

INSTALLATION MANUAL

Nebulon™

AVE-WP-51G-IM

not be disclosed, copied or reproduced in whole or in part without prior written permission from Aveo Engineering Group, s.r.o.

TABLE OF CONTENTS

| | |
|---|----------|
| PART 0 DOCUMENT ADMINISTRATION | 3 |
| 0.1 DOCUMENT APPROVAL | 3 |
| 0.2 AMENDMENT RECORD PROCEDURE | 4 |
| 0.3 AFFECTED PAGES PROCEDURE | 4 |
| PART 1 INSTALLATION DATA | 5 |
| 1.1 PRODUCT INFO | 5 |
| 1.2 OPERATING INSTRUCTIONS | 5 |
| 1.3 INSTALLATION SCHEMATIC / WIRING DIAGRAM | 6 |
| 1.4 CONTROL & POWER INPUTS | 6 |
| 1.5 TECHNICAL SPECIFICATION | 6 |
| 1.6 TECHNICAL DRAWING | 7 |
| 1.7 WIRING CHART | 8 |
| 1.8 EQUIPMENT LIMITATION | 8 |
| 1.9 TESTING THE LIGHTS BEFORE INSTALLATION | 8 |
| 1.10 NOTES ON INSTALLATION | 9 |
| 1.11 CARE AND CLEANING OF LIGHTS | 9 |
| 1.12 CONTINUED AIRWORTHINESS INFORMATION | 9 |
| 1.13 ROHS COMPLIANCE STATEMENT | 11 |
| 1.14 EU REACH REGULATION (EC) No. 1907/2006 | 11 |

Part 0 Document Administration

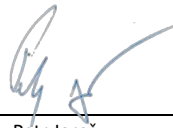
0.1 Document approval

This document has been established in accordance with an alternative procedure to DOA approved under EASA AP429.

This installation manual is according EASA ETSO [Authorization number] and applicable for following part numbers:

- **Nebulon Green** - AVE-WPG-51G-402 Mod(2)
- **Nebulon Red** - AVE-WPR-51G-401 Mod(2)

Compiled by: _____ 8. – September - 2023



Petr Jaroš

Engineer, Aveo Engineering Group, s.r.o.

Approved by: _____ 8. – September - 2023

Georg Hartl

Head of DO, Aveo Engineering Group, s.r.o.

0.2 Amendment Record procedure

The master copy of this document shall be kept electronically as a read only document under the control of Aveo Engineering Group, s.r.o. as Master Copy.

ALL amendments to this manual will initiate a raise of issue.

The original issue will be identified by "01", and subsequent issues will be numbered sequentially from 02 to 99 in Table 01 - **Issue No.** column.

ALL issues of this document will be approved by Head of DO.

| Issue No. | Details | Date | Effected Pages |
|--|---|-------------|------------------------------------|
| 01 | Initial Issue | 26.Jun.2015 | ALL |
| 02 | Update table of content Voltage values changed, Technical Specification upgraded | 20.Jul.2015 | 2 5, 6 & 8 |
| 03 | New Technical drawing with higher clearance in attaching holes (not marked), spec of installing screws added | 3.Jul. 2017 | 7 & 9 |
| 04 | Section 0.5 Distribution list removal Section numbering change Technical specification update Technical drawing update Installation screw update Care and cleaning section update Adding Sections 1.13 and 1.14 | 8.Sep. 2023 | 5 ALL 6 7 9 9 11 |
| Table 01: Document Amendment Record Table | | | |

0.3 Affected Pages Procedure

ALL pages affected by ANY raise of issue of this document will be listed in Table 01 - **Affected Pages** Column.

The reason(s) for **EACH** raise of issue and the description of respective change will be provided in Table 01 - **Details** Column.

Changes from the previous issue are shown as follows:

- a) new text is highlighted with yellow shading: **new**
- b) deleted text is shown with yellow shading and a strike through: ~~deleted~~

Part 1 Installation data

1.1 Product Info

Nebulon™ is a LED position light assembly ETSO Compliant red and green position lights, low drag and low profile designed for aircraft wing position light. This powerful LED lighting system features easy installation, fail safe system, unbreakable construction, waterproof and high candela output

List of the major components (by part number) that make up the equipment complying with the standards prescribed in ETSO.

- **Nebulon Green** - AVE-WPG-51G-402 Mod(2)
- **Nebulon Red** - AVE-WPR-51G-401 Mod(2)

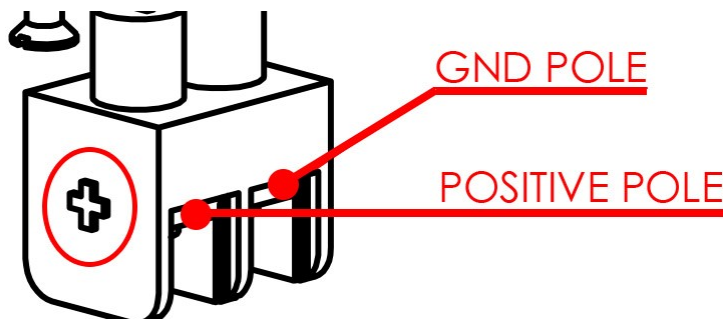


Figure 01: Features of Nebulon

1.2 Operating Instructions

When installed on the aircraft, using the aircraft's power (28 volts), the light will be at its maximum intensity. *(Meet the requirement of TSO-C30C, Aircraft Position Light)*

1.3 Installation Schematic / Wiring Diagram



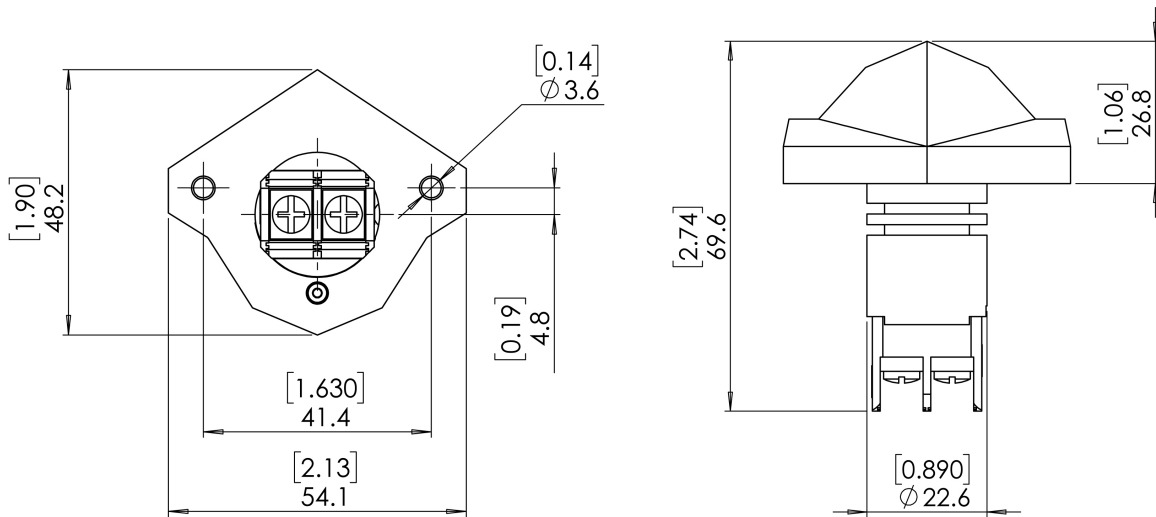
1.4 Control & Power Inputs

| | |
|----------------------|--|
| POSITIVE POLE | Positive POS/NAV power supply line |
| GND POLE | Negative common power supply line (ground) |

1.5 Technical Specification

| | |
|-------------------------------------|-----------------------------------|
| Dimensions: | See Section 1.6 Technical Drawing |
| Weight: | 66g / 2.33oz |
| Operating voltage: | 18-36 VDC |
| Primary input voltage: | 28 VDC |
| Over-voltage protection: | 80V (1s) |
| Input current at 28VDC: | |
| - green | 0.26 A |
| - red | 0.27 A |
| Input power at 28VDC: | |
| - green | 7.3 A |
| - red | 7.6 A |
| Reverse polarity protection: | Yes |
| Over-Voltage shut down: | 38.5 VDC |
| Under-Voltage protection: | Yes |
| Operating temperature: | -55°C to +85°C / -67°F to +185°F |
| Over-Temperature protection: | Yes |

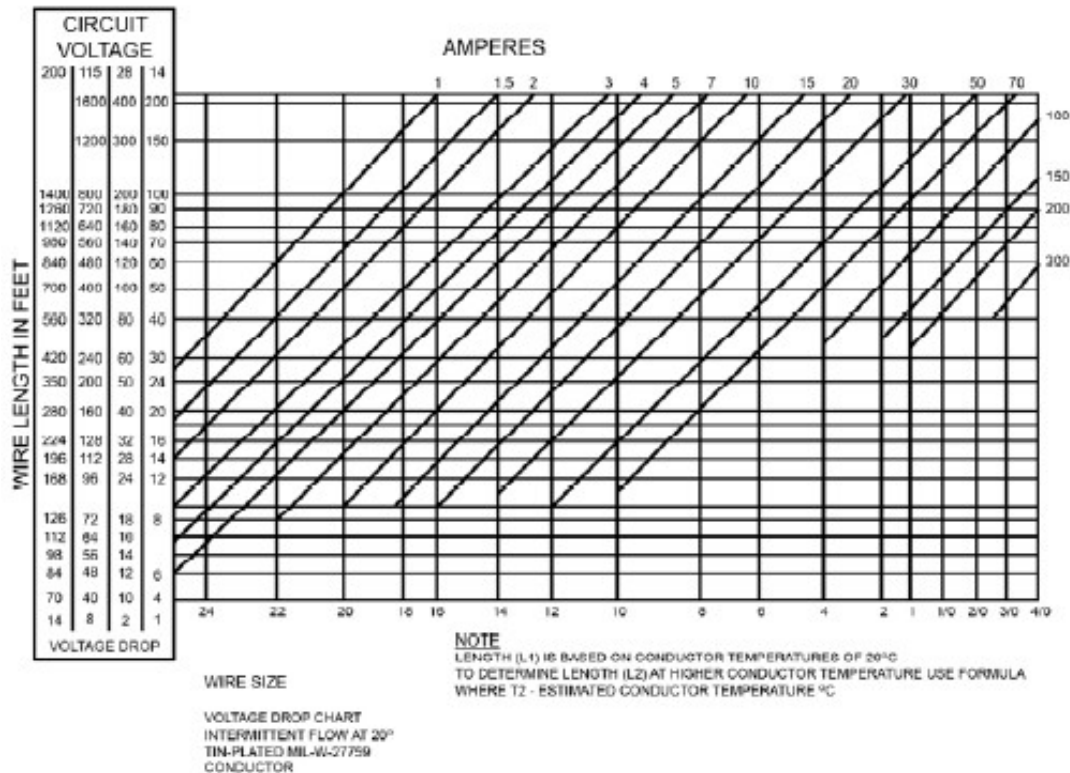
1.6 Technical Drawing



Dimensions are in millimeters / [inches]

1.7 Wiring Chart

Use diagram below defining the wiring size depending on the current and the wire length. Make sure you add up the current for all connected lights. If current is not given, then divide the power by the voltage.



1.8 Equipment Limitation

Nebulon™ should only be powered by 18-36 VDC, typically a 28 Volt aircraft battery.

1.9 Testing the Lights before Installation

All Aveo Aviation lights undergo rigorous testing prior to being released from our engineering manufacturing department. This testing involves a burn-in time as well as other function testing. No light is released for sale without undergoing this extensive operational testing.

When you receive the **Nebulon™** light, and wish to test the function of the light prior to installation on your aircraft, please note the following:

1. Please review the written information that is enclosed in the packaging.

Warranty information as well as a cautionary note about power supply removal is enclosed with each package.

2. Remove the light from the package. Note that there is connector with:
 - Negative lead
 - Positive lead

3. Testing of the function of the light can be done with a regular 28V/5A DC power supply (not a battery charger). Connect the negative pole to the ground (negative) leads of a power supply, and then connect the positive pole to the positive (+) leads on the power supply. The position light should start lighting. When installed on the aircraft, using the aircraft's power (28 volts), the light will be at its maximum intensity.

After testing, the light can be installed on the aircraft.

IMPORTANT NOTES:

1. Under no circumstances should any power supply other than a 18-36 Vdc, or a 24 volt battery be used to test the light. Do not use: Battery chargers, battery back-up power devices, or other bench avionics testing methods to test the aviation light. The light is functional between 18 and 36 volts. Use of a battery charger or other power unit to test the light will void the warranty and may damage the light.

If you have any questions about the installation of the lights, please refer to our web site: www.aveoengineering.com

1.10 Notes on Installation

Spread the tightening forces evenly around the mounting hole. Lights are to be installed using **MS-16995-20** screws or metric equivalent.

1.11 Care and Cleaning of Lights

Aveo Engineering Aviation Lights are factory polished and delivered as ready to install on the aircraft.

If the lights need a deeper cleaning, they should be polished with a quality lamb's wool sheet that is suitable also for deeper polishing. Under no circumstances should any petroleum based product be used to clean the lights.

1.12 Continued Airworthiness Information

This product is delivered with EASA Form1 which is for the operator to report any occurrences to Aveo Engineering as the ETSO holder. The form contains the Aveo Engineering telephone number and the occurrence e-mail address (occurrence@aveoengineering.com). **The operator must report immediately** as the ETSO holder must report occurrences having a potential for an unsafe condition within 72 hours.

a. Circuit/Wiring Protection

Each Nebulon light features a **Negative Temperature Coefficient (NTC)** circuit that limits internal temperatures by attenuating operating current (with a corresponding reduction of brightness) when internal temperatures reach a certain threshold. This proprietary circuitry serves to protect the light itself, and associated aircraft wiring, against a thermal runaway condition.

b. Periodic Inspection Procedure for Galactica Series

The **Nebulon™** lights should always be checked for proper operation during preflight. This procedural information is already provided in all general aviation aircraft flight manuals.

The lights should be visually inspected for general condition, proper operation, and correct installation at each annual and/or 100 hour inspection. Any debris or atmospheric deposits accumulated on the surface of the lights should be removed using a UV Wax such as Farecia Profile UV Wax to ensure ongoing optical clarity. In addition refer to section 10 of installation manual for detailed cleaning instructions.

Turn the lights and do the following:

1. Put on polarized sunglasses or welder goggles to prevent eye damage when looking into the lights.
2. Examine the individual LEDs as per the diagram below. If any of the conditions as indicated on the diagram are exceeded, the light shall be removed and sent to Aveo Engineering for replacement under the Aveo Lifetime Warranty Program.

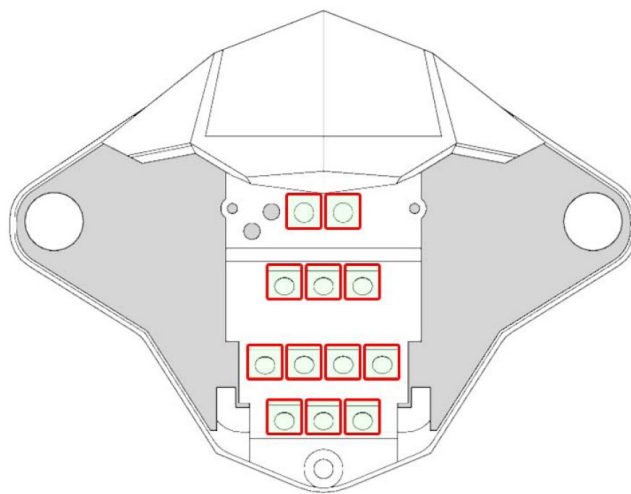


Figure 1: Navigation LEDs – all LEDs (12 pcs)

1.13 RoHS Compliance Statement

Scope

This statement clarifies Aveo Engineering's compliance with European Union Directive 2015/863/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment ("RoHS") that took effect on June 4, 2015. The RoHS Directive restricts the sale of electronic equipment containing certain hazardous substances in the European Union including:

Cadmium(Cd): 0.01%

Mercury: 0.1%

Lead(Pb) : 0.1%

Hexavalent chromium (Cr6+) : 0.1%

Polybrominated biphenyls (PBB): 0.1 %;

Polybrominated diphenyl ethers (PBDE): 0.1 %

Bis(2-Ethylhexyl) phthalate (DEHP): 0.1% (added in 2015);

Benzyl butyl phthalate (BBP): 0.1% (added in 2015);

Dibutyl phthalate (DBP): 0.1% (added in 2015);

Diisobutyl phthalate (DIBP): 0.1% (added in 2015)

Compliance

Aveo Engineering certifies that all products sourced from manufacturing facilities comply with the environmental standards set forth by the Directive 2015/863/EU, recast amendment of RoHS Directive 2011/65/EU Article (4), and do not contain any of the above-mentioned, 10 hazardous substances above the specified limits. All products manufactured by Aveo Engineering are RoHS-compliant. With regards to RoHS-2 CE marking, product packaging is labeled attesting conformity if required.

References

Directive 2015/863/EU of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

1.14 EU REACH Regulation (EC) No. 1907/2006

Aveo Engineering declares that no chemicals are produced and that none of the chemicals used during the production process or needed for the product maintenance or service, is listed on the current European Chemicals Agency's Candidate list of Substances of Very High Concern for Authorization.