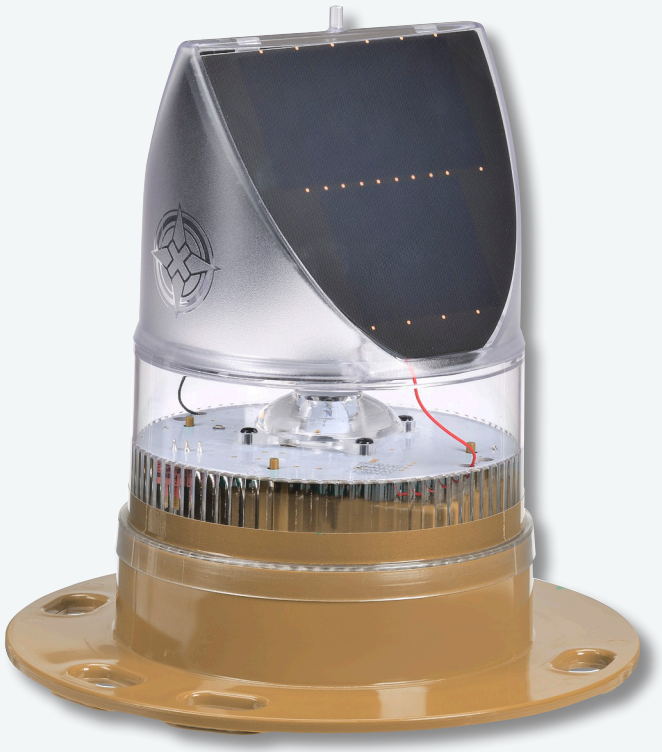
Solar Aviation Light

AV-70

Installation & Service Manual - V1.0



Avlite®

"We Believe Technology Improves Navigation."

Manual Update Register

Version No.	Description	Date	Reviewed	Approved	Design
1.0 (Current)	AV-70 Manual Launch	June 2021	P. Naidu	W. Evans	M. Sugars

Contents

1.0 Introduction

Congratulations! By choosing to purchase an Avlite light, you have become the owner of one of the most advanced solar LED airfield 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 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-70 Models (ICAO, FAA L-861T and L-863)

The AV-70 solar airfield light is designed to comply with ICAO, FAA 861T and 863 requirements and is exceptional in its ability to operate reliably in low sunlight conditions. Made from tough, durable polycarbonate and using the latest LED's, the AV-70 light boasts dual high-performance solar modules incorporated into Avlite's proprietary optics.

As standard, the AV-70 comes with a maximum power point tracker (MPPT) to optimise solar input into the 8.6AH (B1 only), 17.2AH (B2 Only) or 2.5AH (B3 Only) battery for longer run time. In addition, all product variants come with an external interface port for supplementary battery charging via DC input as well as power line control (PLC) communication. Please consult tyour lighting system documentation for more information. The battery is protected from over-charging within the circuit to ensure maximum battery life.

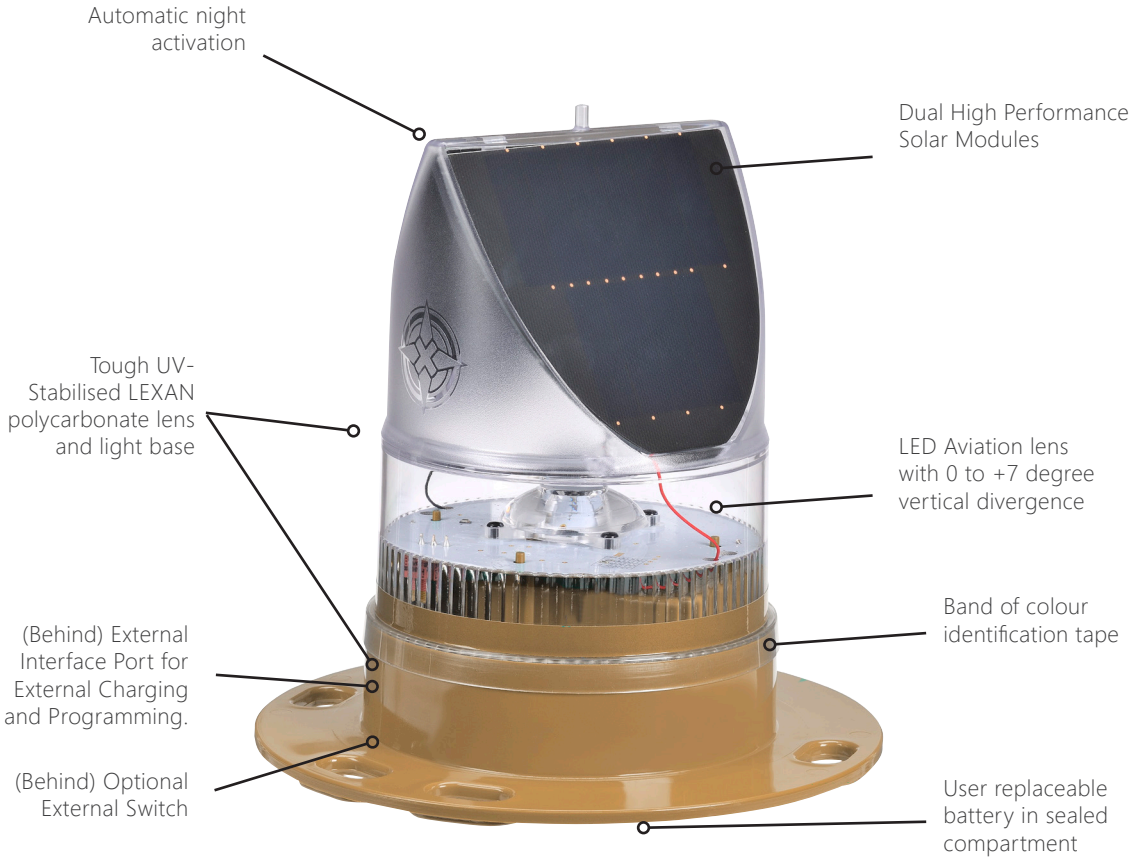
Radio Control capability is optional and can be used in conjunction with a PALC or simple handheld controller. Users can wirelessly control ON/ OFF functions, adjust light intensities, and switch between visual and IR (tactical) operational modes. For more information about our AvMesh™ RF Communications Systems, please refer to the QuickStart Guide or the Installation and Trouble Shooting Manual available at www.avlite.com.

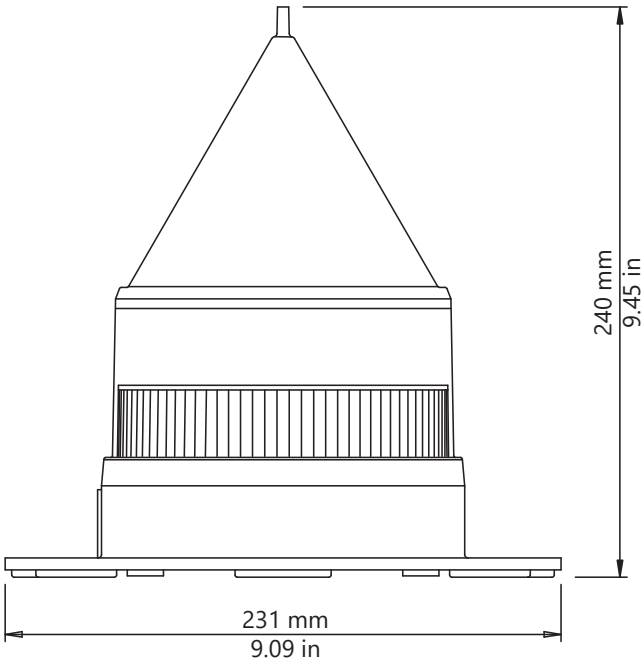
Multiple Radio Controllers can be used to operate the lights at the same time.

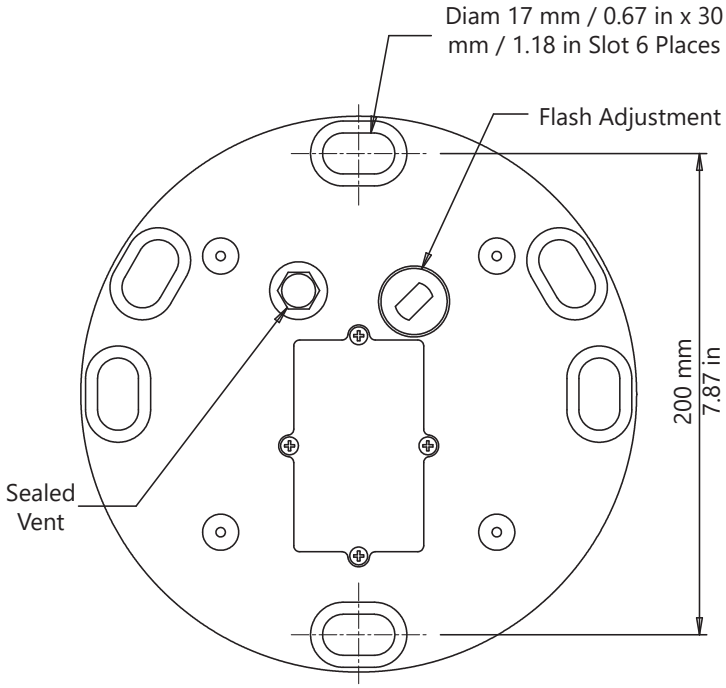
Mounting accessories can be purchased from Avlite or may also be user supplied. The four hole bolt pattern will fit directly onto any 200mm outside diameter (OD) mount.

3.1 Available Options

- Radio Control
- External Switch
- IR Light output
- PALC


Automatic night activation
Dual High Performance Solar Modules
Tough UV-Stabilised LEXAN polycarbonate lens and light base
LED Aviation lens with 0 to +7 degree vertical divergence
Band of colour identification tape
(Behind) External Interface Port for External Charging and Programming.
(Behind) Optional External Switch
User replaceable battery in sealed compartment


240 mm
9.45 in
231 mm
9.09 in


Diam 17 mm / 0.67 in x 30 mm / 1.18 in Slot 6 Places
Flash Adjustment
Sealed Vent
200 mm
7.87 in

4.0 AV-70 Data Sheet

AV-70	B1	B2	B3
Light Characteristics			
Light Source	LED		
Available Colours	ICAO & FAA 861T and 863: Blue, IR. Non-compliant variant: Red, Green, White, Yellow, Bi-directional Combinations, IR		
Horizontal Output (degrees)	360		
Intensity Adjustments	3 Step or 5 Step (Dependent on Variant)		
LED Life Expectancy (hours)	>100,000		
Electrical Characteristics			
Circuit Protection	Integrated		
Temperature Range	-40 to 55°C (-40 to 131°F)		
Transport and Storage Temperature Range	-40 to 55°C (-40 to 131°F)		-40 to 70°C (-40 to 158°F)
Solar Characteristics			
Solar Module Type	Monocrystalline		
Output (Watts)	2.8 (2 x 1.4 watt)		
Solar Module Efficiency (%)	21		
Charging Regulation	MPPT		
Power Supply			
Battery Type	High grade Nickel Metal Hydride (NiMH)		Cyclon AGM-TPPL
Battery Capacity (Ah)	8.6	17.2	2.5
Nominal Voltage (V)	3.6		4.0
Programming/ Charger	Integrated (DC) External (AC)		
Charge Port Rated Power	5 W		
Input Voltage	90-264 VAC, 50/60 Hz		
Radio Controlled			
Frequency	2.4GHz ISM Band		
Range	Up to 1.4km (0.87 mi) relayed		
Expandability	AvMesh®		
Compliance	FCC / CE		
Physical Characteristics			
Body Material	LEXAN® Polycarbonate – UV stabilized		
Body Color options	FAA Yellow, Desert Tan		
Lens Material	LEXAN® Polycarbonate – UV stabilized		
Lens Diameter (mm/inches)	140 / 5 ½		
Lens Design	Single-LED optic		
Mounting	6 x 17mm holes on 200mm PCD		
Height (mm/inches)	240 / 9.45		
Width (mm/inches)	231 / 9.09		
Mass (kg/lbs)	1.4 / 3 ⅛	1.6 / 7 ½	1.4 / 3 ⅛
Service Life	Up to 12 years		
Environmental Standards			
Shock	MIL-STD-202G, Test Condition G, Method 213B		
Vibration	MIL-STD202G, Test Condition B, Method 204		
Wind Speed	Up to 160kph / 100mph		
Humidity	0 to 100%, MIL-STD-810F		
Compliance			
FAA	L861T & 863, Runway And Taxiway AC 150/5345-46E, Portable Runway and Taxiway AC 150/5345-50B LED Color Standard (Engineering Brief No. 67D)		
ICAO	ICAO Annex 14, Vol 1, July 2018		
EMC	EN61000-6-4:2012, EN61000-6-2:2019		
Quality Assurance	ISO9001:2015		
Waterproof	IP68		
Trademarks	AVLITE® and AV-HMALS® is a registered trademark of Avlite Systems		
Other			
Warranty *	3 year warranty		
Options Available	Handheld RF Controller, IR LEDs, External Switch, Pilot Activated Lighting Control (PALC)		
Terms and Conditions	Please refer to the light installation manual for furtherspecifications. 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.

6.0 Operation and Setup

Avlite's AV-70 is a robust, completely self-contained solar powered LED light. The solar module of the light converts sunlight to an electrical current that is used to charge the battery during daylight hours. The battery provides power to operate the light at night.

External ON/OFF Switch

The light is fitted with an external ON/OFF switch at the base of the unit. The ON/OFF switch may be useful if the unit is only required for short periods (i.e. it is being moved or needs to be stored often), and disconnecting the battery is not viable.

External Interface Port

The external interface port is also found at the base of the unit. This can be used to recharge the battery or directly power the light fixture in a wired installation. Please see AV-70 Long Term Battery Storage & Maintenance. In addition, the external interface port can also be used for PLC Communication as well as manual programming via direct connection with the Avlite wireless remote controller. Please see the AvMesh™ RF Communications Manual for more information.

6.1 Activation

Automatic Solar Charging

New lights should be left in the sun for several days to ensure battery is charged before placing in service.

Charging the Battery

The AV-70 contains an integrated solar/battery charging system which allows them to run on solar power or universal mains (AC) input of 90-264VAC via an inline external AC power supply. The AC can be connected either to a generator positioned at one end of the runway, or to a 240VAC utility if available. The AV-70 fixtures will charge automatically when placed in sunlight. In addition, the AV-70 is also fitted with an external interface port on the base of the unit that can be used to manually charge the battery.

Manual battery charging

Manual charging for B1, B2 and B3 battery variants is done via AC. Charging will commence when an AC feed (provided either via a generator or 240 VAC utility) is provided into the external interface port. Charging will be regulated internally to the AV-70. For more information, please see the AV-70 Long Term Battery Storage and Maintenance section of this manual.

Preferred Installation Location

For best light performance, ensure solar modules are not covered and are in clear view of the sky with no shadows.

Lantern Operation

The AV-70 can be activated either via the internal toggle switch or via the external on/off switch if fitted. Depending on product variant, intensity and flash settings need to be set prior to installation. This can be done via the AvMesh™ Handheld Controller for RF variants (Please see the AvMesh™ RF Communications Manual) or via the rotary and DIP switches on the AV-70 PCB for non-RF variants. Procedure for adjustment is as described below:

1. Remove the marked flash adjustment bung (refer to the image below) from the base of the light using a flat blade screwdriver and set internal toggle switch to 'ON'. Alternatively, flick the External Switch to 'ON' if fitted

2. A sealed vent on the base allows air transfer without moisture intake, and should not be disturbed.

3. Set the Light Intensity - The intensity/power settings are adjusted differently for RF and non-RF enabled variants. For non-RF variants, this can be adjusted via the DIP switches on the AV-70 PCB (see section '6.2 Setting an Intensity/Power Setting' of this manual). For RF enabled variants, this can be adjusted via the RF Handheld controller (Please see the AvMesh™ RF Communications Manual).

4. Set the Flash Code - For non-compliant, non-RF variants, the flash code can be adjusted via the rotary switches on the AV-70 PCB (see '6.3 Rotary Switches A and B' section of this manual). For RF enabled variants, the flash code is set by the factory and does not require further adjustment.

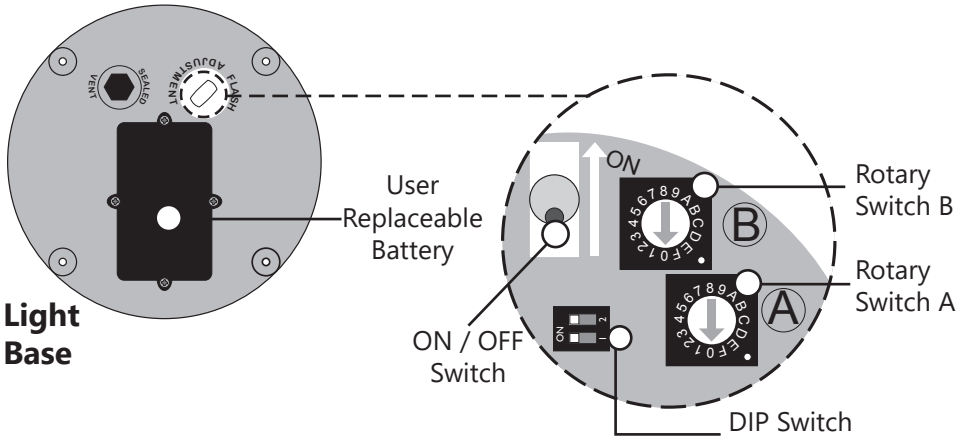
5. Set the Light Group/Node assignment (RF enabled variants only) - Light Groups and node assignments are applicable only to RF enabled variants and can be adjusted via the Rotary switches on the AV-70 PCB (see '6.3 Rotary Switches A and B' section of this manual). Set rotary switches to the required flash code (see '6.3 Rotary Switches A and B section of this manual).

6. To test place dark cover (towel or jacket) on top of light to activate sensor, light will come on within one minute. The Handheld RF controller can be used to test the operation of the RF enabled lights (Please see the AvMesh™ RF Communications Manual)

7. Ensure that the unit is bolted to an even, flat surface.

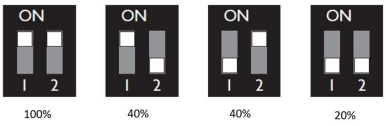
Note: Flash code adjustment is only applicable for non-compliant, non-RF variants.

6.2 Setting an Intensity/Power Setting

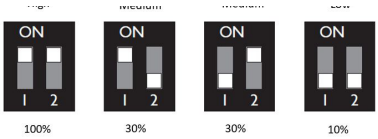


The following diagrams indicate intensity/power settings:

ICAO Variants



FAA 861T and 863 Variants:



Intensity/power settings onnon-RF enabled AV-70s operate via DIP switches, located near the rotary switches on the flasher unit. The intensity/power settings may be used to reduce the power consumption and intensity of the lantern. Setting the lantern to 25% intensity will reduce the power consumption to 25% of the normal 100% setting and the range by 25%. This setting may be used to adjust the current draw of the light to local sunlight conditions.

6.3 Rotary switches A and B

All AV-70 fixtures have 2 rotary switches marked A and B on the flasher unit (see image on previous page). These are used differently for RF and non-RF variants. These are described below:

RF Variants:

For RF variants, rotary switches A and B are used to define the light group and node assignment for a particular light in the system. Please see the AvMesh™ RF Communications Manual for more information.

The default light groups are shown in the table below, however, they can be adjusted via the rotary switches if required.

Node Type	Default Light Group
AV-70-XXXX-XX-XX-W	5
AV-70-XXXX-XX-XX-Y	5
AV-70-XXXX-XX-XX-WY	5
AV-70-XXXX-XX-XX-WR	5
AV-70-XXXX-XX-XX-YR	5
AV-70-XXXX-XX-XX-GY	5
AV-70-XXXX-XX-XX-RG	6
AV-70-XXXX-XX-XX-RX	6
AV-70-XXXX-XX-XX-GX	6
AV-70-XXXX-XX-XX-B	7

Non-RF Variants:

For Non-RF variants, rotary switches A and B are used to set the flash code. Turning the small arrows to the appropriate number or letter will set the code. The flash code can only be adjusted for non-RF, non compliant variants. A comprehensive list of available flash codes is listed in the section below. The unit may take up to 1 minute to activate a new flash code. For RF variants certified to the ICAO, FAA 861T or 863 specification, the flash code will be set by the factory and will not require adjustment.

Example:

Switch		ON	OFF
A	B		
A	0	0.3	2.7

6.4 Flash Codes

AVLITE® code reference is listed by number of flashes. For the latest version of this document visit www.avlite.com, or email support@avlite.com

FL	Flash FL by number Eg. FL 1 S, one flash every second	OC	Occulting; greater period on than off
F	Fixed	ISO	Isophase; equal period on and off
Q	Quick flash	LFL	Long flash long
VQ	Very quick flash	MO	Morse code ( ) contains letter

For example, VQ (6) + LFL 10 S means 6 very quick flashes followed by a long flash, during a 10-second interval.

Please note, Avlite models will retain full autonomy in normal operating conditions with duty cycles up to approximately 30%. In applications whereby duty cycles exceed this limit, a reduction in light intensity is recommended. Please contact a Avlite consultant if assistance is required.

SWITCH		FLASH CODE	ON	OFF
A	B			
0	0	F (Steady light)		
D	3	VQ 0.5 S	0.2	0.3
E	3	VQ 0.6 S	0.2	0.4
F	3	VQ 0.6 S	0.3	0.3
7	3	Q 1 S	0.2	0.8
8	3	Q 1 S	0.3	0.7
9	3	Q 1 S	0.4	0.6
A	3	Q 1 S	0.5	0.5
8	4	Q 1 S	0.8	0.2
B	3	Q 1.2 S	0.3	0.9
9	4	Q 1.2 S	0.5	0.7
C	3	Q 1.2 S	0.6	0.6
F	4	FL 1.5 S	0.2	1.3
1	0	FL 1.5 S	0.3	1.2
0	5	FL 1.5 S	0.4	1.1
0	4	FL 1.5 S	0.5	1.0
2	0	FL 2 S	0.2	1.8
3	0	FL 2 S	0.3	1.7
4	0	FL 2 S	0.4	1.6
5	0	FL 2 S	0.5	1.5
6	0	FL 2 S	0.7	1.3
7	0	FL 2 S	0.8	1.2
1	2	ISO 2 S	1.0	1.0
8	0	FL 2.5 S	0.3	2.2
9	0	FL 2.5 S	0.5	2.0
D	6	FL 2.5 S	1.0	1.5
1	5	FL 3 S	0.2	2.8
A	0	FL 3 S	0.3	2.7
2	5	FL 3 S	0.4	2.6
B	0	FL 3 S	0.5	2.5
3	5	FL 3 S	0.6	2.4
C	0	FL 3 S	0.7	2.3
D	0	FL 3 S	1.0	2.0
2	2	ISO 3 S	1.5	1.5
5	4	OC 3 S	2.0	1.0
E	2	OC 3 S	2.5	0.5
4	6	OC 3.5 S	2.5	1.0
4	5	FL 4 S	0.2	3.8
5	5	FL 4 S	0.3	3.7
E	0	FL 4 S	0.4	3.6
F	0	FL 4 S	0.5	3.5
6	5	FL 4 S	0.6	3.4
0	1	FL 4 S	0.8	3.2
1	1	FL 4 S	1.0	3.0
2	1	FL 4 S	1.5	2.5
3	2	ISO 4 S	2.0	2.0
3	6	OC 4 S	2.5	1.5
F	2	OC 4 S	3.0	1.0
3	1	FL 4.3 S	1.3	3.0
8	5	FL 5 S	0.2	4.8
4	1	FL 5 S	0.3	4.7
5	1	FL 5 S	0.5	4.5
9	5	FL 5 S	0.9	4.1
6	1	FL 5 S	1.0	4.0

SWITCH		FLASH CODE	ON	OFF
A	B			
7	1	FL 5 S	1.5	3.5
4	2	ISO 5 S	2.5	2.5
8	2	LFL 5 S	2.0	3.0
0	3	OC 5 S	3.0	2.0
1	3	OC 5 S	4.0	1.0
2	3	OC 5 S	4.5	0.5
C	6	FL 6 S	0.2	5.8
B	5	FL 6 S	0.3	5.7
C	5	FL 6 S	0.4	5.6
8	1	FL 6 S	0.5	5.5
9	1	FL 6 S	0.6	5.4
A	1	FL 6 S	1.0	5.0
7	5	FL 6 S	1.2	4.8
B	1	FL 6 S	1.5	4.5
5	2	ISO 6 S	3.0	3.0
9	2	LFL 6 S	2.0	4.0
6	4	OC 6 S	4.0	2.0
3	3	OC 6 S	4.5	1.5
4	3	OC 6 S	5.0	1.0
A	4	FL 7 S	1.0	6.0
9	6	FL 7 S	2.0	5.0
5	6	OC 7 S	4.5	2.5
D	5	FL 7.5 S	0.5	7.0
C	1	FL 7.5 S	0.8	6.7
E	5	FL 8 S	0.5	7.5
B	4	FL 8 S	1.0	7.0
6	2	ISO 8 S	4.0	4.0
A	2	LFL 8 S	2.0	6.0
6	6	OC 8 S	5.0	3.0
B	2	LFL 8 S	3.0	5.0
F	5	FL 9 S	0.9	8.1
C	4	FL 9 S	1.0	8.0
7	6	OC 9 S	6.0	3.0
0	6	FL 10 S	0.2	9.8
1	6	FL 10 S	0.3	9.7
D	1	FL 10 S	0.5	9.5
2	6	FL 10 S	0.8	9.2
E	1	FL 10 S	1.0	9.0
1	4	FL 10 S	1.5	8.5
C	2	LFL 10 S	2.0	8.0
D	2	LFL 10 S	3.0	7.0
7	2	ISO 10 S	5.0	5.0
2	4	LFL 10 S	4.0	6.0
8	6	OC 10 S	6.0	4.0
5	3	OC 10 S	7.0	3.0
6	3	OC 10 S	7.5	2.5
F	1	FL 12 S	1.2	10.8
D	4	FL 12 S	2.5	9.5
3	4	LFL 12 S	2.0	10.0
0	2	FL 15 S	1.0	14.0
4	4	LFL 15 S	4.0	11.0
7	4	OC 15 S	10	5.0
A	6	LFL 20 S	2.0	18.0
E	4	FL 26 S	1.0	25.0

SWITCH		FLASH CODE	ON	OFF	ON	OFF
A	B					
0	A	FL (2) 4 S	0.5	1.0	0.5	2.0
E	B	VQ (2) 4 S	0.2	1.0	0.2	2.6
1	A	FL (2) 4.5 S	0.3	1.0	0.3	2.9
2	A	FL (2) 4.5 S	0.4	1.0	0.4	2.7
3	A	FL (2) 4.5 S	0.5	1.0	0.5	2.5
F	9	FL (2) 5 S	0.2	0.8	0.2	3.8
2	C	FL (2) 5 S	0.2	1.2	0.2	3.4
4	A	FL (2) 5 S	0.4	0.6	0.4	3.6
0	7	FL (2) 5 S	0.5	1.0	0.5	3.0
1	7	FL (2) 5 S	1.0	1.0	1.0	2.0
9	B	Q (2) 5 S	0.3	0.7	0.3	3.7
2	9	Q (2) 5 S	0.5	0.5	0.5	3.5
5	A	FL (2) 5.5 S	0.4	1.4	0.4	3.3
7	8	FL (2) 6 S	0.3	0.6	1.0	4.1
A	A	FL (2) 6 S	0.3	0.9	0.3	4.5
6	A	FL (2) 6 S	0.3	1.0	0.3	4.4
7	A	FL (2) 6 S	0.4	1.0	0.4	4.2
9	9	FL (2) 6 S	0.5	1.0	0.5	4.0
2	8	FL (2) 6 S	0.8	1.2	0.8	3.2
3	7	FL (2) 6 S	1.0	1.0	1.0	3.0
3	9	Q (2) 6 S	0.3	0.7	0.3	4.7
A	9	FL (2) 7 S	1.0	1.0	1.0	4.0
7	B	FL (2) 8 S	0.4	0.6	2.0	5.0
8	A	FL (2) 8 S	0.4	1.0	0.4	6.2
4	7	FL (2) 8 S	0.5	1.0	0.5	6.0
8	8	FL (2) 8 S	0.8	1.2	2.4	3.6
5	7	FL (2) 8 S	1.0	1.0	1.0	5.0
4	C	OC (2) 8 S	3.0	2.0	1.0	2.0
5	C	OC (2) 8 S	5.0	1.0	1.0	1.0
F	B	VQ (2) 8 S	0.2	1.0	0.2	6.6
9	A	FL (2) 10 S	0.4	1.6	0.4	7.6
6	7	FL (2) 10 S	0.5	1.0	0.5	8.0
7	7	FL (2) 10 S	0.5	1.5	0.5	7.5
6	9	FL (2) 10 S	0.5	2.0	0.5	7.0
8	7	FL (2) 10 S	0.8	1.2	0.8	7.2
B	9	FL (2) 10 S	1.0	1.0	1.0	7.0
9	7	FL (2) 10 S	1.0	1.5	1.0	6.5
4	9	Q (2) 10 S	0.6	0.4	0.6	8.4
B	A	FL (2) 12 S	0.4	1.0	0.4	10.2
C	9	FL (2) 12 S	0.5	1.0	0.5	10.0
D	9	FL (2) 12 S	1.5	2.0	1.5	7.0
A	8	FL (2) 15 S	0.5	1.5	2.0	11.0
A	7	FL (2) 15 S	1.0	2.0	1.0	11.0
8	B	Q (2) 15 S	0.2	0.8	0.2	13.8
C	A	FL (2) 20 S	1.0	3.0	1.0	15.0
D	A	FL (2) 25 S	1.0	1.0	1.0	22.0

SWITCH		FLASH CODE	ON	OFF	ON	OFF	ON	OFF
A	B							
7	9	Q (3) 5 S	0.5	0.5	0.5	0.5	0.5	2.5
5	9	VQ (3) 5 S	0.2	0.3	0.2	0.3	0.2	3.8
0	C	VQ (3) 5 S	0.3	0.2	0.3	0.2	0.3	3.7
E	9	VQ (3) 5 S	0.3	0.3	0.3	0.3	0.3	3.5
3	C	FL (3) 6 S	0.5	1.0	0.5	1.0	0.5	2.5
2	B	FL (2+1) 6 S	0.3	0.4	0.3	1.2	0.3	3.5

SWITCH		FLASH CODE	ON	OFF	ON	OFF	ON	OFF
A	**B**							
A	B	Q (3) 6 S	0.3	0.7	0.3	0.7	0.3	3.7
F	A	FL (3) 8 S	0.5	1.0	0.5	1.0	0.5	4.5
0	B	FL (3) 9 S	0.3	1.0	0.3	1.0	0.3	6.1
B	7	FL (3) 9 S	0.8	1.2	0.8	1.2	0.8	4.2
B	8	FL (3) 10 S	0.3	0.7	0.3	0.7	0.9	7.1
C	8	FL (3) 10 S	0.4	0.6	0.4	0.6	1.2	6.8
C	B	FL (3) 10 S	0.5	0.5	0.5	0.5	0.5	7.5
C	7	FL (3) 10 S	0.5	1.5	0.5	1.5	0.5	5.5
D	B	FL (3) 10 S	0.6	0.6	0.6	0.6	0.6	7.0
D	7	FL (3) 10 S	1.0	1.0	1.0	1.0	1.0	5.0
3	8	FL (2+1) 10 S	0.5	0.7	0.5	2.1	0.5	5.7
8	9	OC (3) 10 S	5.0	1.0	1.0	1.0	1.0	1.0
B	B	Q (3) 10 S	0.3	0.7	0.3	0.7	0.3	7.7
D	8	FL (2 + 1) 10 S	0.5	0.5	0.5	0.5	1.5	6.5
1	B	FL (3) 12 S	0.5	1.5	0.5	1.5	0.5	7.5
E	A	FL (3) 12 S	0.5	2.0	0.5	2.0	0.5	6.5
E	7	FL (3) 12 S	0.8	1.2	0.8	1.2	0.8	7.2
B	6	FL (3) 12 S	1.0	1.0	1.0	3.0	1.0	5.0
4	8	FL (2+1) 12 S	0.8	1.2	0.8	2.4	0.8	6.0
5	8	FL (2+1) 12 S	1.0	1.0	1.0	4.0	1.0	4.0
1	8	FL (2+1) 13.5 S	1.0	1.0	1.0	4.0	1.0	5.5
F	7	FL (3) 15 S	0.3	1.7	0.3	1.7	0.3	10.7
9	D	FL (3) 15 S	0.4	1.0	0.4	1.0	0.4	11.8
0	8	FL (3) 15 S	0.5	1.5	0.5	1.5	0.5	10.5
F	8	FL (2+1) 15 S	0.6	0.3	0.6	0.3	1.4	11.8
0	9	FL (2+1) 15 S	0.7	0.5	0.7	0.5	1.9	10.7
1	9	FL (2+1) 15 S	0.7	0.7	0.7	0.7	2.1	10.1
6	8	FL (2+1) 15 S	1.0	2.0	1.0	5.0	1.0	5.0
1	C	VQ (3) 15 S	0.1	0.5	0.1	0.5	0.1	13.7
4	B	FL (3) 20 S	0.5	3.0	0.5	3.0	0.5	12.5
3	B	FL (3) 20 S	0.5	1.5	0.5	1.5	0.5	15.5
5	B	FL (3) 20 S	0.8	1.2	0.8	1.2	0.8	15.2
6	B	FL (3) 20 S	1.0	1.0	1.0	1.0	1.0	15.0

SWITCH		FLASH CODE	ON	OFF	ON	OFF	ON	OFF	ON	OFF
A	B									
B	F	VQ (4) 4 S	0.3	0.3	0.3	0.3	0.3	0.3	0.3	2.3
B	D	Q (4) 6 S	0.3	0.7	0.3	0.7	0.3	0.7	0.3	2.7
8	D	Q (4) 6 S	0.4	0.6	0.4	0.6	0.4	0.6	0.4	2.6
1	D	FL (4) 10 S	0.5	1.0	0.5	1.0	0.5	1.0	0.5	5.0
2	D	FL (4) 10 S	0.8	1.2	0.8	1.2	0.8	1.2	0.8	3.2
F	E	Q (4) 10 S	0.3	0.7	0.3	0.7	0.3	0.7	0.3	6.7
B	E	FL (4) 12 S	0.3	1.7	0.3	1.7	0.3	1.7	0.3	5.7
4	F	FL (4) 12 S	0.5	0.5	0.5	0.5	0.5	0.5	0.5	8.5
C	E	FL (4) 12 S	0.5	1.5	0.5	1.5	0.5	1.5	0.5	5.5
3	D	FL (4) 12 S	0.8	1.2	0.8	1.2	0.8	1.2	0.8	5.2
A	D	Q (4) 12 S	0.3	0.7	0.3	0.7	0.3	0.7	0.3	8.7
4	D	FL (4) 15 S	0.5	1.5	0.5	1.5	0.5	1.5	0.5	8.5
8	E	FL (4) 15 S	1.0	1.0	1.0	1.0	1.0	1.0	1.0	8.0
7	D	FL (4) 15 S	1.5	0.5	0.5	0.5	0.5	0.5	0.5	10.5
D	E	FL (4) 16 S	0.5	1.5	0.5	1.5	0.5	1.5	0.5	9.5
C	D	FL (4) 20 S	0.3	3.0	0.3	3.0	0.3	3.0	0.3	9.8
5	D	FL (4) 20 S	0.5	1.5	0.5	1.5	0.5	1.5	0.5	13.5
0	D	FL (4) 20 S	0.5	1.5	0.5	1.5	0.5	4.5	0.5	10.5
3	F	FL (4) 20 S	1.5	1.5	1.5	1.5	1.5	1.5	1.5	9.5
0	F	Q (4) 20 S	0.5	0.5	0.5	0.5	0.5	0.5	0.5	16.5
E	E	Q (4) 28 S	0.5	0.5	0.5	0.5	0.5	0.5	0.5	24.5

SWITCH		FLASH CODE	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
A	B											
D	D	Q (5) 7 S	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	2.7
E	D	Q (5) 10 S	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	5.7
E	8	FL (5) 12 S	0.5	1.5	0.5	1.5	0.5	1.5	0.5	1.5	0.5	3.5
5	F	FL (5) 20 S	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	15.5
9	F	FL (5) 20 S	0.8	1.2	0.8	1.2	0.8	1.2	0.8	1.2	0.8	11.2
9	E	FL (5) 20 S	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.0

SWITCH		FLASH CODE	ON	OFF		OFF		OFF		OFF	ON	OFF	ON	OFF
A	B													
F	D	Q (6) 10 S	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	4.7
A	F	FL (6) 15 S	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	9.7
7	F	FL (6) 15 S	0.5	1.0	0.5	1.0	0.5	1.0	0.5	1.0	0.5	1.0	0.5	7.0

SWITCH		FLASH CODE	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
A	**B**															
6	E	VQ (6) + LFL 10 S	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	2.0	5.0
7	E	VQ (6) + LFL 10 S	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	2.0	4.4
2	F	Q (6) + LFL 15 S	0.2	0.8	0.2	0.8	0.2	0.8	0.2	0.8	0.2	0.8	0.2	0.8	2.0	7.0
2	E	Q (6) + LFL 15 S	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	2.0	7.0
3	E	Q (6) + LFL 15 S	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	2.0	5.8
8	F	VQ (6) + LFL 15 S	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	2.0	9.4

SWITCH		FLASH CODE	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF		OFF	ON	OFF	ON	OFF	ON	OFF
A	B																			
4	E	VQ (9) 10 S	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	5.8
5	E	VQ (9) 10 S	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	4.9
1	F	Q (9) 15 S	0.2	0.8	0.2	0.8	0.2	0.8	0.2	0.8	0.2	0.8	0.2	0.8	0.2	0.8	0.2	0.8	0.2	6.8
0	E	Q (9) 15 S	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	6.7
1	E	Q (9) 15 S	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	4.8

SWITCH		FLASH CODE	ON	OFF	ON	OFF	ON	OFF	ON	OFF
A	B									
MORSE CODE ( ) INDICATES LETTER										
7	8	MO (A) 6 S	0.3	0.6	1.0	4.1				
7	B	MO (A) 8 S	0.4	0.6	2.0	5.0				
8	8	MO (A) 8 S	0.8	1.2	2.4	3.6				
B	8	MO (U) 10 S	0.3	0.7	0.3	0.7	0.9	7.1		
C	8	MO (U) 10 S	0.4	0.6	0.4	0.6	1.2	6.8		
D	8	MO (U) 10 S	0.5	0.5	0.5	0.5	1.5	6.5		
9	8	MO (A) 10 S	0.5	0.5	1.5	7.5				
8	9	MO (D) 10 S	5.0	1.0	1.0	1.0	1.0	1.0		
A	8	MO (A) 15 S	0.5	1.5	2.0	11.0				
F	8	MO (U) 15 S	0.6	0.3	0.6	0.3	1.4	11.8		
0	9	MO (U) 15 S	0.7	0.5	0.7	0.5	1.9	10.7		
1	9	MO (U) 15 S	0.7	0.7	0.7	0.7	2.1	10.1		
7	D	MO (B) 15 S	1.5	0.5	0.5	0.5	0.5	0.5	0.5	10.5

7.0 Optional IR Remote Control

Test Mode / Configure T/C

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:

R B T/C — The light flashes the current battery status.

R L T/C — 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.

R B I T/C — 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.

R B I T/C — Read Operation mode

B I 1 T/C — Always on mode

B I 2 T/C — Standby mode

B I 3 T/C — 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

Lux L

This key sets the ambient light threshold levels.

The format is L X T/C

Where 'x' is the desired setting from the table below.

There are 5 programmable lux levels which are set together for the sunset and sunrise transitions.

Level	Sunset (Dusk)	Sunrise (Dawn)
1	64	100
2*	100	150
3	150	240
4	240	370
5	370	600
*Default/Factory Preset		

Example key sequence: L 1 T/C

Assume the current Lux settings are at the factory preset values of 2.

This sets the ambient light level to be lower than the default 100 lux. The light will turn on when its surroundings are darker.

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.

8.0 Unpacking, Installation, Wiring and Setup

8.1 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.

8.2 Installation

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.

Tools required for assembly & installation

- Hammer or Sledge Hammer
- 6mm Allen Key

Intensity and Flash Settings

Intensity and/or Flash settings may be adjustable depending on product variant. Please see pages 11-15.

Light Operation and Configuration

NOTE: Before activating the lights, the lights must be layed out on the runway in the location they will be installed.

8.3 Installation Recommendation

1. Installation of the Light Fixture

The AV-70 fixture is able to be installed on any appropriately reinforced mounting point with a 200 PCD. Avlite recommends that the RF variants should be installed only on mounting plates and stackes to avoid compromised RF performance, Alternatively, the appropriate mounting accessories can be purchased separately from Avlite. The installation of these mounting accessories is described below:

Option 1: Rubber Tile Mounting

The completed AV-70 rubber tile assembly is to be mounted on a surface capable of supporting 6kg minimum. Securing the rubber tile to the mounting surface is optional, however, Avlite recommends that the tile be secured at a minimum of two points.

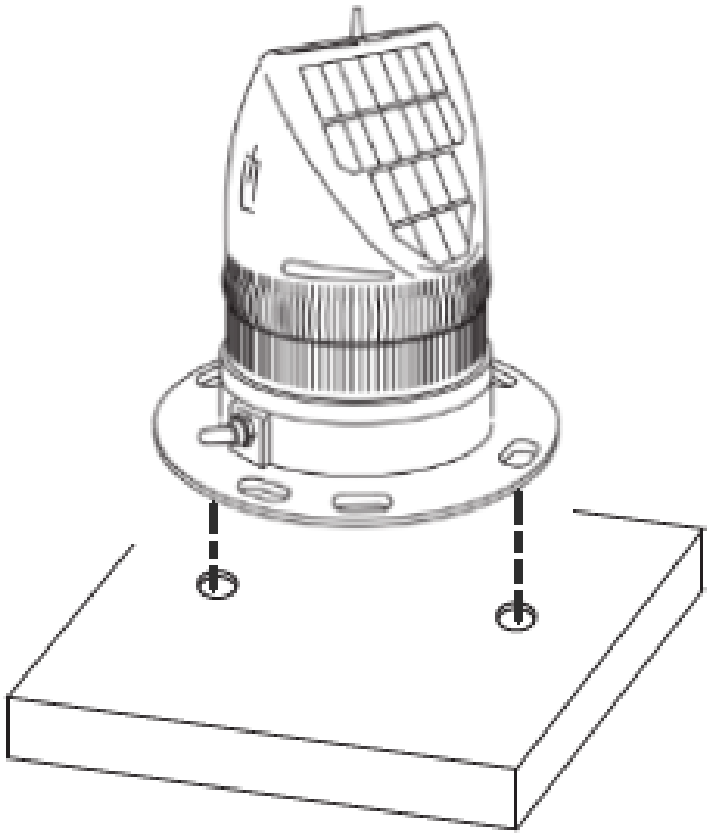
a. Align the holes of the light base to those on the mounting tile.

b. For quick release pins: Center a large washer over the hole on the light base. Depress the blue button on the quick release pin and insert through the washer, through the light base and into the hole in the mounting tile. Repeat on the other side.

   For bolts: Fit te AV-70 on the top of the mounting tile. Insert bolts through the holes in the tile, entering from the bottom. Install penny washer and nut on each. Tighten nuts.

- **NOTE:** RF lights should always be installed on mounting plates and stakes. Avlite does not recommend installation on rubber tiles.

Item	Description	Qty
1	AV-70 Solar Airfield Light	1
2	Rubber Tile	1
3	Penny Washer, 8mm	3
4	Quick Release Pins (if required)	2



Option 2: Frangible Stake Mount

The completed AV-70 mount plate assembly is to be mounted on the Stake in firm soil (not loose sand, screenings or other unbound material).

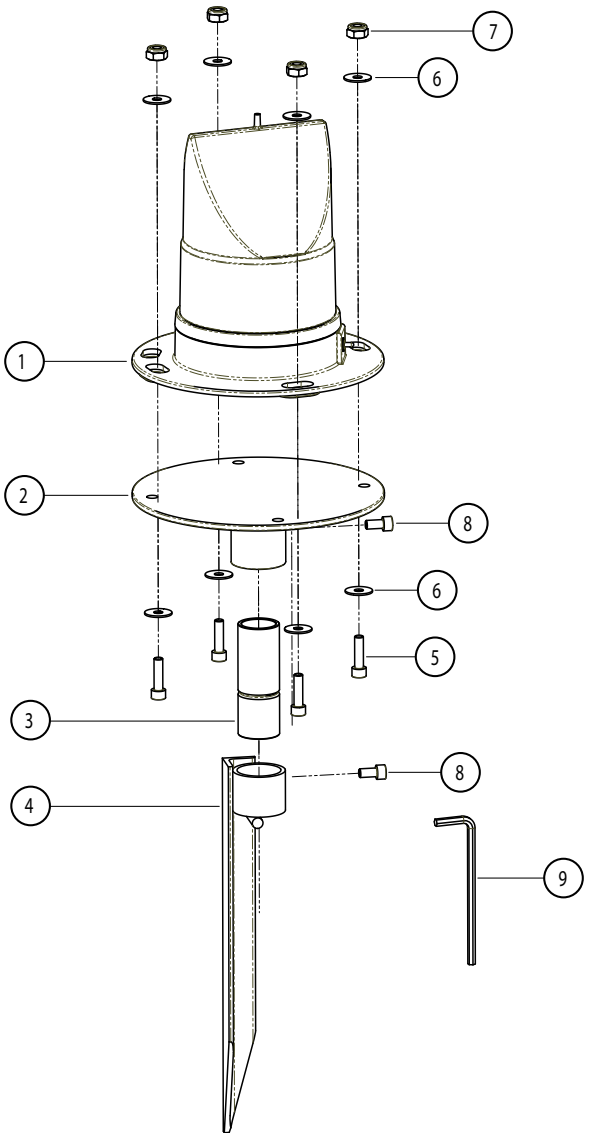
a. Fit the AV-70 light on the top of the mounting plate. Insert bolts through the four holes in the mount, entering from the bottom. Install a penny washer and a Nylock nut on each bolt and tighten.

b. Fit the boss of the mount plate into the shorter barrel of the frangible sleeve. Using a 6mm Allen key, tighten the socket head cap screw against the stake mount boss.

c. Use a sledge hammer to drive the stake into the soil at the chosen location. Drive the stake down until the bottom of the stake sleeve is at ground level. During Installation every effort should be made to ensure that the light is level when installation is complete. When installing a stake mount into the ground ensure that the stake is installed straight into the ground and not on an angle. Ensure that the mounting plate is level using a spirit level.

d. Fit the AV-70 mount plate assembly on top of the stake. Using a 6mm Allen key, tighten the bottom socket head cap screw against the stake sleeve.

Item	Description	Qty
1	AV-70 Solar Airfield Light	1
2	Mount Plate	1
3	Frangible Sleeve	1
4	Stake (355mm)	1
5	Bolt, 8mm x 30	4
6	Penny Washer, 8mm	4
7	Nylock Nut, 8mm	4
8	Socket Head Cap Screw, 8mm x 16	2
9	Allen Key, 6mm	1



Option 3: Installing the Light Assembly to the Frangible Concrete Mount

a. Mount the base plate to the concrete using 4 x M8 concrete bolts.

b. Fit the frangible sleeve and mounting plate onto the concrete base plate and secure using the M8 x 16 SHCS

c. Level the assembly using a spirit level.

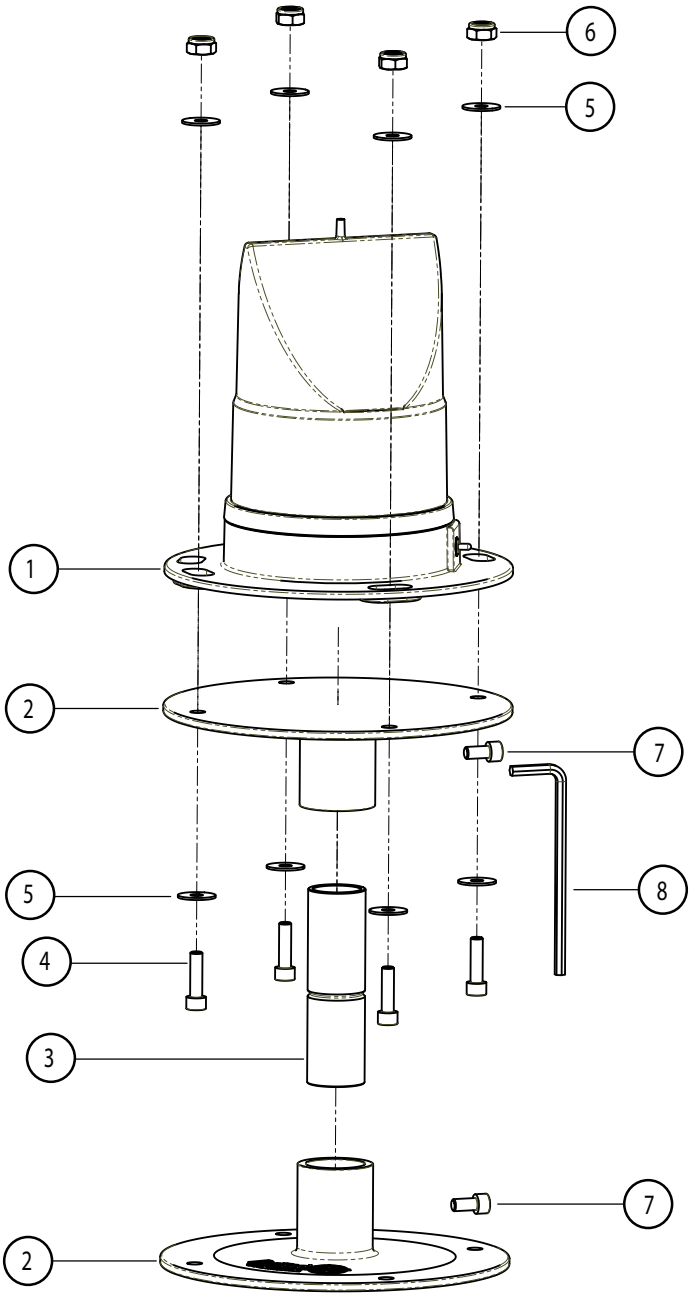
d. Fit the AV-70 to the light mounting plate using M8 SHCS, large flat washers and Nylock nuts.

e. For further adjustments on levelling the light, see the next page.

NOTE: After adjustments, ensure all nuts and bolts are tightened securely and all tools, spares and packaging are removed from the runway.

NOTE: Before activating the RF light variants (if applicable), the lights must be laid out on the runway in the location they will be installed.

Item	Description	Qty
1	AV-70 Solar Airfield Light	1
2	Mount Plate	2
3	Frangible Sleeve	1
4	Bolt, 8mm x 30	4
5	Penny Washer, 8mm	4
6	Nylock Nut, 8mm	4
7	Socket Head Cap Screw, 8mm x 16	2
8	Allen Key, 6mm	1



Levelling the light

During Installation every effort should be made to ensure that the light is level when installation is complete.

The following will help to ensure that the lights are installed correctly:

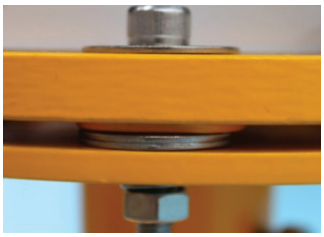
When installing a stake mount into the ground ensure that the stake is installed straight into the ground and not at an angle.

When installing a concrete mount plate ensure that the concrete pad is level using a spirit level.

Check the mounting plate with a spirit level in all directions

Fit the frangible coupling and top mounting plate and check that the light mounting plate is level using a spirit level.

If the mounting assembly can not be levelled to a satisfactory plane, then spacers can be used under the 4 mounting points to complete levelling.



Spacers must be secured. Flat penny Washers can be placed under the 4 mounting points and secured in place by the mounting bolts.

Washers of different thicknesses can be used, as can multiple washers. Use longer bolts when required.

Important: Please ensure that spacers are not just under one mounting point. Please fill in spacers under other mounting points. Failure to space gaps will result in damage to the base or the mounting plate.

9.0 Maintenance and Servicing

Designed to be almost maintenance-free, the AV-426 requires minimal attention, though the following maintenance and servicing information is provided to help ensure the life of your Avlite product.

1. Cleaning Solar Panels - occasional cleaning of the solar panels may be required. Using a cloth and warm soapy water, wipe off any foreign matter before rinsing the panels with fresh water.

2. Battery Check - inspection of batteries should be performed every year for RF variants and every three years (minimum) for non-RF variants to ensure that the charger, battery and ancillary electronics are functioning correctly. Using a voltage meter, check that the battery voltage is at least 3.6 volts under 100mA load, and ensure all terminals are clear of foreign matter.

Replacing the battery

The AV-70 lights are the only compact aviation light with a double sealed battery compartment. This provides the user with the ability to change the battery after years of operation.

NOTE: before carrying out the process below, please see the 'Safe Battery Handling on the next page,

1. Remove the light from either the Rubber tile, Frangible Mount or Frangible Concrete Mount.

2. Remove the marked flash adjustment bung from the base of the light and set internal toggle switch to ‘OFF’.

3. Unscrew small screws to remove battery plate.

4. Remove battery from AV-70 case and unscrew positive and negative leads.

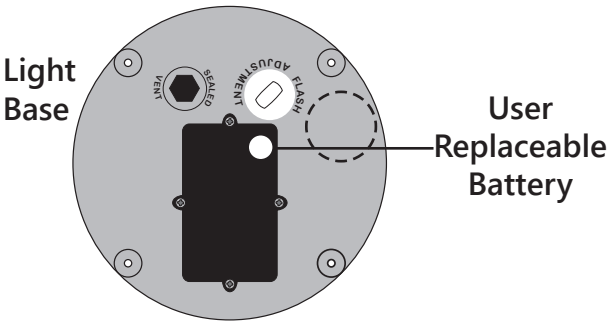
5. Discard old battery in a safe manner.

6. Reattach positive and negative leads to new battery and then place back into case.

7. Reattach battery plate and switch light ‘ON’ via internal switch. Replace the flash adjustment bung.

8. To test place dark cover (towel or jacket) on top of the light to activate the sensor, light will come on. For RF variants, the remote control will need to be used to test the operation of the light. (see the AvMesh™ RF Communications Manual for more information).

Care must be taken to observe the polarity of the battery before the leads are connected, and ensure the replacement battery is fitted correctly. Always discard old batteries in a safe manner.



NOTICE:

Care must be taken to observe the polarity of each wire before they are connected.
To ensure waterproofing of the unit, make sure that there is a satisfactory seal.

Long Term Storage Instructions

If the AV-70 is to be placed in storage for an extended period, being more than 5 months, please follow the below steps.

1. The 3.6V NiMH Battery must be stored in a fully charged condition.
2. Remove the Flash Adjustment plug and turn the ON/OFF switch to the OFF position.
3. Remove the battery cover and disconnect the Positive (+) Terminal.
4. Fold the Terminal away from the Negative Battery Terminal.
5. Replace the Battery Cover
6. Replace the Flash Adjustment Plug.

All batteries will discharge over time and the rate of discharge is dependent on temperature. If the light is being stored in temperatures greater than the optimum temperature the battery will discharge faster.

Please check battery every 2-4 months. Recharge if necessary.

WARNING:

The CYCLON battery cell and monobloc (i.e. B3 Battery Type) may be stored for up to two years at room temperature (25°C or 77°F) and recharged with no loss in cell reliability or performance capabilities. The recharge may be accomplished without resorting to special charging techniques. When batteries are stored at or near 25°C (77°F) we recommend conducting an OCV audit every six (6) months and recharging when OCV readings approach 2.00 volts per cell (VPC). If storage temperatures are significantly higher than 25°C (77°F), even for short durations, the frequency of OCV audits must be increased.

Safe Battery Handling

Charging and Discharging

- Always ensure batteries are fully charged when installing new lights. The light will be dispatched from the Avlite factory fully charged. However if time has elapsed between dispatch and installation, battery voltage must be checked.
- Never short-circuit or reverse polarity of a battery, damage to the battery and device may occur, and there is a risk of fire.
- Do not use different types of batteries in the same battery assembly. Sealed lead acid and NIMH do not mix.
- If the battery has been deep-discharged, a prolonged charging time is required to bring the battery back to full capacity.

Handling

- Do not incinerate or dismantle batteries. Cell components are corrosive and may be harmful to skin and eyes.
- Do not pull on battery lead wires or connector. Excessive force on the leads or connectors can damage the welding joints or other connections.
- Batteries are recyclable. Please dispose of properly.

WARNING:

Placing metal articles across the battery terminals can result in severe skin burns. It is good practice to remove all metallic items such as watches, bracelets and personal jewelry when working on or around the battery terminals. As a further precaution, when installing batteries or working on them, insulating gloves should be worn and only insulated tools should be used to prevent accidental short circuits.

Storage

- Always store batteries in a cool, dry place.
- After long storage, it is desirable to cycle (charge/discharge) the battery - 3 times to restore full capacity.
- Do not mix batteries with metal objects during storage or transportation to avoid accidental short-circuit.
- Do not store large quantities of batteries in a densely packed condition hen they are in a charged or partially charged state.

10.0 Troubleshooting

Problem	Solution
Light will not activate.	• 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 if the light is set for DUSK till DAWN mode.. • Ensure flash setting is on a valid code. • Ensure battery terminals are properly connected.
Light will not operate for the entire night.	• Expose light to direct sunlight and monitor operation for several days. Avlite products typically require 1.5 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. • Reducing the light output intensity or duty cycle (flash code) will reduce current draw on the battery. • Ensure solar module is clean and not covered by shading during the day.
Lights are constantly on during the day.	• Ensure the flash code is not set to F F. This flash code is for testing purposes only and will be steady on for 24 hours a day. • Ensure the light is not set to ALWAYS ON
Light will not respond to controller in Radio Control Mode	Refer to AvMesh™ RF Communications System Installation and Trouble Shooting Manual, available under the AV-70 Downloads section.

11.0 Warranty

Refer to Avlite website at www.Avlite.com.

Notes

Notes

Contact Us!

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

Avlite Head Office

11 Industrial Drive, Somerville
Victoria, Australia 3912
T: +61 (0)3 5977 6128
F: +61 (0)3 5977 6124

Avlite USA

61 Business Park Drive, Tilton
New Hampshire, USA 03276
T: +1 (603) 737 1311
F: +1 (603) 737 1320

Avlite Asia

8 Wilkie Road, #03-01
Wilkie Edge, Singapore 228095
T: +65 9119 8770

@ info@avlite.com

www.avlite.com

www.star2m.com

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