FRESH AERO FlightLights
LED Taxi/Landing/Recognition Light for Sonex, Van's RV *& other Homebuilt Aircraft*

Manual

The Steelebrook Group

Where Imagination Meets Innovation

Fresh Aero FlightLights *LED* Taxi/Landing/Recognition Light for Sonex, RV & Other Homebuilt Aircraft

Thank you for purchasing the **Fresh Aero LED Taxi/Landing/Recognition (TLR) Light f**or Sonex, Van's RV and other homebuilt Aircraft. We're confident you'll be pleased with this innovative LED TLR light specifically designed for your homebuilt and sport aircraft.

A combination of innovative features, like easy two axis positioning, high lumen output, low current consumption, high quality and low price produce a leading edge LED TLR light system that's tough to beat.

Features include:

Eight very high intensity LEDs (or four LEDs a one halogen lamp) nicely packaged in a 110 mm, 56 mm wide by 54 mm deep cast aluminum box with custom brackets that fasten between the wing ribs or inside cowlings on Sonex, RV and other homebuilt aircraft.

The total package, including the brackets weighs only 11 ounces.

Very easy to install. Just fasten the brackets to adjacent wing ribs (using the included templates) or to inside of cowlings

The bracket/light box attachment can be easily adjusted for rotational and lateral positioning without disturbing the bracket/rib attachment.

These lights can also be mounted inside cowlings using alternate brackets that we'll be offering soon.

These lights push out 1000 lumens of pure white light and consume only 682 milliamps (.68 ampere) of power at 13.8 vdc. That's only 9.5 watts per box! Our new hybrid LED/Halogen light use a 12 degree 35 watt halogen bulb with a separate switch to illuminate the runway on final approach.

Wide 45 degree radiation pattern on LED and 12 degree beam on halogen light.

Very long life cycle. LEDs, when used correctly, have an approximate life span of over 50,000 hours. The TLR Lights are warranted for 5 years. And after that, the bulbs are replaceable (although you'll probably never need to do it). For only 24 dollars for each box.

A strobe and "wing wag" (with two light boxes) option is also available now.

These lights are offered in both an unfinished aluminum and an optional black textured finish.

We also offer wing leading edge lens kits at down-to-earth prices.

All components have a UL flame retardant rating of at least HB 94

Vibration proof design. Aircraft vibration will not be a factor.

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Study and save this manual

Read this entire manual before using your Fresh Aero Taxi/Landing Lights. Make sure you understand the instructions and safety precautions in this manual. Keep this manual and your invoice in a safe place for future reference.

Fresh Aero TLR Light General Safety Warnings and Precautions

Warning: always adhere to the following safety precautions when using this product.

- Do not alter or modify the TLR Light in any way.
- Do not tamper with internal components. The units have specific internal components to match the LED light configuration. There are no user replacement parts and removing the rear cover will void the warranty.
- The TLR Light can be configured for 12/14 or 24/28 VDC electrical systems. Do not use the 12/14 VDC light with higher voltage systems. Higher than rated voltage will damage LEDs or drastically shorten LED life span and void warranty.
- Handle all units carefully. Do not drop.
- Do not kink or crush wire leads when installing.
- Always protect these lights with a 5 ampere fuse.

Warning: *The warnings, precautions and instructions discussed in this manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that common sense and caution are factors that cannot be built into the Fresh Aero Taxi/landing Light and must be supplied by the person or persons using this product.*

Important Notice: If you have questions regarding the installation or operation of the Fresh Aero TLR Light, or just need another manual, please call or write Fresh Aero Aviation at the contact numbers or e-mail address on the last page of this Guide. Manuals are also available on our web site in PDF format at www.freshaero.com.

Other Legal Notices

Fresh Aero makes no representations or warranties regarding any damages, injuries or benefit expected by using this unit lawfully, or any request from a third person, which are caused by the inappropriate use of this product.

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Disclaimer of Warranty

Fresh Aero makes no representations of warranties, either expressed or implied, by or concerning any content of these written materials and in no event shall be liable for any implied warranty for any consequential, incidental or indirect damages (including but not limited to damages for loss of business profits or business interruption) arising from the use or inability to use these written materials or equipment. No liability is assumed with respect to the use of the information contained in these written materials, or for damages resulting from the use of the information contained therein.

Fresh Aero FlightLights Taxi/Landing/Recognition Light

Limited 5 Year Warranty

Fresh Aero makes every effort to provide high quality and durable products to the aviation community and warrants to the original purchaser that this product is free from defects in materials and workmanship for 5 years from date of purchase. The original purchaser must own the aircraft the Taxi/landing Light is installed on. Fresh Aero's liability is limited to repair or replacement of defective parts. This warranty does not apply to damage due directly or indirectly to misuse, abuse, negligence or accidents; repairs or alterations outside our facilities; or to lack of maintenance. We shall in no event be liable for death, injuries to persons or property or for incidental, contingent, special or consequential damages arising from the use of our product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation of exclusion may not apply to you.

To take advantage of this warranty, the product or part must be returned to us with transportation charges prepaid. Proof of purchase date and an explanation defect or problem must be included with the product. If inspection verifies the defect, we will either repair or replace the product at our discretion. We will return the repaired or replaced product at our expense, but if we determine there is no defect, or that the defect resulted from causes not within the scope of our warranty, then the purchaser must bear the cost of returning the product.

This warranty gives you specific rights and you may also have other rights which vary from state to state.

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Installation Identification Photos

Photo 1

The holes in the ends of the brackets just attach to adjacent wing ribs at a convenient location forward of the spar (or inside of a cowling). The brackets are custom fabricated to fit your aircraft and layout templates are included. The 3 box holes in the bracket provide for lateral adjustment of the light.

Photo 2

Photo 2 depicts the recommended Sonex layout location of the rib attach points. Heat buildup will not be an issue so these lights can be mounted in close proximity to the leading edge light lens.

Photo 3

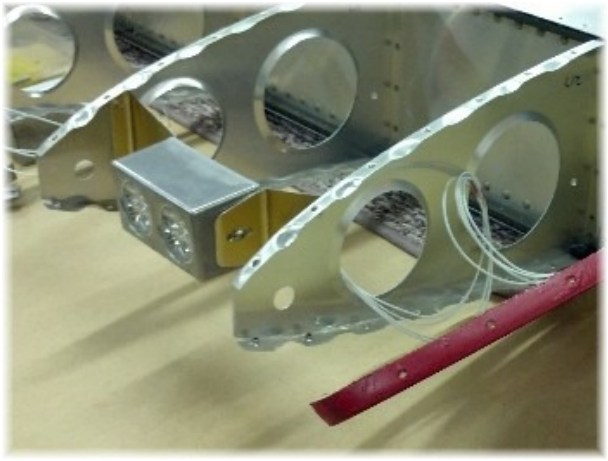

Photo 3 depicts the recommended Sonex layout location with MIL-W-22759/16 wires running through the holes in the wing ribs. We recommend positioning the TLR Light in the most outboard rib bay forward of the rib fore lightening holes.

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Installing the Fresh Aero TLR Light System

Read and understand all the proceeding safety precautions and warnings before installing the TLR Light.

FAA Approval Information (USA Installations): The Fresh Aero TLR Light is designed and manufactured for homebuilt (experimental) aircraft. If you install this product on a certified aircraft, you will need at least a FAA field approval to be completely legal and airworthy. See last page of this manual.

Use FAA approved methods and procedures (USA) when installing connecting the Taxi/Landing Light. Refer to FAA EA-AC 43.13-1A&2A "Acceptable Methods, Techniques and Practices" for correct procedures.

Note: the following guidelines assume you are in the process of building and have access to the interior of the wing forward of the spar. If you are installing the TLR Light on a wing that is already "skinned" forward of the spar, please refer to the "finished wing" section for additional information on installing these lights on finished aircraft.

Another note: If you're installing your TLR Light in a cowling, some of the following instructions will not apply to you. The included brackets will probably work for you - with a little bending. Mount the light just inside the cowling with screws,washers and locking nuts though the cowling. Provide clearance for pivoting and aiming the light without contacting the lens. If you need custom brackets for a perfect fit, we can fabricate them for you for a modest cost. Just contact us for more information.

1. Installing the Taxi/Landing Light in the wing Leading Edge

1.1 Locate aircraft (or wing) on a level surface and chock aircraft tires (if already on the tires) to prevent movement.

1.2 Determine the location of the Taxi/Landing Light. This is a subjective choice and there's no right or wrong location other than the units must be mounted between adjacent ribs forward of the spar where no interior obstructions will interfere with the installation. Verify that no structure, wires, cables or other components will interfere with mounting and wiring. That said, we do highly recommend that these lights be mounted in the rib bays closest to the wing tips (see photo 3 and note below).

- **Note:** We recommend an outboard location as there is very little wing loading and skin bending moments at the outboard locations. This is probably not an issue but why not go for all the integrity you can get. The Sonex OneX may be an exception to this recommendation as the section inboard of the wing fold is a separate skin section and is inherently rigid.

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Installing the Taxi/Landing Light … *continued*

1.3 Locate the Bracket Mounting Template at the back of this manual and cut out the center section on the outside red line. Locate the template cutout on the rib with the rib flange facing away and center the template with the forward line aligned with the flange forward vertical end. Secure the template with tape at this position.

1.4 Use a spring loaded center punch , awl or similar tool to "spot" holes in the center of the two bracket attach hole locations on the template. Remove the template and drill/deburr the holes.

Note: the bracket holes are 11/64 inch (clearance for 8-32 screws). Use this size drill if you're using 8-32 screws. We don't include the screws because some builders may choose to use pulled rivets. If this applies to you, just drill the holes for the rivets you use.

Note: we do offer "EasyNut" kits for finished aircraft. This kit significantly facilitates the bracket mounting procedure on finished aircraft. Please contact us for more information.

1.5 Move the template to the opposite rib (the rib with he rib flange facing towards you). Align and secure the template as in step 1.3. Spot, drill and deburr the holes in flange as in step 1.4. Remove the template.

Note: You will need to trim the upper and lower edges of the template slightly to eliminate flange interference as explained on the template.

1.6 Hold the brackets in place on the ribs and confirm that the opening between the brackets (where the light box attaches) is centered between the rib rivet lines (see note below). If not, reverse the brackets, rib to rib.

Note: The brackets are different lengths! We do this to center the TLR Light between the rivet lines on the ribs for symmetry. The rivet lines are offset from the ribs so we offset the brackets too. It just looks better on the finished aircraft.

1.7 Temporally mount the brackets to the light box with the 5 mm hex head screws and insert the assembly into position between the ribs. Confirm that the assembly fits properly between the ribs. If the assembly is too snug, bend the middle of the brackets slightly to achieve the correct fit, then bend the bracket flanges for parallelism. If the assembly is loose, add washers to each side for the proper fit.

1.8 When proper positioning and fit is achieved, mount the brackets to the ribs using your choice of fasteners.

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Installing the Taxi/Landing Light … *continued*

1.9 Mount light box between the brackets and hand start the the included 5 mm hex screws and lock washers in the holes in the box. Tighten by hand as much as possible. "Aim" light box to the desired position using the rotational adjustment for up and down positioning. To adjust the lateral positioning, use the additional holes in the brackets. (see photo 1). Tighten the screws with a 8 mm box or open end wrench.

Caution: *To prevent striping the nuts in the light box, do not over tighten the screws. The lip on the bracket end will "bite" into the box to prevent movement.*

2. Mounting the Switch (or switches)

2.1 Mount the TLR Light switch in the desired location and wire one terminal to the positive aircraft bus. Be sure your switch is rated for at least 3 amperes dc volts for one light box and 6 amperes for two light boxes. This is more than you need, but it's important to use sturdy, reliable switches.

Important Note: If you purchased the TLR Hybrid Light with the halogen bulb, you need to mount another 5 ampere switch specifically for the halogen bulb as the LED and halogen bulbs are switched separately.

2.2 Protect the TLR Lights with a 2 ampere fuse (4 amperes for the above hybrid light) for one box and 4 ampere fuse (8 amperes for the above hybrid light) for two boxes upstream of the switch. Use FAA approved procedures for connecting wires.

3. Wiring the System

Note: We recommend that the ground wires for Taxi/Landing lights be run to the wings to provide a direct connection and increase reliability. The procedure below reflects this recommendation. This said, if you're certain that you have reliable electrical continuity in your wings, you can ground your ground wires to the airframe to save wire and weight. Be sure to test the continuity from the control box to the wingtips and use FAA approved procedures for connecting wires.

3.1 Begin by fishing 2 leads of 18 gauge MIL-W-22759/16 or equivalent aircraft stranded wire from the Taxi/Landing lights to a common ground point and the downstream terminal of the switch. You can start at either end and run the wires through the wing the holes in the wing ribs. Be sure to protect the wires from abrasion from the metal ribs. Leave some slack in the wires to allow for expansion and contraction. Be sure wires do not interfere with other systems and control linkages. Secure wires securely using FAA approved procedures.

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Wiring the System … *continued*

3.2 Connect all leads to their respective terminals using FAA approved procedures. The Taxi/Landing Lights use internal diode technology so connection polarity is not an issue on the light side..

Warning: *Make sure wires do not kink or abrade on metal structure.*

Note: If your have a high quality crimping tool designed for the type of connectors you're using (butt splice, end splice, etc), these connections can be crimped. We prefer to solder and shrink wrap the splices for the most reliable connection. Please consider this method.

3.3 Test your installation by inserting the recommended fuse and turning on your TLR Light switch.

Another important operational note: If you installed the TLR Hybrid Light (lights), we strongly recommend you only use the halogen light in the landing pattern because the halogen bulb consumes more power than the LED lights and you really don't need the halogen light in away from the airport environment. The LED light can readily be seen by distant aircraft and the halogen light will add very little "to being seen at a distance".

4. Installing the TLR Light on Finished Aircraft

Please consider the following additional "hints & tips" for installing these lights on finished aircraft.

If you purchased the Fresh Aero Lens Mounting Kit, just follow the procedures in our manual that was included with your lens kit. If the lens kit was purchased from another source, follow the instructions included with that kit. The opening cut into the leading edge needs to be at least the width of the light box and wide enough to allow attachment and adjustment of the brackets and light box. This is not an issue on "non-skinned" aircraft, but on finished aircraft, this will be your work space on the light side of the installation. You will also want to consider purchasing the "EasyNut" Kit for fastening the brackets to the ribs. This kit significantly facilitates the bracket mounting procedure on finished aircraft.

Also, a right angle drill motor or right angle drill adaptor will probably be necessary to drill the the bracket attach holes in the ribs as the lens opening will not accept a standard size drill motor.

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Installing the TLR Light on Finished Aircraft … *continued*

Your running wires can be "pushed" through the wing with semi-rigid plastic tubing long enough to reach the fuselage or light, depending on where you start. Fish the wires through the tube and use duct tape to secure the wires to the outside of one end. Fish the tube and wires though the wing lightening holes until they reach the fuselage or light. With tubing in place, pull the wires though the tubing until you have the length you need to make your connections to the control box. Remove the wires from the tube and pull the tube back out.

Note: Consider leaving the tube in the wing to provide wire abrasion protection.

Another note: We're prototyping a conical "starter plug" to insert in a length of ½ inch PVC water tubing to facilitate pushing the tube through the wing. Please contact us for more information.

A Few Words on FAA Approval (USA Installations)

We consider the Fresh Aero Taxi/Landing Light to be an innovative and safe wing leading edge light for home built (experimental) aircraft.

This same lighting potential exists for certified aircraft but even minor modifications will probably need some type of FAA approval to be legally used in certified aircraft.

If you install the TLR Light in your certified aircraft, you will need at least an FAA field approval (337 form) to be completely legal and airworthy. Please talk to your local FAA Flight Standards Office for more information.

Thanks again for purchasing the Fresh Aero FlightLights TLR Light. We have tried to make this light and manual as user friendly as possible. We always welcome your comments and suggestions for future revisions.

Fresh Aero Aviation, 1142 Roseland Drive, Columbia, TN 38401-7700
Phone: 931-381-6092, 931-215-8801
Email: info@freshaero.com, www.freshaero.com