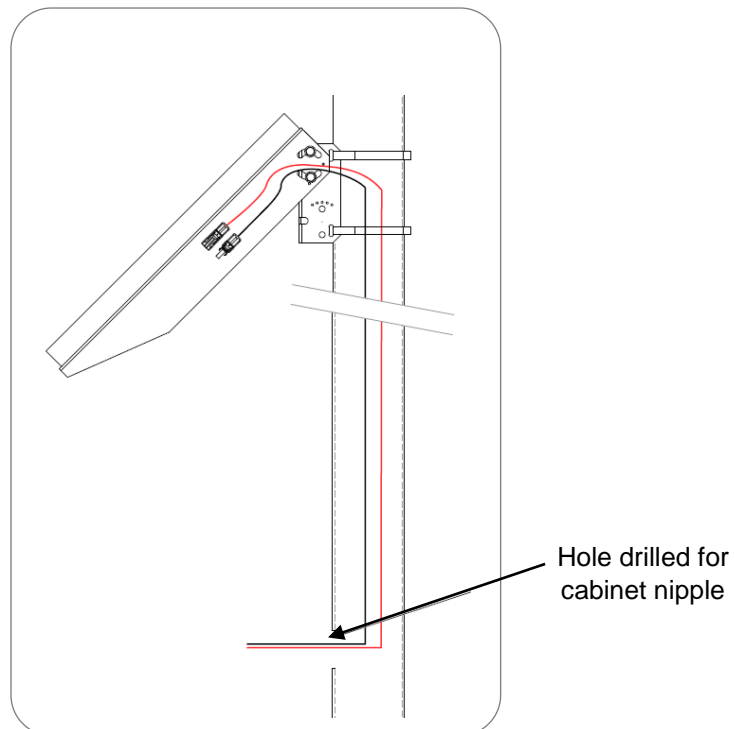
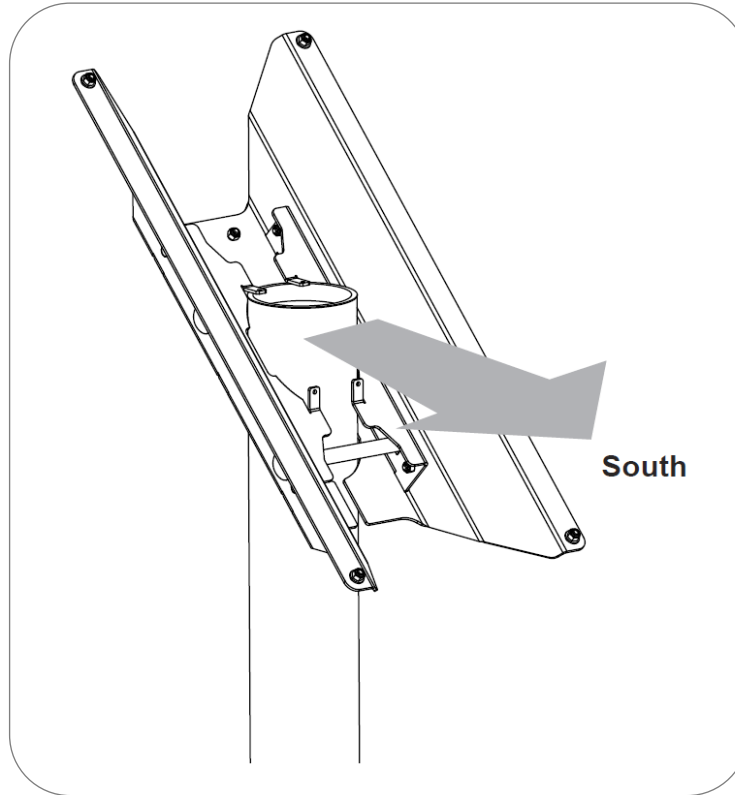## 4.2 Solar Panel Mounting - Top of Pole (Legacy Galvanized Steel Mount)

1. Attach solar panel to top of pole mount using supplied ¼" bolts, washers and locknuts. Leave nuts finger tight. **DO NOT FULLY TIGHTEN** at this stage.
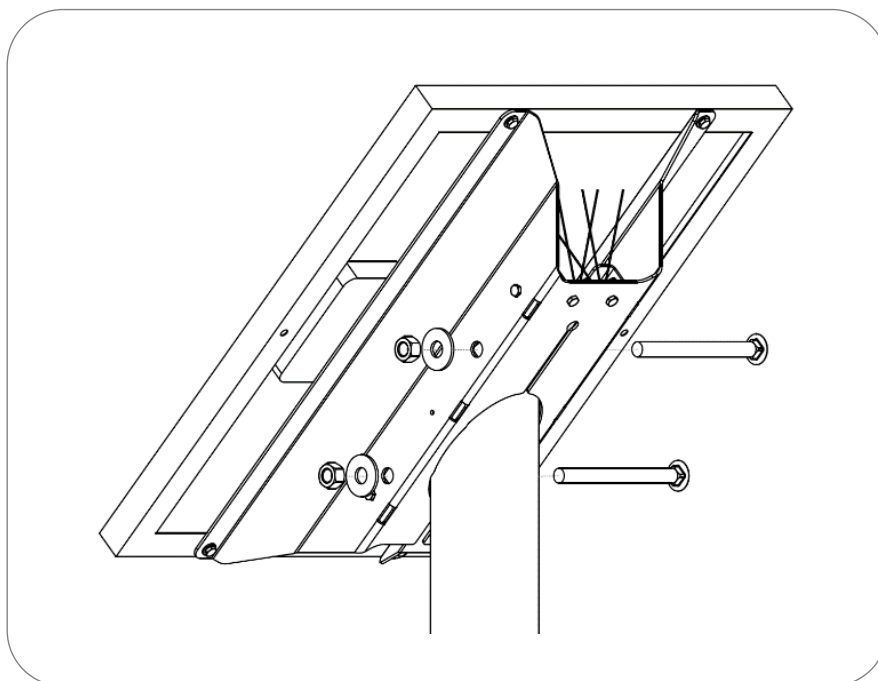

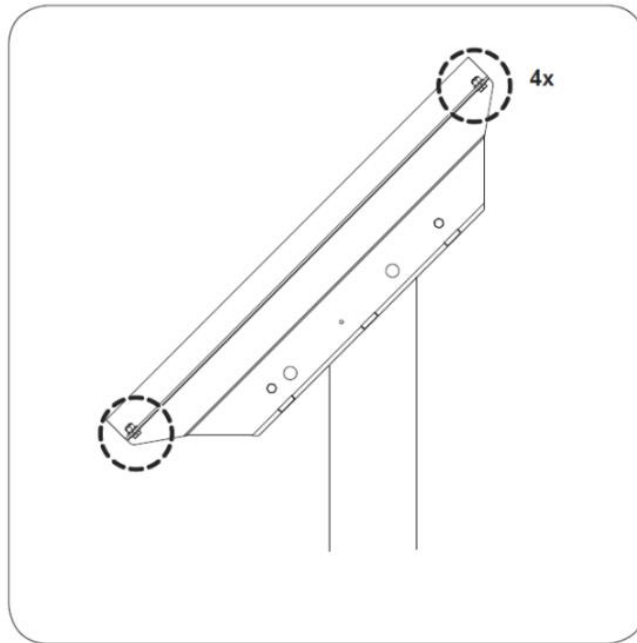2. Insert cap into pole top and slide bracket onto the pole.

3. Ensure panel mount sits securely on the top of pole cap, as shown below (image shows solar panel removed for illustration purposes). Orient so panel faces South (in Northern Hemisphere).
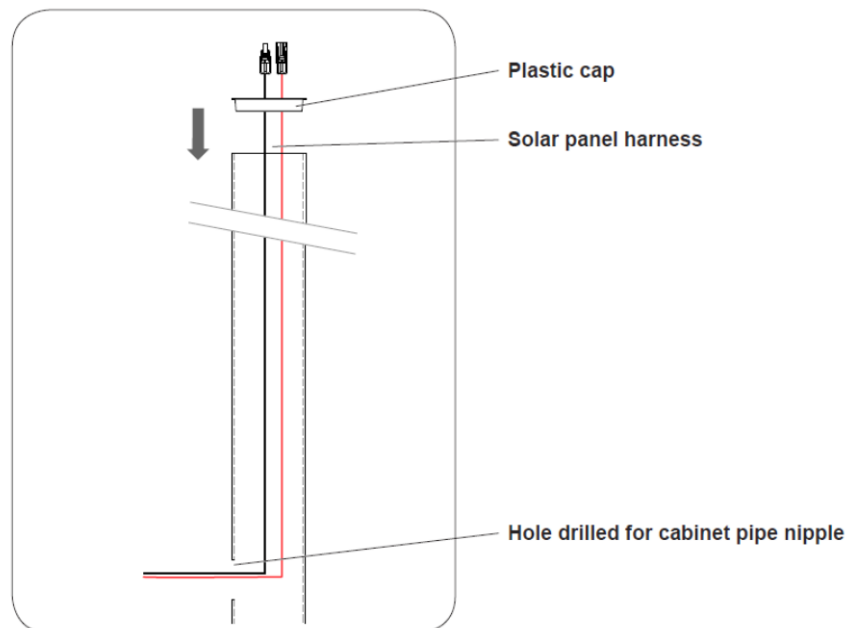

South

4. Install and tighten supplied 5/8" bolts with nuts and washers.

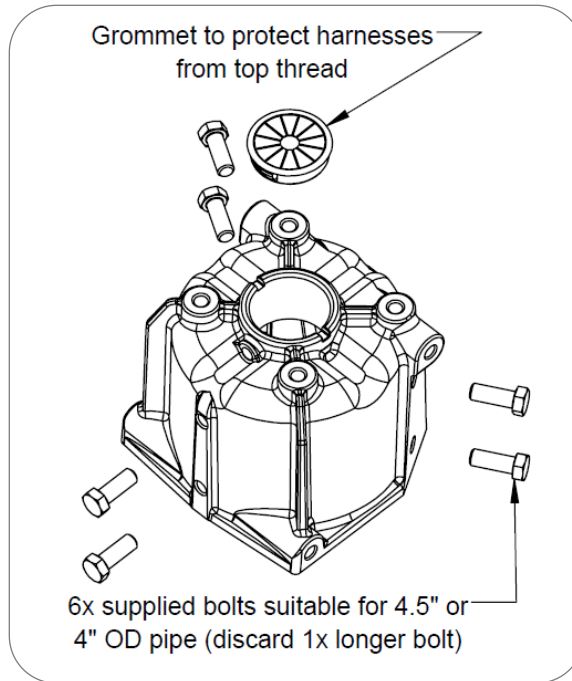5. Tighten ¼" bolts and nuts securing solar panel to mount.

6. Route supplied solar panel wires down pole and through hole for cabinet conduit nipple.

Plastic cap

Solar panel harness
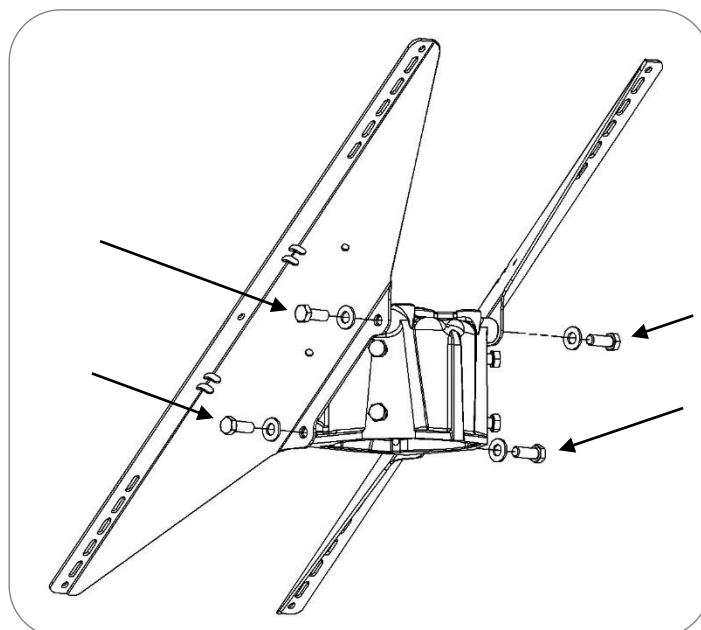
Hole drilled for cabinet pipe nipple

4.3   Solar Panel Mounting - Top of Pole (Cast Mount)

1. Install grommet and thread 6x 3/8" bolts into casting. Only thread in a couple turns so bolts do not protrude inside.

Grommet to protect harnesses from top thread

6x supplied bolts suitable for 4.5" or 4" OD pipe (discard 1x longer bolt)

2. Attach both sheet metal brackets to casting with supplied 3/8" bolts and washers.

3. Attach solar panel to top of pole mount using supplied ¼" bolts, washers and locknuts. Leave fasteners finger tight. **DO NOT FULLY TIGHTEN** at this stage.

1/4" Nyloc Nut

1/4" Washer

1/4" Bolt
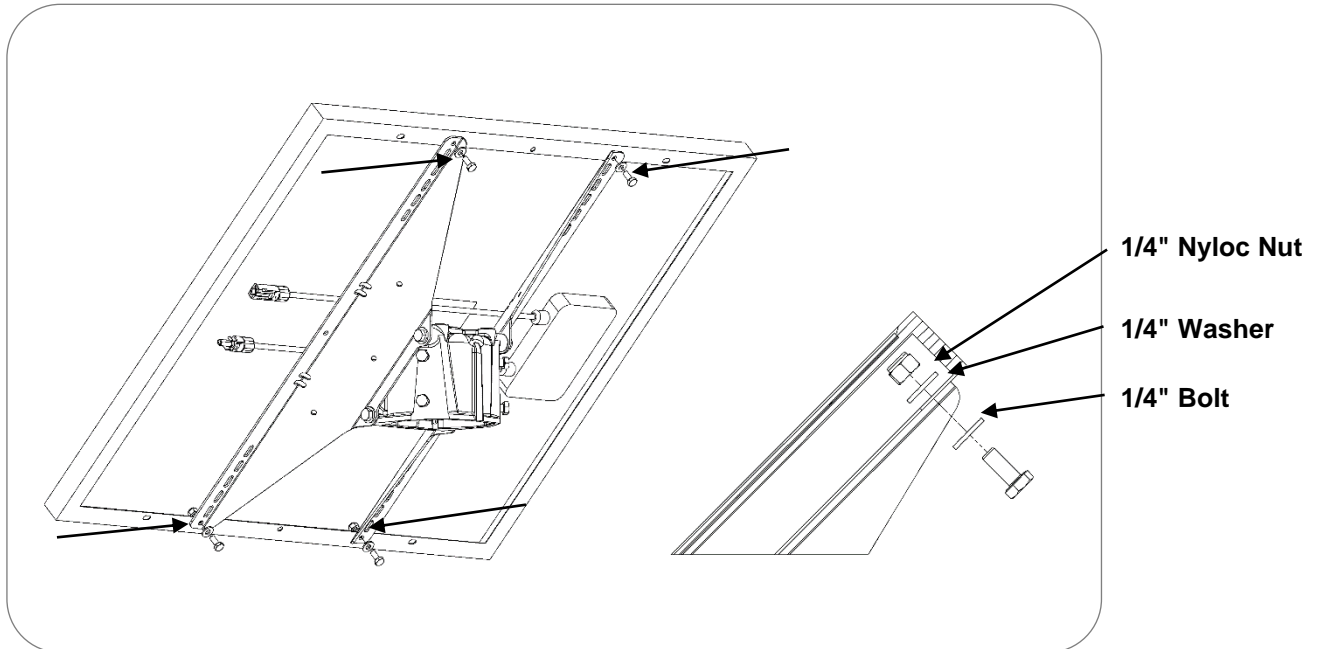
4. Slide casting over top of pole and orient so panel faces South (in Northern Hemisphere). Tighten the 6x 3/8" bolts to secure casting to pole (solar panel not shown for illustration purposes).
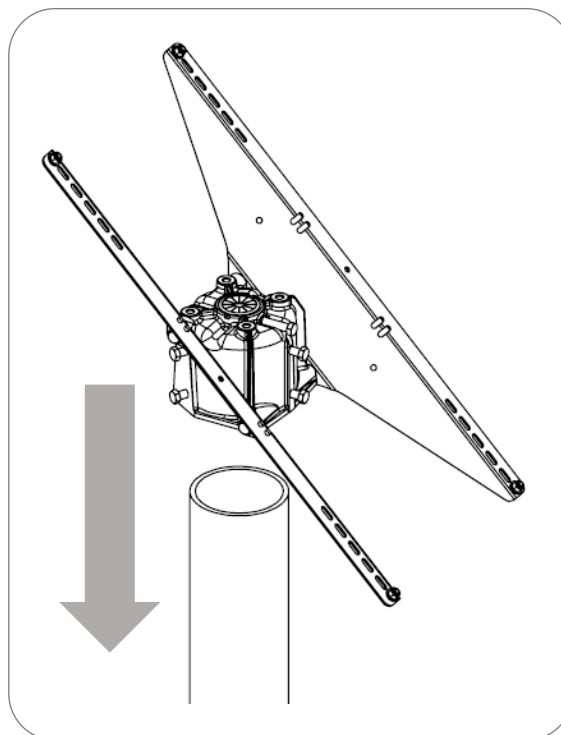
5. Tighten ¼" bolts and nuts securing solar panel to mount.
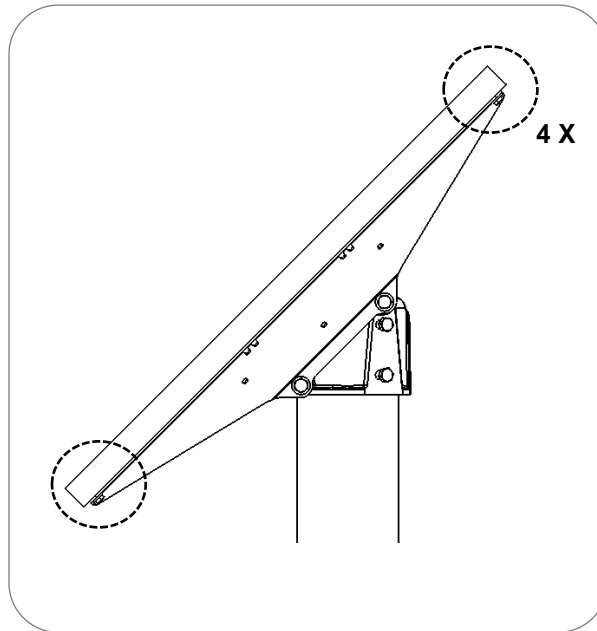
6. Route supplied solar panel wires down pole and through hole for cabinet conduit nipple.

Hole drilled for cabinet nipple

4.4   Cabinet Mounting

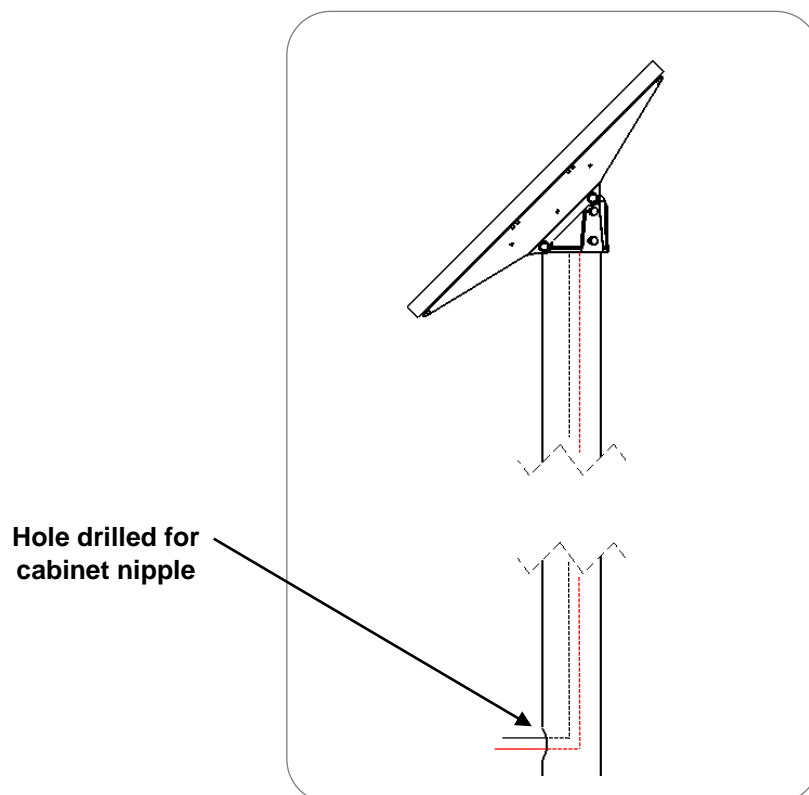1. Mark the positions of the flashing beacon(s), LED sign(s) or light bar(s) and cabinet on pole. Drill holes for cables and pipe nipple exit/entry points as shown below.

Solar Panel, Side of Pole Mount
Solar Harness Cable
Exit/Entry Point

Cabinet - Pipe Nipple
Exit/Entry Point

Flashing Beacon
Cable Exit/Entry Point
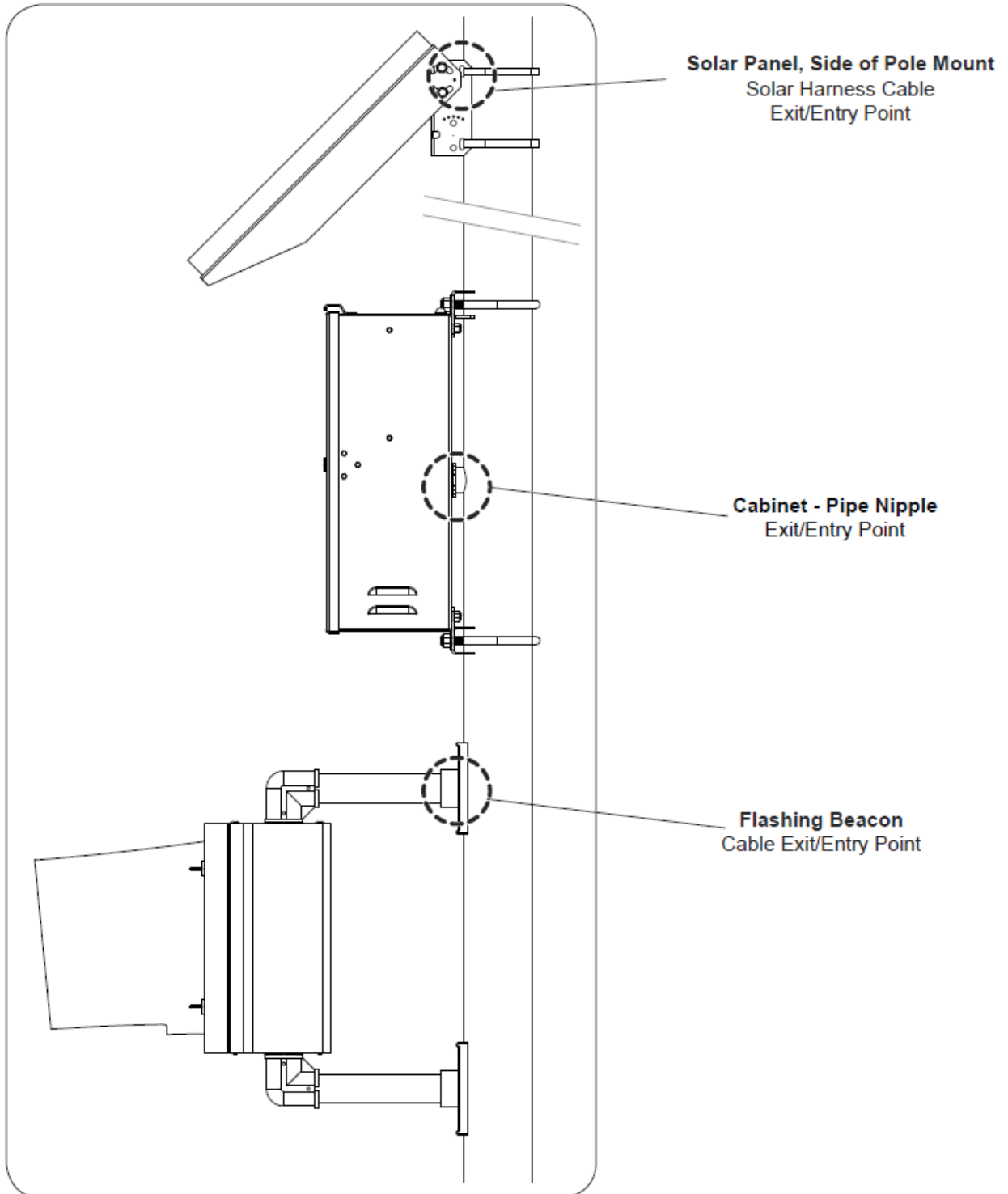
NOTE **Before mounting the cabinet to the pole, all wiring internal to the pole (power, LED, optional StreetHub™ serial communications and ground cables) should be fished through the pole.**

1. Loosen four nuts on back of cabinet and spread brackets outward. Tighten nuts to 20 ft-lb.
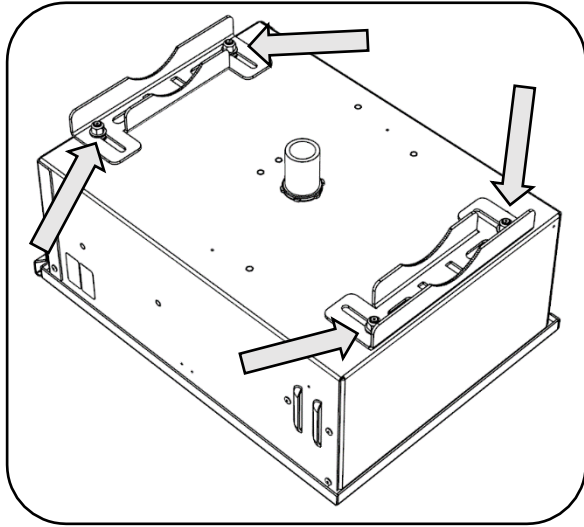
Mounting Bracket Retention Nuts
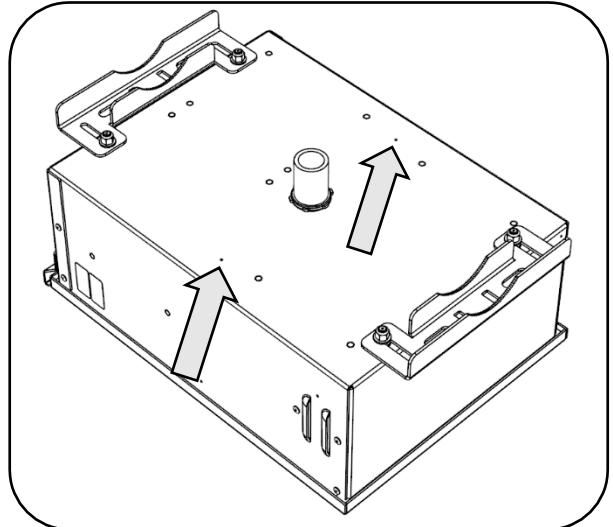
Drill points for external cable routing

NOTE On the back of the cabinet, there are 2 drill points that may be used for routing of liquid-tight conduit external to the mounting pole. Prior to drilling the cabinet, ensure there are no components which may be damaged on the inside of the cabinet.

An optional hole plug kit is available if the pipe nipple is removed from the cabinet (see below).
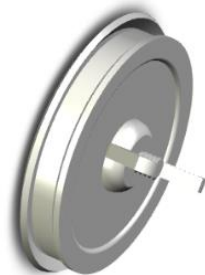
Hole Plug
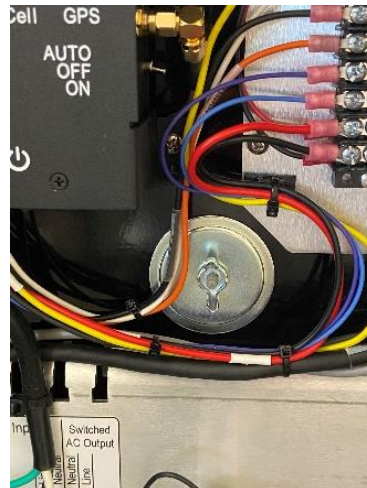
Hole Plug Installed

2. Route the beacon or light bar harnesses through cabinet pipe nipple.

Hole drilled for cabinet pipe nipple

Hole drilled for flashing beacon harness
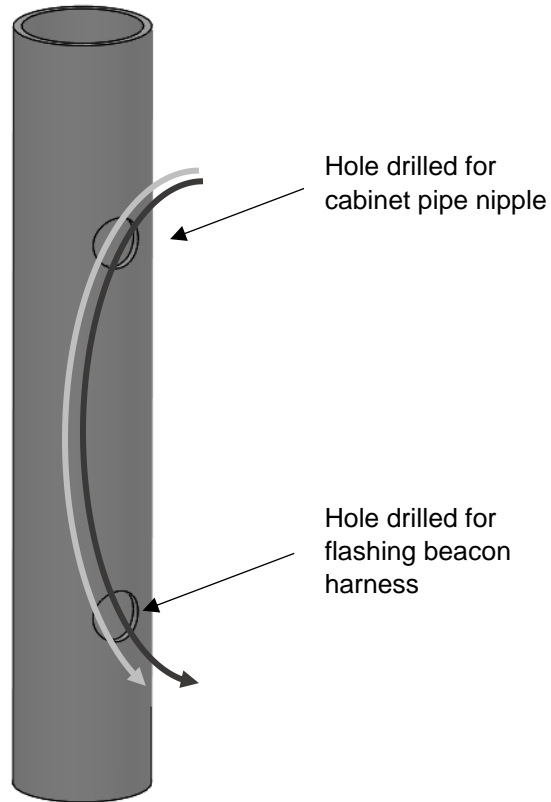
3. Route solar panel wires into cabinet and install cabinet onto pole with optional U-bolt kit or suitable banding (not supplied).
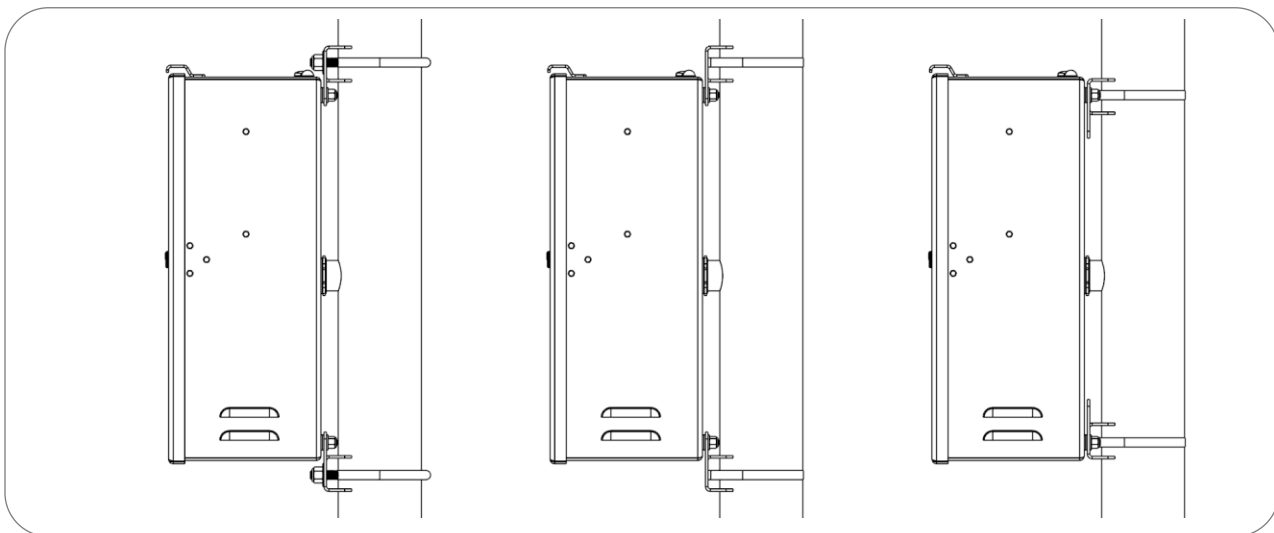
U-Bolts   Banding (brackets extended)   Banding (brackets retracted)

4. Connect the beacon/light bar harness(es) to the LED terminals. For light bars, use "RRFB" wire colors shown on label. For beacons or signs use "Round" wire colors shown on label. If a pushbutton is used, connect push-button terminals: red to INPT(+), black to INPT(−).
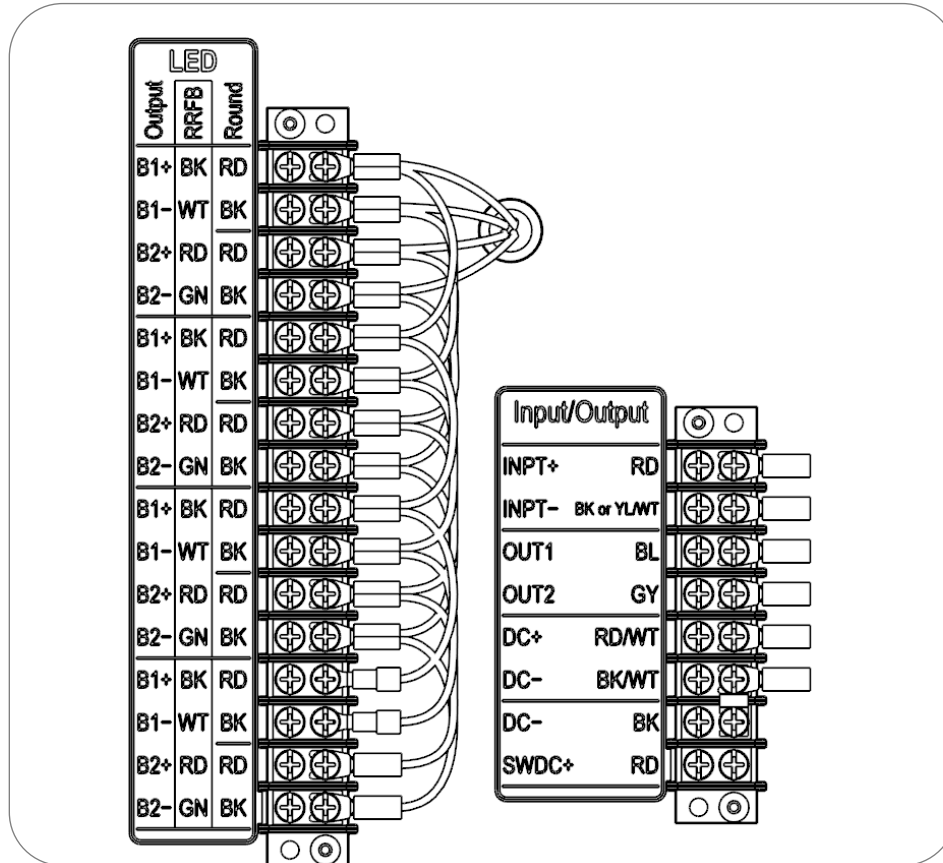
5. Connect solar panel harness to terminals on right side of cabinet: red wire with yellow heat shrink to Solar (+), black wire with brown heat shrink to Solar (−).
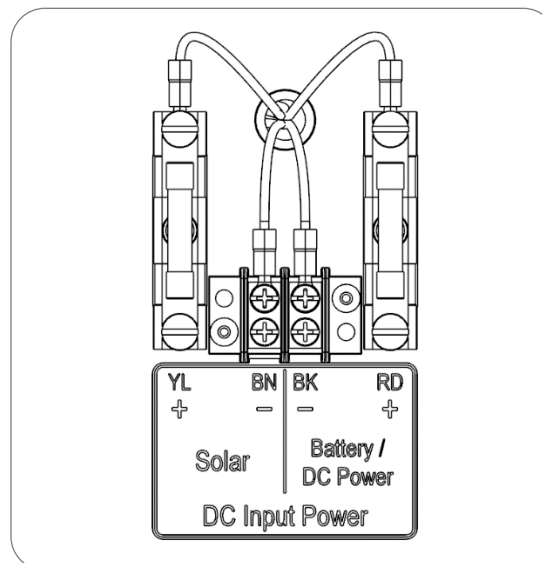
6. Install and connect the battery using the color-coded wires as shown on the terminal wiring label (red to positive, black to negative).
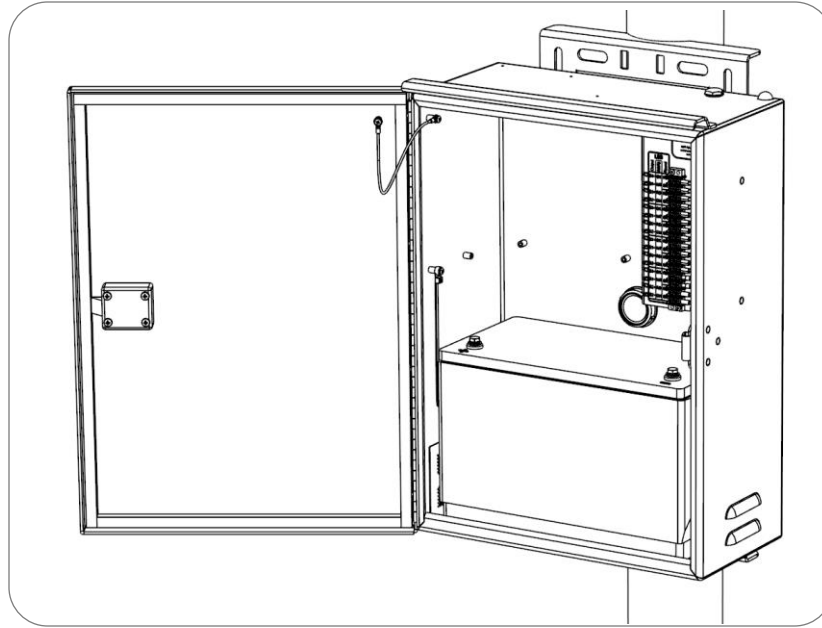
7. Connect solar panel harness to the solar panel. Solar panel connectors and excess cable can be coiled up and tie-wrapped underneath the solar panel.

"CLICK"
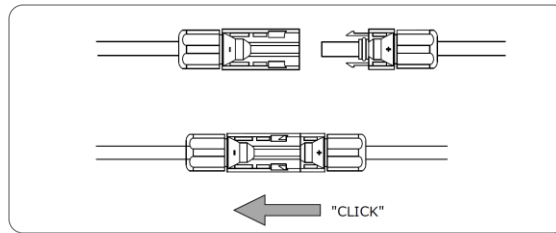
8. For AC systems, connect AC input wires according to the label description Black / HOT to the circuit breaker, White / NEUTRAL to the terminal block and Green / GROUND to the ground bus bar.
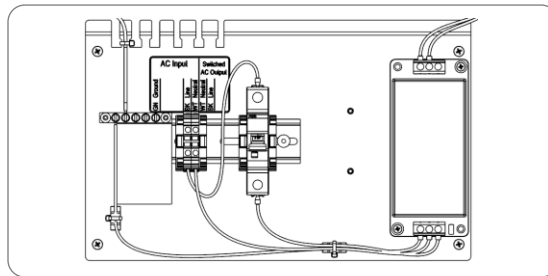
⚠ **CAUTION** **Ensure cabinet door is fully closed and latched once all internal wiring connections and system configuration have been completed; otherwise, damage may occur to cabinet door or internal components.**

4.5 RRFB Light Bars Installation (SC315-G)

1. Feed light bar cable(s) through post, creating a drip loop.
2. Mount light bar universal bracket(s). Bolts and banding not supplied.
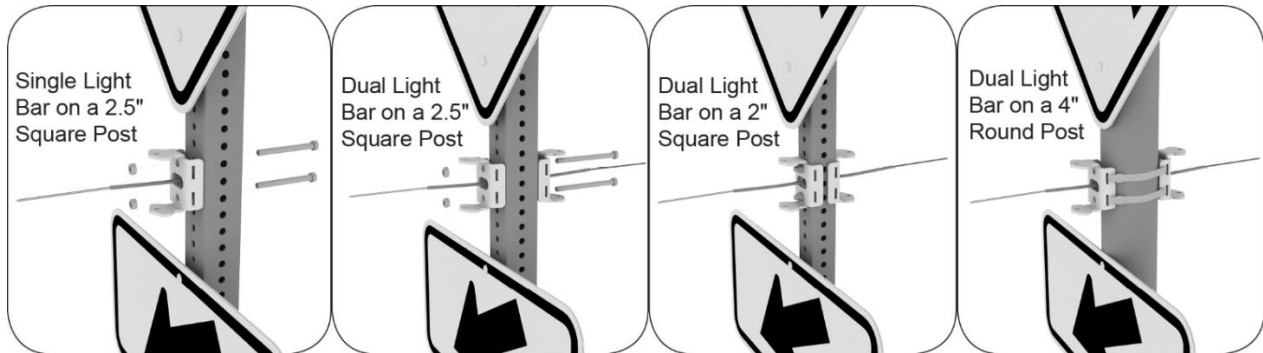
3. Mount light bar(s) onto universal bracket(s) through slots in back. Bolt light bar to universal bracket as shown. Install two anti-vandal rotation locking screws. Tighten mounting nuts. Secure cable using supplied cable ties as shown.
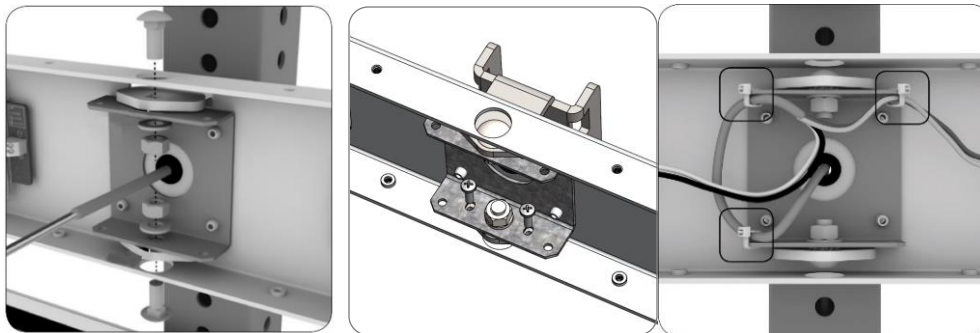
4. Align light bar as required. Push light bar wires into light bar connectors, following color scheme indicated on unit. **For FHWA compliance, mount light bar so black and white wires are on the left side.** Slide on light bar cover and secure with four screws provided. If the pedestrian confirmation light is not required in one direction, use the supplied opaque label to cover the indicator light.
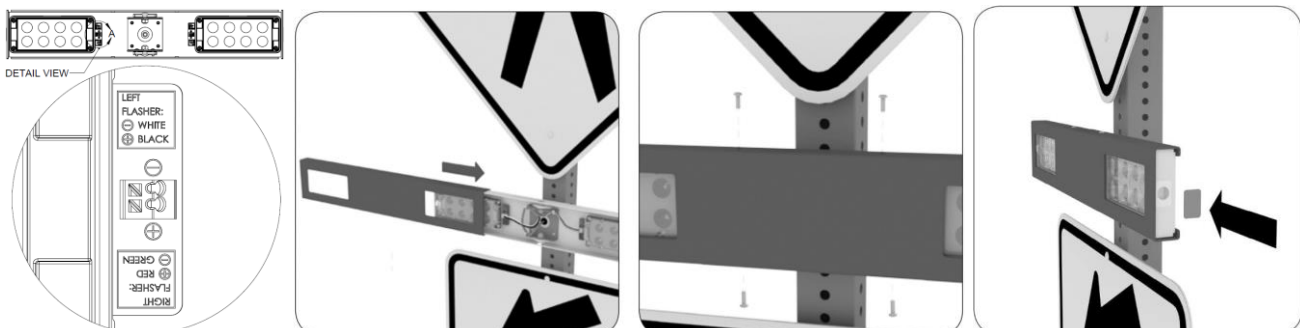
4.6   RRFB Light Bar Backplates (R920-E/F)

1. With the light bar already installed and wired, install the backplate over and behind the light bar with the flanges facing forward.

2. Install light bar cover and align screw holes.

3. Slide back plate flanges forward over light bar cover.

4. Align and install four screws several turns, then tighten all four.

5.1   Pushbutton Installation (SC315-G / R820-G)

NOTE   If the G Series is wired for a pushbutton but none is needed (such as an advance RRFB), insulate the ends and secure the wires.

NOTE   The pushbutton can be connected in either polarity.

1. For round poles, cut holes to size and tap as required. Deburr the hole that the pushbutton wiring will pass through.

2. Feed the pushbutton cable through the pole, creating a drip loop.

5.2 Polara iNX and iDX Audible Pushbutton Kit Installation

| NOTE | This section applies to both the iNX and iDX (touchless) audible pushbuttons. |

The Polara iNX/iDX series supersedes the XAV audible pushbutton and integrates the controller inside the pushbutton assembly. The iNX/iDX pushbutton kit includes a pushbutton harness (available in 16ft, 36ft or 75ft lengths), the iNX/iDX audible pushbutton assembly, and the R10-25 pedestrian pushbutton sign.

| NOTE | The Digital Output on the EMS must be set to ALL when used with the iNX/iDX pushbuttons on standard systems. |

| NOTE | For systems with no installed LED fixtures, the Digital Output must be set to "nLED." This function requires the EMS to have firmware version 1.1.5.0 or newer. See Firmware Version in Section 6.1 in the complete user manual for instructions on how to check the EMS firmware version. |

1. Connect the iNX/iDX harness to the EMS and pushbutton terminals as detailed below. Torque EMS terminal block screws to 12 in-lb. Please consult Polara's installation documentation for more information.
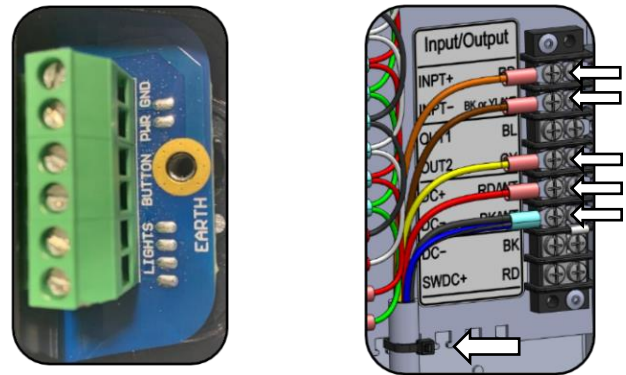
iNX/iDX Terminal	Wire Color	EMS Terminal	Function
GND	Black	DC-	Battery Negative
PWR	Red	DC+	Provides +12V power to pushbutton
BUTTON (Non-Polarized)	Orange	INPT+	Triggers EMS to activate beacons
	Brown	INPT-	Triggers EMS to activate beacons
LIGHTS (Non-Polarized)	Blue/Black	DC-	Battery Negative
	Yellow	OUT2	Provides confirmation signal that beacons are flashing to iNX/iDX - triggering audible message

2. Secure cable to EMS near terminal block using cable tie.

3. Check that the button is configured correctly.

| NOTE | Onsite configuration of the pushbutton can be done via the iNX/iDX Android and iOS app, refer to the Polara iNX/iDX user manual for details. |

Ensure that the "wireless sync" feature is disabled. Go to *Wireless Sync* from the app homepage.

Ensure that the flash pattern in the Polara app corresponds to the beacon flash pattern. The default is set to "rapid flash," suitable for RRFBs. In the settings menu, under *LED Flash Behavior*, select the *Play Predefined Pattern* option and chose the appropriate option based on the EMS flash pattern (see reference table below):

EMS Flash pattern	iNX/iDX flash pattern
rFb, rFb2, 0.1u, 0.25u, 0.1uF, 0.1AF	Rapid Flash
0.5u, 0.5A, 0.5A3	Simple On/Off
stdY	Solid LED On

5.3   Campbell Guardian Audible Pushbutton Kit Installation

The Campbell Guardian audible pushbutton kit includes a pushbutton harness (16ft, 36ft or 75ft) prewired to the G Series EMS (as shown below), along with the Guardian audible pushbutton, and an associated sign. Please consult Campbell's installation documentation for more information.

NOTE The Digital Output on the EMS must be set to ALL when used with the Guardian pushbutton on standard systems.

NOTE For systems with no installed LED fixtures, the Digital Output must be set to nLED. This function requires the EMS to have firmware version 1.1.5.0 or newer. See Firmware Version in Section 6.1 in the complete user manual for instructions on how to check the EMS firmware version. Contact Carmanah for instructions if adding an audible pushbutton to an older system.
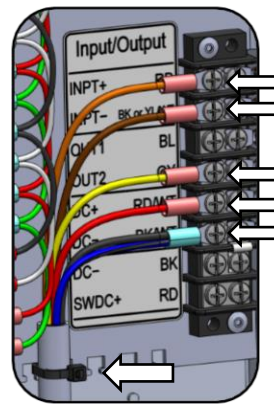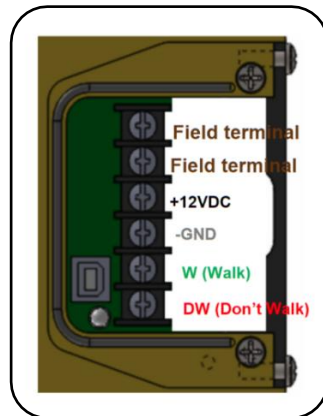
Campbell Terminal	Wire Color	Terminal Block Connection	Function
Field terminal	Orange	INPT+	1 of 2 pushbutton inputs to EMS from Guardian
Field terminal	Brown	INPT−	2 of 2 pushbutton inputs to EMS from Guardian
+12VDC	Red	DC+	Positive side of 12-volt power supply for Guardian
-GND	Black	DC−	Negative side of 12-volt power supply for Guardian
W (Walk)	Yellow	OUT2	Guardian sense line for triggering recorded message when fixture flashing is detected
Not Used	Blue/Black	DC-	Not Used, apply tape to wire end or trim at jacket exit
DW (Don't Walk)			Not used
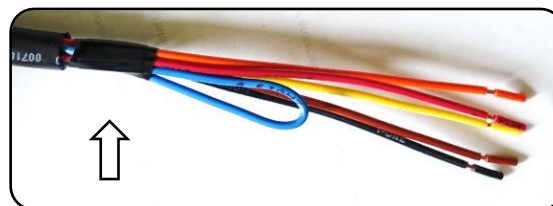
6.1 EMS Programming and Testing

The G Series' Energy Management System (EMS) has several programming functions and settings. These are accessed through the On-Board User Interface (OBUI). Specific products will use a subset of the complete OBUI settings, which are covered in the full user manual's sections specific to each product.

6.2   EMS On-Board User Interface Operation

The EMS OBUI has three buttons to navigate and change settings and activate functions as required. The Up arrow, Down arrow and SET button are used to scroll through menus, access settings and accept changes to settings.

Use the Up or Down buttons to initially activate the OBUI and illuminate the display.

See following sections which contain both an image of the cabinet door label and an expanded list of settings and functions.

For RRFBs and crosswalk beacons, use the input type ⎍⎏⎍⎓ (button) only. All other options are non-compliant and not to be used.

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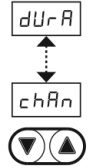**Mail:** Carmanah Technologies Corporation
250 Bay Street
Victoria, BC V9A 3K5, Canada

Phone: 1.250.380.0052
1.877.722.8877 (Toll-free)

Email: customersupport@carmanah.com

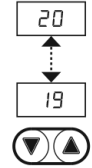**Website:** carmanah.com

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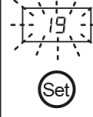
Use Arrow buttons to scroll through the menu.	Press and hold the Set button to edit a setting. Display will blink when ready to edit.	Use Arrow buttons to adjust the setting (press and hold to adjust quickly).	Press and hold the Set button to accept new setting. Display will flash 3 times.	Ensure the solar panel is facing the equator (pointing south if you are in the northern hemisphere).
dUrA ↕ chAn ▼▲	20 ↕ 20 Set	20 ↕ 19 Set	19 Set	

ALERT!

LEd → SHrt / oPEn

LEd: LED beacon fault alert. Only appears if there is a problem with the LED beacon(s) Use the tESt function to clear the alert

SHrt: LED beacon is shorted

oPEn: LED beacon has an open circuit

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bAtt → good / chAr / Lo / bAd → 12.58

bAtt: Battery status and voltage

good: Battery is charged (>12.6V)

chAr: Battery requires charging (12.6 - 11.7V)

Lo: Battery has very low voltage (11.69 - 10.50V)

bAd: Battery needs replacing (<10.50V)

12.58: Battery voltage

SoLr → nItE / dAY → 16.55

SoLr: Ambient brightness sensor status

nItE: Sensor is not detecting light (nighttime)

dAY: Sensor is detecting light (daytime)

16.55: Solar panel voltage

FLAS → ▼▲ Set → 0.5A

FLAS: Flash pattern
rfb, rfb1, rfb2, 0.1U, 0.25U, 0.5U, 0.5A, 0.5A3, 0.1UF, 0.1AF ...
See latest manual for up-to-date flash pattern descriptions

InPt → ▼▲ Set → bttn / no / nc / d2d

InPt: Input type

bttn: Momentary push button

no: Normally open switch

nc: Normally closed switch (24/7)

d2d: Dusk to dawn

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dUrA → ▼▲ Set → 20

dUrA: Duration of the flashing

20: Duration in seconds from 5 to 3600

IntY → ▼▲ Set → 100

IntY: Output current

100: Output in mA, from 20 to 1400

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nItE → ▼▲ Set → 30

nItE: Nighttime dimming

30: Percentage of daytime level, from 10 to 100%

AAA → ▼▲ Set → on / oFF → 10

AAA: Ambient auto-adjust

on: Ambient auto-adjust is enabled

oFF: Ambient auto-adjust is disabled

10: Ambient auto-adjust dim level

ALC → ▼▲ Set → on / oFF → 10

ALC: Automatic light control

on: Automatic light control is on

oFF: Automatic light control is off

10: Automatic light control level

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tEmP → ▼▲ Set → rEd / YEL / oFF

tEMP: Temperature correction of beacon

rEd: Red beacon

YEL: Yellow beacon

oFF: Off used for light bar

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cAL → ▼▲ Set → on / oFF

cAL: Internal calendar

on: Calendar is enabled

oFF: Calendar is disabled

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rF → ▼▲ Set → on / oFF

rF: Radio

on: Radio is enabled

oFF: Radio is disabled

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chAn → ▼▲ Set → 5

chAn: Radio channel for synchronized systems

5: Selected channel from 1 to 14 (default is 5)

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rAdo → dEt / ndEt

rAdo: Radio detection status

dEt: Radio is detected

ndEt: Radio is not detected

---

outP → ▼▲ Set → ALL / nitE / nLEd

outP: Digital output

ALL: Digital output enabled when flashing

nitE: Digital output enabled when flashing at night

nLEd: Digital output enabled during activation when there is no LED load

---

inPS → oPEn / cLoS / Shrt

inPS: Push button input status

oPEn: No button press detected

cLoS: Button press was detected

Shrt: Short detected in button or harness

Act → 0

Act: Activation count

0: Average daily activations over last 90 days

---

tESt → ▼▲ Set → YES / no

tESt: Test the system and clear any fault warnings

YES: Activates the LED beacon

no: Skips the test, does not clear any warnings

---

bISt → ▼▲ Set → YES / no

bISt: Built in system test

YES: Activates the built-in system test

no: Skips the built-in system test

---

uEr → 0.0.0.0

vEr: Firmware version number

0.0.0.0: The firmware version number

82573RevC

EMS On-Board User Interface Settings Overview

Menu Items	User-adjustable	Broadcast to other systems?	Setting Description or Function
LED Fault	NO	NO	Not normally visible, only appears when the EMS detects an LED fault.
Battery Status	NO	NO	Reports battery voltage and status
Solar Status	NO	NO	Reports solar panel voltage and status
Flash Pattern	YES	NO	Indicates the flash pattern currently set
Input Type	YES	NO	Indicates input mode, NC for 24/7 operation, bttn for momentary button input, and NO for calendar setting.
Flashing Duration	YES	YES	For crosswalks, reports the time duration for a flash pattern.
Intensity (LED Driver Current)	YES	NO	Indicates the intensity (in milli-amps) the LED modules are set to use. Higher numbers mean brighter lights.
Night Dimming	YES	YES	Indicates what fraction of the daytime intensity the LEDs are set to at night.
Ambient Auto-Adjust	YES	YES	If enabled, automatically dims LEDs on overcast days up to 50% to prevent glare for drivers.
Automatic Light Control (ALC)	YES	NO	If enabled, automatically dims LEDs in response to unexpected solar deficiency to preserve battery life.
LED Temperature	YES	NO	If enabled, adjusts LED power output to account for the effects of environmental temperature variations.
Internal Calendar	YES	NO	Allows LED loads to be set to turn on and off according to a time schedule programmed using Carmanah calendar programming software
Radio Enable	YES	NO	Turns the radio on or off
Radio Channel	YES	NO	Allows channels to be changed to overcome radio interference issues on a per unit basis.
Radio Detection Status	NO	NO	Confirms whether a radio module has been detected by the system controller (EMS).
Digital Output	YES	NO	Used for relay control. Can be adjusted to allow external loads to be switched on at any time, or only at night.
Pushbutton Input Status	NO	NO	Detects the status of the pushbutton input and whether there are any faults found.
LED Fixture Test	YES	NO	Allows the LED loads to exhibit a test flash sequence.
Built-In Self-Test	YES	NO	Allows the system to run a number of self tests and can be used for troubleshooting purposes.
Firmware Version	NO	NO	Displays the firmware version programmed on the system controller (EMS).

7.1 Troubleshooting

Symptom	Possible Cause and What to Check
The EMS does not activate or display any information.	• Check if battery or AC power input voltage are above 12V. Charge or replace battery if low. • Check all fuses. • Ensure solar panel is clean, clear of debris, and not shaded by buildings or vegetation to allow proper battery charging.
LEDs won't flash when pushbutton on the same post is pressed.	• Check that button is functioning and is providing the typical feedback. If the button has an LED or audio feedback, ensure that these are operating. • Check the wiring to the button for continuity. • Check the wiring to the LED fixtures for continuity and make sure the wires are not pinched anywhere along their length. Check that the wiring polarity (positive / negative) is correct on the LED fixtures. • Check the battery voltage, either through the OBUI or with a voltmeter (see item above). Test the system using the "Test" function. If the LEDs flash using the OBUI functions, then the problem is in the button or wiring to the button.
LEDs on same post flash, but other systems in the wireless group won't flash.	• Ensure that all the units are set to the same radio channel using the OBUI. See the EMS Programming and Testing section of this manual. • Ensure that the units are not too far apart (ideal 500 ft maximum, 1,000 ft. unobstructed line of sight). • Check for barriers or obstructions between systems such as buildings or billboards.
LED fixture on same post does not flash.	• Ensure that the wire colors and polarities are correct. Check that the electrical connections are secure.
The LEDs are dim when flashing.	• Check the OBUI for ALC status and battery voltage. • Ensure that the solar panel is clean, clear of debris, and is not shaded by buildings or vegetation. • If the solar panel is covered or shaded, this will prevent proper battery charging and may drive the system to automatic light control mode (ALC). • Check for debris covering the ambient light sensor on top of the solar engine and confirm the photosensor is correctly detecting day and night. • A flashlight can be shone into the photosensor to simulate day, and the photosensor can be covered to simulate night. • Confirm the intensity is set correctly to a value that has been confirmed to be sustainable using a solar simulation. • Check the Ambient Auto-Adjust (AAA) setting on the OBUI. • Turn off the AAA to see if this corrects the dim LEDs.
The LEDs appear too bright when flashing	• The intensity setting on the user interface can be turned down to a more suitable brightness level. • Verify all fixtures are working. If a fixture stops working, the current that would normally flow through it is redirected into the remaining fixtures, which increases their brightness.
Fixtures flash when no button is pressed	• Ensure that all units in a group are set to the correct radio channel using the OBUI while also ensuring that nearby systems at a different location are using a different channel.
LED Open Fault is showing on User Interface	• The EMS is looking for the other fixture in the alternate pattern and declares an "LED Open" fault when it doesn't find one. Set flash pattern to unison.

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