15102 Sommermeyer St Suite 125- Houston, TX 77041
VOICE: **713-973-6905** - FAX: **713-973-9352**
web: www.twrlighting.com

IMPORTANT!!!!

PLEASE TAKE THE TIME TO FILL OUT THE FORM COMPLETELY. FILE IN A SAFE PLACE. IN THE EVENT YOU EXPERIENCE PROBLEMS WITH OR HAVE QUESTIONS CONCERNING YOUR CONTROLLER, THE FOLLOWING INFORMATION IS NECESSARY TO OBTAIN PROPER SERVICE AND PARTS.

MODEL # **LC-STAR** (Lighting Controller - LONESTAR)

SERIAL # _____

PURCHASE DATE _____

PURCHASED FROM _____



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Questions or information beyond this manual, please contact TWR Lighting, Inc.

TWR Lighting, Inc.
15102 Sommermeyer St Suite 125- Houston, TX 77041
Voice: **713-973-6905** - Fax: **713-973-9352** – Toll Free: **800-661-8606**
E-mail: **techsupport@twrlighting.com**
web: www.twrlighting.com

The use of non-original manufacturer parts which are not approved by TWR Lighting, Inc. may invalidate the warranty as well as compliance with requirements as published in the FAA Advisory Circulars AC70/7460-1M, AC150/5345-43J and AC150/5345-53 and ICAO Annex 14 Volume 2 standards.

DISCLAIMER

While every effort has been made to provide a complete, up-to-date, accurate manual, no liability claims for damages resulting from any errors or omissions in this manual will be accepted by TWR Lighting, Inc.

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1 GENERAL INFORMATION

The STAR controller and monitoring unit is for lighting structures in accordance with the FAA Advisory Circular AC 707460-1M, CAR 621, and ICAO Annex 14. The Star controller is used with TWR's variety of medium and low-intensity obstruction lights.

The STAR lighting system uses digital data communication technology that allows all the lights on the system to be connected via a single TWR Lighting, Inc. LCABLE-1 cable, which combines power and control wires for ease of lighting system installation.

The STAR controller includes a user-friendly interface screen to allow full access and diagnostics at the site. There is also an ethernet or optional wireless modem for remote monitoring features.

The controller power requirement is 120-240VAC Single phase 50/60Hz and is housed in a metal NEMA 4 enclosure.
An optional STAR controller 24-48VDC model is available.

Each medium-intensity obstruction light has a unique identity which allows the STAR controller to control light operation, monitor conditions and indicate the real-time status of the system, including all failures specified by FAA, CAR, and ICAO that need to be advised to proper authorities.

1.1 Monitoring: Customer Failure Alarm - Dry contact closure (Form C)

1.1.1 Power Fail

Monitors incoming and power supply voltage and will therefore indicate if the AC or DC power has failed through an individual relay across normally closed or open to common.

1.1.2 Beacon Red Fail

Monitors beacon L864 red LED operation and will therefore indicate if red light has failed through an individual relay across normally closed or open to common.

1.1.3 Mode State Status

The monitor operation status of the photocell indicates day or night mode through an individual relay across normally closed or open to common.

1.1.4 Photocell Fail

Monitors Photocell day/night function and will therefore indicate if photocell has failed through an individual relay across normally closed or open to common.

1.1.5 Marker/Sidelight Fail

STARSF-CS Module monitors marker/sidelights (L810 red LED) operation and will therefore indicate if light has failed through an individual relay across normally close to common.

1.1.6 Communications Fail

Monitors communications between STAR controller and lights and will therefore indicate if communications have failed through an individual relay across normally closed or open to common.

1.2 User Interface Functions

1.2.1 Ethernet/WIFI

Optional for Aircraft Detecting Lighting System (ADLS). (Part Number: **LCO-ADLS**)

1.2.2 Photocell override

TWR's beacon has a built-in photocell, but for applications requiring ground-level photocell operation, there is an **optional** photocell kit user can install to override the beacon Day and Night mode function. Contact TWR service personnel for instructions 713-973-6905 x 4. (Part numbers: **6390-FAA** (REDSTAR L864 Photocell), **SSPIGTAIL** & **SSMTKIT**)

1.2.3 GPS – Global Positioning System (Satellite Communications)

Optional for GPS used to Synchronize beacon flash timing (Part Number: **LCO-GPS**)

2 INSTALLATION

Note: In this section, please remember that not everything mentioned will apply to your system. Some of the information is related to other beacon and sidelight models that are compatible with the Lonestar controller.

Before proceeding with the installation of the STAR controller, lights, and cable, it is essential to thoroughly read this entire manual. Additionally, carefully inspect all equipment for any signs of damage. In case damage is detected, report it to TWR technical support before continuing with the installation. **TWR Technical Support 713-973-6905 Ext. #6**

Suggested tools:

1. Flathead screwdriver
2. #1 flat head screwdriver (small for spring terminal blocks)
3. Flat head #3 Ground lugs
4. Philips #2 for fuse blocks
5. Crescent wrench
6. Electrical Meter

Note: The system warranty will become null and void if this lighting system is not installed according to the instructions and diagrams within this manual.

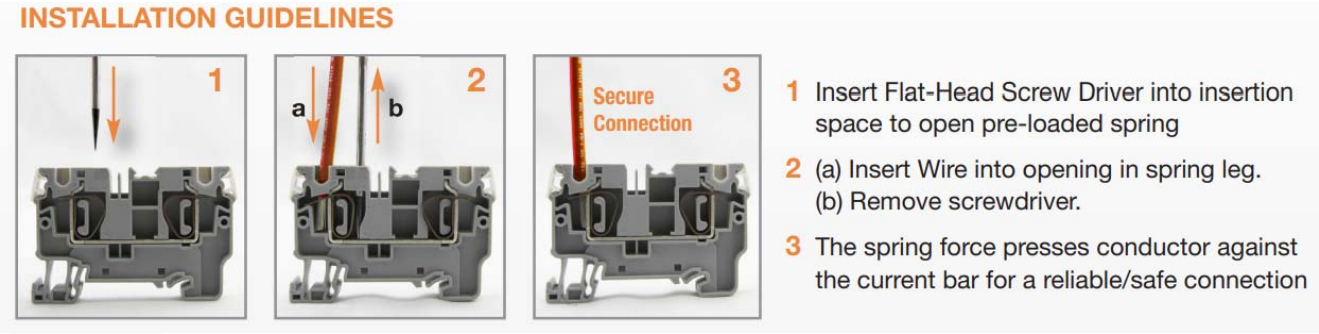
2.1 STAR CONTROLLER (Part # LC-STAR)

2.1.1 Controller mounting

The STAR controller enclosure is typically installed at the base of a structure or in an equipment building. To mount the controller, ensure that appropriate brackets and hardware are available for attachment to the structure or equipment building. Refer to the mounting dimensions provided on the LC-100 Chassis layout drawing located at the back of this manual.

2.1.2 Controller terminal blocks

The LC-STAR controller employs spring-loaded terminal blocks for making connections. To ensure proper installation, refer to the following instructions. Additionally, you can access a video guide by scanning the QR code provided. This video will offer visual assistance in understanding the correct installation procedures.



WATCH VIDEO

2.1.3 Controller electrical

The STAR controller and lighting system operate on 120/240 VAC 50/60Hz power. To determine the appropriate breaker size, refer to the operating load specified in your specific lighting kit drawing at the back of the manual. Optional 24-48 VDC controllers are also available. Electrical power input is routed through the base of the enclosure via a ¾" NPT hub. Installation should comply with local methods and adhere to the National Electrical Codes (NEC).

PERFORMANCE OF LC-STAR (CONTROLLER), REDSTAR (FAA L864) AND OL1 (FAA L810)			
PRODUCT		**Wattage/Volt Amps-MODE**	**UNIT**
120Vac	LC-STAR - (CONTROLLER)	**7W/7VA**-NIGHT & **7W/7VA**-DAY	EACH
	REDSTAR – (FAA L-864 BEACON	**15W/16VA**-NIGHT & **5W/6VA**-DAY	EACH
	OL1-IR – (FAA L-810 SIDELIGHT)	**12W/12VA**-NIGHT & **0W/0VA**-DAY (OFF)	EACH
	LIGHTING SYSTEM TOTAL:	**34W/35VA**-NIGHT **&** **12W/13VA**-DAY	

PERFORMANCE OF LC-STAR (CONTROLLER), REDSTAR (FAA L864/865) AND OL1 (FAA L810)			
PRODUCT		**Wattage/Volt Amps-MODE**	**UNIT**
240Vac	LC-STAR - (CONTROLLER)	**6W/8VA**-NIGHT & **7W/8VA**-DAY	EACH
	REDSTAR – (FAA L-864 BEACON	**14W/15VA**-NIGHT & **4W/5VA**-DAY	EACH
	OL1-IR – (FAA L-810 SIDELIGHT)	**12W/12VA**-NIGHT & **0W/0VA**-DAY (OFF)	EACH
LIGHTING SYSTEM TOTAL:		**32W/35VA**-NIGHT **&** **11W/13VA**-DAY	

PERFORMANCE OF LC-STAR (CONTROLLER), LONESTAR (FAA L864/865) AND OL1 (FAA L810)			
PRODUCT		**Wattage/Volt Amps-MODE**	**UNIT**
120Vac	LC-STAR - (CONTROLLER)	**7W/7VA**-NIGHT & **7W/7VA**-DAY	EACH
	LONESTAR – (FAA L-864/865 BEACON	**34W/35VA**-NIGHT & **52W/53VA**-DAY	EACH
	OL1-IR – (FAA L-810 SIDELIGHT)	**12W/12VA**-NIGHT & **0W/0VA**-DAY (OFF)	EACH
	LIGHTING SYSTEM TOTAL:	**53W/54VA**-NIGHT **&** **59W/60VA**-DAY	

PRODUCT		**Wattage/Volt Amps-MODE**	**UNIT**
240Vac	LC-STAR - (CONTROLLER)	**6W/8VA**-NIGHT & **7W/8VA**-DAY	EACH
	LONESTAR – (FAA L-864/865 BEACON	**33W/38VA**-NIGHT & **53W/56VA**-DAY	EACH
	OL1-IR – (FAA L-810 SIDELIGHT)	**12W/12VA**-NIGHT & **0W/0VA**-DAY (OFF)	EACH
	LIGHTING SYSTEM TOTAL:	**51W/58VA**-NIGHT **&** **60W/64VA**-DAY	

2.1.4 Controller cable for light operation

The standard lighting system uses a single cable to power and control lights. Locate the appropriate ¾" NPT hub at the base of the controller enclosure for cable connector installation and termination. The use of wire and conduit is optional.

2.1.5 Controller marker/sidelight sensor (STARSF-CS)

Sidelight current sensor is default set at the factory to monitor 3x sidelights (L810-IRs) and will therefore indicate if one sidelight has failed through the STARSF-CS relay with normally closed contacts. Note with so many variables it may be necessary to adjust the settings on the module to function properly, **see the operations section of this manual.** On some lighting systems sidelights may not be necessary and therefore disabled from the main control board.
(Contact TWR Technical Support for more details at 713-973-6905 Ext. #6)



Figure 1: STARSF-CS

2.1.6 Controller alarm monitoring connections

Customer contact points for monitoring beacon and markers/sidelights are provided on the main control board terminal block and will indicate if light has failed through a normally closed or open to Common relay.

2.1.7 Controller external photocell (optional)

Monitors Photocell day/night function and will therefore indicate if photocell has failed on main control board terminal block through a normally closed or open to Common relay.

2.1.8 Controller wireless monitoring modem (optional)

Monitors lighting system status through wireless transmission to network operation center or personal device. Contact TWR for more details.

2.2 BEACON LIGHT (Part # REDSTAR)



Figure 2: REDSTAR Beacon

2.2.1 Beacon mounting

The Beacon comes with four mounting feet arranged every 90 degrees on a 13-1/4" bolt circle. To mount the Beacon, ensure you have a bracket and/or hardware suitable for attachment to the structure. Refer to the mounting dimensions provided on the Beacon drawing located towards the back of this manual.

2.2.2 Beacon electrical

The standard beacon operates on 120/240 VAC 50/60Hz power. Optional 24-48 VDC beacons are available. Refer to the beacon drawing toward the back of this manual. Tower-mounted aviation obstruction light housing shall be bonded to the tower using 16 mm² (#6 AWG) or coarser, solid, or stranded, tinned, copper conductor. Connection to be made to the housing base ground lug using PENETROX A or A-13 Oxide Inhibitor or similar UL (DVYW) product. Connection to the tower shall be made using tower manufacturer-approved methods (typically a type of mechanical clamp)."

2.3 BEACON LIGHT (Part # LONESTAR)



Figure 3: LONESTAR Beacon

2.3.1 Beacon mounting

The Beacon comes with four mounting feet arranged every 90 degrees on a 13-1/4" bolt circle. To mount the Beacon, ensure you have a bracket and/or hardware suitable for attachment to the structure. Refer to the mounting dimensions provided on the Beacon drawing located towards the back of this manual.

2.3.2 Beacon electrical

The standard beacon operates on 120/240 VAC 50/60Hz power. Optional 24-48 VDC beacons are available. Refer to the beacon drawing toward the back of this manual. Tower-mounted aviation obstruction light housing shall be bonded to the tower using 16 mm² (#6 AWG) or coarser, solid, or stranded, tinned, copper conductor. Connection to be made to the housing base ground lug using PENETROX A or A-13 Oxide Inhibitor or similar UL (DVYW) product. Connection to the tower shall be made using tower manufacturer-approved methods (typically a type of mechanical clamp)."

2.4 SIDEMARKER / SIDELIGHT (Part # OL1xxxx / OL2xxxx)



Figure 4: OL1CLED



Figure 5: OL2CLED

2.4.1 Marker/Sidelight mounting

Marker/Sidelight is provided with ¾" female NPT for mounting. For more details refer to the drawing at the back of this manual.

2.5 CABLE (Part # LCABLE-1)

2.5.1 Cable specifications

TWR uses a single composite PVC-jacketed cable consisting of 3x 12 AWG wires (Black, White, and Red) for power, 1x 14 AWG wire (Green) for ground, and 4x 22 AWG wires (Blue, Yellow, Orange, and Gray) for communications. All shield wires must be twisted together and terminated to ground. Conduit and wire solutions are available.

2.5.2 Cable mounting

Securely attach the cable using the provided ties, or use appropriate grips, or clamps, ensuring proper routing and clearance. Consider support brackets for heavy or long cables. Conduct a thorough inspection and testing if applicable. For cable routing, refer to the lighting kit drawings at the back of the manual.

2.5.3 Cable connection

LCABLE-1 cable uses a cord connector/cable gland over PVC jacket of cable for watertight entry. Refer to drawings toward the back of this manual.

3 Operation

Before powering up and operating the lighting system you must perform commissioning. TWR technical service is available 24/7 and can assist you with measurements.

3.1 LIGHTING SYSTEM COMMISSIONING

3.1.1 COMMISSIONING FORM

MEDIUM INTENSITY LED
MODEL LC-STAR

Obstacle light system commissioning sheet

INSTALL DATE:	
SITE ADDRESS:	
COMMISSIONING DATE:	
INSTALLED BY:	
COMMISSIONED BY:	
TWR LIGHTING, INC. ORDER REFERENCE NUMBER:	

SYSTEM INFORMATION	**LOCATION ON STRUCTURE**
SERIAL # LC-STAR CONTROLLER	
SERIAL # BEACON 1	
SERIAL # BEACON 2	
SERIAL # BEACON 3	
SERIAL # BEACON 4	
SERIAL # BEACON 5	
SERIAL # BEACON 6	
SERIAL # BEACON 7	
SERIAL # BEACON 8	
SERIAL # BEACON 9	
SERIAL # BEACON 10	
SERIAL # BEACON 11	
SERIAL # BEACON 12	

MEDIUM INTENSITY LED
MODEL LC-STAR

Visual Inspection

o	Check the lights to ensure that they have not been damaged during installation.
o	Check that all installation terminal connection points are tight and that the wires are connected according to the applicable interconnection diagrams. (**TAKE PHOTOS OF WIRING**)
o	Check that electrical connections are properly made (no stray wires and properly connected cable glands, etc...) "Outer shield and inner shield cut flush with cable PVC jacket" (**TAKE PHOTOS**)
o	Check that lights are installed horizontally – use the level indicator on the beacon
o	Check all mechanical installation points (nuts and bolts tight, cables properly secured, etc...)
o	Check that all grounding is properly secure.
o	Check that all System Terminators (Resistors) are installed at the correct points in accordance with the diagrams. (**TAKE PHOTOS**)

3.1.2 IMPEDANCE CHECK

Impedance measurements confirm there are no shorts within wiring indicating all connections are correct. Within the LC-Star controller after completing installation of all components with the system deenergized place your electrical meter setting on Ohms checking the following locations.

***MEASUREMENTS (with a multimeter)**		
PASS	FAIL	*** WIRES DISCONNECTED AT LC-STAR CONTROLLER (Cable readings)**
o	o	**BLUE** (B) TO **YELLOW** (A) = **150-180** Ohms
o	o	**BLUE** (B) TO **GREY/ORANGE** (C) = **300-600** Ohms
o	o	**YELLOW** (A) TO **GREY/ORANGE** (C) = **650-800** Ohms
o	o	**GREY/ORANGE** (C) TO GROUND/ CONTROLLER BACK PANEL= Range 180-200 Ohms for single beacon, more than one beacon divides 180-200 Ohms by number of beacons. **Example: 3 beacons = (60-66.6 Ohms)**
		*** IMPEDANCE MEASUREMENTS (WITH INPUT POWER OFF)**
o	o	**BLUE** (B) TO **YELLOW** (A) = **70-85** Ohms
o	o	**BLUE** (B) TO **GREY/ORANGE** (C) = **250-350** Ohms
o	o	**YELLOW** (A) TO **GREY/ORANGE** (C) = **250-350** Ohms
Measurement variances can apply but verify with TWR Technical support **713.973.6905 x 4** for acceptance.		

START-UP

o	Connect the power supply to the system.
o	1. Check that the incoming power supply has the correct voltage and proper protection level. Single phase 120VAC? ( ) 2. Check voltage at top junction box L-N ( ) L-Ground ( )
o	Turn on the power supply and allow the system to initialize. (approx. 1 minute)

Refer to the manual to rectify any system faults – Contact TWR Lighting, Inc. for support: 713.973.6905 x 4

3.2 STAR CONTROLLER (Part # LC-STAR)

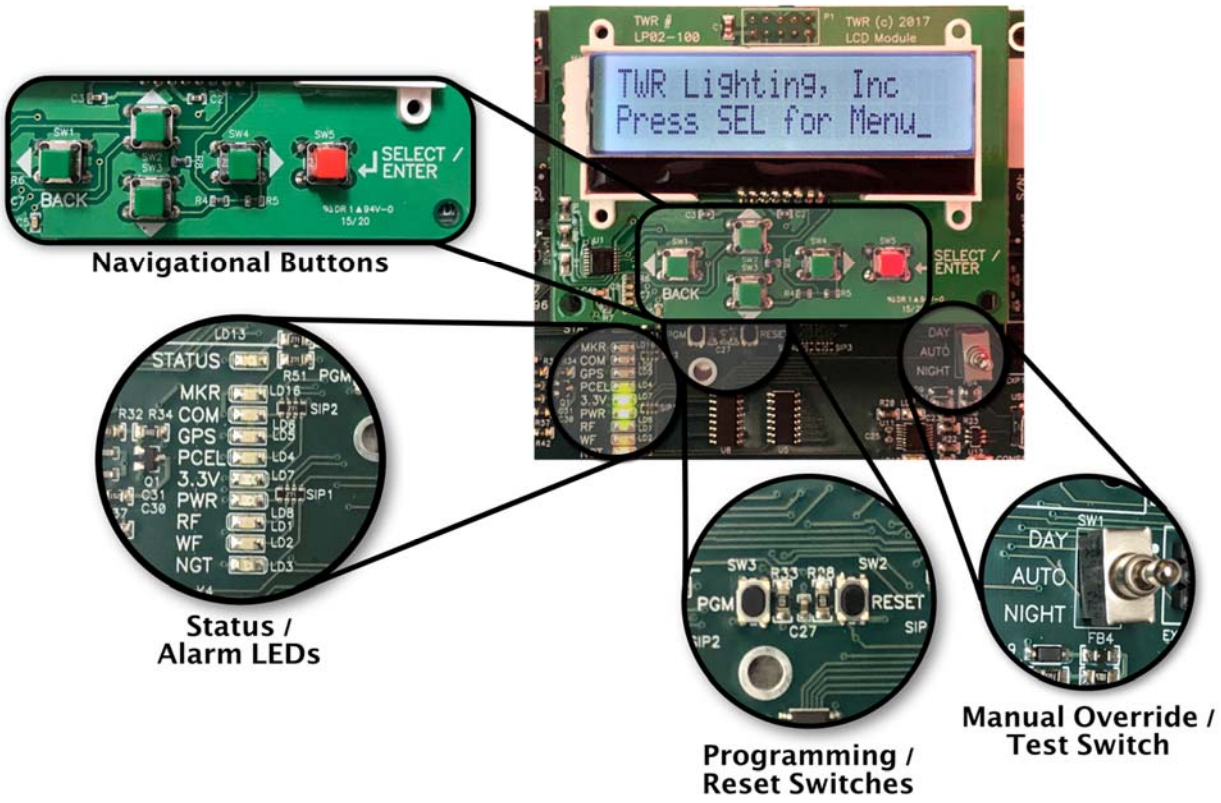


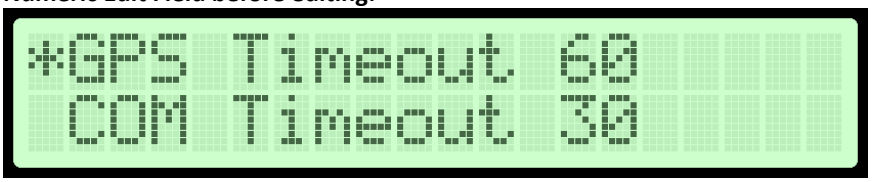
Figure 3: SCREEN AND CONTROLS

3.2.1 Screen and Controls

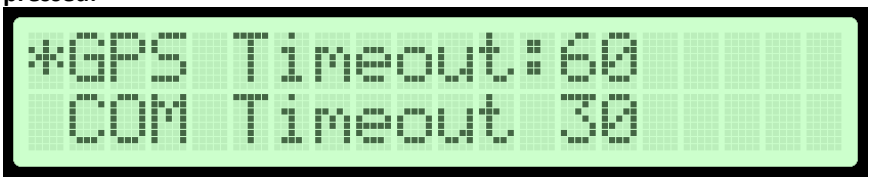
The Star controller has a screen menu with Up, Down Right and Left curser blue position push buttons and a red Select/Enter push button. Any menu item with a – to the left of the option will indicate the menu item is Read Only or a Status item and does not have any actions if you press the select button. Items marked with an asterisk * next to them can be selected / changed or indicate that the item is a sub-menu. Exiting a sub-menu is usually done by pressing the Left / Back button or by scrolling down to a "<Cancel" or "<Back" menu item.

There are a few types of editable fields: Choose, Toggle and Numeric. Choose to present a list of items and you select the item from the list by using the **Up** / **Down** buttons and select to choose or press the **Back** button to exit without selecting. Toggle will cycle through different items in place using the **Up**/**Down** buttons and select to choose. Fields with editable numeric values will change the character to the left of the value being edited to either a colon "**:**" or "**>**" to indicate the **Up**/**Down** buttons can be used to increment or decrement the value. Typically, the ":" indicates a small change and a "**>**" indicates a large change but can be reversed depending on what makes sense for the number being edited (a large number vs small). Pressing **Select** to cycle between the increment size or to finalize the change. So, to edit you would press Select once and the edit indicator changes to a "**:**". Press Select again and it changes to "**>**". Finally pressing Select a third time and end the edit.

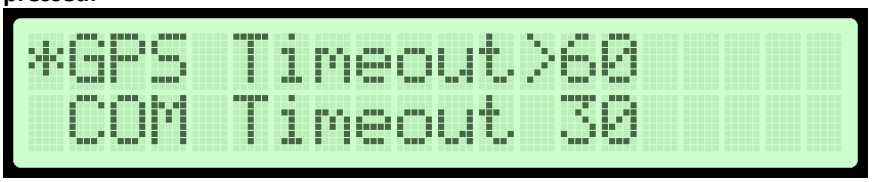
Numeric Edit Field before editing:



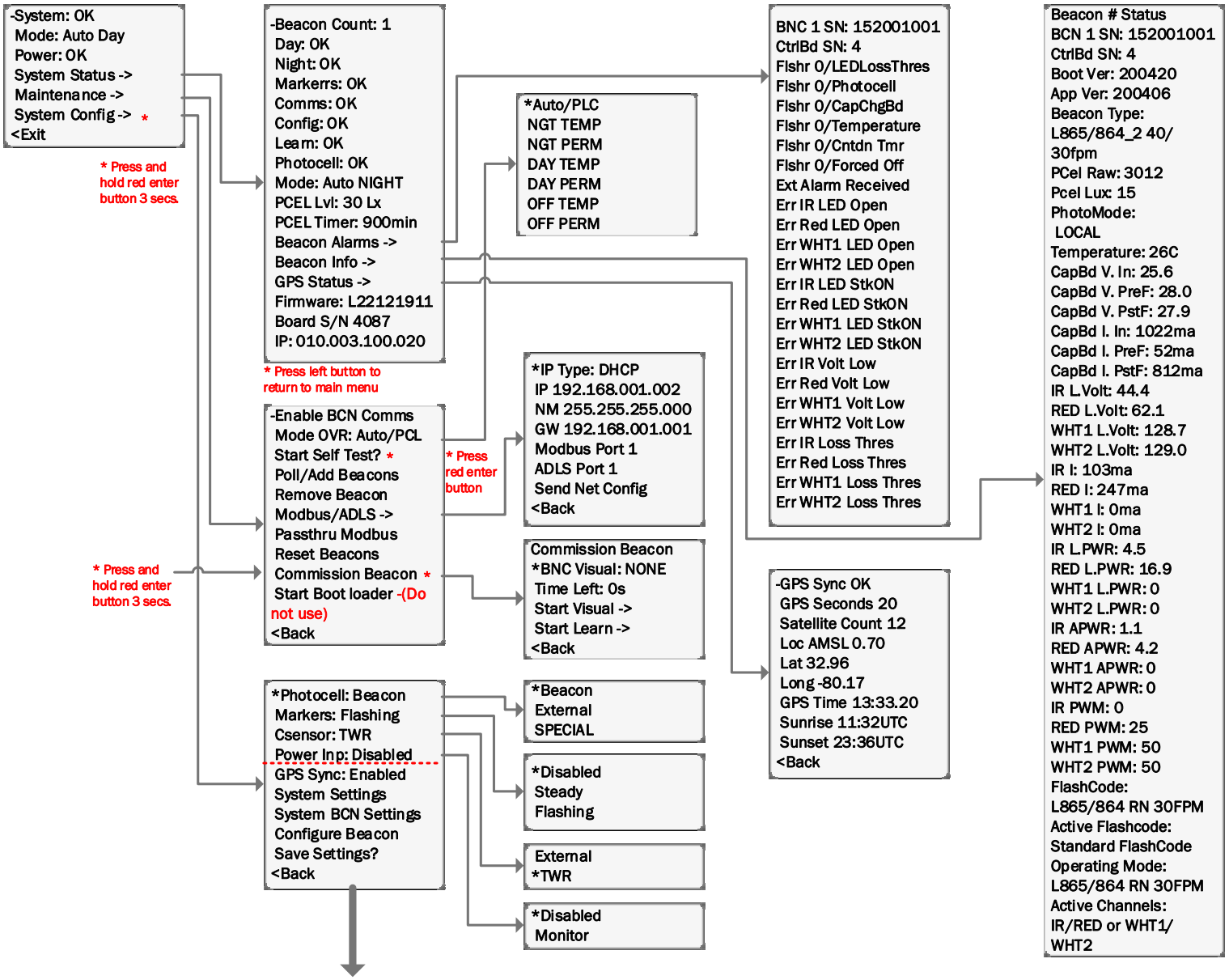
Numeric Edit Field after pressing Select to edit (showing the ":"): The value will change by +/-10 when Up/Down is pressed:



Numeric Edit Field after pressing Select to edit (showing the ">"). The value will change by +/-1 when Up/Down is pressed:



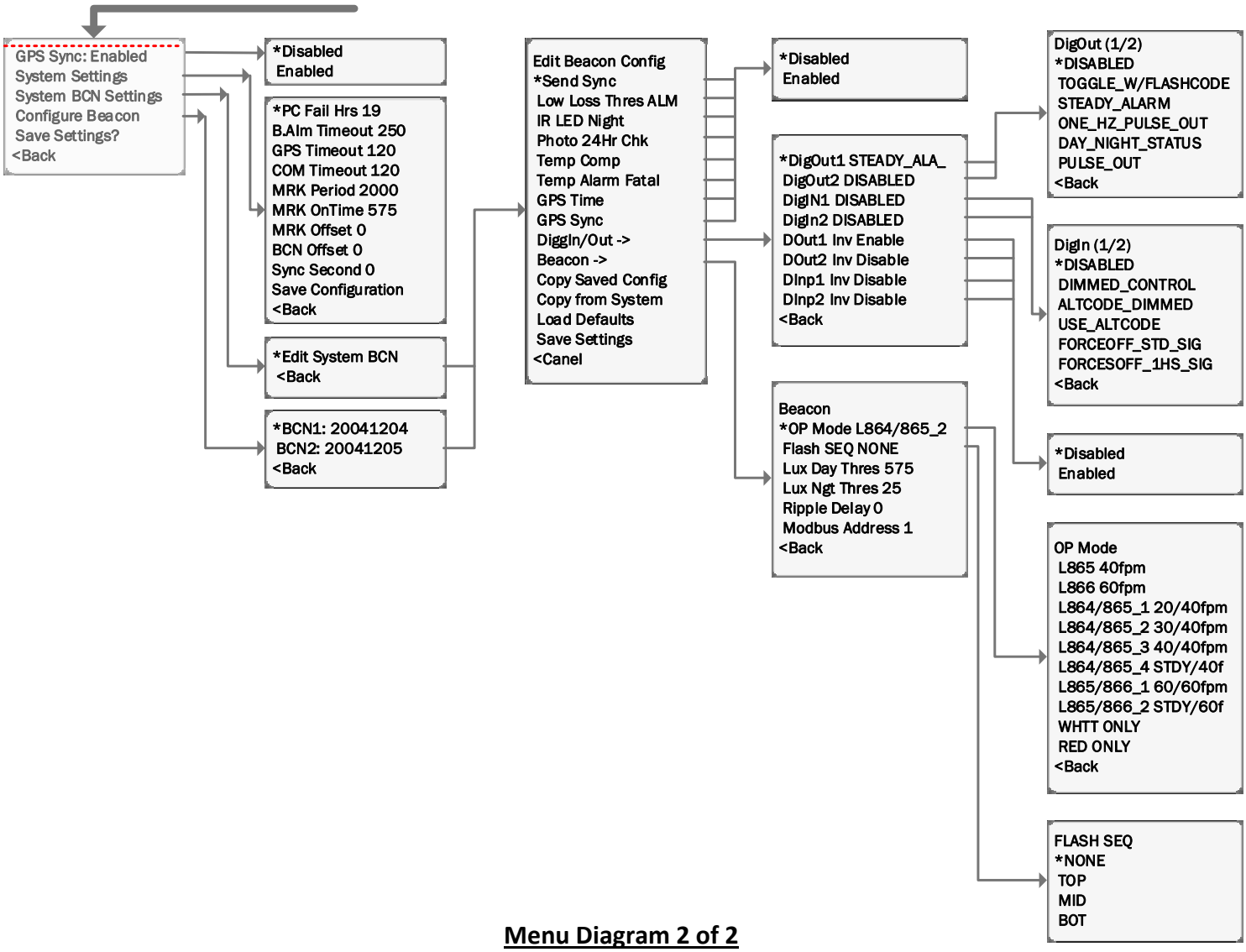
Menu System Overview



(Continues to second diagram)

Menu Diagram 1 of 2

(Continued from diagram #1)



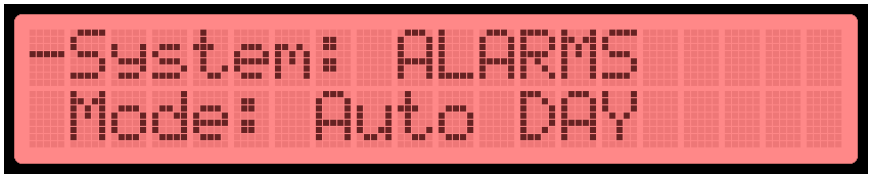
Menu Diagram 2 of 2

3.2.2 Main Menu

Depress red select/enter push button to awake the display.

3.2.2.1 System (status)

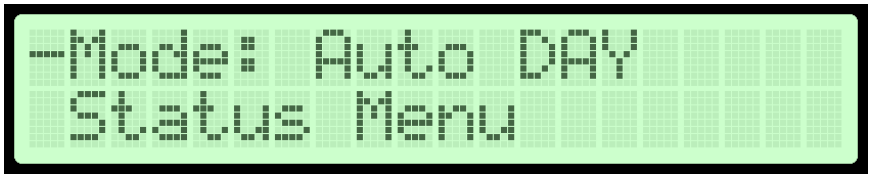
Overall status of the lighting system. Will indicate “OK” when there are no alarms or failures or “ALARMS” when there is a system or lighting issue/alarm.



3.2.2.2 Mode (status)

Indicates the current operating mode of the lighting system. The possible modes include:

- **Auto DAY** (photocell day mode)
- **Auto NIGHT** (photocell night mode)
- **Man DAY** (toggle switch photocell override day mode)
- **Man NIGHT** (toggle switch photocell override night mode)
- **Man AUTO** (toggle switch photocell auto mode, will change to Auto Night or Auto Day)
- **White BACKUP** (the night fail backup mode or low intensity white)
- **PCEL FAIL** (photocell has failed and system in white backup)
- **Force OFF** (lights forced off through the menu Mode Override)
- **Force DAY** (lights forced to day mode through the menu Mode Override)
- **Force NIGHT** (lights forced to night mode through the menu Mode Override)



3.2.2.3 System Status (submenu)

Pressing Select will display the Status submenu. The status screen will show the various lighting and system status overview and contains the submenus for showing the detailed beacon alarms (see *Beacon Alarms menu*) causes and beacon information (*see Beacon Info menu*).

3.2.2.4 Maintenance (submenu)

Depress red select/enter push button to see how many beacons are connected and type of beacon.

3.2.2.5 System Configuration (submenu)

Depress red select/enter push button to see how many beacons are connected and type of beacon.

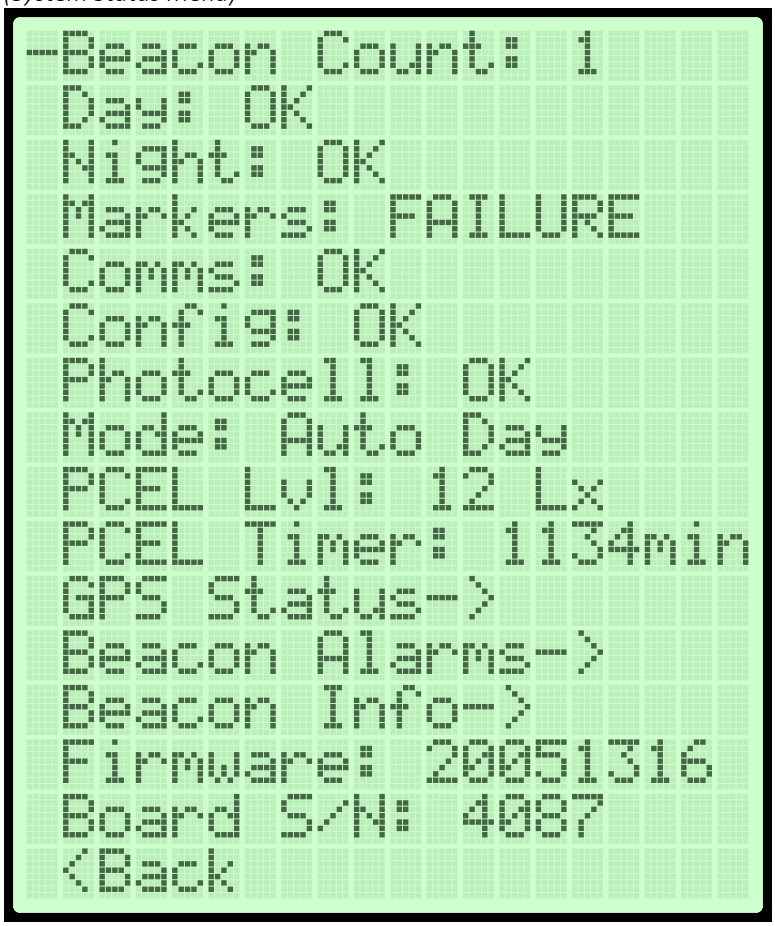
3.2.2.6 Exit

This menu item, since at the main menu, will cause the LCD to turn off. The display will come on every few minutes then turn back off. Pressing Select while the screen is off will display the last menu it was on.

3.2.2.7 System Status Menu

Depress The status screen will show the various lighting and system status overview and contains the submenus for showing the detailed beacon alarms (see *Beacon Alarms menu*) causes and beacon information (*see Beacon Info menu*).

(System Status Menu)



3.2.2.8 Beacon Count (status)

Shows the number of configured beacons on the system.

3.2.2.9 Day (status)

Will indicate "**OK**" when the day beacons are operating normally or "**FAILURE**" when an abnormal condition is detected. A detailed reason for the alarm can be found in the Beacon Alarm submenu.

3.2.2.10 Night (status)

Will indicate "**OK**" when the night beacons are operating normally or "**FAILURE**" when an abnormal condition is detected. A detailed reason for the alarm can be found in the Beacon Alarm submenu.

3.2.2.11 Marker/Sidelight (status)

Will indicate "**OK**" when the side markers are operating normally or "**FAILURE**" when an undercurrent or flasher failure has been detected (if the Marker option is not disabled in the system settings).

3.2.2.12 Comms (status)

Will indicate "**OK**" when all the beacons are communicating or "**FAILURE**" when any of the configured beacons have stopped communicating.

3.2.2.13 Config (status)

Will indicate "**FAILURE**" if the configuration has not been setup or the board has detected a problem with the configuration. This error must be cleared by pressing the Select button, then selecting "**OK**" and pressing Select.

3.2.2.14 Photocell (status)

Will indicate "**OK**" when the photocell (in the beacons or on the ground depending on the configuration) is changing states within the programmed max time (see Photocell Time under System Configuration menu). If a "**FAILURE**" is shown that would indicate the photocell is not changing modes. A photocell failure will force the system into day mode. If the photocell is set to use the Beacon option, then at least 50% of the photocells must remain operational before a failure will be considered.

3.2.2.15 Mode (status)

Indicates the current operating mode of the lighting system. The possible modes include:

- **Auto DAY** (photocell day mode)
- **Auto NIGHT** (photocell night mode)
- **Man DAY** (toggle switch photocell override day mode)
- **Man NIGHT** (toggle switch photocell override night mode)
- **Man AUTO** (toggle switch photocell auto mode, will change to Auto Night or Auto Day)
- **White BACKUP** (the night fail backup mode or low intensity white)
- **PCEL FAIL** (photocell has failed and system in white backup)
- **Force OFF** (lights forced off through the menu Mode Override)
- **Force DAY** (lights forced to day mode through the menu Mode Override)
- **Force NIGHT** (lights forced to night mode through the menu Mode Override)

3.2.2.16 PCEL Level (status)

Displays the light level in Lux if the photocell is configured to use the Beacon photocell.
Example: **PCEL Lvl: 13 Lx**

3.2.2.17 PCEL Timer (status)

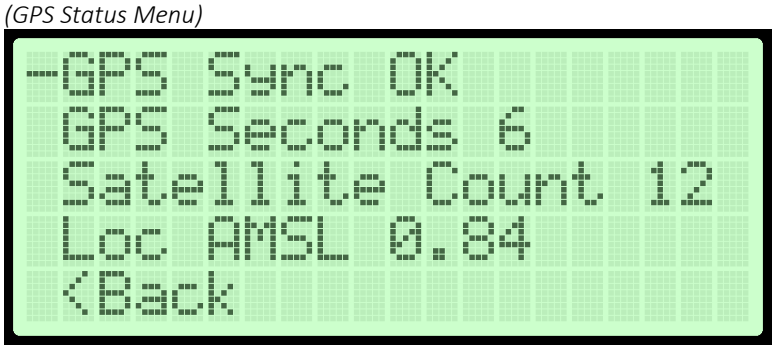
Displays the amount of time remaining in minutes before the photocell is considered failed. The photocell timer setting can be found under the System Configuration menu. 60 = 1hr, 1440 = 19hr

Example: **PCEL Timer: 925min** (in 925 minutes or about 15 hours, if the photocell does not change modes there will be a PCEL Fail alarm).

3.2.2.18 GPS Status (submenu)

Displays the optional GPS Status submenu showing the GPS signal status, GPS Seconds and Satellite Count.

(GPS Status Menu)



- **GPS Sync** – Displays OK if the optional GPS Module is receiving the time and 1PPS pulses or FAILED if either the time or 1PPS is not being received.

- **GPS Seconds** – Displays the current seconds portion of the time received from the GPS.
- **Satellite Count** – Shows the number of satellites the GPS receiver is picking up.
- **Loc AMSL** - Displays the estimated height AMLS calculated from the GPS (for reference only)

3.2.2.19 Beacon Alarms (submenu)

Displays each beacon and the current alarm status for the currently showing beacon. On a system with more than one beacon the Left / Right buttons will switch between them and show the beacon address and serial number at the top. The Up / Down buttons will scroll through the list of alarms. Press the Left button once back to beacon 1 to exit the menu. The following are the possible alarm reasons and descriptions:

- **Flshr O/LEDLossThres** – This alarm is set when any LED driver experiences LED voltage loss that exceeds 25% from its Learned value.
- **Flshr O/Photocell** – Indicates if the flasher has been turned off by the photocell.
- **Flshr O/CapChgBd** – Indicates if the flasher has been turned off due to a fault with the Capacitor Charge Board.
- **Flshr O/Temperature** – Indicates if the flasher has been turned off due to a temperature fault.
- **Flshr O/CntDn Timer** – Indicates if the flasher has been turned off due to a count-down timer.
- **Flshr O/Forced Off** – Indicates if the flasher has been forced off with an external command.
- **Ext Alarm Received** – Indicates an External Alarm has been received from another beacon.
- **Err IR LED Open** – Indicates a fault with the IR LEDs caused by an open circuit.
- **Err RED LED Open** – Indicates a fault with the RED LEDs caused by an open circuit.
- **Err WHT1 LED Open** – Indicates a fault with the White1 strand LEDs caused by an open circuit.
- **Err WHT2 LED Open** – Indicates a fault with the White2 strand LEDs caused by an open circuit.
- **Err IR LED StkON** – Indicates a fault caused by the IR LEDs being stuck on.
- **Err RED LED StkON** – Indicates a fault caused by the RED LEDs being stuck on.
- **Err WHT1 LED StkON** – Indicates a fault caused by the White1 strand LEDs being stuck on.
- **Err WHT2 LED StkON** – Indicates a fault caused by the White2 strand LEDs being stuck on.
- **Err IR Volt Low** – Indicates a low voltage fault with the IR LEDs.
- **Err RED Volt Low** – Indicates a low voltage fault with the RED LEDs.
- **Err WHT1 Volt Low** – Indicates a low voltage fault with the White1 strand LEDs.
- **Err WHT2 Volt Low** – Indicates a low voltage fault with the White2 strand LEDs.
- **Err IR Loss Thres** – Indicates a fault caused by an IR LED voltage loss of 25% from its Learned value.
- **Err RED Loss Thres** – Indicates a fault caused by a RED LED voltage loss of 25% from its Learned value.
- **Err WHT1 Loss Thres** – Indicates a fault caused by a White1 strand LED voltage loss of 25% from its Learned value.
- **Err WHT2 Loss Thres** – Indicates a fault caused by a White2 strand LED voltage loss of 25% from its Learned value.

3.2.2.20 Beacon Info (submenu)

Displays the current status of each beacon. On a system with more than one beacon the Left / Right buttons will switch between them and show the beacon address and serial number at the top. The Up / Down buttons will scroll through the information. Press the Left button once back to beacon 1 to exit the menu. The following are the beacon information fields and descriptions of the values:

Field	Example	Description
Boot Ver	200420	The version of the boot firmware loaded on the beacon
App Ver	200406	The version of the application firmware loaded on the beacon

Beacon Type	L865/864_240/30fpm	The beacon's configured FAA Classification and Flash rate
PCEL Raw	3091	The current photocell ADC reading (raw value)
PCel Lux	15	The current beacon/local photocell Lux value (does not pertain to external photocell if used)
PCel Mode	LOCAL	Indicates the current photo control mode (Local, External or Switch)
Temperature	26	Indicates the Temperature of the LED Assembly in degrees C
CapBd V.In	25.6	Indicates the DC voltage going into the Capacitor Charge Board
CapBd V.PreF	28.0	Indicates the DC voltage out of the Capacitor Charge Board prior to the LEDs firing
CapBd V.PostF	27.9	Indicates the DC voltage out of the Capacitor Charge Board after the LEDs have fired
CapBd I.In	9.1	Indicates the current in mA going into the Capacitor Charge Board
CapBd I.PreF	6.9	Indicates the current in mA out of the Capacitor Charge Board prior to flashing the LEDs
CapBd I.PostF	68.3	Indicates the current in mA out of the Capacitor Charge Board after the LEDs have fired
IR L.PWR	4.6	Indicates the IR LED Power in Watts
RED L.PWR	1.9	Indicates the RED LED Power in Watts
WHT1 L.PWR	7.2	Indicates the WHITE1 strand LED Power in Watts
WHT2 L.PWR	8.7	Indicates the WHITE2 strand LED Power in Watts
IR L.APWR	1.1	Indicates the average IR LED Power in Watts
RED L.APWR	0.4	Indicates the average RED LED Power in Watts
WHT1 L.APWR	1.1	Indicates the average WHITE1 strand LED Power in Watts
WHT2 L.APWR	1.4	Indicates the average WHITE2 strand LED Power in Watts
IR L.Volt	44.4	Indicates the IR LED DC Voltage (V)
RED L.Volt	62.1	Indicates the RED LED DC Voltage (V)
WHT1 L.Volt	128.7	Indicates the WHITE1 strand LED DC Voltage (V)
WHT2 L.Volt	129.0	Indicates the WHITE2 strand LED DC Voltage (V)
IR PWM	0	Indicates the IR PWM rate in %
RED PWM	25	Indicates the RED PWM rate in %
WHT1 PWM	50	Indicates the WHITE1 strand PWM rate in %
WHT2 PWM	50	Indicates the WHITE2 strand PWM rate in %

Flasher Mode	RUNNING	Indicates the operating state of the core flasher module. This may have the value STOPPED, RUNNING, DISABLED, FORCE OFF, or LEARNING.
FlashCode	L864/865 RN 30FPM	Indicates the current FlashCode in use
Active FlashCode	Standard Flashcode	Indicates the active FlashCode set (Standard, Alt1 or Alt2)
Operating Mode	L864/865 RN 30FPM	Indicates the current operating mode (FAA classification, mode, and flash rate)
Active Channels	IR/RED or WHT1/WHT2	Indicates the active LED Drivers / channels in use

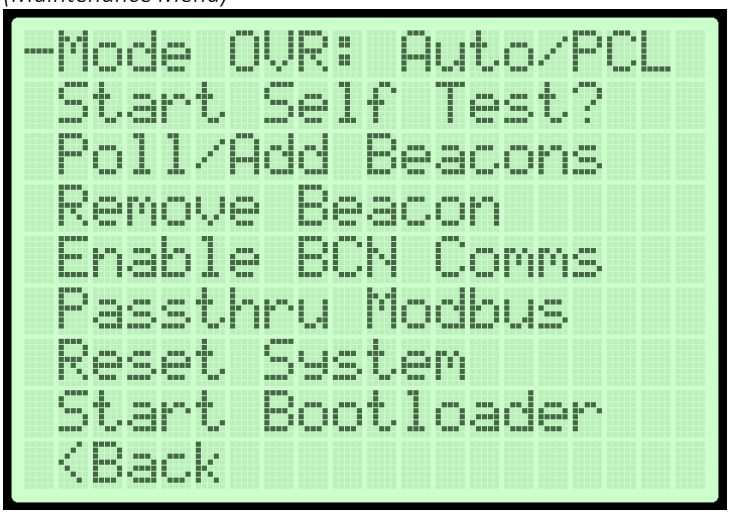
3.2.2.21 Firmware Version / Board S/N (status)

Shows the lighting controller firmware version and board serial number.

3.2.2.22 Maintenance Menu

The maintenance screen displays a few menu operations that can be used to help diagnose the system or when a beacon is added or removed from the system. Please consult with TWR before using the advanced options.

(Maintenance Menu)



3.2.2.23 Mode Override (option)

Will indicate the current light override mode and can be changed by pressing the Select button and choosing the override mode. If the mode is overridden the PCEL Alarm will be triggered as a reminder that the mode has been overridden. Selecting one of the PERM modes (permanent) will cause the system to operate in the selected mode even after a reset, so use it with caution. The possible selections are:

- **Auto/PCL** - Switches back to the normal automatic photocell-based operation.
- **NGT TEMP** - Switches to Night mode temporarily (2 minutes) then switches back to Auto mode.
- **NGT PERM** - Switches to Night mode permanently and will be retained even after a reset.
- **DAY TEMP** - Switches to Day mode temporarily (2 minutes) then switches back to Auto mode.
- **DAY PERM** - Switches to Day mode permanently and will be retained even after a reset.
- **OFF TEMP** - Switches the beacons off temporarily (2 minutes) then switches back to Auto mode.
- **OFF PERM** - Switches the beacons off permanently and will be retained even after a reset.

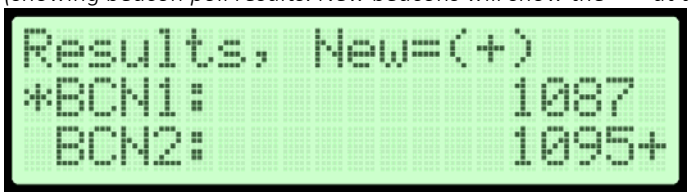
3.2.2.24 Start Self-Test (action)

Selecting this action then selecting “Yes” will run through all of the lighting modes checking for failures before switching each mode off then checks for failures after the beacon has been turned off to make sure there are no preexisting failures or alarm and that the beacon is correctly detecting it has been switched off. If the system has the Markers / Sidelight option enabled, they will be tested also by turning off power to the markers while keeping the marker current sensor enabled. The final test status will be displayed after completion and the Up / Down button can be used to scroll through the history.

3.2.2.25 Poll / Add Beacons (action)

Selecting this action will scan the system for all beacons that are communicating and shows the beacon address (Modbus / BCN#) and Serial Number along with an indication (a “+” at the end of the line) if the beacon is not configured. Use the Up/Down buttons to go through the list. Pressing the Select button on a beacon line will give the option to set the beacon address (*by pressing Select on the Chng BCN Addr option*) and add it to the system if it is new or update the beacon Address if it already exists in the configuration. It is recommended that the top beacon be assigned address 1. Valid range is 1-254

(showing beacon poll results. New beacons will show the “+” at the end)



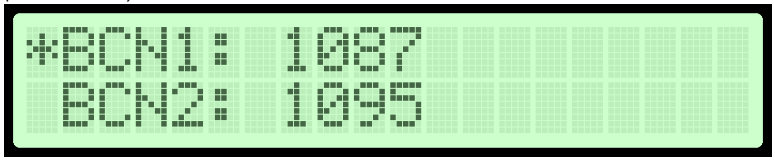
(showing beacon poll options when selecting a beacon that exists in config)



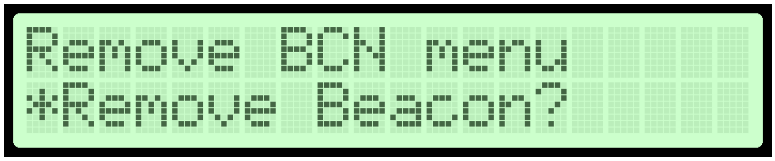
3.2.2.26 Remove Beacon (locked action / contact customer support)

Selecting this action will show the list of configured beacons and give the option to remove a beacon from the system. This can be used to remove a beacon that is being replaced. Use the **Up/Down** buttons to go through the list and pressing the **Select** button on a beacon will prompt to remove it.

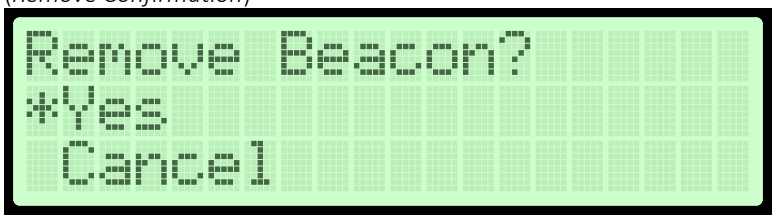
(Beacon list)



(*Remove Prompt*)



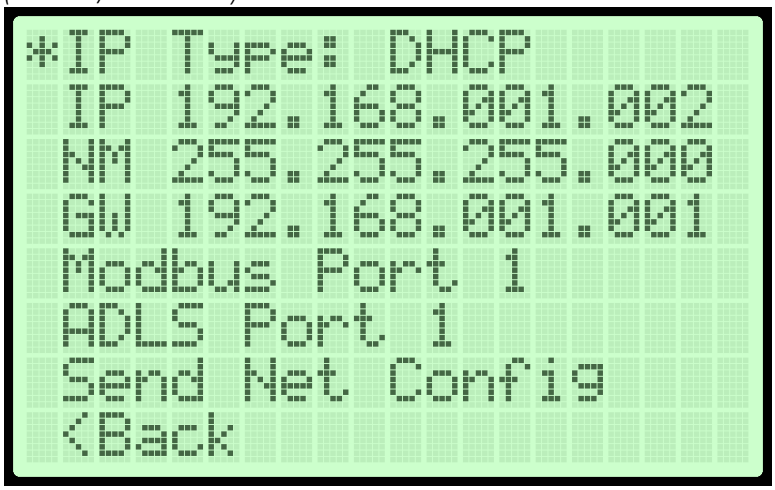
(*Remove Confirmation*)



3.2.2.27 Modbus / ADLS (submenu)

Selecting this action will show the menu for configuring the optional Ethernet/Modbus TCP/ADLS (radar) module. Send the configuration to the module after configuring the appropriate network settings by selecting the "Send Net Config" menu option. The ethernet module will reboot after receiving the new configuration. The current IP Address will always show at the bottom of the System Status menu.

(Modbus/ADLS Menu)



3.2.2.28 IP/NM/GW (option)

Used to configure the IP Address / Netmask and default Gateway on the optional Ethernet Module (part# LP03-100).

(*IP Address option*)



Press the **Select** button to begin editing. The cursor will change to a **block** indicating the current edit position along with showing a colon: after the field name.

(*IP Address showing edit position select*)



Change the edit position using the **UP** and **DOWN** buttons. Once the **block cursor** is at the position that needs editing, press the **Select** button to switch to digit edit mode. The cursor will change to an **underline** below the position being edited as shown below:

(*IP Address showing edit digit mode*)



Once in the edit digit mode showing the underline cursor, use the UP and DOWN buttons to change the number (up to increase and down to decrease). Press the **Select** button to exit digit edit mode and go back to block cursor position select mode. Continue moving to and editing the IP/NW/GW numbers using the above steps. Press the **Select** button twice without making any changes or the **Left** button at any time to complete the edit process.

3.2.2.29 Send Net Config (action)

Selecting this action will send the network configuration to the Ethernet module which will then reconfigure and reboot.

3.2.2.30 Enable BCN Comms (option)

This is automatically done anytime the system starts and should only be used if a beacon has been configured with the TX RS485 option turned off for some reason.

3.2.2.31 Passthru Modbus (option)

This option is for advanced use only and should not be enabled unless instructed by TWR. **There will be no alarm monitoring while this option is enabled, so use it with caution.** This option, when enabled, allows all communications with the beacons to be passed through to the USB Communications port on the controller. Set to Disabled by default.

3.2.2.32 Reset System (option)

This option will cause the controller board to reset.

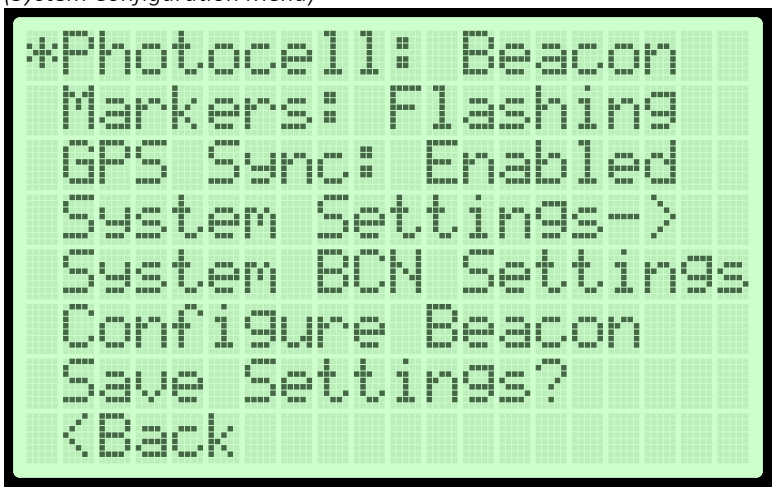
3.2.2.33 Start Bootloader (locked action / contact customer support)

This option is for advanced use only and should not be enabled unless instructed by TWR. Allows new firmware to be installed or updated. Selecting this option will stop all functionality until the board is reset.

3.2.2.34 System Configuration Menu (locked menu / contact customer support)

The system configuration screen is where all the system and beacon parameters are configured. Please consult with TWR before changing any settings.

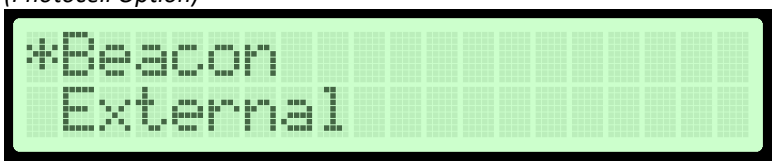
(System Configuration Menu)



3.2.2.35 Photocell (option)

The Photocell option is used to tell the controller what type of photocell will be used to detect the light levels used to switch modes. The two options are **Beacon** and **External**. If set to the **Beacon** option, the system will use the light levels (Lux) reported by each beacon to determine when to switch modes. When configured this way, a majority of the beacon photo sensors must agree in order to switch modes. Setting this option to **External** will use a standard 120VAC photocell attached to the light controller to control when the modes are switched between day and night.

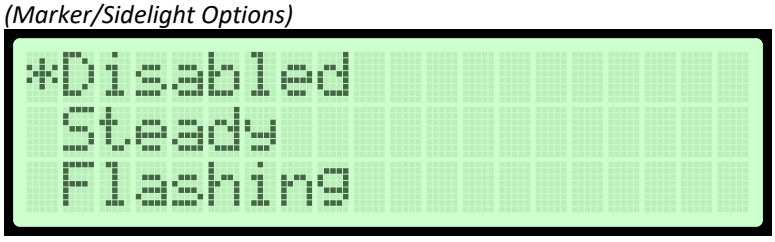
(Photocell Option)



3.2.2.36 Markers/Sidelight (option)

The Markers option is used to tell the controller what mode the L810 side markers will use. The options are **Disabled** (if no markers are connected), **Steady** (steady burn or on solid / not flashing), and **Flashing** (Set if FAA calls for "Avian" markers). The Flashing mode flashes the markers according to the *Marker Period* and *Marker On Time* configuration under the *System Settings* menu and should match the beacon flash rate.

(Marker/Sidelight Options)



3.2.2.37 GPS Sync (option)

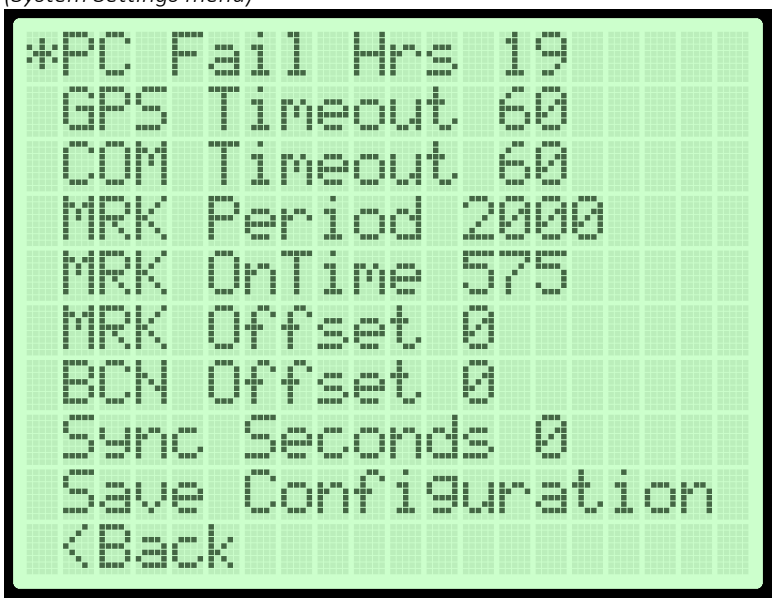
Enables or **Disables** beacon synchronization using the optional GPS Sync module. Enabling this option requires that the **M2** module is installed on the LP01-100 board and that the GPS antenna is installed. The beacons and (flashing/avian) markers can be configured to flash in sync with other lighting systems using the *Sync Seconds*,

BCN Offset, and *MRK Offset* settings in the *System Settings* menu. When this option is enabled, the GPS Alarm will activate if no signal is received from the GPS module within the configured *GPS Timeout* setting.

3.2.2.38 System Settings (submenu)

Depress red select/enter push button to go into the system settings menu where the fail timers, marker timing and offsets, and GPS sync seconds can be configured.

(System Settings menu)



3.2.2.39 PC Fail Hrs. (setting)

This setting configures the number of Hours of not detecting any transition of the photocell before the Photocell (PCEL) Alarm triggers and the PCEL status indicator will light Red. Pressing Select button will display a ":" in front of the hours to indicate edit mode. Use the Up/Down buttons to increase or decrease the value by 1. Pressing the Select button again will change the ":" to ">" indicating the Up/Down buttons now will increase or decrease the value by 5. Press the Select button again to stop editing. The recommended value is between 19 and 24 hours. The valid range is 0-48hr.

3.2.2.40 GPS Timeout (setting)

This setting configures the number of Seconds of not detecting any update from the optional GPS Sync module before the GPS Alarm triggers and the GPS status indicator will light Red. Pressing Select button will display a ":" in front of the seconds to indicate edit mode. Use the Up/Down buttons to increase or decrease the value by 1. Pressing the Select button again will change the ":" to ">" indicating the Up/Down buttons now will increase or decrease the value by 10. Press the Select button again to stop editing. The recommended value is 60 seconds. Valid range is 0-1200s.

3.2.2.41 COM Timeout (setting)

This setting configures the number of Seconds of not detecting any beacon communications over the RS485 connection before the COM Alarm triggers and the COM status indicator will light Red. A beacon communications failure will also trigger a Day and Night alarm just in case the COM alarm is not monitored. The Beacon Status menu will show which beacons are not communicating by showing the beacon as Missing. Pressing the Select button will display a ":" in front of the seconds to indicate edit mode. Use the Up/Down buttons to increase or decrease the value by 1. Pressing the Select button again will change the ":" to ">" indicating the Up/Down buttons now will increase or decrease the value by 10. Press the Select button again to stop editing. The recommended value is 60 seconds. The valid range is 0-600s.

3.2.2.42 MRK Period (setting)

The Marker Period configures how long (in milliseconds) the side markers period (on and off time) will be and is only valid if the markers are set to *Flashing*. The period should be set to the same period as the beacon flash rate (2000 for 30FPM, 3000 for 20FPM, 1500 for 40FPM and 1000 for 60FPM). Pressing Select button will display a ":" in front of the value to indicate edit mode. Use the Up/Down buttons to increase or decrease the value by 25ms. Pressing the Select button again will change the ":" to ">" indicating the Up/Down buttons now will increase or decrease the value by 1ms. Press the Select button again to stop editing. The recommended value is 2000 for avian markers so it will match a beacon set to 30FPM. Valid range is 0-4000ms.

3.2.2.43 MRK OnTime (setting)

The Marker on Time configures how long (in milliseconds) the side markers will be turned on and is only valid if the markers are set to *Flashing*. The on time should be set to the same on time of the beacon. Pressing the Select button will display a ":" in front of the value to indicate edit mode. Use the Up/Down buttons to increase or decrease the value by 25ms. Pressing the Select button again will change the ":" to ">" indicating the Up/Down buttons now will increase or decrease the value by 1ms. Press the Select button again to stop editing. The recommended value is 575 for avian markers so it will match a beacon set to 30FPM. Valid range is 0-3000ms.

3.2.2.44 MRK Offset and BCN Offset (setting)

The Marker and Beacon Offset configures how long (in milliseconds) before the marker and beacon the side markers will be turned on from the GPS Sync start. Pressing the Select button will display a ":" in front of the value to indicate edit mode. Use the Up/Down buttons to increase or decrease the value by 25ms. Pressing the Select button again will change the ":" to ">" indicating the Up/Down buttons now will increase or decrease the value by 1ms. Press the Select button again to stop editing. The recommended value is 0 but can be adjusted to add a sync delay to match other lighting systems. Valid MRK range is -4000ms to +8000ms and BCN range is -1000ms to +4000ms.

3.2.2.45 Sync Seconds (setting)

The Sync Seconds configures which second at which the GPS Sync will be triggered. Pressing the Select button will display a ":" in front of the value to indicate edit mode. Use the Up/Down buttons to increase or decrease the value by 1s. Pressing the Select button again will change the ":" to ">" indicating the Up/Down buttons now will increase or decrease the value by 10s. Press Select button again to stop editing. The recommended value is 0 but can be adjusted to 1 or 59 to sync on an odd second to match other lighting systems if needed. The valid range is 0-59.

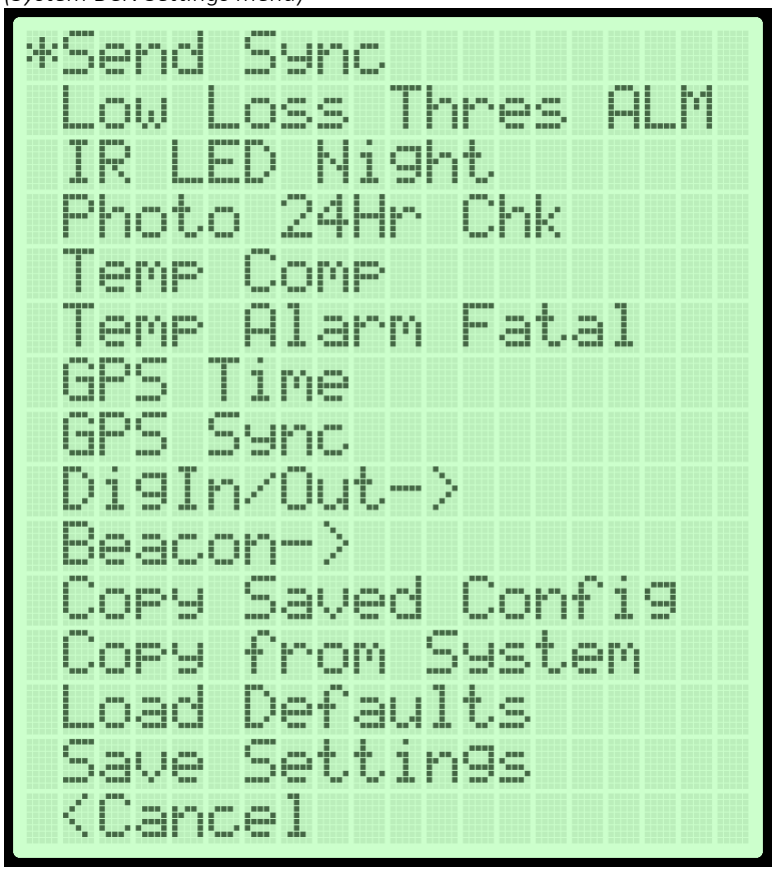
3.2.2.46 Save Configuration (action)

Pressing the Select button will save the current configuration.

3.2.2.47 System BCN Settings (submenu)

Depress red select/enter push button to go into the system beacon settings menu where default beacons settings (FAA operation type, flash sequence, photocell lux, etc.) can be entered. These are only used if you are editing a beacon and select the option "**Copy from System**". This will then copy all these settings over to the current beacon that is being edited and is a way to make sure a beacon has the correct settings if it is ever replaced. All the following descriptions will also apply to the **Configure Beacon** menu and therefore will only be described here.

(System BCN Settings menu)



3.2.2.48 Send Sync (option)

Enables or **Disables** beacon flash synchronization messages between the beacons when communications between the lighting controller (LP01-100) and the beacons is disconnected or has failed. The beacons listen for messages from the controller and if the messages are not received after 10 minutes, the beacons will start sending the sync messages. This option should be Enabled by default.

3.2.2.49 Low Loss Thres ALM (option)

Enables or **Disables** the Low Voltage Power Loss Threshold Alarm when an LED driver experiences 25% voltage loss from the learned value. When enabled this will also cause the LED driver to turn off (if in Red night mode in a dual setup it will switch to the White backup). This option should be Enabled by default.

3.2.2.50 IR LED Night (option)

Enables or **Disables** the use of the IR (infrared) LED Driver at night that helps with better visibility for aircraft pilots using night vision goggles (NVGs) or Aviator Night Vision Image Systems (ANVIS). This option is Enabled by default.

3.2.2.51 Photo 24Hr Chk (option)

Enables or **Disables** the beacon option to check for photocell changes in a 24hr period and will cause a PCEL alarm if a failure is detected. This option is Enabled by default.

3.2.2.52 Temp Comp (option)

Enables or **Disables** the LED Drivers Temperature Compensation. When enabled the voltage of the drivers will be adjusted to account for temperature changes. This option is Enabled by default.

3.2.2.53 Temp Alarm Fatal (option)

Enables or **Disables** the LED Drivers Temperature Alarm if the temperature of the LED assembly is lower or greater than the set thresholds. This option is Disabled by default.

3.2.2.54 GPS Time (option)

Configures the beacon GPS Sync option to use either the **UTC** seconds or **GPS** seconds when the onboard beacon GPS Sync option (when beacon is in standalone mode, not the same as the optional M2 GPS Sync module) is enabled.

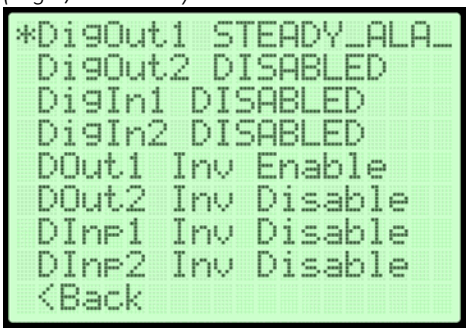
3.2.2.55 GPS Sync (option)

Enables or **Disables** the onboard beacon GPS Sync option (when beacon is in standalone mode, not the same as the optional M2 GPS Sync module). This option is Disabled by default.

3.2.2.56 DigIn/Out (submenu)

Displays the Beacon Digital Input / Output configuration menu. Digital output (labeled as Alarm Out on each beacon) can be configured to indicate a beacon alarm, day/night mode, or disabled.

(DigIn/Out menu)



3.2.2.57 DigOut1/2 (option)

Configures the Digital Out1 and Out2 Outputs (DigOut1 is used for the local beacon alarm). Can be one of the following options:

- **DISABLED** – Output will not function.
- **TOGGLE_W/FLASHCODE** – Output toggles in sync with beacon flash rate.
- **STEADY_ALARM** – Output state will change upon an alarm condition. The polarity can be configured with the DOut1/2 Inv option.
- **ONE_HZ_PULSE_OUT** – Outputs a 1Hz pulse if no alarm exists.
- **DAY_NIGHT_STATUS** – Output state will follow photocell state.
- **PULSE_OUT** – Outputs a pulse sync at the start of each flash cycle.

3.2.2.58 DigIn1/2 (option)

Configures the Digital 1/2 Inputs. Can be one of the following options:

- **DISABLED** – Input will not function.
- **DIMMED_CONTROL** – When active, will use Alternate Intensity.
- **ALTCODE_DIMMED** – When active, will use alternate flash code ‘Alt1’ and Alternate Intensity.
- **USE_ALTCODE** – When active, will use alternate flash code ‘Alt1’

- **FORCEOFF_STD_SIG** – When active, this will force the lamp off.
- **FORCEOFF_1HZ_SIG** – When a 1Hz signal is present, this will force the lamp off

3.2.2.59 DOut1/2 Inv (option)

Inverts the polarity of the Digital Output when enabled (making the output Normally Closed). Default value: Enabled.

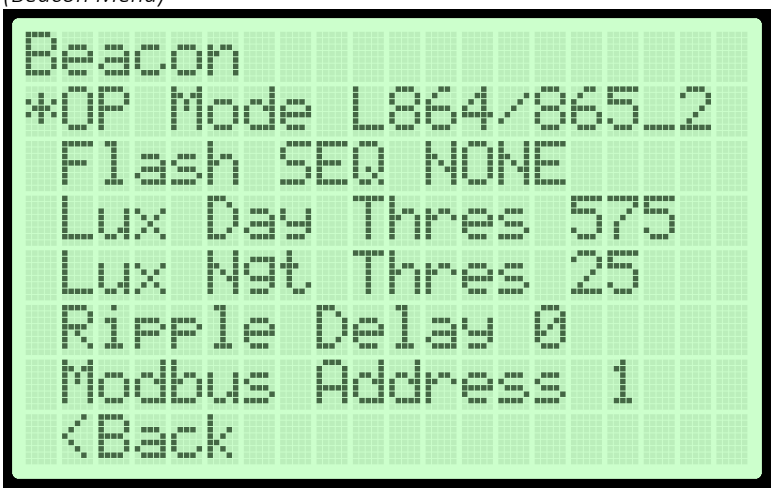
3.2.2.60 DInp1/2 Inv (option)

Inverts the polarity of the Digital Input when enabled. Default value: Disabled.

3.2.2.61 Beacon (submenu)

Displays the Beacon configuration menu. Used to set the FAA Beacon Type (operating mode), Flash Sequence (catenary), Day/Night Lux Threshold (photocell transition points), and Ripple Delay (flash delay).

(Beacon Menu)



3.2.2.62 OP Mode (option)

Configures the Digital Out1 and Out2 Outputs (DigOut1 is used for the local beacon alarm). Can be one of the following options:

- **L865 40fpm** – White only 40FPM
- **L866 60fpm** – White only 60FPM
- **L864/865_1 20/40fpm** – Dual Red/White 20FPM Night / 40FPM Day
- **L864/865_2 30/40fpm** – Dual Red/White 30FPM Night / 40FPM Day
- **L864/865_3 40/40fpm** – Dual Red/White 40FPM Night / 40FPM Day
- **L864/865_4 STDY/40** – Dual Red/White Steady Night / 40FPM Day
- **L864/866_1 60/60fpm** – Dual Red/White 60FPM Night / 60FPM Day
- **L864/866_2 STDY/60** – Dual Red/White Steady Night / 60FPM Day
- **WHT ONLY** – White (do not use, testing only)
- **RED ONLY** – Red (do not use, testing only)

3.2.2.63 Flash SEQ (option)

Configures the Flash Sequence of this beacon (mainly used on a Catenary setup). Can be one of the following options:

- **NONE** – Delay time will be defined by the **Ripple Delay** field.

- **MID** – Middle beacon. No delay.
- **TOP** – Top beacon. Delay of 1 x (1/13 of flash cycle), from start of Middle beacon.
- **BOT** – Bottom beacon. Delay of 3 x (1/13 of flash cycle), from start of Middle beacon.

3.2.2.64 Ripple Delay (setting)

Configures the beacon flash delay from sync command in 50ms increments. This delay is only used if the **Flash SEQ** setting is set to **NONE**. For example: to delay the flash of the beacon by 150ms set the Ripple Delay to a value of 3 (3 x 50ms = 150ms).

3.2.2.65 Modbus Address (setting)

Configures the beacon's Modbus address used in communications over the RS485 network. This address must be unique between the beacons and recommend setting the top beacon to address 1 then the next level down to address 2 and so on. This address is also used to identify each beacon on the LCD menu. BCN1 would be using Modbus Address 1, BCN2 address 2, etc.

3.2.2.66 Copy Saved Config (option)

This option is only available in the **Configure Beacon** menu. After being prompted if you wish to proceed, this option will load all the settings that have been previously saved when this beacon was previously edited, allowing you to edit those settings and then optionally send them to the beacon. This option can be used to load the saved settings if a beacon has been replaced and you would like to make sure it has the same settings as before.

3.2.2.67 Copy From System (option)

This option is only available in the **Configure Beacon** menu. After being prompted if you wish to proceed, this option will load all the settings that have been saved to the **System BCN Settings**, allowing you to edit those settings and then optionally send them to the beacon. This option can be used to load the saved settings if a beacon has been replaced and you would like to make sure it has the same settings as before.

3.2.2.68 Load Defaults (option)

This option will load the default beacon settings programmed into the firmware (L864/865) and allow you to edit them then Save them (to the beacon and memory). You will be prompted if you wish to proceed before the defaults are loaded.

3.2.2.69 Save Settings (option)

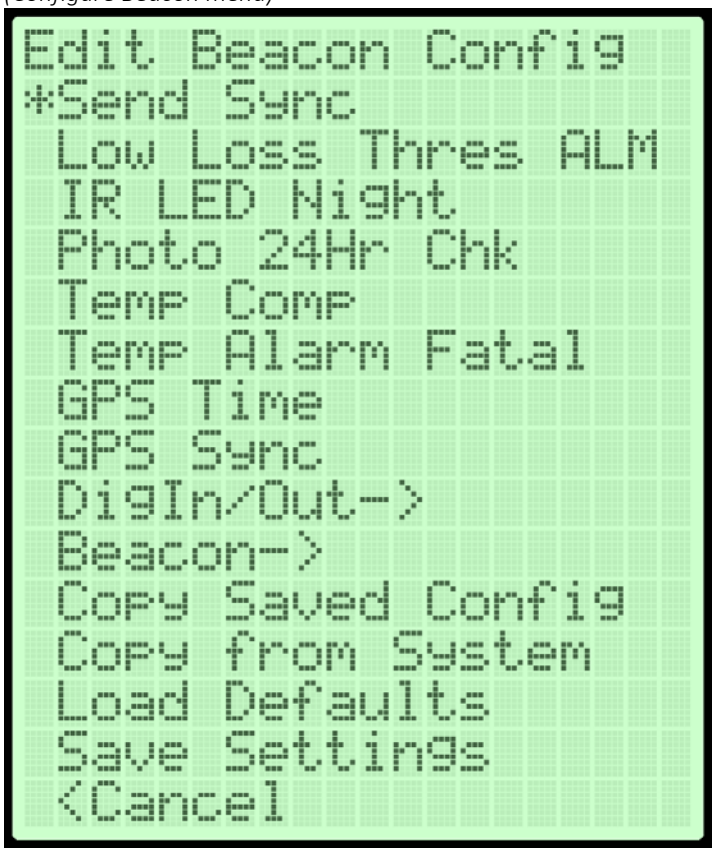
If the System BCN Settings are being edited this option will save them to non-volatile memory. The System BCN Settings are only used when editing a beacon and select the "**Copy from System**" option which will then load the System BCN Settings and use them for the current beacon being edited.

If a beacon is being edited using the Configure Beacon menu, the Save Settings option will first check to see if the beacon Modbus Address has changed. If it detects that the address changed, the system will send a message to the beacon telling it to change to the new address. Once the settings have been saved to non-volatile memory, the settings are sent to the beacon being edited and take effect immediately.

3.2.2.70 Configure Beacon (submenu)

Depress red select/enter push button to go into the configure beacon menu. This is where the beacon settings (FAA operation type, flash sequence, photocell lux, etc.) can be edited. See the field descriptions above under the **System BCN Settings** menu.

(Configure Beacon menu)



3.2.2.71 Save Settings (action)

This action saves all the configuration to non-volatile memory where it is loaded on boot. This does not write the configuration to the beacons, that should be done with the Save Settings option under the **Config Beacon** menu after you edit each beacon.

3.2.3 PCB LED Indicators

The Star controller LED indicators provide a quick visional of lighting system condition.

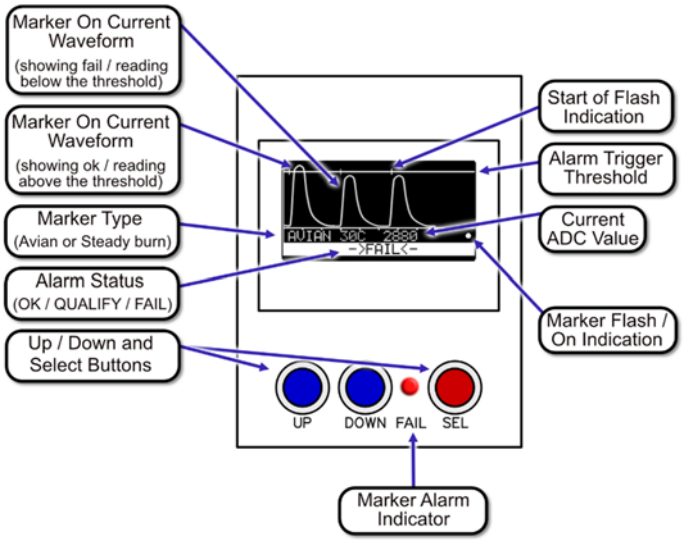
- **STATUS** = Beacon Sync – illuminated amber when the “sync” message is sent to the beacons.
- **GPS PPS** = GPS Sync pulse – illuminated green when the satellite sync pulse is received from the optional GPS Sync Module. This sync pulse is used to synchronize the flashing of beacons on multiple towers.
- **RXD / TXD** = Beacon data – the RXD and TXD indicators will blink when data is either received “RXD” from or transmitted “TXD” to the beacons over the RS485 port.
- **MKR** = Marker/Sidelight - illuminated red a marker/sidelight is currently in the “failure” state and not illuminated the markers are “off” or “ok”
- **COM** = Communications with Light - illuminated red is a “failure” of communications to one or more of the beacons. Not illuminated means beacon communications are “ok”
- **GPS** = Global Positioning System (optional) - illuminated red indicates a “failure” in receiving either the GPS 1PPS or the time packets. Not illuminated is “not active” or “ok”
- **PCEL** = Photocell - illuminated red indicates a “failure” in detecting any change in the photocell state within the programmed time period (defaults to 19 hours) or the Manual Mode switch / override menu option is not in the “Auto” mode. Not illuminated is “ok”

- **3.3V** = Board 3.3V Power - illuminated green “good” when the board voltage regulator is putting out the 3.3V needed to power up. Not illuminated or “off” means the board does not have main power or the 3.3V regulator is not working.
- **PWR** = Board powered and processor running - illuminated green “good” when the processor boots and starts running. Not illuminated would indicate a power or processor / firmware issue.
- **RF** = Red Fail - illuminated red “fail” when a red beacon failure is detected. Not illuminated or “off” means the red beacon is ok.
- **WF** = White Fail - illuminated red “fail” when a white beacon failure is detected. Not illuminated or “off” means the white beacon is ok.
- **NGT** = Night Mode - illuminated amber when the system is in “night” mode. Not illuminated or “off” means the system is in Day mode.

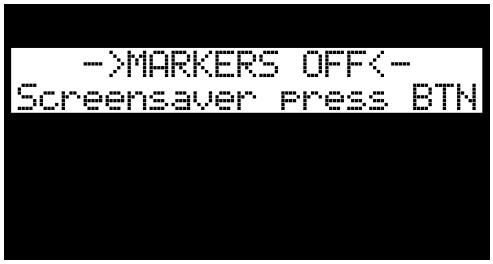
3.3 MARKER / SIDELIGHT SENSOR (Part # STARSF-CS)

3.3.1 Screen and controls

Press and hold the SEL button to display the main menu.
The UP / DOWN buttons can be used to adjust the alarm threshold from the graph screen if the option ‘Allow Manual Change’ is set to ‘Y’.
The red fail LED will blink to indicate an alarm is qualifying and go solid when there marker alarm.



3.3.1.1 **The screensaver** shows after 15 minutes to help stop image burn-in. Press the red SEL to show the activity graph:

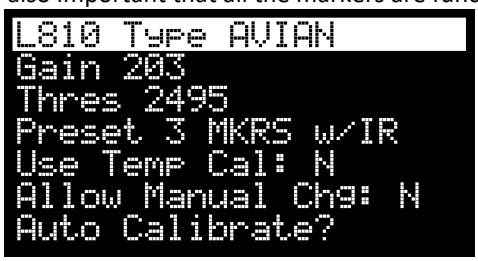


3.3.1.2 **Main menu.** Use the UP / DOWN buttons to move through the items and press SEL to go into submenu or change an item. Status, Internal Temperature, Calibration Temperature and Adjustment are all read only status.



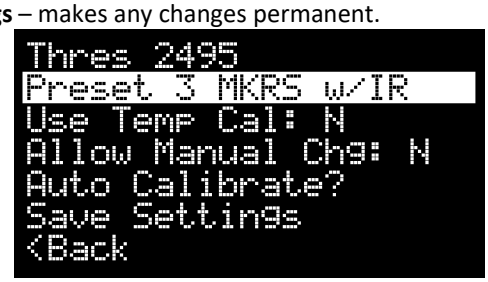
3.3.1.3 Settings menu.

- **L810 Type** - option to set the markers type to Avian (flashing) or Steady. The correct type must be selected for the correct alarm detection. Press the SEL button then use the UP/DOWN buttons to change.
- **Gain** - adjusts the current detection amplification and should only be manually adjusted if instructed by TWR Technical support.
- **Thres** (alarm threshold) - sets the level at which below is considered an alarm condition and is usually set by selecting a preset or using the auto calibration option.
- **Preset** – pressing SEL will allow you to pick from 1 to 6 marker presets (bulb count) and sets the correct gain and threshold for the selection. This is also used when the Auto Calibration option is selected.
- **Use Temp Cal** – should not be used at this time. Default is 'N'
  Allow Manual Change – when set to 'Y' will allow the alarm threshold to be adjusted manually using the UP / DOWN buttons from the graph screen.
- **Auto Calibration** – This option will select the optimal gain and alarm threshold. It is very important to have the correct number of installed markers selected using the Preset option before running auto calibrate. It is also important that all the markers are functional during the calibration.

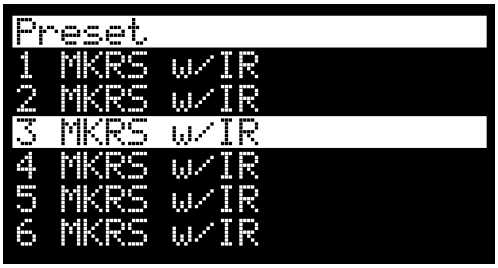


Settings menu (continued)

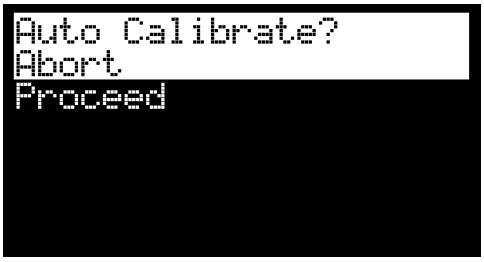
- **Save Settings** – makes any changes permanent.



- **Preset** – selects the number of markers installed.



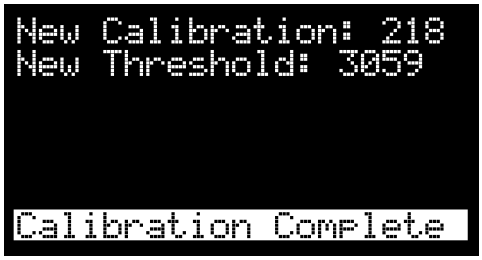
- **Auto Calibration** proceed / abort option – Selecting Proceed will run the auto calibration routine. Select Abort to cancel the calibration.



Auto Calibration warning:



- **Auto Calibration complete**. Press the SEL button to accept and save the settings or press UP button to cancel the save.



3.4 BEACON LIGHT (Part # LONESTAR)

3.4.1 Beacon power

TWR uses a single composite PVC cable (LCABLE-1) to provide power (120-240VAC) and data communication to beacon. Refer to drawing toward the back of this manual.

4 MAINTENANCE

4.1 TROUBLESHOOTING

4.1.1 STAR CONTROLLER (Part # LC-STAR)

4.1.1.1 No Power:

1. Check the 5amp or 10amp fuse/breaker “L” at input power.
2. Check that AC power is present at the top of fuse/breaker “L:” and that AC power is present at the AC-DC power supply and green indicator is lit.
3. Check for 24VDC output from AC-DC power supply over to “Power In” terminal on control board LP01-100 and green power indicator is lit.
4. Check for any damaged or obvious power surges on control board LP01-100.
5. Try resetting or power cycling the LC-Star controller.

4.1.1.2 No Mode Change (Beacon Photocell)

1. Check that the mode override switch on control board LP01-100 is in “Auto”.
2. Check the Mode under System Status Menu and see what mode the system is in. Should be set to Auto Day/Auto Night. If it shows Night or White backup, then there is a Red Beacon Alarm or a Photocell Alarm and will need to be switched to the backup mode. If it is a photocell alarm the PCEL alarm LED will be lit (or if in any manual override).
3. If manual override is shown (MAN xxx or FORCED xxx) then check under the Maintenance menu and make sure the Mode OVR is ser to Auto/PCL (auto photocell mode).
4. Check that all beacons are communicating and do not have a red alarm that will put the system in the backup mode.

4.1.1.3 No Mode Change (External Photocell)

1. Check that the mode override switch on control board LP01-100 is in “Auto”.
2. Check the Mode under System Status Menu and see what mode the system is in. Should be set to Auto Day/Auto Night. If it shows Night or White backup, then there is a Red Beacon Alarm or a Photocell Alarm and will need to be switched to the backup mode. If it is a photocell alarm the PCEL alarm LED will be lit (or if in any manual override).
3. If manual override is shown (MAN xxx or FORCED xxx) then check under the Maintenance menu and make sure the Mode OVR is ser to Auto/PCL (auto photocell mode).
4. Check that the photocell input changes between 120VAC (in night mode) and 0VAC in day mode.

4.1.1.4 Marker Alarm:

1. Check that the system is configured for Markers under System Configuration screen (options are Disabled, Steady, and Flashing).
2. Check that the markers are visually on in night mode (you may have to use the mode override if using Flashing markers since a marker failure would cause the system to go into white backup).
3. Check the “S” fuse/breaker.
4. Check that the STARSF-CS cable is plugged into the EXP2 connector properly.
5. Check that the current sensor is powered when in night mode.
6. Check that the current sensor settings are correct.
7. Check that you have power going up to the markers when in night mode.

4.1.1.5 System in White Backup at night:

1. Check for Avian (flashing) Marker failure.
2. Check for beacon alarms (Red or IR Driver / LED errors).
3. Check the Mode OVR setting under the Maintenance screen.

4.1.1.6 GPS Failure:

1. Check that the GPS Sync option is enabled.
2. Check that the GPS module is installed and seated firmly.
3. Check that the GPS antenna cable is screwed on correctly and the antenna has a clear view of the sky.
4. Check the GPS Status under the System Status menu and verify that is has three or more satellites in view.
5. Power cycle controller.

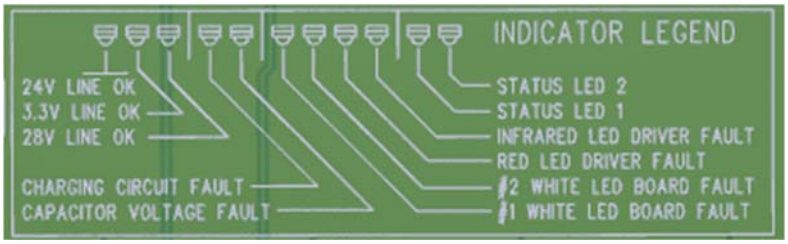
4.1.1.7 Beacon Alarms:

1. Check the number of beacons to be correct at the top of the System Status screen.
2. Check that the TXD 485 light is flashing regularly. If it flashes, the RXD 485 should also flash in return indicating that there is comms on the RS485 lines.
3. Check that the configured beacons are showing under the System Status Beacon Info screen. If they are missing, then check the power to the beacons.
4. Make the resistance readings on the RS485 lines.
5. Check if any beacons respond to the POLL option under the Maintenance screen. If they are present, but with different Modbus ID's may be lost configuration or unconfigured replacement.

4.1.2 BEACON LIGHT (Part # LONESTAR)

4.1.2.1 LED Indicators

1. Lonestar Beacon Indicator Legend:



This legend is located on the main PCB in the base of the Lonestar Beacon. The corresponding LED indicators are located on the LP02-101 PCB.

Call TWR Technical Support 713-973-6905 Ext. #6

4.2 MAJOR COMPONENTS PARTS LIST

No spare parts are expected to be needed during the warranty period nor during the commissioning procedure. In case a site requires maintaining some spare parts at hand, the 'SP' marked parts can be bought in advance.
The warranty statement as written in this manual is applicable during the installation and commissioning procedure and daily operation.

QTY.	DESCRIPTION	PART NUMBER	SP
2	1 AMP FUSE	KTK-1	Y
4	5 AMP FUSE (Fuse holder L & B)	FLM-5	Y
2	10 AMP FUSE	FNQ-10	Y
1	SURGE PROTECTOR	DS240S-230/G	Y
1	STAR CONTROLLER MAIN PCB - ASM	LPA1-100	N
1	STAR CONTROLLER ETHERNET PCB	LP03-100 (OPTIONAL)	N
1	CONTROLLER POWER SUPPLY	MDR-20-24	N
1	STAR OL1 SYNCHRONIZED FLASHER	STARSF-CS	N
4	END STOP	8WA1808	N
3	FUSE HOLDER	USM-1	N
13	PHOENIX "ST4" SERIES TERMINALS	CX4XXX	N
1	WIRELESS MODEM RV50	MODEM RV50-LTE (OPTIONAL)	N
1	EXTERNAL PHOTOCELL (DEFAULT IN LONESTAR BEACON)	6390-FAA (OPTIONAL)	N
1	TERMINAL BLOCK ASSEMBLY	G1002470	N
1	LONESTAR BEACON MAIN PCB	LP01-101	N
1	BEACON PC CONTROL & MONITORING PCB	LP02-101	N
1	LONESTAR BEACON POWER SUPPLY	LP03-101	N
1	LONESTAR BEACON CAPACITOR CHARGER PCB	LP04-101	N
2	LONESTAR BEACON WHITE LED DRIVER PCBs	LP05-101	N
1	LONESTAR BEACON RED-IR LED DRIVER PCB	LP06-101	N
1	560,000UF CAPACITOR	STB99016	N
1	POWER SUPPLY PCB	LP01-103	N
1	LED LIGHT ENGINE ASSEMBLY (LONESTAR BEACON TOP)	LE-LONESTAR	N
1	GPS PCB	LP01-102 (OPTIONAL)	N
1	MOV ON MDR-20-24 (N4 & L5)	V20E320P	Y

5 WARRANTY AND RETURN POLICY

TWR Lighting®, Inc. (“TWR®”) warrants its products (other than “LED Product”) against defects in design, material (excluding incandescent bulbs) and workmanship for a period ending on the earlier of two (2) years from the date of shipment or one (1) year from the date of installation.
TWR Lighting®, Inc. (“TWR®”) warrants its “LED Product” against defects in design, material, and workmanship for a period of five (5) years from the date of shipment. TWR®, at its sole option, will, itself, or through others, repair, replace or refund the purchase price paid for “LED Product” that TWR® verifies as being inoperable due to original design, material, or workmanship. All warranty replacement “LED Product” is warranted only for the remainder of the original warranty of the “LED Product” replaced. Replacement “LED Product” will be equivalent in function, but not necessarily identical, to the replaced “LED Product.”

TWR Lighting®, Inc. (“TWR®”) warrants its “LED Product” against light degradation for a period of five (5) years from the date of installation. TWR®, at its sole option, will, itself, or through others, repair, replace or refund the purchase price paid for “LED Product” that TWR® verifies as failing to meet 75% of the minimum intensity requirements as defined in the FAA Advisory Circular 150/5345-43G dated.
09/26/12. All warranty replacement “LED Product” is warranted only for the remainder of the original warranty of the “LED Product” replaced. Replacement “LED Product” will be equivalent in function, but not necessarily identical, to the replaced “LED Product.”
Replacement parts (other than “LED Product”) are warranted for 90 days from the date of shipment.
Conditions not covered by this Warranty, or which might void this Warranty are as follows:

- x Improper Installation or Operation
- x Misuse
- x Abuse
- x Unauthorized or Improper Repair or Alteration
- x Accident or Negligence in Use, Storage, Transportation, or Handling
- x Any Acts of God or Nature
- x Non-OEM Parts

The use of non-OEM parts or modifications to original equipment design will void the manufacturer warranty and could invalidate the assurance of complying with FAA requirements as published in Advisory Circular 150/5345-43.

Field Service – Repairs are warranted for 90 days from the date of service, except where TWR® has made recommendations that were not adhered to that may cause premature failure on previous repairs. Labor, Travel, and Tower Climb are not covered under warranty. The customer shall be obligated to pay for all incurred charges not related to warranty. All warranty repairs are performed by trained TWR® personnel or dispatched through an extensive network of certified and insured Service Representatives.
Return Terms – You must first contact our Customer Service Department at 713-973-6905 to acquire a Return Merchandise Authorization (RMA) number to return the product(s). Please have the following information available when requesting an RMA number:

- x The contact name and phone number of the tower owner
- x The contact name and phone number of the contractor
- x The site name and number
- x The part number(s)
- x The serial number(s) (if any) x A description of the problem x The billing information
- x The Ship To address

Warranty& Return Policy

(continued)

This RMA number must be clearly visible on the outside of the box. If the RMA number is not clearly labeled on the outside of the box, your shipment will be refused. Please ensure the material you are returning is packaged carefully. The warranty is null and void if the product(s) are damaged in the return shipment.
All RMAs must be received by TWR LIGHTING®, INC., 15102 Sommermeyer St Suite 125- Houston, TX 77041, within 30 days of issuance.
Upon full compliance with the Return Terms, TWR® will replace, repair and return, or credit product(s) returned by the customer. It is TWR's sole discretion to determine the disposition of the returned item(s).
Replacements – Replacement part(s) will be shipped and billed to the customer for product(s) considered as Warranty, pending return of defective product(s). When available, a certified reconditioned part is shipped as warranty replacement with a Return Merchandise Authorization (RMA) number attached. Upon receipt of returned product(s), inspection, testing, and evaluation will be performed to determine the cause of defect. The customer is then notified of the determination of the testing.

- x Product(s) that is deemed defective and/or unrepairable and covered under warranty - a credit will be issued to the customer's account.
- x Product(s) found to have no defect will be subject to a $75.00 per hour testing charge (1 hour minimum), which will be invoiced to the customer. At this time, the customer may decide to have the tested part(s) returned and is responsible for the return charges.
- x Product(s) under warranty, which the customer does not wish returned, the customer will be issued a credit against the replacement invoice.

Repair & Return – A Return Merchandise Authorization (RMA) will be issued for all part(s) returned to TWR® for repair. Upon receipt of returned product(s), inspection, testing and evaluation will be performed to determine the cause of defect. The customer is then notified of the determination of the testing. If the returned part(s) is deemed unrepairable, or the returned part(s) is found to have no defect, the customer will be subject to a $75.00 per hour testing charge (1 hour minimum), which will be invoiced to the customer. Should the returned parts be determined to be repairable, a written estimated cost of repair will be sent to the customer for their written approval prior to any work being performed. To have the tested part(s) repaired and/or returned, the customer must issue a purchase order and is responsible for the return shipping charges.
Return to Stock – Any order that is returned to TWR® for part(s) ordered incorrectly by the customer, or unneeded upon receipt, the customer is required to pay a 20% restocking fee. A credit will be issued once it is determined that the Return Terms are met.
Credits – Credits are issued once it is determined that all the Warranty and Return Terms are met. All credits are processed on Fridays. In the event a Friday falls on a Holiday, the credit will be issued on the following Friday.
Freight – All warranty replacement part(s) will be shipped via ground delivery and paid for by TWR®. Delivery other than ground is the responsibility of the customer.

Warranty& Return Policy

(continued)

REMEDIES UNDER THIS WARRANTY ARE LIMITED TO PROVISIONS OF REPLACEMENT PARTS AND REPAIRS AS SPECIFICALLY PROVIDED. IN NO EVENT SHALL TWR® BE LIABLE FOR ANY OTHER LOSSES, DAMAGES, COSTS OR EXPENSES INCURRED BY THE CUSTOMER, INCLUDING, BUT NOT LIMITED TO, LOSS FROM FAILURE OF THE PRODUCT(S) TO OPERATE FOR ANY TIME, AND ALL OTHER DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING ALL PERSONAL INJURY OR PROPERTY DAMAGE DUE TO ALLEGED NEGLIGENCE, OR ANY OTHER LEGAL THEORY WHATSOEVER. THIS WARRANTY IS MADE BY TWR® EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED. WITHOUT LIMITING THE GENERALITY OF THE FORGOING, TWR® MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS OF THE PRODUCT(S) FOR ANY PARTICULAR PURPOSE. TWR® EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES.

5.1 RMA FORM

RMA-Form

		RETURN MATERIAL AUTHORIZATION FORM
		Please send this form together with the defect product to TWR Lighting, Inc.
TWR Lighting, Inc. reference RMA #	:	
Date (mm-dd-yyyy)	:	
Number of pages	:	1 of
Customer name	:	
Contact person	:	
Delivery address	:	TWR Lighting, Inc., 15102 Sommermeyer St Suite 125- Houston, TX 77041
Department	:	Service
Telephone	:	(713) 973-6905
Fax	:	(713) 973-9352
Dear customer,		
Please fill in this form completely and return it to the above fax number without indicating an RMA number. The RMA number will be immediately generated by us. Please complete the following questions. **Use one sheet for each item that is returned.**		
Customer reference RMA nr.	:	
Site location	:	
Product type	:	
Serial number	:	
Reason for return delivery	:	
Initial TWR Lighting, Inc. PO (order) number	:	
Warranty claimed	:	Yes / No
Replacement product needed in advance?	:	Yes / No
Inspection costs in the amount of $75.00 will be charged for each product. When a replacement product is ordered, the inspection cost will be calculated in the price.		

6 Technical Drawings

6.1 CONTROLLER

6.1.1 LC-STAR CHASSIS LAYOUT AND SCHEMATIC (DRAWING #LC-100)

6.2 LIGHTING KITS

6.2.1 LE11-3A LIGHTING KIT (DRAWING #LK-101)

6.2.2 LE23-0A LIGHTING KIT (DRAWING #LK-401)

6.3 BEACON AND SIDELIGHT DETAIL

6.3.1 LONESTAR MAJOR COMPONETS DETAIL (DRAWING #101187)

6.3.2 SIDELIGHT L810 DETAIL (DRAWING #100657)

6.3.3 SIDELIGHT MOUNTING DETAIL (DRAWING #101138)

6.4 JUNCTION BOX AND CABLE DETAIL

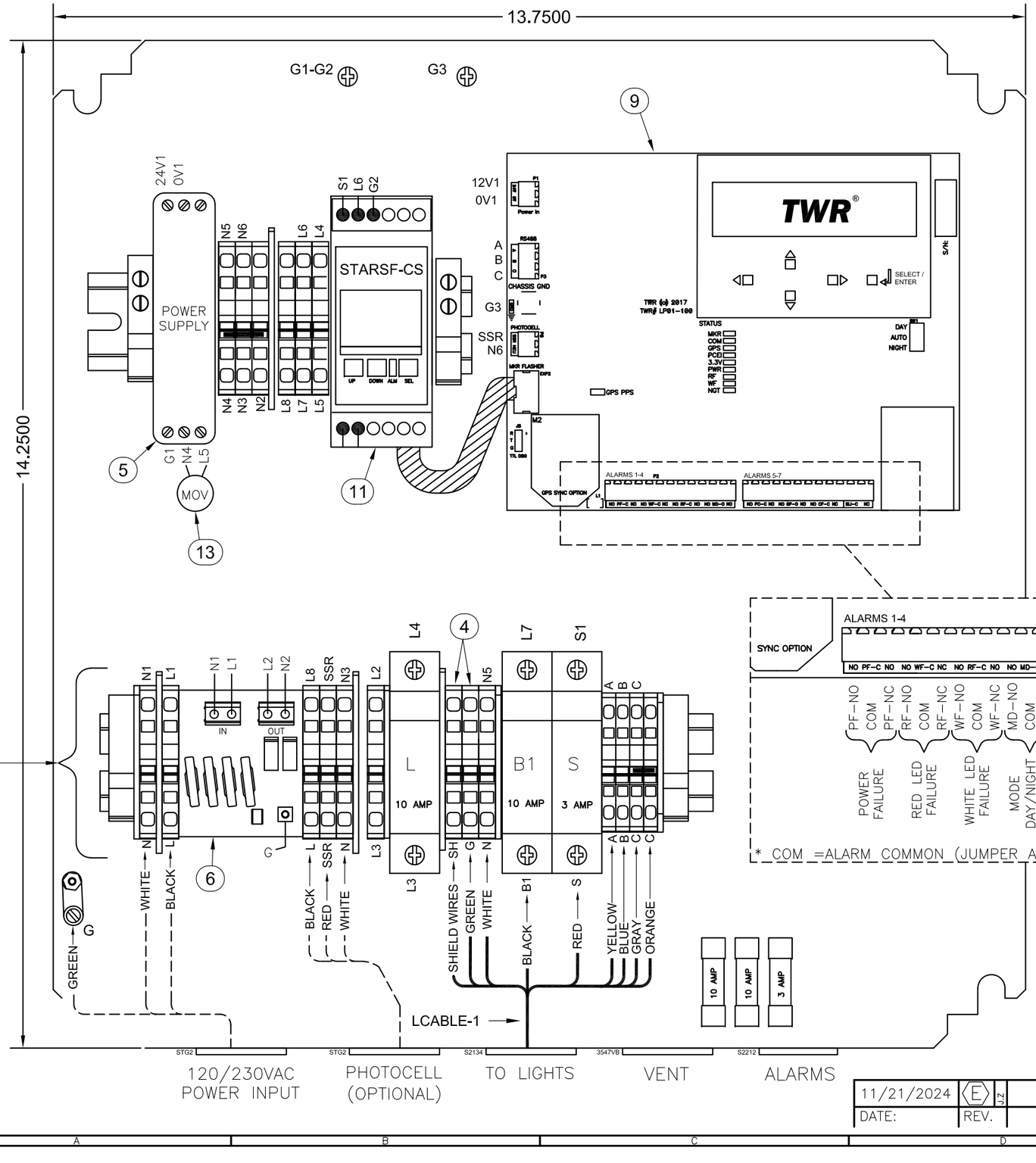
6.4.1 JUNCTION BOX MOUNTING DETAIL (DRAWING #101180)

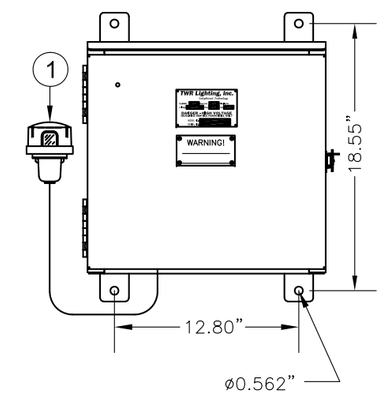
6.4.2 LCABLE-1 DETAIL (DRAWING #F01-112SL)

6.4.3 LCABLE-2 DETAIL (DRAWING #F01-113SL)

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6390-FAA	EXTERNAL PHOTOCELL (OPTIONAL)
2	4	CX2.5	5mm 2 POSITION SPRING CLAMP TERMINAL
3	13	CX4	6mm 2 POSITION SPRING CLAMP TERMINAL
4	2	CXG4	GROUNDING TERMINAL
5	1	MDR-20-24	POWER SUPPLY 120/240VAC TO 24VDC
6	1	LP02-107	SURGE SUPPRESSOR
9	1	LPA1-100	LC-STAR CONTROL & DISPLAY ASSY
11	1	STARSF-CS	SYNCHRONIZED FLASHER W/ CURRENT SENSOR
12	3	USM-1	FUSE HOLDER
13	1	V20E320P	MOV 320Vrms,840V,10kA,20mm

NOTES:
1) THIS DRAWING IS PROVIDED AS GENERAL REFERENCE. TWR LIGHTING INC. DOCUMENTATION SUPERCEDES THIS DRAWING AND SHOULD BE REVIEWED PRIOR TO INSTALLATION OF THIS SYSTEM.
2) WIRES ARE CONNECTED LETTER TO LETTER, N1 TO N1, N2 TO N2 ETC.
3) INPUT POWER SHOULD BE PER NEC.
4) ENCLOSURE GROUND STUD TO BE BONDED TO GROUND NETWORK.





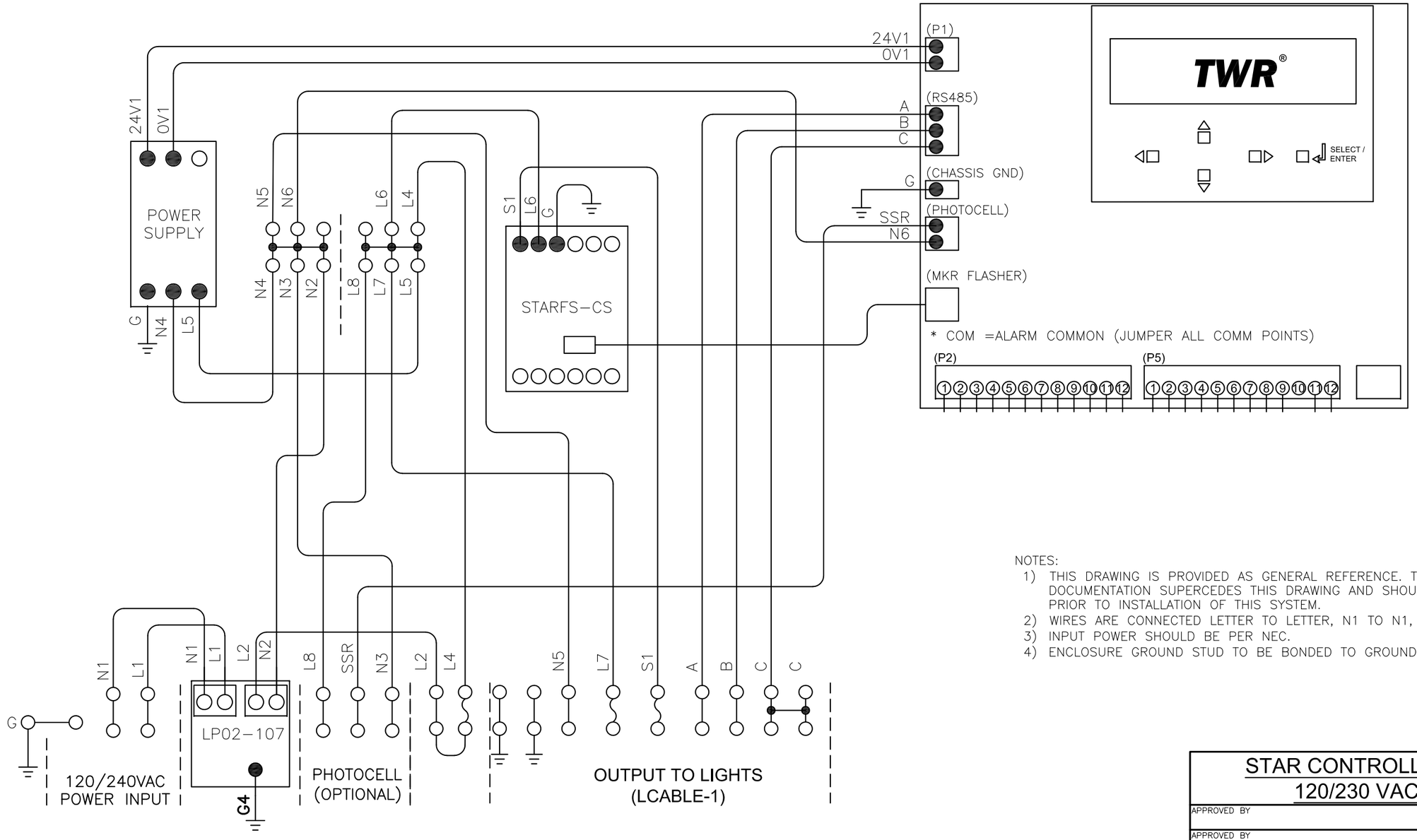
ENCLOSURE MOUNTING DIMENSIONS

STAR CONTROLLER (LC-STAR)
120/230 VAC 50-60Hz

APPROVED BY			
APPROVED BY			
APPROVED BY	Sam Trenchard		
DRAWN BY	J.ZAMORANO	SIZE B	SHEET QTY. 1 OF 2
DATE	09/01/2023	SCALE N.T.S.	DWG. NO. LC-100

DATE:	REV.	DESCRIPTION
11/21/2024	E	UPDATED SURGE PROTECTION

The use of non-OEM parts or modifications to original equipment design will void the manufacturer warranty and could invalidate the assurance of complying with FAA requirements as published in Advisory Circular 150/5345-43.
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NOTES:

1) THIS DRAWING IS PROVIDED AS GENERAL REFERENCE. TWR LIGHTING INC. DOCUMENTATION SUPERCEDES THIS DRAWING AND SHOULD BE REVIEWED PRIOR TO INSTALLATION OF THIS SYSTEM.
2) WIRES ARE CONNECTED LETTER TO LETTER, N1 TO N1, N2 TO N2 ETC.
3) INPUT POWER SHOULD BE PER NEC.
4) ENCLOSURE GROUND STUD TO BE BONDED TO GROUND NETWORK.

STAR CONTROLLER (LC-STAR)
120/230 VAC 50-60Hz

11/21/2024	E	J.Z	UPDATED SURGE PROTECTION
DATE:	REV.		DESCRIPTION

APPROVED BY

APPROVED BY

APPROVED BY Sam Trenchard

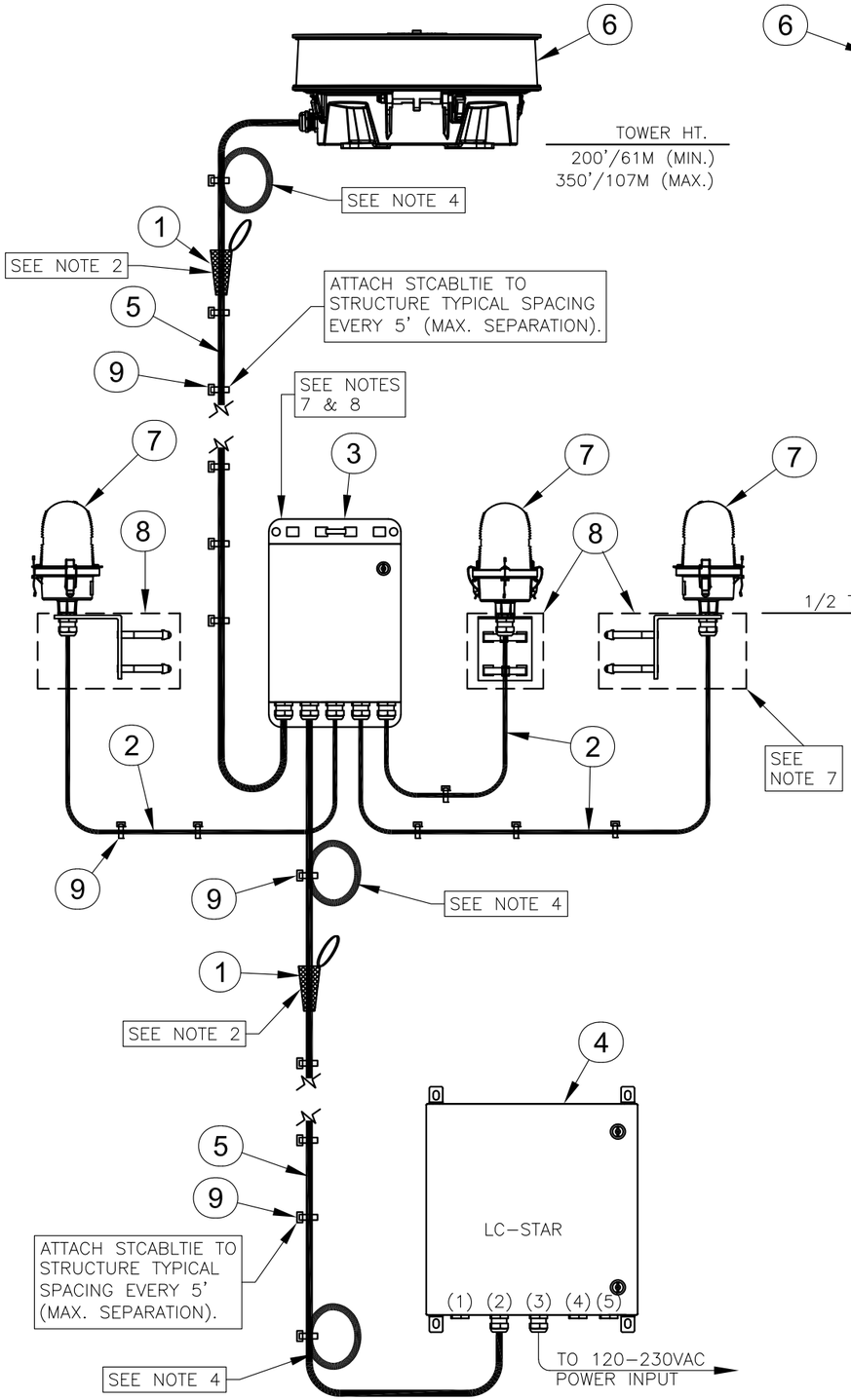
DRAWN BY J.ZAMORANO | SIZE B | SHEET QTY. 2 OF 2

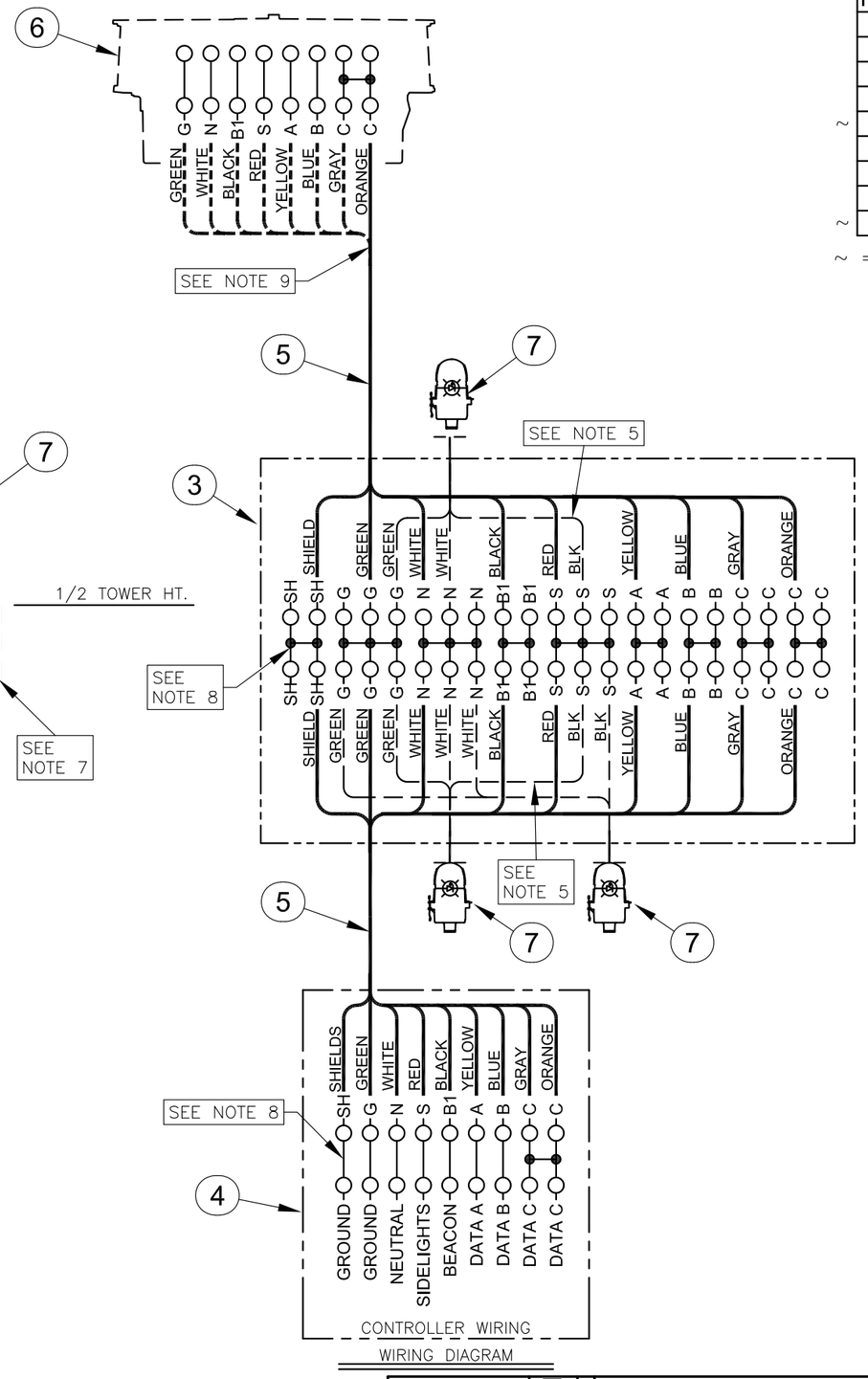
DATE 09/01/2023 | SCALE N.T.S. | DWG. NO. LC-100

TWR Lighting Technologies

The use of non-OEM parts or modifications to original equipment design will void the manufacturer warranty and could invalidate the assurance of complying with FAA requirements as published in Advisory Circular 150/5345-43.

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BILL OF MATERIALS				
ITEM	QTY	UNITS	NAME	DESCRIPTION
1	2	ea	CABLEGRIP3	SINGLE EYE LACE MESH 0.63"-0.74"
2	40	ft	CSO14/3	14AWG / 3-CON. S.O. CORD (FOL OLs)
3	1	ea	JBS	UNIVERSAL MOUNTED JUNCTION BOX
4	1	ea	LC-STAR	STAR LIGHTING CONTROLLER
~ 5	0	ft	LCABLE-1	POWER & DATA CABLE (TWR HT. + 65')
6	1	ea	LONESTAR	L864/L865 DUAL LED BEACON
7	3	ea	OL1LED	L-810 LED SIDELIGHT
8	3	ea	OLMOUNTKIT	UNIVERSAL OL MOUNTING KIT
~ 9	0	ea	STCABLTIE	STROBE CABLE TIES (TWR HT. ÷ 5 + 20)

~ = ITEMS QUANTITY CALCULATED ACCORDING TO STRUCTURE HEIGHT.

NOTES:
1) THIS DRAWING IS PROVIDED AS A GENERAL REFERENCE. TWR LIGHTING, INC. DOCUMENTATION SUPERSEDES THIS DRAWING & SHOULD BE REVIEWED PRIOR TO INSTALLATION OF THIS SYSTEM.
2) CABLEGRIP3 IS USED TO SUPPORT CABLE BEFORE CORD CONNECTOR AND SERVICE LOOP, THE SINGLE EYE LOOP SHOULD BE ATTACHED TO STRUCTURE SECURELY.
3) IF MOUNT IS NEEDED FOR BEACON USE P/N BMSIDE-1.
4) IT IS RECOMMENDED TO INSTALL A SERVICE LOOP PRIOR TO EVERY JUNCTION BOX AND CONTROLLER CONNECTION.
5) BLACK WIRE FROM SIDELIGHTS CONNECTS TO RED TERMINALS
6) LIGHTING CABLES ARE TO BE SUPPORTED OVER TOWER FLANGES TO ENSURE THAT THEY DO NOT RUB OR BREAK OPEN.
7) USE P/N HC6-10 TO SECURE JUNCTION BOX AND SIDELIGHT ASSEMBLY TO STRUCTURE. REFER TO DRAWINGS 101180 & 101138 FOR MORE DETAIL.
8) BARE SHIELD WIRES NEED TO BE TERMINATED IN CONTROLLER AND JUNCTION BOXES.
9) BARE SHIELD WIRES NEED TO BE CUT FLUSH WITH CABLE PVC OUTER JACKET IN EACH BEACON (NOT TERMINATED).

POWER CONSUMPTION

- ✓ 12hrs day - 4.0/LC-STAR + 32.0/L865 + 0.0/L810 (36 x 12= 0.432KWh)
- ✓ 12hrs night - 4.0/LC-STAR + 13.0/L864 + 24.0/L810 (41 x 12= 0.492KWh)
- ✓ "24hrs = **0.924 KWh"**

LE11-3A DUAL LED LIGHTING KIT

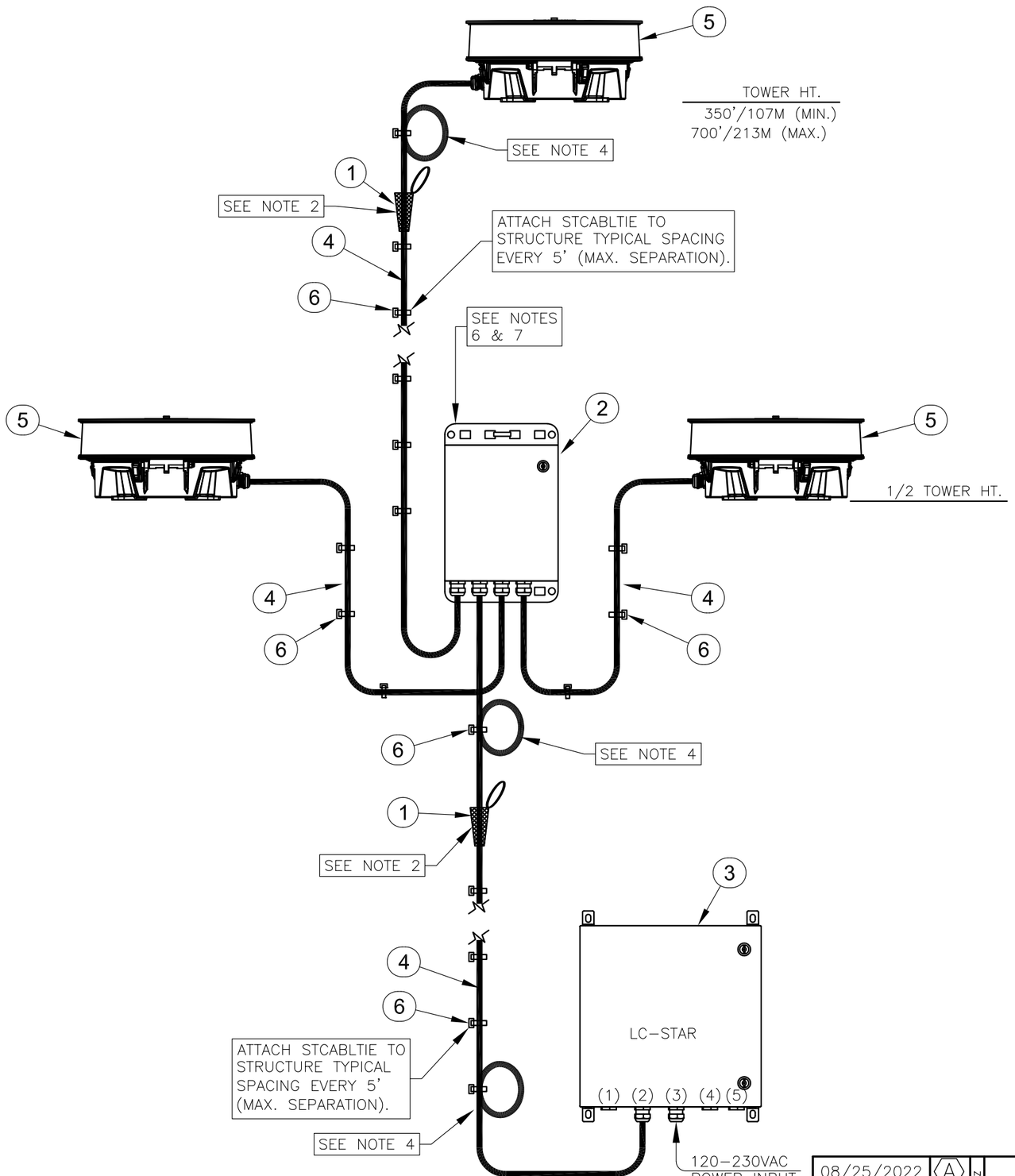
(TOWERS 200'/61M TO 350'/107M)

APPROVED BY			
APPROVED BY			
APPROVED BY			
DRAWN BY: J.ZAMORANO	SIZE: B	SHEET QTY.: 1 OF 1	
DATE: 02/27/2020	SCALE: N.T.S.	DWG. NO.: LK-101	

DATE:	REV.		DESCRIPTION
09/21/2022	B	JZ	BOM ITEM 6 UPDATED

The use of non-OEM parts or modifications to original equipment design will void the manufacturer warranty and could invalidate the assurance of complying with FAA requirements as published In Advisory Circular 150/5345-43.

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BILL OF MATERIALS					
	ITEM	QTY	UNITS	NAME	DESCRIPTION
	1	2	ea	CABLEGRIP3	SINGLE EYE LACE MESH 0.63"-0.74"
	2	1	ea	JBS	UNIVERSAL MOUNTED JUNCTION BOX
	3	1	ea	LC-STAR	STAR LIGHTING CONTROLLER
~	4	0	ft	LCABLE-1	POWER & DATA CABLE (TWR HT. + 95')
	5	3	ea	LONESTAR	L864/L865 DUAL LED BEACON
~	6	0	ea	STCABLTIE	STROBE CABLE TIES (TWR HT. ÷ 5 + 20)

~ = ITEMS QUANTITY CALCULATED ACCORDING TO STRUCTURE HEIGHT.

NOTES:

1) THIS DRAWING IS PROVIDED AS A GENERAL REFERENCE. TWR LIGHTING, INC. DOCUMENTATION SUPERSEDES THIS DRAWING & SHOULD BE REVIEWED PRIOR TO INSTALLATION OF THIS SYSTEM.
2) CABLEGRIP3 IS USED TO SUPPORT CABLE BEFORE CORD CONNECTOR AND SERVICE LOOP, THE SINGLE EYE LOOP SHOULD BE ATTACHED TO STRUCTURE SECURELY.
3) IF MOUNT IS NEEDED FOR BEACON USE PART #BMSIDE-1.
4) IT IS RECOMMENDED TO INSTALL A SERVICE LOOP PRIOR TO EVERY JUNCTION BOX AND CONTROLLER CONNECTION.
5) LIGHTING CABLES ARE TO BE SUPPORTED OVER TOWER FLANGES TO ENSURE THAT THEY DO NOT RUB OR BREAK OPEN.
6) USE P/N HC6-10 TO SECURE JUNCTION BOX TO STRUCTURE. REFER TO DRAWING 101180 FOR MORE DETAIL.
7) BARE SHIELD WIRES NEED TO BE TERMINATED IN CONTROLLER AND JUNCTION BOXES.
8) BARE SHIELD WIRES NEED TO BE CUT FLUSH WITH CABLE PVC OUTER JACKET IN EACH BEACON (NOT TERMINATED).

POWER CONSUMPTION

- ✓ 12hrs day - 4.0/LC-STAR + 96.0/L865 (100 x 12= 1.20KWh)
- ✓ 12hrs night - 4.0/LC-STAR + 39.0/L864 (43 x 12= 0.516KWh)
- ✓ "24hrs = **1.716 KWh"**

LE23-0A DUAL LED LIGHTING KIT

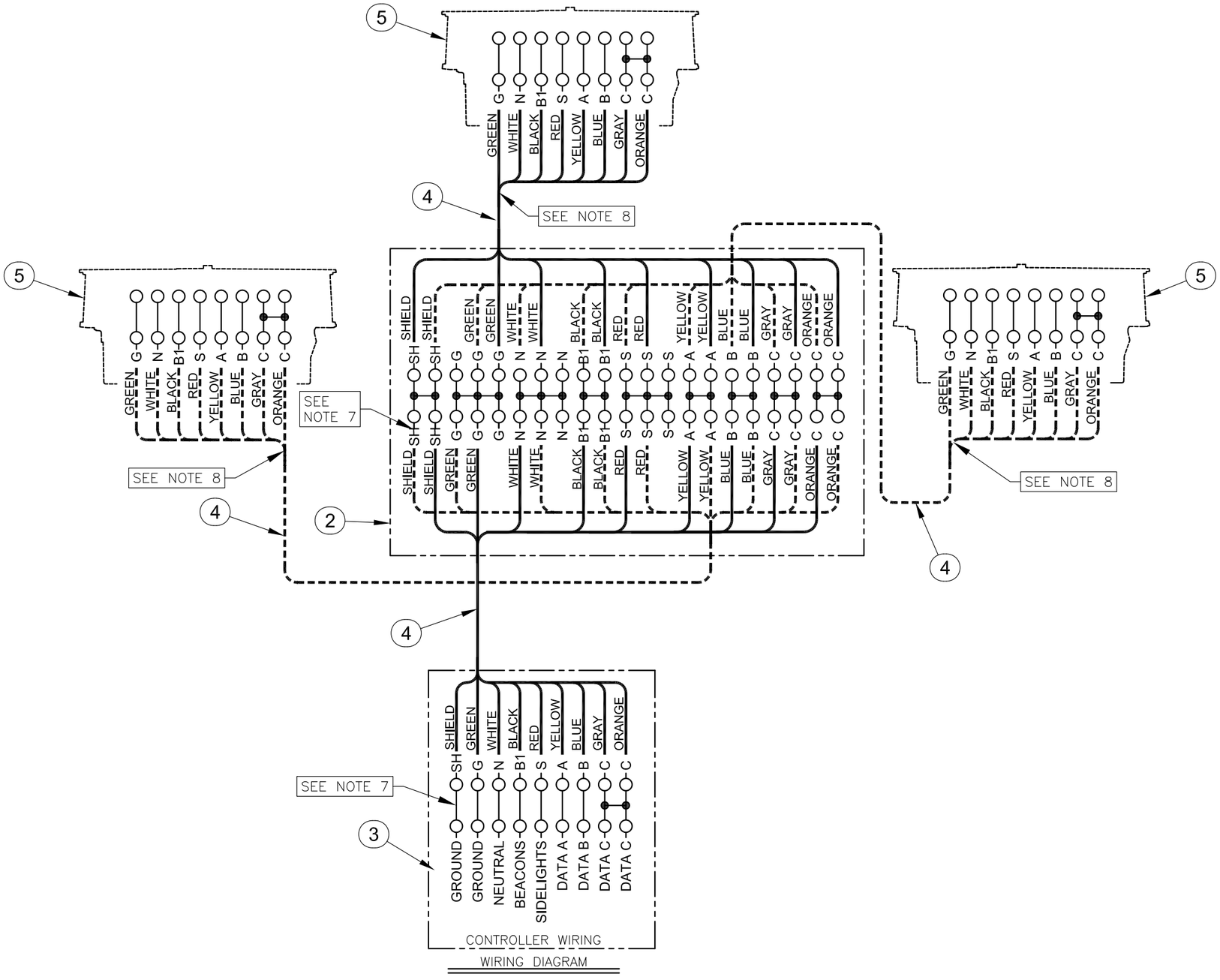
(TOWERS 350'/107M TO 700'/213M)

APPROVED BY			
APPROVED BY			
APPROVED BY			
DRAWN BY J.ZAMORANO	SIZE B	SHEET QTY. 1 OF 2	
DATE 06/24/2020	SCALE N.T.S.		DWG. NO. LK-401

DATE:	REV.	DESCRIPTION
08/25/2022	A JZ	JUNCTION BOX UPDATE

The use of non-OEM parts or modifications to original equipment design will void the manufacturer warranty and could invalidate the assurance of complying with FAA requirements as published in Advisory Circular 150/5345-43.

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BILL OF MATERIALS					
	ITEM	QTY	UNITS	NAME	DESCRIPTION
	1	2	ea	CABLEGRIP3	SINGLE EYE LACE MESH 0.63"-0.74"
	2	1	ea	JBS	UNIVERSAL MOUNTED JUNCTION BOX
	3	1	ea	LC-STAR	STAR LIGHTING CONTROLLER
~	4	0	ft	LCABLE-1	POWER & DATA CABLE (TWR HT. + 95')
	5	3	ea	LONESTAR	L864/L865 DUAL LED BEACON
~	6	0	ea	STCABLTIE	STROBE CABLE TIES (TWR HT. + 5 + 20)

~ = ITEMS QUANTITY CALCULATED ACCORDING TO STRUCTURE HEIGHT.

NOTES:
1) THIS DRAWING IS PROVIDED AS A GENERAL REFERENCE. TWR LIGHTING, INC. DOCUMENTATION SUPERSEDES THIS DRAWING & SHOULD BE REVIEWED PRIOR TO INSTALLATION OF THIS SYSTEM.
2) CABLEGRIP3 IS USED TO SUPPORT CABLE BEFORE CORD CONNECTOR AND SERVICE LOOP, THE SINGLE EYE LOOP SHOULD BE ATTACHED TO STRUCTURE SECURELY.
3) IF MOUNT IS NEEDED FOR BEACON USE PART #BMSIDE-1.
4) IT IS RECOMMENDED TO INSTALL A SERVICE LOOP PRIOR TO EVERY JUNCTION BOX AND CONTROLLER CONNECTION.
5) LIGHTING CABLES ARE TO BE SUPPORTED OVER TOWER FLANGES TO ENSURE THAT THEY DO NOT RUB OR BREAK OPEN.
6) USE P/N HC6-10 TO SECURE JUNCTION BOX TO STRUCTURE. REFER TO DRAWING 101180 FOR MORE DETAIL.
7) BARE SHIELD WIRES NEED TO BE TERMINATED IN CONTROLLER AND JUNCTION BOXES.
8) BARE SHIELD WIRES NEED TO BE CUT FLUSH WITH CABLE PVC OUTER JACKET IN EACH BEACON (NOT TERMINATED).

POWER CONSUMPTION

- ✓ 12hrs day - 4.0/LC-STAR + 96.0/L865 (100 x 12= 1.20KWh)
- ✓ 12hrs night - 4.0/LC-STAR + 39.0/L864 (43 x 12= 0.516KWh)
- ✓ "24hrs = **1.716 KWh"**

LE23-0A DUAL LED LIGHTING KIT

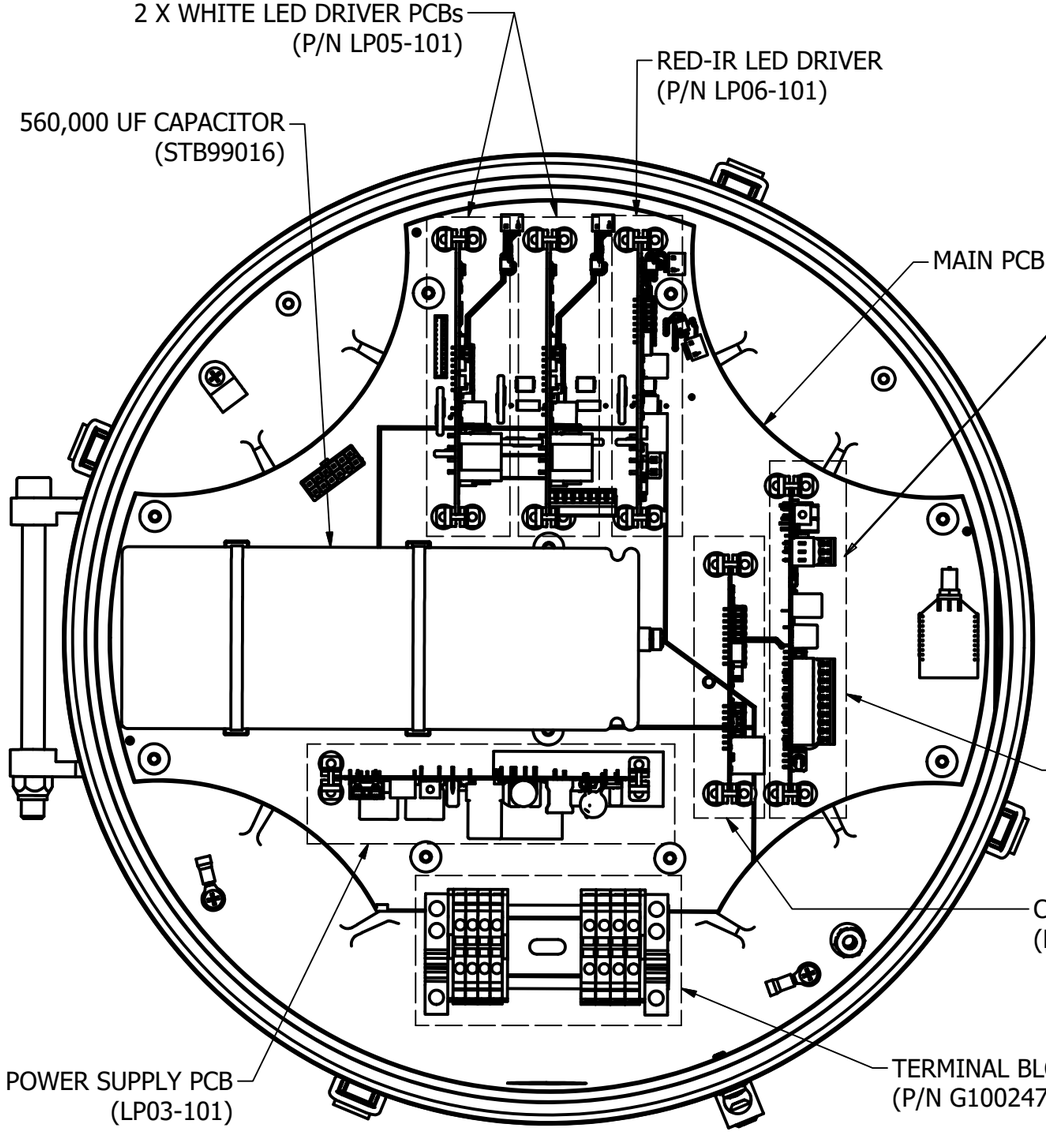
(TOWERS 350'/107M TO 700'/213M)

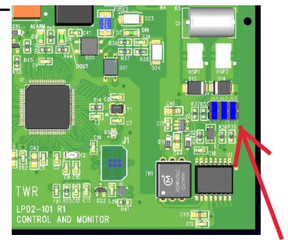
APPROVED BY			
APPROVED BY			
APPROVED BY			
DRAWN BY J.ZAMORANO	SIZE B	SHEET QTY. 2 OF 2	
DATE 06/24/2020	SCALE N.T.S.	DWG. NO. LK-401	

DATE:	REV.	DESCRIPTION
08/25/2022	A J.Z	JUNCTION BOX UPDATE

The use of non-OEM parts or modifications to original equipment design will void the manufacturer warranty and could invalidate the assurance of complying with FAA requirements as published in Advisory Circular 150/5345-43.

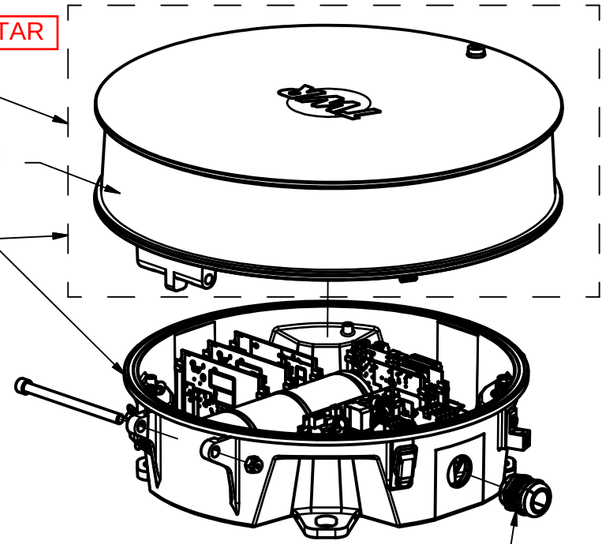
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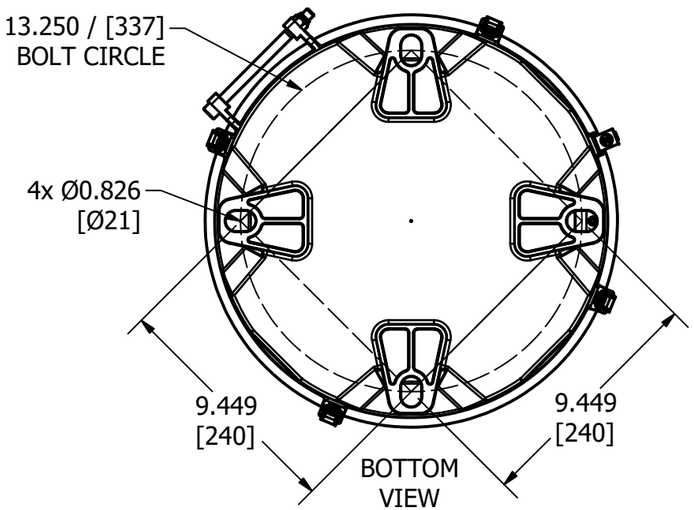




TYPICAL STATION #1 TO HAVE J3-1 THROUGH J3-3 JUMPERS INSTALLED.
STATIONS #2-#99 TO HAVE J3-1 THROUGH J3-3 JUMPERS REMOVED.
FACTORY DEFAULT

LEDLTENGSTAR





DUAL LED BEACON (P/N LONESTAR)
MAJOR COMPONENTS

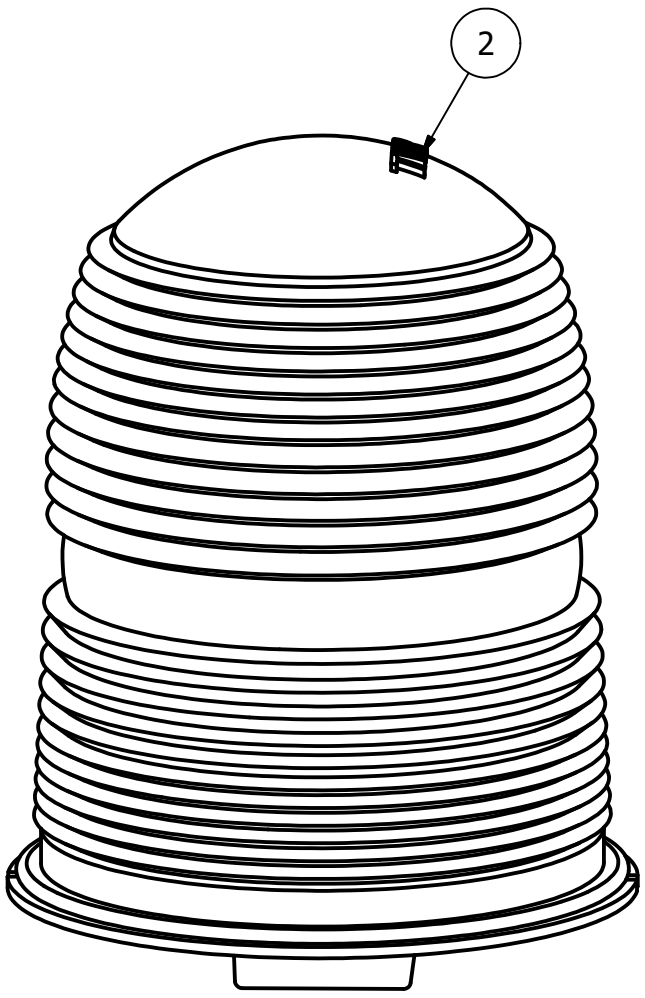
PROD DEPT	TWR Lighting, Inc. Enlightened Technology®
SERV DEPT	
ENGINEER	
DRAWN BY: J.ZAMORANO	SHEET SIZE: B; SHEET QTY.: 1 OF 1
DATE: 6/29/2020	SCALE: N.T.S; DWG. NO.: 101187

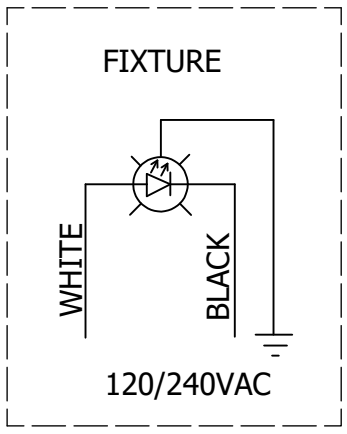
REV	DATE	BY	DESCRIPTION
C	11/29/2023	JZ	ADDED DIMS AND WEIGHT

The use of non-OEM parts or modifications to original equipment design will void the manufacturer warranty and could invalidate the assurance of complying with FAA requirements as published in Advisory Circular 150/5345-43.

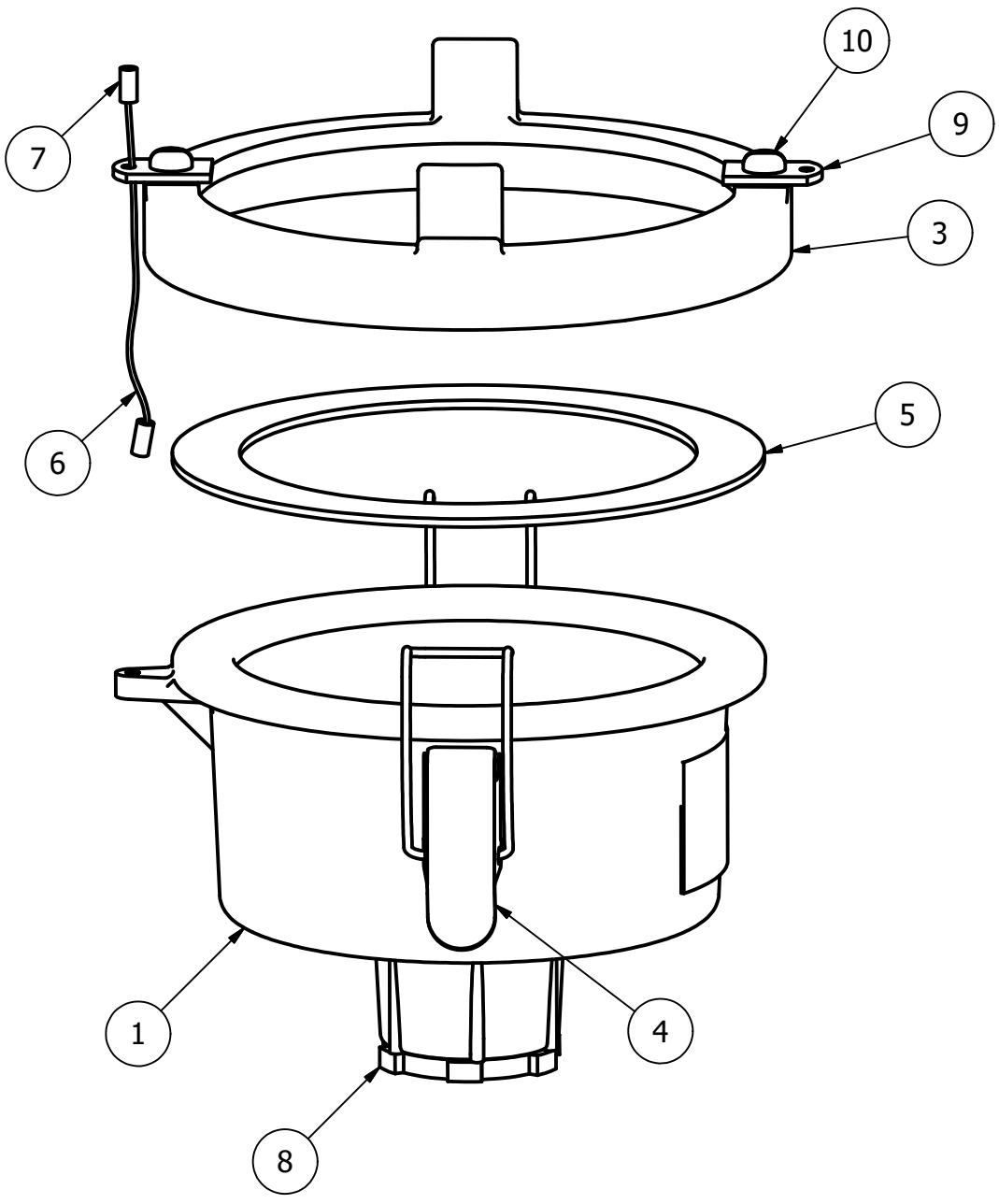
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Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	105RV	SINGLE SIDELIGHT BODY
2	1	LED120-2RK	120/240VAC LED LIGHT (OPTION)
2	1	LED120-2RK-IR	120/240VAC LED/IR LIGHT (OPTION)
3	1	106V	VALOX LENS HOLDER RING
4	2	HC255SS	SIDELIGHT LATCH
5	1	OLG2	OL1 6 LED GASKET
6	.5	7X7SS	1/16 HOL 7X7 S.S. WIRE
7	2	A1A	STAKON CRIMP
8	1	A314	3/4" CONDUIT LOCKNUT GALV.
9	3	12V245	OL LENS CLIP
10	3	832X14PH	8-32 X 1/4 PH SS SLOT SCREW

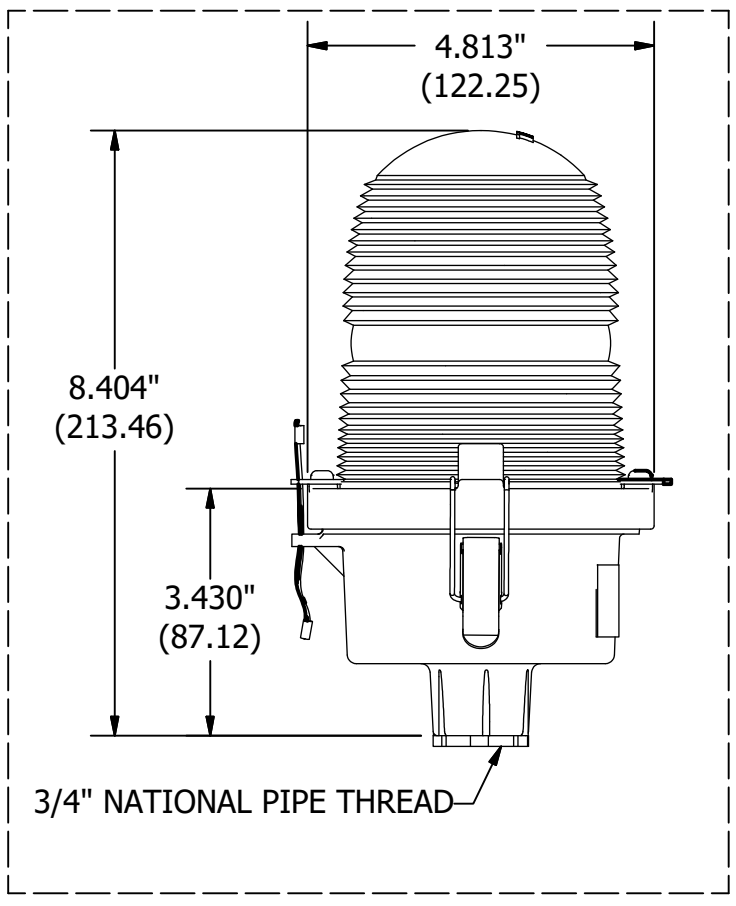




* GROUND WIRE MUST BE CONNECTED TO PROPERLY PROTECT POWER SUPPLY. FAILURE TO GROUND WILL VOID ALL WARRANTIES.



DIMENSIONS



AUTHOR	DATE	REV	DESCRIPTION
J.ZAMORANO	09/26/2023	E	UPDATED BOM

OL1CBH34LED2-IR 120VAC FAA-OL16LED (L810 OBSTRUCTION LIGHT)

PROD DEPT

SERV DEPT

ENGINEER

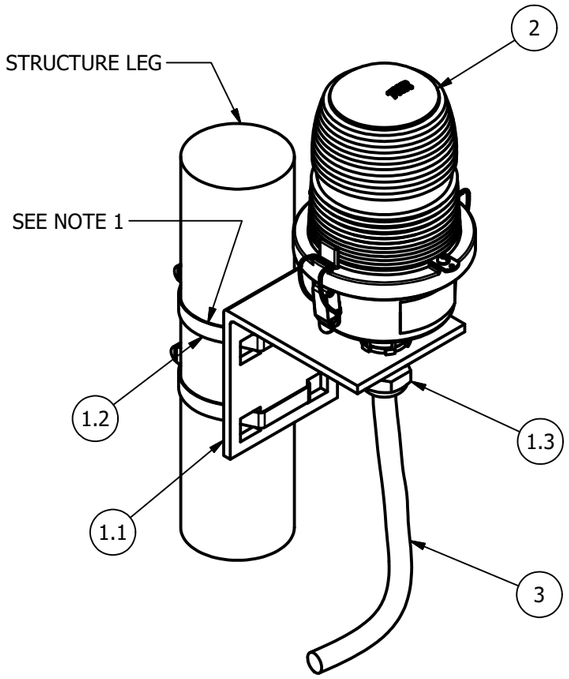
TWR Lighting Technologies

DRAWN BY	SHEET SIZE	SHEET QTY.
J.BUSTAMANTE	B	1 OF 1
DATE: 6/14/2007	SCALE: N.T.S	DWG. NO.: 100657

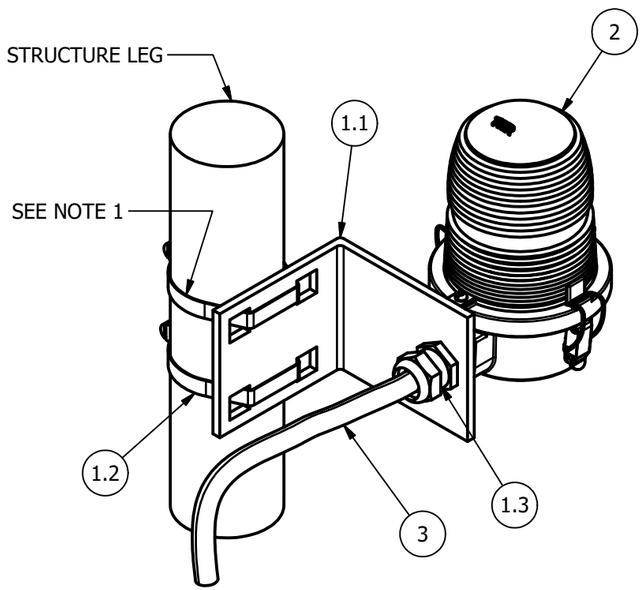
The use of non-OEM parts or modifications to original equipment design will void the manufacturer warranty and could invalidate the assurance of complying with FAA requirements as published in Advisory Circular 150/5345-43.

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BOTTOM HUB INSTALLATION



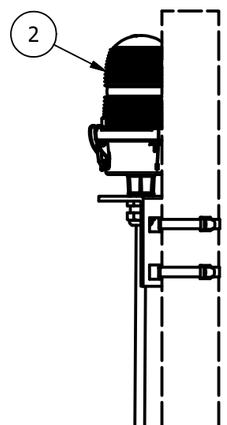
SIDE HUB INSTALLATION

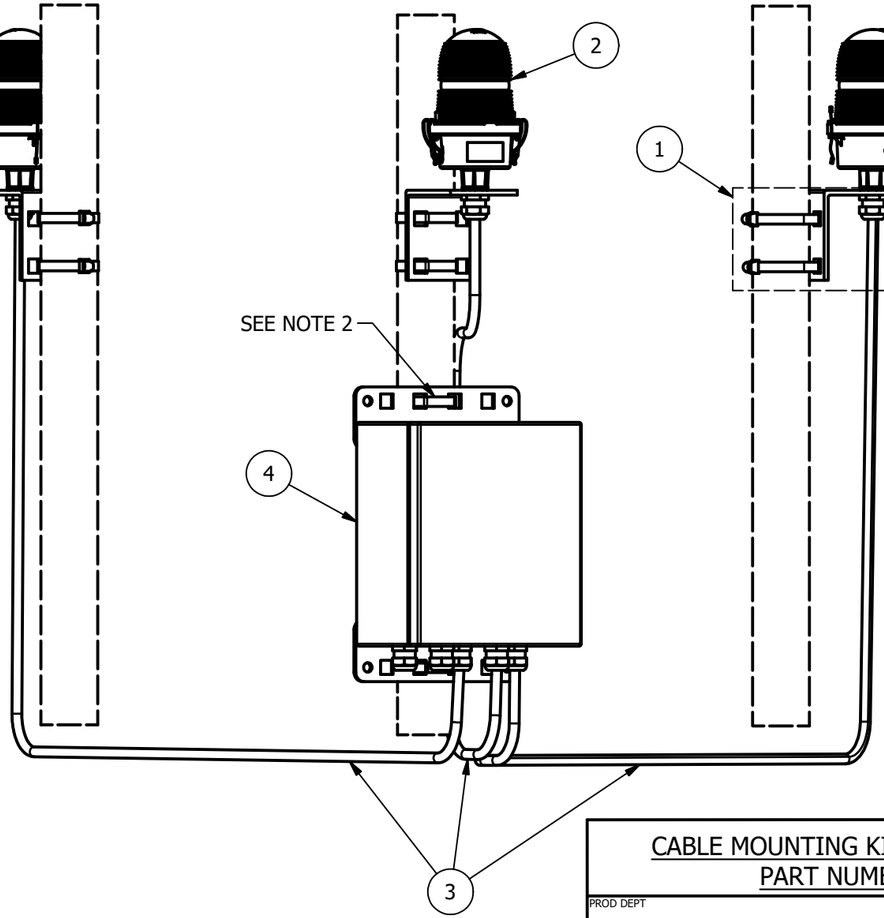


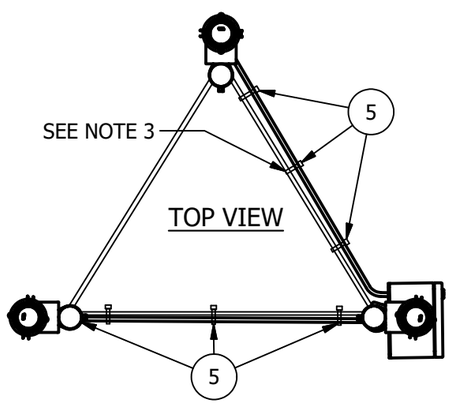
NOTES

1. PART HC6-10 NEEDS TO BE DOUBLED FOR TOWER LEGS WITH A DIAMETER LARGER THEN 6".
2. USE PART HC6-10 PROVIDED WITH JUNCTION BOX TO SECURE ASSEMBLY TO A VERTICAL PORTION OF STRUCTURE. REFERENCE DRAWING 101180.
3. USE PART STCABLETIE TO SECURE CABLE TO THE STRUCTURE.
4. ITEMS 1.1 TO 1.3 ARE INCLUDED WITH ITEM 1. QUANTITIES REFLECT 3 OLMOUNTKITs.

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	3	OLMOUNTKIT	OL UNIVERSAL MOUNTING KIT
1.1	3	101136	OL MOUNTING BRACKET
1.2	12	HC6-10	STAINLESS STEEL MOUNTING STRAP 6" DIA.
1.3	3	CGB295SA	3/4" CORD CONNECTOR 0.50 - 0.625
2	3	OL1_____	3/4" BOTTOM OR SIDE HUB SIDE MARKER
3	40'	CSO14/3	14AWG / 3CON. S.O. CORD
4	1	JBS	UNIVERSAL MOUNTED JUNCTION BOX
5	6	STCABLETIE	CABLE TIES (FOR CABLE SUPPORT)







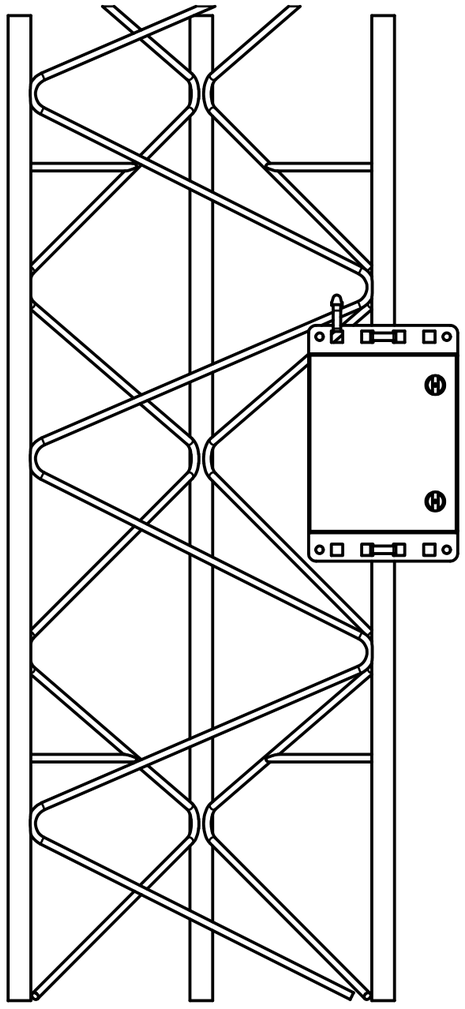
REV	AUTHOR	DATE	DESCRIPTION
C	J.ZAMORANO	09/27/2023	UPDATED JUNCTION BOX

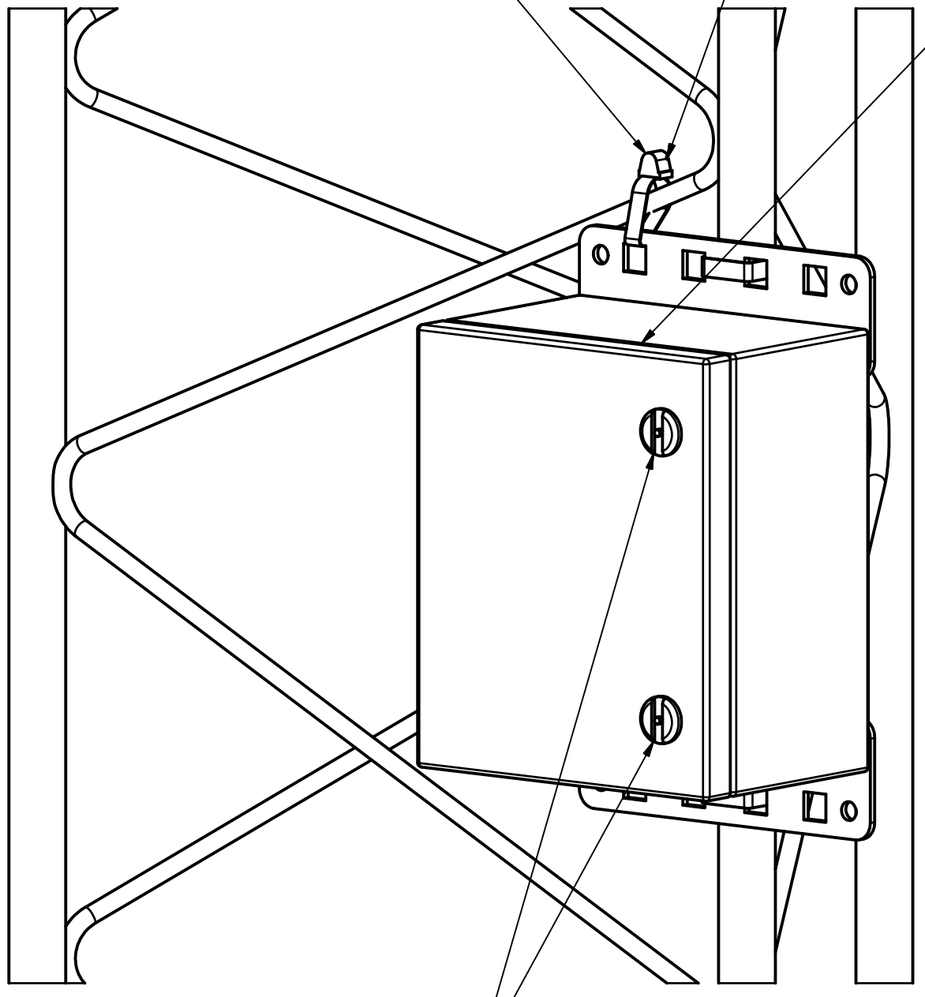
CABLE MOUNTING KIT FOR (3) SIDELIGHTS
PART NUMBER: OL3XKIT

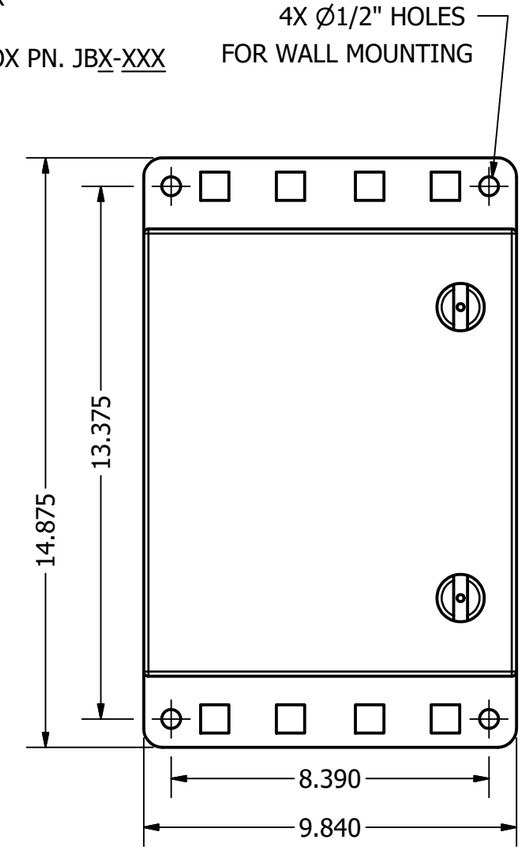
PROD DEPT			
SERV DEPT			
ENGINEER			
DRAWN BY: J.ZAMORANO		SHEET SIZE: B	SHEET QTY.: 1 OF 1
DATE: 3/19/2019	SCALE: N.T.S	DWG. NO.: 101138	

The use of non-OEM parts or modifications to original equipment design will void the manufacturer warranty and could invalidate the assurance of complying with FAA requirements as published in Advisory Circular 150/5345-43.

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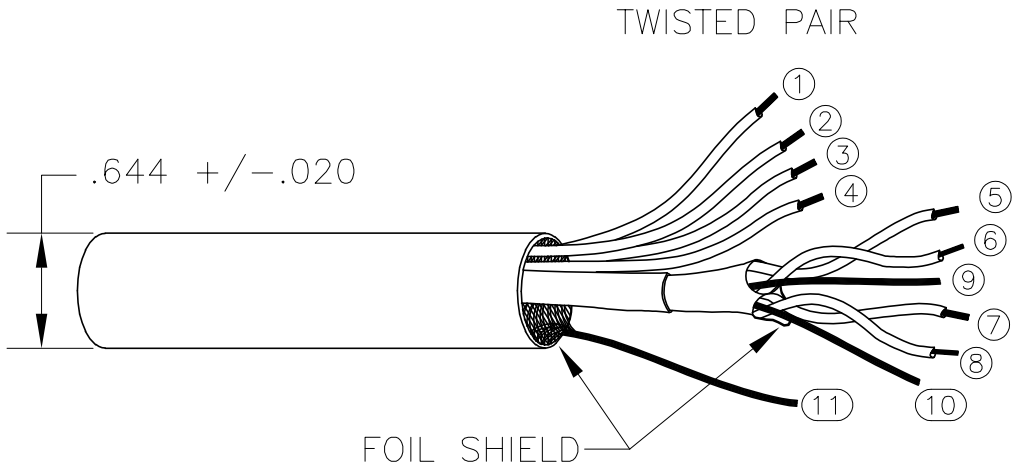


JUNCTION BOX MOUNTING DETAIL

PROD DEPT		TWR Lighting®, Inc. Enlightened Technology®	
SERV DEPT			
ENGINEER			
DRAWN BY	J.ZAMORANO	SHEET SIZE	B
		SHEET QTY.	1 OF 1
DATE	05/19/2020	SCALE	N.T.S
		DWG. NO.	101180

The use of non-OEM parts or modifications to original equipment design will void the manufacturer warranty and could invalidate the assurance of complying with FAA requirements as published in Advisory Circular 150/5345-43.

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GENERAL: 3X12AWG, 1X14AWG ISP PVC COMPOSITE CABLE

3 CONDUCTORS (12 AWG):
COLOR CODE: BLACK, WHITE, RED
1 CONDUCTOR (14 AWG):
COLOR CODE: GREEN
2 SHIELDED PAIR: (22 AWG):
COLOR CODE: YELLOW / BLUE / SHIELD
2 SHIELDED PAIR: (22 AWG):
COLOR CODE: ORANGE / GRAY / SHIELD

RATING:
UL-2464
300 VOLTS
80 DEGREE CENTIGRADE
CSA AWM I/II A/B

SPECIFICATION
HILS STROBE CABLE

CONDUCTOR NUMBER	AWG	TINNED COPPER WIRE STRAND	INSULATION VOLTAGE	COLOR
1	12	65/30 STRANDED	300V MIN.	BLACK
2	12	65/30 STRANDED	300V MIN.	RED
3	12	65/30 STRANDED	300V MIN.	WHITE
4	14	41/30 STRANDED	300V MIN.	GREEN
5	22	7/30 STRANDED	300V MIN.	BLUE
6	22	7/30 STRANDED	300V MIN.	YELLOW
7	22	7/30 STRANDED	300V MIN.	ORANGE
8	22	7/30 STRANDED	300V MIN.	GRAY
9	22	7/30 STD BARE	NONE	BARE
10	22	7/30 STD BARE	NONE	BARE
11	14	41/30 STD BARE	NONE	BARE

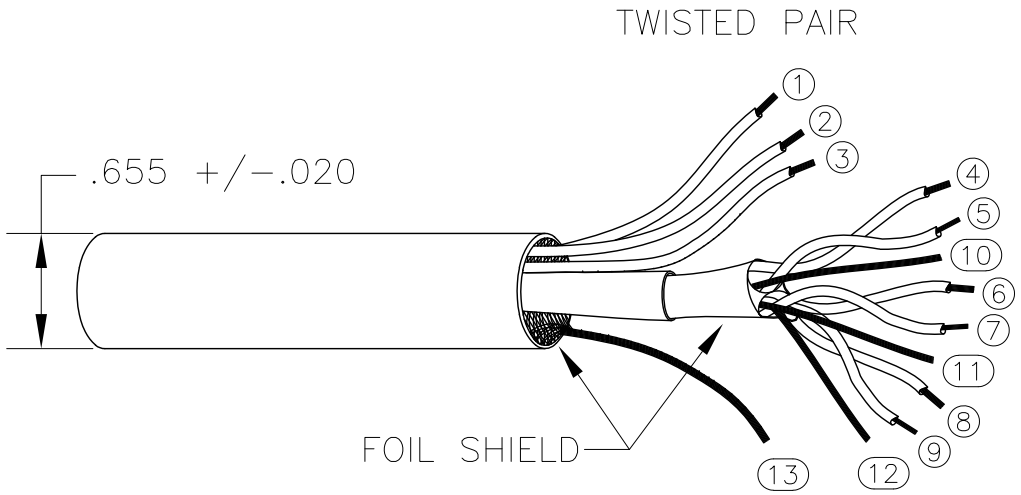
LCABLE-1 (LED CABLE)

TWR Lighting, Inc.

APP'D	ENGINEER	CHK'D BY
DRAWN BY: G.D.S.	SHEET SIZE: A	SHEET QTY.: 1 OF 1
DATE: 10/25/2019	SCALE: N.T.S.	DRAWING NO.: F01-111SL

DATE	<A>	G.D.S.	CORRECTED NOTES

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GENERAL: 3X12AWG, 1X14AWG ISP PVC COMPOSITE CABLE

2 CONDUCTORS (12 AWG):
COLOR CODE: BLACK, WHITE,
1 CONDUCTOR (14 AWG):
COLOR CODE: GREEN
2 SHIELDED PAIR: (22 AWG):
COLOR CODE: YELLOW / BLUE / SHIELD
2 SHIELDED PAIR: (22 AWG):
COLOR CODE: ORANGE / GRAY / SHIELD
2 SHIELDED PAIR: (22 AWG):
COLOR CODE: RED / TAN / SHIELD

RATING:
UL-2464
300 VOLTS
80 DEGREE CENTIGRADE
CSA AWM I/II A/B

SPECIFICATION
HILS STROBE CABLE

CONDUCTOR NUMBER	AWG	TINNED COPPER WIRE STRAND	INSULATION VOLTAGE	COLOR
1	12	65/30 STRANDED	300V MIN.	BLACK
2	12	65/30 STRANDED	300V MIN.	WHITE
3	14	41/30 STRANDED	300V MIN.	GREEN
4	22	7/30 STRANDED	300V MIN.	YELLOW
5	22	7/30 STRANDED	300V MIN.	BLUE
6	22	7/30 STRANDED	300V MIN.	ORANGE
7	22	7/30 STRANDED	300V MIN.	GRAY
8	22	7/30 STRANDED	300V MIN.	RED
9	22	7/30 STRANDED	300V MIN.	TAN
10	22	7/30 STD BARE	NONE	BARE
11	22	7/30 STD BARE	NONE	BARE
12	22	7/30 STD BARE	NONE	BARE
13	14	41/30 STD BARE	NONE	BARE

LCABLE-2 (LED CABLE)

TWR Lighting, Inc.

APP'D	ENGINEER	CHK'D BY
DRAWN BY: J.Z	SHEET SIZE: A	SHEET QTY.: 1 OF 1
DATE: 12/04/2020	SCALE: N.T.S.	DRAWING NO.: F01-111SL

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