

Medium Intensity Obstruction Light AV-OL-MI

Installation & Service Manual - V3.0



*"We Believe Technology
Improves Navigation."*

Manual Update Register

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1.0 Introduction

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

Avlite Systems draws on more than 25 years experience in the design and manufacture of navigation aids, and particular care has been taken to ensure your light 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 light, and be able to maximise its operating function.

Please remember to complete the Avlite warranty registration at www.avlite.com.

2.0 Technology

Avlite Systems is a world-class 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-OL-MI Model

The AV-OL-MI is a red, medium intensity LED obstruction beacon designed to comply with either ICAO MIOL Type B or Type C, or FAA L-864 requirements. The model is illuminated for night operation as either a steady burning (ICAO Type C only) or flashing (ICAO Type B or FAA L-864) beacon that can be used for marking obstacles from 45 metres above ground, such as telecommunication towers, wind turbines, buildings and other tall structures.

Avlite's LED obstruction lights offer an ultra bright, energy efficient and cost effective lighting solution. The light fixture is available in two configurations, universal DC (24–48VDC) or universal AC (90–264VAC).

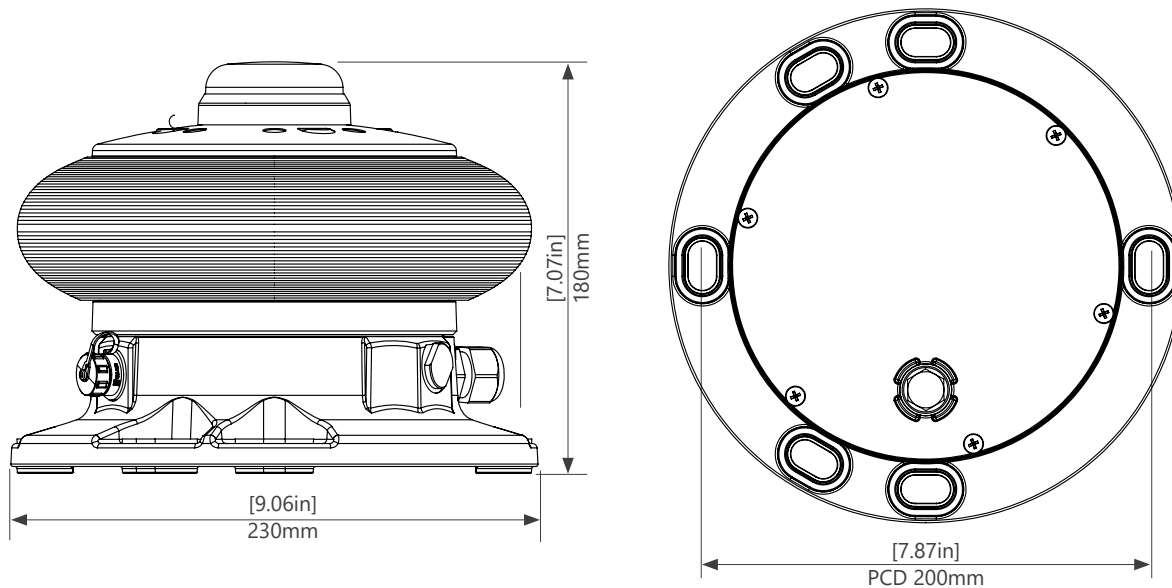
The light fixture incorporates internal diagnostic checking and an alarm contact for remote monitoring. The alarm relay will be released whenever there is a problem e.g. no power, supply voltage too low, LED failure, etc. The alarm relay will remain energized during the day when operating normally.

3.1 Available Options

- Controller with Satcom and GSM Connectivity (See our AV-OL-CTRL Controllers)
- Solar add-on
- Mounting fixtures



Technical Illustrations



4.0 AV-OL-MI Data Sheet

	DC	UM
Light Characteristics		
Light Source	LED	
Colour	Red/IR	
Peak intensity (cd)	Complies with ICAO Medium Intensity Type B and C	
Horizontal Output (degrees)	360	
Vertical Divergence (degrees)	As per ICAO specifications	
Reflector Type	Multi LED Optic	
Operation Mode Adjustment	User adjustable between dusk till dawn and 24 hour operation	
LED Life Expectancy (hours)	<100,000	
Electrical Characteristics		
Operating Voltage	24-48 VDC	90-264 VAC - 50/60 Hz
Peak Power (W)	60 W	80 VA
Average Power (W)	Type B: 8 W Type C: 25 W L-864: 7 W	Type B: 12.3 VA Type C: 38.5 VA L-864: 10.8 VA
Circuit Protection	Integrated	
Temperature Range	-40 to 55°C	
Physical Characteristics		
Body Material	7-stage powder-coated aluminium	
Lens Material	Impact modified UV stabilized acrylic	
Lens Diameter (mm/inches)	230 / 9	
Mounting (mm/inches)	200 / 7.07 bolt pattern	
Height (mm/inches)	151 / 6	
Width (mm/inches)	230 / 9	
Mass (kg/lbs)	5.5 / 12.3	
Service Life	12 years plus	
Environmental Standards		
Shock	MIL-STD-202G, Test Condition G, Method 213B	
Vibration	MIL-STD202G, Test Condition B, Method 204	
Wind Speed	Up to 240 kph / 150 mph	
Humidity	0 to 100%	
Compliance		
EMC	EN61000-6-4:2019 EN61000-6-2:2019	
Quality Assurance	ISO9001:2015	
ICAO	Medium Intensity Obstruction Light - Type B and C	
Other		
Warranty	5 year warranty	
Options Available	Add on solar system for DC variant. Mounting accessories. Obstruction Controller with SATCOM or GSM available. Turn-key kit based on structure.	
Terms and Conditions	Please refer to the light installation manual for further specifications. Warranty Terms and Conditions - www.avlite.com	

5.0 Safety Information

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

- 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.
- Make sure the light fixture mounting is vertically aligned to guarantee the required beam pattern of the airfield light.
- Make sure any nearby obstacles do not impede the lights' beam pattern.
- 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.
- Operate the light only within the indicated electrical ratings and product usage instructions.
- To ensure that the light and peripheral equipment function safely and correctly, use cable in compliance with the effective local electrical code.
- Do not stare at the LED or shine the LED into your eyes or those of another person.
- Dispose of the product according to the local laws and regulations for your region, for example, at a recycling centre that accepts electronic devices.
- Ensure the tower or mast is grounded (NO RF HAZARD).
- Check the mast lighting circuit is not faulty.
- Make sure the mounting pole is vertically aligned to guarantee the required beam pattern of the obstruction light

6.0 Operation and Setup

When powered up, the light will constantly check day/night status using its internal ambient light sensor. The ambient light sensor averages its measurement for 30 seconds.

FAA: By default the lights turn ON when the ambient light decreases to not less than 35 footcandles (376.7 lux) and turn OFF when the ambient light decreases to not more than 60 footcandles (645.8 lux).

ICAO: By default the lights turn ON when the ambient light decreases to not less than 100 lux and turn OFF when the ambient light increases to not more than 150 lux.

If the light detects a LED failure the alarm relay can be used to provide a feedback to the user. In night mode, the MI is illuminated red and either flashes (for ICAO Type B or FAA L-864) or remains steady burning (for ICAO Type C). In day mode, the light will not be illuminated.

Light intensity & operation mode setting for FAA or ICAO compliant light fixture

The fixture will be supplied with either the FAA or ICAO compliant optic as specified by product type. The MI comes preset to the intensity setting required to produce either an FAA (L-864) or ICAO (Type B or Type C) photometric profile in dusk-till-dawn mode and does not need to be set by the user.

Note: The ICAO Model and FAA Model have their own unique optic. The ICAO model cannot be used for FAA purposes and the FAA model cannot be used for ICAO purposes. The model required needs to be specified at the time of order.

6.1 GPS Synchronisation

Avlite has utilised the latest advancements in GPS technology to develop an internal synchronisation system that is incorporated into the lights. Using overhead satellites, multiple obstruction lights set to the same flash pattern are able to flash in synchronisation (for MI Type B or FAA L-864 during night operation only). No additional power supplies, aerials or control systems are required, and with its microprocessor-based system, the GPS option is specifically designed to provide maximum reliability and performance over a wide range of environmental conditions.

Operating Principle

Each light operates independently and requires no operator intervention. A minimum of 4 satellites need to be in view for the built-in GPS receiver to collect time data. At dusk, the light sensor will turn the light on. If time data is available, the MI will come on synchronised to every other obstruction light with the same selected flash code. Synchronisation is achieved using an internal algorithm based on the highly accurate time base and time data received from the satellites. The satellite data is provided from a number of earth stations using atomic clocks as the time base. Continuous self-checking ensures that the lights will continue to run in synchronisation.

Light Activation

At power-up the microprocessor checks that the internal GPS module is programmed correctly and is able to provide valid time base and time data. Once outside with a clear view of the sky, valid data should become available within 20 minutes.

Note: Lights will not synchronise if different flash codes are selected.

7.0 Unpacking, Installation and Wiring



WARNING:

DO NOT connect directly to an unregulated power source. Connecting to an unregulated source may result in damage.



WARNING:

Do not stare into light emitting diode (LED) beams.



WARNING:

LED lights contain glass components. Do Not Drop. Always follow the instructions outlined in the product manual when cleaning the equipment. Improper cleaning methods and use of unauthorized cleaning agents can damage equipment.

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 and Wiring

Mount the MI light directly to the top of the tower or installation structure either by securing it to any appropriately reinforced mounting point with a 200mm PCD or by attaching an optional Avlite Right Angle Pole Mounting Bracket (for medium intensity fixtures) to the tower and bolting the MI to the bracket. The obstruction light is manufactured with an input power cable of length defined at the time of order. One end of the input power cable is pre-terminated at the light fixture.

Connect the provided input power cable to the corresponding power source in accordance with in accordance with the AC or DC wiring diagrams shown on the following pages (as specified by product type).

Note: Make sure the mounting pole is vertically aligned to guarantee the required beam pattern of the obstruction light. Make sure the light's beam pattern is not disturbed by any nearby obstacles

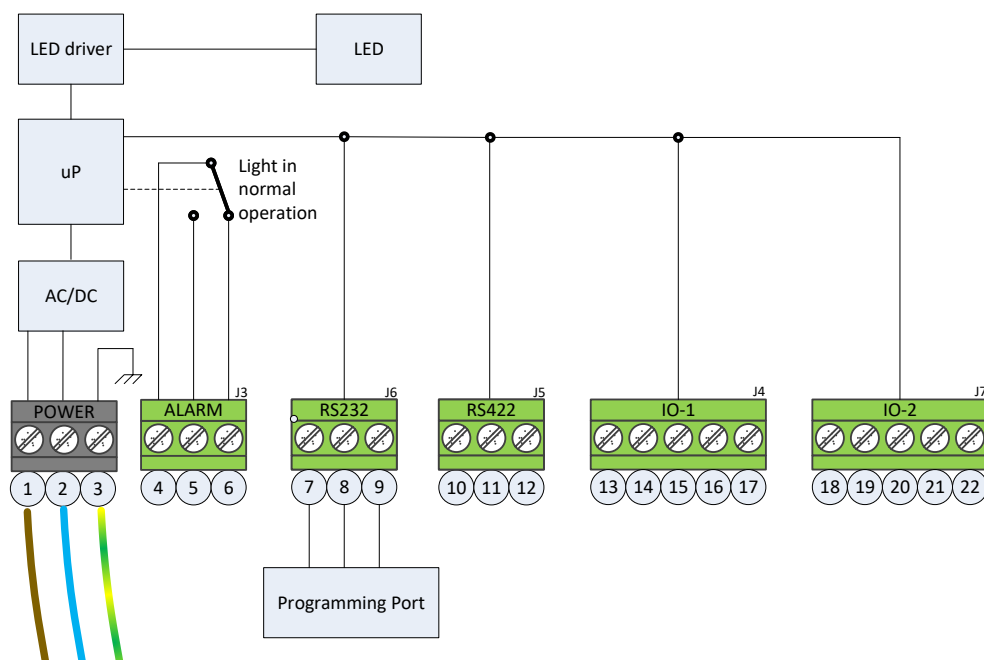
AC Power Connection

The unit is designed to operate from a nominal AC voltage from 90VAC-264VAC.

Wire as follows:

- Line/Active = L1 (Brown for Australia, Europe and UK - Black for USA and Canada)
- Neutral = L2 (Blue for Australia, Europe and UK - White for USA and Canada)
- Earth = L2 (Green/Yellow for Australia, Europe and UK - Green for USA and Canada)

For location details of the terminals please refer below:



Number	Connector	Signal
1	Power	L1
2	Power	L2
3	Power	GND
4	Alarm	COMM
5	Alarm	NO
6	Alarm	NC
7	RS232	GND_B
8	RS232	RxD
9	RS232	TxD
10	RS422	GND_B
11	RS422	422-
12	RS422	422+
13	IO-1	3V3
14	IO-1	IN-1
15	IO-1	GND_A
16	IO-1	OUT-1A
17	IO-1	OUT-1B
18	IO-2	3V3
19	IO-2	IN-2
20	IO-2	GND_A
21	IO-2	OUT_2A
22	IO-2	OUT_2B

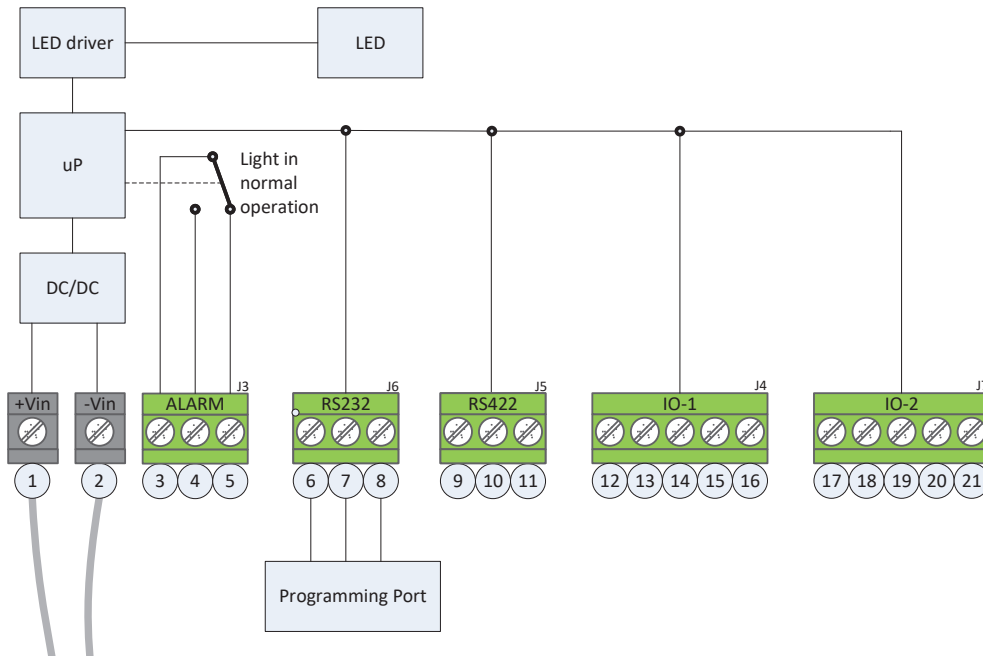
DC Power Connection

The unit is designed to operate from a nominal DC voltage from 24V to 48V.

Wire as follows:

- Positive supply (+) = +VDC (Brown)
- Negative supply (-) = 0V (Blue)

For location details of the terminals please refer below:



Number	Connector	Signal
1	+VIN	+VDC
2	-VIN	-VDC
3	Alarm	COMM
4	Alarm	NO
5	Alarm	NC
6	RS232	GND_B
7	RS232	RxD
8	RS232	TxD
9	RS422	GND_B
10	RS422	422-
11	RS422	422+
12	IO-1	3V3
13	IO-1	IN-1
14	IO-1	GND_A
15	IO-1	OUT-1A
16	IO-1	OUT-1B
17	IO-2	3V3
18	IO-2	IN-2
19	IO-2	GND_A
20	IO-2	OUT_2A
21	IO-2	OUT_2B

Alarm Relay Output

In normal operation the relay is energised

- Terminal contacts COMM and NC of the relay are electrically closed
- Terminal contacts COMM and NO of the relay are electrically open

Whenever the LED is not lit due to a power failure and/or a LED failure the relay will not be energised.

- Terminal contacts COMM and NO of the relay are electrically closed
- Terminal contacts COMM and NC of the relay are electrically open

The alarm relay comes configured as follows:

- Relay normal operation (default, as described above)

The following alarm relay configurations are available as a special order. These must be specified at the time of order:

- Relay inverse operation (inverse functionality of the normal operation, used to conserve power)
- Relay disable (in case the relay is not required, used to conserve power)

Note: The alarm relay is intended for low voltage (SELV) connection only.

NOT FOR MAINS CONNECTION

Please contact AVLITE for further details.

General Purpose Inputs and Outputs

The AV-OL-MI fixture supports a minimum of five discrete IOs via General Purpose Inputs (2) and Outputs (3) in order to meet monitoring requirements as well as provide compatibility with our obstruction lighting controllers.

The I/O configurations must be specified at the time of order.

- General Purpose Inputs (IN-1 and IN-2)

Available Input Type	Description
Disabled	The input line will not be monitored.
Photocell Control	The input line is used to control the state of the photocell/light sensor. Input Low = Night Input High = Day
OpMode Control	The input line is used to control the operation mode used by the lantern. Input Low = Always On Input High = Day and Night

- General Purpose Outputs (OUT-1 and OUT-2)

Available Output Type	Description
Disabled	The output line will remain inactive
Photocell Status	The output line will show the status of the photocell/light sensor. Open Contact = Night Closed Contact = Day
LED Fault	The output line will show the fault state of the LED monitoring. Open Contact = Fault Closed Contact = OK
Visible LED Fault	
IR/NVR LED Fault	
GPS Sync	The output line will show the state of the GPS synchronisation. Open Contact = Not Synchronised Closed Contact = Synchronised

7.3 Testing Procedure

Note: Avlite recommends that all testing be done during the day.

Check function of the MI by carrying out the following:

- a. Night mode test: Cover the MI fixture and check night operation is functioning as expected. The MI should either flash red (for Type B or L-864) or operate as a red, steady burning light (for Type C).
- b. Day mode test: Uncover the MI fixture and check day operation is functioning as expected. The MI should no longer be illuminated.

8.0 IR Remote Control

Test Mode / Configure

Pressing the T/C button for up to 5 seconds places the light in Test Mode. The light will flash once in response to the T/C button being pressed and then turn off.

Normal Operation

The light will return to normal operation once it has not detected a valid key press for 30 seconds. The light will flash once to indicate it is returning to normal operation.

Read

Pressing the Read followed by one of the configuration keys shall cause the light to flash the configured value.

Example Key Sequences:



The light flashes the current battery status.



The light flashes the sunset level in Lux, followed by a 2 second gap, followed by the sunrise level. Levels are in the range of 1 to 9.



The light flashes the Operational Mode. Modes are as follows:

1 flash = Always-On

2 flashes = Standby

3 flashes = Dusk-to-Dawn

Operational Mode

The light has three modes of operation: Always on, Standby Mode and Dusk-to-Dawn mode. These modes are selected via the IR remote control.

In Always On mode, the daylight sensor is disabled and the lantern will remain ON.

In Standby mode, the lantern is turned off and the daylight sensor is disabled.

In Dusk-to-Dawn, the daylight sensor is enabled.



Read Operation mode



Always on mode



Standby mode



Dusk-to-Dawn mode

Battery Status

B

This function reads the battery status. The response from the light is:

4 flashes = High Voltage

3 flashes = Good Voltage

2 flashes = Low Voltage

1 flashes = Cutoff Voltage or below

Example Key sequence:

R

B

T/C

Error/Acknowledge Indication

If the key sequence is invalid, or an out of bounds value is attempted to be set, the light flashes 5 times for 1 second. (The command then needs to be sent from the start.)

Example key sequence: (Set the intensity level to 5 – undefined.)

I

5

T/C

The light flashes 5 times for 1 second.

When a key sequence has been entered successfully the light will respond acknowledgement with a 1 second flash.

9.0 Maintenance and Servicing

Designed to be maintenance free the Obstruction Lights requires minimal attention, though the following maintenance and servicing information is provided to help ensure the life of your Avlite product.

- Occasional cleaning of the dome lens may be required using a cloth and warm soapy water.

External 24V Battery System (SLA)

Red Status LED	Name	Voltage	Description
Slow	High	27.0V and above	Voltage is higher than expected, this may indicate a problem with the solar regulator.
Off	Optimal	Between 25.0V – 27.0V	Voltage is correct for a charged battery
1 Quick	Good	Approximately 24.0V	Voltage is correct, this is where the lantern returns to normal operation
2 Quick	Ok	Between 23.5V - 24.0V	Voltage is a little low, but within expectations.
3 Quick	Low	Between 21.0V – 23.5V	Voltage is low, this is where the alarm relay is first activated
4 Quick	Flat	21.0V and below	Voltage is flat, this is where the main LEDs are turned off and the flat battery cutoff is enabled

External 36V Battery System (SLA)

Red Status LED	Name	Voltage	Description
Slow	High	40.5V and above	Voltage is higher than expected, this may indicate a problem with the solar regulator.
Off	Optimal	Between 37.5V – 40.5V	Voltage is correct for a charged battery
1 Quick	Good	Between 36.0V - 37.5V	Voltage is correct, this is where the lantern returns to normal operation
2 Quick	Ok	Between 35.0V – 36.0V	Voltage is a little low, but within expectations.
3 Quick	Low	Between 32.0V - 35.0V	Voltage is low, this is where the alarm relay is first activated
4 Quick	Flat	32.0V and below	Voltage is flat, this is where the main LEDs are turned off and the flat battery cutoff is enabled

External 48V Battery System (SLA)

Red Status LED	Name	Voltage	Description
Slow	High	54.0V and above	Voltage is higher than expected, this may indicate a problem with the solar regulator.
Off	Optimal	Between 50.0V – 54.0V	Voltage is correct for a charged battery
1 Quick	Good	Between 48.0V - 50.0V	Voltage is correct, this is where the lantern returns to normal operation
2 Quick	Ok	Between 47.0V – 48.0V	Voltage is a little low, but within expectations.
3 Quick	Low	Between 43.0V - 47.0V	Voltage is low, this is where the alarm relay is first activated
4 Quick	Flat	43.0V and below	Voltage is flat, this is where the main LEDs are turned off and the flat battery cutoff is enabled

24V DC Supply System

Red Status LED	Name	Voltage	Description
Slow	High	30.0V and above	Voltage is higher than expected, this may indicate a problem with the solar regulator.
Off	Optimal	Between 24.0V – 30.0V	Voltage is correct for a charged battery
1 Quick	Good	Approximately 24.0V	Voltage is correct, this is where the lantern returns to normal operation
2 Quick	Ok	Between 21.6V - 24.0V	Voltage is a little low, but within expectations.
3 Quick	Low	Between 19.2V – 21.6V	Voltage is low, this is where the alarm relay is first activated
4 Quick	Flat	19.2V and below	Voltage is flat, this is where the main LEDs are turned off and the flat battery cutoff is enabled

36V DC Supply System

Red Status LED	Name	Voltage	Description
Slow	High	45.0V and above	Voltage is higher than expected, this may indicate a problem with the solar regulator.
Off	Optimal	Between 36.0V – 45.0V	Voltage is correct for a charged battery
1 Quick	Good	Approximately 36.0V	Voltage is correct, this is where the lantern returns to normal operation
2 Quick	Ok	Between 32.4V – 36.0V	Voltage is a little low, but within expectations.
3 Quick	Low	Between 28.8V - 32.4V	Voltage is low, this is where the alarm relay is first activated
4 Quick	Flat	28.8V and below	Voltage is flat, this is where the main LEDs are turned off and the flat battery cutoff is enabled

48V DC Supply System

Red Status LED	Name	Voltage	Description
Slow	High	60.0V and above	Voltage is higher than expected, this may indicate a problem with the solar regulator.
Off	Optimal	Between 48.0V – 60.0V	Voltage is correct for a charged battery
1 Quick	Good	Approximately 48.0V	Voltage is correct, this is where the lantern returns to normal operation
2 Quick	Ok	Between 43.2V – 48.0V	Voltage is a little low, but within expectations.
3 Quick	Low	Between 38.4V - 43.2V	Voltage is low, this is where the alarm relay is first activated
4 Quick	Flat	48.4V and below	Voltage is flat, this is where the main LEDs are turned off and the flat battery cutoff is enabled

Once the Flat Battery cutoff condition is in effect, the lantern will not turn back on until it sees day light and the battery voltage is above the 'OK' threshold for at least one minute.

Yellow Status LED	Lantern Status	Lantern	Description
Off	Standby	OFF	Lantern is in Standby Mode
Quick Flashing 0.15s on, 0.15s off	Day to Night Transitioning (Dusk Till Dawn Mode)	OFF	Light is activating and will turn on after detecting 30 seconds of continuous darkness
2 Quick Flashes every 2s	Operational, Not Synchronised	ON	Lantern is in Normal operating condition. it is not connected to any GPS synchronisation
1 Quick Flash every 2s	Operational, Synchronisation in Progress	ON	Lantern is 're-syncing' with GPS. The lantern re-sync's with GPS every 15 minutes.
Slow Flashing 1.5s on, 1.5 off	Operational, Synchronised	ON	Normal operating condition. Lantern is synchronised to GPS-enabled lanterns.
2 Quick Flashes every 11s	Operational, Synchronised as Slave	ON	Lantern is a Hard Wire Synchronised Slave.

10.0 Troubleshooting

Problem	Possible Cause	Solution
Light will not activate	No power to light	<ul style="list-style-type: none"> Check battery terminals are properly connected. Check battery voltage is above the flat battery threshold.
	Ambient lighting conditions	<ul style="list-style-type: none"> Ensure internal toggle switch is set to the 'ON' position. Ensure light is in darkness. Wait at least 60 seconds for the program to initialise in darkness.
Light will not operate for the entire night.	Insufficient Charging	<ul style="list-style-type: none"> Expose light to direct sunlight and monitor operation for several days. Avlite products typically require 2.5-3.0 minimum hours of direct sunlight per day to retain full autonomy. From a discharged state, the light may require several days of operational conditions to 'cycle' up to full autonomy. Ensure solar module is clean and not covered by shading during the day.
Lights are constantly on during the day.	Incorrect Operation Mode	<ul style="list-style-type: none"> Check the Operational Mode setting in AvlitePro is not set to 'Always ON'

11.0 Warranty

Refer to Avlite website at www.Avlite.com.

12.0 Notes

Contact Us!

Avlite's solutions are easy-to-install and scalable. We have a solution for every budget.



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Improves Navigation."*