AV-HL-CTRL-T1

Heliport Lighting Controller

INSTALLATION & SERVICE MANUAL

V1.0

Table of Contents

1.0 Introduction

Congratulations! By choosing to purchase an Avlite product, you have become the owner of one of the most advanced obstruction products in the world.

Avlite Systems draws on more than 25 years of experience in the design and manufacture of navigation aids, and particular care has been taken to ensure your product gives years of trouble-free service.

As a commitment to producing the highest quality products for our customers, Avlite has been independently certified as complying with the requirements of ISO 9001:2015 quality management system.

By taking a few moments to browse through this booklet, you will become familiar with the versatility of your lighting solution, and be able to maximise its operating function.

Please remember to complete the Avlite warranty registration card accompanying your product.

2.0 Technology

Avlite Systems is a world-class solar lighting systems manufacturer with a proven reputation for rapid, innovative, and agile technology solutions designed specifically for defence, government, civil and humanitarian aid operations in the most remote, toughest environments.

Electronics

Avlite employs leading in-house electronic engineers in the design and development of software and related circuitry. All individual electronic components are sourced directly by Avlite procurement staff ensuring that only the highest quality components are used in our products.

LED Technology

All Avlite lights use the latest advancements in LED (Light Emitting Diode) technology as a light source. The major advantage of LED's over traditional light sources is well established in that they typically have an operational life in excess of 100,000 hours, resulting in substantial savings to maintenance and servicing costs.

Precision Construction

Commitment to investing in the design and construction of injection-moulded parts including optic lenses, light bases and a range of other components ensures that all Avlite products are of a consistent and superior quality.

Optical Performance

Avlite manufactures a range of aviation LED lenses moulded from multi-cavity dies. The company has superior in-house lens manufacturing capabilities to support outstanding optical performance.

Award-winning, Patented Technology

Several United States and Australian patent registrations are held on Avlite's range of innovative designs, with other regional patents pending in Canada, United Kingdom and Europe.

3.0 AV-HL-CTRL-T1

The AV-HL-CTRL-T1 Controller is an essential component of a helipad lighting system. It blends manual and remote-control functionality into a compact, intuitive and user-friendly package to provide power, monitoring and control of the installed helipad light fixtures.

The T1 helipad controller automatically evaluates the helipad lights for operation and performance. It is designed to work with a maximum of 24 perimeter lights and 4 floodlights and can also be connected to an illuminated wind direction indicator to indicate wind direction and speed.

For safety and security, the control enclosure comes with a safety interlock which prevents access to the controller while the system is powered on.

The Controller is available in two input power configurations; a universal AC or DC and comes with optional enhanced control which includes light dimming control and interfaces for RF control output via an optional add-on.

As standard, the controller comes with BMS Input Control Interfaces and either RF input (via RF relay) or PALC (Pilot Activated Lighting Control) interfaces. The PALC enables remote operation of an unmanned heliport and is available with either CASA or FAA compliance.

3.1 Available Options

- Enhanced control
    - Light Dimmability
    - RF Control Output add-on compatibility
- RF Control Input add-on
- RF Control Output add-on
- PALC (Pilot Activated Lighting Control)
- Solar add-on
- Control unit mounting hardware
- Junction boxes

Note: This installation and service manual must be used in conjunction with the installation manuals of the individual components.

- AV-HL-RF-SOL
- AV-HL-FL
- AV-HLI2
- AV-WSC-TILT
- AV-PALC
- AV-ALS-RR
- AV-ALS-RC

Controller

Note: Mounting hardware not included.

[15.75in]
400mm

[23.62in]
600mm

[7.87in]
200mm
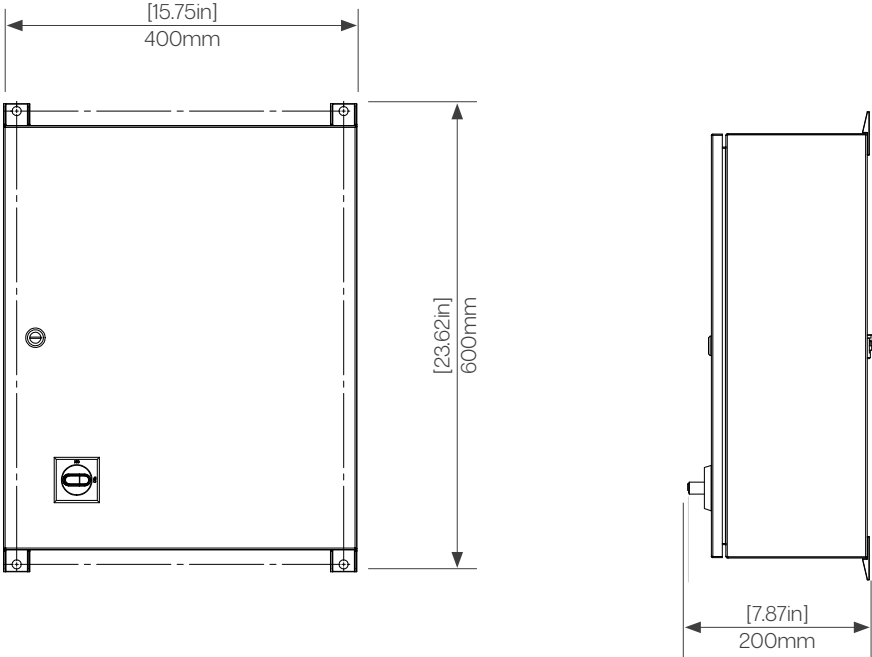
4.0 AV-HL-CTRL-T1 Data Sheet

HLS T1 Controller	AC	DC
Electrical Characteristics		
Input		
Input Voltage	90-264 VAC	18-30 VDC
Input Frequency	50 / 60 Hz	N/A
Power Consumption		
Peak	552 VA	20W[1]
Interfaces		
Control	Manual, Digital Input (I/O), Modbus TCP/IP	
Monitoring	Modbus TCP/IP	
Physical Characteristics		

Dimensions	Height (inches/mm)	Width (inches/mm)	Depth (inches/mm)	Mass (lbs./kg)
Control Unit	23.62 / 600	15.75 / 400	7.87 / 200	63 / 28.5

Mounting	
Control Unit	Wall mounted (mounting accessories available)
Certifications and Compliance	
CE	EN61000-6-3:2007, EN61000-6-1:2007
Quality Assurance	ISO9001:2015
Protection Rating	IP65/NEMA4X
Intellectual Property	
Trademarks	AVLITE® is a registered trademark of Avlite Systems
Warranty *	3 year warranty
Options Available	Enhanced control with Light Dimmability and RF Control Output add-on compatibility
Add-ons Available	RF Control Input RF Control Output PALC (Pilot Activated Lighting Control) Solar System Control unit mounting hardware Junction Boxes

1. Excludes distributed power to light fixtures

5.0 Safety Information

Before proceeding with installation or service, make sure the following conditions are met:

- Ensure the tower or mast is grounded (NO RF OR SHOCK HAZARD)

- Check the mast lighting circuit is not faulty

- Ensure power lines are not 'live' (NO ELECTRICAL HAZARD)

- Avoid touching live circuits!

- Avoid touching any component or any part of the circuitry while the unit is operating. Do not change components or make adjustments inside the unit with power on.

- When installing, comply with all local electrical code(s).

- Mains power should always be disconnected when work is being done in close proximity to electrical fittings, and electrical work should only be done by a licensed electrician.

- To ensure that the equipment functions safely and correctly, use cable in compliance with the effective local electrical code.

- Dispose of the product according to the local laws and regulations for your region, for example, at a recycling centre that accepts electronic devices.

6.0 Operation and Setup

The AV-HL-CTRL-T1 Controller is available with manual control as well as optional remote control via PALC (radio receiver), RF Input (RF relay) and optional RF fixture control via RF Output (RF transmitter) add-on. It is designed to operate with 24 perimeter light fixtures, 4 floodlights as well as an Illuminated Wind Direction Indicator (windsock).

The FATO, TLOF and floodlight circuits are based on a daisy chained architecture (with or without the aid of junction boxes). Each light circuit is connected to the Primary Controller individually, with optional floodlight activation based on pilot preference.

The Windsock circuit is matched to input voltage and allows a power wind indicator to provide an indication of wind direction and speed.

The Controller is a wall mounted enclosure, recommended to be installed in close proximity to the helipad (mounting hardware available).

6.1 Product Overview

6.1.1 Front Panel Layout - AV-HL-CTRL-T1-UM-01 Enhanced Controller shown
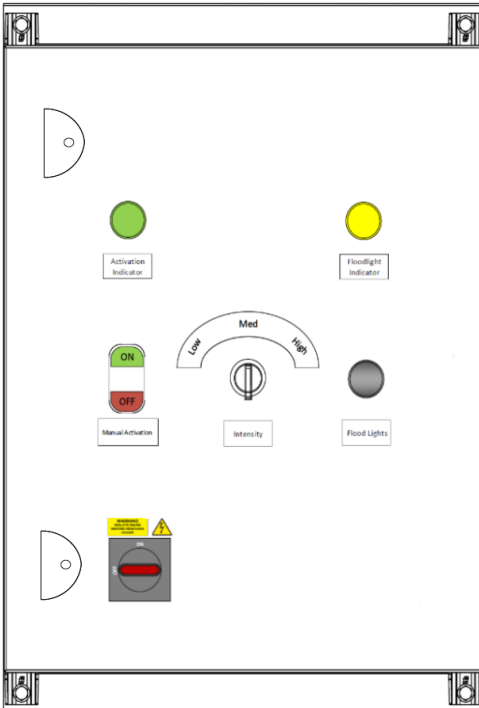
Note: The intensity selector switch is applicable for enhanced control only.

6.1.2 T1 Controller

Manual Control:

Turning the safety interlock to **On** and pressing the **On** button on the Manual Activation Push Button will turn on the TLOF and FATO lights as well as the Activation Indicator (green). Pressing the **Off** button will turn off the lights as well as all the indicators on the front of the Control Panel.

The Intensity of the TLOF and FATO lights can be adjusted via the Intensity Selector Switch (if enhanced control is enabled).

The floodlights have optional activation via the **Floodlights** push button. When enabled, the **Floodlight Indicator** will be illuminated yellow and the floodlights will be turned on with the rest of the system. Similarly, if the **Floodlights** push button is disabled, the floodlights will remain off when the rest of the system is turned on.

Remote Control (if applicable):

PALC:

The PALC option allows the system to be activated by a pilot in an approaching aircraft. The transmitted signals are received via the radio receiver in the PALC which then sends them to the PLC input in the control unit. These get converted into the required output signals and sent via physical cabling to activate or deactivate the lights in the system (including the illuminated wind direction indicator). In this way, the PALC allows the lighting to be off and commanded on only when needed by approaching aircraft. The system is set to a user specified field adjustable time-out period in order to extinguish the lights automatically after landing.
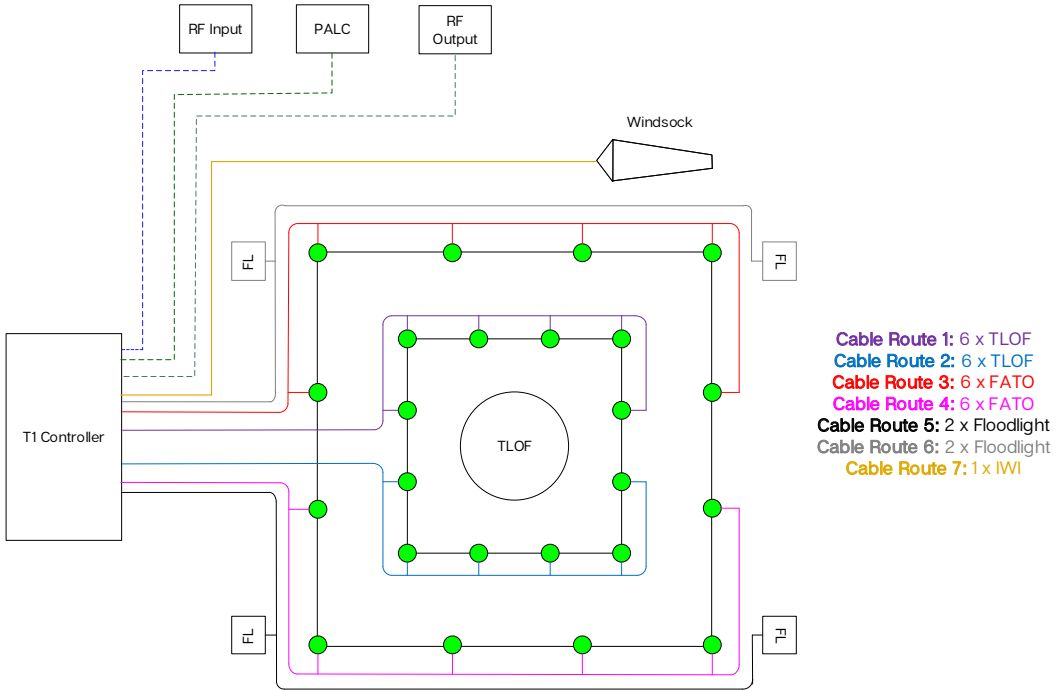
RF Control Input:

The optional RF Control Input (via RF relay) can be used as an alternative to the PALC. The operation is similar to the PALC in that it receives signals from an Avlite handheld controller and sends them to the PLC in the control unit to activate the lights in the system via physical cabling.

RF Output:

The optional RF Output option (via RF transmitter) allows wireless activation and deactivation by receiving signals from the PLC output and broadcasting them to the RF enabled lights in the system via a 2.4 GHz encrypted network.

6.2 Interface Wiring

Cable Route 1: 6 x TLOF
Cable Route 2: 6 x TLOF
Cable Route 3: 6 x FATO
Cable Route 4: 6 x FATO
Cable Route 5: 2 x Floodlight
Cable Route 6: 2 x Floodlight
Cable Route 7: 1 x IWI

7.0 Unpacking, Installation, Wiring and Setup

7.1 Unpacking

Unpack all hardware and inspect for damage. If there is any damage, please contact your Avlite Office.

Retain original packing material for possible future use in shipping.

7.2 Installation

7.2.1 Warnings and Cautions

WARNING:
Confirm that the power switch is toggled to the OFF position when power is connected. **DO NOT** connect power to the PCU when the control panel power switch is toggled to the PWR position. This may result in damage to the power sources.

WARNING:
DO NOT connect directly to the DC output of a generator, or any other unregulated power source. Connecting to an unregulated source may result in damage.

7.2.2 Cabling Requirements

The installation of the AV-HL-CTRL-T1 Helipad Controller requires the following cables:

Reference Point	Cable Type	Min	Max	Max Length
TLOF (Single Circuit)	Power & Data 3 conductor	4mm^2	6mm^2	@4mm^2 : 70m @6mm^2 : 110m
FATO (Single Circuit)	Power & Data 3 conductor	4mm^2	6mm^2	@4mm^2 : 70m @6mm^2 : 110m
Floodlight	Power Cable 2 conductor	6mm^2	6mm^2	@4mm^2 : 70m @6mm^2 : 110m
IWI / Wind cone	AC: Power Cable 3 conductor	AC: 2.5mm^2	AC: 4mm^2	Refer to IWI Manual
	DC: Power Cable 2 conductor	DC: 6mm^2	DC: 4mm^2	
BMS/External Control Input	Data Cable 2 Conductor	2.5mm^2	6mm^2	Refer to MNS Manual
Optional				
RF Relay Assembly-Control Unit	• Power Cable: 2.5mm^2, 2 conductor • Data Cable: 1mm^2, 3 conductor			
PALC Radio Receiver-Control Unit	• Power Cable: 2.5mm^2, 2 conductor • Data Cable: 1mm^2, 2 conductor (with IWI) or 3 Conductor (without IWI)			
RF Transmitter-Control Unit	• Power Cable: 2.5mm^2, 2 conductor • Data Cable: 1mm^2, 4 conductor			

7.2.3 Installation Recommendation

Note: The sequence of steps can be adjusted for site requirements.

1.   Wire and test the system on ground level.

Conduct a basic functional check to ensure that the lights turn on as expected.

2.   Mount the Control Unit

The Control Unit should be mounted at eye level in close proximity to the helipad to ensure that it is easily accessible for servicing and maintenance. There should be plenty of clearance around all sides to allow direct access when the door of the control unit is completely open.

Mount the Control Unit to the wall using the mounting tabs. Secure using the required mounting fixtures.

Example of Control Unit mounting hardware

Pre-installed Control Unit tab

**Note:** Mounting hardware is not included with the solution.

3. Wire TLOF light circuit to Control Unit

Note: The AC version of the Control Unit with enhanced control is shown throughout this installation procedure. The DC Enhanced version of the Control Unit is shown in step 11.
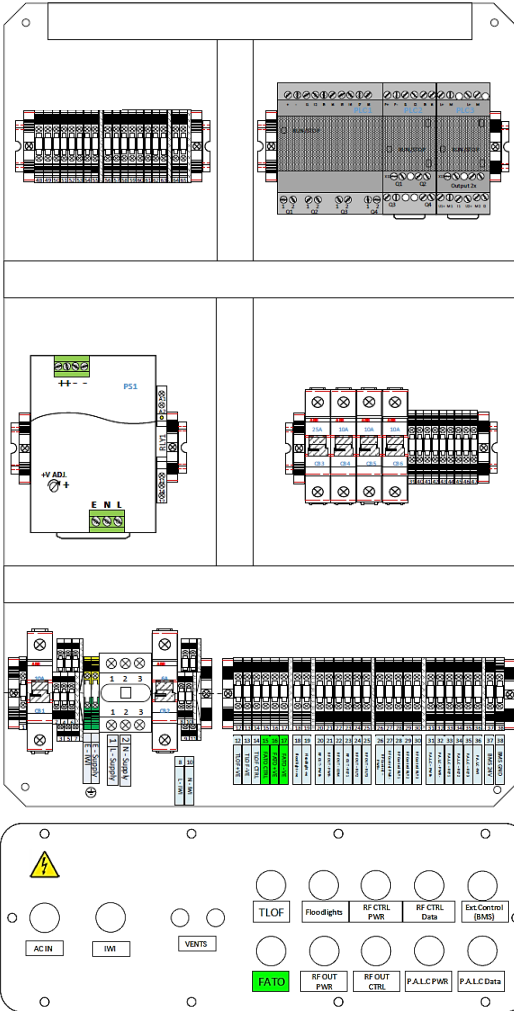
Wiring Instructions-Power and Data cable:

- Connect the positive conductor from the TLOF circuit to the 'TLOF +VE' labelled terminal (i.e. terminal 12) in the Control Unit.
- Connect the negative conductor from the TLOF circuit to the 'TLOF -VE' labelled terminal (i.e. terminal 13) in the Control Unit.
- Connect the Control conductor from the TLOF circuit to the 'TLOF CTRL' labelled terminal (i.e. terminal 14) in the Control Unit.
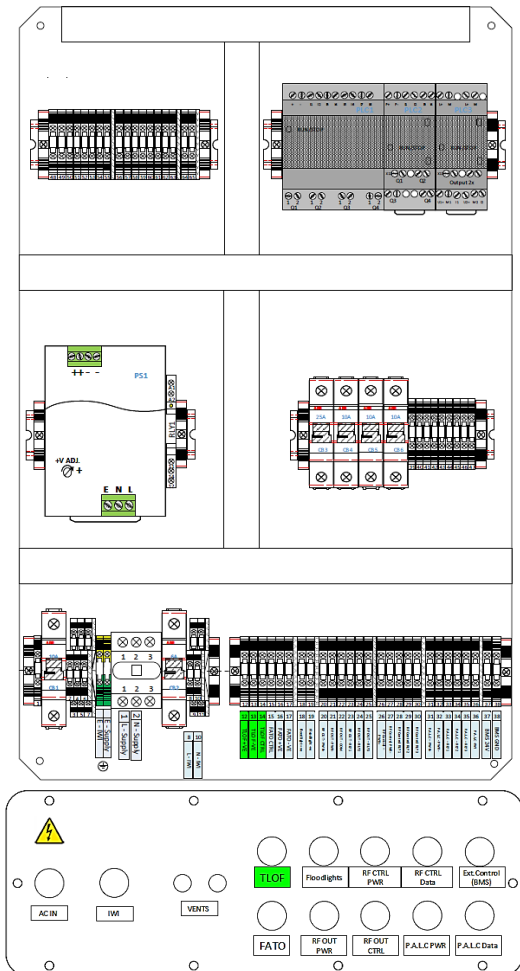
4.   Wire the FATO light circuit to Control Unit

Wiring Instructions-Power and Data cable:

• Connect the positive conductor from the FATO circuit to the 'FATO +VE' labelled terminal (i.e. terminal 16) in the Control Unit.

• Connect the negative conductor from the FATO circuit to the 'FATO-VE' labelled terminal (i.e. terminal 17) in the Control Unit.

• Connect the Control conductor from the FATO circuit to the 'FATO CTRL' labelled terminal (i.e. terminal 15) in the Control Unit.
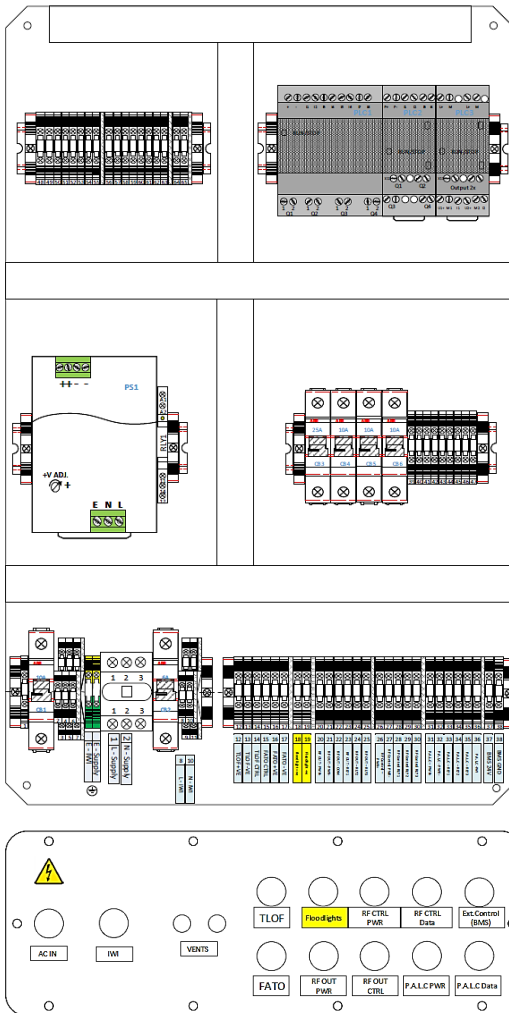
5. Wire the Floodlights to the Control Unit
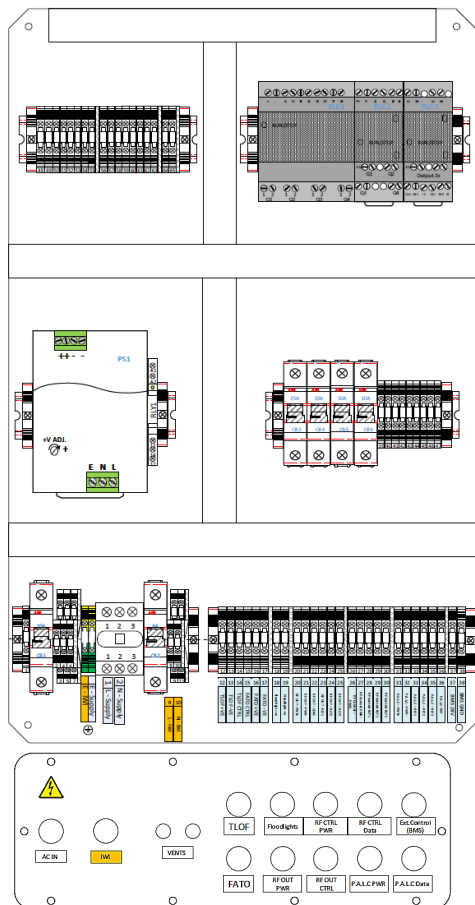
Wiring Instructions-Power cable:
- Connect the positive conductor from the floodlight circuit to the 'Floodlight +ve' labelled terminal (i.e. terminal 18) in the Control Unit.
- Connect the negative conductor from the floodlight circuit to the 'Floodlight -ve' labelled terminal (i.e. terminal 19) in the Control Unit.

6. Wire the Illuminated Wind Direction Indicator (IWI) to the Control Unit:

AC Installation

*   Connect the Live conductor from the IWI to the 'L-IWI' labelled terminal (i.e. terminal 8) in the Control Unit.
*   Connect the Neutral conductor from the IWI to the 'N-IWI' labelled terminal (i.e. terminal 10) in the Control Unit.
*   Connect the Earth conductor from the IWI to the 'E-IWI' labelled terminal in the Control Unit.

DC Installation:

*   Connect the positive conductor from the IWI to the 'IWI +ve' labelled terminal in the Control Unit.
*   Connect the negative conductor from the IWI to the 'IWI -ve' labelled terminal in the Control Unit.

7. Wire connections for BMS control to Control Unit:

- Connect the Signal 24VDC conductor from the BMS controller to the 'BMS 24V' labelled terminal (i.e. terminal 37) in the Control Unit.
- Connect the 0V conductor from the BMS controller to the 'BMS GND' labelled terminal (i.e. terminal 38) in the Control Unit.
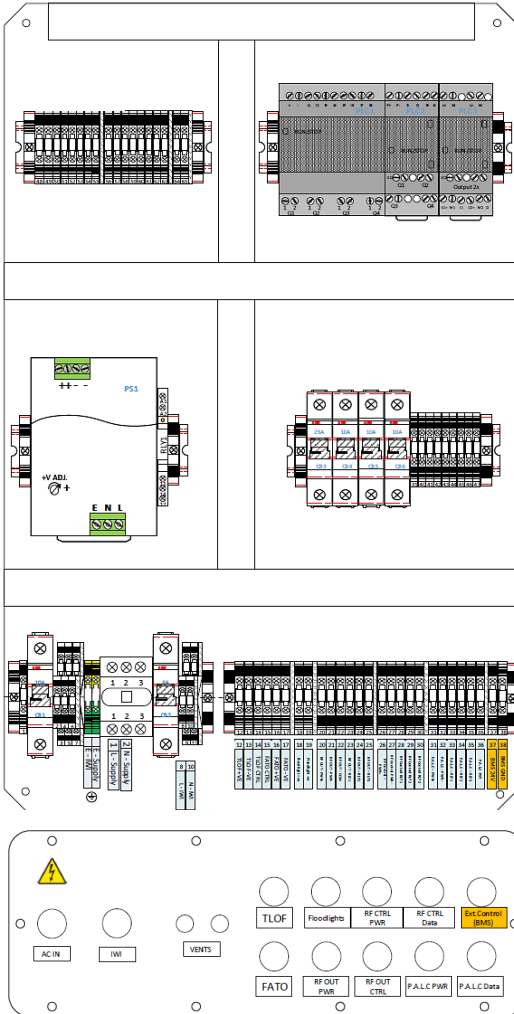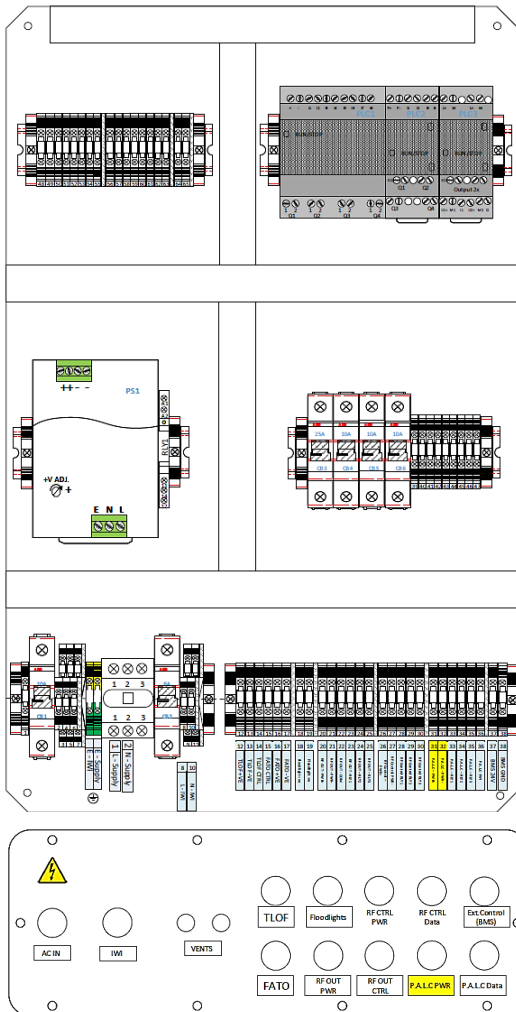
8. Add-on: PALC

Wire the Radio Receiver to the Control Unit:

Wiring Instructions-Power Cable:

• Connect the positive conductor from the Radio Receiver to the 'P.A.L.C-PWR+' labelled terminal (i.e. terminal 31) in the Control Unit.

• Connect the negative conductor from the Radio Receiver to the 'P.A.L.C-PWR+' labelled terminal (i.e. terminal 32) in the Control Unit.
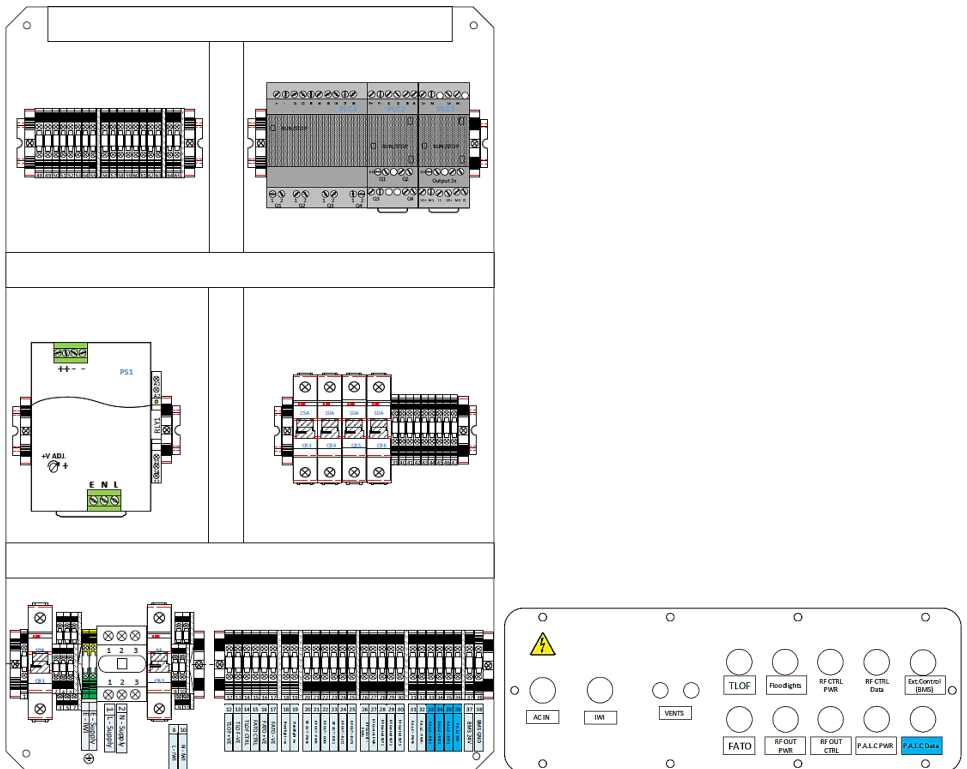
Wiring Instructions-Power Cable:

- Connect the RLY1 conductor from the Radio Receiver to the 'P.A.L.C-RLY1+' labelled terminal (i.e. terminal 33) in the Control Unit.
- Connect the RLY2 conductor from the Radio Receiver to the 'P.A.L.C-RLY2+' labelled terminal (i.e. terminal 34) in the Control Unit.
- Connect the RLY3 conductor from the Radio Receiver to the 'P.A.L.C-RLY3+' labelled terminal (i.e. terminal 35) in the Control Unit.
- If applicable, connect the IWI conductor (for the illuminated wind direction indicator) from the Radio Receiver to the 'P.A.L.C-IWI+' labelled terminal (i.e. terminal 36) in the Control Unit.

Note: If single intensity PALC is used, wire the airfield lighting control output to the desired intensity input.

Input terminal	Intensity
P.A.L.C-RLY1+	Low
P.A.L.C-RLY2+	Medium
P.A.L.C-RLY3+	High

9. Add-on: RF Control Input
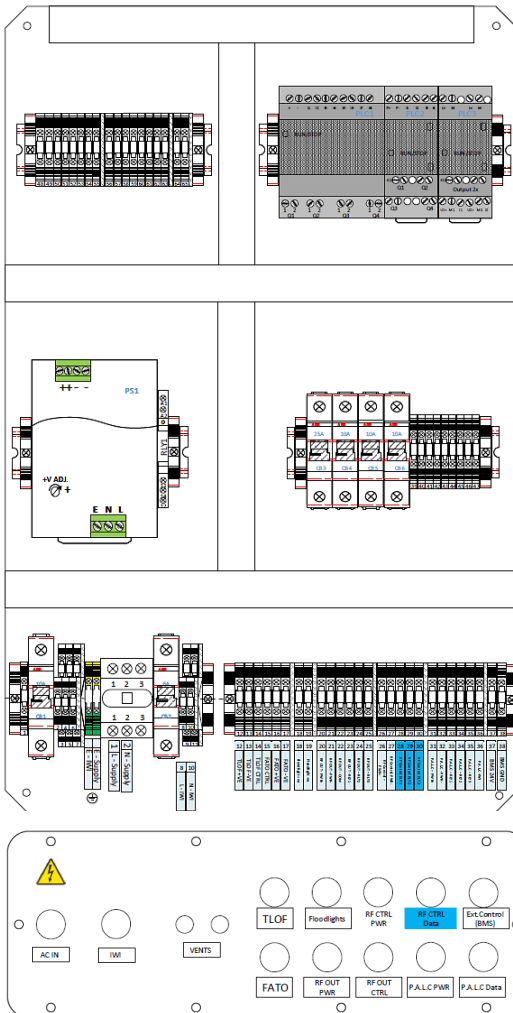
Wiring Instructions-Power Cable:

- Connect the positive conductor from the RF Relay Assembly to the 'RF Control PWR+' labelled terminal (i.e. terminal 26) in the Control Unit.
- Connect the negative conductor from the RF Relay Assembly to the 'RF Control PWR-' labelled terminal (i.e. terminal 27) in the control Unit.
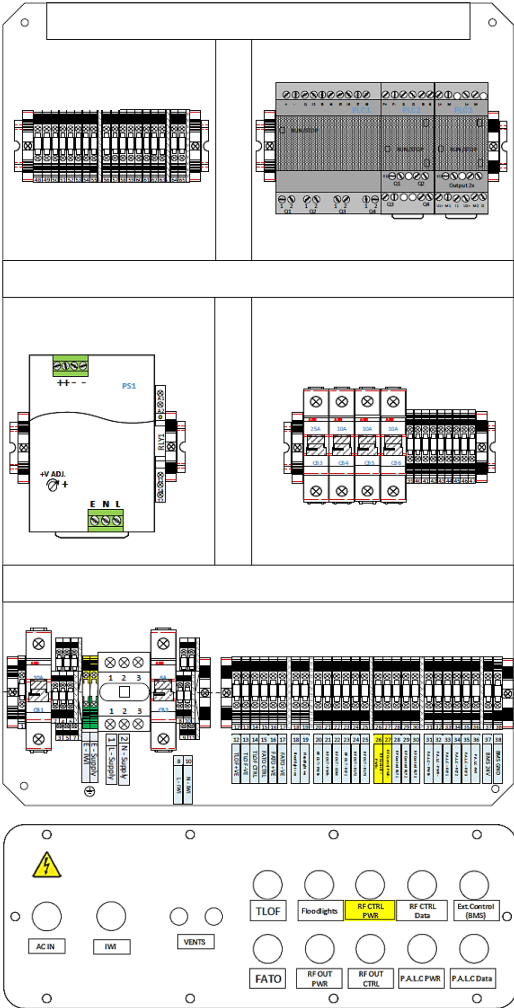
Wiring Instructions-Data Cable:

- Connect the RLY1 conductor from the RF Relay Assembly to the 'RF Control RLY1' Labelled terminal (i.e. terminal 28) in the Control Unit.

- Connect the RLY2 conductor from the RF Relay Assembly to the 'RF Control RLY2' Labelled terminal (i.e. terminal 29) in the Control Unit.

- Connect the RLY3 conductor from the RF Relay Assembly to the 'RF Control RLY3' Labelled terminal (i.e. terminal 30) in the Control Unit.

10. Add-on: RF Control Output

Wire the RF Transmitter to the Control Unit

Wiring Instructions-Power Cable:
- Connect the red positive conductor from the RF Transmitter to the 'RF OUT-PWR+' labelled terminal (i.e. terminal 20) in the Control Unit.
- Connect the black negative conductor from the RF Transmitter to the 'RF OUT-PWR-' labelled terminal (i.e. terminal 21) in the Control Unit.
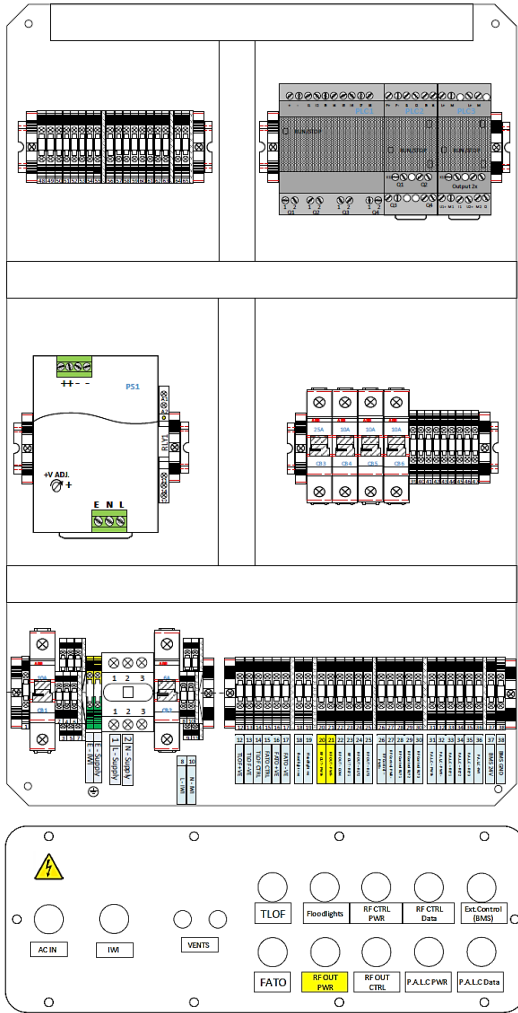
Wiring Instructions-Data Cable:

- Connect the COM conductor from the RF Transmitter to the 'RF OUT-COM' labelled terminal (i.e. terminal 22) in the Control Unit.

- Connect the RLY1 conductor from the RF Transmitter to the 'RF OUT-RLY1+' labelled terminal (i.e. terminal 23) in the Control Unit.

- Connect the RLY2 conductor from the RF Transmitter to the 'RF OUT-RLY2+' labelled terminal (i.e. terminal 24) in the Control Unit.

- Connect the RLY3 conductor from the RF Transmitter to the 'RF OUT-RLY3+' labelled terminal (i.e. terminal 25) in the Control Unit.
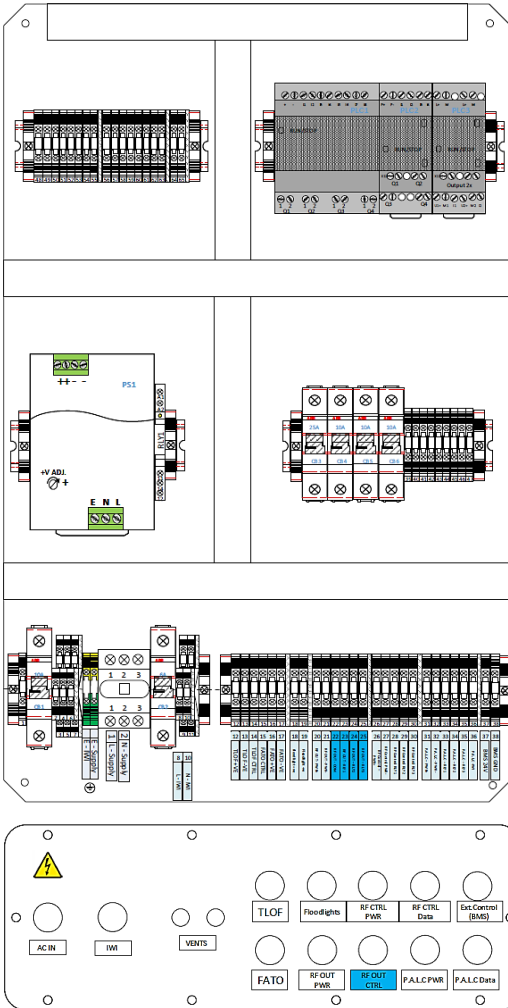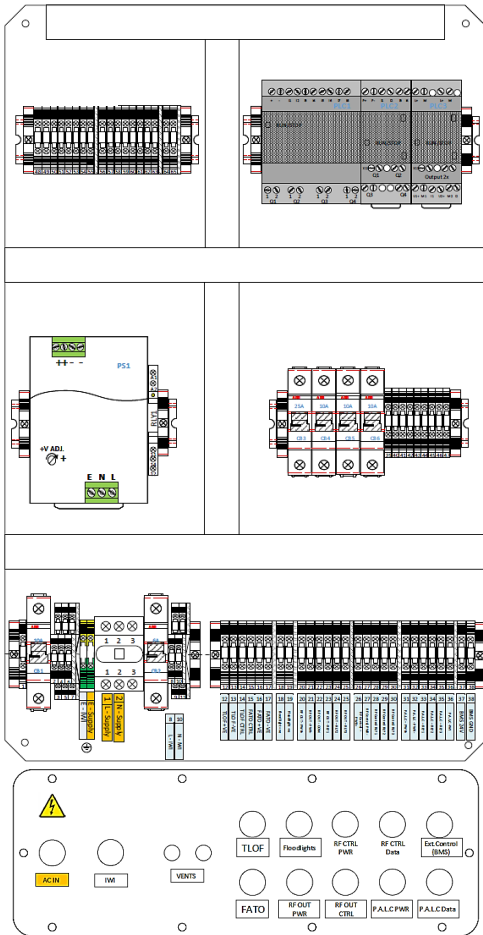
11. Wiring the Control Unit:

AC Installation:

Connect the incoming power conductors to the appropriate terminals (L-Supply and N-Supply) on the power switch in the Control Box.

The Earth conductor will be connected to the green/yellow terminal block (i.e. terminal E-Supply) adjacent to the power switch.

See the diagrams of the Control Unit and Gland Plate below:
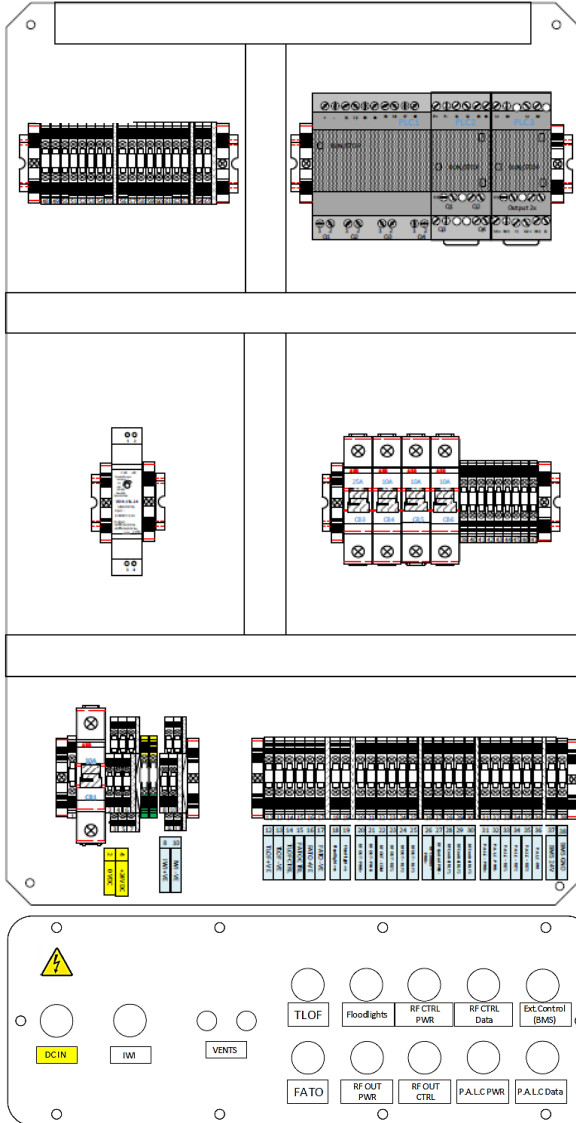
DC Installation:

Connect the incoming power conductors to the appropriate terminals (+24VDC and 0VDC) in the Control Unit.

See the diagrams of the Control Unit and Gland Plate below:

7.3 Testing Procedure

1.   Power the system on.
2.   Check that no circuit breakers have tripped.

Base Version:

Check the function of all lights in the system:

a.   Activate the Manual Control button with the floodlights disabled. Turn the system on and ensure that all lights except the floodlights are illuminated.

   For 01 variants, switch through the low, medium and high intensity settings via the selector switch and ensure that the lights illuminate accordingly.

   Turn the system off and ensure that all lights are extinguished.

b.   Activate the Manual Control button with the floodlights enabled. Turn the system on and ensure that the floodlights are illuminated with the rest of the system.

   For 01 variants (i.e. enhanced control), switch through the low, medium and high intensity settings via the selector switch and ensure that the lights illuminate accordingly.

   Turn the system off and ensure that all lights are extinguished.

Note: The windsock must turn on and off with the rest of the system, but with no intensity control.

BMS Control:

a.   Turn the system off.
b.   Send a BMS control signal and verify that the lights turn on and off accordingly.

PALC:

Verify PALC Functionality:

a.   Using a radio, simulate a push to talk (P.T.T) signal.

b.   Verify that the lights are illuminated at the correct intensity according to the P.T.T signal.

   -For 01 variants (i.e. enhanced control), the lights should be activated at low, medium and high intensity

   -For 00 variants, (i.e. unenhanced control) the lights should be activated at high intensity only

c.   Verify that manual control has no effect while the PALC is on.

d.   Verify that the system turns off after the PALC has timed out and ensure that manual control is active.

RF Control Input:

Verify RF Control Input functionality:

a.   Send a command with low, medium and high intensity via an Avlite Handheld Controller.

b.   Verify that the required lights (without RF) are illuminated at the correct intensity.

   -For 01 variants (i.e. enhanced control), the lights should be activated at low, medium and high intensity

   -For 00 variants, (i.e. unenhanced control) the lights should be activated at high intensity only.

c.   Verify that manual control has no effect while the Avlite handheld controller is activated.

d.   Set the Avlite Handheld Controller to standby and verify manual control is active.

RF Control Output (Applicable for enhanced control only):

Verify RF Control Output functionality:

a.   Send a command with low, medium and high intensity via manual control on T1 controller.

b.   Verify RF enabled light fixtures respondat low, medium and high intensity.

c.   Verify that RF enabled lights turn on and off accordingly with manual control inputs.

Note: RF enabled floodlights do not have intensity control and will always be illuminated at high intensity.

8.0 Maintenance and Servicing

Please refer to the installation manuals of the individual heliport components for maintenance and servicing.

Inspect the Control Unit for evidence of dust or water penetration. Repair gaskets or conduit entries as required.

Inspect control wiring for failing insulation, open conductors or other wiring flaws and repair as required.

9.0 Replacement Parts

If replacement parts are required, please call a local Avlite distributor and reference the Product or Configuration Code called out in the "Product Configuration and Options" section of the corresponding product data sheet.

10.0 Troubleshooting

Problem	Possible Cause	Solution
Base Build		
No light fixtures activate	**Input power**	• **Check wiring from input and upstream circuit breakers to controller and ensure wiring is correct and undamaged.**
	Wiring from controller to lights	• **Check wiring from controller to individual lights circuits and ensure wiring is correct and undamaged.**
Multiple fixtures not activating in a light circuit	**There is input power to the light circuit but no output power**	• **Check wiring from the affected light circuit to the controller and ensure wiring is correct and undamaged.**
Single light fixture not activating	**There is input power to the light fixture but no output power**	• **Check wiring from the affected light to the controller and ensure wiring is correct and undamaged.**
No light dimming (enhanced control only)	**Wiring from controller to light circuits**	• **Verify control is connected to every light circuit.** • **Ensure that every light circuit has a control wire fed to it through the daisy chain.**
BMS Input		
BMS input not working	**Voltage level**	• **Verify correct voltage level has been provided**
PALC		
PALC is not activating system	• **Input power**	• **Verify input power is correct. Refer to PALC product manual.**
	• **Wiring to enclosure**	• **Check wiring is correct and undamaged. Refer to PALC product manual.**
	• **Frequency settings between PALC and radio.**	• **Refer to PALC product manual for correct frequency settings.**

Problem	Possible Cause	Solution
PALC		
PALC not activating system at correct intensity	**Wiring of conductors to required intensity terminals**	· **Check wiring of airfield lighting control output to the corresponding intensity input terminals in the table shown in step 10 of the installation procedure.**
RF Control Input		
System not activating	**Input power**	· **Verify input power is correct. Refer to add-on RF control input product manual.**
	Wiring to enclosure	· **Check wiring is correct and undamaged. Refer to add-on RF control input product manual.**
	Frequency settings between PALC and radio.	· **Refer to add-on RF control input product manual for correct frequency settings.**
System is activating at the incorrect intensity	**Wiring of conductors to required intensity terminals.**	· **Refer to add-on RF control input product manual.**
RF Control Output		
RF enabled lights unresponsive	**Wiring to controller and RF transmitter**	· **Check cabling to controller is correct and undamaged. Refer to user manual.** · **Check wiring into add-on enclosure (RF transmitter) is correct and undamaged. Refer to user manual.** · **Check battery diagnostic of RF enabled fixtures. Refer to user manual.**
RF enabled lights are activated at the incorrect intensity	**Wiring to intensity terminals**	· **Verify wiring to correct intensity points** · **Verify wiring of control output is correct and undamaged.**

Notes

Avlite Solution Verticals available

Airfield

Heliport

Obstruction