



INSTALLATION MANUAL  
**Crystal Conforma**

**AVE-CCPS-IM**

**TABLE OF CONTENTS**

**PART 0 DOCUMENT ADMINISTRATION ..... 3**

0.1 DOCUMENT APPROVAL .....3

0.2 AMENDMENT RECORD PROCEDURE .....3

0.3 EFFECTED PAGES PROCEDURE .....4

**PART 1 INSTALLATION DATA ..... 5**

1.1 CRYSTAL CONFORMA .....5

1.2 OPERATING INSTRUCTIONS .....6

1.3 INSTALLATION SCHEMATIC / WIRING DIAGRAM .....6

1.4 CONTROL & POWER INPUTS .....7

1.5 TECHNICAL SPECIFICATION .....7

1.6 TECHNICAL DRAWING .....8

1.7 WIRING CHART .....9

1.8 EQUIPMENT LIMITATION .....10

1.9 CARE AND CLEANING OF LIGHTS .....10

1.10 TESTING THE LIGHTS BEFORE INSTALLATION .....10

1.11 NOTES ON INSTALLATION .....11

1.12 CONTINUED AIRWORTHINESS INFORMATION .....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 applicable for following part numbers:

- Crystal Conforma (Red, Raised wingtip) **AVE-CCPSR-R01**
- Crystal Conforma (Green, Raised wingtip) **AVE-CCPSG-R01**
- Crystal Conforma (Red, Drooped wingtip) **AVE-CCPSR-D01**
- Crystal Conforma (Green, Drooped wingtip) **AVE-CCPSG-D01**

Compiled by: \_\_\_\_\_ 3 July 2017  
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Approved by: \_\_\_\_\_ 3 July 2017  
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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 of issue | Effectuated Pages |
|--|---------------|---------------|-------------------|
| 01   | Initial Issue | 3 July 2017   | ALL               |
|  |               |               |                   |
|  |               |               |                   |
| <b>Table 01: Record of Document Amendments</b> |               |               |                   |

### 0.3 *Effected Pages Procedure*

ALL pages affected by ANY raise of issue of this manual will be listed in Table 01 - **Effected 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 *Crystal Conforma*

Crystal Conforma™ is the ultimate ALL-IN-ONE wingtip module for aircraft. This light provides Position and Strobe Light per ETSO standards.

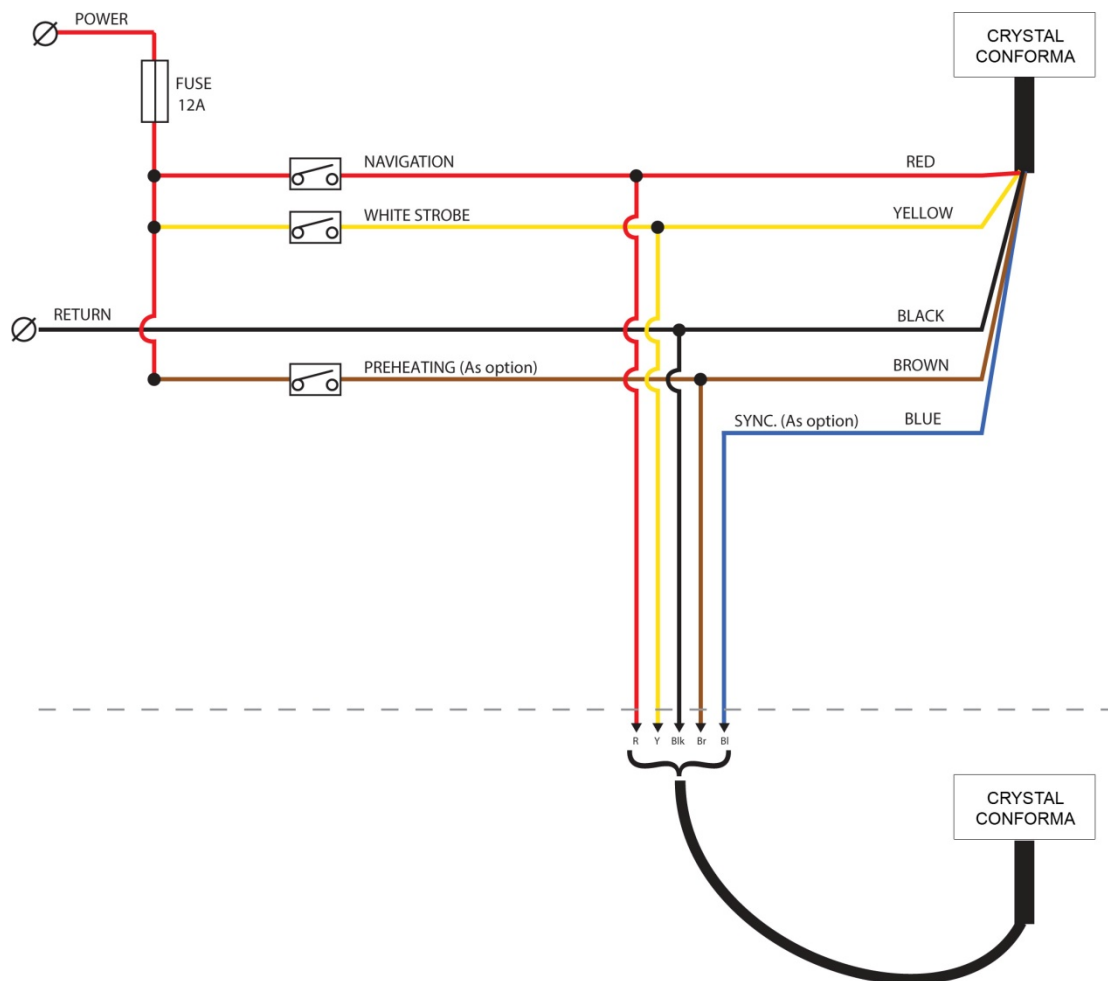
|   |                      |
|---|----------------------|
| Crystal Conforma (Red, Raised wingtip)    | <b>AVE-CCPSR-R01</b> |
| Crystal Conforma (Green, Raised wingtip)  | <b>AVE-CCPSG-R01</b> |
| Crystal Conforma (Red, Drooped wingtip)   | <b>AVE-CCPSR-D01</b> |
| Crystal Conforma (Green, Drooped wingtip) | <b>AVE-CCPSG-D01</b> |



## 1.2 Operating Instructions

When installed on the aircraft, using the aircraft's power (14 and 28 volts), the light will be at its maximum intensity. *Operating voltage range is 9 to 36 V DC.*

## 1.3 Installation Schematic / Wiring Diagram



**Wire type:** multicores 22 AWG, 600 V insulation, 200°C rating;  
**Wire length:** 30" minimum (770 mm minimum)

## 1.4 Control & Power Inputs

|               |   |
|---------------|---|
| <b>Red</b>    | +14 V DC or +28 V DC, Nav. Steady               |
| <b>Yellow</b> | +14 V DC or +28 V DC, Anti-collision Strobe     |
| <b>Black</b>  | Common 14 V DC or 28 V DC, return VRTN          |
| <b>Blue</b>   | Synchronisation                                 |
| <b>Brown</b>  | +14 V DC or +28 V DC, preheating stand-by power |

## 1.5 Technical Specification

|                                 |  |
|---------------------------------|--|
| <b>Dimensions:</b>              | 286.8 mm x 62,1 mm x 56,5 mm<br>11.29" x 2.44" x 2.22" |
| <b>Weight:</b>                  | max. 410 g / 0.90 lbs                                  |
| <b>Operating Voltage Range:</b> | 9 to 36 V DC   |

|                                      |       |
|--------------------------------------|-------|
| <b>Output power</b> , not less than: |       |
| - navigation - steady red            | 4.3 W |
| - navigation - steady green          | 5 W   |
| - pulse strobe white                 | 26 W  |

|                                     |       |
|-------------------------------------|-------|
| <b>Input power</b> , not more than: |       |
| - navigation - steady red           | 4.5 W |
| - navigation - steady green         | 7.1 W |
| - pulse strobe white                | 36 W  |

0.39 A max **preheating**, 72 Ohm resistive warming element (serial 36 x 2 Ohm, P=0.5 W per resistor, max. power 11W).

1. 0.50 A x 36 V = 18 W
2. 0.39 A x 28 V = 11 W
3. 0.25 A x 18 V = 4.5 W

|  |               |
|--|---------------|
| <b>Output current</b> , not less than: |               |
| - navigation steady                    | 0.170 A / LED |
| - white strobe                         | 0.9 A / LED   |

**Repetition Flash Rate of Strobe:** 50 cycles per minute

**Warm up time:** not more than 40 s

**Low temperature slope start:** not more than 60 s

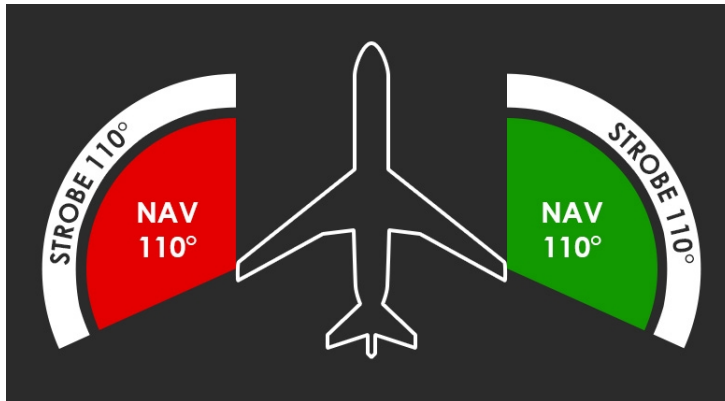
**Ambient temperature:** -55 °C ... +80 °C

At temperature below -40°C preheating is activated.

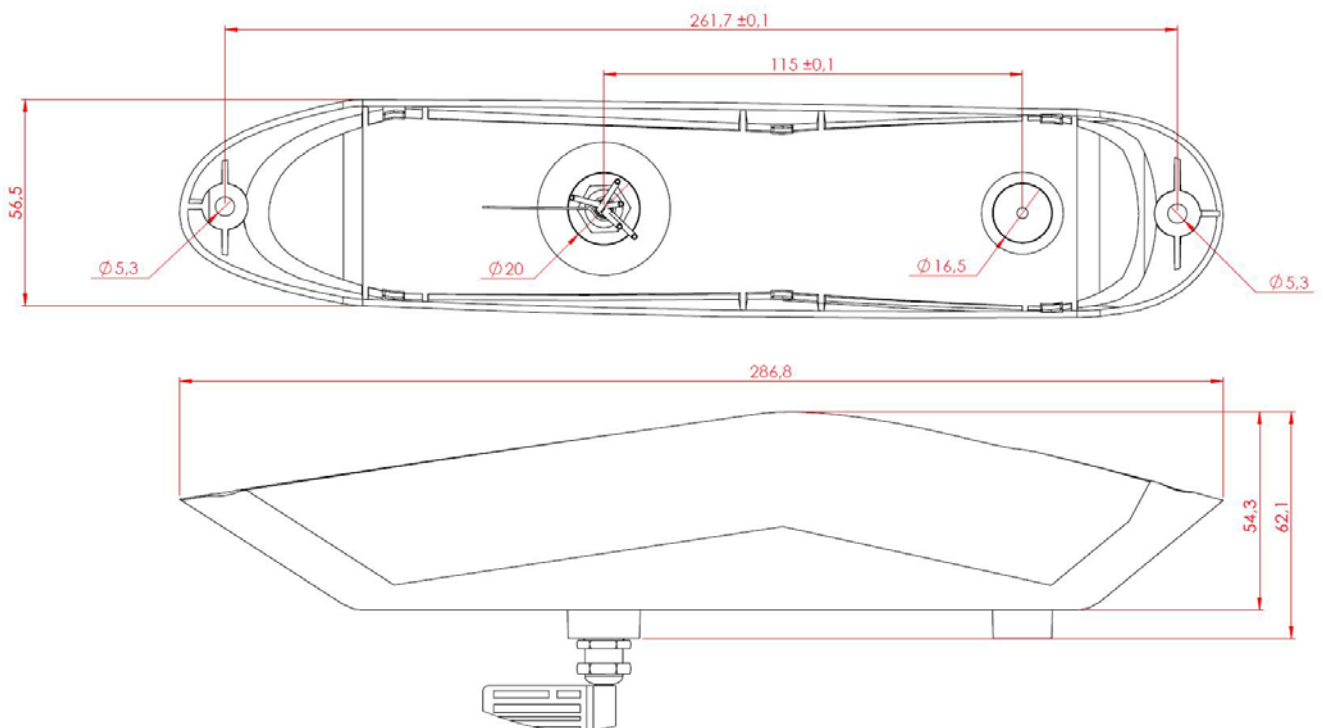
**Overheat protection:** +85 °C

|                            |                       |
|----------------------------|-----------------------|
| <b>Voltage protection:</b> |                       |
| a. Transient voltage:      | 60 V, both polarities |
| b. Under-voltage lockout:  | 9 V, not more         |

- c. Over-voltage lockout: 36 V, not less



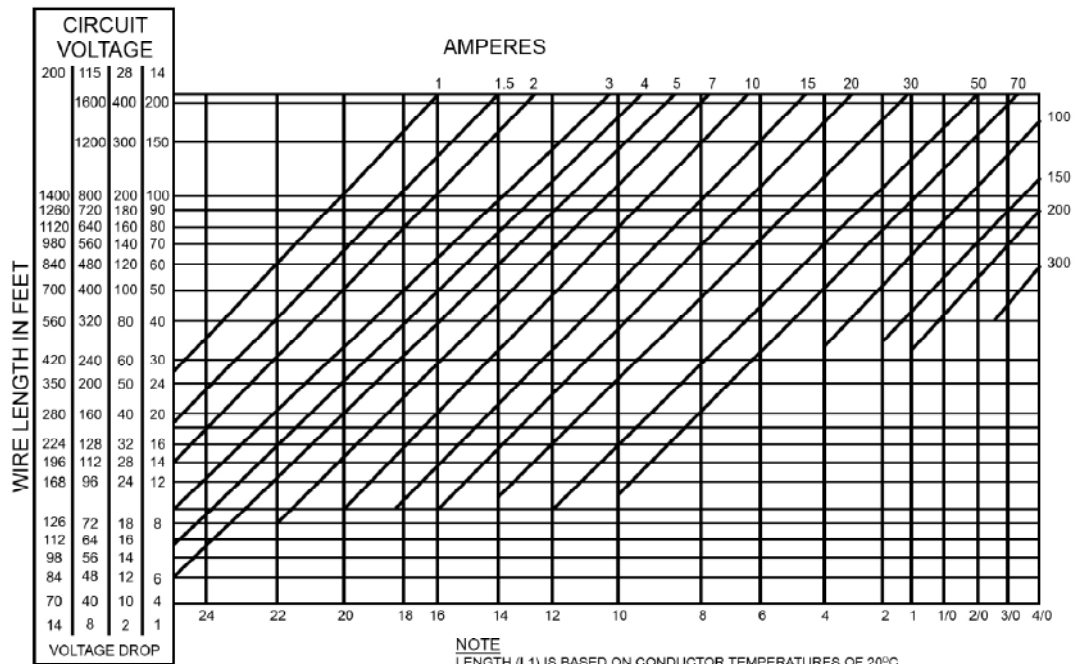
## 1.6 Technical Drawing



\*dimensions in mm



## 1.7 Wiring Chart



**NOTE**  
LENGTH (L1) IS BASED ON CONDUCTOR TEMPERATURES OF 20°C  
TO DETERMINE LENGTH (L2) AT HIGHER CONDUCTOR TEMPERATURE USE FORMULA  
WHERE T2 - ESTIMATED CONDUCTOR TEMPERATURE °C

WIRE SIZE

VOLTAGE DROP CHART  
INTERMITTENT FLOW AT 20°  
TIN-PLATED MIL-W-27759  
CONDUCTOR

## 1.8 Equipment Limitation

*Crystal Conforma* should only be powered by 9-36 V DC.

## 1.9 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.

## 1.10 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 *Crystal Conforma* light, and wish to test the function of the light prior to installation on your aircraft, please observe the following procedure:

1. Review the written information that is enclosed in the packaging. Warranty information as well as a cautionary note about power supply removal is enclosed in each package.
2. Remove the light from the package. Note that there are two sets of wires:

|               |  |
|---------------|--|
| <b>Red</b>    | +14 V DC or +28 V DC, Nav. Steady                |
| <b>Yellow</b> | +14 V DC or +28 V DC, Anti-collision Strobe      |
| <b>Black</b>  | Common 12 V DC or 28 V DC return VRTN            |
| <b>Blue</b>   | Synchro (as option)                              |
| <b>Brown</b>  | +14 V DC or + 28 V DC, preheating stand-by power |

3. Testing the function of the light can be accomplished using a regular 14V/10A DC or 28V/5A DC power supply (not a battery charger).

Connect the black wire to the ground (negative) leads of a power supply, then connect the yellow or red wire to the positive (+) leads on the power supply. The light should start flashing (yellow wire = strobe light) or lighting (red wire = green/red light). Connecting the blue wires from each *Crystal Conforma* light together (and not to the ground or positive terminals on the battery) should result in flashing all lights at once. It indicates the synchronization feature is working properly.

When installed on the aircraft and using the aircraft's power (28 volts), the light will be at its maximum intensity.

If the tests are successfully completed, the lights can be installed on the aircraft.

#### **IMPORTANT NOTES:**

Under no circumstances should any power supply other than a 9-36V DC, or a 28 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 9 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](http://www.aveoengineering.com).

### ***1.11 Notes on Installation***

In order to meet all ETSO requirements, the **Crystal Conforma** light module should be installed into an Aveo manufactured wingtip only. In case you intend to mount any other than AVEO wingtip, contact kindly the manufacturer on the website <http://www.aveoengineering.com/contact-us/>.

Stainless steel screws M4 (DIN912) or SHCS #8-32 or equivalent mounting screws are recommended to be used for installation. Screw length depends on placement of screws on aircraft.

Spread the tightening forces evenly around the mounting hole.

### ***1.12 Continued Airworthiness Information***

From the webpage <http://www.aveoengineering.com/> the customer can download the form F-AVE-001A which shall be used by operator for reporting any occurrences to the Aveo Engineering as the ETSO holder. The form contains the Aveo Engineering telephone number and the occurrence e-mail address ([occurrence@aveoengineering.com](mailto:occurrence@aveoengineering.com)).

**The operator shall report immediately** as the ETSO holder is obliged to report occurrences having potential to lead to an unsafe condition within 72 hours.

#### **a. Circuit/Wiring Protection**

Each Galactica series light features a **Negative Temperature Coefficient** (NTC) circuit that limits internal temperatures by attenuating operating current (with corresponding reduction of brightness) when internal temperatures reach a certain threshold. This proprietary circuitry is intended for protecting the light itself, and associated aircraft wiring, from a thermal runaway condition. The operation of strobes without airflow is recommended to be limited in order to avoid heat buildup. This NTC circuitry feature enables the life of LEDs and electronic components to be

tripled and thereby provide an even great margin of safety for continued airworthiness due to the dramatic enhancement of electronics reliability.

**b. Periodic Inspection Procedure**

The Crystal Conforma 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 examined for general condition, proper operation, and correct installation at each inspection to be carried out annually and/or after 100 hours of operation. 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 1.10 of installation manual for detailed cleaning instructions.

The following procedure shall be performed, firstly, in the steady mode and secondly, in the strobe mode:

1. Turn the lights on.
2. Put on polarized sunglasses or welder goggles to prevent eye damage when looking into the lights.
3. Examine the individual LEDs. *If any of the LEDs fail, the light shall be removed and sent to Aveo Engineering for replacement under the Warranty Program.*