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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, and warnings; as well as all the labels affixed to the product. Failure to do so could result in personal injury or damage to the 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.**
- **FAILURE TO TIGHTEN DOWN CLAMP WASHERS WILL MAKE INTERNAL COMPONENTS VULNERABLE TO SURGE OR LIGHTNING DAMAGE AND VOID THE SYSTEM WARRANTY.**
- **FAILURE TO PROPERLY BOND THE EARTH GROUND WIRE TO THE JUNCTION BOX WILL RESULT IN EVENTUAL LIGHTNING DAMAGE OF THIS SYSTEM. TO AVOID WARRANTY NULLIFICATION, FOLLOW ALL DIRECTIONS IN THEIR ENTIRETY.**
- **WARNING: FAILURE TO PROPERLY BOND THE FLASHHEADS AND POWER SUPPLY ENCLOSURES TO THE TOWER STRUCTURE WILL RESULT IN EVENTUAL LIGHTNING DAMAGE OF THIS SYSTEM. THE SYSTEM'S WARRANTY SHALL BE VOID IF ALL FLASHHEADS AND POWER SUPPLY ENCLOSURES ARE NOT PROPERLY BONDED TO THE TOWER STRUCTURE. TO AVOID WARRANTY NULLIFICATION, FOLLOW ALL DIRECTIONS IN THEIR ENTIRETY.**
- **CAUTION: NEVER LOOK AT THE FRONT OF A FLASHHEAD WHILE THE SYSTEM IS ENERGIZED. THE FLASHHEAD COULD START FLASHING CAUSING TEMPORARY BLINDNESS WHICH WOULD BE DANGEROUS AT HIGH ELEVATIONS.**
- **FAILURE TO SET UP SYSTEM CORRECTLY DURING STARTUP WILL RESULT IN THE TOWER HAVING TO BE CLIMBED AGAIN TO PERFORM TROUBLESHOOTING.**
- **DIALIGHT CORPORATION DOES NOT WARRANT THE HIGH INTENSITY SYSTEM WHEN USING IT WITH A TEMPORARY POWER SOURCE.**
- **DIALIGHT CORPORATION DOES REQUIRE PICTURES OF THE INSTALLATION FOR COMMISSIONING PURPOSES. FAILURE TO DO WILL VOID ALL ALL WARRANTIES.**
- **THE SITE MANAGER OR OWNER MUST SUPPLY RECENT PICTURES OF THE STRUCTURE TO ENSURE ACCURACY OF THE LIGHTING SYSTEM AND HARDWARE SUPPLIED.**
- **ADEQUATE WIRING GAUGES AND BREAKER SIZES ARE THE RESPONSIBILITY OF THE SUPPLIER OF THE SYSTEM.**
- **SPECIAL CONSIDERATIONS ARE REQUIRED FOR INSTALLING ON HOT AM TOWERS. CONTACT THE SUPPLIER OF THE SYSTEM WHEN IN DOUBT.**
- **AC INPUT TOLERANCES ARE A MAXIMUM OF +/-10% OF THE NOMINAL VOLTAGES SHOWN IN THE MANUAL**
- **DO NOT LOOK INTO THE INFRARED (IR) LEDs. THESE IR LEDs ARE INTEGRATED INTO THE FLASHHEAD WITH THE RED/WHITE LEDs. THEY WILL NOT APPEAR TO BE ON, BUT CAN BE VERIFIED USING MOST DIGITAL CAMERAS.**

Warranty

Please visit www.dialight.com/resources/warranties for the latest warranty policy.

Product Overview

The Dialight L-856 / L-864 High Intensity White / Red / Infrared (IR) Strobe System, herein referred to as the System, is designed for the lighting of tall structures such as television and radio towers, chimneys, cooling towers, tall buildings, wind generators and other obstructions to aerial navigation, per specification by the FAA (Federal Aviation Administration).

This product uses LED technology within each Flashhead to produce white or red strobe light. Unlike conventional xenon flashtube technology, little or no maintenance is required during the lifetime of this System. Working voltages within this system never exceed 200 Volts DC. By significantly lowering the working voltage with respect to Xenon white strobes, this System represents an advance in obstruction lighting safety and efficiency.

One Base Controller is required to operate the System with up to eighteen (18) L-856 flashheads and up to three (3) L-864/865 Antenna Obstruction Light (AOL). For example, a System with six Flashheads or a system with eighteen Flashheads will use the same Base Controller to operate.

With the use and proper setup of the Base Controller each of the below FAA Lighting Systems can be configured through the LCD display.

White Only System

The system may comprise up to eighteen L-856 High Intensity White Strobe Flashheads; each Flashhead with a corresponding Power Supply. The Flashheads are typically distributed as three per level on up to six levels, for a maximum of eighteen Flashheads.

Red/White with IR System

The System may comprise up to eighteen L-856/864 High Intensity White Strobe Flashheads which have the RED L-864 and Infrared (IR) included in each of the LED modules. Each has a corresponding Power Supply. The Flashheads are typically distributed as three per level on up to six levels, for a maximum of eighteen Flashheads. L810 Marker Lights are also monitored through the base controller.

AOL Strobe

Additionally, up to three (3) L-864/L-865 Medium Intensity Strobe may be integrated into the system as an Antenna Obstruction Light (AOL). The Base Controller will synchronize, monitor, and control the entire system, as well the Antenna Obstruction Light(s).

Terminology

The following definitions apply to the System:

L856	FAA class of a flashing White High Intensity Obstruction Light, 40 FPM
L864	FAA class of a flashing Red with IR Medium Intensity Obstruction Light, 30 FPM
L810	FAA class of a Red with IR Steady Burning Obstruction Light
Base Controller	Master Control Cabinet
LCD Screen	Liquid Crystal Display; forty-character module
Micro Board	Printed circuit board with onboard micro controller
Relay Board	Provides 8 external connections for alarm status and monitoring
Alarms	Alarm faults that need to be verified and corrected, NOTAM must be reported
Events	Events are a notice to the site manager that an "event" occurred but has NOT caused an Alarm. These are also used to troubleshoot alarms.
Power Supply	Enclosure mounted to the tower controlling an individual Flashhead
Dip Switches	Located in Power Supplies to assign addresses to each Flashhead
Flashhead	The 3 individual LED Modules mounted together
Flash "LED" Module	The individual module numbered 1, 2 or 3 containing the LED's and reflectors
PEC Mode	Flash intensity based on outdoor ambient light condition
Heartbeat	Blinking LED which indicates a Micro Board is healthy. NOTE: Located in both the Base Controller and Power Supply
Red System	When properly configured through the main micro provides RED and IR at night operation
White System	When properly configured through the main micro provides WHITE at Day and Twilight operation
AOL	Antenna Obstruction Light, also can be added through the Base Controller
Synchronization	All lights flash simultaneously to the human eye
Communication	RS485 signals between Controller, Power Supply and Flashhead
25% Failure	Alarm occurs when greater than 25% of a single Flashhead is out, monitors for both in Red with IR operation and white operation
System	The lighting, hardware, wiring and any other materials required for installing the lighting components.

System Descriptions:

The below devices are covered in this manual.

D366A57CTRAC	Gen3 High Intensity Controller 120, 208, 240 or 277VAC 50/60Hz Input Voltage Operates up to Eighteen (18) L-856 or L-864/856 Flashheads Operates up to six (6) levels of L-810 LED fixtures (up to 4 per level)
D366A57CTRACN	Gen3 High Intensity Controller 120, 208, 240 or 277VAC 50/60Hz Input Voltage Operates up to Eighteen (18) L-856 or L-864/856 Flashheads Operates up to six (6) levels of L-810 LED fixtures (up to 4 per level) Integrated Network w/Embedded Monitoring (INEM) Included
D366A57270	Gen3 Dual Red/White w/Infrared (IR) High Intensity Flashhead (L-856/864) Gen3 White High Intensity Flashhead (L-856) 208, 240 or 277VAC Input Voltage
D1CWFH409	Dual Red/White w/Infrared (IR) & 4 conductor AOL Flashhead Configured in controller as Dual Red/White or White Only
D1CWPS9409	Dual Red/White w/Infrared (IR) AOL Power Supply 120/277VAC Input Voltage L-864/865 or L-865 flash head w/IR, 4 conductor cable required
RTOCR2700x	120/240VAC L-810 LED Sidelight w/IR, Single or Double
D2566000PEC	High Intensity Photocell

System not listed, please contact Dialight technical support at 844-436-5422.



Getting Started

Carefully unpack and take inventory of all system components before beginning the following steps. Flashheads and Power Supply Enclosures come in separate boxes. They must be paired together and laid out in a clean work area.

Parts Typically Supplied:

- Base Controller
- LED Flashheads (Each consisting of 3 modules factory secured together)
- Corresponding LED Flashhead Power Supplies
- Spare Parts Kit(s)
- User Manual
- Quick Start Manual (Configuring the Base Controller)

NOT Supplied with this Manual are the site-specific installation and wiring diagram. These items will be supplied by the System seller or installer.

Section 1: General Tower & Site Preparation

It is recommended that the tower on which the system is to be installed be inspected prior to the installation. This includes the grounding array at and around the tower. Proper grounding is critical for a reliable maintenance free system.

Existing junction boxes should be opened and checked for leaks.

Existing wiring that will be used for the new LED lighting system must be checked at this time for proper gauge sizing, ratings, breaks, oxidation, and other damage that could cause electrical issues during the installation and operation. Failures in the wiring during or after the installation are the responsibility of the Site Manager and the owner of the structure. It is recommended that any reused existing cable has the bare wire cut far enough back to expose clean copper. If this is not possible then the cabling MUST be replaced.

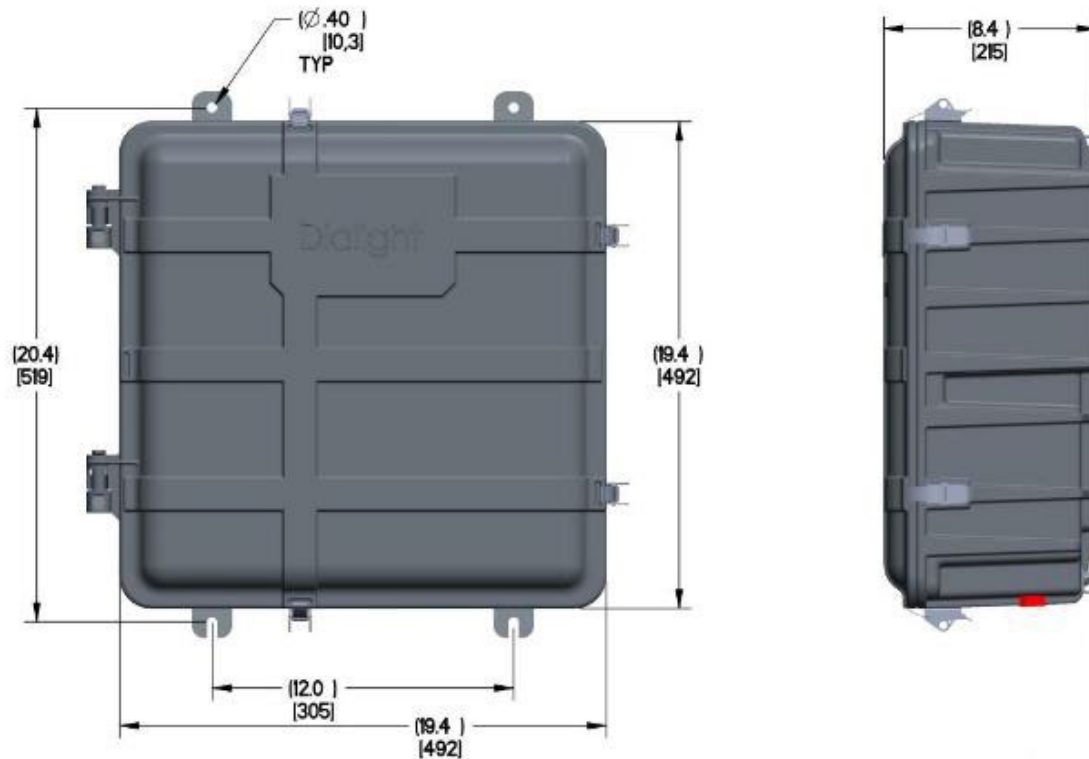
Cable drip loops and drain plugs must be added to the system as seen fit.

- Cable drip loops - suggested minimum of 5 feet at each light and/or power supply
- Drain plugs should be located at the bottom of any conduit run and or at the lowest point of the conduit run.
- For horizontal conduit runs it is required that the conduit be tilted or angled toward junction boxes that have drain plugs. Conduit should not tilt downwards to un-drained enclosures or to breaker panels.

Section 2: Dimensions for Mounting Equipment

The Base Controller, Flashhead Power Supplies and optional AOL Power Supply will utilize the same NEMA4 enclosure.

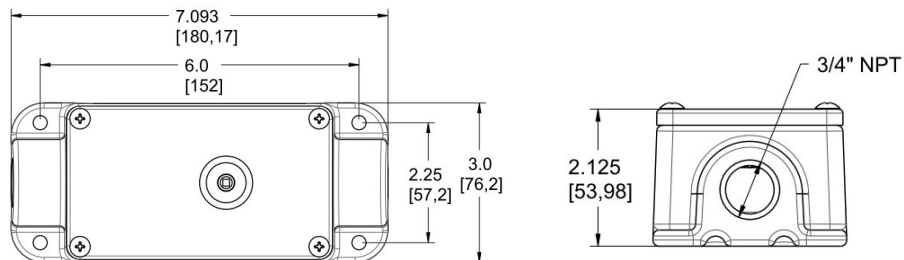
- Recommended mounting hardware diameter is 3/8" (10.3mm)
- Weight of the Base Controller enclosure is 40 lb. (18.1 kg)
- Weight of the Flashhead Power Supply enclosure is 40 lb. (18.1 kg)
- Six (6) 3/4-inch NPT entrance holes provided on bottom side of enclosure



Dimensions for Mounting the D2566000PEC Photocell

The photocell is housing in a small junction box with ambient detector mounted behind the cover window. Ensure that the photocell is mounted vertically on rigid 3/4" conduit.

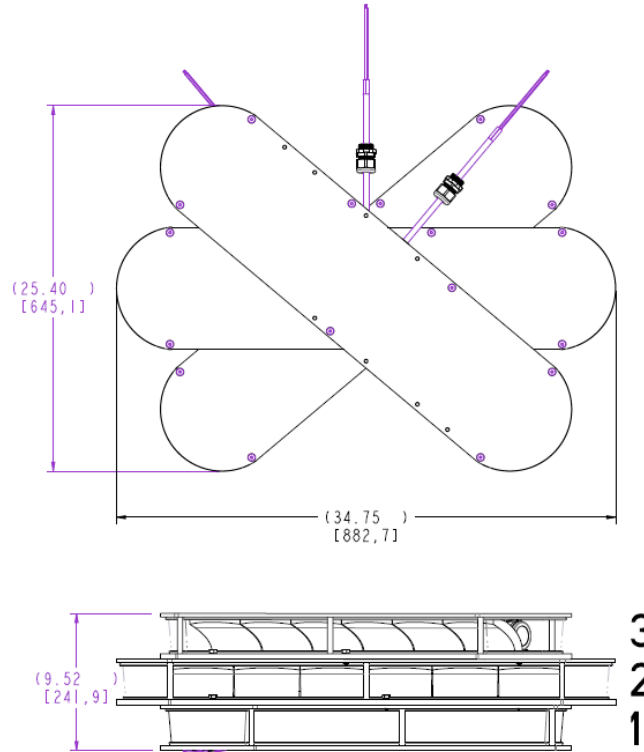
- Four (4) $\varnothing 0.22$ " (5.6mm) thru holes provided for mounting



Dimensions for Mounting the D366 L856/864 Flashhead

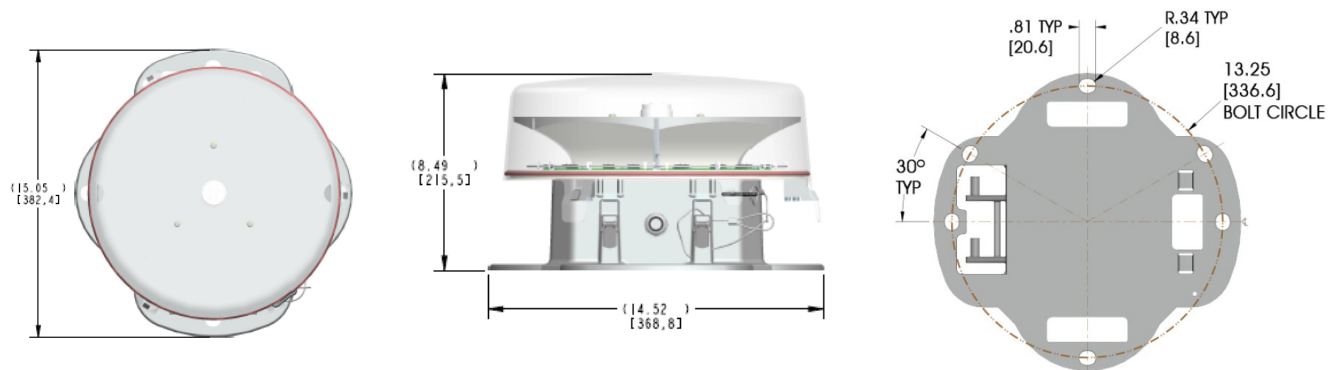
The D366 High Intensity Flashhead will be mounted on a bracket that is supplied by others.

- Weight of the flashhead is 63 lbs. (30 kg)



Dimensions for the D1CW AOL L864/865 Flashhead

Weight of the flashhead is 21 lbs. (9.5 kg)



Electrical Specifications

Flashhead Voltage:	135 - 165 VDC (150 VDC nominal)
Flashhead Power Supply Voltage:	208 - 277 VAC, +/- 10% 50/60 Hz
Base Controller Voltage:	120 - 277 VAC, +/- 10% 50/60 Hz
Power Supply Enclosure Wattage:	Day mode: 160 W Twilight mode: 30 W White Night mode: 23 W Red/IR Night Mode: 35 W
Base Controller Wattage (all modes):	6.5 W Maximum
Flash Rate:	Day: 40 FPM Twilight: 40 FPM White Night: 40 FPM Red/IR Night: 30FPM
Flash Intensity:	Day: 270,000 Candela (± 25%) Twilight: 20,000 Candela (± 25%) Night(red): 2,000 Candela (± 25%) Night (IR): > 246 mW/sr
Light Pattern (all modes):	Horizontal plane: 120° Vertical plane: 3°- 7°

Environmental Specifications

Operating Temperature Range: -40°F to +130°F (-40°C to +55°C)

Humidity: 95% relative humidity

Wind: up to 150 mph (240kmph)

Protection: IP66, Suitable for outdoor use

Pollution degree: P1

Equipment intended to be installed at an altitude of 2000m or less



Section 3: Choosing a Circuit Breaker

Refer to the wiring diagram, that is sent by the lighting system installer, with the cables and hardware for site specific information. This information is required to be sent by the system provider or the hardware provider.

For the purpose of sizing tower conductor gauges and circuit breakers follow the table and formula below. Input current is inversely proportional to supply voltage, so low supply voltages result in higher input currents. It is the responsibility of the system supplier to calculate the required cable gauges and breaker sizes.

All tolerances are +/- 10% from nominal voltages shown below. Measurements are actual measurements and not scaled.

Table 1 - High Intensity Strobe Current Ratings

Nominal Supply Voltage /Freq (VAC)	RMS Current (A) per Flashhead	Peak Current (A) per Flashhead
208 / 60Hz	1.12	2.18
240 / 50Hz	.96	1.98
277 / 60Hz	.87	1.68

Find the proper voltage used to operate the system in the table above; then multiply the number of Flashheads on the System times the RMS current to find the total operating current. Also multiply the number of Flashheads on the System times the peak current to find the total peak current.

If using a Dialight D1CW strobe as an AOL, then you must add the current of the AOL to the total calculated below if the AOL is to be powered off the same breaker.

Table 2 - AOL (D1CW) Current Ratings

Nominal Supply Voltage/Freq (VAC)	RMS Current (A) for AOL	Peak Current (A) for AOL
208 / 60Hz	0.8	1.3
240 / 50Hz	0.50	0.8
277 / 60Hz	0.50	0.8

WARNING: The above tables are for individual Flashheads and the AOL. The complete system power requirements must be calculated. It is recommended that no more than 80% of the breaker rating is used.



Section 4: Base Controller Preparation

The Base Controller should be permanently mounted in a location which has easy access for inspections or upgrades. See Section 2 for required mounted area requirements.

The Base Controller can be energized from the same circuit breaker as the Flashhead Power Supplies or it can be run from a dedicated 120VAC 50/60Hz. In the case of different voltages and breakers, it is recommended that the Power Supplies be powered up first, then the Base Controller. This will only be required during the installation process and configuring the system. The preferred installation method is to have the Base Controller be on its own dedicated breaker.

WARNING: Power Supplies/Flashheads can NOT properly operate from 120VAC.

Table 3 - Base Controller Electrical Parameters

Nominal Supply Voltage (VAC) Hz	Watts	Information
120 +/-10% Max 50/60Hz	6.5	Can only be used if Controller has its own dedicated circuit breaker
208 +/-10% Max 50/60Hz	6.5	
240 +/-10% Max 50/60Hz	6.5	
277 +/-10% Max 50/60Hz	6.5	

The Base Controller can be mounted to any sufficient location the installer/electrician sees fit. The dimensions are given below. If the Base Controller is to be mounted to an exterior structure such as the tower, then special grounding considerations must be adhered to avoid voided warranties.

For exterior mounting, it is suggested that the conduit or glands be mounted on the bottom of the enclosure using holes provided by Dialight to ensure a weather tight seal for the life of the product. If there is a possibility of water or condensation entering through the conduit or cables, the installer must take all necessary precautions to prevent water entering the enclosure. Failure to do so will void all warranties.



Base Controller Component Layout

Open the Base Controller enclosure and set aside any spare parts bags. Some spare parts included in this bag may be required for the fixtures being mounted on the structure. The following diagrams provide details of the Base Controller parts and locations.

System Component	Description	Part Number	System Component	Description
LCD	Main Control Board w/LCD	D7406LCD	TB1	AC Input Terminal Block
RJB	RS485 Junction Board	D7800RJB	TB2	L810 Sidelight Level Block
RLY	Dry Contact Alarm Board	D7600RLY	TB3	Photocell Block
PMB	Photocell / L810 Monitor Board	D7503SLM	TB4	Tower Side RS485 Block
PS	48VDC Power Supply	D2669006RA	TB5	Remote INEM RS485
FS	AC Filter/Surge Board	D7202SUR	GND	Ground Connection

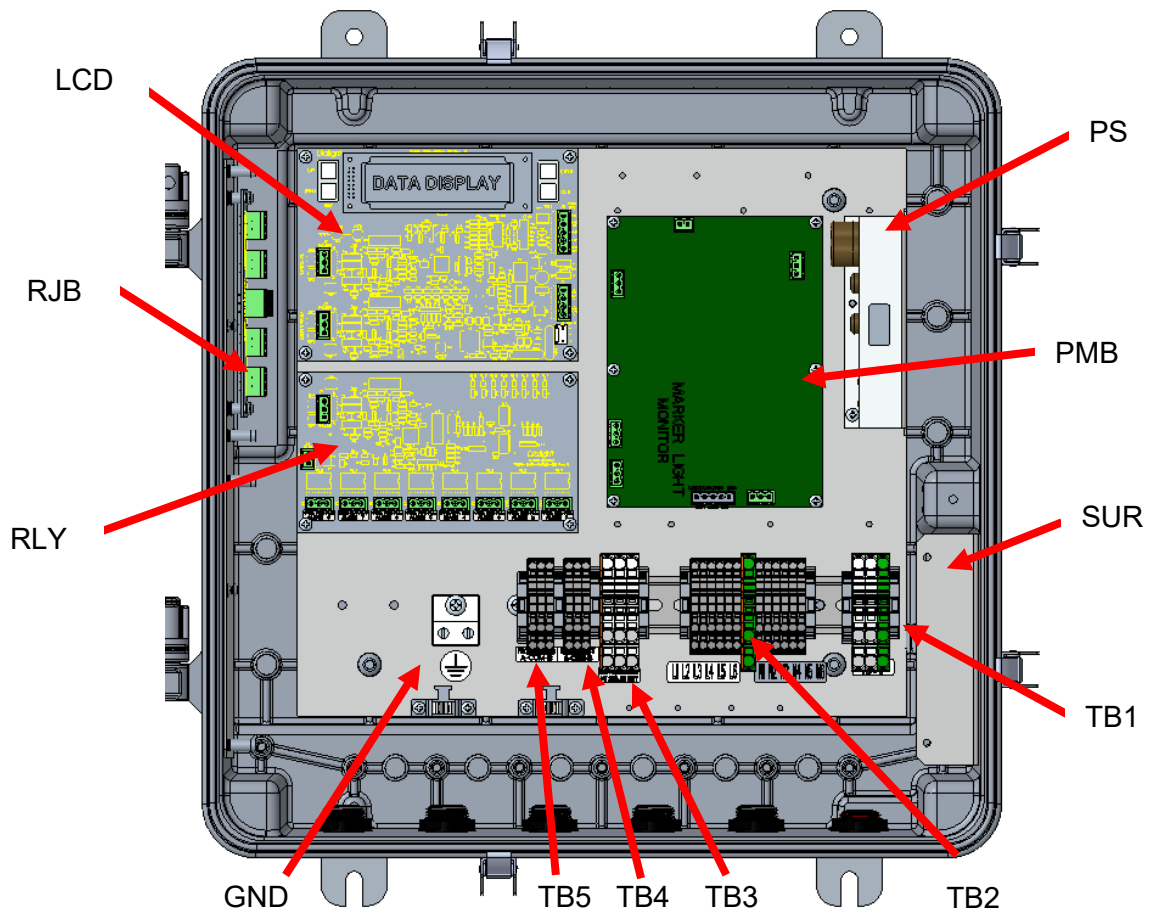


Figure 1 – Base Controller Interior



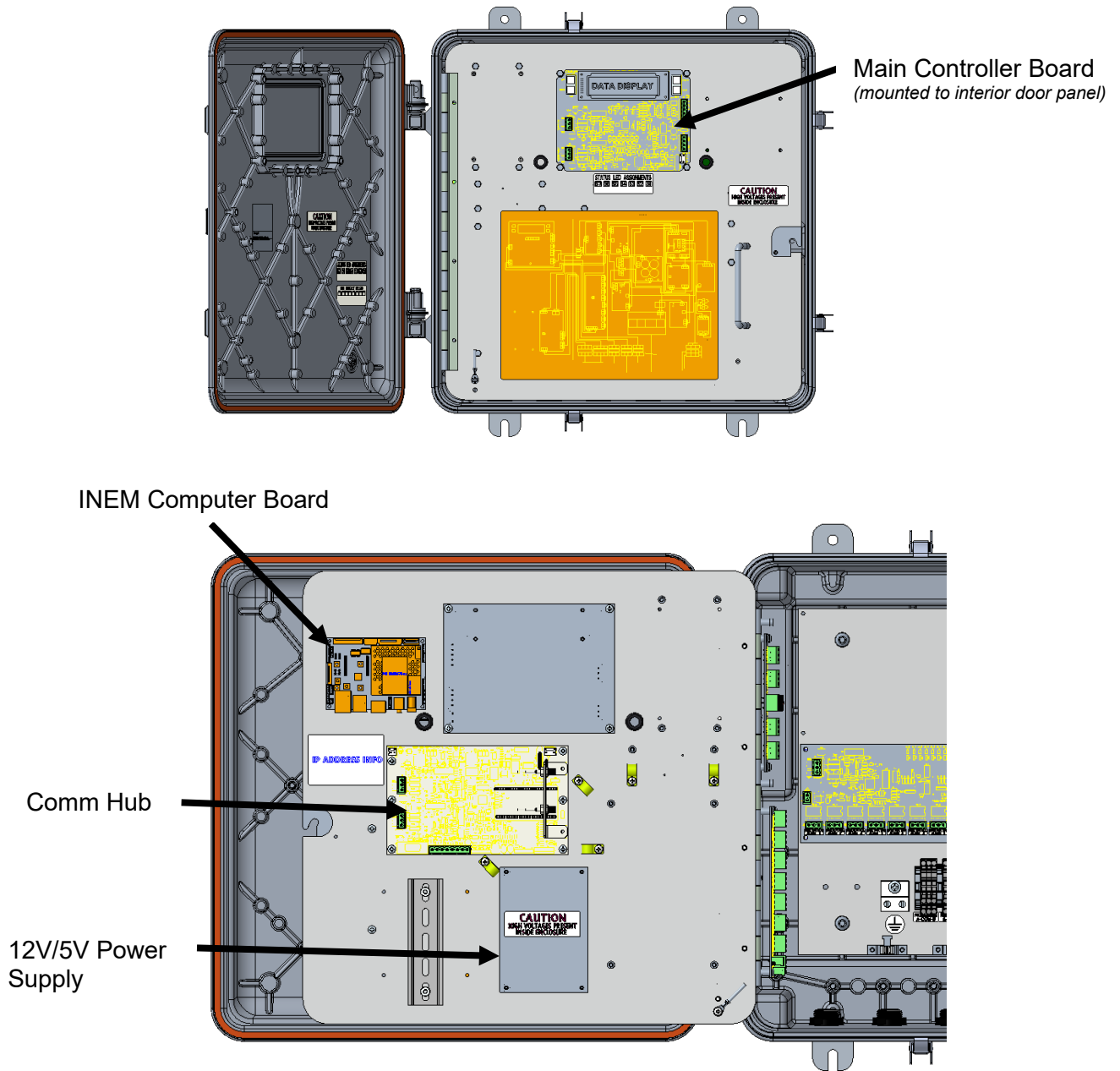


Figure 2 – Base Controller w/Integrated INEM



Section 5: Base Controller Input Power

Input power is connected at terminals labeled TB1 (see below). It is recommended that the Base Controller operate from a dedicated circuit breaker at 120VAC 50/60Hz. Input cable or wire NOT supplied with the system.

- The AC connection requires three conductors. Live, Neutral and Earth Ground.
- Input Voltage is 120/277 VAC 50/60Hz (100-305 VAC range).
- Typical wire size operating at 120VAC is #14-AWG.

Individual wires can be used but must be fed through seal tight or conduit.

Earth ground connection is required to provide safety and proper operation of the system.

WARNING: Floating Neutrals are not permissible within the wiring of the system and the installer must verify the connections. This will “Void” all warranties and cause system failure during turn on.

WARNING: No more than 305VAC measured from Live to Earth Ground or Live to Neutral on TB1. This must be measured before powering up the system.

NOTE: The load and voltage loss of the cable must be quantified before selecting the cable size requirements. See electrical specifications for details.

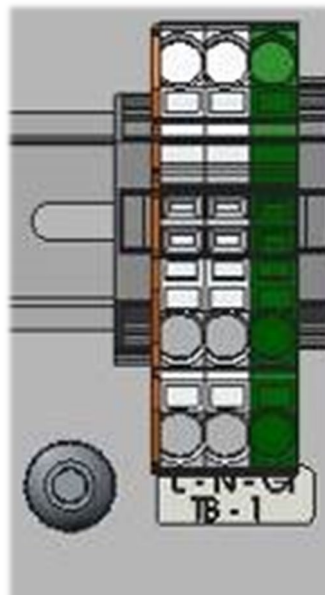


Figure 3 – AC Input Terminal Block

Section 6: Photocell Installation

One photocell is used for all Dialight Vigilant® Controllers, p/n D2566000PEC. No other photocell can be used as it will damage the system and void the warranty.

- Open supplied photocell enclosure by removing four screws.
NOTE: Screws are not captive to the cover plate.
- Insert cable/wires thru bottom port of housing.
- Strip back required length of jacket to allow connections.
- Remove green connector from circuit board.
- With screws shown – connect Red, Green, and Black wires.
- Color code will be Black-Green-Red once connector is seated.
- Completely reseal connector into circuit board.



Photocell to Controller Connections

- V+= Red Wire
(Supply from Controller)
- SIG IN= Green Wire
(Sense to Controller)
- RET= Black Wire
(Ground)



NOTE: A zip tie is provided inside the photocell enclosure to secure the cable from falling out. A UL knot can also be used to prevent the cable from sliding down the conduit. Weight of cable should not be placed on terminal block alone.

Cable Requirements:

Three conductor, 18AWG minimum with a max. distance of 500 feet from the controller.

Photocell must face north and be placed in a location without obstructions or excess ambient light (i.e. security light).

The photocell comes supplied with a 3/4" NPT conduit hub. Conduit mounting is recommended method for installing the photocell. If exposed cable is used in a hazardous location, the cable must have either a shield or braiding that is properly connected to body of the photocell and to the controller enclosure. 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.

Section 7: IR Sidelight (L810) Connections

Certain structures will require the use of low intensity red L-810 obstruction lights. When obstruction lights are required, the wiring connections will be at TB2. The Base Controller can operate and monitor up to six (6) obstruction light levels.

There are individual terminals for each light level for line and neutral. Typical nomenclature will have the lowest level at TB2-L1/N1. A common Neutral can be utilized for all the sidelight levels. Connection of a common Neutral can be at TB2-N1.

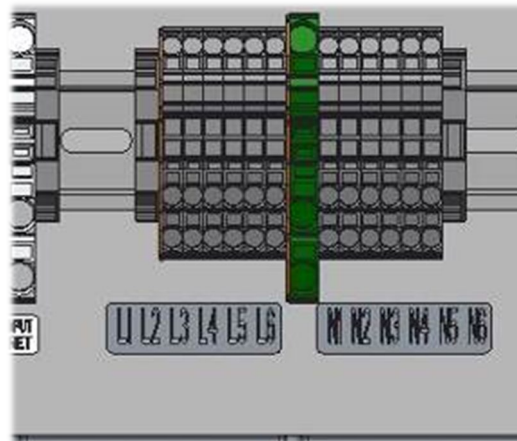


Figure 4 – DIN Rail Terminal Blocks

After the sidelight level(s) are connected, the system needs to be calibrated to set the monitoring thresholds of each light level. This procedure will be covered in Quick Startup Guide that is supplied with the system. Only Dialight RTO Series L-810 AC fixtures can be used.

Section 8: Base Controller - Tower RS485 Connection

The RS485 is the communications link between the Base Controller and all the lights on the structure. Inadequate connections or loose cables could cause events or alarms to be displayed and make troubleshooting time-consuming. The RS485 cable will connect to TB4 (RS485 Input). The connection of the RS485 cable is vitally important to the operation of the system.

NOTE: Every RS485 communications connection MUST be checked while installing the system.

NOTE: Each level of the structure can be tested before other fixtures are connected. Ensure the terminating resistor is engaged in highest number flashhead.

The common color code for the RS485 is Yellow, Gray and Blue. This color code is used throughout the Base Controller and Flashhead Power Supplies. The installer must record the color code if it is different.

A 3-conductor cable (18AWG minimum) with a foil shield, braid and a drain wire is required.

Conductor	Connection Point	Description	Color Code
Conductor 1	Label "A"	Communications "A"	Grey
Conductor 2	Common	Common for RS485	Yellow
Conductor 3	Label "B"	Communications "B"	Blue
Drain wire	Ground Terminal	Ground	Bare wire
Foil Shield / Braid	Clamping Terminal	Ground	Connected when cable enters the enclosure and must be bonded to the plate

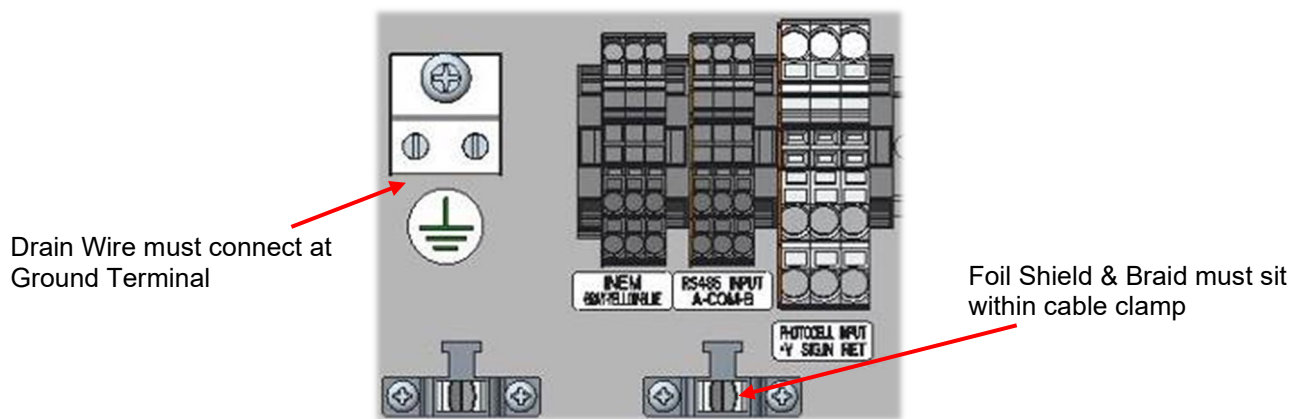


Figure 5 – RS485 Terminal Block



Section 9: Base Controller – Remote INEM RS485 Connection

If a remote INEM (Integrated Network w/Embedded Monitoring) is used in conjunction with the D366 Base Controller, the RS485 connection will be connected at TB5 (INEM).

This terminal will be unused if the INEM is integrated within the D366 controller or no INEM is present.

Section 10: Sync Input/Output

This connection is made at the Main LCD board at J8. Take care when routing the wire/cable from the external GPS Module or second Base Controller. The LCD will be mounted on the interior door, so the GPS wire/cable will need to be routed thru the controller and along the factory wiring to the LCD J8 connection. GPS wire/cable should be zip-tied to the factory wiring harness.

The SYNC IN contact looks for a pulsed signal with a period of 1,500 milliseconds, where the leading edge to falling edge of the pulse is greater than 100 milliseconds. This will trigger forty flashes per minute synchronized with the other system's output.

In order for the system to work with a GPS controller or Main Base Controller, the Base Controller requiring the external SYNC must be configured through the setup screens with "EXT GPS" set to YES. See the Quick Start Guide for more details on the GPS setup.

If connecting between two Base Controllers, two #18-AWG wires will be required to connect between the Main Base Controller at J8-GND and J8-SYNC OUT to the second Base Controller at J-8-GND and J8-SYNC IN.



NOTE: The maximum distance between the Base Controller and the device receiving the sync signal is 50 feet. If longer distances are required, please contact www.dialight.com.

NOTE: Be sure to following all installation instructions supplied with the 3rd Party GPS System.



Section 11: AOL Enable / Disable

An AOL Flashhead and Power Supply can be added to the System at any time by way of RS485 communications. By connecting RS485 from the AOL Power Supply to the junction box/surge device, the Base Controller will be configured for an AOL. The system will control and monitor the AOL. The system can accommodate up to three AOL units. The AOL must be fed from the same AC power source as feeding the high intensity lights.

WARNING: The AOL must be an approved Dialight version or delivered from one of their partners. Refer to the AOL instruction manual for additional wiring and mounting details.

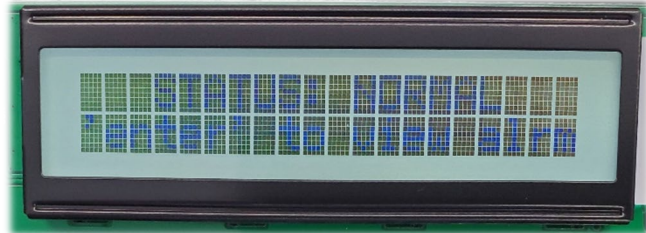
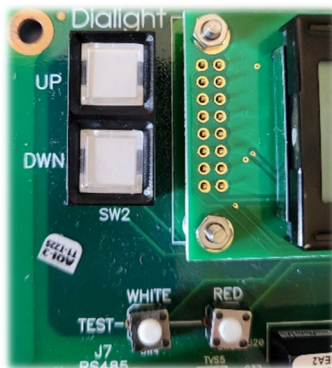
To enable the use of an AOL requires configuration through the config screen on the LCD. See the supplied Quick Startup Guide for configuration.

Section 12: Photocell Validation

Perform the following to make sure the Photocell is correctly connected and controlling the System mode. Initial testing can be done with only the Base Controller and Photocell; flashheads do not need to be connected or powered for this test. Ensure the Photocell is properly wired per Section 6.

Validation Steps

1. Turn on the Base Controller and wait for the Home Screen.
2. Using the up/down arrows on the Main Control Board - go to the "STATUS: NORMAL".
3. On the Monitor Board confirm LED Photo_Fault is not lit.
4. Remove the Phoenix connector on the Monitor Board J4 (circled in red below).
5. The status alarm must go from Normal to Alarm. The LED Photo_Fault will turn RED.
6. Press the "ENT" button the last alarm will be PEC lost will show "act".
7. Re-install the J4 connector and the LED Photo-Fault will be turned off.
8. Press the UP arrow and the next entry will be PEC lost "Clr".



For testing the actual operation of the Photocell, it is required that the Photocell be covered to indicate night mode operation. Since twilight mode is triggered between day and night mode, only day and night mode are required to be tested to ensure proper operation of the Photocell.

Validation Steps

1. With the Base Controller powered on, using the up/down arrows select the Mode screen.
2. Verify the present mode which will be day, twilight or night.

MODE: Day T=X C
ACTIVE: WHT

3: If the System mode is Day then simply covering the Photocell with a glove will change the state of the Photocell to Twilight, then Night. If the System mode is Night, shine a light source into the Photocell eye and wait for the mode change. Up to a 1-minute delay is common.

MODE: Night T=X C
ACTIVE: RED

WARNING: If the Photocell is removed or not connected properly all Flashheads will operate in Night mode based on if the system is set for RED night or WHITE night.

Section 13: Initial Flashhead Power Supply Preparation

The Flashhead Power Supply requires the most field wiring and should be configured and reviewed before being installed on the tower. The Power Supply has the same mounting dimensions as the Base Controller (see Figure 1 for details). The enclosure comes with mounting tabs that are to be joined to the body of the tower.

At the bottom of the enclosure there are six factory installed holes. Three of these are for connection to the Flashhead modules and one for AC mains and one for RS485 communications cable. The AC and RS485 can be run together and must be in seal tight or conduit. Unused holes must remain plugged to maintain ingress protection ratings.

The three left most entrances are numbered to correspond to the D336 Flashhead module cable number.

NOTE: If for some un-foreseen reason additional holes are required for the installation. Contact the seller of the system or Dialight for instructions.

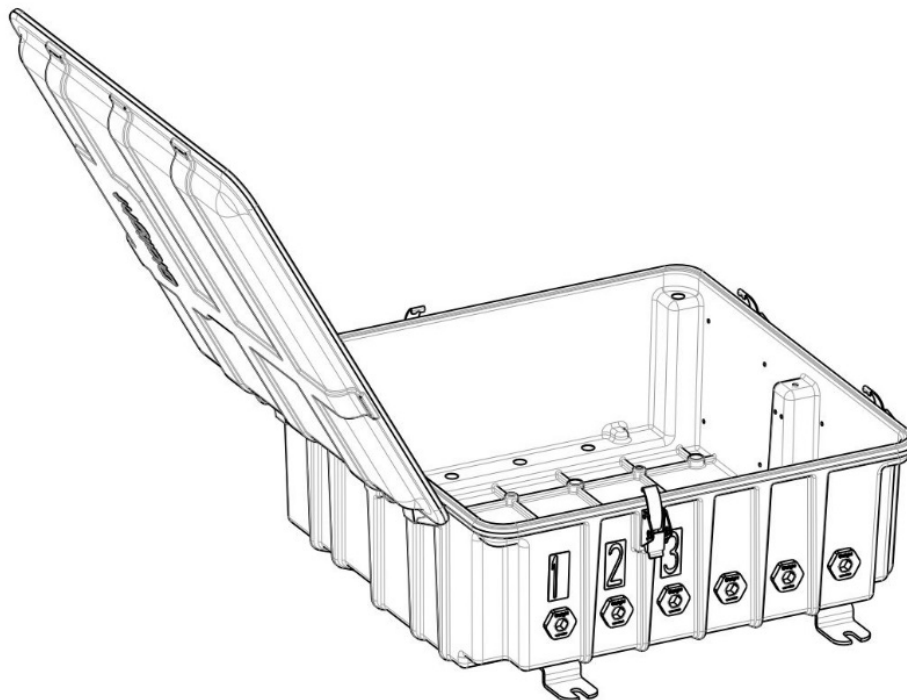


Figure 6 – Factory Installed Holes

Flashhead Power Supply Component Layout

System Component	Description	Part Number	System Component	Description
MB	Micro Board	D7107MIC	TB1	AC Input Terminal Block
PSA	Power Supply A	D7701DRV	TB2	RS485 Terminal Block
PSB	Power Supply B	D7701DRV	TB3	Light Module 3 Terminal Block
FS	Filter/Surge Board	D7200SUR	TB4	Light Module 2 Terminal Block
INT	Interlock Switch	D8000SWS	TB5	Light Module 1 Terminal Block
			GND	Ground Connections

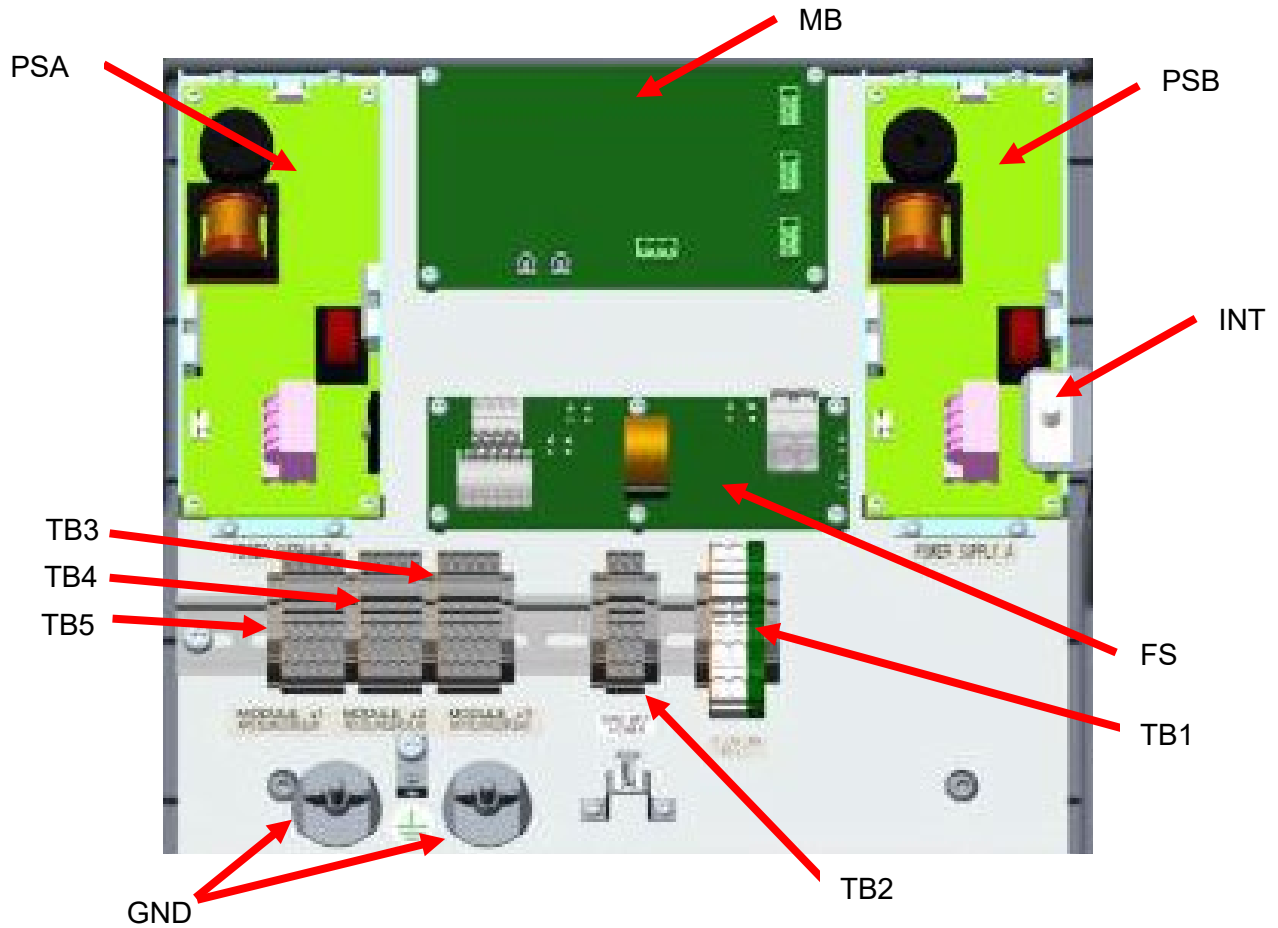


Figure 5 – Power Supply Layout



Section 14: Power Supply Addressing

Open the enclosure and orientate your view to match the illustration shown below. On the Micro Board there is a DIP switch array designated as SW1. This is the addressing switch used to identify this Power Supply Enclosure / Flashhead on the system.

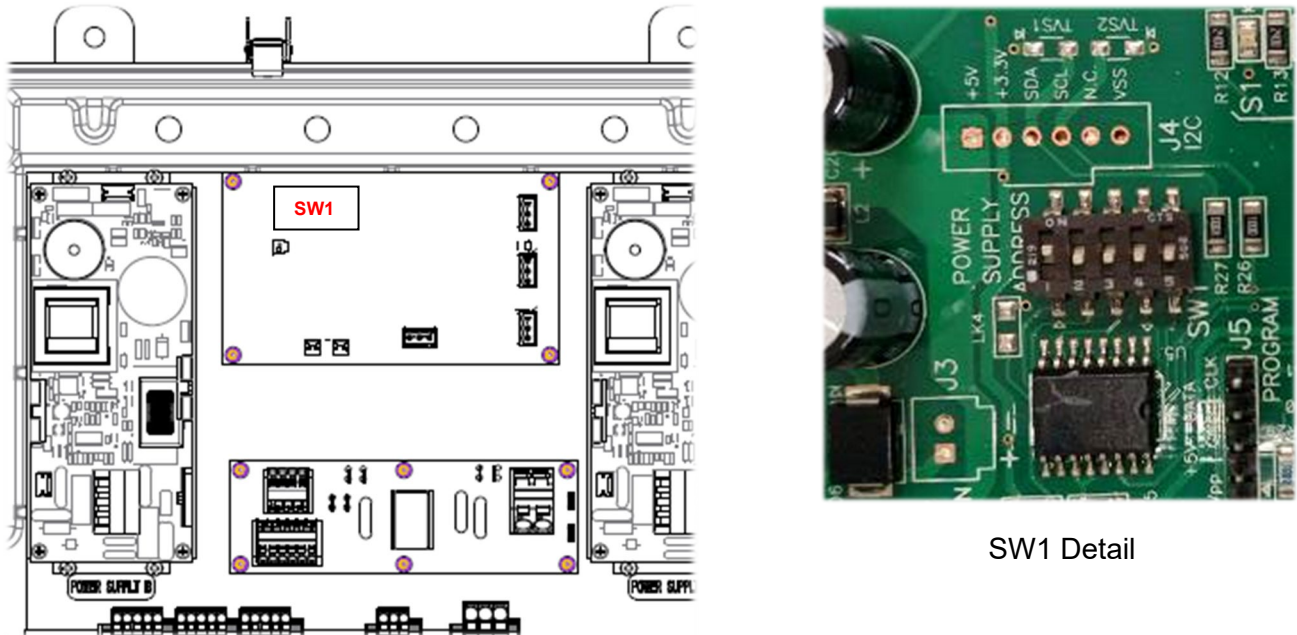


Figure 6 – Flashhead Addressing

The default factory address is 1 (Position 1 UP). One of the Power Supply Enclosures must be set as address 1. The addresses of all other Power Supply Enclosures must be changed. The inside of the enclosure will have a sticker showing all the possible address positions for switch SW1.

The switch position value are as follows:

Position	Value
1	1
2	2
3	4
4	8
5	16

Example Setting for Light 12

Position	ON /OFF
1	OFF
2	OFF
3	ON
4	ON
5	OFF

No two Power Supplies can have the same address setting. If duplicate settings are made then configuration errors will be shown in the event log.



Flip the DIP switches on SW1 to match the desired address for that Power Supply location, as shown below, and then immediately mark the inner label with an X in permanent marker as to which address was SET. The enclosure should be closed up tightly before being lifted to the mounting location. Therefore before mounting the address should also be written on the outside of the enclosure with a grease pencil or marker.

SET	ADDRESS NUMBER	LEG	BINARY NUMBER (1-2-4-8-16)					
			SWITCH POS.	1	2	3	4	5
-----	NOTE: 1 = ON, 0 = OFF	-----						
	1	A		1	0	0	0	0
	2	B		0	1	0	0	0
	3	C		1	1	0	0	0
	4	A		0	0	1	0	0
	5	B		1	0	1	0	0
	6	C		0	1	1	0	0
	7	A		1	1	1	0	0
	8	B		0	0	0	1	0
	9	C		1	0	0	1	0
	10	A		0	1	0	1	0
	11	B		1	1	0	1	0
	12	C		0	0	1	1	0
	13	A		1	0	1	1	0
	14	B		0	1	1	1	0
	15	C		1	1	1	1	0
	16	A		0	0	0	0	1
	17	B		1	0	0	0	1
	18	C		0	1	0	0	1

Figure 7 – Flashhead Address Table

NOTE: Typical installations are that Power Supply #1 is located on the lowest level and mounted to the Northern most leg (Leg A). Looking down from the top of the structure counting clockwise the next is 2 (Leg B) and the next is 3 (Leg C). So that above #1 is #4 and above that is #7 and so one.

NOTE: This is required unless the Site manager wants something different than the above states.



Section 15: Power Supply Cable Definition & DC Connections

The Flashhead cable is supplied factory installed into each of the modules that make up the Flashhead. Each cable should be approximately 15 feet (4.5m) in length. The corresponding power supply should be mounted within this cable length. Contact the seller of the system or Dialight if additional length is required.

The best practice would be to connect and test the Flashhead and Power Supply at ground level so that the electrical connections can be tested. Each of the three red cables should be passed through a corresponding cable grip. All cables and cable grips are numerically labeled for easy match up.

Cable Preparation

The ends of each cable have been prepared for connections within the Power Supply. The triad of blue, yellow, and gray wires are for RS485 communication. The black and red wires are for DC power from the Power Supply. Do not alter the length of these wires or attempt to cut back or modify the exposed braided shield. The picture below shows the prepared cable end. All remaining cable should be looped inside or near the power supply as a drip/service loop.

NOTE: The cable grip has been pre-installed on to the cable. The nut must first be removed after securing the cable grip to the enclosure.



Figure 8 – Prepared Cable End with Braid

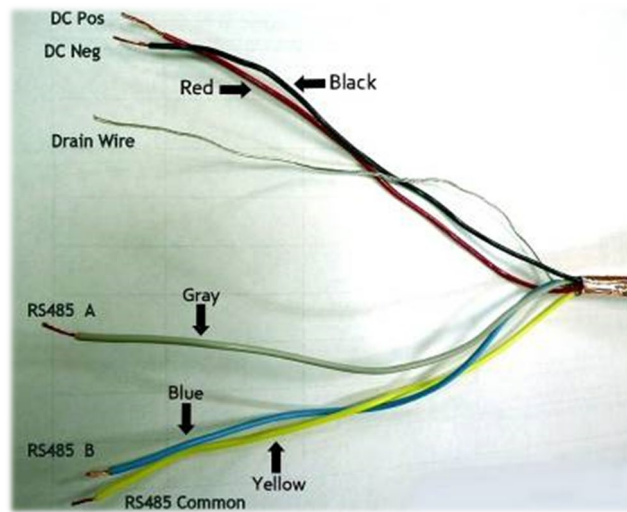


Figure 9 – Cable Color Code

Cable Grounding

Lay the exposed braid underneath one of two large clamp washers (whichever one which lines up with that cable grip position). Two cable braids can be landed side by side on the clamp washers as shown below. Pull enough of the cable length through to reach all connections before tightening down the washers.



Figure 10 – Braid Secured Under Clamp Washer



FAILURE TO PROPERLY TIGHTEN DOWN CLAMP WASHERS WILL MAKE INTERNAL COMPONENTS VULNERABLE TO SURGE OR LIGHTNING DAMAGE AND VOID THE SYSTEM WARRANTY

NOTE: If the Red and Black wires need to be shortened, then $\frac{3}{4}$ " of insulation should be removed. The wires must be neatly twisted before inserting into the terminal blocks.



DC Power Wiring

The DC power wiring needs to be terminated on the DIN rail terminal blocks shown in Figure 11 below. The DIN rail terminal blocks are labeled appropriately for each module. Twisted all exposed ends prior to inserting into terminal block.

Module #1 gets connected to pins 4 (Red) and 5 (Black) of TB5.

Module #2 gets connected to pins 4 (Red) and 5 (Black) of TB4.

Module #3 gets connected to pins 4 (Red) and 5 (Black) of TB3.

Use a small flathead screwdriver to terminate by inserting the blade into the slot and easily lifting the screwdriver to open the spring level and inserting the wire. All wires should have a strip length of $\frac{1}{2}$ " to $\frac{3}{4}$ " to make proper connection within spring loaded terminal block. The wire must go in easily and must not be forced into the terminal block. Tug on all connections to ensure the wire ends were landed properly.

Drain wires from all three Module cables must be terminated on the grounding bus. This connection is for lightning / surge protection and should be double checked like all other wiring discussed above. Extra attention should be placed on routing these connections neatly. Twist all drain wires together and insert at ground lug. Ensure wires pass by the ground screw.

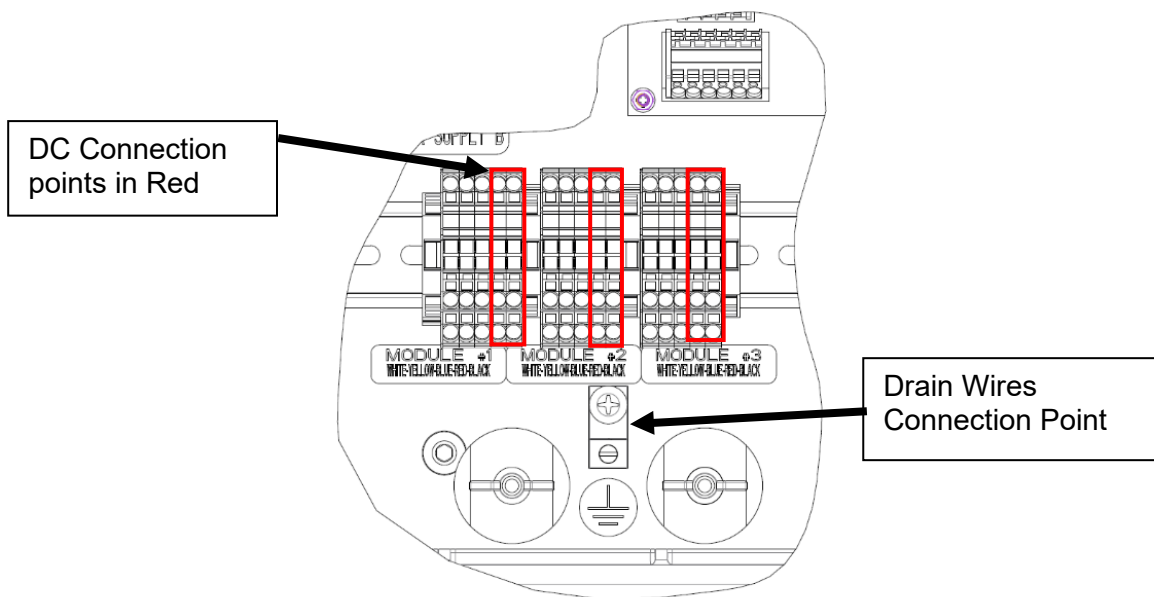


Figure 11 – DC Power Connection Points

Section 16: Flashhead Communication Connections

The Flashhead RS485 connections must now be terminated to the DIN rail terminal blocks labeled Module 1 (TB5), Module 2 (TB4) and Module 3 (TB3). It is very important to land these connections on the correct terminal for proper function of the Flashhead.

The color code is clearly shown on the label as White, Yellow, and Blue. These will correspond to the factory color code of Gray, Yellow and Blue on top side of the terminal block. All wires should have a strip length of 1/2" to 3/4" to make proper connection within spring loaded terminal block.

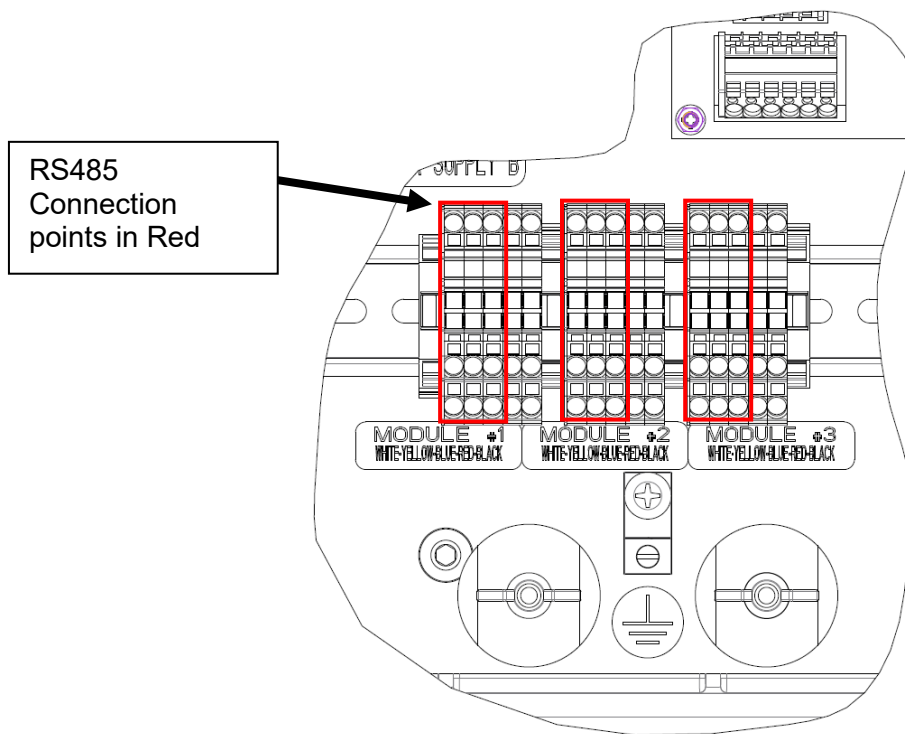


Figure 12 – Flashhead Communication Connection Points



Section 17: Junction Box Preparation

A Surge Protection module (D7206SUR) must be installed at each light level to provide protection against surges on the RS485 lines. The module is typically installed at the light level junction box and terminated with wire nuts. The module has pigtails which allow for several wires to be twisted together with a wire nut. All of the respective “A”, “B”, and Common wires going to the Power Supply Enclosures need to be joined in this fashion.

The module has two color-coded pigtails labeled “To Tower” and “To Power Supplies”.

To Tower will connect to the vertical run of RS485 lines.

To Power Supply will connect to the three RS485 cables from the flashheads.

The green wire is bonded to Earth ground within the junction box.

NOTE: The module can be tested by using a multi-meter to check resistance. By connecting the multi-meter from ‘To Tower’ Blue to ‘To Power Supply’ Blue; the meter must measure less than 10ohms. If an “OL” or open load is measured than the module is bad or there is a bad connection. This test should be conducted for each of the colored wires.

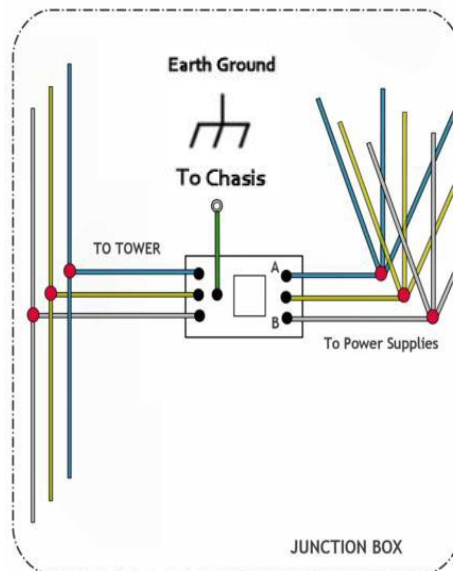


Figure 14 - Protection Board Wiring



FAILURE TO PROPERLY BOND THE EARTH GROUND WIRE TO THE JUNCTION BOX WILL RESULT IN EVENTUAL LIGHTNING DAMAGE OF THIS SYSTEM. TO AVOID WARRANTY NULLIFICATION, FOLLOW THE ABOVE DIRECTIONS IN THEIR ENTIRETY.

Section 18: Mounting Power Supply Enclosures

This section is also required when the Base controller is mounted to the exterior structure.

NOTE: For commissioning purposes pictures are required of the wiring and mounting of the power supplies to the structure. They **MUST** be reviewed and verified before de rigging.

Power Supply Enclosures must be mounted to the tower structure. This may require the addition of rails or mounted connected to the tower structure. The additional use of a grounding strap between each Power Supply Enclosure and the tower structure may be required to ensure proper grounding. If the Ground strap is added then it is recommended that the ground strap is located on the front of one of the four mounting tabs before bolting.

The installer should avoid using numerous bolt-through connections when bonding the Power Supply Enclosure to the Tower. The use of prefabricated lug bonds made from annealed size #1 copper cable joined at both ends with tinned copper lugs conforming to ASTM B-187 is recommended. The lug should be permanently mechanically bonded to cable.



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

Section 19: Mounting Flashheads

For Brackets and Mounting instructions refer to the wiring diagram provided by system installer.

NOTE: For commissioning purposes, pictures are required of the wiring and mounting of the Flashheads to the structure. They **MUST** be reviewed and verified before de-rigging.

Flashheads must be mounted to brackets that are permanently secured to the tower structure. Some brackets will have a mechanism for slight pitch adjustment (zero to eight degrees). Since there could be a mechanical hinge in the bracket, there is not sufficient metal contact to ensure proper bonding between the Flashhead and the tower structure. Therefore, use of a grounding strap between each Flashhead and the tower structure is required. Each Flashhead has Aluminum housing with extra M8x1.25 threaded holes for the purpose of adding such a strap from proper grounding.

Although this one bonding connection will be made with an M8 nut and bolt, the installer should avoid using numerous bolt-through connections when bonding to the Tower.

NOTE: Module “#1” **MUST** be positioned on the bottom due to the orientation of the optics. The modules are factory marked on the backside.

NOTE: The Flashhead is designed to be mounted parallel to the ground.

NOTE: The installer must level the Flashhead in both orientations to ensure minimal ground scatter. It is recommended that it is mounted level within 0.25° of zero.

Table 4 – Light Unit Elevation above the Horizontal

Height of Light Unit Above Terrain	Degrees of Elevation Above the Horizontal
Exceeding 500 feet AGL	0
401 feet to 500 feet AGL	1
301 feet to 400 feet AGL	2
300 feet AGL or less	3



Complete 3 Level Flashhead (3 Modules make a Flashhead)

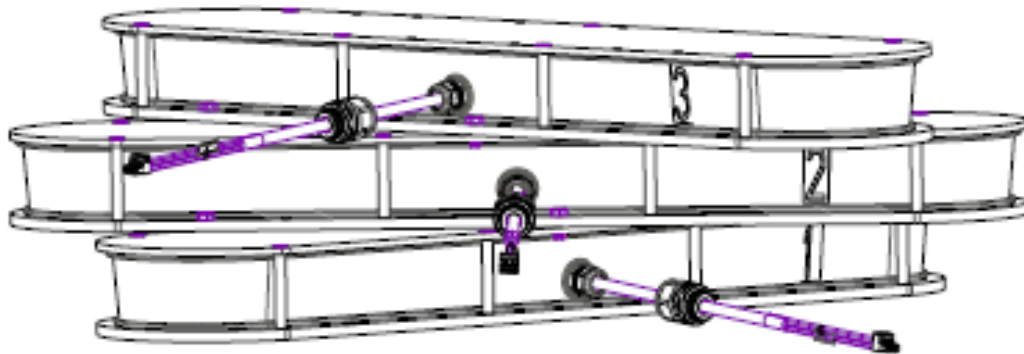
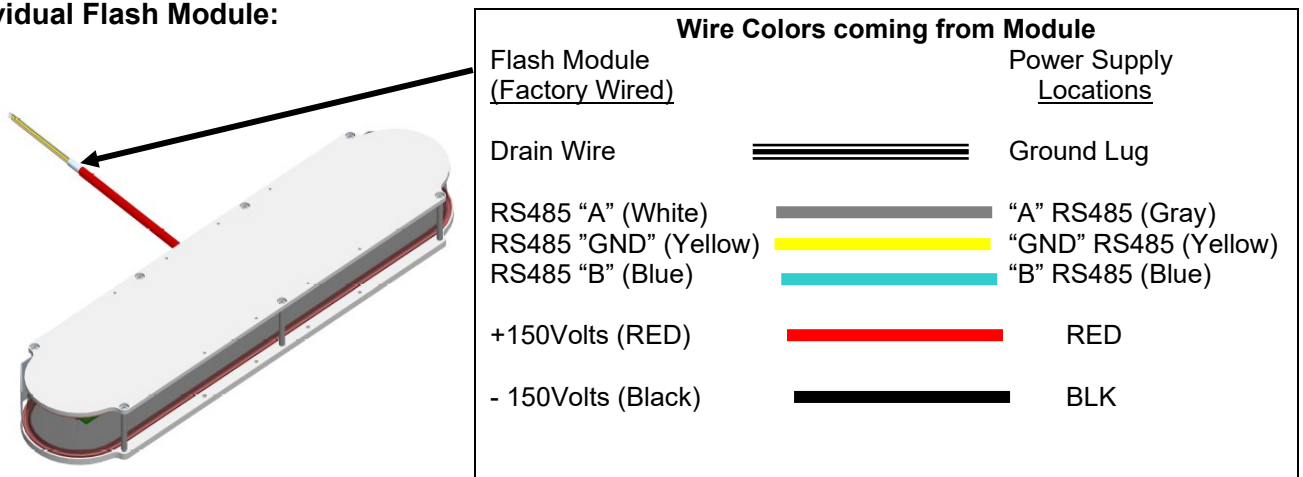


Figure 15 – Completed Flashhead

Each flashhead module has a factory wired pigtail of approximately 15 feet. The pigtail should not be cut (reduced in length). Each module is sealed with no maintenance components.

Individual Flash Module:









Flash Module (Factory Wired)	Wire Colors coming from Module	Power Supply Locations
Drain Wire		Ground Lug
RS485 "A" (White)		"A" RS485 (Gray)
RS485 "GND" (Yellow)		"GND" RS485 (Yellow)
RS485 "B" (Blue)		"B" RS485 (Blue)
+150Volts (RED)		RED
- 150Volts (Black)		BLK

Figure 16 – Individual Flash Module

WARNING: During cold weather installation, cables could become stiff and proper care should be taken to not over bend any cables. Cables are rated for cold bends at 8 times the diameter of the cable. The bend needs to be greater than a 4 inch turn. Tighter bends could cause the cable to break.

WARNING: Flashheads are not intended to be directly mounted in High RF areas and proper operation of the system could be compromised. All installations should be reviewed and approved via the Site manager, system seller and Dialight. Failure to do so will VOID all warranties.



Section 20: Final System Checks

Perform the following before applying power to the flashheads.



FAILURE TO SET UP THE SYSTEM CORRECTLY DURING STARTUP WILL RESULT IN THE TOWER HAVING TO BE CLIMBED AGAIN TO PERFORM TROUBLESHOOTING.

Grounding

The primary goal of grounding this System is to maintain a low resistance level between the electrical sub components and the tower structure. Improved lightning immunity results as this resistance is reduced. For comparison, the National Electrical Code requires the resistance value between the earth and a grounding bus to not exceed 25 ohms, however for this application lowering ground resistance values to levels as close to 0 ohms as possible is the only way to prevent lightning related damage.

It is compulsory for the installer to use an Ohm meter to check the resistance after all bonding is complete. A normal value range to see between the inside of a Power Supply Enclosure and the bare metal of the tower structure is 0.3 to 1.3 Ohms. Check each Power Supply enclosure with a Multimeter set on Resistance/Ohms measurement to ensure the grounding was done properly.

Communication

A termination resistor is factory installed in the Base controller. There is an additional Termination Jumper required. Jumper must be added to the highest beacon Power Supply. This Termination Jumper closes the RS485 communication line and makes the total line resistance 130 Ohms. You can check this with the system off and by removing J7 off the LCD board.

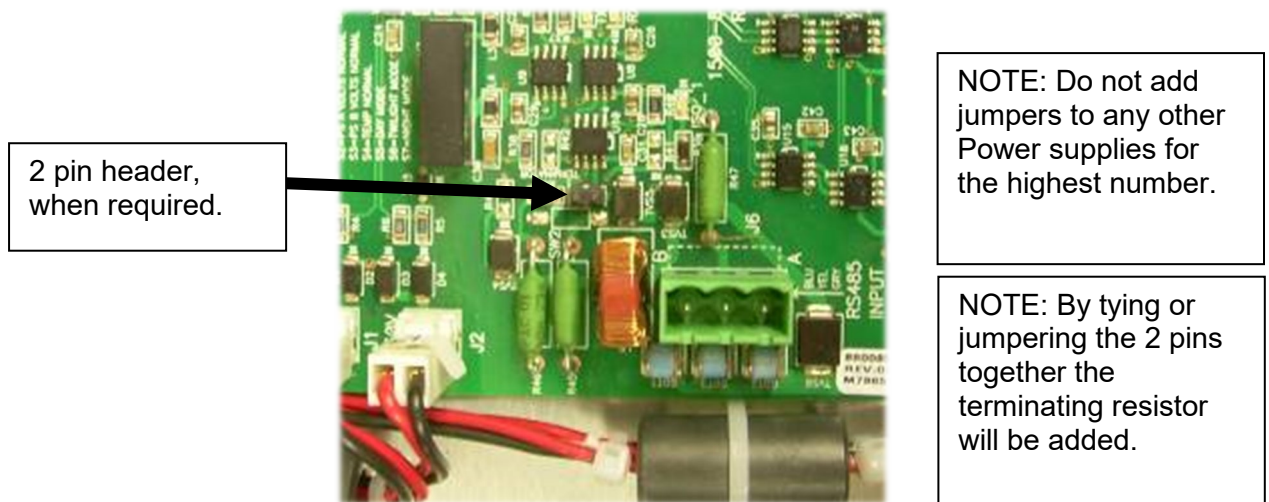


Figure 17 – Additional Termination Resistor Jumper Connection

Back Probe of RS485

Back probe all the RS485 ports on each Flashhead Power Supply and out-going port of the Base Controller with a Multimeter set on Resistance/Ohms. Place one probe where the “A” wire terminates in the back of the plug and the other probe firmly on the ground bus of the backplane. Be sure to press firmly. Depending on the model meter you should see an open circuit symbol, OL, or a value exceeding 20 mega Ohms. Repeat this process by back probing for the Common wire (middle) and the “B” wire. Then, repeat all the steps for each communication port. This step will confirm there are no shorted communication wires within the System.



Figure 18 - Back Probing Connections

DC Wiring

Check terminal block J2 on the Filter/Surge board by performing short circuit check with a Multimeter. Back probe the terminals and ensure that positive terminal positions have no continuity with negative terminal positions. Perform this check for each Power Supply Enclosure.

AC Wiring

On the Base Controller ensure that the Hot and Neutral wires are landed correctly on the AC connection terminal block.

WARNING: Power Supplies require a minimum of 208vac and a maximum voltage of 305Vac from live to ground.

Section 21: System Power Up

All Flashhead Power Supplies must be completely closed with door clamps before proceeding. Interlock switches inside these enclosures will not make contact unless a good seal is established.

NOTE: It is highly recommended that individual light levels are tested as the system is being installed. For example once a level is installed this level should be tested and verified before adding additional levels.

NOTE: When testing each level, LCD should be programmed for the total number of flashheads currently being tested. If not, an alarm will be generated.

It is recommended to have one installer positioned near a Flashhead, and one installer near the Base Controller. Energize the System from the circuit breaker(s). If the Base Controller is on a dedicated circuit, power the Flashheads first, then turn on the Base Controller.

The LCD Screen will illuminate at the Base Controller and display “please wait...”. The next screen will begin counting down from 15 and once complete the display will be in the main screens for system setup. See the quick start manual for configuring the system.

If the countdown from 15 does not happen and the screen just stays at 15 then the Base Controller does not see any Flashheads on the RS485 communications line. Please check that the communications is connected and that no wires have been reversed. At the back of the Flashhead it is possible to see small green and yellow LED’s light up.



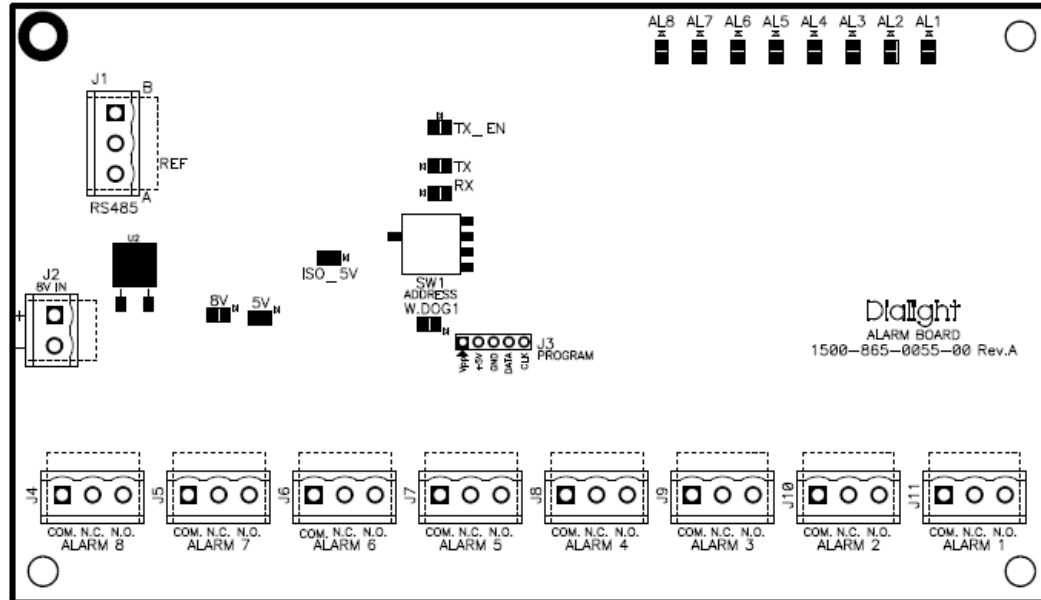
CAUTION: NEVER LOOK AT THE FRONT OF A FLASHHEAD WHILE THE SYSTEM IS ENERGIZED. THE FLASHHEAD COULD START FLASHING CAUSING TEMPORARY BLINDNESS WHICH WOULD BE DANGEROUS AT HIGH ELEVATIONS.

Section 22: Alarm Relays

Eight relay outputs are provided to externally monitor alarms from the System.

LEDs AL8 is AMBER color and monitors the function of the photocell mode.

LEDs AL7 – AL1 provide visual indication of Alarm Status.



Relay	Alarm 8	Alarm 7	Alarm 6	Alarm 5	Alarm 4	Alarm 3	Alarm 2	Alarm 1
LED	AL8	AL7	AL6	AL5	AL4	AL3	AL2	AL1
Alarm Failure	ACTIVE PHOTOCCELL MODE	L810 Failure	AOL Comm	Day to Night Failure	Photocell Failure	25% Failure	Sync Failure	RS485 Failure or Config errors

To interface outside of the Base Controller, the installer must choose either to use the Normally Open, or Normally Closed contacts on the relay board depending on the installation’s requirements. Using the 3-position Phoenix on the header allows for any combination of normally open and normally closed contacts to be utilized. To wire the dry contacts it is recommended to use 18-22 AWG wire. The preferred strip length for the Phoenix connector is ¼ inch.

If the existing monitoring system does not have 8 alarm ports then multiple relays can be multiplexed together. Typically, AL8/Alarm 8 is not connected to monitoring system.

Section 23: Maintenance

There is no regular maintenance required for this System.

Dialight recommends the following spare parts be purchased for emergency replacement.

Table 5 – System Part Numbers

D366 Flashhead	Dialight Part Number
Complete Flashhead	D3661019FH
Flashhead Module	D3661019MOD
D366 Power Supply	
Micro Board	D7107MIC
Power Supply A	D7701DRV
Power Supply B	D7701DRV
Filter/Surge Board	D7200SUR
Interlock Switch	D8000SWS
D366 Base Controller	
Main Control Board w/LCD	D7406LCD
RS485 Junction Board	D7800RJB
Dry Contact Alarm Board	D7600RLY
Photocell / L810 Monitor Board	D7503SLM
48VDC Power Supply	D2669006RA
AC Filter/Surge Board	D7202SUR



Section 24: Troubleshooting

Engineering Technical Support Contact Phone Number

844-436-5422

Table 8 - Troubleshooting

	PROBLEM	CAUSE	SOLUTION
1.	Diagnostic and Display Board in the Base Controller reads "Tower Style : _____ " (blank)	There were no devices detected on the network during startup.	Make sure the communication cable is wired correctly at all ends. Check the "config" screen to make the correct selections are made
2.	Diagnostic and Display Board correctly displays tower style, but the Power Supply map has missing addresses.	There is either an electrical or communication problem with the Power Supply Enclosure(s) at the missing address.	The missing addresses should be checked for wiring issues while the System is off. If more than one is bad, proceed by isolating power to just a single bad address. Observe that address, power up by pulling the interlock switch outward. This will allow the Power Supply Enclosure to power up with the door open. Wait a minute after startup. Observe if the Micro Board powers up correctly.
3.	Heartbeat on a Power Supply Enclosure Micro Board comes on, but other status lights do not.	Communication to this address was never established.	Observe the RX (receive) and TX (transmit) LED indicators on the Micro Board for pulsing. If the RX light comes on every 1.5 seconds then there is at least a connection to the Base Controller. If the RX or TX lights are hanging solid, there are crossed communication wires, or shorted communication wires somewhere in the network. This could be anywhere and every junction box and Power Supply Enclosure must be checked.



	PROBLEM	CAUSE	SOLUTION
4.	Adding an AOL interface to the System caused the whole system to go down.	There are crossed communication wires, or shorted communication wires inside the AOL enclosure.	The junction box preceding the AOL must be checked as well as the AOL enclosure.
5.	The Flashheads are not flashing in sync. Addresses are missing or dropping on and off the map.	There is too much RS-485 bias on the network, or too many termination resistors on the network. Weak RS-485 signal.	<p>Verify the communications connections at the missing Power Supplies, Verify the addresses have been set correct. Check the level junction boxes for proper connections.</p> <p>Remove good Power Supplies by unplugging outgoing communications to the rest of the tower and individually test the problematic Power Supplies.</p>
6.	A Flashhead appears on the network but after 25 flashes it appears to shut down and drops off the Power Supply map. Reappears when the System is restarted.	25% of the lighting in that Flashhead has failed.	There is a problem inside the sealed Flashhead. Further visual evaluation should be done. Verify the LED's on the driver cards in the Power Supplies are illuminated. Check the red and black wires going in to the terminals wired to
7.	A Flashhead will only flash in Day mode; eventually loses sync with the rest of the System.	The Flashhead is in stand-alone mode. Meaning, it was successfully started up but lost communication at a later time.	Something has changed since startup. There is either a loose wire intermittently losing contact or a similar problem. Check all communication wiring to the bad address.



	PROBLEM	CAUSE	SOLUTION
8.	Entire System will only flash in a certain mode. i.e. Night mode all the time. Regardless of outdoor light conditions.	Photocell and its respective wiring has a problem.	Check the connections on the Monitor Board. Verify that the Photocell Failure alarm indicators are not lit. If they are lit, check Photocell connections.
9.	In a style C tower, the AOL is not in sync with the rest of the System. The tower type is displayed correctly and the AOL is listed under active interfaces.	The sync output from the AOL Interface kit is not being accepted by the D1CW Micro Board.	The problem will be located in the Power Supply enclosure of the AOL. Verify by opening the enclosure that all the connections are made correctly and the RS485 communications is attached.
10.	In a style C tower, the AOL is flashing RED/IR.	The AOL Interface kit is not wired correctly to the D1CW Micro Board.	Use the AOL / Red with IR System manual to troubleshoot the wiring connection between the AOL Interface kit and the D1CW Micro Board.
11.	In a style F tower, after 100 flashes in NIGHT mode, then system behaves like a style C tower.	There is a RED/IR light fault from the AOL. Which means the system will go to white night by per FAA requirements.	There is a red fault input being sent to the Base Controller. The problem would be either in the Power Supply where there is a bad Red/IR driver or in the Flashhead.

Serial Number Coding

The serial numbers of the fixtures being installed are located on the Dialight label. Dialight refers to the serial numbers as **Date Codes**. The date code is used to determine warranty status of the unit. The Date Codes are set up as:

- The following YY,DDD, S/N.
- YY= the year it was produced
- DDD= Julian day of the year
- S/N= a number of either 3 or 4 digits.



REVISION HISTORY

REV	ECO No.	DRN	CKD	APP	QA	CM	DATE
A	67178	NS	AV	AR	YS	JN	2/27/20
B	68491	TLD	AV	AR	YS	JN	4/24/20
C	106115	JAJ	DW	AR	YS	MB	6/20/23