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# ANTI-COLLISION LIGHT SYSTEMS INSTALLATION AND SERVICE MANUAL, SEPTEMBER 16, 1999

Approved under

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STC SA6NE (March 21, 1974)

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STC SA21NE (March 1, 1978)

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STC SA615EA (June 18, 1999)

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STC SA800EA (September 8, 1999)



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## INTRODUCTION TO WHELEN ANTI-COLLISION STROBE LIGHTING SYSTEMS, STC SA800EA / STC SA615EA / STC SA6NE / STC SA21NE

Whelen's Anti-Collision Strobe Light Systems are approved under STC SA615EA, STC SA800EA, STC SA6NE, and STC SA21NE, manufactured under PMA as an approved anti-collision light for all aircraft, when installation is accomplished in accordance with the following instructions.

Whelen's Anti-Collision Strobe Light Systems are designed and approved specifically for General Aviation Aircraft, to comply to FAR 91.205(c) (3) (visual flight rule night) requirements.

Whelen's approved Anti-Collision Strobe Light Systems can be installed on all aircraft by completing the installation with reference to this Installation and Service Manual, and the appropriate technical data listed below:

ADVISORY CIRCULAR 43.13-1B, Chapter 11, Sections 1, 2, 3 and 7, Electrical Systems.

ADVISORY CIRCULAR 43.13-2A, Chapters 1 and 2, Radio Installations.

ADVISORY CIRCULAR 43.13-2A, Chapter 4, Anti-Collision Light Installations.

ADVISORY CIRCULAR 20.21, 12-3-64, Application of Glass Fiber Laminates in Aircraft.

## WHAT IS AN FAA APPROVED ANTI-COLLISION LIGHT SYSTEM?

**DESCRIPTION:** An approved Anti-Collision Light System must produce an envelope of light of a minimum of 400 effective candles in Aviation Red or Aviation White (Ref. FAR 23.1397), 360 degrees around the aircraft's vertical axis 75 degrees above and 75 degrees below the horizontal plane, with a maximum of 0.5 steradians (1642 sq. degrees) of solid angle blockage (Ref. FAR 23.1401(b)).

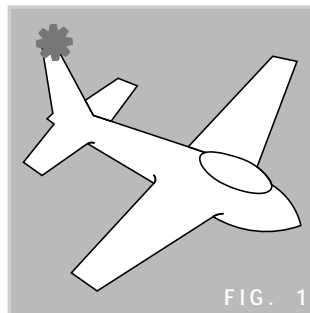
Described on this page are 5 basic types of installations approved by the administrator. See Fig. 1-4.

**FLASH RATE REQUIREMENTS:** A single anti-collision light or multiple anti-collision light system flashing simultaneously, must flash at a minimum of 40 flashes per minute and a maximum of 100 flashes per minute.

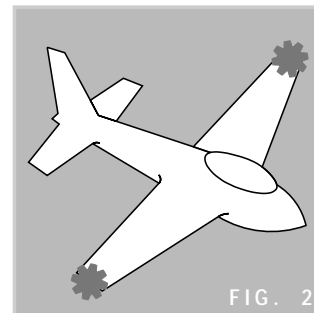
A multiple anti-collision light system, each light flashing at a random or controlled alternate flashing, can exceed 100 flashes per minute, but not over 180 flashes per minute from any position around the aircraft.

**EFFECTIVE INTENSITY REQUIREMENTS:** Home-built and new type design aircraft, which application for type certificate or operation limitations was applied for after August 11, 1971, will require an anti-collision light of 400 effective candles minimum, either in Aviation Red or White per FAR 23.1401. All other aircraft require only 100 effective candle power, prior to August 11, 1971. Position lights must meet the requirements of FAR 23.1385, FAR 23.1387, and FAR 23.1389.

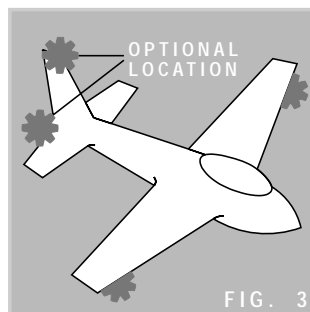
## FIVE LOCATIONS ON THE AIRCRAFT FOR ANTI-COLLISION STROBE LIGHTS, TO COMPLY TO THE LIGHT PATTERN REQUIREMENTS.



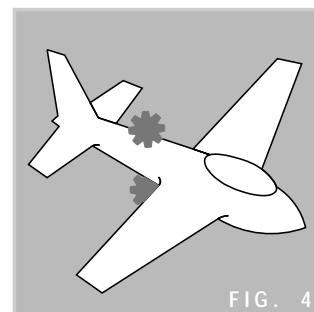
One anti-collision strobe light mounted on the vertical fin will meet the minimum requirements on most aircraft. A half red and half white lens is recommended.



Two wingtip strobe lights that protrude beyond the wingtip, their light converging in front and back of the aircraft within 1200 ft. is an approved anti-collision strobe light system.



Enclosed wingtip anti-collision strobe lights, require a third strobe light on the tail or vertical fin, to fill in the required light envelope. This is an approved anti-collision system.



A fuselage mounted anti-collision strobe light system requires a minimum of two strobe lights to get the required vertical coverage. This is an approved anti-collision system.

## GENERAL AVIATION MINIMUM POSITION LIGHTING REQUIREMENTS

For compliance to FAR Part 23.1385 through 23.1397, VFR flight rule night requirements on a General Aviation aircraft, you must have a TSO,d Aviation Red forward position light on the left and an Aviation Green forward position light on the right. See Figure 7, page 4.

These are normally mounted on the most outward extremity of the airframe so they can project their light directly in front of the aircraft 0 degree to 110 degrees left and right horizontally, and 180 degrees up and down vertically, unobstructed by any part of the aircraft.

The tail position light must project its Aviation White light toward the rear of the aircraft, 70 degrees horizontally left and right from 0 degree straight back behind the aircraft, 180 degrees up and down, 0.04 Steradian (131.36 sq. degrees) interference is allowable, reference FAR Part 23.1387(c). More than one light is acceptable.

## POSITION LIGHTS AND ANTI-COLLISION LIGHT DISTRIBUTION PATTERNS REQUIREMENTS

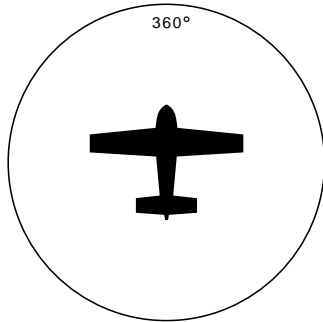


FIG. 5. An approved anti-collision strobe light system must project light 360° around the aircraft's vertical axis. One or more strobe lights can be used.

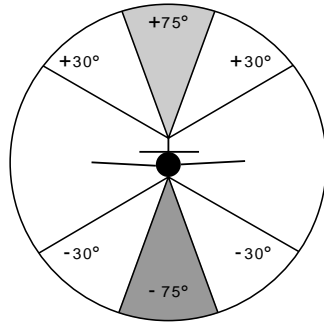
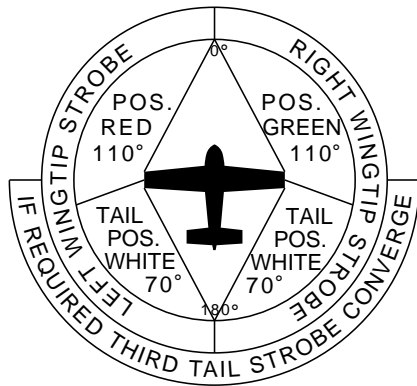


FIG. 6. An approved anti-collision strobe light system must project light + or - 30° above and below the horizontal plane of the aircraft. One or more strobe lights can be used. The + or - 75° projected light is required since July 18, 1977.

FIG. 7. Approved light pattern in the horizontal plane. The anti-collision wingtip mounted lights must converge within 1200 feet directly in front and rear of the aircraft on center line. If the wingtip strobe light convergence is greater than 1200 ft. in back of the aircraft, a 3rd light is necessary.



## DESCRIPTION OF ANTI-COLLISION LIGHT HARDWARE, APPROVED UNDER STC SA800EA / STC SA615EA / STC SA21NE

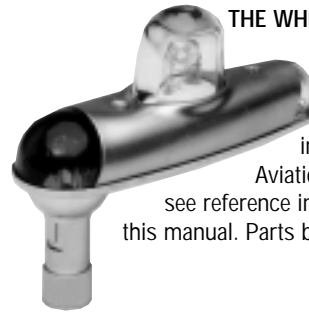


THE WHELEN A650 WINGTIP STROBE LIGHT HEAD ASSEMBLY mounts on the back of the Whelen W1285 wingtip position light, replacing the position light lens retainer, reference installation instructions on page 8 of this manual. Parts breakdown shown on Pg. 19, Fig. 30.

SUPERSEDES A429.

THE WHELEN A650-PG AND -PR WINGTIP POSITION AND STROBE LIGHT HEAD ASSEMBLY ready to install on the wingtip with minimum modification to the aircraft's structure. Installation instructions are on page 8 of this manual. Parts breakdown shown on Pg. 19, Fig. 29.

SUPERSEDES A429-PG AND -PR.



THE WHELEN A600-PG AND -PR COMPLETE WINGTIP STROBE LIGHT HEAD ASSEMBLY WITH FORWARD AND TAIL POSITION LIGHTS ready to install on the wingtip of most General Aviation aircraft using 3 mounting screws, see reference installation instructions on page 10 of this manual. Parts breakdown shown on Pg. 19, Fig. 28.

THE WHELEN A625 STROBE LIGHT HEAD ASSEMBLY is the same physical size as the Model S tail position light and will fit the same mounting adapter. It is used in enclosed-type wingtips. The unit fits nicely behind the position light on conical camber wingtips, see reference installation instructions on page 9 of this manual. Parts breakdown shown on Pg. 19, Fig. 25. SUPERSEDES A430.



THE WHELEN A500A COMBINATION TAIL POSITION AND ANTI-COLLISION STROBE LIGHT HEAD ASSEMBLY replaces the Type S tail position light, and provides a 3rd strobe light to the anti-collision light system. The A500A is used in either the vertical or horizontal mounting position, reference installation instructions on page 10 of this manual, reference installation instructions on page 10 of this manual. Parts breakdown shown on Pg. 19, Fig. 23. SUPERSEDES A500.



THE WHELEN A450 STROBE LIGHT HEAD ASSEMBLY was designed for use in severe environments (vibration, chemicals, oil, moisture). The unit mounts on the aircraft using Whelen's H102 "B" or H103 "A" mounting adapter (see Page 5), see reference installation instructions on page 11 & 12 of this manual. Parts breakdown shown on Pg. 19, Fig. 26.



THE WHELEN A470A STROBE LIGHT HEAD ASSEMBLY is designed to produce light 360 degrees around the aircraft. The A470A incorporates a vibration proof strobe light flash tube which also allows flush mounting. The unit mounts on the aircraft using Whelen's H102 "B" or H103 "A" mounting adapter (see Page 5), see reference installation instructions on page 11 & 12 of this manual. Parts breakdown shown on Pg. 19, Fig. 27. SUPERSEDES A470.

THE WHELEN MODEL 70509 Halogen Flashing Anti-Collision Light. Totally self-contained, flashing anti-collision light assembly with FAA TS0-C96a approval, reference installation instructions on page 12 of this manual.

NOTE: Model 70509 is not recommended for use on helicopters.



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**THE WHELEN SA,CF SELF CONTAINED STROBE LIGHT HEAD ASSEMBLY.**

Designed to fit any standard fairing or fuselage adapter previously used for rotating beacons. The SA,CF is available in Aviation White only. See page 11.



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**MODELS A612, A610.** For Cessna Single Engine Aircraft, 1972 and later.

FAA/PMA APPROVED.

A610 (strobe tube assembly)  
A612 (magnifying lens)

In this system the A610 and A612 are mounted directly onto the wingtip retainer. Use the A612 as a template for cutting a hole in the existing light shield.

See page 9.



A612  
Magnifying Lens

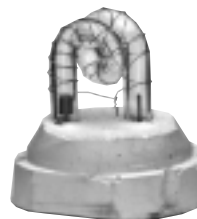
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**THE WHELEN HR,CFA SELF CONTAINED STROBE LIGHT HEAD ASSEMBLY.**

Designed to fit any standard fairing or fuselage adapter previously used for rotating beacons. The HR,CFA is available in Aviation Red or White, or split Aviation Red and White. See page 11.



**SUPERSEDES HR,DF & HR,DFA**



A610  
Strobe Tube  
Assembly)

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**MODELS H102 AND H103.**

FAA/PMA APPROVED.

These adapters are designed for the A470A and A450. H102 allows direct mounting of the strobe light head assembly to the skin of the fuselage or the top of a 2-1/2" diameter Cessna vertical stabilizer fairing. H103 is designed to allow strobe light head assemblies to be installed in 3-3/4" diameter standard rotating beacon mounting.

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**A440 MOUNTING ADAPTER** Available for fuselage installations of Models HR,CFA and SA,CF. Mounting Adapter. (3.75 opening, 3 screw mounting.)



A440 fuselage mount.



H102



H103

**DESCRIPTION OF POWER SUPPLIES APPROVED  
UNDER STC SA800EA / STC SA615EA / STC SA6NE**

**MODEL HDA, CF**  
FAA-PMA APPROVED  
P/N A413AHDA-CF-14/28



The HDA, CF is the finest power supply available. It has the capacity for simultaneous flashing, alternate flashing or both. Wing outputs can be disabled when trigger function is engaged. See page 13.

**HDA,CF SPECIFICATIONS:**

**Power Consumption:**  
7.0 Amps @ 14 volts DC, 3.5 Amps @28 volts DC;  
**Weight:** 2 lbs.; **Length:** 5.50"; **Width:** 5.0", **Height:** 2.37";  
**Flash Rate:** alternately at 90 +/- 5 FPM,  
simultaneously at 50 +/- 5 FPM.

**MODEL HT, CF**  
FAA-PMA APPROVED  
P/N A490T-CF-14/28

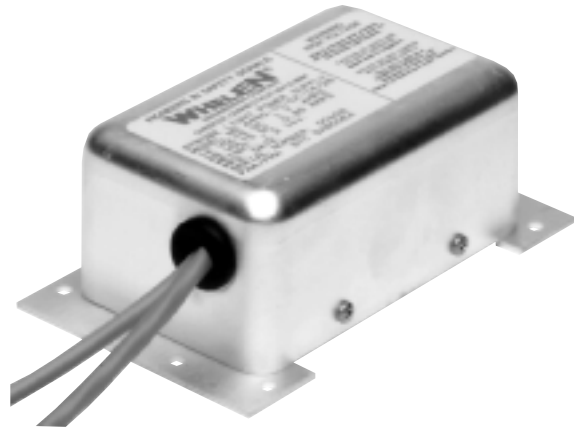


Our most compact, single-source power supply produces an accumulated 19 joules of energy. See page 14.

**HT, CF SPECIFICATIONS:**

**Power Consumption:** 1.7 Amps @14 volts DC;  
.85 Amps @28 volts DC; **Weight:** 1.2 lbs.; **Length:** 5.0";  
**Width:** 3.12"; **Height:** 2.25"; **Flash Rate:** 50+/- 5 FPM.

**MODEL HTC-CF**  
FAA-PMA APPROVED  
P/N A490TC-CF-14/28



Same as Model HT-CF but with a mounting plate that can directly replace factory installed systems on S/E Cessnas, S/E Aero Commanders and S/E Grumman Americans. See page 14.

**HTC-CF SPECIFICATIONS:**

**Power Consumption\*:** 1.7 Amps @ 14 volts DC;  
.85 Amps @ 28 volts DC;  
**Weight:** 1.5 lbs.; **Length:** 5.0"; **Width:** 3.12";  
**Height:** 2.25"; **Flash Rate:** 50+/- 5 FPM.

**MODEL HTS, CF**  
FAA-PMA APPROVED.  
P/N A490ATS-CF-14/28



The HTS, CF produces an accumulated 34 joules of energy. It can be equipped to flash simultaneously with up to 5 other HTS, CF power supplies by connecting an 18 gauge wire between the synchronization mechanisms in each power supply. An 18 gauge low voltage wire supplies power to each HTS power supply. See page 14.

**HTS, CF SPECIFICATIONS:**

**Power Consumption\*:** 4.0 Amps @ 14 volts DC;  
2.0 Amps @ 28 volts DC;  
**Weight:** 1.7 lbs.; **Length:** 5.0"; **Width:** 3.12"; **Height:** 3.06";  
**Flash Rate:** 50+/- 5 FPM.

See pages 13 & 14 for installation information.

## CUSTOM ANTI-COLLISION LIGHT INSTALLATION PROCEDURES STC SA800EA / STC SA615EA / STC SA21NE

The following information is to assist in the installation of a custom Whelen anti-collision strobe light system on any aircraft, and how to return the aircraft back to service with compliance to FAR Part 91.205(c) (3).

1. Choose from figures 1, 2, 3 or 4, on page 3, the anti-collision light system which is most applicable to the aircraft.
2. With reference to the STC's "Limitation and Conditions" for field of coverage requirements. Check the field of coverage of the proposed location. (Figures 5, 6 and 7 on page 4 define the required field of coverage).
3. These STC's document that Whelen's anti-collision strobe lights meet the requirements as specified in AC 43.13-2A, Chapter 4, PAR.51(a and b) (1). STC SA615EA covers replacement of original equipment, STC SA800EA and STC SA21NE cover installation of new anti-collision light systems.
4. Vertical fin mounted anti-collision strobe beacons (Ref. Figure 1 page 3), will conform to the FAR 23.1401, 0.5 steradian (1642 sq. degrees) maximum solid angle blockage requirements on most standard configurations (CAM 3 and FAR Part 23) high or low wing type aircraft. An average solid angle blockage for an installation of this type is 1324 sq. degrees.
5. Fuselage mounted anti-collision light systems require two (2) anti-collision strobe beacons (Ref. Figure 4 page 3) to get the  $\pm 75$  degrees required. Two lights mounted in this manner exceed the steradian requirements of 21,600 sq. degrees total coverage.
6. Fuselage mounted anti-collision lights should be located on the fuselage center line to reduce reflection on the wings as much as possible. They should be mounted near the trailing edge of the wing, to reduce cockpit reflection.

### APPROVED METHOD OF DETERMINING ADEQUATE COVERAGE OF WINGTIP AND TAIL STROBE LIGHT INSTALLATIONS.

The most practical system is the approved wingtip anti-collision strobe light system. These systems consist of two or more lights to complete the anti-collision light requirement. There is no question as to their complying to the field of coverage when the installation is completed (Reference to the following instructions).

The acceptable distance for the two wingtip anti-collision strobe lights to converge in front and back of the aircraft on center line is 1200 feet. If both wingtip anti-collision strobe lights can be seen at 1200 feet or less directly in front and back of the aircraft, it is considered a point of light source, therefore a third light is not necessary.

The wingtip anti-collision light must be located in such a way that it will project light  $\pm 75$  degrees above and below the horizontal axis of the aircraft, and the summation of the 2 or 3 lights will project light 360 degrees around the vertical axis.

**PILOT AND CREW INTERFERENCE:** In some installations it will be necessary to mask the strobe light head assembly, to reduce pilot annoyance. This interference problem varies from one aircraft to another of the same model, due to paint schemes and colors. The Navigation Light Detector will be a source of reflection and should be reduced in size, or masked as necessary. A small aluminum or plastic plate mounted between the navigation light and the wingtip protruding up or down as required (like some plastic navigation light detectors, and trimmed to shadow the objectionable reflected area), is simple and very effective.

The solid angle blockage must be reviewed after installing any masking that will disturb the 360 degrees by  $\pm 75$  degrees pattern. The aforementioned type masking used on wingtip lighting seldom interferes with this pattern.

### ESTABLISHING SOLID ANGLE BLOCKAGE WITH REFERENCE TO AC 43.13-2A, CHAPTER 4.

1. To determine the vertical angles to use with reference to Figure 7 and 8 of the aforementioned chapter 4, attach a long string to the subject light source location.
2. Fix a navigational-type plotter or protractor to the string with weighted thread fixed to the center of the scale for a plumb bob.
3. Level the aircraft or determine the offset angle.
4. Pull the string over the point of solid angle blockage (Ref. Figure 6 page 4. Any angles greater than  $\pm 75$  degrees vertical are not a factor.
5. Apply the vertical and horizontal angles to the graph paper (Ref. Figure 4.8 and instructions in text of paragraph b6 and c of Chapter 4).

A flight test will be performed by properly certified pilot with reference to paragraph 52(a) (b) of Chapter 4.



Typical wing-tip installations.

**PROCEDURES FOR INSTALLING THE WHELEN  
ANTI-COLLISION LIGHT HEAD ASSEMBLIES  
STC SA800EA / STC SA615EA / STC SA738EA /  
STC SA21NE**

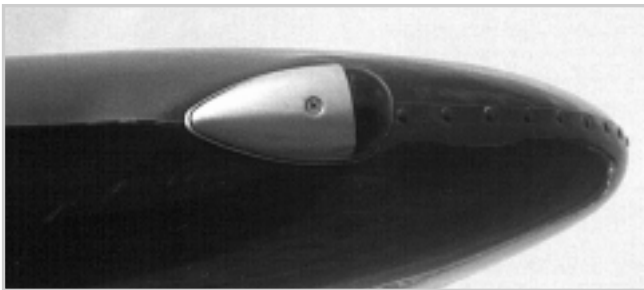
**A650 WINGTIP STROBE LIGHT.**

The A650 strobe light head assembly was designed to fit on the Whelen W1285-2 base light assembly, used on the majority of General Aviation aircraft. To install the Whelen A650 strobe light head assembly on the aircraft, proceed with the following instructions:



A650

1. Remove the wingtip navigation light and wingtip, when necessary.
2. Install the nylon three position AMP pin connectors A441 on the end of the flash tube wires (RED in pin 1, BLACK in pin 2, and WHITE in pin 3).
3. Assemble the navigation light assembly on the wingtip using the A650 strobe light assembly as the navigation light lens retainer:
  - a. Install the rubber pad (supplied in kit) on the position light base plate under the A610 flash tube, if necessary to make the lens firm in its mounting.
4. In some installations it will be necessary to mask the A650 strobe light, to reduce pilot annoyance. The Navigation Light Detector will be a source of reflection, and should be reduced in size or masked as necessary. A small aluminum or plastic plate, mounted between the navigation light and the wingtip, protruding up or down as required (like some plastic navigation light detectors), and trimmed to shadow the objectionable reflected area, is most effective. This reflection problem varies from one aircraft to another, due to aircraft design and paint color scheme, and must be checked on every installation.



BEFORE



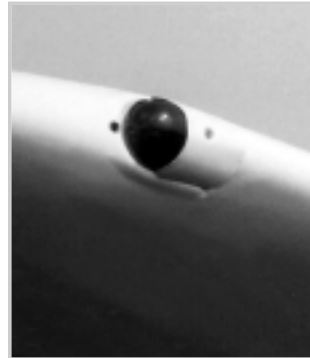
AFTER/WITH MODIFIED WINGTIP.

**A650-PR (RED) AND A650-PG (GREEN) FORWARD POSITION  
ANTI-COLLISION LIGHT ASSEMBLY.**

These assemblies are interchangeable with the Grimes A1285 position light, using the original mounting hardware or appropriate approved fasteners. To mount the A650-PR and -PG on the wingtip, use the W1285-2 position light base plate as a template, drill the three (3) mounting screw holes if necessary, and open the 3/8 inch x 1 inch opening in the center base plate through the wingtip for access to the strobe light flash tube interconnecting cable connector.



A650-PR/PG



BEFORE



AFTER/WITH MODIFIED WINGTIP.

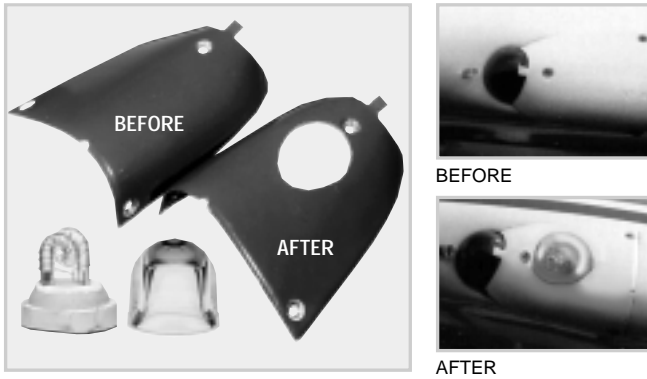
**A650 WINGTIP STROBE LIGHT INSTALLATION ON LATER  
MODEL CESSNA WINGTIPS WITH SHORTENED LIGHT BASE.**

Because Cessna has modified the Type E Series Wingtip Navigation Light, by cutting off the back 1.3 inch, and designed their wingtip to fit in closer to the light, it will be necessary to do a little fiberglass work when completing this installation. The A650 can be installed on these Cessnas in the manner below, and instructions above.

1. Remove the wingtip and the navigation light assembly.
2. Take a complete Model W1285 navigation light with an A650 head assembly installed, or an A650-PR or -PG, and place it in position on the wingtip. Mark around the navigation light base plate to get an outline of the navigation light profile on the wingtip.
3. File or trim away the excess wingtip material, to allow the navigation light and the A650 strobe light assembly to fit neatly in place. Allow at least 0.060 inch clearance around the A650 strobe head assembly and the wingtip.
4. To fill in the hole in the wingtip made by this trimming, and to provide a platform for the navigation and strobe light assembly, mount the navigational light base plate on the wingtip using the two (2) forward screws with a sheet of polyvinyl between the wingtip and the base plate for a parting agent. Tape the polyvinyl back over the wingtip to form a seal, so it is possible to apply a polyester resin putty, or epoxy putty like "Bondo", on the inside of the tip. Build up the trimmed area with this putty, as to have about 1/4 inch of material under and in back of the base plate. Prepare the surface and the putty material in accordance with the putty manufacturer's instructions, to assure a good bond to the wingtip.
5. Remove the navigation light base plate and parting agent.
6. To improve the appearance of this installation, fill the indentation on the outside of the wingtip with the aforementioned putty, and file the excess material to a clean profile before painting.
7. Drill the third mounting screw hole for the navigation light, and complete the installation, reference the enclosed information.



**LATE MODEL SINGLE ENGINE CESSNA WINGTIP STROBE LIGHT INSTALLATION.**



1. Remove the position light lens retainer being careful not to drop the red or the green lens.
2. Establish a center line on the Cessna lens retainer, referencing to the lens retainer center mounting screw, and position light base plate rear mounting screw.

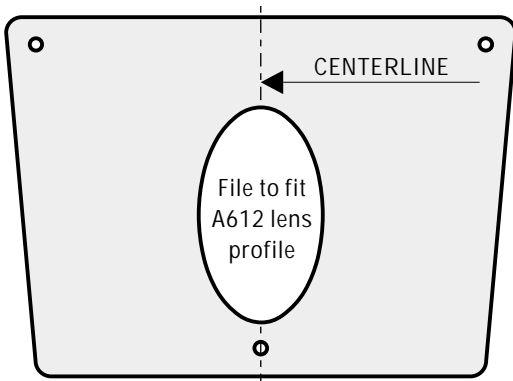
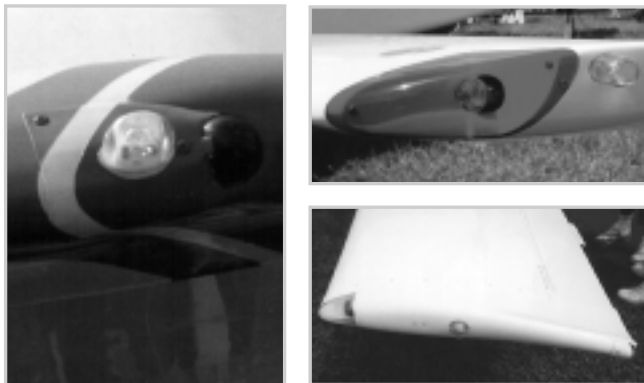


FIG. 8

3. Scribe the A612 lens profile as shown in illustration above, the object being to have the strobe light centered over the position light base plate.
4. Trim or fit an opening to the scribe line to fit the A612 lens. Due to the uneven surface of the Cessna lens retainer, the A612 will contact only the front and rear radius.
5. Place the sponge rubber pad supplied under the A610 flash tube to firm the assembly. RTV is recommended to secure lens in the modified retainer.
6. The flash tube interconnecting cable is routed through square holes in the rear bulkhead of the position light area.
7. Install the modified position light lens retainer, A610 flash tube and A612 lens, using original hardware.



**A625 STROBE LIGHT ASSEMBLY.**

The A625 strobe light head assembly fits into a 1.1 inch hole. The mounting screws are 1.75 inch center to center. It protrudes 1.7 inch outside the aircraft's skin, and 1.1 inch inside the aircraft.

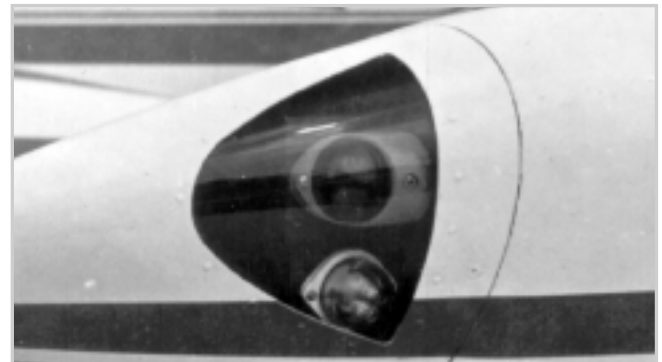


When installing an A625 strobe light head assembly on the rudder, refer to the aircraft's MAINTENANCE and/or SERVICE MANUAL for accepted procedures for balancing the rudder before returning the aircraft to service.

Mount the anti-collision strobe light head assembly as close to the stabilizer center line as practical, to eliminate backscatter as much as possible for the horizontal surface.

When installing the A625 strobe light head assembly in an enclosed area like a Beech enclosed wingtip or tail cone, maintain at least 0.060 inch clearance around the lens to the plastic cover. The A625 mounts conveniently just behind the forward position light on Cessna's conical camber wingtip. Make sure that the navigation light pattern is not interrupted when installing the A625 strobe light head on a wingtip. The A612 lens is not considered an obstruction.

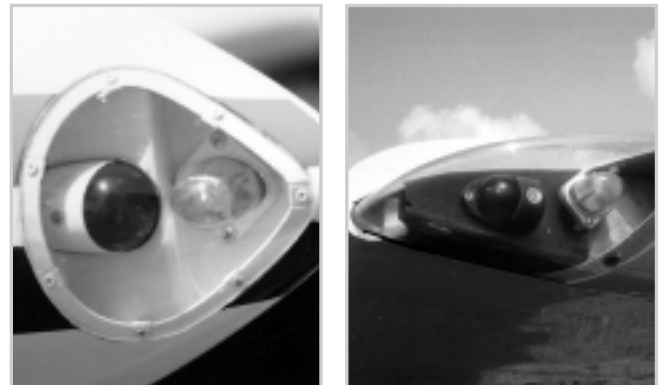
**A625 INSTALLATION IN CESSNA 300 OR 400 SERIES WINGTIP TANKS.** The A625 fits just under the navigation light, on an adapter plate of 0.032 inch aluminum, approximately 2-3/8 inches x 3-1/2 inches. Fit this plate between the navigation light and its mounting surface, and locate the A625 strobe head below the navigation light.



Bend and trim the adapter plate as necessary, so that the A625 clears the transparent window that covers the navigation light area 0.060 inch minimum.

The conduit for the navigation light wire is very small. To get the necessary wires to operate the strobe light and the navigation light through this conduit, use a 20 gauge wire, with less than 0.060 inch OD. It has been found that the Belden 8502 or 8308, has an 0.058 inch OD.

Photos below show typical installations.



## A600-PG AND -PR ANTI-COLLISION WINGTIP STROBE LIGHT HEAD ASSEMBLY WITH FORWARD AND TAIL POSITION LIGHTS.

### INSTALLATION INSTRUCTIONS

Remove two (#6-32 x .312LG) retainer screws and retainer for installation of the A600PG/PR. **BE CAREFUL NOT TO DROP THE GLASS COVERS** as they are held in position by the retainer. Attach the base assembly to your wing-tip with 3 #6-32 countersunk screws.



The A600 Anti-Collision Strobe Light with Forward and Tail position light is a complete exterior light package. When properly installed on the aircraft wingtips, it will comply to FAR Part 91.205(c-2) & (c-3).

The A600 must be mounted on the aircraft extremities so that the light distribution pattern is not obstructed by any parts of the aircraft (Reference figures 5, 6, and 7 on page 4). A limited amount of obstruction is permitted (Reference Part 23.1401, Paragraph (b) Anti-Collision Light Coverage, and Part 23.1387, Paragraph (e) Tail Light Coverage).

The convergence of the two wingtip tail position lights must occur within 1200 feet directly behind the aircraft to comply with field of coverage requirements. One may, but need not, remove the old tail position light when using the A600.

The A600 base plate must be mounted parallel to the vertical and horizontal center lines of the aircraft to project the light pattern properly.

Properly mounting the A600 on the most outward radius of each wingtip will cover the required area appropriately without any solid angle blockage. The A600 mechanically mounts on the wingtip using the original three mounting holes and screws (Reference A1285 and W1285 position lights).

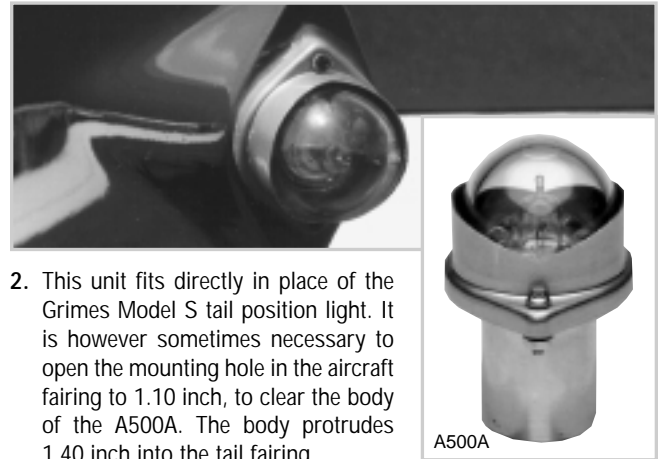
The RED wire applies power to the forward position light. The BLUE wire applies power to the tail position light. The BLACK wire is ground and one BLUE. The RED and one BLUE wires are wired in parallel to the existing wingtip position light wire.

The 14 volts forward position lights draw 1.9 amps each, the tail position lights draw 1.8 amps each, for a total of 7.4 amps for a 14 volts DC system. The 28 volts forward position lights draw 0.95 amps each, the tail position lights draw 0.90 amps each, for a total of 3.7 amps for a 28 volts DC system.

The A600 weights 0.5 lbs. each.

### A500A COMBINATION TAIL STROBE AND POSITION LIGHT.

1. Remove the Model S tail position light by removing the two (2) retainer ring screws.



2. This unit fits directly in place of the Grimes Model S tail position light. It is however sometimes necessary to open the mounting hole in the aircraft fairing to 1.10 inch, to clear the body of the A500A. The body protrudes 1.40 inch into the tail fairing.
3. Establish the proper light pattern of the A500A tail position light. The retainer shield must be located so that the bottoms of the V notches are vertical (parallel to the rudder) to shadow the light so it will produce a horizontal light pattern of 70 degrees left and right of straight back of aircraft.

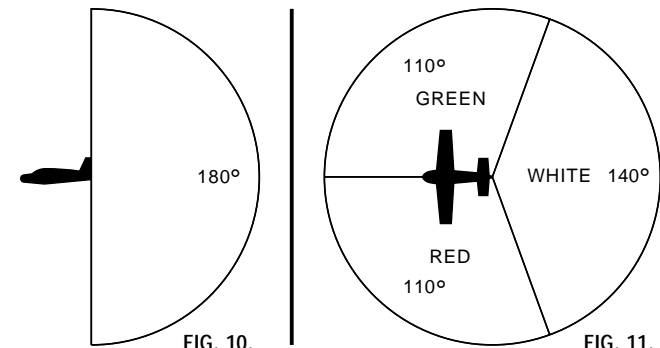
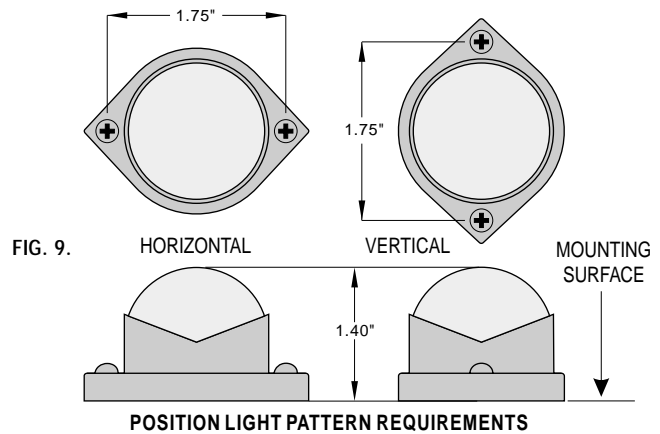


FIG. 10. APPROVED LIGHT PATTERN IN THE VERTICAL PLANE

FIG. 11. APPROVED LIGHT PATTERN IN THE HORIZONTAL PLANE

CONNECTING WIRING OF THE A500A TO THE A441 AMP 3 POSITION PIN CONNECTOR HOUSING, AND THE A444 AMP 2 POSITION PIN HOUSING CONNECTOR.

Anode	RED wire	Pin 1 of A441
Cathode	BLACK wire	Pin 2 of A441
Trigger	WHITE wire	Pin 3 of A441
Position Light A+	BLUE wire	Pin 1 of A444
Position Light Ground	BLUE wire	Pin 2 of A444

**ROTATING BEACON REPLACEMENTS.**



BEFORE WITH ROTATING BEACON



AFTER WITH STROBE LIGHT

The A450 and A470A remote anti-collision strobe light head assemblies are direct replacements for the rotating beacon, using the H103 "A" mounting adapter. They are mounted on the aircraft using the same type hardware and fastener originally used.

The "A" mounting adapter (H103) is a cup mounting adapter that fits the standard 3.750 inches rotating beacon mounting, using the same mounting hardware, three (3) 6-32 x 3/8 inch maximum length screws.

The A440 mounting flange supports the "A" mounting adapter on a flat surface such as the top or bottom of the fuselage. See Reference AC 43.13-2A, Chapter 4 for approved location, mounting and installation procedures.



The photos above show typical installations

**MODELS SA,CF-14/28 OR HR,CFA-14/28 STROBE LIGHTS FOR ROTATING BEACON REPLACEMENT.**



A470A



A450

6. FLASH TUBE REPLACEMENT. The A469B flash tube in the HR,CFA-14/28 and the SA406 flash tube in the SA,CF-14/28 are simple to replace by removing the A409 clamp ring and lifting the lens. The flash tube plugs into the power supply (reference page 19), Parts Breakdown A450 and A470A.

1. These models are interchangeable with rotating beacons on any aircraft having a 3.750 inch diameter fairing or mounting adapter.
2. Install strobe unit in place of the existing beacon, using three (3) 6-32 x 3/8 inch screws (maximum length) supplied in kit.
3. Connect the existing wiring, positive to the white wire and ground to the black wire protruding from the power supply.
4. Check rudder balance with reference to the aircraft's service manual, when installing the strobe light unit on the rudder. The balance, weight and strobe light unit should equal the original rotating beacon and balance weight total.
5. When installing the strobe light unit in an inverted position, and water collects inside the lens of the strobe light head assembly, drill a #40 hole in the bottom of the A402A lens as indicated on label affixed to lens. For model SA,CF-14 or 28 remove the RTV plug from the hole in the SA402 lens.

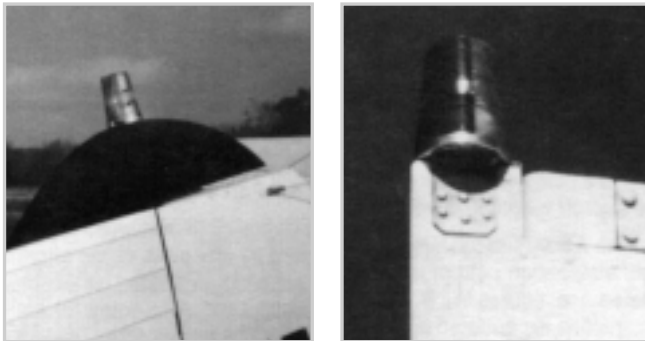
**A450 AND A470A REMOTE STROBE LIGHT HEAD ASSEMBLIES.**

The A450 and A470A strobe lighthouse assemblies, can be mounted on the aircraft fuselage or vertical stabilizer, provided the specifications in AC 43.13-2, Chapter 4, Paragraph 52(a) are complied with.



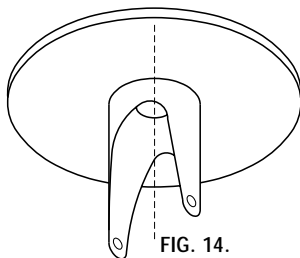
**VERTICAL FIN AND RUDDER MOUNTING OF ANTI-COLLISION STROBE LIGHTS.**

Rudder mounted anti-collision lights should be located top center of the rudder hinge center line, or rudder balance must be established after installation. Refer to AC 43.13-2A, Chapter 4, Paragraph 55(e), "Rudder Installation". The rudder or fin cap is excellent for shadowing the prop and cabin area if the light is mounted far enough back.

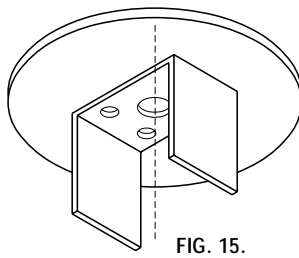


**NOTE:** Mounting an A450 or A470A strobe light head assembly on a vertical fin or rudder, can be accomplished by fabricating a mounting adapter similar to the ones shown in illustrations below.

A similar adapter can be fabricated for the A625, for a lower profile light installation. A section of streamline tubing works very nicely for these adapters.



Round or streamline tubing cut to fit rudder or vertical fin welded to 2 1/2" OD .40" thick disc. (Reference AC 43.13-1B, Chapter 2, Section 2).

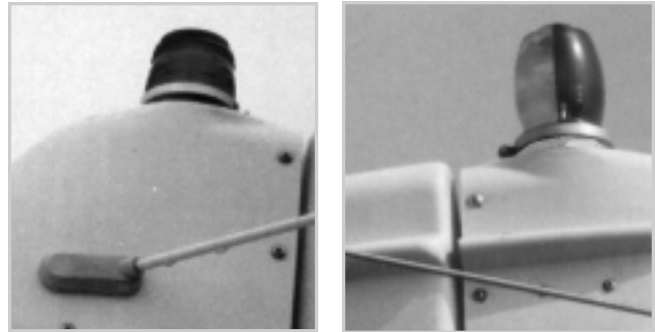


Metal bracket shaped to fit the vertical fin or rudder with 2 1/2" OD .040" thick disc riveted in place. (Reference AC 43.13-1B, Chapter 2).

Fabrication and installation of these mounting brackets are referenced in this approved installation manual, and AC 43.13-1B and 2A.

Documentation of structural integrity of the fabricated installation must be approved by an "IA" or other representative of the FAA. Conformity inspections will be performed with reference to approved techniques, and procedures specified in this manual (see page 3).

**QUARTZ TYPE FLASHER REPLACEMENTS.**



BEFORE WITH QUARTZ LIGHT      AFTER WITH REMOTE STROBE LIGHT

The A450 and A470A remote anti-collision strobe light head assemblies are direct replacement for the quartz-type flasher, using the original or the H102 "B" mounting adapter.

The H102 "B" mounting adapter is mounted in the aircraft's structure, with four (4) MS 20470 AD4 rivets, or four (4) 6-32 screws and self-locking nuts. Drill out the center hole in the skin to allow access to the strobe head connector.

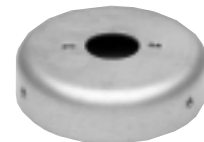
**MODEL 70509**

Halogen Flashing Anti-Collision Light  
Totally self-contained, flashing anti-collision light assembly with FAA TSO-C96a approval.

**NOTE:** Model 70509 is not recommended for use on helicopters.



70509-( )



70509 Mounting Adapter  
P/N 11-350519-001  
Outside Dia. - 3.678" / fits 3.75" Hole



Model 70509 installation.

## INSTALLATION OF THE REMOTE STROBE LIGHT POWER SUPPLIES STC SA800EA / STC SA615EA

**IMPORTANT NOTE...** THE STROBE LIGHT POWER SUPPLY SHOULD NOT BE MOUNTED CLOSER THAN 3 FEET OF THE ADF LOOP.

The Remote Strobe Light Power Supply will be installed using for reference AC 43.13-2A, Chapter 4 for installation procedure, using four (4) MS, AN or NAS 8/32 screws and self-locking nuts.

### LOCATION.

1. Consider areas or locations designated by the aircraft manufacturer, to install the strobe light power supplies, or other optional equipment not already in use.
2. For alternate locations consider areas or locations such as the cabin baggage compartments, on the floor under the seat, non-structural bulk-heads, fire walls, hat racks, etc.
3. If necessary, fabricate support brackets or shelves, and attach them to the aircraft structure to provide a mounting that will withstand the inertia forces stipulated in Chapters 1 and 3 of AC 43.13-2A.
4. Documentation of structural integrity of the fabricated installation must be approved by an "IA" or other representative of the Federal Aviation Agency. Conformity inspections will be performed with reference to approved techniques and procedures specified in this manual (see page 3 and 4).
5. When installing the remote strobe light power supply in an inverted position, drill a 3/16 inch diameter hole in the lowest corner of the cover to provide for a water drain. Care must be taken not to let the drill protrude into the power supply, for it may inflict damage to the electronic components.
6. Specifically call out the location of the strobe light power supply and the strobe light heads on the FAA Form 337 for the anti-collision light installation.

### WIRING INSTRUCTIONS.

**WARNING: WHELEN STROBE LIGHT POWER SUPPLIES ARE POLARITY SENSITIVE. REVERSING THE INPUT POLARITY WILL CAUSE SEVERE DAMAGE TO THE POWER SUPPLY.**

Steps below: "Ref. AC 43.13-1B, Chapter 11, Sections 1, 2, 3 & 7".

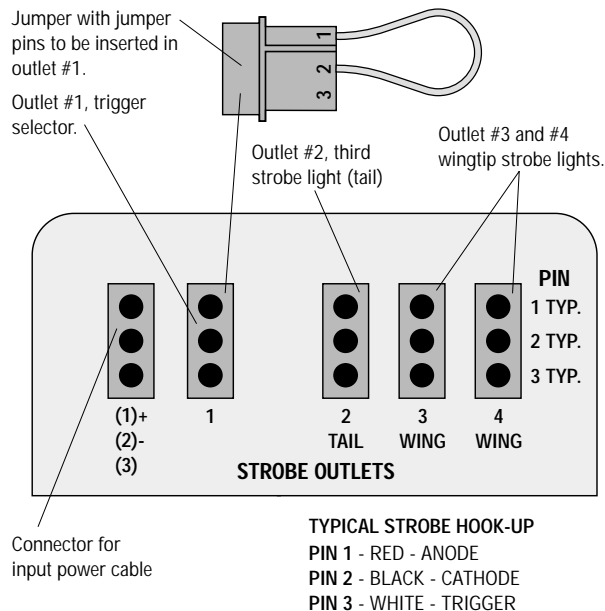
1. Choosing wire size of input A+ lead, refer to Paragraph 444 "Electric Wire Chart" Figure 11.7 and 11.7A, with reference to Strobe Light Model Current requirement chart on page 6 and 11 of this manual, and "Wire and Circuit Protection Chart" Figure 11.1 of AC 43.13-1B.
2. Shielded wire is not generally necessary, but has proven helpful when radio interference has been encountered.

**NOTE:** One will not experience any radio interference caused by the Whelen Strobe Light Systems, when the radios and strobe light systems are properly installed.

3. For penetrating pressure hull refer to aircraft service manual.

THE WHELEN MODEL HDA,CF (A413A, HDA,CF-14/28) POWER SUPPLY is a 3 outlet, power source, flashing two remote strobe light heads simultaneously, and a third remote strobe light head flashing alternately.

FIG. 16.

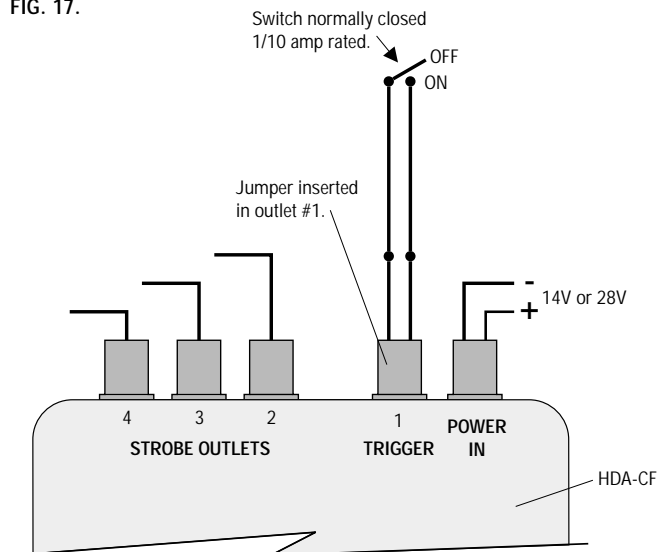


### T3 FUNCTION

Outlet #1 is a trigger selector. Jumping pins #1 and #2 on the jumper plug produces an alternating flashing between outlet #2 and outlets #3 and #4, at 50 CometFlashes, +/-5, per minute. A switch in place of the jumper will permit turning off the wingtip strobe lights, while the tail light will remain ON. See Diagram in Figure 17 below.

By using outlets #2 and #3, or #2 and #4, the unit produces a combined total of 44 Joules alternating at 90 CometFlashes per minute. The A413A,HDA-CF-14/28 replaces the A413A,HDA-DF-14/28. HD, HD,T2 and HD,T3 power supplies which have been discontinued.

FIG. 17.



### T3 OPTION DIAGRAM

### WHELEN MODEL HTS,CF POWER SUPPLY

THE WHELEN MODEL HTS,CF (A490A,TS,CF-14/28) POWER SUPPLY replaces the old HS (A412A, HS,DF-14 or -28) and HTS-DF (A490ATS-DF). The HTS,CF is a 16-6-6-6 joules strobe light power source, which can be used as an independent power source for any of the Whelen strobe light head assemblies. This power supply is approved for use with an Aviation Red or White anti-collision strobe light head assembly

The HTS,CF mechanically fits the same foot print as the old A412A,HS,DF, A490ATS-DF and A490,T,DF-14/28 power supplies.

The HTS,CF can be synchronized by running an 18 gauge or larger wire between pin's 3 on each power supply. (See Picture)

The A490A,TS,CF-14/28 power supply has two connectors.

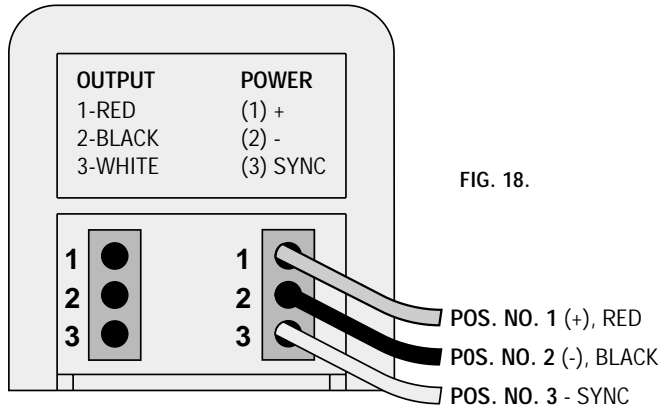


FIG. 18.

Looking at the power supply connectors with the mounting plate flat on a bench, the left connector is the strobe outlet. The right connector is the power input and synchronization.

**Left Connector.** Is the strobe light power supply power output.

**Pin 1.** Top. Red wire, anode 450 volts DC nominally

**Pin 2.** Center. Black wire, strobe light ground.

**Pin 3.** Bottom. White wire, trigger. 200 volts DC nominally

**Right Connector.** Is the strobe light power supply power input

**Pin 1.** Top. Red Wire 13 to 30 volt, positive input.

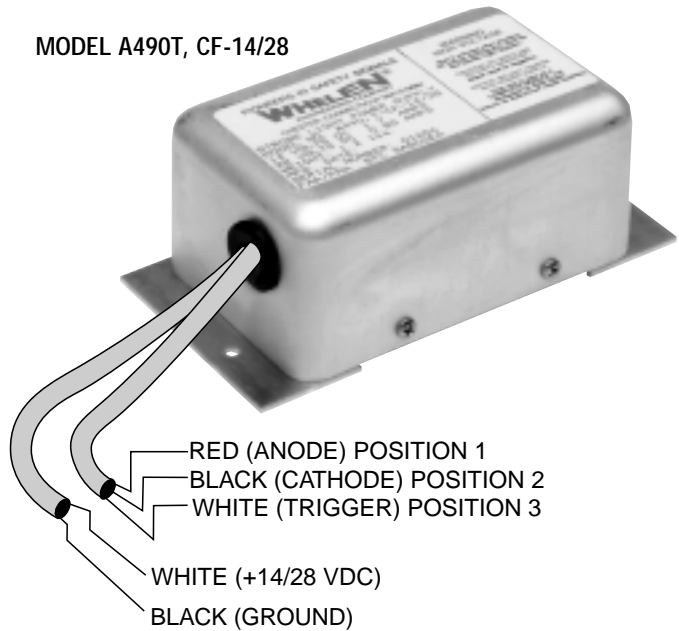
**Pin 2.** Center. Black wire ground.

**Pin 3.** Bottom. Synchronization pin. If synchronization is desired connect an 18 gauge wire between pin's 3 on each power supply.

### WHELEN MODEL HT,CF (A490,T,CF-14/28) POWER SUPPLY

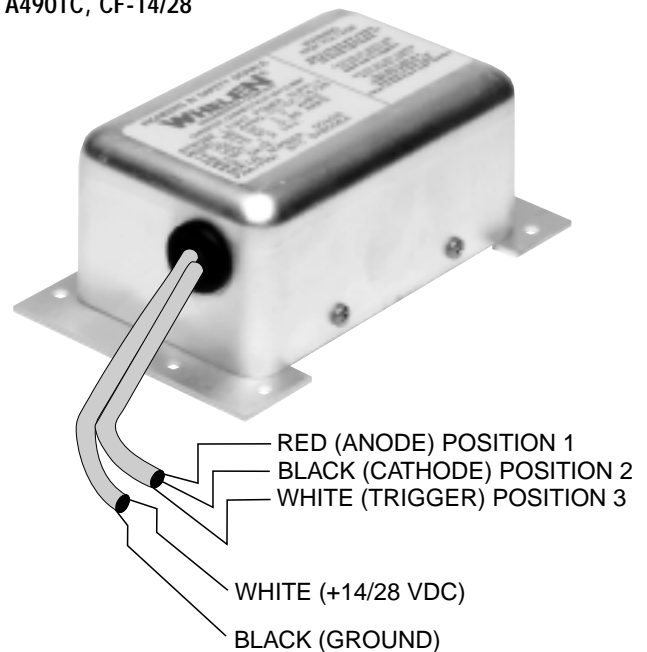
THE WHELEN MODEL HT,CF (A490,T,CF-14/28) POWER SUPPLY is a single 10-3-3-3 joules remote strobe light power source for any Whelen strobe light head assemblies. Its size and weight make it adaptable for wingtip installation. This power supply is approved for Aviation White only.

#### MODEL A490T, CF-14/28



See Page 15, Figure 19 for connector assembly.

#### MODEL A490TC, CF-14/28



## INTERCONNECTING CABLE.

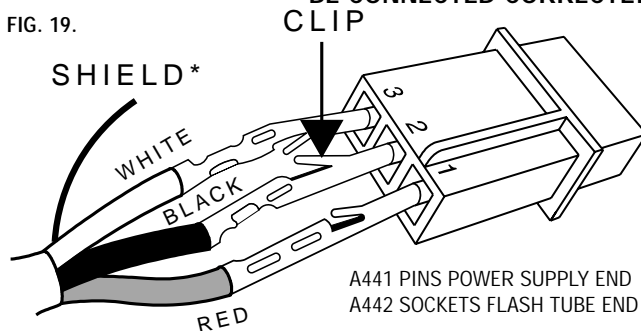
1. The interconnecting cable is supplied with one end unfinished so that cable can be installed through small openings, and cut to length before finishing off the power supply end.
2. The grey vinyl outer jacket on the cable supplied with a Whelen Strobe Light, is an excellent chafe-resistant material, and additional chafe protection is seldom necessary. The use of RTV to secure the interconnecting cable in inaccessible locations is acceptable.
3. High voltage leads shall not parallel ADF leads closer than 6 inches, and shall not parallel gyro or flux gate compass leads closer than 3 inches.
4. Reference should be made to AC 43.13-1B, Chapter 11, Sections 3 and 7, when routing and fishing the interconnecting cable.
5. Leave a service loop at the strobe light head end, to allow access to the connector for flash tube replacement without having to disassemble the aircraft.

**COLOR CODE ON PIN 1 RED - Anode+ 425 VDC Nominally**  
**INTERCONNECTING CABLE: PIN 2 BLACK - Flash tube ground**  
**PIN 3 WHITE - Trigger 200VDC**

\*Ground shield to aircraft. Ground at the power supply only.

### CAUTION: CABLES CONNECTING REMOTE POWER SUPPLY TYPE STROBE LIGHTS MUST BE CONNECTED CORRECTLY.

FIG. 19.



## OBSERVE COLOR AND PIN NUMBERS

The retaining clip on the side of each pin or socket of the A441 and A442 connector assemblies must be bent out (Reference illustration shown above) so that they positively snap into the AMP 3 position socket nylon connector housing.

If it is not possible to get a good grip, it is recommended that the pins and sockets be soldered to prevent burning of the wires.

**CAUTION:** When pins 1 and 2, or pins 2 and 3 are reversed, the system will appear to operate normally, but this condition will cause early flash tube failure, and will void the flash tube warranty.

## COMPLETING THE ANTI-COLLISION LIGHT INSTALLATION.

1. Check all avionics systems for interference from this installation, reference AC 43.13-2A, Chapter 4, Paragraph 52(b).
2. A flight check will be performed by a properly certificated pilot with reference to AC 43.13-2A, Paragraph 52(a) and (b).
3. If a solid angle blockage document must be established, it should be performed after all masking has been installed and all flight testing is completed. See page 3 of this manual.
4. **WATERPROOFING OF STROBE LIGHT INSTALLATIONS:** When necessary to waterproof the installation of a strobe light mounting to the aircraft, apply GE (silicone rubber) RTV 102 (or equivalent) around the open area where water could get in.
5. Label all switches and breakers, install Pilot Warning Placard.
6. Up-date aircraft records and complete form 337.

## TROUBLE-SHOOTING PROCEDURES FOR AVIATION ANTI-COLLISION STROBE LIGHT SYSTEMS

WHEN REPAIRING WHELEN ANTI-COLLISION STROBE LIGHT SYSTEMS, USE ONLY WHELEN FAA APPROVED HARDWARE. BE CAREFUL OF STROBE LIGHT PARTS THAT ARE SIMILAR IN APPEARANCE!

The Whelen Aviation Strobe Light is a condenser discharge strobe light system. A condenser is charged to approximately 450 volts DC, then discharged across a xenon flash tube at controlled intervals. The condenser is parallel across the xenon flash tube that is designed to hold off the 450 volts DC applied, until the flash tube is triggered by an external pulse. This pulse is generated by a solid state timing circuit in the power supply.

When trouble-shooting a strobe light system first determine if the trouble is with the flash tube or the power supply. This can be accomplished by replacing the flash tube assembly with a good operating flash tube, or with the use of a Whelen Strobe Check unit.

Whelen's power supplies are protected against a short or open circuit on the output. In either case the power supplies will effectively turn themselves off when subjected to a shorted output of a xenon flash tube that refuses to flash.

**WARNING:** Strobe light power supplies are meant to be used, not to remain in an inactive state. Use them at all times, this will improve their proper functioning. Any strobe light power supply that has been out of service for a long period of time is subject to failure because the electrolytic condenser loses the polarity formation. A strobe light power supply not having been used for one year or longer is vulnerable to failure.

If this is the case, it is recommended to start operating the system on a voltage that is reduced by 25 percent for 10 to 15 minutes before putting the power supply into normal service. This will prevent overheating of the condenser while they reform. If the power supply, after a long period of non use, is operated at full voltage immediately, there is an excellent possibility that the condenser will become overheated.

### POWER SUPPLY TEST PROCEDURES:

THE POWER SUPPLY IS A **HIGH VOLTAGE** DEVICE. LET THE POWER SUPPLY BLEED DOWN FOR 10 MINUTES AFTER TURNING OFF POWER BEFORE HANDLING.

**WARNING:** Reverse polarity of the input power, for just an instant, will permanently damage the power supply. This damage is sometimes not immediately apparent, but will cause failure later on.

External trigger switching is not provided on the A413A, HDA-DF Strobe Light Power Supply (Reference A413, T3-DF old style strobe light power supply, outlet #1). Do not short out high voltage for extended length of time; it will cause overheating of the output diodes and cause possible failure.

A normal operating power supply emits an audible tone. If there is no sound emitted, investigate.

1. Determine that there is a proper input voltage at the power supply. If this test is positive go to step 2.
2. Clear all possible shorts at the power supply, by disconnecting the output cables from the power supply outlets, and connect an operating strobe light head assembly or a Strobe Check unit directly to the power supply outlet, then apply the required voltage to the power supply input. If this application proves positive the power supply is in working condition, and the problem may be with the interconnecting cables.

---

### CABLE CONTINUITY CHECK PROCEDURES.

If pins 1 and 3 are reversed, or if there is a short between pins 1 and 2 of the interconnecting cable, the power supply will be rendered non-operable until the short is cleared. A short of this type will not cause any permanent damage to the power supply. However a discharge of the condenser across pin 1 and pin 3 will destroy the trigger circuit in the power supply.

1. Check for continuity between the connectors of each interconnecting cable:
  - Pin 1 to pin 1 (red wire = anode +).
  - Pin 2 to pin 2 (black wire = flash tube ground -).
  - Pin 3 to pin 3 (white wire = trigger).
2. Check for shorts between pins 1 and 2, pins 1 and 3, and pins 2 and 3 of the interconnecting cable.

**NOTE:** When pins 1 and 2, or pins 2 and 3 are reversed, the system will appear to operate normally, but these conditions will cause early flash tube failure, and void the flash tube warranty.

---

### XENON FLASH TUBE PROCEDURES.

1. A xenon flash tube can be very photosensitive. One will flash normally when exposed to an external light source, but may become hard to fire when subjected to darkness.
2. They will become hard firing with age, or when exposed to a very high temperature. A hard firing tube will sometimes operate with the engine running, but will fail when operated on a low battery.
3. They can develop a leak through eggshelling of the glass, or a leak can develop around the seal of the wire to the glass. This is caused by hot and cold cycling of normal operating of the system.
4. They can go into self-ionization (continuously glow a light blue), thus rendering the entire system non-operational until flash tube is replaced. This most likely occurs when the input voltage is highest. This can be checked by turning the system off. When turning the system back on, it generally will operate normally for a few flashes before going back into self-ionization.

ANY OF THE ABOVE MENTIONED CONDITIONS ARE REASONS FOR REPLACEMENT OF THE XENON FLASH TUBE.

**NOTE:** Installing one new flash tube in any multi-head strobe light system, will sometimes cause the remaining old flash tube to misfire or skip. This signifies that the old flash tube is nearing the end of its service life. However, to check the questionable flash tube, install it in a system and apply a reduced voltage, approximately 20 percent, to the input to the power supply. If the flash tube will operate at this reduced level, it still has a great deal of service life in it.

WHELEN'S (CometFlash® "CF" Strobe Light System) consists of four high energy pulses per burst of light, 45 bursts of light per light.

**NOTE:** Whelen Engineering does not recommend attempting to repair their strobe light power supplies in the field. It is recommended to take advantage of our 24-hour Repair Service.

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### R.F.I. AND E.M.I. PROBLEMS (Radio Noise).

Whelen Engineering strobe light power supplies are designed with a low pass filter built in to keep R.F.I. and E.M.I. down to a minimum, however, sometimes there will be interference in the radios by the strobe light system. Most always, this is an installation problem, not a strobe light power supply problem.

The power supply should acquire its power from a low impedance source, such as the alternator or generator end of the electrical buss. Historically, the rotating beacon or strobe light circuit breaker is added on the electrical buss at the opposite end, with the radio in between the strobe breaker and the low impedance end of the electrical buss. Any noise generated by the power supply will be transmitted into the radio through the A+ input lead to the radio. Most of the new radio equipment manufactured today has inadequate input filtering, and any noise on the electrical buss is amplified in the radio and produced through the speaker and/or head phones loud and clear.

Two things can be done to alleviate the problem...

1. Connect the strobe light circuit breaker to the low impedance end of the electrical buss, using a 16 gauge jumper, as close to the battery as possible.
2. Install additional filtering in the radio A+ line, or provide an isolated A+ source for the radios by installing a filter choke in series with the radio input power lead and a filter adapter to ground and reference all radios to their filter. This will also improve the radio system from other line noises.

Frequently, the noise is not on the A+ lead but is conducted through the ground circuit. Alternator, electrical motor, fuel pumps and strobe light power supplies draw heavy current through the ground circuit of the aircraft's frame. Any voltage drop in the ground circuit between the battery ground and the radio ground can look like a signal to the radios. When the speaker, head phone and microphone use the aircraft's ground for return to the radios, one will always experience some interference. The amount of interference depends upon how much potential difference there is between the two ground points. By isolating the audio grounds from the airplane ground at the speaker, head phone and microphone junctions, and grounding the aforementioned with the radio at one central ground point, will eliminate the majority of all ground inducted radio noise.

Do not parallel any audio leads with any power lead supplying energy to a noise generator; (i.e.) alternator, electric motor or DC choppers such as inverters and strobe light power supplies.

The interconnecting cable between the power supply and the remote strobe light head assembly radiate very little, for the output circuit of the power supply is very low impedance. They can radiate RF like an antenna if the shield is not terminated to ground. The radiation of RF energy is reduced to a minimum by properly terminating the shield at one end or the other, generally the power supply end, but which ever proves the quietest ground. Do not terminate both ends.

When installing a strobe light system, provide a good ground and a low impedance source to the strobe light power supply. Eliminate ground loops in audio circuits by using a centrally located ground point for all audio grounds.

Whelen Engineering has available RF shielded flash tubes and strobe light head assemblies to suppress the trigger pulse or clicking sometimes heard in the radios.

If noise problems persist, and the procedures described have not cleared them up, please contact the Whelen Engineering Company for assistance.

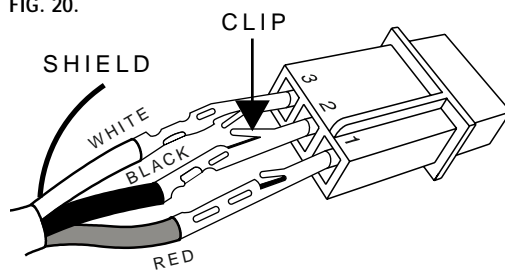


# INTERMIXING ANTI-COLLISION STROBE LIGHT SYSTEM EQUIPMENT

**OBSERVE COLOR AND PIN NUMBERS. CABLES CONNECTING REMOTE POWER SUPPLY TYPE STROBE LIGHTS MUST BE CONNECTED CORRECTLY!**

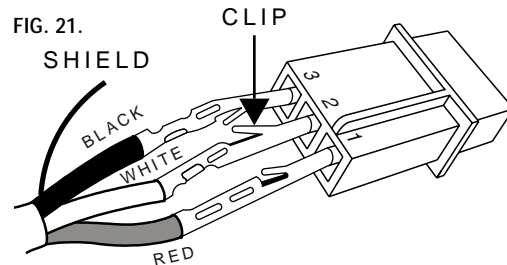
Whelen Engineering and Aero-flash wiring between light assemblies and remote power supplies are identical as pictured below.

FIG. 20.



Grimes and SDI (Hoskins) wiring between light assemblies and remote power supplies are identical as pictured below.

FIG. 21.



Both Grimes and SDI sometimes use MS (Cannon Type) connectors:

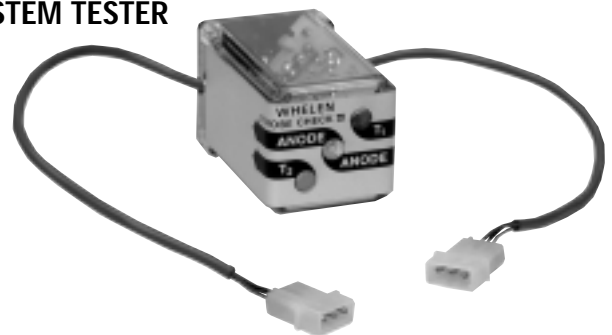
**A = RED (Anode), B = White (Trigger), C = Black (Ground)**

**CAUTION:** WIRING SEQUENCE VARIES BETWEEN COMPARABLE EQUIPMENT MADE BY DIFFERENT COMPANIES. WHEN INTERMIXING ANTI-COLLISION STROBE LIGHT SYSTEM EQUIPMENT, MAKE SURE TO CHECK WIRE COLOR AND TO CONNECT RED TO RED, WHITE TO WHITE, BLACK TO BLACK.

## CAUTION

**THE WHELEN STROBE LIGHT POWER SUPPLY IS A HIGH VOLTAGE DEVICE. DO NOT REMOVE OR TOUCH TUBE ASSEMBLY WHILE IN OPERATION. WAIT 5 MINUTES AFTER TURNING OFF POWER BEFORE STARTING WORK.**

## WHELEN STROBE SYSTEM TESTER



A strobe system tester designed to determine the reason the strobe light system is not working properly. This kit contains an instruction sheet and a trouble shooting procedure sheet. Test power supplies and interconnecting cables. It also comes with an adapter for testing Grimes and Hoskins strobe light systems.

# PARTS BREAKDOWN - AIRCRAFT STROBE BEACONS

* PARTS OUT OF PRODUCTION (AVAILABLE ON SPECIAL REQUEST).	A457B-D-H	Radio Shielded Tail Light Lens Assembly for Horizontal Mounting.	
** PARTS REPLACED BY NEW PRODUCTION COMPONENTS.	* A469A	Xenon Strobe Flash Tube Assembly.	
# H102 OR H103 MOUNTING ADAPTER IS REQUIRED.	A469B	Xenon Strobe Flash Tube Assembly.	
A402A	Red Optic Lens.	A469D	Radio Shielded Xenon Strobe Flash Tube Assembly.
A402A	White Optic Lens.	A469-D-K	Radio Shielded Kit for A469A.
A402A	Split Red/White Lens.	# A470A-R or W	Strobe Light Head Assembly, Red or White Lens.
* A406	Strobe Xenon Flash tube Assembly, replaced by A469.	# 470A-R/W	Strobe Light Head Assembly with Split Red/White Lens.
01-0450685-00	Clamp Ring Assembly.	** A490,T,DF-14/28	HT Strobe Power Supply. Replaced by A490,T,CF-14/28
** A413A,HDA,DF-14/28 HDA,DF	Strobe Light Power Supply. Replaced by A413A,HDACF	** A490,TC,DF-14/28	HT-C Strobe Power Supply. Replaced by A490TC,CF-14/28
A413A,HDA,CF-14/28	HDA,CF Strobe Light Power Supply	** A490A,TS,DF	HTS Strobe Power Supply. Replaced by A490A,TS,CF
A417-1	Interconnecting cable.	A490A,TS,CF	HTS-CF Strobe Power Supply.
A424	Tail Strobe Light Mounting Cup.	A500A	Tail Position and Strobe Light Head, Specify voltage, vertical or horizontal mounting.
A425	Tail Strobe Light Lens Retainer.	A504	Disc Lamp Socket for A555A.
A425A-V	Tail Strobe Light Lens Retainer Mask for A500A, Vertical mounting.	A506	Strobe Xenon Flash Tube and Socket Assembly for A500A.
A425A-H	Tail Strobe Light Lens Retainer Mask for A500A, Horizontal Mounting.	A507	Lamp Socket Assembly for A555A.
* A426	Wingtip Strobe Light Lens Retainer.	A508-14 or 28	Halogen Lamp for A500A, A555A, A600.
* A427	Wingtip Strobe Xenon Flash Tube.	A555A V or H	Tail Position Light Head Assembly,Specify voltage, vertical or horizontal mounting.
A427-4	Rubber Pad Spacer.	A600-PG or -PR	Wingtip Strobe Light Head with forward and Tail Position Light. Specify voltage.
* A428	Wingtip Strobe Light Lens.	A605	Base Plate Assembly.
* A428-C	Wingtip Strobe Light Radio Shielded Lens.	A606	Retainer.
* A428-D	Wingtip Strobe Light Radio Shielded Lens, plus A426 Retainer Assembly.	A610	Strobe Xenon Flash tube Assembly.
** A429	Wingtip Strobe Light Head Assembly, replaced by A650.	A612	Lens for A625.
** A429-PG or -PR	Wingtip Position and Strobe Light Head, replaced by A650-PG and -PR.	A612-D	Lens Retainer Assembly (Radio Shielded).
A430	Tail Strobe Light Head Assembly.	A615	Lens for A600 Tail Light.
A435	Tail Strobe Xenon Flash Tube Assembly.	A616	Gasket for A600 Tail Light.
A436	Tail Strobe Light Gasket.	A626	Retainer Lens.
A438	Lens Masking Strip.	A626-D	Lens Retainer Assembly (Radio Shielded).
A440	WRM-65 Mounting Flange, 3-3/4 inches diameter for HR,SA.	A650	Wingtip Strobe Light Head Assembly.
A441	AMP 3 Position Pin Connector with 3 Pins.	A650-PG or -PR	Wingtip Position and Strobe Light Head. Specify voltage of position light.
A442	AMP 3 Position Socket Connector with 3 Sockets.	H102	"B" Mounting Adapter.
M441	Molex 3 Position Pin Connector with 3 Pins for Piper Installation.	H103	"A" Mounting Adapter, 3-3/4 inch diameter.
M442	Molex 3 Position Socket Connector with 3 Sockets for Piper Installation.	** HR,DF 200-14/28	HR or SA Strobe Power Supply. Replaced by HR,CF 200-14/28
A443	AMP Connector T3 Jumper Plug.	HR,CF 200-14/28	HR or SA Strobe Power Supply.
A444	AMP 2 Position Pin Connector with 2 Pins.	SA402	Lens Assembly for SA and A450.
M444	Molex 2 Position Pin Connector with 2 Pins for Piper Installation.	SA406	Strobe Xenon Flash Tube Assembly for SA and A450.
A446	AMP 2 Position Socket Connector Housing with 2 Sockets.	SA418-2	Gasket 1/32 inch for SA and A450.
# A450	Strobe Light Head Assembly.	W1282	Forward Position Light Lens Retainer.
A455	Gasket.	W1283	Forward Position Light Gasket.
** A456	A460 Tail Position Light Socket and strobe light Assembly, replaced by A506.	W1284-R or G	Forward Position Light Lens, Red or Green.
A457A	Tail Light Lens for A500A and A555A.	W1285-PR or -PG	Forward Position Light Assembly, Red or Green. Specify voltage.
A457A-D	Radio Shielded Tail Light Lens Assembly for A500A.	W1285-2	Forward Position Light Base.
A457B-D-V	Radio Shielded Tail Light Lens Assembly for Vertical Mounting.	W1290-14 or 28	Forward Position Lamp. Specify voltage.

**PARTS NOT ILLUSTRATED ARE OUT OF PRODUCTION  
(CONTACT WHELEN ENGINEERING CO., INC).**

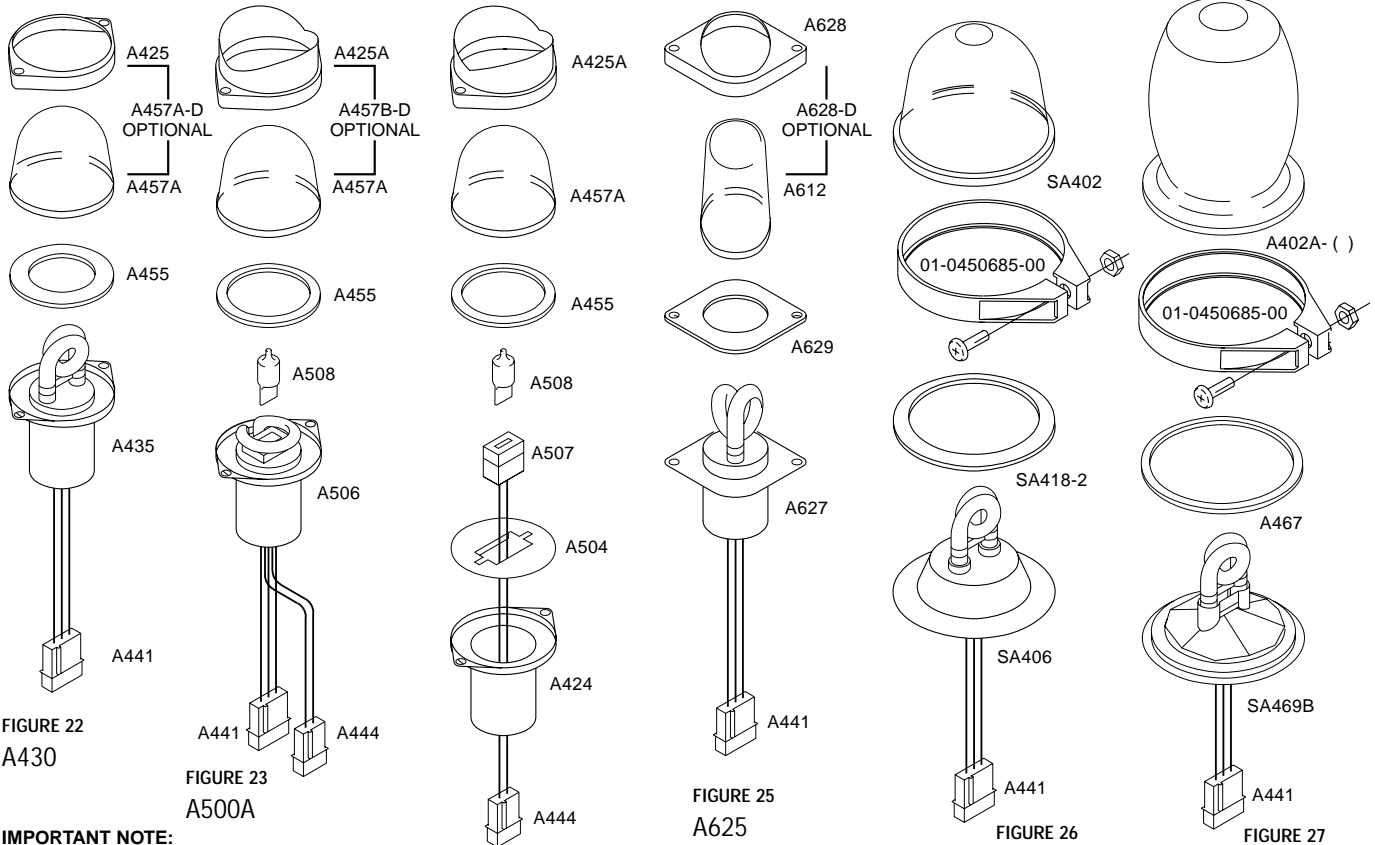


FIGURE 22  
A430

FIGURE 23  
A500A

FIGURE 24  
A555A

FIGURE 25  
A625

FIGURE 26  
A450

FIGURE 27  
A470A

**IMPORTANT NOTE:**  
When ordering models A500A and A555A, or lens assembly part number A457B-D, make sure to **SPECIFY HORIZONTAL OR VERTICAL.**  
**REF.** Page 10 of this manual.

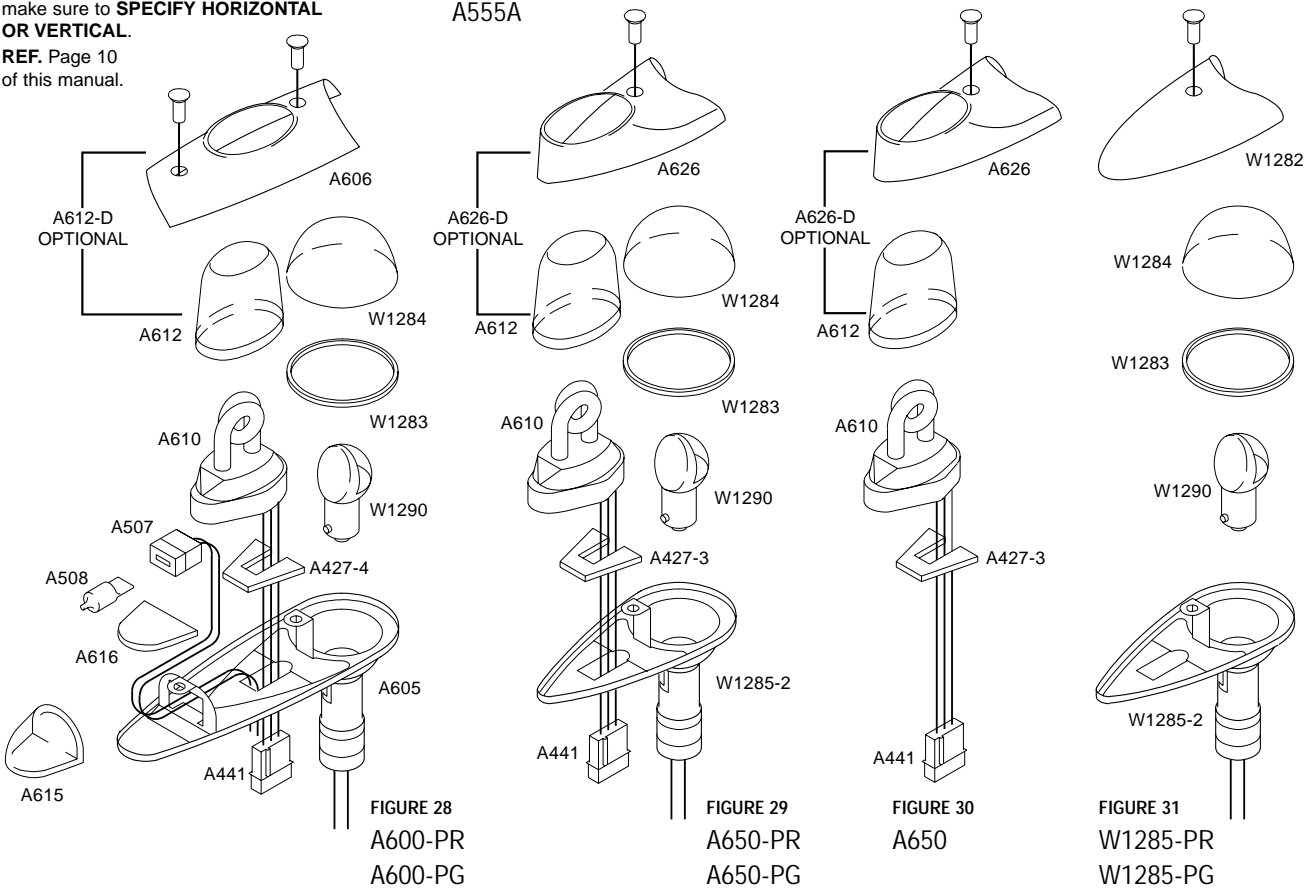


FIGURE 28  
A600-PR  
A600-PG

FIGURE 29  
A650-PR  
A650-PG

FIGURE 30  
A650

FIGURE 31  
W1285-PR  
W1285-PG

United States Of America  
Department of Transportation - Federal Aviation Administration  
**Supplemental Type Certificate**

*Number* SA615EA

*This Certificate issued to* Whelen Engineering Company, Inc.  
Route 145, Winthrop Road  
Chester, Connecticut 06412-0684

*certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 3, 6, 23, 27 of the Civil Air/Federal Aviation Regulations.*

*Original Product Type Certificate Number :* See Attached Eligibility List dated June 18, 1999

*Make :*

*Model :*

*Description of Type Design Change:*

Installation of Whelen Anti-Collision Strobe Light System, Models HD, HR, HR-CF-A, or HS (-14(14V) or -28(28(V)), as replacement for originally installed anti-collision lights, when installed in accordance with Whelen Installation and Service Manual dated January 1, 1985, or later FAA-approved revisions.

*Limitations and Conditions:*

1. These lights comply with the anti-collision light standards of the FARs as follows:
  - a. With the red or combined red/white lens; those effective on or prior to August 10, 1971.
  - b. With the white lens; those effective on August 11, 1971.

(See continuation sheet 2 of 6 )

The STC holder will provide each person it permits to use this certificate to alter the product written evidence of the agreement in a form acceptable to the Administrator.

*This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked or a termination date is otherwise established by the Administrator of the*

*Date of application :* February 19, 1968

*Date reissued :*

*Date of issuance :* May 14, 1968

*Date amended :* June 18, 1999

*Federal Aviation Administration.*

See page 2 for amendment history.



*By direction of the Administrator*

*Ronald L. Vavruska*  
(Signature)

Ronald L. Vavruska  
Manager  
Boston Aircraft Certification Office

(Title)

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.

FAA Form 8110-2(10-68) Page 1 of 6

This certificate may be transferred in accordance with FAR 21.47.

CONTINUED PAGE 2.

Limitations and Conditions (Cont'd):

2. Install the following placard Whelen Part No. A421, or other FAA approved equivalent:

"WARNING TO AVOID OPTICAL ILLUSION AND SEVERE VERTIGO, TURN ANTI-COLLISION LIGHTS OFF UPON ENTERING CLOUDS, FOG OR HAZE."

3. Minimum required operating voltage is 13.2 volts for 14 volt systems.  
Minimum required operating voltage is 26.4 volts for 28 volt systems.
4. The aircraft listed on the eligibility list are those which have had both the physical installation of the lights substantiated and the field of coverage checked including the 20" mask. Aircraft not included in the list can use these lights when the physical installation and field of coverage is substantiated as indicated in; Whelen's Installation and Service Manual for Whelen Aviation Anti-Collision Strobe Light Systems dated November 7, 1972, in the portion entitled "Aircraft Not Specifically Mentioned on the Eligibility List".
5. HD or HD, power ;supplies may be used in; place of an HS or HD power supply respectively in order to also provide power for other Whelen strobe lights installed in accordance with STC SA800EA. The preceding is a statement of compatibility of power supplies only. Refer to STC SA800EA for installation of the other Whelen Strobe Lights acceptable in combination with this STC.

6. The approval of this change in type design applies basically to aircraft listed on the attached eligibility list. This approval should not be extended to other aircraft of these models on which other previously approved modifications are incorporated unless it is redetermined by the installer that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse effect upon the airworthiness of the aircraft. This determination should include a night flight check as specified in AC 43.13-2, Chapter 4, Paragraph 42a.

NOTE: Aircraft whose application for type certificate was made before April 1, 1957, may, but need not, comply with the field of coverage requirements of FAR 23 (27).1401(b). Compliance with Far 91.33(c) may not be shown provided the light installation is in accordance with data approved prior to August 11, 1971, and applicable criteria of Advisory Circular 43.13-2 are met.

United States Of America  
Department of Transportation - Federal Aviation Administration  
**Supplemental Type Certificate**

*Number* SA800EA

*This Certificate issued to* Whelen Engineering Company, Inc.  
Route 145, Winthrop Road  
Chester, Connecticut 06412-0684

*certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 3, 6, 23, 27 of the Civil Air/Federal Aviation Regulations.*

*Original Product Type Certificate Number:* See Attached Eligibility List dated September 8, 1999

*Make:*

*Model:*

*Description of Type Design Change:*

Installation of Aviation White Anti-Collision Strobe Lights Whelen Models A429, A430, A434, A450, A470-R/W (Red/White), A470A-R/W (Red/ White), A500, A625, or A650 and associated power supplies or Model SA Strobe Light System in accordance with Whelen Installation and Service Manual dated January 1, 1985, or later FAA-approved revisions.

*Limitations and Conditions:*

1. The Aviation White Anti-Collision Lights listed under Description of Type Design Change meet the requirements of FAR 23 and the similarly numbered sections of FAR 27 as follows:
  - a. 23.1397(c), 23.1401(c), (d), (e), effective August 11, 1971;
  - b. 23.1401(f) in effect on August 10, 1971 (See STC Continuation Sheet)

(See continuation sheet 2 of 8 )

The STC holder will provide each person it permits to use this certificate to alter the product written evidence of the agreement in a form acceptable to the Administrator.

*This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked or a termination date is otherwise established by the Administrator of the*  
*Date of application:* May 2, 1969

*Date reissued:*

*Date of issuance:* November 14, 1969

*Date amended:* September 8, 1999

*Federal Aviation Administration.*

See page 3 for amendment history.



*By direction of the Administrator*

*Ronald L. Vavruska*  
(Signature)

Ronald L. Vavruska  
Manager  
Boston Aircraft Certification Office

(Title)

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.

FAA Form 8110-2(10-68) Page 1 of 8

This certificate may be transferred in accordance with FAR 21.47.

CONTINUED PAGE 2 AND 3.

- c. A408W and 470W with power supplies approved under STC SA615EA meet FAR 23.1401 (f) effective August 11, 1971.
- d. A650 or A625 with power supplies producing a minimum of 20 joules per flash meets FAR 23.1401 (f) effective August 11, 1971.
2. To complete the approval of those lights as anti-collision light systems, the installation on individual aircraft must be checked to show compliance with FAR 23.1401(b) (Field of Coverage); unless the "Installation and Service Manual for Whelen Anti-Collision Strobe Light Systems", dated 28 September 1978 specifically indicates that a particular installation has been checked for compliance with the aforementioned sub-section (Example: Bell 206A with lights installed at the specified locations).

NOTE: The aforementioned installation and Service Manual contains an acceptable method for checking the adequacy of coverage when using two lights (wing-tip) or three lights (wing tips and tail lights). For some other acceptable methods see Advisory Circular AC 43.13-2 Chapter 4 Paragraph 46b(2). Installation made in accordance with STC SA800EA Amendments prior to 9/14/71 need only be checked for obstructed visibility to meet anti-collision light requirements.

3. Install the following placard, Whelen Part No. A421-1, or other FAA approved equivalent, in view of the pilot:

"WARNING TURN OFF STROBE LIGHTS WHEN TAXING IN VICINITY OF OTHER AIRCRAFT OR DURING FLIGHT THROUGH CLOUDS, FOG OR HAZE. STANDARD POSITION LIGHTS TO BE ON FOR ALL NIGHT OPERATIONS."

4. On all helicopter installations, install the following placard in view of the pilot:  
"THE WHITE STROBE LIGHT MUST BE TURNED OFF DURING ALL NIGHT TAKEOFFS AND LANDINGS."
5. The modification approved by this STC can be installed in conjunction with those approved by STC SA615EA or STC SA738EA as delineated in the "Installation and Service Manual for Whelen Anti-collision Strobe Light System's"
6. On Mitsubishi MU-2B, MU-2B-10, -20, -15, -30 aircraft: Whelen's "Mitsubishi MU-2B, -10, -20, -15, -30 Wing Tip and Tail Strobe Light Installation Procedure", dated 19 February 1971, is required in addition to the "Installation and Service Manual for Whelen Anti-Collision Strobe light System".
7. This approval should not be incorporated in any aircraft of these specific models on which other approved modifications are incorporated, unless it is determined that the interrelationship between this change and any of those previously incorporated approved modifications will not introduce any adverse effect upon the airworthiness of the aircraft. This determination should include a night flight check as specified in AC 43.13-2 Chapter 4, Paragraph 42A.

NOTE: Aircraft whose application for type certification was made before April 1, 1957, may, but need not, comply with the field of coverage requirements of FAR 23(27).1401(b). Compliance with FAR 91.33(c) may be shown provided the light installation is in accordance with data approved prior to August 11, 1971, and applicable criteria of Advisory Circular 43.13-2 are met.

**(THIS IS A COMBINED REPRINT OF TWO STC.)**  
**CONTACT WHELEN ENGINEERING COMPANY, INC. FOR THE LATEST ELIGIBILITY LIST.**

**NOTE:** This eligibility list is for reference only. Whelen's PMA hardware can be installed on any aircraft using approved techniques and procedures found in this manual, and appropriate advisory circulars.

United States of America  
 Department of Transportation - Federal Aviation Administration  
**Supplemental Type Certificate**  
 (Continuation Sheet)

*Number* SA615EA SA800EA

Date Amended: June 18, 1999

**ELIGIBILITY LIST**

The following aircraft have been approved for installation of the Whelen H Series (HS, HD, HR, HD, T, HT, AND SA-14 or -28 volt) Aviation Red or Aviation White Anti-Collision Strobe Light Systems,. Aircraft identified by ## are not included on STC SA615EA Eligibility list.

**June 18, 1999**

AIRCRAFT MANUFACTURER	MODEL	TYPE CERTIFICATE
<b>AERO COMMANDER</b>	100, 100-180	1A21
	111	A11SO
	112	A12SO
	500, 500-A, -B, -S, -U, 520, 560, 560A, 560E	6A1
	560F, 680, 680E, -F, 720, 680FL, 680FL(P), 680T, V, W, 681, 690, 685	2A4
<b>AMERICAN AVIATION</b>	AA-1, *AA-1A	A11EA
	AA-5	A16EA
<b>BEECH</b>	23, A23, A23A, A23-19, -24, -19A, B19, M19A, B23, C23, A24, A24R, C24R	A1CE
	35, A35, B35, C35, D35, E35, F35, G35, 35R	A-777
	H35, J35, K35, M35, N35, P35, S35, V35, V35A, V35B, 35-33, 35-A33, 35-B33, 35-C33, 35-C33A, 36, A36, E33, E33A, E33C, F33, F33A, F33C	3A15
	50(L-23A), B50(L-23B), C50, D50(L-23E), D50A, D50B, D50C, D50E, E50(L-23D, RL-23D), F50, G50, H50, J50	5A4
	95-55, 95-A55, 95-B55, (T45A) 95-B55D, 95C55, 95, B95, B95A, D95A, E95, D55, D55A, E55, E55A, 56TC, A56TC, A56TC,58	3A16
	65(L23F), A65, A65-8200, 65-8200, 65-80, 65-A80-8800, 65-B80, 65-88, B90, 65-90, 65-A90, 65-A90-1, (U21A, RU-21A, RU-21D), E90, 65-A90-2, (RU-21B), 65-A90-3 (RU-21C), 70	3A20
	60, A60 A	12CE
99, 99A,100, 200	A14CE	
<b>BELLANCA</b>	14-19-3A, 17-30, 17-30A, 17-31A, 17-31ATC	1A3
	7EC, 7ECA, 7FC, 7GC, 7GCA, 7GCAA, 7GCB, 7GCBA, 7GCBC, 7HC, 7JC, 7KCAB	A-759
<b>BELL</b>	206A, 206B, 206L, 206L-1, 206L-3, 206L-4, 407	H2SW
	47B, B3, D, D1, E, G, G-2, H1	H-1
	47G-2A, -2A-1, -3, -3B, -3B1, -3B-27, -4, -4A, -5, -5A	2H3
	47J, K, J-2, J-2A	2H1
<b>BRITTEN NORMAN</b>	BN-2, -2A, -2A-2, -2A-6, -2A-8	A17EU
	BN-2A, MK.III	A29EU
<b>CESSNA</b>	120, 140	A-768
	##140A	5A2
	150, 150A, B, C, D, E, F, G, H, J, K, L, M, A150K, A150L, A150M, 152, A152	3A19
	##170, 170A, 170B	A-799
	172, 172A, B, C, D, E, F, G, H, I, K, L, M, N, P, P172D, R172K	3A12

AIRCRAFT MANUFACTURER	MODEL	TYPE CERTIFICATE	
<b>CESSNA</b> (continued)	P172D, 172RG, 175, 175A, B, D	3A17	
	177, 177A, B	A13CE	
	177RG	A20CE	
	180, 180A, B, C, D, E, F, G, H, J, K	5A6	
	182, 182A, B, C, D, E, F, G, H, J, K, L, M, N, P, Q, R, T182, R182, TR182	3A13	
	185, 185A, B, C, D, E, A185E, A185F	3A24	
	188, 188A, B, A188, A188A, A188B, A188C	A9CE	
	##190, 195, 195A, B	A-790	
	206, P206, P206A, B, C, D, E, TU206A, B, C, D, E, F, G, TP206A, B, C, D, E, U206, U206A, B, C, D, E, F, G	A4CE	
	207, 207A, T207, T207A	A16CE	
	210, 210A, B, C, D, E, F, G, H, J, K, L, N, T210F, G, H, J, K, L, M, N, 210-5(205, 210-5A(205A), 210-5A, P210N	3A21	
	310, 310A, B, C, D, E, F, G, H, I, J, 310J-1, E310J, 310K, L, N, P, 310Q, T310P, Q, 310R	3A10	
	*320, 320A, B, C, D, E, F, 320-1, 340, 340A	3A25	
	*336	A2CE	
	337, 337A, B, C, D, E, F, T337D, E, F, G	A6CE	
	*401, 401A, B, 402, 402A, B, 411, 411A, 421, 421A, 414, 421B	A7CE	
	<b>DeHAVILLAND OF CANADA</b>	DHC-2 MK.I, MK.II, MK.III	A-806
		DHC-3	A-815
DHC-6, Models 1, 100, 110, 200, 210, 300		A9EA	
<b>FAIRCHILD HILLER</b>	FH-1100	H2WE	
<b>GRUMMAN</b>	##G-164, G-164A, G-164B	1A16	
<b>HELIO</b>	H-250, H-295, H-391, H-391B, H-395, H-395A	1A8	
<b>HUGHES</b>	269A, B, C, 269A-1	4H12	
	369, 369A, H, HM, HS, HE	H3WE	
<b>PIPER</b>	PA-11	A-691	
	PA-12	A-780	
	PA-14	A-797	
	PA-15	A-800	
	PA-16	1A1	
	PA-17	A-805	
	PA-18 Series, PA-19	1A2	
	PA-20	1A4	
	PA-22 Series	1A6	
	PA-25 Series	2A8	
	PA-23, PA-23-160, *PA-23-235, *PA-23-250, *PA-E23-250	1A10	
	PA-24-180, PA-24, -24-250, -24-260, -24-400	1A15	
	PA-28-140, -28-150, -28-151, -28-160, -28-161, -28-180, -28-235, -28S-160, -28R-180, -28S-180, -28-181, -28R-200, -28R-201, -28R-201T, -28RT-201, -28RT-201T, -28-201T, -28-236	2A13	
	PA-30, PA-39, 151, 161	A1EA	
	PA-31P	A8EA	
	PA-31, PA-31-300, 325, 350	A20SO	
PA-32-260, -300, PA-32S-300, R300, R301T	A3SO		
<b>MOONEY</b>	##M20B, C, D, E, F, G, J, K, L, M	2A3	
<b>MITSUBISHI</b>	##MU-2B, MU-2B-10, -15, -20, -30	A2PC	
<b>UNIVAIR (STINSON)</b>	##108, 108-1, -2, -3, -5	A-767	

**NOTES TO ELIGIBILITY LIST:**

\* Aircraft as marked require specific attention to proper balancing of the rudder. Refer to the Manufacturer's Service Manual for balancing instructions.



**WHELEN<sup>®</sup>**  
**ENGINEERING COMPANY, INC.**

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