

## **AV-OL-CTRL-T2**

**Obstruction Lighting Controller**

### **INSTALLATION & SERVICE MANUAL**



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Version No.	Description	Date	Reviewed	Approved	Design
1.0	AV-OL-CTRL-T2 Manual Launch	October 2020	P. Naidu	W. Evans	M. Sugars

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# 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 control unit, and be able to maximise its operating function.

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

## Acronyms and Abbreviations

The following abbreviations will be used throughout this Installation Manual:

cd	candela
ft.	foot
in.	inch
LED	Light Emitting Diode
VAC	Volts, Alternating Current
VDC	Volts, Direct Current
AWG	American Wire Gauge
MI	Medium Intensity
LIOL	Low Intensity Obstruction Light
LI	Low Intensity

## 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-OL-CTRL-T2

The AV-OL-CTRL-T2 Obstruction Lighting Controller is an application specific control and monitoring system to provide a full turnkey solution for A1/I2 structures ranging between 45-106 meters (150 and 350 feet). These include telecommunication towers and utility towers, wind turbines, cranes, buildings and other tall structures.

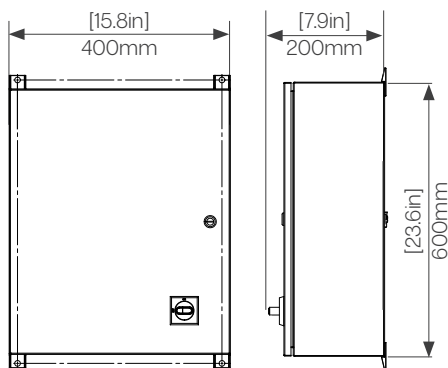
The T2 Obstruction Controller comes as a fully assembled, ready to install central control unit.

The T2 Obstruction Controller is available in two input power configurations, a universal AC (90-264VAC) or 24-48 VDC (solar compatible) and comes with Star2M monitoring via GSM or SATCOM as options.

The best in class system power draw allows tower owners to utilize solar for locations lacking reliable and or cost-effective access to regular utility power. Avlite's experience, knowledge and tools for solar applications provides years of maintenance free, off-grid operation with an emphasis on FAA and ICAO compliance.

With a range of accessories including brackets, cable and junction boxes, utility and telecommunication companies, electrical contractors and state and local governments can now quickly and easily purchase all obstruction lighting components from a single source, simplifying the ordering process and reducing the possibility of incompatible, stand-alone components from different manufacturers.

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



### 3.1 Available Options

- Solar Input Power (for 24VDC) – Call Avlite for details.
- Cable Kit (suitable for 106 m structure) Includes:
  - 80m of 2.5mm<sup>2</sup>, 3 conductor wire
  - 80m of 14mm<sup>2</sup>, 2 conductor wire
  - 50m of 4mm<sup>2</sup>, 5 conductor wire
- Remote Monitoring and Control

Avlite offers remote Star2M monitoring via GSM or SATCOM. Operators can remotely monitor the status of their installation from a compatible device. The system can also be configured to send out SMS text messages or e-mail alerts to designated operators should alarm conditions be triggered, such as low voltage or light failure.

Please contact Avlite for operational information for the Monitoring & Control options. Visit <https://www.star2m.com> to find out more about Star2M
- Mounting Bolt Set (includes bolts, nuts, washers)

Please contact Avlite for further details
- Control Unit Mounting Hardware
  - 2" pipe clamps
  - $\frac{3}{4}$ " pipe clamps

Please contact Avlite for further details.



## 4.0 AV-OL-CTRL-T2 Data Sheet

### AC

### DC

#### Electrical Characteristics

Input Voltage	90-264VAC	24-48VDC
Input Frequency	50/60 Hz	N/A

#### Power Consumption (Full Load)

Peak	84VA	70W
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#### Physical Characteristics

Mounting	Wall mounted (mounting accessories available)
Height (mm/inches)	600/23.6
Width (mm/inches)	400/15.8
Length (mm/inches)	200/7.9
Mass (kg/lbs)	28.5/63
Service Life	12 years +

#### Intellectual Property

Trademarks	AVLITE® is a registered trademark of Avlite Systems
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#### Compliance

CE	EN61000-6-3:2007, EN61000-6-1:2007 FCC 47 CFR Part 15, subpart B
Quality Assurance	ISO9001:2015
Protection Rating	IP65/NEMA4X

#### Other

Warranty *	3 year warranty
Options Available	SATCOM or GSM Mounting Brackets Solar Input Power (for 24-48VDC) Cable Kit (for 106m height) Monitoring and Control Mounting Bolt Set (includes bolts, nuts, washers) Star2M
Terms and Conditions	Please refer to the individual light installation manuals for further specifications



## 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 light and peripheral equipment function 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

Avlite's AV-OL-CTRL-T2 Obstruction Control Unit can connect to four components: A single red Medium Intensity obstruction beacon (MI), and three red, single fixture obstruction lights (LI).

An External Photocell allows the lights to automatically switch between day and night mode. The Photocell output can also be overridden for system testing and maintenance via the Photocell Bypass Switch.

The Control Unit automatically evaluates the T2 lights for operation and performance while providing local and remote display of information and alarms; operators can conveniently view the lights' real time status from the web based Star2M™ portal.

### 6.1 Product Overview

#### 6.1.1 T2 Controller

The T2 Control Unit provides power, control and monitoring of the light fixtures.

For safety and security, the control unit 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 remote monitoring via Star2M with either GSM or SATCOM telemetry.

By default, the control unit comes with 2 dry contacts for external monitoring of both the MI and LI light fixtures which receive the associated alarm in the event of a power or LED fault. (**Note:** External dry contact monitoring is unavailable if remote monitoring via GSM or Satcom has been enabled)

A Photocell Bypass Switch is provided with the Control Unit to override the Photocell output for system testing and maintenance and is factory-set to AUTO (auto day/night) mode.

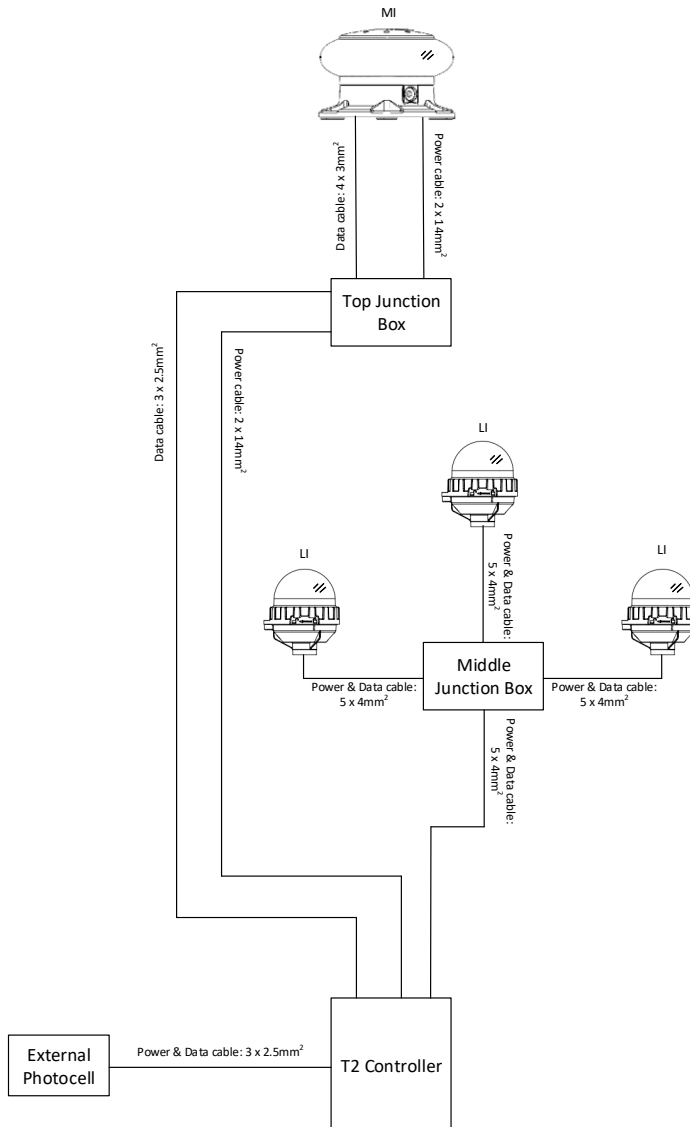
The Control Unit with the AC option has an interface switch on the door. The DC version has a circuit breaker in the cabinet for switching the power ON and OFF.

To test the function of lights for night operation, the system must be operating in **Day** mode. Toggle the switch to **Override** by turning the switch to the right. All lights should illuminate. To return to the **Auto** mode, return the switch to the **Auto** position.

**Note:** Time delays are to be expected when changing modes. Allow up to 1 minute to change between functions.



## 6.1.2 Interface Wiring





# 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



### **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.



### **WARNING:**

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



### **CAUTION:**

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.

### 7.2.1 Tools Required

Tools Needed (not supplied)
Flush Cutter
Tongue & Groove Pliers
Silicone Sealant
Cable Jacket Trimmer (optional)
Utility Knife
Electrical Tape
Insulated Terminal Crimper
Wire Strippers 10AWG to 18AWG Range
2.5mm Hex Key
2.0mm Flat Blade Precision Screwdriver
#2 Phillips Screwdriver
Mounting hardware (optional purchase)
Cables (owner supplied or optional purchase)

### 7.2.3 Factory Configuration

- External Photocell wired with 7.5 metre flying lead.
- Preassembled T2 Control Unit complete with internal wiring

### 7.2.4 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. See section *7.3 Testing Procedure* for more information.



## 2. Mount the Control Unit

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The Control Unit should be mounted in a reasonable location at eye level 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.

- a. Attach the required mounting hardware to the top and bottom of the Control Unit.



Example of Control Unit mounting hardware

Pre-installed Control Unit tab

- b. Mount the Control Unit (with the previously attached mounting hardware) to the tower or installation structure using the mounting tabs. Secure using the required mounting fixtures.



**Note:** Mounting hardware is not included with the Control Unit.

### 3. Mount External Photocell

Insert the Photocell into the mount (Avlite supplied) by inserting the contact blades into the receptacle. Secure the Photocell assembly to the tower or installation structure using the required mounting fixtures.

The following considerations should be taken into account when mounting the external Photocell:

- Mount in a reasonable location at eye level to ensure that it is easily accessible for servicing and maintenance.
- The Photocell should be pointed away from the equator (North in Northern Hemisphere, South in Southern Hemisphere).
- The Photocell should be located away from bright, artificial lighting.

**Note:** Mounting fixtures are not supplied.



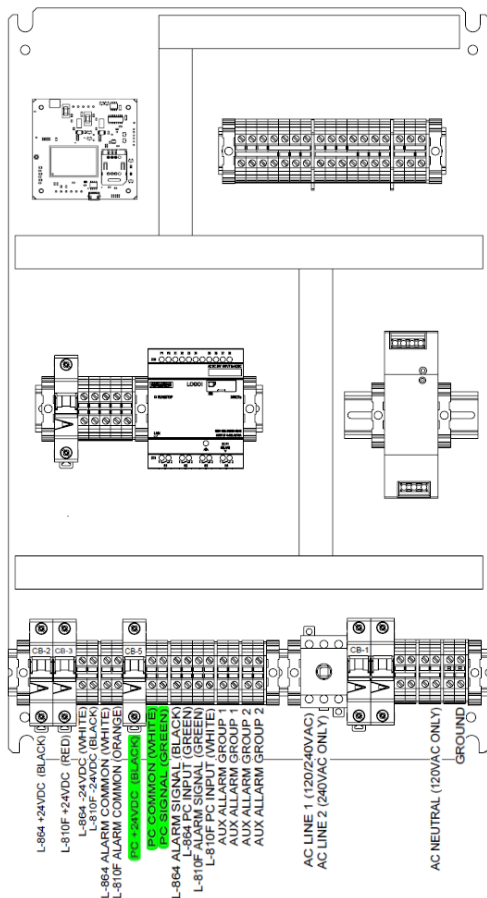


#### 4. Wire the Photocell to the Control unit and cut cable to the required length.

**Note:** The AC version of the Control Unit with remote monitoring is shown throughout this installation procedure. Details regarding the DC installation are shown on page 19.

##### Wiring instructions-Power and Data Cable:

- Connect the black positive conductor from the External Photocell to circuit breaker 5 (labelled 'PC +24VDC') on terminal block 1 in the Control Unit
- Connect the white negative conductor from the External Photocell to the 'PC -Common' labelled terminal on terminal block 1 in the Control Unit
- Connect the green Photocell signal conductor to the 'PC Signal' labelled terminal on terminal block 1 in the Control Unit



Refer to the AV-OL-KT-A1/I2 Installation and Service manual for recommended cable sizes.



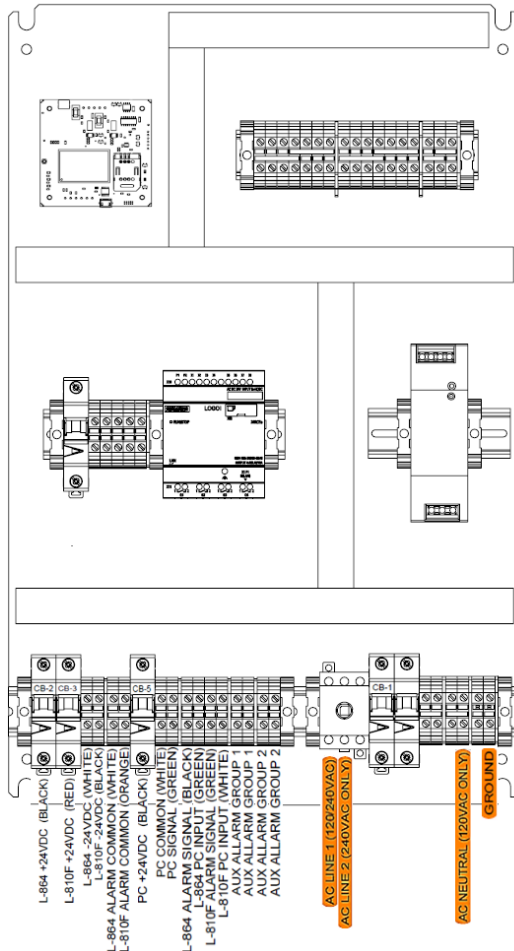
## 5. Wiring the Control Unit:

After installing and wiring the Medium Intensity Fixture to the top junction box, route the top junction box to the control unit. After installing and wiring the Low Intensity Fixtures to the middle junction box, route the middle junction box to the control unit. Please see the AV-OL-KT-A1/I2 Installation and Service Manual for more information.

### AC Installation:

Connect the incoming power conductors to the appropriate terminals (i.e. AC Line 1, AC line 2 and AC Neutral) on the power switch on terminal block 1 in the Control Unit.

The grounding conductor will be connected to the 'Ground' labelled terminal block (green/ yellow) adjacent to the power switch.





## DC Installation:

Connect the positive DC conductor to circuit breaker 1.

Connect the negative conductor to the common terminal block adjacent to the circuit breaker on terminal block 1.

## 7.3 Testing Procedure

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

1. Power the system on.
2. Check that no circuit breakers have tripped.
3. 4. Check function of all lights (i.e. MI and all LI single fixture lights) by carrying out the following:
  - a. **-Night mode:** Cover the External Photocell and check night operation is functioning as expected. The MI should either flash red (for Type B) or operate as a red, steady burning light (for Type C). All of the LI single fixtures should be illuminated red as steady-burning lights.
  - b. **-Day mode:** Uncover the External Photocell and check day operation is functioning as expected. All lights should be off.
4. Turn the Photocell Bypass Switch to Override and ensure that all lights illuminate in night mode.
5. Turn the Photocell Bypass Switch back to Auto.
6. For O1 & O2 Variants only:
  - Trip the breaker for the MI and ensure that the corresponding alarm is received (if monitoring is installed)
  - Trip the breaker for the LI lights and ensure that the corresponding alarm is received (if monitoring is installed)

## 8.0 Maintenance and Servicing

Refer to the individual light manuals for light maintenance.

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.

Ensure Photocell is free from debris (i.e. snow, leaves, etc.) for reliable and continuous operation.

## 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
MI beacon is out (No Alarm)	No power to light	<ul style="list-style-type: none"> <li>• Check for voltage in Control Box.</li> <li>• Check controller to Beacon cable connections at both ends.</li> </ul>
	Junction box wiring	<ul style="list-style-type: none"> <li>• Check junction box wiring.</li> </ul>
MI beacon is flashing white at night	Photocell input is high	<ul style="list-style-type: none"> <li>• Check wiring.</li> <li>• Confirm there is 0 voltage at the Photocell input.</li> </ul>
	Beacon in “limp mode”	<ul style="list-style-type: none"> <li>• Visually confirm Beacon is flashing at ½ the intensity of normal day mode.</li> </ul>
A single LI fixture is out (No Alarm)	Marker wiring	<ul style="list-style-type: none"> <li>• Check the wiring of the malfunctioning lamp.</li> </ul>
	Junction box wiring	<ul style="list-style-type: none"> <li>• Check junction box wiring.</li> </ul>
All LI Single fixture lights are out (No Alarm)	Junction box wiring	<ul style="list-style-type: none"> <li>• Check junction box wiring.</li> </ul>
	Cable to junction box	<ul style="list-style-type: none"> <li>• Check controller to junction box cable connections at both ends.</li> <li>• Inspect cable for breaks.</li> </ul>
Light is out	<ul style="list-style-type: none"> <li>• No power to light</li> <li>• Light failure</li> <li>• Light in Alarm Mode</li> </ul>	<ul style="list-style-type: none"> <li>• Physically check connections in junction boxes and control box.</li> <li>• If wiring functions properly, use an alternate power source to check the light.</li> <li>• Replace light if necessary.</li> </ul>
MI top light is not operational (no red mode)	<ul style="list-style-type: none"> <li>• Wired incorrectly or wire(s) lose</li> <li>• Light failure</li> <li>• No power to the light</li> </ul>	<ul style="list-style-type: none"> <li>• Check wiring of light in top junction box and Control Box.</li> <li>• Measure voltage at junction box. If correct input power, replace light.</li> <li>• If no voltage to the junction box, check output power from Control Box.</li> </ul>

Problem	Possible Cause	Solution
LI Single fixture is not operational (others turning red at night or photocell covered)	<ul style="list-style-type: none"> <li>• Wired incorrectly or wire(s) lose</li> <li>• Light failure</li> </ul>	<ul style="list-style-type: none"> <li>• Check wiring to light in middle junction box</li> <li>• Measure voltage at junction box. If correct voltage replace light.</li> </ul>
LI Single fixtures are not operational (top light red flashing at night or when photocell covered)	<ul style="list-style-type: none"> <li>• Wired incorrectly or wire(s) lose</li> <li>• Light failure</li> <li>• No power to the light</li> </ul>	<ul style="list-style-type: none"> <li>• Check wiring of lights in Middle junction box and Control Box.</li> <li>• Measure voltage at junction box. If correct input power, replace light.</li> <li>• If no voltage to the junction box, check output power from Control Box.</li> </ul>
Single fixture middle lights are not operational (top light red flashing during the day)	<ul style="list-style-type: none"> <li>• Wired incorrectly or wire(s) lose</li> <li>• Photocell failure</li> <li>• PLC failure</li> </ul>	<ul style="list-style-type: none"> <li>• Check wiring between Photocell and PLC, check wiring output of PLC.</li> <li>• Cover photocell. Check if output voltage of PLC changes. If no change, replace Photocell.</li> <li>• If Photocell operational, replace PLC.</li> </ul>
All lights are not operational	<ul style="list-style-type: none"> <li>• No or wrong input voltage</li> <li>• Tripped breaker or no output voltage</li> <li>• Wired incorrectly or lose wire(s)</li> </ul>	<ul style="list-style-type: none"> <li>• Check input power to Control Box.</li> <li>• Check output voltage to both top and middle lights in the Control Box.</li> <li>• Check wiring between Control Box and top and middle junction boxes.</li> </ul>
Light not transitioning between day-night or night-day	<ul style="list-style-type: none"> <li>• Wired incorrectly or wire(s) lose</li> <li>• Photocell failure</li> <li>• PLC failure</li> </ul>	<ul style="list-style-type: none"> <li>• Check wiring between Photocell and PLC, check wiring output of PLC.</li> <li>• Cover photocell. Check if output voltage of PLC changes. If no change, replace Photocell.</li> <li>• If Photocell operational, replace PLC.</li> </ul>



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# Notes



# Avlite Solution Verticals available



Airfield



Heliport



Obstruction



We believe technology improves navigation™

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