

Document: 9100-127-2650-99

Revision C

Release Date: 11/26/19

Hazardous Location Red Controller Assembly DHZC-CTR-2C-8000

READ AND FOLLOW ALL SAFETY INSTRUCTIONS





KEEP THESE INSTRUCTIONS!



- 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.



Release Date: 11/26/19

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 <u>all</u> instructions, cautions, notes and warnings, as well as <u>all</u> 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.

Marning:

To avoid the risk of fire, explosion, or electric shock, this product should be installed, inspected, and maintained by a qualified electrician only, in accordance with all applicable National electrical codes.

Marning:

To avoid electric shock:

- Be certain electrical power is OFF before and during installation and maintenance.
- The Power Supply must only be connected to Dialight Corp approved products.

<u>Marning:</u>

To avoid explosion:

- Do not connect to equipment that the Controller is not intended for.
- Ensure the marked T Rating is less than the ignition temperature of the Hazardous Atmosphere.
- Do not operate in ambient temperatures above those indicated on the Products label.
- Do not operate if the fasteners are not properly tightened.
- Do not operate in Hazardous locations with the Enclosure cover open.

▲ Warning:

To avoid explosion (Continued):

- EXPLOSION HAZARD- DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.
- AVERTISSEMENT RISQUE D'EXPLOSION AVANT DE DECONNECTER L'EQUIPEMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DESIGNE NON DANGEREUX.
- DO NOT REMOVE OR REPLACE WHILE CIRCUIT IS LIVE UNLESS THE AREA IS KNOWN TO BE FREE OF IGNITIBLE CONCENTRATIONS.
- THIS EQUIPMENT IS SUITABLE FOR USE IN HAZARDOUS OR NON-HAZARDOUS LOCATIONS ONLY. REFER TO PRODUCT FOR RATINGS



Release Date: 11/26/19

- EXPLOSIONS HAZARD DO NOT DISCONNECT WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS KNOWN TO BE FREE OF IGNITABLE CONCENTRAITIONS.
- WARNING EXPLOSION HAZARD DO NOT REPLACE ANY COMPONENTS UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA KNOWN TO BE NON-HAZARDOUS.
- AVERTISSEMENT RISQUE D'EXPLOSION NE PAS REMPLACER LES COMPOSANTES QUE L'ALIMENTATION EST COUPEE OU QUE LA ZONE EST CONNUE POUR ETRE NON DANGEREUX.
- WARNING EXPLOSION HAZARD SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 1.
- AVERTISSEMENT RISQUE D'EXPLOSION LA SUBSTITUTIOND E COMPOSANTSP EUTR ENDRE CE MATERIEL INACCEPTABLE POUR LES EMPLACEMENTS DE CLASSE I, DIVISION 1.

Marning:

- 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 recommend by the manufacture may cause an unsafe condition.
- DO NOT use this equipment for other than intended use.

Warning:

The technical data indicated on the product label is to be observed.

- Changes to the design and modifications of the Controller are not permitted.
- Only genuine Dialight replacement parts are to be used when unforeseen maintenance is required. Consult factory at www.Dialight.com or authorized representative as required.

Classifications for use:

- HAZARDOUS LOCATIONS:
 - CLASS I DIV 1 & 2 GROUPS A, B,C, D
 - Max Ambient Temp: +55°C
- Outdoor Type:
 - NEMA 4X rated
- Ta Ambient Temperature:
 - -40 TO +55° C T6
 - o 135°C T4



Release Date: 11/26/19

Introduction

This manual is for the installation and configuration of the Dialight Hazardous Location Red Controller. Part Number = DHZC-CTR-2C-8000

Table of contents:

Front Matter

- Personal hazard warning
- Notice and warnings
- Classifications for use
- Introduction

1) Operation and Installation

- A. System overview
 - Parts supplied
 - Typical basic system diagrams
 - Detail view of power supply/controller
- B. Installation Procedures Lighting and Controller
 - Controller mounting dimensions
 - Installation requirements
 - AC Mains connection to Controller/Power requirements
 - Connecting L810 and/or L864 lights
 - Photocell connection
 - Configuring/Calibrating the Controller
 - Calibration of L810/L864 output ports
 - Setting flash/steady modes
 - Setting flash rate
 - Connecting alarm dry contacts

2) Troubleshooting

- Diagnostics
- Troubleshooting Table



Release Date: 11/26/19

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. This controller is rated for Class I, Division 2 hazardous locations. 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 the two outputs are individually mode selectable. The flash rate of the lights is also configurable.

Parts supplied

1x Controller

Typical System Diagram

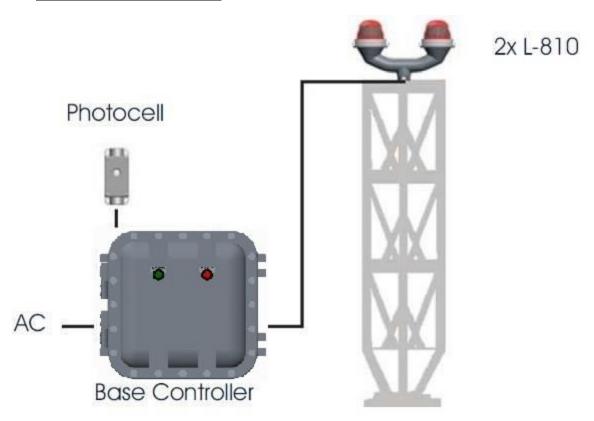


Figure 1 - Typical System A0 Connection Configuration



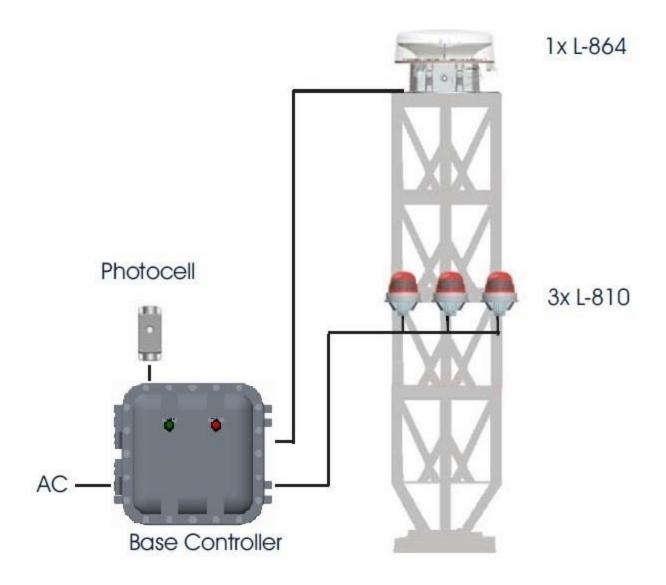
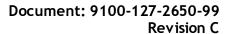


Figure 2 - Typical System A1 Connection Configuration



Release Date: 11/26/19



Detail View of the Controller

Front View

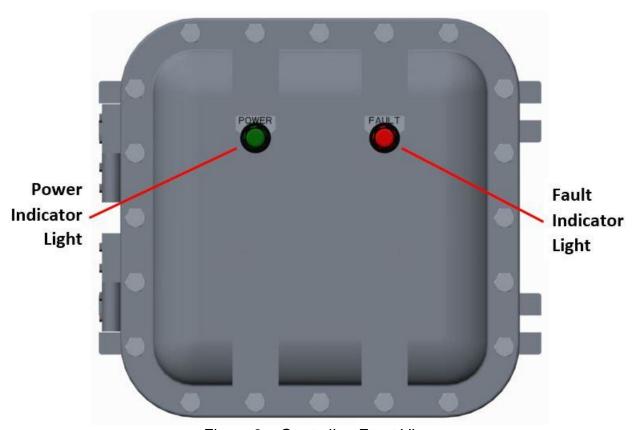


Figure 3 – Controller, Front View

<u>Fault Indicator Light RED</u> – used to alert the operator that a fault of the system has occurred, or that the system is operating in low intensity (DIM) mode

<u>Power Indicator Light GREEN</u> – used to inform the operator that there is AC input power present inside the controller.



Release Date: 11/26/19

Inside view of the Controller

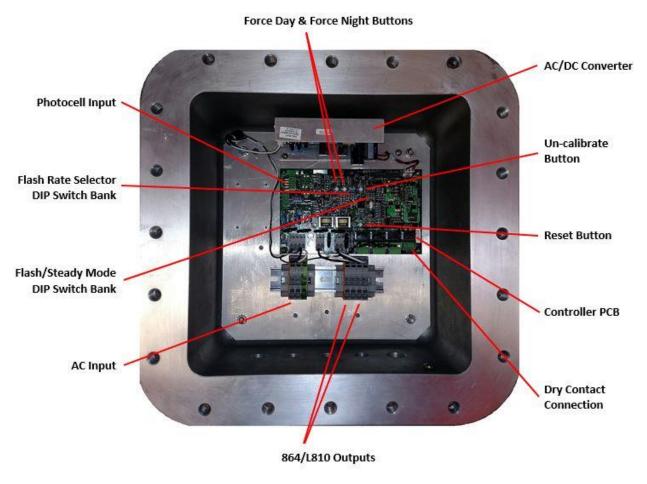


Figure 4 - Controller Assembly

<u>UN-Calibrate button</u> – Pushing and holding this button will clear previous calibration data and put the controller in "current sense mode," reading and recording currents on each port

<u>AC/DC Converter</u> – Converts the AC input to 48 Volts DC in order to run the controller PCB

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

<u>L864/L810 Outputs</u> – These are the two switched AC outputs to connect up to 2 L864 beacons or up to 8 L810 units per port.

<u>AC Input</u> – This terminal block input is used for connection of the AC input to the controller



Document: 9100-127-2650-99

Revision C Release Date: 11/26/19

Photocell Input - Interfaces the photocell to the system

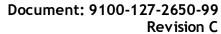
<u>Reset Button</u> – Pushing this will reset the microprocessor of the system, will read the calibration settings upon each reset

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

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

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

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



Release Date: 11/26/19



B. Installation Procedures – Lighting and Controller

During installation, proper grounding techniques must be utilized.

Controller:

Mounting Dimensions of the Controller

Note – All dimensions shown in inches, mounting holes openings can accommodate up to 1/2" screws/bolts.

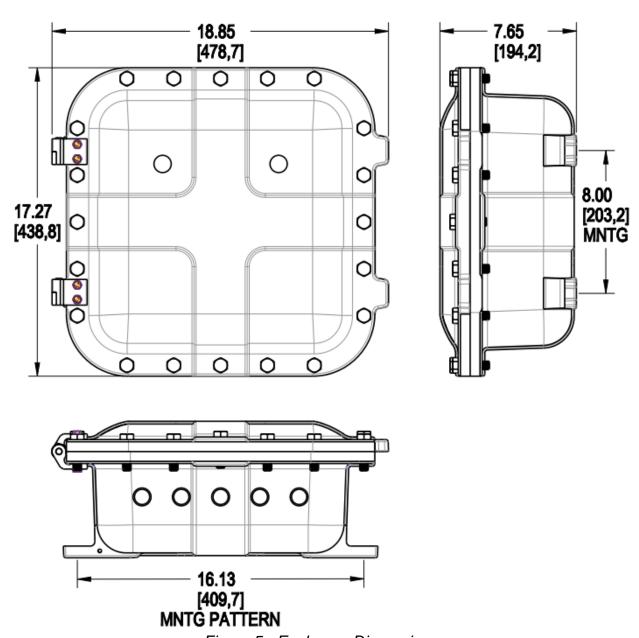


Figure 5 - Enclosure Dimensions



Release Date: 11/26/19

Installation Requirements

- Mount the L864 and/or L810 lights, Photocell and Controller to their intended locations
- Apply AC power to terminal block, Figure 6
 - 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 8AWG (10.55mm²) cable.
- Connection of the L864 and/or L810 RTO lights, Figure 7
- Attach output of Photocell to controller, Figure 8
- Calibrating the Current Sensors, Figure 9

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

Connection of AC Mains Power

1. 120-240 Volt AC is to be connected to the AC input Terminal Blocks (Figure 6)

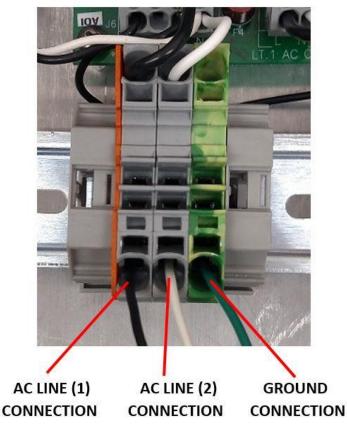


Figure 6 - AC Wire Connections

Connect AC power to the controller as shown above



Release Date: 11/26/19

Power Consumption Figures: Controller Only

AC voltage input	Input Current (mA)		Power Consumption (Watts)			<u>ATHD</u>	Power Factor	
	Normal Operation							
	<u>Min</u>	<u>Nom</u>	<u>Max</u>	<u>Min</u>	Nom	<u>Max</u>		
120V/60Hz	45	55	65	4	5	6	<20%	>0.9
240V/50Hz	45	55	65	4	5	6	<20%	>0.9

Connection of the Marker Lights (L810's) and Beacons (L864) to the Controller:

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

Table 1 – supported L810 and L864 lights

	Red only
L864 Beacon	D464B13001
L810 Marker	RTO2R0700x or 8602R0100x

- 1. L810 marker specifics:
 - a. When L810 marker lights are being used, they must be connected to Port 1 (L.T. 1) labeled <u>L1 N1</u>
 - 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 860-2R01-001 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) labeled <u>L2 N2</u>
 - 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 as follows; (Figure 7)
 - Line (black) cable to "L" connection of terminal block L1 or L2
 - Neutral (white) cable to "N" connection of terminal block N1 or N2



Release Date: 11/26/19

 The Earth ground, GREEN wire of the three conductor cable will be secured in the Earth Ground Block

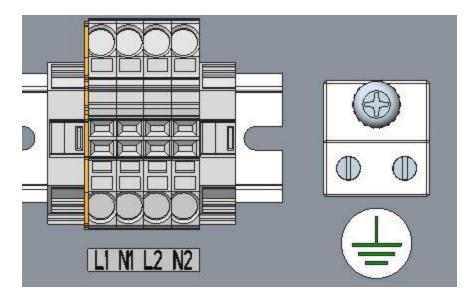


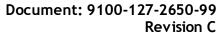
Figure 7-L810 & L864 Connection

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.

NOTE: Use of 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.
- 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.
- Repeat connections to the Controller PCB J4 respectively. (figure 8)



Release Date: 11/26/19



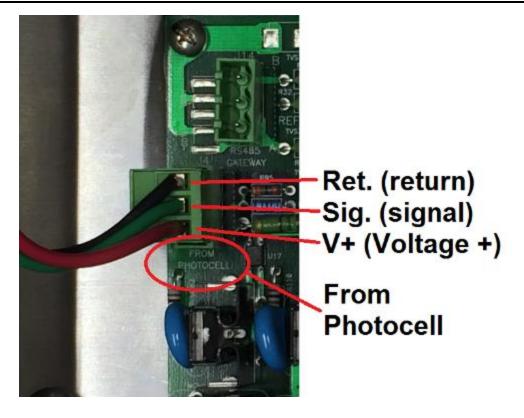


Figure 8 - Photocell Connection



Release Date: 11/26/19

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 9)
- c. When the red FAULT1 and FAULT2 indicator LED's (figure 9) on the driver board light, release Un-Calibrate button
- d. Press the SW1 RESET button to finish calibration sequence. (figure 9)

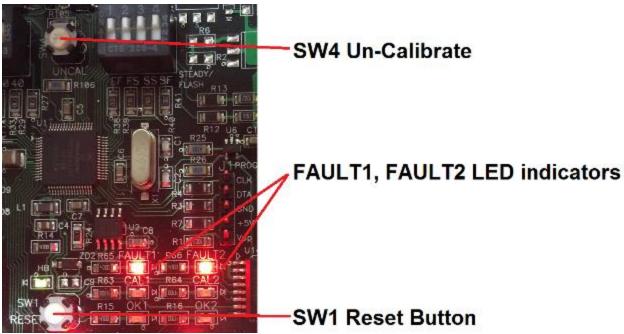


Figure 9 - Controller Configuration

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.

- a. Flashing or steady as well as flash rate is controlled by settings on DIP switch blocks SW2 and SW3.
- b. 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.
- c. If flashing is desired on one or both ports, settings are as table 2 indicates.



Release Date: 11/26/19

Table 2 - Flash/Steady output selection

CIVIO Dooitio	200	T GDIC 2	2 - Flash/Steady output selection
SW3 Position			Status
1 2	2 3	4	Both ports (L.T.1 and L.T.2) have flashing
			output
X			
>	(X	X	
FF FS		SF	
Position 1 (F		down	Dowt 4 /L T.4) floobing output Dowt 2
1 2	2 3	4	Port 1 (L.T.1) flashing output, Port 2 (L.T.2), steady burn output
X	/		(E.T.Z), Steady built output
	`		
	1	\ \ <u>\</u>	
X	X	X	
FF FS	s ss	SF	
Position 2 (F	FS) up, 1, 3	3, 4 dow	'n
1 2		4	Both ports (L.T.1 and L.T.2) have steady
			burn output
	X		
$ X \rangle$	(X	
FF FS		SF	
Position 3 u			
1 2		4	Port 1 (L.T.1) Steady burn output, Port 2
			(L.T.2) flashing output
		X	
X X	(X		
FF FS	s ss	SF	
Position 4 u	p, 1-3 dow	n	

••••••



Release Date: 11/26/19

Table 3 - Flash Rate Selection

SW2 Po	SW2 Positions			Flashes Per Minute (FPM)			
		2		20 FPM			
1	2	3		20.1.1			
X							
	X	X					
20							
20	30	40					
Position		3 down		00 5014			
1	2	3		30 FPM			
	V						
	X						
X		X					
20	30	40					
Position	2 up, 1	and 3 de	own				
1	2	3		40 FPM			
		V					
		X					
X	X						
20	30	40					
Position	3 up, 1	and 2 de	own				

Status Dry Contact - Connections:

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

Table 4 - Status Dry Contact description

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



Release Date: 11/26/19

2. Troubleshooting

This system has an external fault and power indicator to monitor operation of the controller while the enclosure is closed. The unit must be powered down before opening the enclosure in a hazardous environment. If the controller can be opened in a non-hazardous, safe environment there are built in diagnostics enabling the operator to visually see that the system has encountered a fault, thus indicated by the fault light on the front of the controller door. This system also 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. If fault light is lit, or other symptoms arise, refer to the troubleshooting table as follows.

Table 5 - Troubleshooting Table

Table 5 - Houbleshooting Table							
No power to the	Ensure proper connections and	Restore connections at the AC					
system	voltage at the AC terminal block	terminal blocks, turn on circuit					
	input, 120-240VAC, 50/60Hz	breaker if off on the AC supply to					
		the system					
No L810 or L864	Ensure proper connections to	Restore connections at output					
lights are lit,	the light output ports. Night LED	ports if found to be improperly					
system on in	on bottom right of controller	connected. If lights turned on					
night mode	PCB should be on, if not on,	while manually forcing system					
	manually force system into night	into Night mode, check for proper					
	mode using SW8-Night button	photocell wiring and functionality					
Will not switch	Ensure connections at the	Using the Dialight 3 conductor					
from Day to	Photocell PCB and the Driver	cable, ensure that BLACK is					
Night, or Night to	board are consistent on both	connected to RET on the boards,					
day	ends of the photocell wire	RED to V+ and GREEN to SIG IN					
Alarm indicated	Verify that alarm LED AL1, AL2	Correct improper alarm contact					
at port 1 or 2	or AL3 are lit on board. If not lit,	wiring as necessary, refer to					
	check that alarm wiring is	table 1, dry contact descriptions					
	properly connected. If lit, refer to						
	below steps for each individual						
	alarm						
AL1 present	Manually force system into Night	If voltage is present, the lights or					
	mode. Using AC volt meter,	their wiring is suspect. If no					
	ensure there is AC voltage	voltage is present, there is a					
	present at port output. Note that	possibility of an open fuse on the					
	this voltage will be turning on	controller PCB. Note that fuses					
	and off if port is specified to	are not user serviceable, contact					
	flash	Dialight support at this time.					



Release Date: 11/26/19

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 a possibility 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



Document: 9100-127-2650-99

Revision C Release Date: 11/26/19

<u>REV</u>	ECO No.	DRN	CKD	APP	QA	CM	DATE
A	32065	CAG	SA	CV	YS	JN	2/4/16
В	39763	BAM	CAG	SA	JP	JN	1/12/16
С	64624	TLD	AV	AR	YS	JN	11/26/19