

A yellow triangle with a black exclamation mark inside.

A0/A1 Controller Assembly Operation/Installation Manual

READ AND FOLLOW ALL SAFETY INSTRUCTIONS

A yellow triangle with a black exclamation mark inside.

- *DO NOT let any supply cords touch hot surfaces higher than cord ratings.*
- *DO NOT mount near gas or electric heaters*
- *Equipment should be mounted in locations and at heights where it will not be subjected to tampering by unauthorized personnel.*
- *The use of accessory equipment not recommended by the manufacturer may cause unsafe conditions.*
- *DO NOT use this equipment for other than intended use.*

SAVE THESE INSTRUCTIONS!!

- *The operation and maintenance must be carried out by authorized personnel.*
- *Repairs and Installation must only be carried out by a qualified electrician.*
- *Only genuine Dialight replacement parts must be used when unforeseen repairs are required.*
- *Observe the national safety rules and regulations during installation!*
- *Earth Grounding is required throughout the install process. Failure to do so could void all warranties!*
- *No alterations should be done without the agreement from Dialight Corp. Alterations other than written in this manual will void all warranties.*

Notice and Warnings:

This manual contains important information regarding the proper installation, operation, and maintenance of this product. Before using the product, read and understand all instructions, cautions, notes and warnings, as well as all of the labels affixed to the product. Failure to do so could result in personal injury or damage to equipment and/or void the product warranty.



FAILURE TO LEAVE THE ENCLOSURES FREE FROM DEBRIS UPON COMPLETION OF INSTALLATION MAY CAUSE SHORT CIRCUITS AND VOID THE SYSTEM WARRANTY



CAUTION: ONLY APPROVED PHOTOCELLS CAN BE USED WITH THIS SYSTEM



WARNING: FAILURE TO PROPERLY BOND THE LOW INTENSITY L810 LIGHTS AND CONTROLLER ENCLOSURES TO THE TOWER STRUCTURE WILL RESULT IN EVENTUAL LIGHTNING DAMAGE OF THIS SYSTEM. THE SYSTEM'S WARRANTY SHALL BE VOID IF ALL LOW INTENSITY L810 LIGHTS AND CONTROLLER ENCLOSURES ARE NOT PROPERLY BONDED TO THE TOWER STRUCTURE. TO AVOID WARRANTY NULLIFICATION, FOLLOW THE DIRECTIONS IN THEIR ENTIRETY.



CAUTION: NEVER LOOK AT THE L810 LIGHTS WHILE THE SYSTEM IS ENERGIZED. THE LIGHTS COULD ILLUMINATE CAUSING TEMPORARY BLINDNESS WHICH WOULD BE DANGEROUS AT HIGH ELEVATIONS.

Introduction

This manual is for the installation and configuration of the Dialight A0/A1 Red Controller system.

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1. Operation and Installation

A. System Overview:

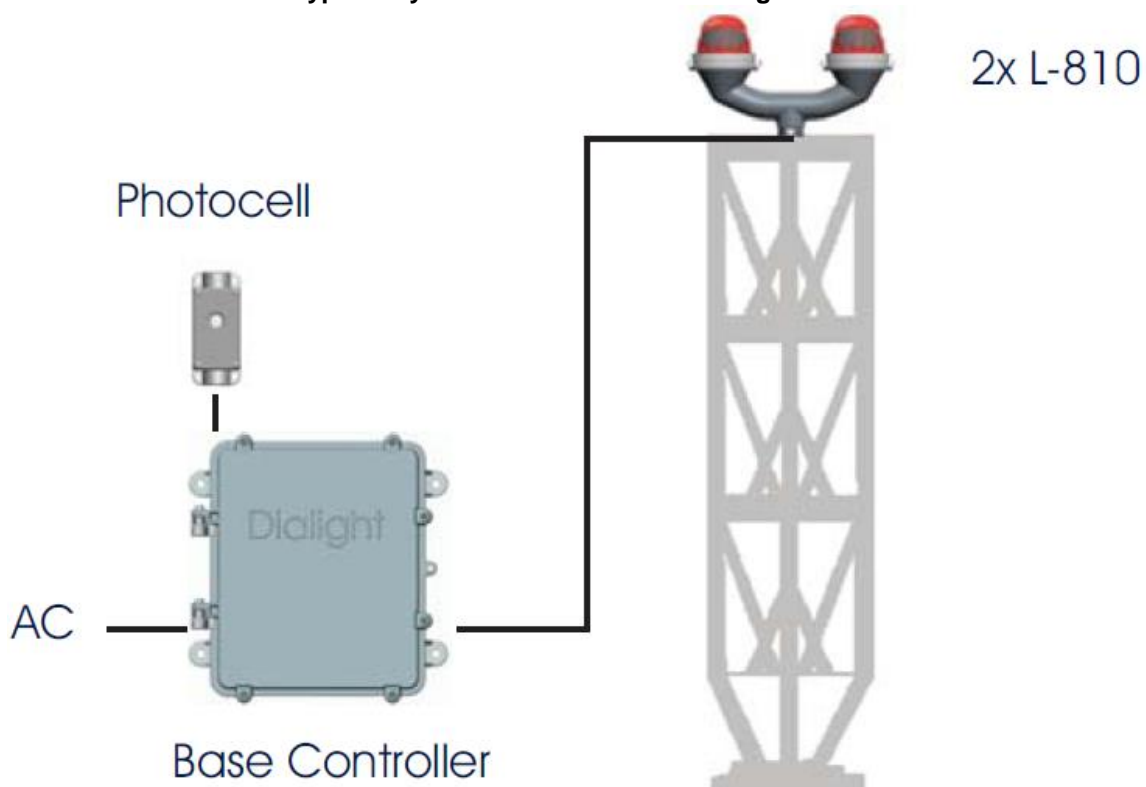
Dialight's LED based Red Obstruction System is ideal for A0 and A1 FAA tower types and can be used to mark other structures as well. The operation of the lights is configurable and fully monitored. The side markers and/or beacons can be run in steady burn or flashing mode, each of two outputs individually mode selectable. The flash rate of the lights is also configurable. The Dialight Gateway is optional and provides remote monitoring of the system. The lights are ETL verified to the FAA requirements.

Parts supplied with A1 Low Intensity Controller

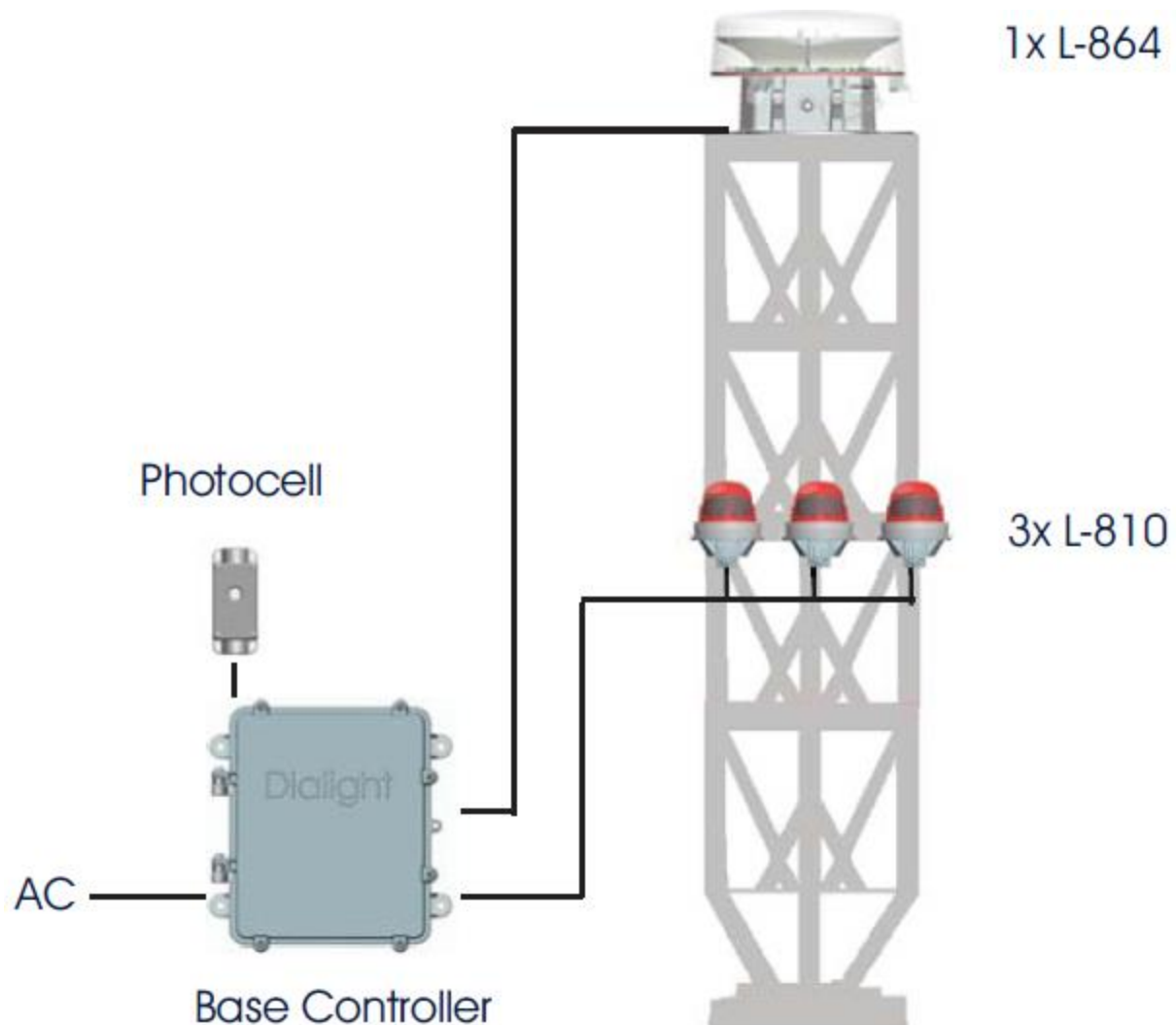
1x Power Supply/Controller
 4x Cable entry glands
 1x ¾ NPT plug
 6x 3 position Phoenix connector plugs

Typical Basic System Diagrams

Typical System A0 Connection Configuration



Typical System A1 Connection Configuration



Detail View of the Power Supply/Controller

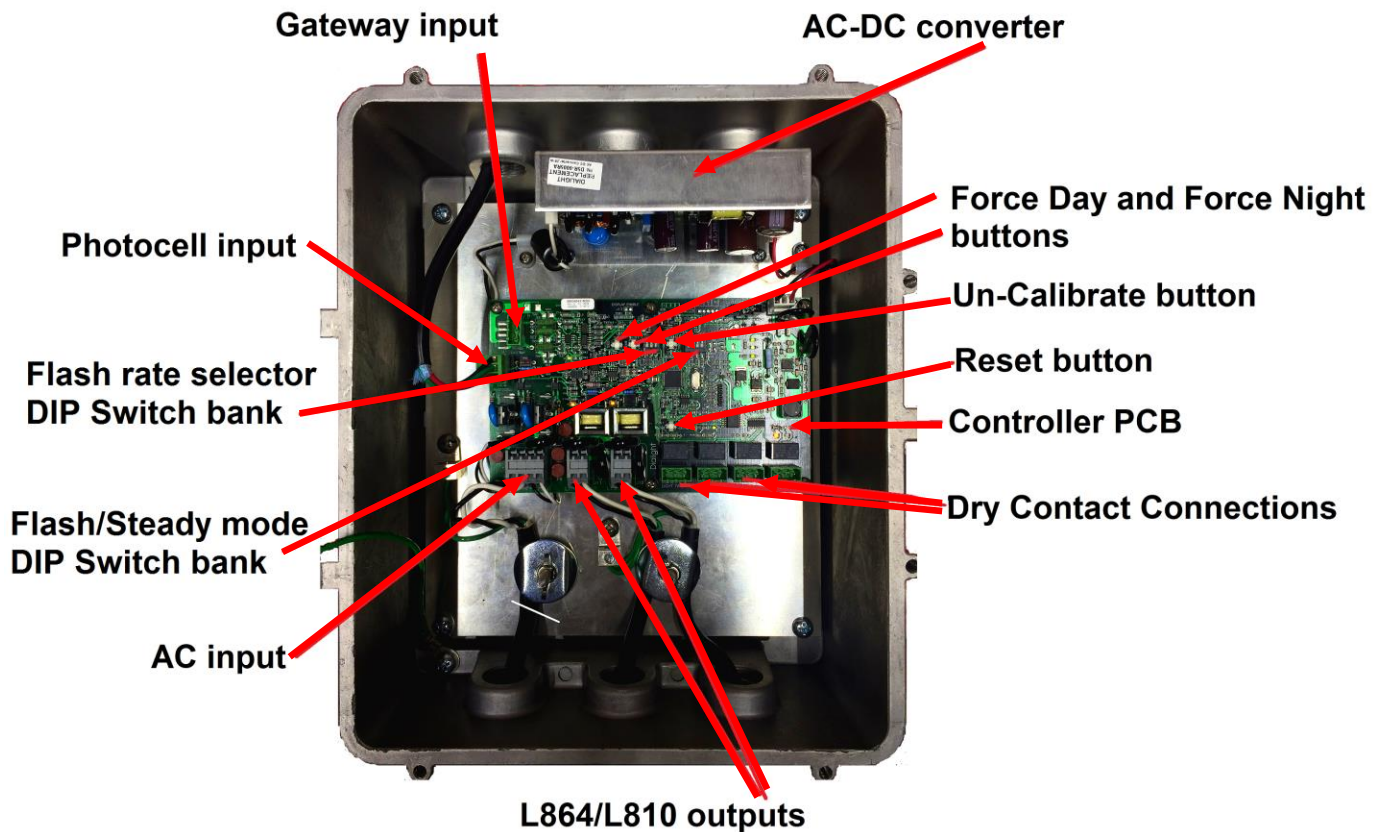


Figure 1 – Controller Interior

UN-Calibrate button – Pushing and holding this button will put the controller in “current sense mode,” reading and recording currents on each port

AC-DC Converter – Converts the AC input to 48 Volts DC in order to run the controller PCB

Controller PCB – The main circuit board of the system, where connections and selections are made

L864/L810 Outputs – These are the two switched AC outputs to connect one beacon or up to 8 L810 units per port.

AC Input – This terminal block input is used for connection of the AC input to the controller

Photocell Input – Interfaces the photocell to the system

Reset Button – Pushing this will reset the microprocessor of the system, will read the calibration settings upon each reset

Flash rate selector DIP Switch Bank – Used to select either 20, 30 or 40 flashes per minute, each at a 50% duty cycle

Flash/Steady mode DIP Switch bank – Used to select steady burn or flashing operation of the L864/L810 output ports, individually controlled

Force Day and Force Night buttons – Used to manually select day and night modes of the system

Dry Contact Connections – These are the contacts of the alarm relays 1, 2, 3 and 4

Gateway Input – This is the input for an optional Dialight wireless gateway.

B. Installation Procedures – Lighting and Controller

During installation on the tower, proper grounding techniques must be utilized. The system has built in Lightning and RF immunity at each section, but for it to be effective proper ground connection techniques must be used. For more details, contact your local sales rep.

AO/A1 Controller:

Mounting Dimensions of the Controller

Note – All dimensions shown in inches, mounting hole openings can accommodate up to 3/8" screws/bolts.

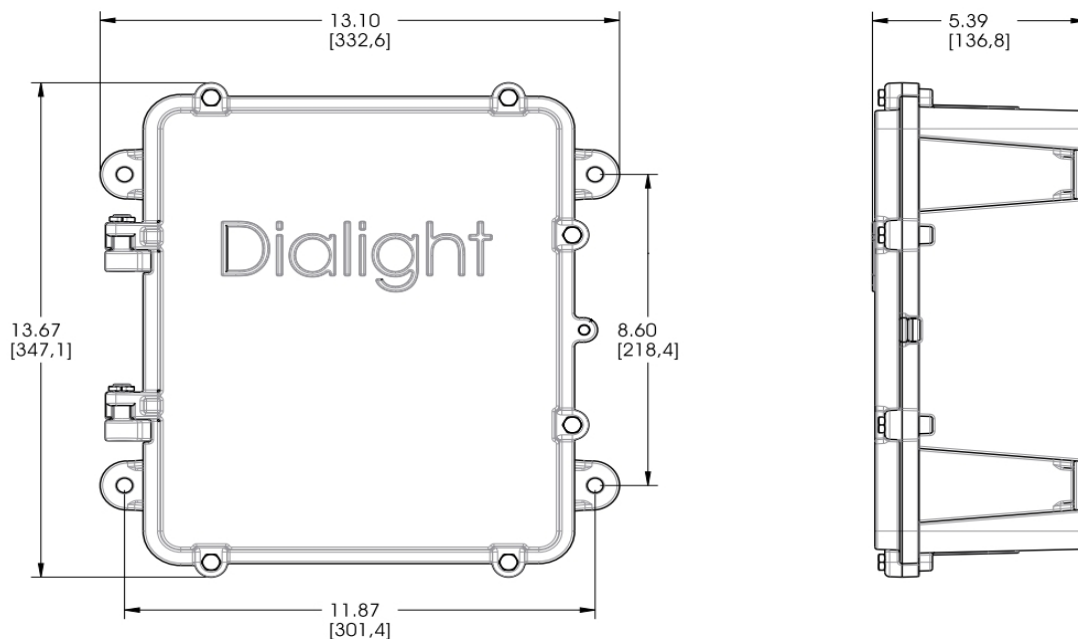


Figure 2 – Controller Mechanical Dimensions

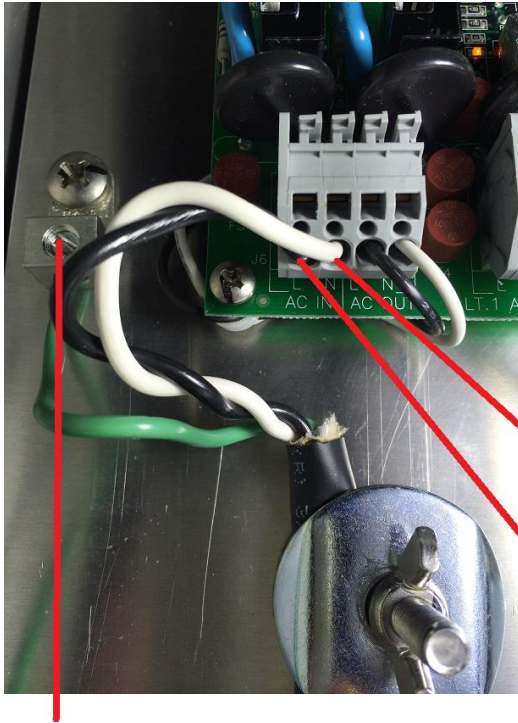
Installation Requirements

- Mount the L864 and/or L810 lights, Photocell and Controller to their intended locations
- Apply AC power to terminal block, Figure 3
 - AC supply requirements, 120-240VAC, 50/60Hz, capable of supplying 1 Amp.
 - A minimum of 14 AWG (2.08mm²) cable is to be used. The terminal block can accept up to 12 AWG (3.31mm²) cable.
- Connection of the L864 and/or L810 RTO lights, Figure 4
- Attach output of Photocell to controller, Figure 5
- Calibrating the Current Sensors, Figure 6

NOTE: Multiple grounding points are provided in the enclosure for protective and functional Earth/Ground connections.

Connection of AC Mains Power

1. 120 Volt AC is to be connected to the AC input Terminal Blocks (Figure 3)



AC Neutral connection

AC Line connection

Earth Ground connection

Figure 3 – AC Input Connections

Connection of the Marker Lights (L810's) to the Controller:

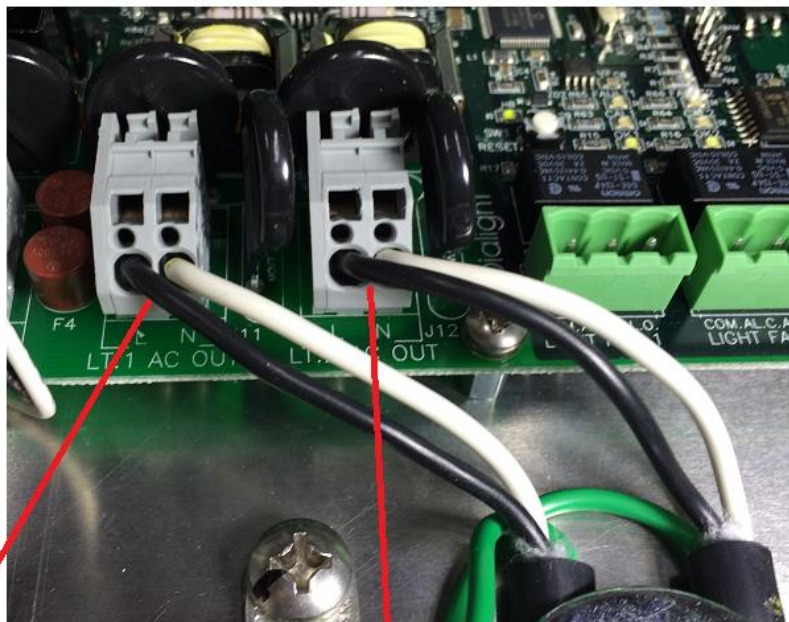
WARNING: Refer to table for compatible L864 beacons and L810 marker lights.

Table 1 – supported L810 and L864 lights

	Red only	Red + IR
L864 Beacon	D564A13001 or D464A13001	D464R13001
L810 Marker	RTO-1R07001 or 860-1R01	RTO-CR07001

1. L810 marker specifics:
 - a. When L810 marker lights are being used, they must be connected to Port 1 (L.T. 1)
 - b. A minimum of two L810 RTO, or maximum of 8 L810 RTO lights are to be wired in parallel at their location on the structure, all wired to the three conductor cable, keeping wire colors consistent.
 - c. A minimum of one 860-1R01 L810 can be used per port, with a maximum of three per port.

2. L864 beacon specifics:
 - a. When an L864 beacon is to be used, it must be connected to Port 2 (L.T. 2)
 - b. The port will support one L864. In no circumstances are L810's and L864's to be sharing a single port.
3. A typical A1 tower will have one L864 wired to port 2 (L.T. 2) and three L810 lights wired in parallel to port 1 (L.T.1).
4. The three conductor AC cable shall be connected to the controller at the driver board follows; (Figure 4)
 - Line (black) cable to "L" connection of terminal block LT.1 or LT.2.
 - Neutral (white) cable to "N" connection of terminal block LT.1 or LT.2.
 - The Earth ground, GREEN wire of the three conductor cable will be secured in the Earth Ground Block



Port 1 L810

Port 2 L864

Figure 4 – Marker Light Connections

Photocell Connection:

The Photocell requires use of the three conductor cable, with a minimum of 18 AWG conductor. Photocell connectors are labeled on both the Photocell PCB and the Controller PCB. Ensure consistency of connections on both connection points. Use of a conduit is recommended. If a cable without conduit is used in a hazardous location installation then the cable at minimum MUST have either a shield or braid

that is properly connected to body of the photocell and to the enclosure of the controller it is being installed to. Failure to properly ground or use a cable without the shield or braid will void all warranties and the product could be subject to premature failures.

1. Unscrew the photocell cover to expose the screw terminal Phoenix connector, pull connector from Photocell PCB.
2. Connect the RED wire of the three conductor cable to the +V location indicated on the Photocell PCB.
3. Connect the GREEN wire of the three conductor cable to the SIG IN location indicated on the Photocell PCB.
4. Connect the Black wire of the three conductor cable to the RET location indicated on the Photocell PCB.
5. Repeat connections to the Controller PCB J4 respectively. (figure 5)

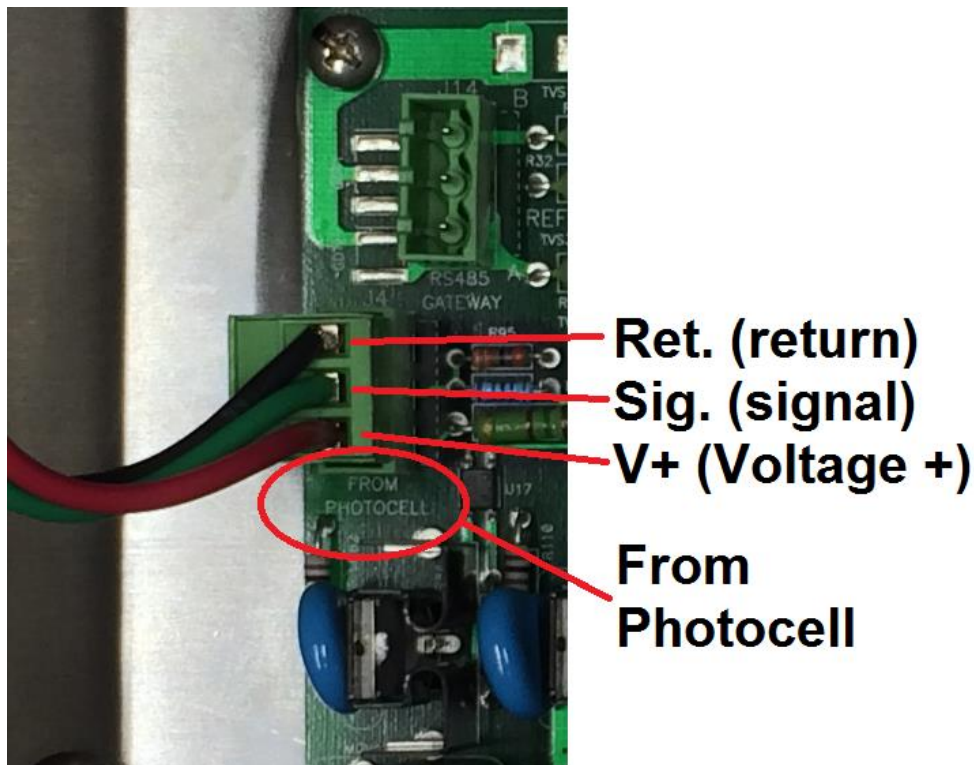


Figure 5– Photocell Connections

Configuring/Calibrating the Controller

1) Calibrating the L864/L810 ports

- a. Apply AC power to the system
- b. Push and hold the SW4 Un-Calibrate button (figure 6)
- c. When the red FAULT1 and FAULT2 indicator LED's (figure 6) on the driver board light, release Un-Calibrate button
- d. Press the SW1 RESET button to finish calibration sequence. (figure 6)

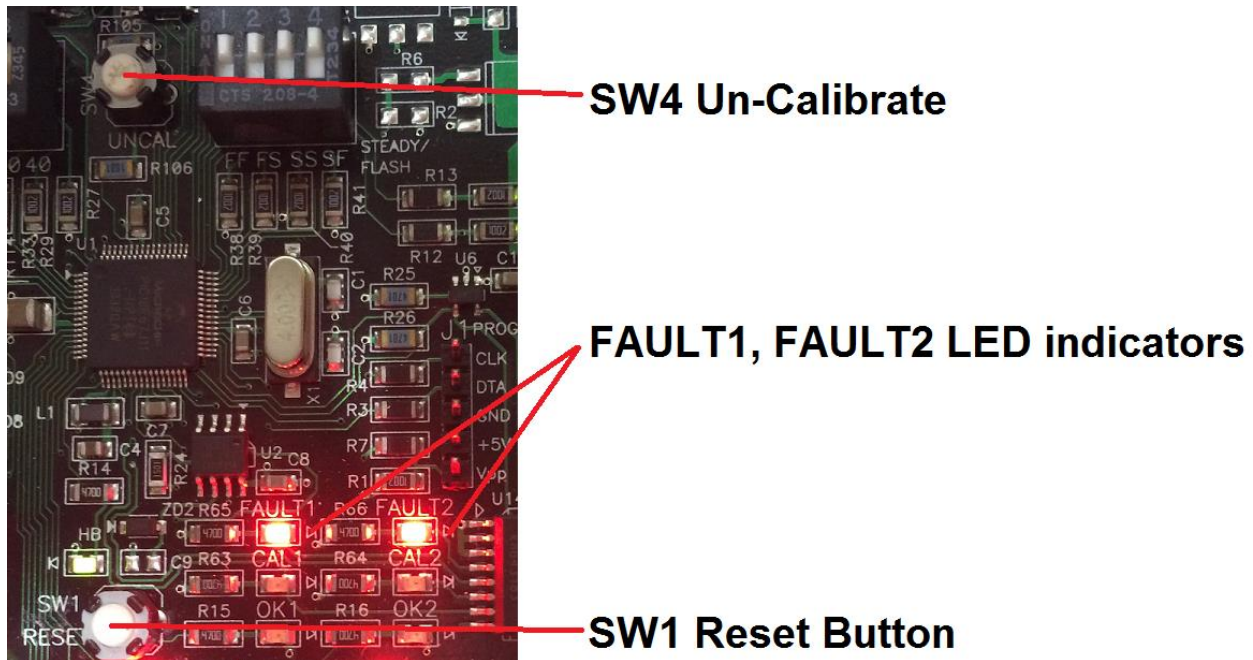


Figure 6 – Controller Calibration

Note that a correct calibration will have a green LED lit labeled OK1 if there is a connection detected at Port 1, and a green LED lit labeled OK2 if there is a connection detected at Port 2. A red FAULT LED followed by an alarm will indicate that there are two or more L810 lights not functioning or if port is being utilized for an L864 beacon, the beacon is not functioning.

2) Configuring ports - Flashing or Steady and Flash Rate

Warning: Do not set dip switches in any configurations other than pictured below.

- Flashing or steady as well as flash rate is controlled by settings on DIP switch blocks SW2 and SW3.
- Determine if lights are to be flashing or steady burn. If flashing, decide on their flash rate. 20, 30 and 40 flashes per minute are available, all operating on a 50% duty cycle.
- If flashing is desired on one or both ports, settings are as table 2 indicates.

Table 2 – Flash/Steady output selection

SW3 Positions				Status
1	2	3	4	Both ports (L.T.1 and L.T.2) have flashing output
X				
	X	X	X	
FF	FS	SS	SF	
Position 1 (FF) up, 2-4 down				
1	2	3	4	Port 1 (L.T.1) flashing output, Port 2 (L.T.2), steady burn output
	X			
X		X	X	
FF	FS	SS	SF	
Position 2 (FS) up, 1, 3, 4 down				
1	2	3	4	Both ports (L.T.1 and L.T.2) have steady burn output
		X		
X	X		X	
FF	FS	SS	SF	
Position 3 up, 1, 2, 4 down				
1	2	3	4	Port 1 (L.T.1) Steady burn output, Port 2 (L.T.2) flashing output
			X	
X	X	X		
FF	FS	SS	SF	
Position 4 up, 1-3 down				

Table 3 – Flash Rate Selection

SW2 Positions			Flashes Per Minute (FPM)
1	2	3	20 FPM
X			
	X	X	
20	30	40	
Position 1 up, 2-3 down			
1	2	3	30 FPM
	X		
X		X	
20	30	40	
Position 2 up, 1 and 3 down			
1	2	3	40 FPM
		X	
X	X		
20	30	40	
Position 3 up, 1 and 2 down			

Alarm Dry Contacts - Connections:

Utilize the dry contact alarm terminals to monitor the status of the lighting system.

Table 4 – Alarm Dry Contact descriptions

Title	Status: No Alarm	Status: Alarm or power lost to controller
Light Fail 1 (J7) (Alarm occurs when current on port 1 (L.T.1) drops greater than 25% of calibrated current)	COM-AL.C = open, COM-AL.O = closed	COM-AL.C = closed, COM-AL.O = Open, AL1 LED lit when power is present to controller
Light Fail 2 (J8) (Alarm occurs when current on port 2 (L.T.2) drops greater than 25% of calibrated current)	COM-AL.C = open, COM-AL.O = Open	COM-AL.C = closed, COM-AL.O = Open, AL2 LED lit when power is present to controller
PEC/TRANS Fail (J9) (Alarm occurs when electronic connection to photocell is lost or if a day-night or night-day transition has not occurred in over 18 hours)	COM-AL.C = open, COM-AL.O = Open	COM-AL.C = closed, COM-AL.O = Open, AL3 LED lit when power is present to controller

Status Dry Contact - Connections:

Utilize this dry contact terminal set to monitor that the system is in Day or Night mode

Table 5 – Status Dry Contact description

Title	Mode: Day or power lost to controller	Mode: Night
Mode (J10) Indicates if the system is operating in Day or Night mode	COM-DAY.C = closed, COM-DAY.O = open DAY LED indicator is lit when power is present at the controller	COM-DAY.C = open, COM-DAY.O = closed Night LED indicator is lit

2. Troubleshooting

This system has built in diagnostic modes enabling the user to manually switch into Day or Night. To force into either mode, use the buttons labeled DAY and NIGHT, SW5 and SW8. By holding the desired button down for three seconds, the system will manually change modes, and hold that mode for two minutes. The system will return to its normal operation automatically, using photocell input to determine the correct mode.

Table 6 - Troubleshooting Table

No power to the system	Ensure proper connections and voltage at the AC terminal block input, 120-240VAC, 50/60Hz	Restore connections at the AC terminal blocks, turn on circuit breaker if off on the AC supply to the system
No L810 or L864 lights are lit, system on in night mode	Ensure proper connections to the light output ports. Night LED on bottom right of controller PCB should be on, if not on, manually force system into night mode using SW8-Night button.	Restore connections at output ports if found to be improperly connected. If lights turned on while manually forcing system into Night mode, check for proper photocell wiring and functionality
Will not switch from Day to Night, or Night to day	Ensure connections at the Photocell PCB and the Driver board are consistent on both ends of the photocell wire	Using the Dialight 3 conductor cable, ensure that BLACK is connected to RET on the boards, RED to V+ and GREEN to SIG IN
Alarm indicated at port 1 or 2	Verify that alarm LED AL1, AL2 or AL3 are lit on board. If not lit, check that alarm wiring is properly connected. If lit, refer to below steps for each individual alarm.	Correct improper alarm contact wiring as necessary, refer to table 1, dry contact descriptions
AL1 present	Manually force system into Night mode. Using AC volt meter, ensure there is AC voltage present at port output. Note that this voltage will be turning on and off if port is specified to flash	If voltage is present, the lights or their wiring is suspect. If no voltage is present, there is a possibility of an open fuse on the controller PCB. Note that fuses are not user serviceable, contact Dialight support at this time.
AL2 present	Manually force system into Night mode. Using AC volt meter, ensure there is AC voltage present at port output. Note that this voltage will be turning on and off if port is specified to flash	If voltage is present, the lights or their wiring is suspect. If no voltage is present, there is anpossibility of an open fuse on the controller PCB. Note that fuses are not user serviceable, contact Dialight support at this time.

AL3 present	Ensure consistent wiring from photocell connector to the connection at the controller PCB. Ensure there are no obstructions interfering with the photocell sensor	Repair wiring as necessary and remove any obstructions to the photocell.
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REVISION HISTORY

<u>REV</u>	<u>ECO No.</u>	<u>DRN</u>	<u>CKD</u>	<u>APP</u>	<u>QA</u>	<u>CM</u>	<u>DATE</u>
A	21281	CV	SA	DW	JP	JN	10/1/14
B	22119	CV	EK	DW	EM	JN	11/10/14
C	23941	CV	SA	DW	JP	JN	2/13/15
D	64576	TLD	AV	AR	YS	JN	12/11/19