

Chapter 10 Wing Tips

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10.1 Introduction

The Lancair ES uses upswept wing tips which are angled back at 12°. For your convenience, the tips are one piece and installation is straight forward.

Instructions for installing the wing tip lighting are also included for the Whelen light kit. Other types of wing tip lighting can be used, but it is your decision on the style of aircraft lighting you want.

This chapter also finishes the fuel venting system that was started with the wings.

Steps to Completion

- Pre-fit the wing tip and make sure the L.E. and T.E. have a nice transition. Also pre-fit with the aileron in place.
- Prepare the wing tip for mounting and drill the holes.
- Add a wing tip reinforcement rib.
- Install the wing tip lighting.
- Install the clear lens.
- Complete the wing tip fuel vent.

A Word about Sanding and Cleaning

The instructions in this chapter refer to preparing a surface or preparing a bonding area. When we recommend preparing a surface or a bonding area, we expect each of the following steps to be completed every time.

1. Sand the area using 40-grit sandpaper.
2. Vacuum all sanded areas.
3. Clean all sanded surfaces with Acetone.

10.2 Parts List

Wing tip

Item	Part Number	QTY	Description
4)	2012L	1	Wing tip, left
5)	2012L-M	1	Wing tip mount, left
6)	2012R	1	Wing tip, right
7)	2012R-M	1	Wing tip mount, right
8)	MS24694-S5		Mounting screws
9)	K1000-08		Nutplates
10)	AN426A3-5		Rivets

Light kit

Item	Part Number	QTY	Description
1)	Whelen A650-PG/PR	2	Whelen wing tip light kit
2)	K1000-06	6	Nutplates
3)	AN246A3-5	12	Rivets
4)	MS24693-S28	6	Screws

Fuel vent

Item	Part Number	QTY	Description
1)	516-A	2	Hose for wing tip fuel vent
2)	AN91906D	2	Fitting for 3/8" aluminum tubing
3)	AN815-4D	2	Fitting if using 1/4" aluminum tubing



Revisions

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REV. 2nd Ed./08-15-2006

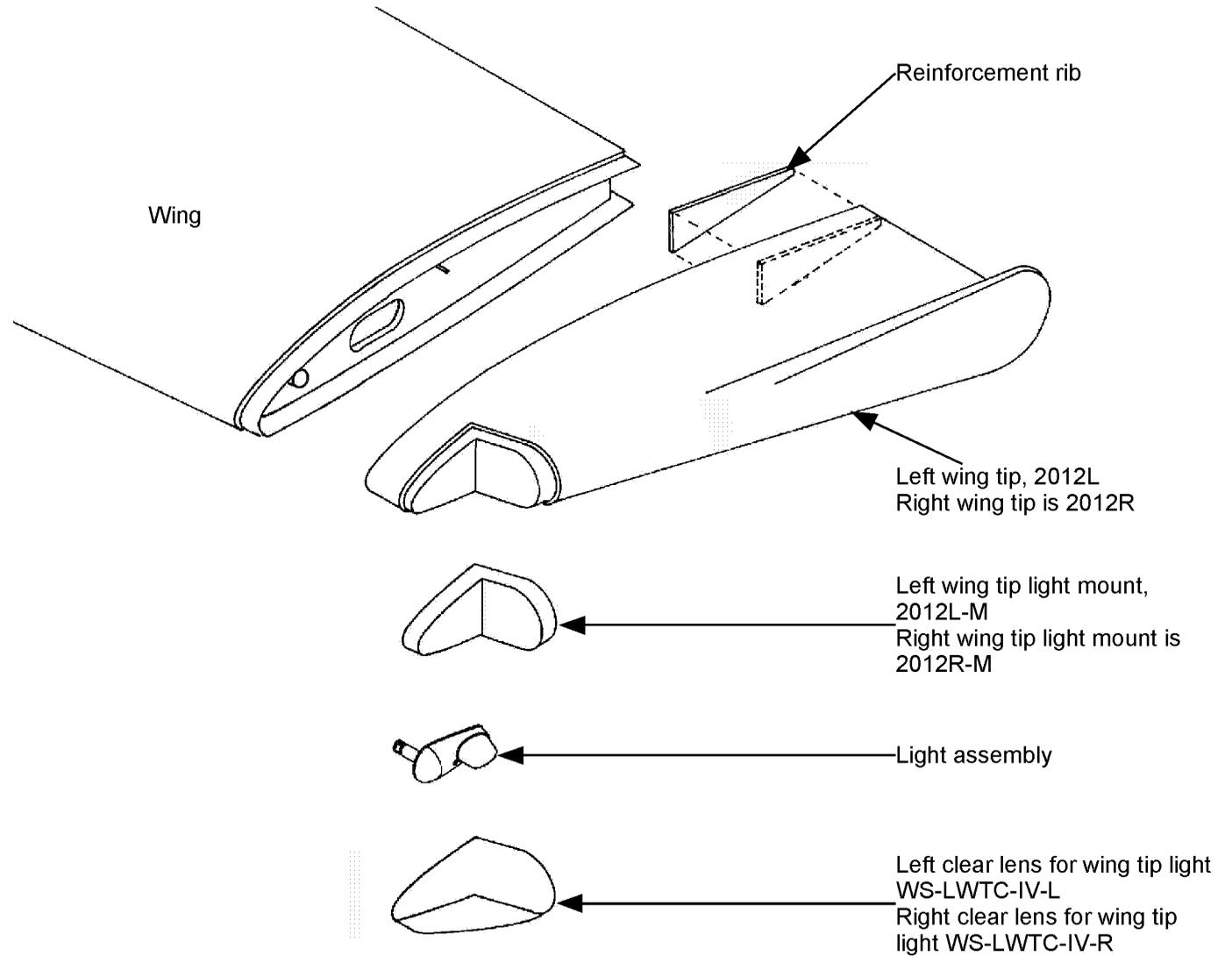
Wing Tips

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10.3 Construction Procedures

Figure 10.3.0.1 shows the pieces necessary for completing the wing tip and the wing tip light. For an overview of the fuel vent see Figure 10.3.C.1.

Figure 10.3.0.1 Wing tip and light exploded view



10.3.A Mounting the Wing Tip

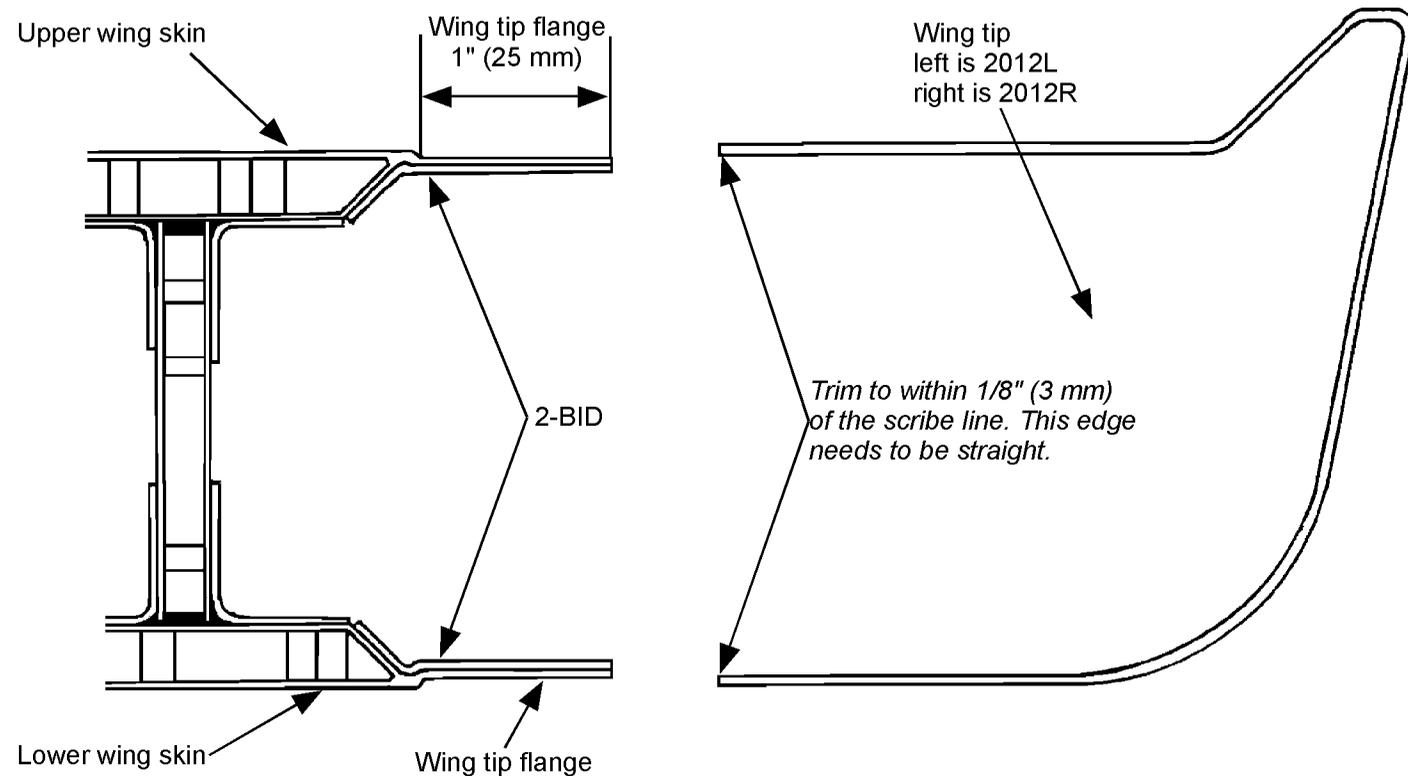
 Pre-fit the wing tip during the trimming and sanding process until you have a smooth T.E. and L.E. transition.

A wing tip mounting flange is molded into each upper and lower wing skin at BL 204. The wing tip is secured to the flange with countersunk screws and nutplates.

Steps...

1. Trim each fiberglass wing tip (2012L and 2012R) to within 1/8" (3 mm) of the scribe line. This will leave some extra trimming material if you have a slight misalignment after the wing tip is pre-fit.
2. Sand the trimmed edges using a long, straight sanding block. The wing tip inboard edge needs to be straight. See Figure 10.3.A.1.
3. Apply a 2-BID to the inside of the wing tip flange on the wing.
4. After the 2-BID has cured, trim the flange to a 1" (25 mm) width. See Figure 10.3.A.1.

Figure 10.3.A.1 Trimming the wing tip



5. Slide the wing tip onto the wing tip flange.
The electrical tubing exiting the outboard end of the wing was left long for ease of installation.
6. Cut the electrical tubing flush with the outboard edge of the joggle.
7. Push the wing tip aft until the L.E. of the tip aligns with the L.E. of the wing. At this point the T.E. of the wing tip should align with the T.E. of the aileron. See Figure 10.3.A.2 and the detail view in Figure 10.3.A.3.

Due to builder variances it is possible that your trailing edges do not align. If you have one of the following T.E. alignment situations, perform the stated action:

- Wing tip T.E. is shorter by 1/8" (3 mm) or less of the aileron T.E. – trim some off the aileron T.E. using a long board sander.
- Wing tip T.E. is more than 1/8" (3 mm) shorter than the aileron T.E. – add to the wing tip T.E.
- Aileron T.E. is short of the wing tip T.E. – add to the aileron T.E.

Figure 10.3.A.2 Aligning the T.E. of the wing tip to the aileron

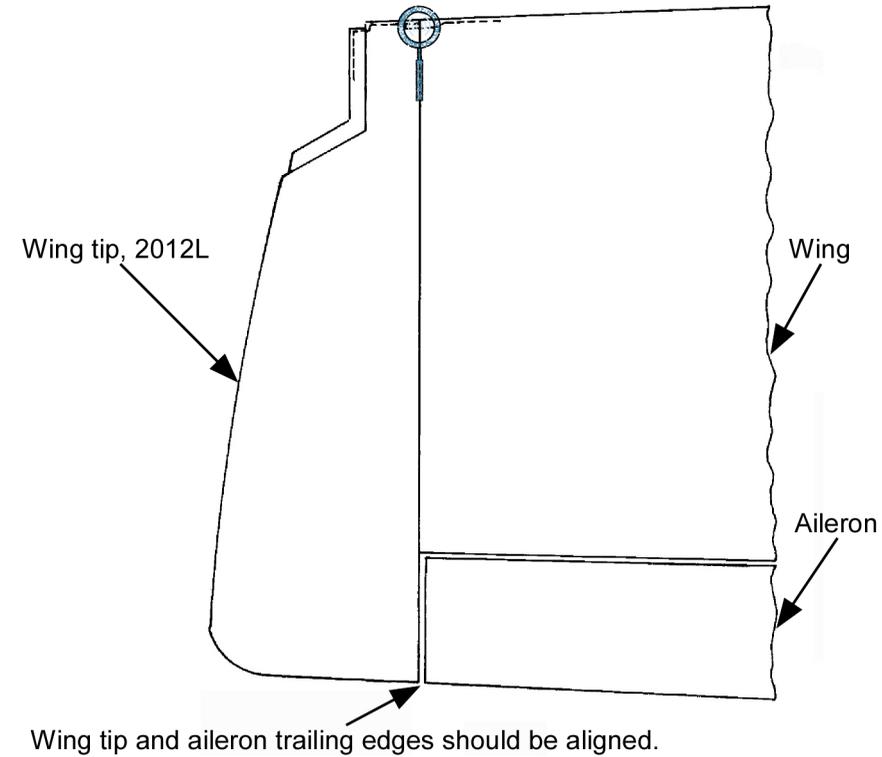
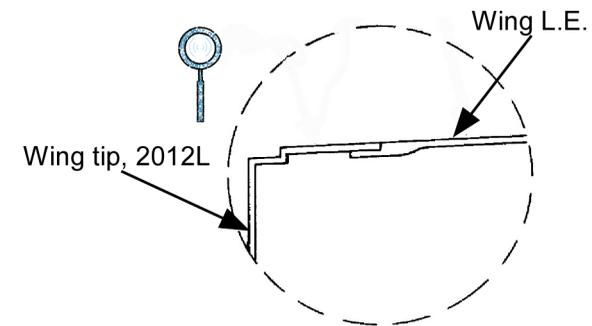


Figure 10.3.A.3 Aligning the L.E. of the wing tip to the wing



8. Check that the wing tip is level with the top and bottom wing skins by resting a straight edge on each skin, extending out 3-4" onto the tip.

The wing tip will, of course, begin to sweep up, but there should be a flat transition area to the wing skins.

WARNING: The wing tip must be aligned correctly before continuing with the installation.

9. Drill 1/8" (3 mm) cleco holes through the wing tip and the wing tip flange on the wing where the mounting screws will be located.

The holes should be spaced approximately 3" (75 mm) apart on the top and bottom of both the wing and wing tip.

Figure 10.3.A.4 Mounting screw locations



10. Make sure the wing tip rests against the flange in the L.E. area.
If it does not rest against the flange in the L.E. area, this shape may vary slightly from builder to builder, add a release by applying a thin release tape to the wing tip and building up the wing tip flange with a micro/flox mixture. See Figure 10.3.A.5.
11. Enlarge the 1/8" (3 mm) cleco holes to a #20 drill size to accommodate the mounting screws (MS24694-S5).
12. Countersink the wing tip holes to fit the flush type screw heads.
13. Secure the nutplates (K1000-08) to the wing tip flange at each mounting screw location with two rivets (AN426A3-5).
14. Install your wing tip with the mounting screws and check the alignment again.
15. Install the aileron. If you need instructions, refer to Chapter 4, section 4.3.C *Balancing the Ailerons* on page 4.20
16. Check the aileron travel. The wing tip should not interfere with the aileron travel.
A .050" gap between the wing tip and aileron is standard. Sand the outboard tip of the aileron if the gap is too narrow.

Figure 10.3.A.5 Building up the flange

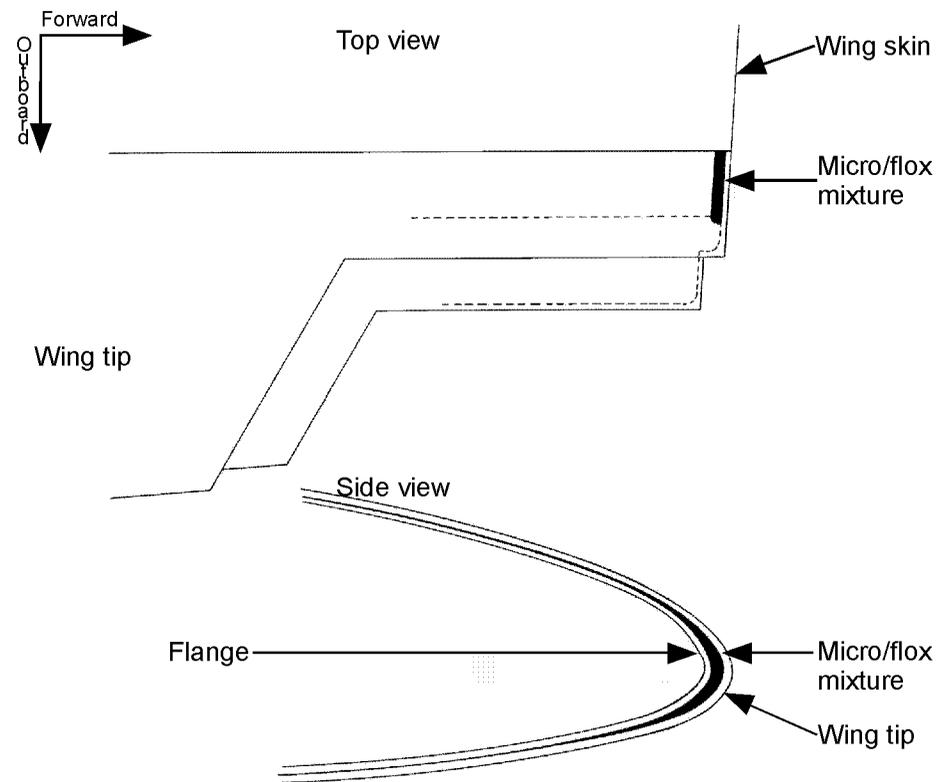
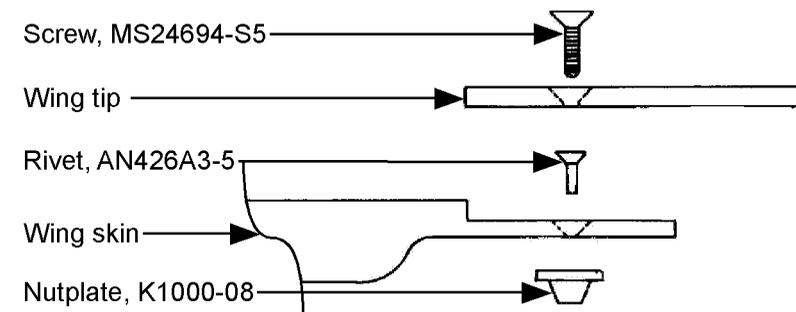
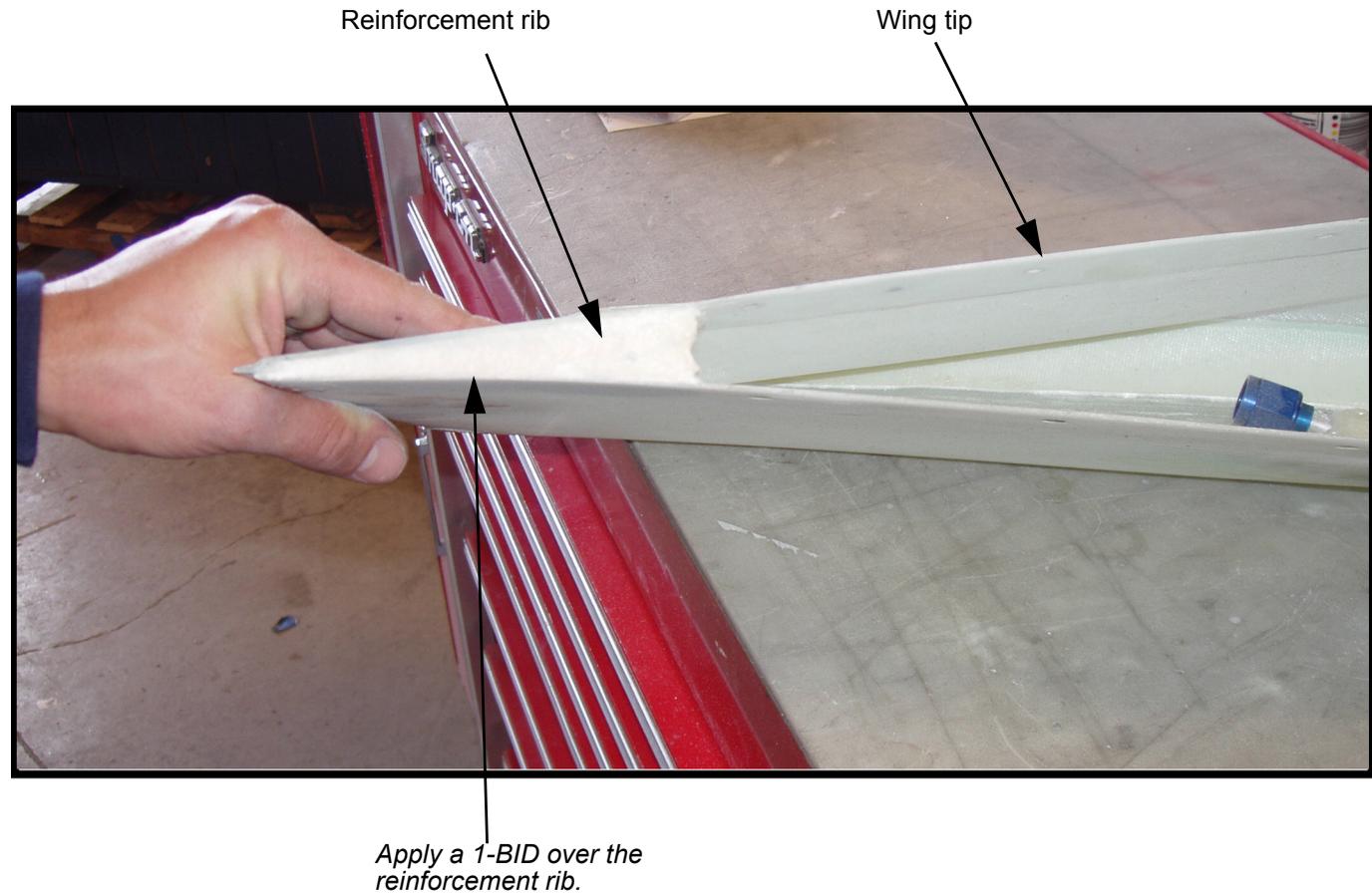


Figure 10.3.A.6 Mounting the wing tip to the wing



17. Cut a wing tip reinforcement rib from the 2-ply per side E-glass prepreg sheet.
The rib will be located 1" (25 mm) outboard of the aileron tip.
18. Fit the rib into the wing tip and floc the rib in position.
Tip: Be careful not to expand the wing tip and make it thicker than the aileron. See Figure 10.3.A.7.
19. Apply a 1-BID to the wing tip reinforcement rib area.

Figure 10.3.A.7 Wing tip reinforcement rib floxed in position



10.3.B Adding the Wing Tip Lighting

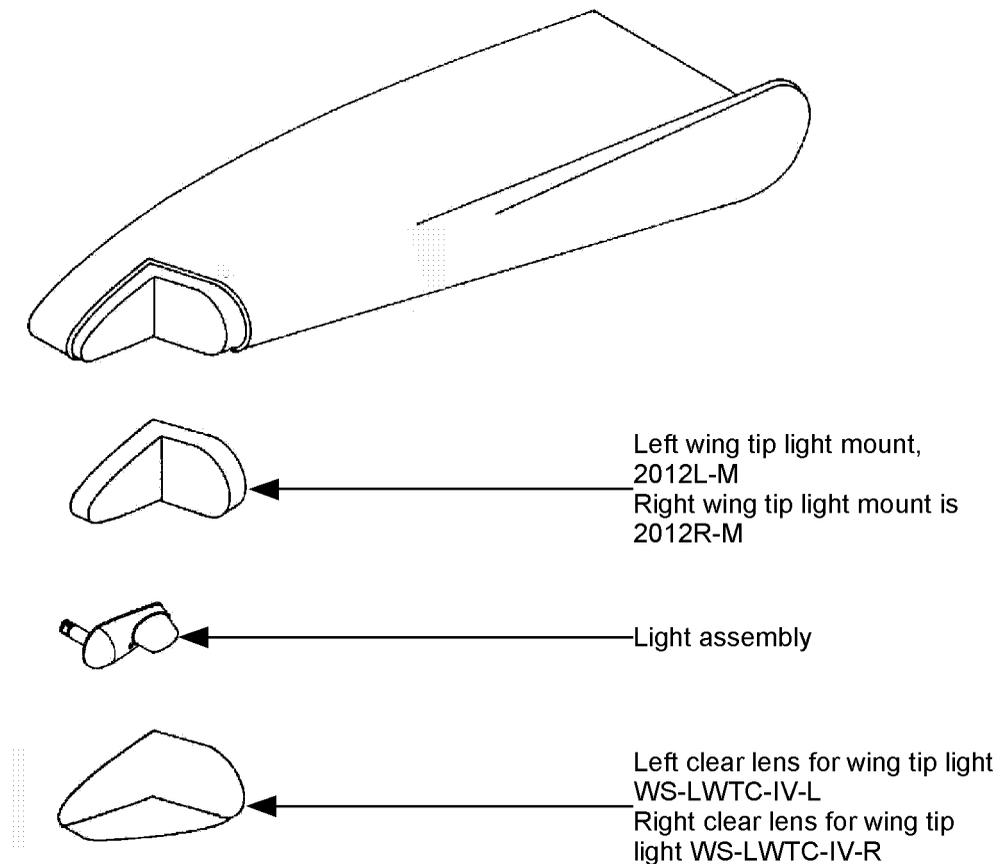
The ES wing tip is molded to accept a Whelen A650-PG/PR position/strobe light, with the red light on the left tip and the green light on the right. Fiberglass tip light mounts are provided for easy mounting of the position/strobe light assemblies and lenses.

A tail strobe light (Whelen 500) is mounted on the rudder later in construction to conform to FAA regulations. The power supply (Whelen A413A) for all lighting is located in the fuselage. The power supply installation will also be covered later in construction. For more information on wiring see *Chapter 23 General Wiring*.

Steps...

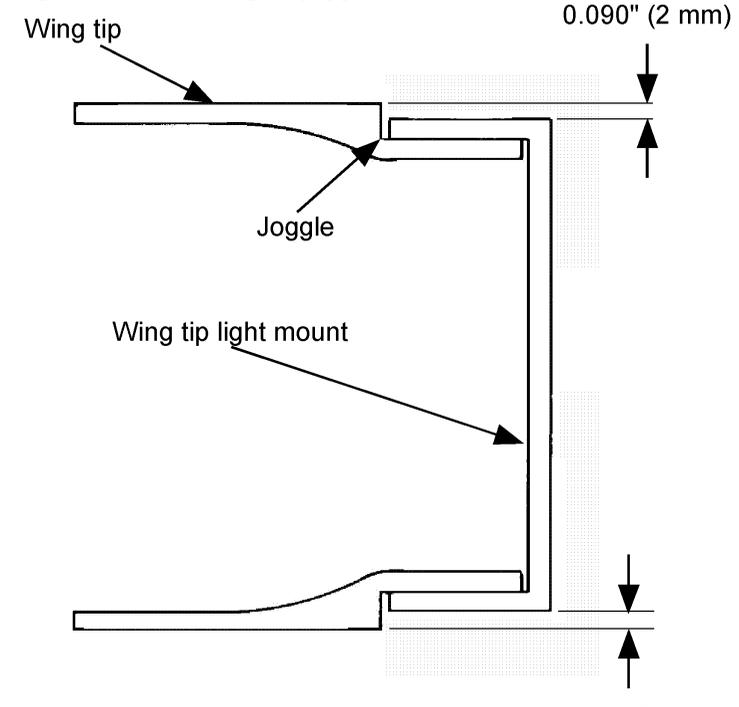
1. Locate the position/strobe light assembly on the wing tip light mount as shown in Figure 10.3.B.1 and using the scribe marks on the vertical face of the light mount.
2. Grind out the fiberglass using the scribe lines so the position/strobe light assembly can rest flat on the light mount. Keep the grinding to a minimum.
3. Using the position light's mounting holes as guides, drill #29 holes through the wing tip light mount.

Figure 10.3.B.1 Wing tip light assembly



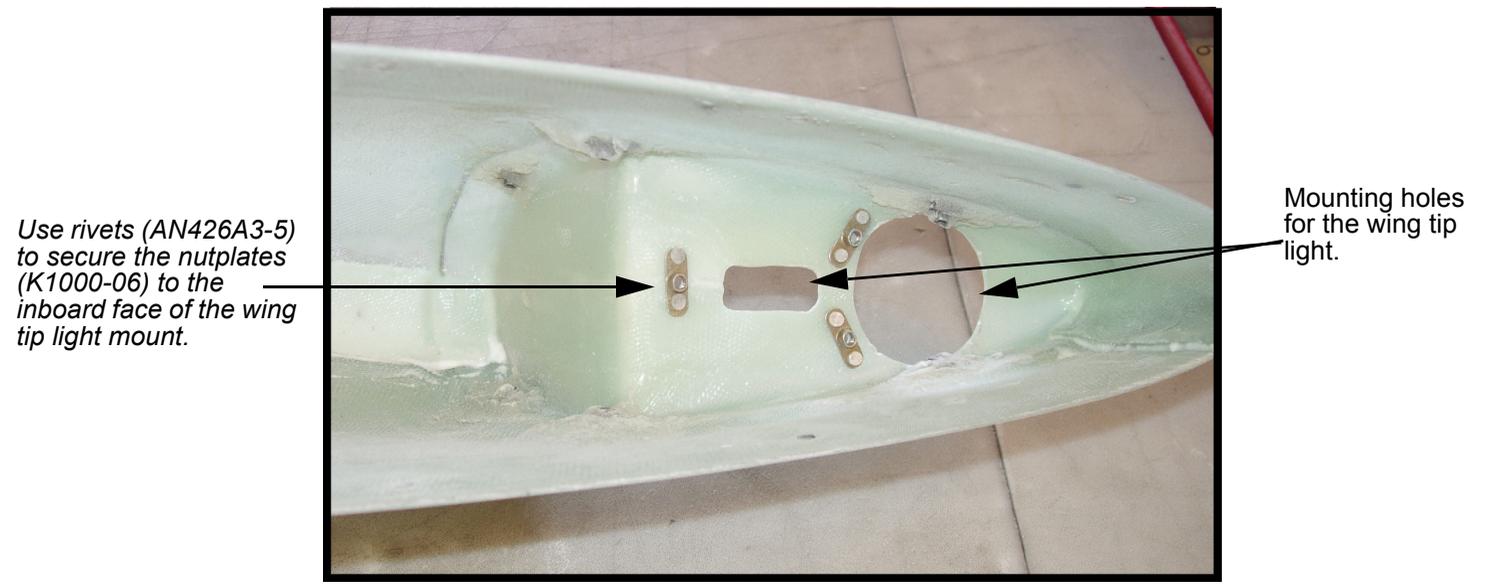
4. Use rivets (AN426A3-5) to secure a nutplate (K1000-06) to the inboard face of the wing tip light mount at each mounting bolt hole.
5. Secure the position light assembly to the wing tip light mount with countersunk screws MS24693-S28.
6. Trim the wing tip light mount so it will fit in the wing tip joggle.
The surface of the light mount should be about 0.090" below the surface of the wing tip around the perimeter of the joggle. This will allow the clear lens to fit flush with the wing tip.
7. When you are satisfied with the fit of the wing tip light mount, use a few drops of instant glue to temporarily secure the mount to the wing tip joggle.

Figure 10.3.B.2 Wing tip joggle



8. Trim the clear lens to fit into the wing tip joggle, flush with the surface of the wing tip.
9. When you are satisfied with the fit of the lens, temporarily secure the lens to the wing tip with masking tape. Don't use instant glue to secure the lens as the glue will fog up the clear plastic.

Figure 10.3.B.3 Inboard face of the wing tip mount



- Drill six #29 holes through the lens, light mount and wing tip joggle. See Figure 10.3.B.5 for the hole locations.

Be extremely careful when drilling through the clear plastic lens. There are drills made especially for Plexiglas that make the drilling process safer.

Tip: If you must use a regular drill it is a good idea to first apply masking tape to the lens and then lightly center punch where you are about to drill. Start with a very small #50 hole, then drill progressively larger ones until you reach #29. If you don't drill very slowly, the plastic could shatter.

- When you've finished drilling, remove the lens and wing tip light mount from the wing tip. Use two rivets, AN426A3-5, per nutplate, K1000-06, to secure the nutplates to the joggle at each mounting hole location.
- Carefully countersink the clear plastic lens for the screws, MD24693-S28.
- Assemble the position light assembly, light mount and clear lens onto the wing tip.

Tip: If the lens still doesn't rest flush with the wing tip surface, you can insert a thin cork washer between the lens and the light mount to bring the lens surface flush with the wing tip surface.

See Figure 10.3.B.6 on the next page for the fitting of the lens to the wing tip.

Figure 10.3.B.4 Cross section view for securing the wing tip light

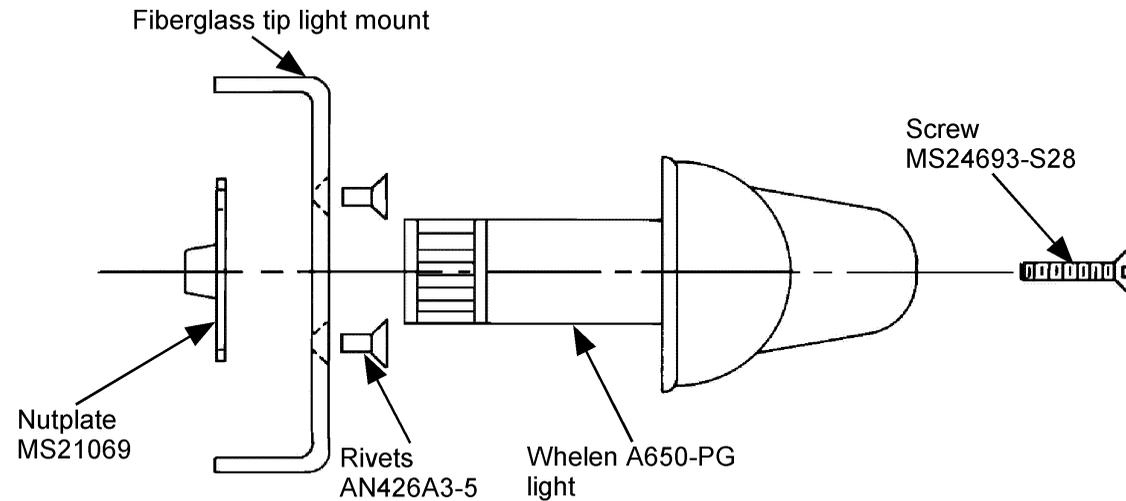


Figure 10.3.B.5 Installed wing tip and light

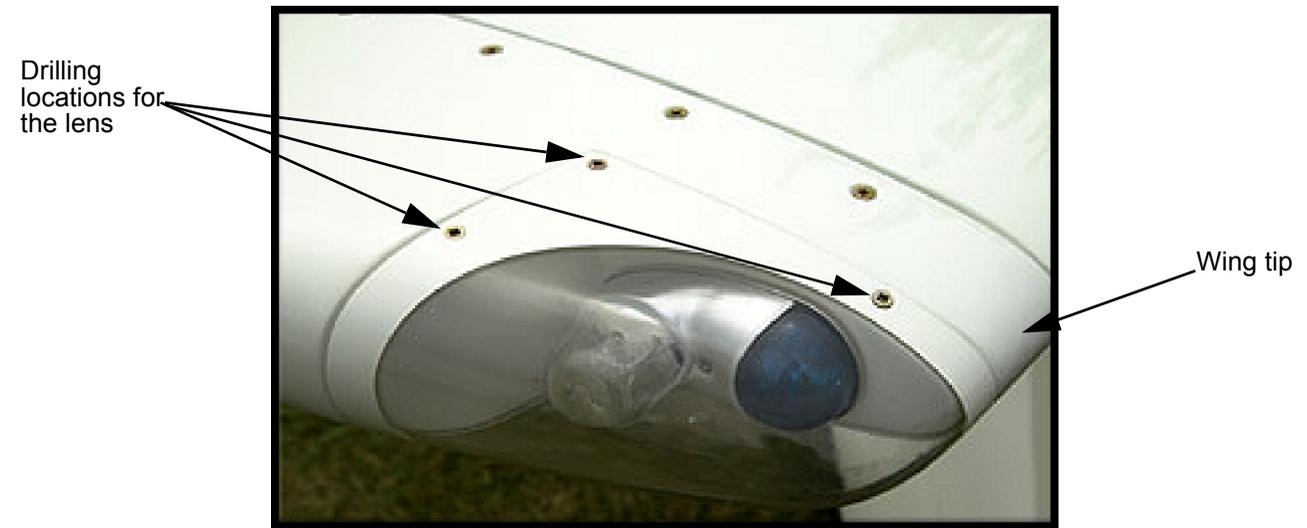
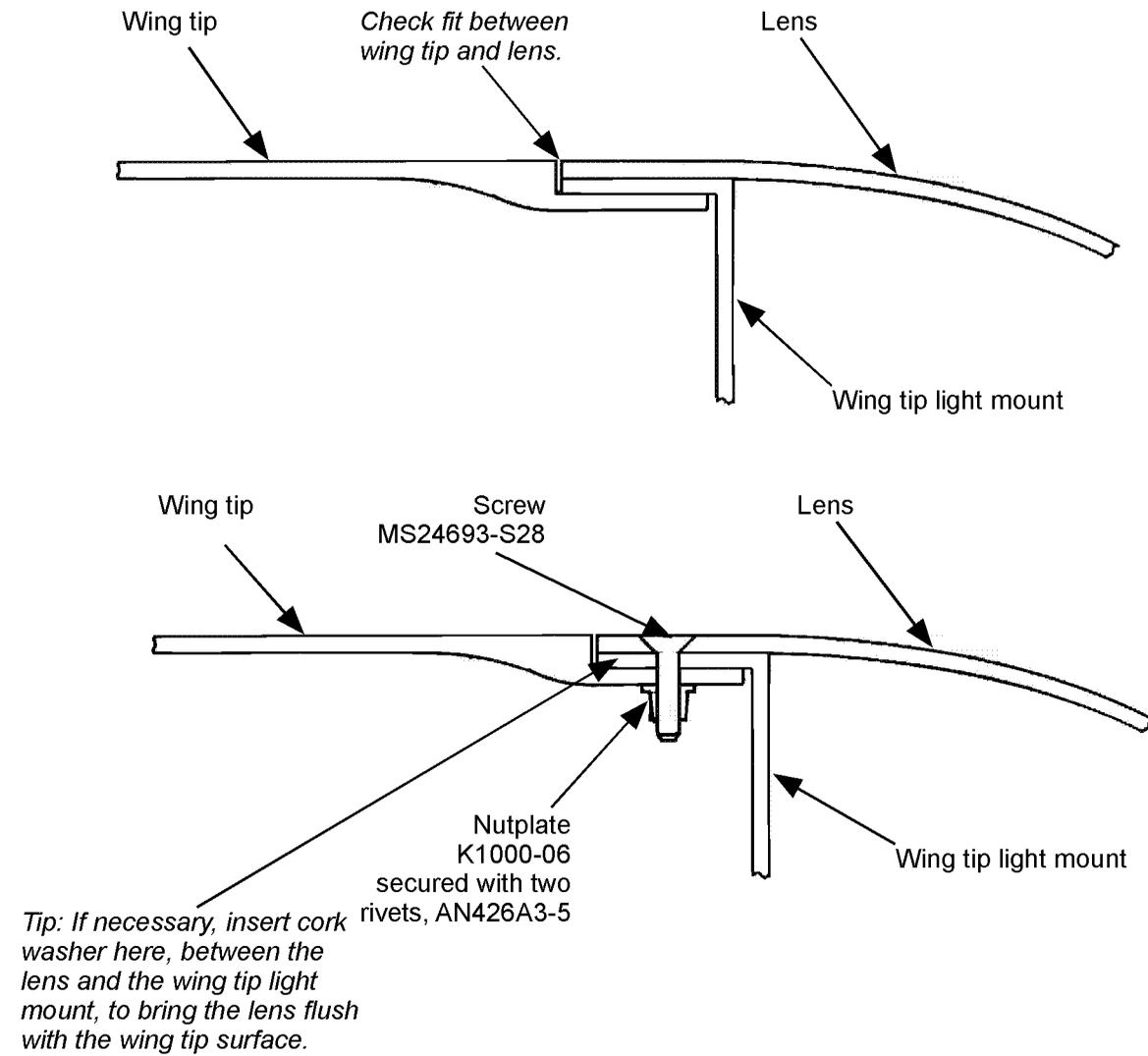


Figure 10.3.B.6 Fitting the lens to the wing tip



10.3.C Completing the Fuel Vents

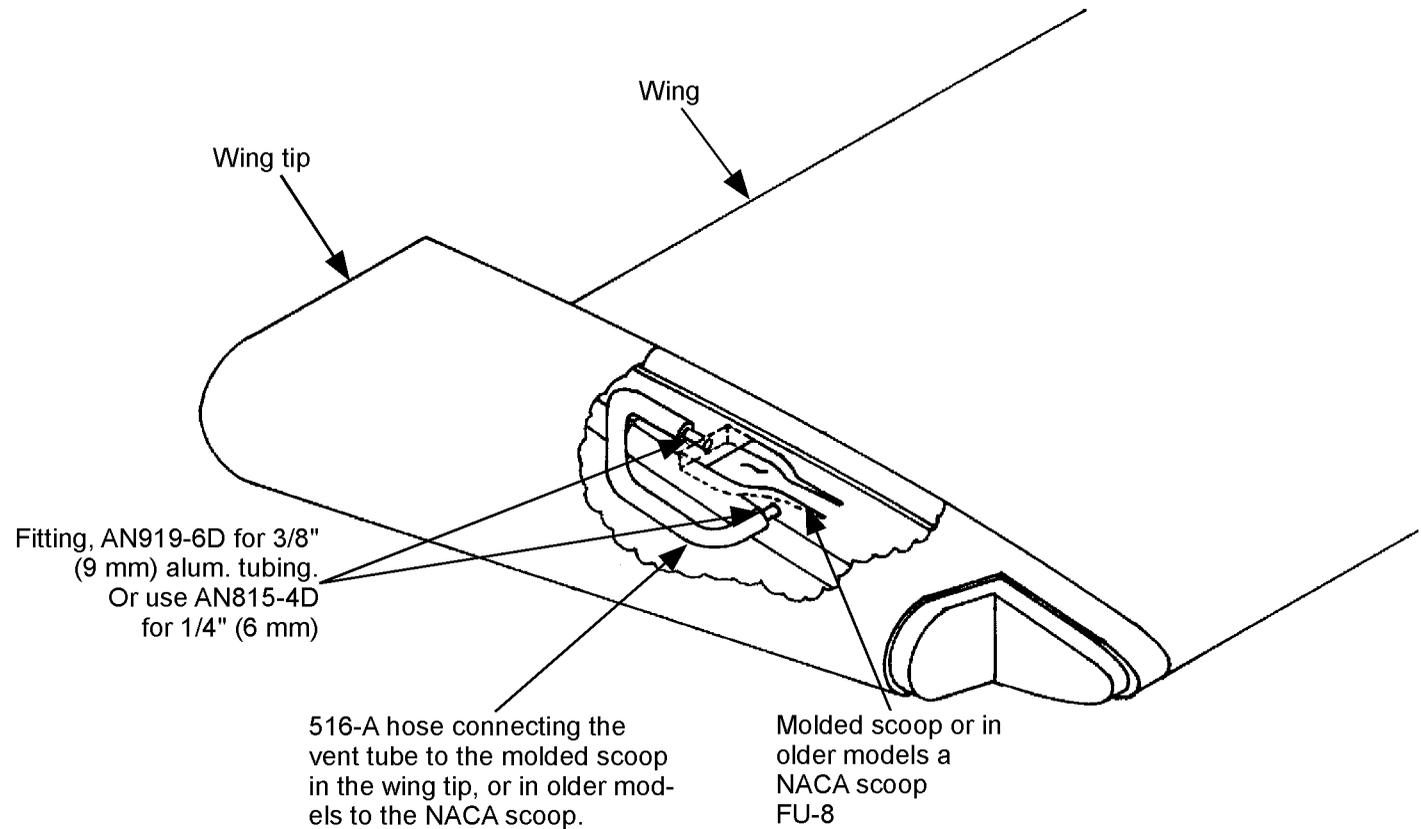
Earlier, when working on the wings, you bonded a 3/8" (9 mm) dia. fuel vent to the top wing skin, running from the highest point of the fuel tank to just outboard of the BL 202.5 rib. Now you will finish the vent system by connecting the scoop to the vent tube with a plastic line.

On later models the scoop has been incorporated into the wing tip mold. If you have one of the earlier models, you will need to refer to an older version of the manual

Steps...

1. Trim around the scoop to clean up the edge.
A sharp edge helps the airflow and adds efficiency to the scoop.
2. Fair in the narrow inlet at the L.E. of the scoop to allow a smooth airflow.

Figure 10.3.C.1 Fuel vent system



3. Cut a 3" (75 mm) piece of 1/4" (6.4 mm) dia. aluminum tubing.
4. Drill a 1/4" (6.4 mm) hole through the aft face of the small NACA scoop.
5. Sand the area around where you just drilled the 1/4" (6.4 mm) dia. hole.
6. Rough up the surface of the 3" (75 mm) long aluminum tube where it will be bonded to the scoop.
7. Prep all areas.
8. Use Hysol (with a little flox added) to pot the end of the 3" (75 mm) long tube into the aft face of the scoop. You should bend the tube slightly so the plastic vent line can be slipped onto it.
9. Slide a 3/8 to 1/4" (9 to 6.4 mm) hose fitting (AN919-6D) over the aluminum tubing. On the other end of the fitting, slide 3/8" (9 mm) I.D. plastic tubing. If you need a 1/4 to 1/4" (6 to 6 mm) hose fitting, use AN815-4D.
10. Form the hose into a gentle curve (meaning no kinks) to the end of the aluminum vent tube that extends out the BL 202.5 rib.
11. Using another hose fitting slip it over the aluminum tubing and the plastic hose.

This completes the fuel vent system.

WARNING: Do not allow debris in the vent line. A clogged vent tube will cause engine failure.

Figure 10.3.C.2 Fuel vent fitting over aluminum tube

