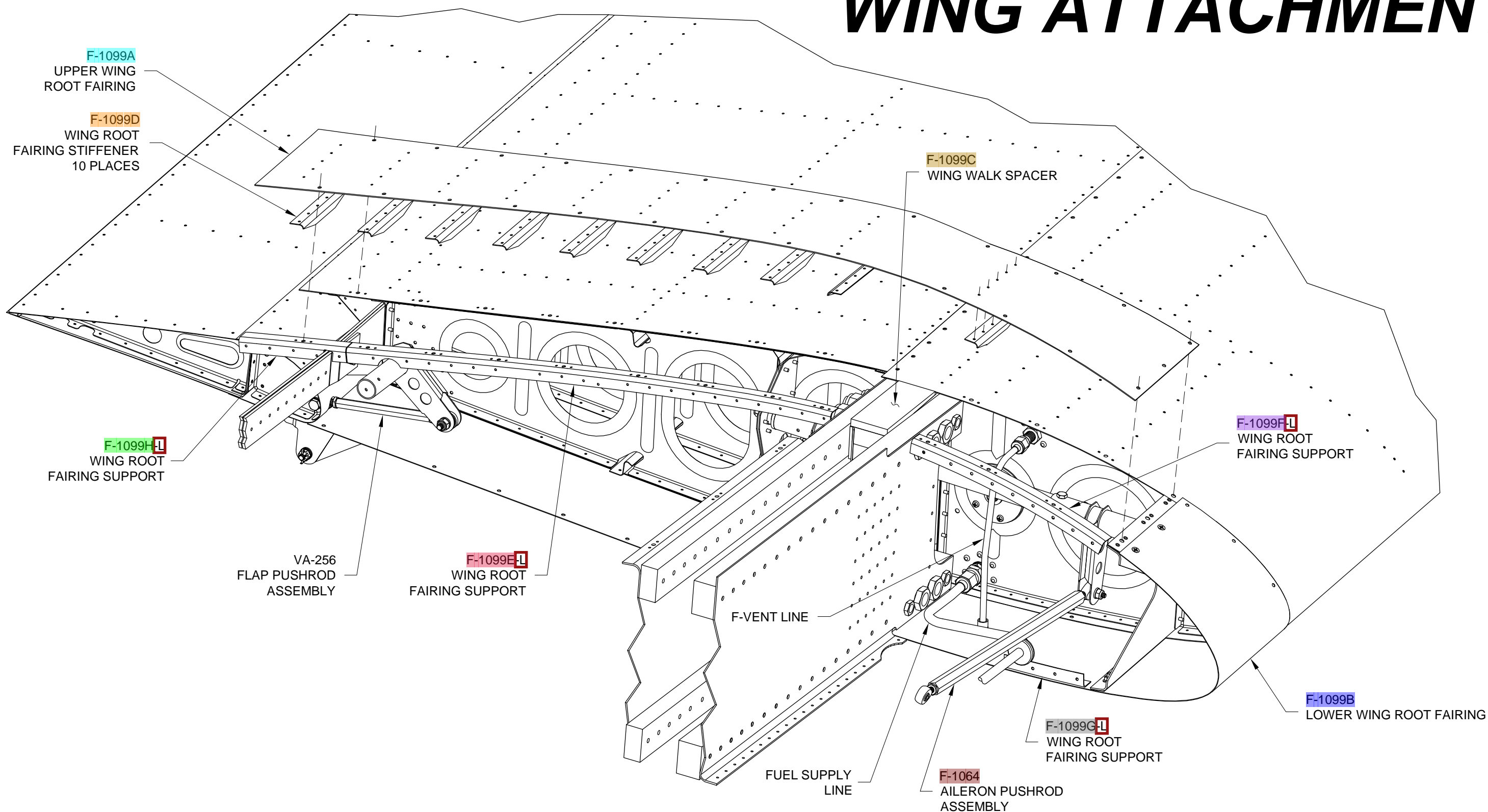


SECTION 44: WING ATTACHMENT



NOTE: This section describes the left wing installation. Repeat the steps on pages 2 through 11 for the right wing.

Step 1: Cut apart the **F-1099E** **FC-L** Wing Root Fairing Support to make the **F-1099E-L**, **F-1099F-L**, **F-1099G-L**, and **F-1099H-L** Wing Root Fairing Supports as shown in Figure 1. Parts are shown flat prior to bending.

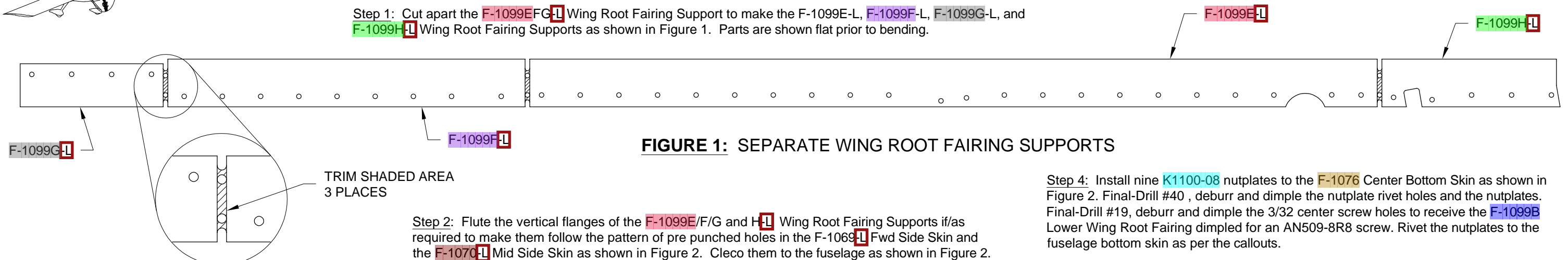


FIGURE 1: SEPARATE WING ROOT FAIRING SUPPORTS

Step 2: Flute the vertical flanges of the **F-1099E/F/G** and **H-L** Wing Root Fairing Supports if/as required to make them follow the pattern of pre punched holes in the **F-1069-L** Fwd Side Skin and the **F-1070-L** Mid Side Skin as shown in Figure 2. Cleco them to the fuselage as shown in Figure 2.

Final-Drill #30 the holes common to the wing root fairing supports to the fwd side skin and the mid side skin.

Remove all wing root fairing supports and deburr all the #30 holes in the supports and to the fuselage side skins.

Step 3: Bevel the lower corners of the **F-1004A** and **F-1004B** Center-Section Bulkheads as well as the **F-1004F** and **F-1004H** Center-Section Lower Forward/Aft Bars as per the detail in Figure 2 to eliminate interference with the **T-1001-L** Fuel Tank Skin during assembly.

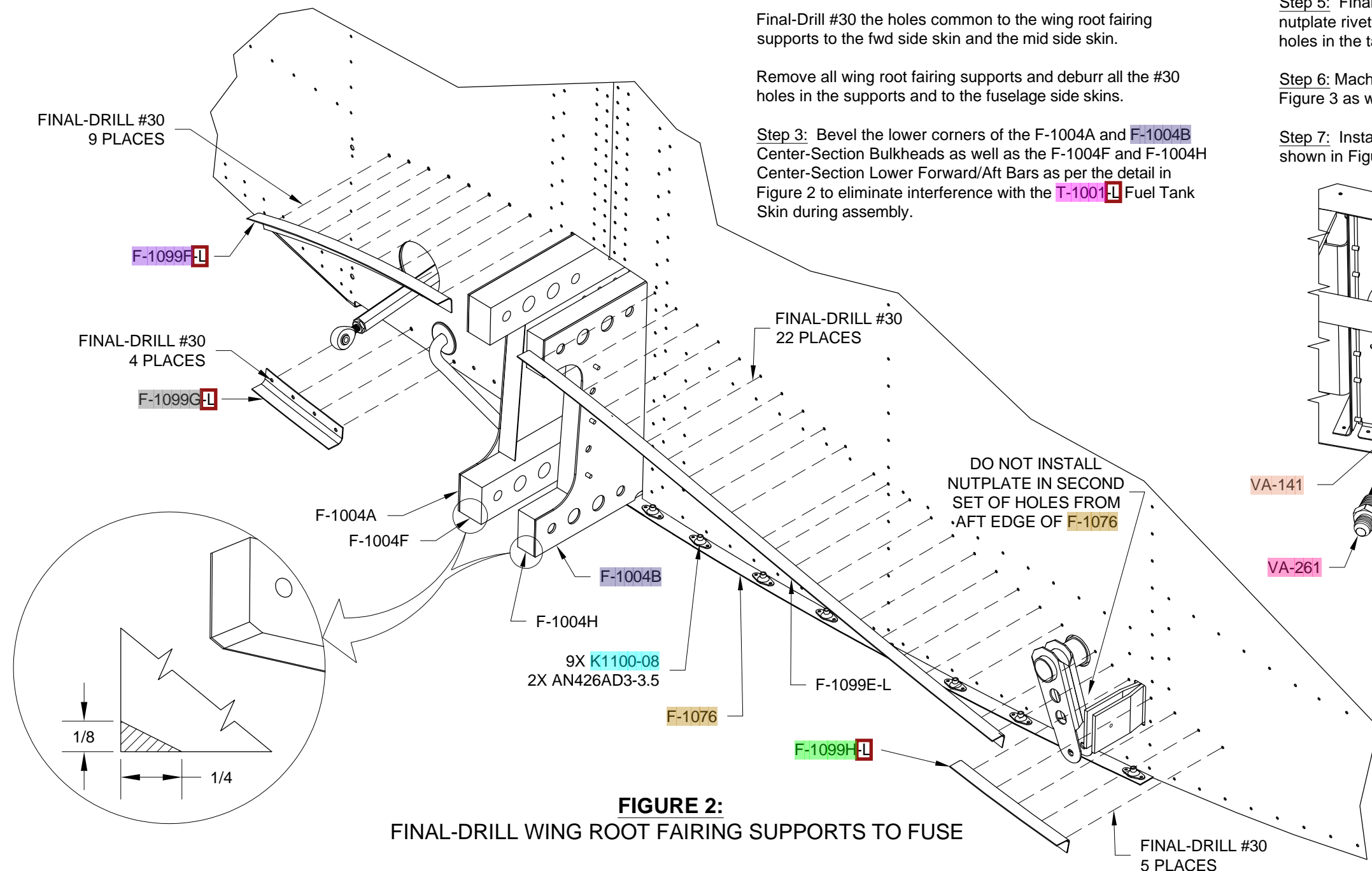


FIGURE 2: FINAL-DRILL WING ROOT FAIRING SUPPORTS TO FUSE

Step 4: Install nine **K1100-08** nutplates to the **F-1076** Center Bottom Skin as shown in Figure 2. Final-Drill #40, deburr and dimple the nutplate rivet holes and the nutplates. Final-Drill #19, deburr and dimple the 3/32 center screw holes to receive the **F-1099B** Lower Wing Root Fairing dimpled for an AN509-8R8 screw. Rivet the nutplates to the fuselage bottom skin as per the callouts.

Step 5: Final-Drill #40 and machine countersink the **T-1001-L** Fuel Tank Skin for the nutplate rivets as shown in Figure 3. Final-Drill #19, deburr and dimple the two #8 screw holes in the tank skin. Rivet the nutplates depicted to the tank skin as per the callouts.

Step 6: Machine countersink the top three #19 holes on the tank attach flange shown in Figure 3 as well as the two #19 holes on the bottom of the tank attach flange not shown.

Step 7: Install the **VA-261** Fuel Strainer into the **VA-141** Fuel Flange and tighten as shown in Figure 3.

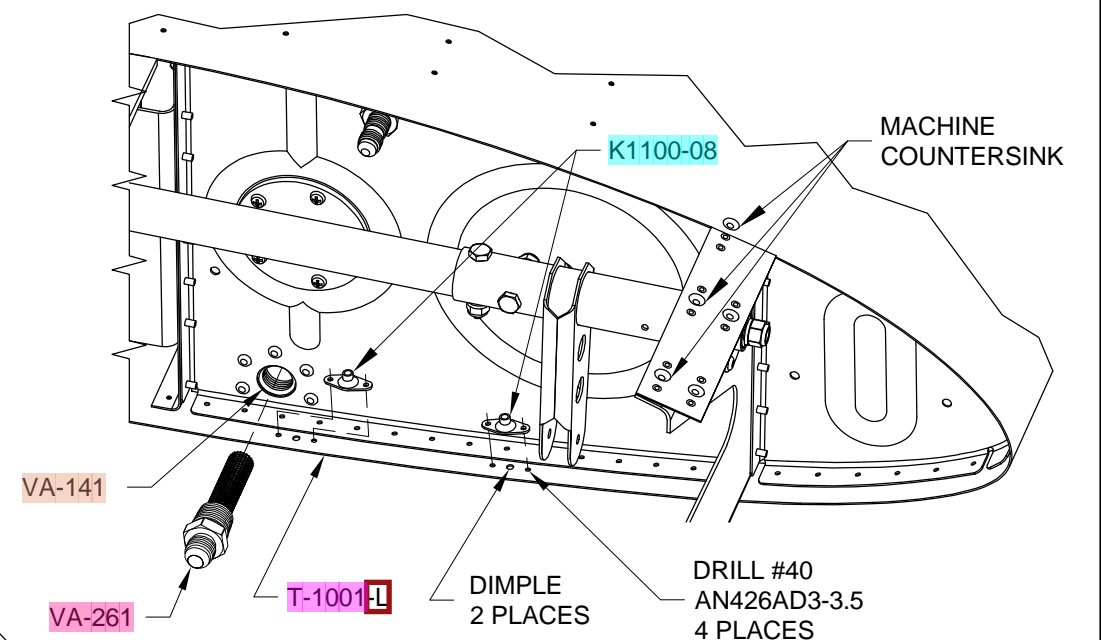
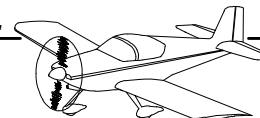


FIGURE 3: ATTACHING TANK SKIN NUTPLATES

Step 8: Fit the **F-1099B** Lower Wing Root Fairing to the wing bending it by hand a little at a time to conform it to the shape of the tank leading edge. This will be easier to do while the wings are off the aircraft.



Step 1: Slide the wing spar (left shown) into the fuselage and temporarily pin as shown in Figure 1.

When bringing the spar into it's exact position, lining up the bolt holes in the bulkhead and spar, it is often helpful to use drift pins. This could be a disposable hardware store bolt with the end rounded or tapered on a grinder. GENTLY driving this lubricated pin into a nearly aligned hole will center the bulkhead/spar hole so that the bolts can be installed without excessive force.

It is recommended that 3/8 dia. hardware store bolts be used for test fitting to prevent damage to the holes and NAS bolts. For fitting, it is only necessary to install four 3/8 bolts(pins), one top and one bottom per wing.

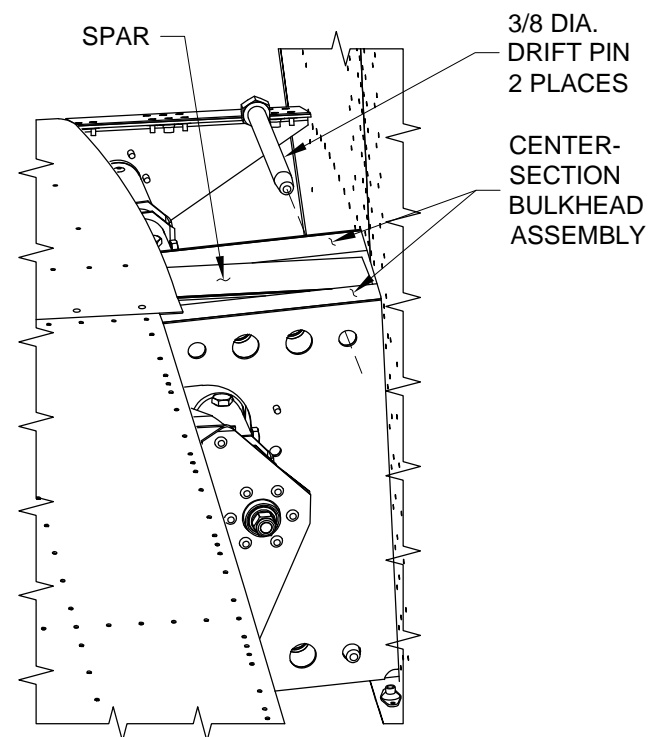


FIGURE 1: ATTACH WING

Step 2: Cleco together the rear spar and F-1005B Rear Spar Attach Bars as shown in Figure 2. Clamp them in place. Remove the cleco and carefully pilot-drill to 3/16, 1/4, 5/16 and finally 3/8.

WARNING: Use great care when drilling to avoid a hole that is oversize or out of round.

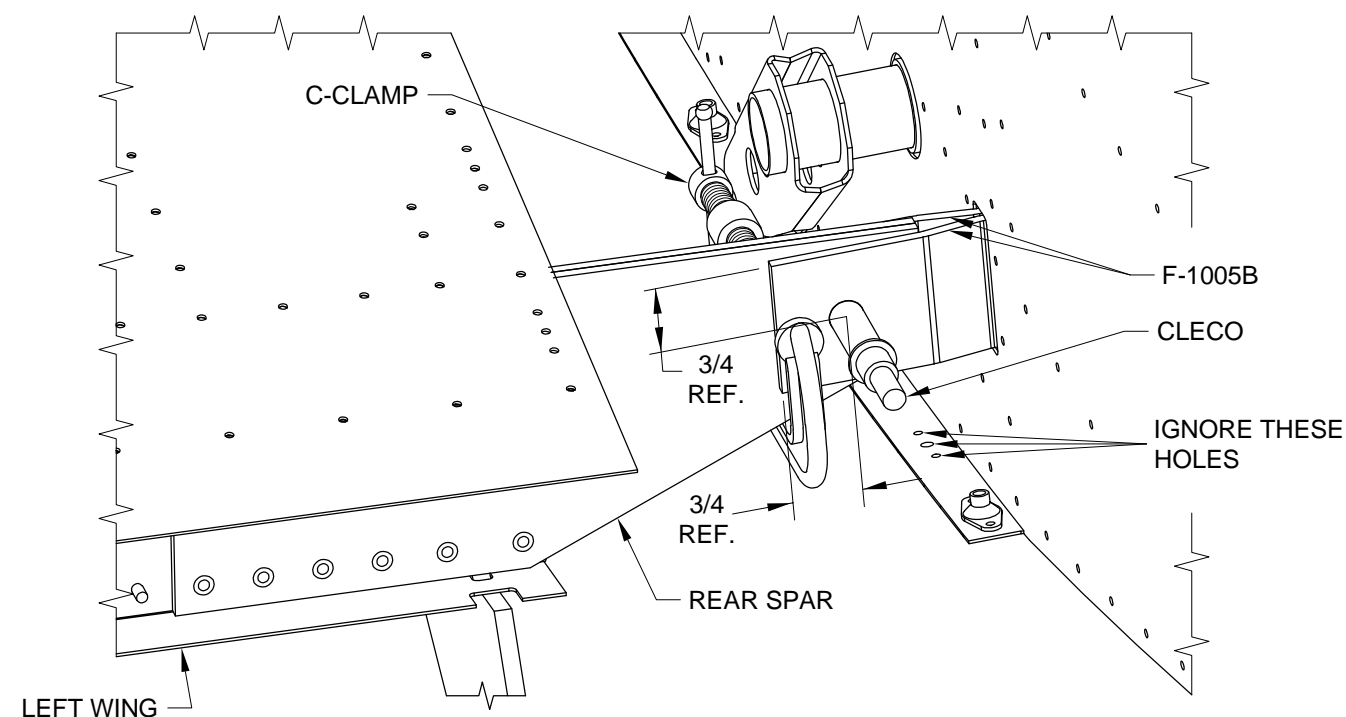


FIGURE 2: MATCH-DRILL REAR SPAR AND REAR SPAR ATTACH BARS

Step 3: Remove the clamp. Bolt the rear spar to the F-1005B Rear Spar Attach Bars using the hardware shown in Figure 3.

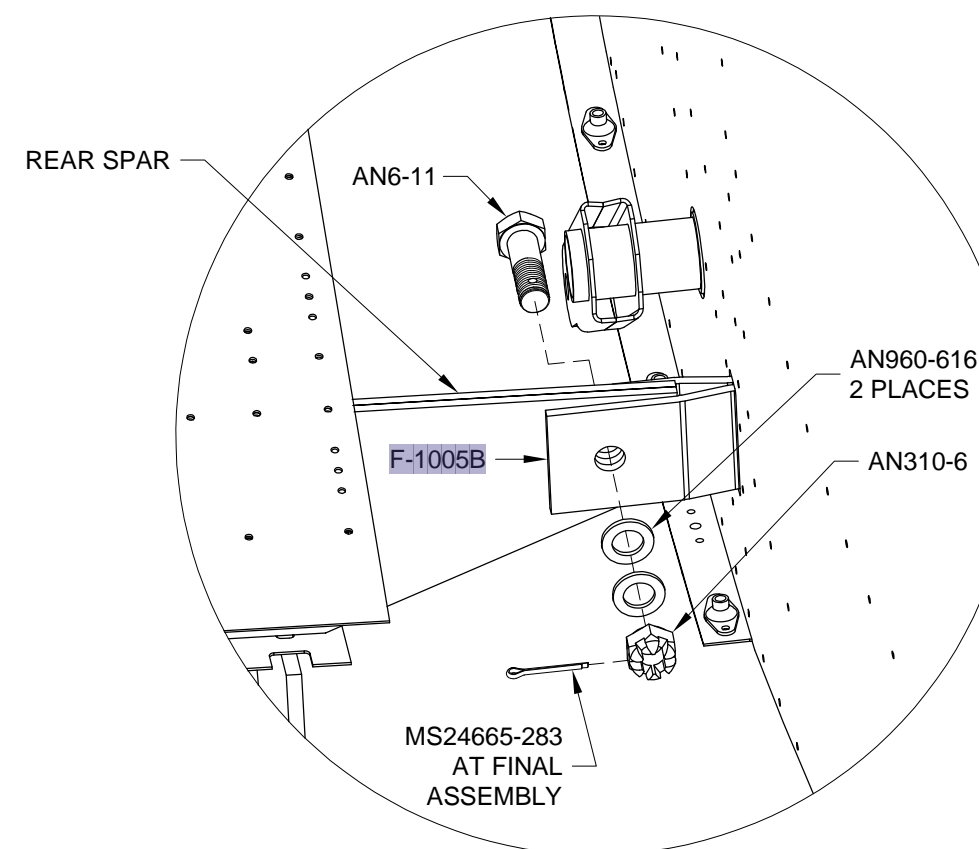
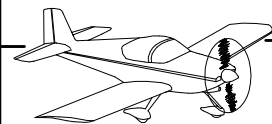


FIGURE 3: BOLT REAR SPAR ATTACH



Step 1: Bolt the F-1064 Aileron Pushrod Assembly to the WD-1014 Torque Tube Assembly as shown in Figure 1. There are two washers called-out; one washer is installed inside the torque tube clevis arm along with the pushrod rod end bearing and the other washer is installed under the nut.

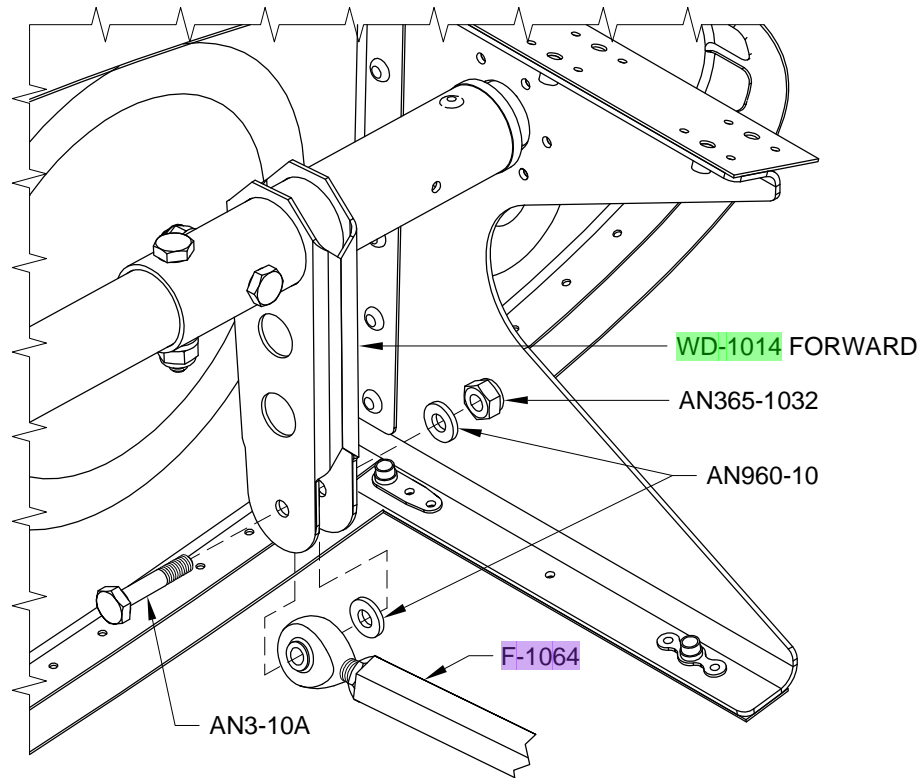


FIGURE 1: ATTACH AILERON PUSHROD

Step 2: Rig the ailerons. Use the W-730 Bellcrank Jig to set the aileron actuation system (left wing shown) to its neutral position as shown in Figure 2. **NOTE: It may not be necessary to remove the bellcrank to aileron pushrod bolt. There should be enough thread protruding from the nut to allow the use of the bellcrank jig.**

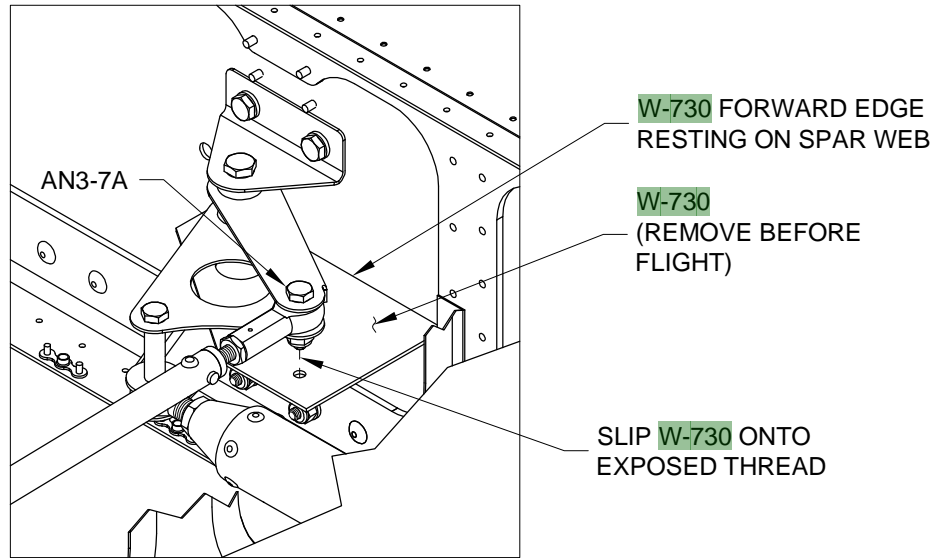


FIGURE 2: INSTALL BELLCRANK JIG

Step 3: Insert a WD-1012 Control Stick into the WD-1011 Left Control Stick Base. Adjust the length of the F-1064 Aileron Pushrod Assembly to obtain a neutral (vertical) control stick position. Tighten the jam nuts when adjustment is complete.

Step 4: Install the W-730 Bellcrank Jig in the right wing while leaving the first bellcrank jig in the left wing. Install the right side F-1064 Aileron Pushrod Assembly by adjusting its length as required to fit between the WD-1011 Right Control Stick Base and the WD-1014 Torque Tube Assembly. Since the neutral control stick position was already determined for the left control stick the right side control stick should already be vertical.

Sweep the control sticks through their full range of motion and check for interference.

Step 5: Position the fuel supply line near to the VA-261 Fuel Strainer fitting as shown in Figure 3. Mark the tube for cutting. Leave enough material so that it will not be pre loaded when attached and remember to account for the flare.

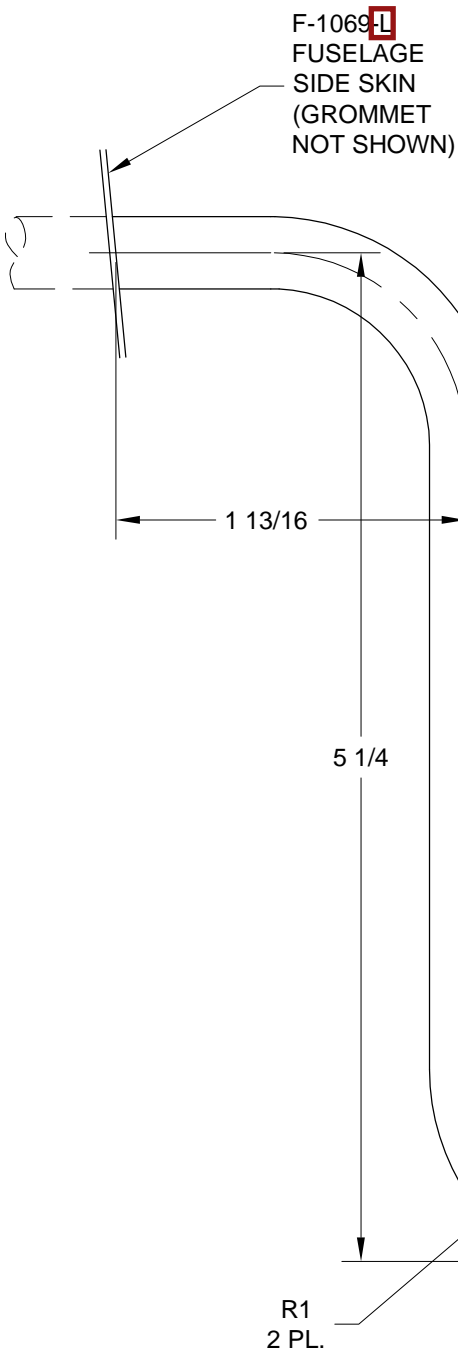


FIGURE 4: FUEL SUPPLY LINE TEMPLATE

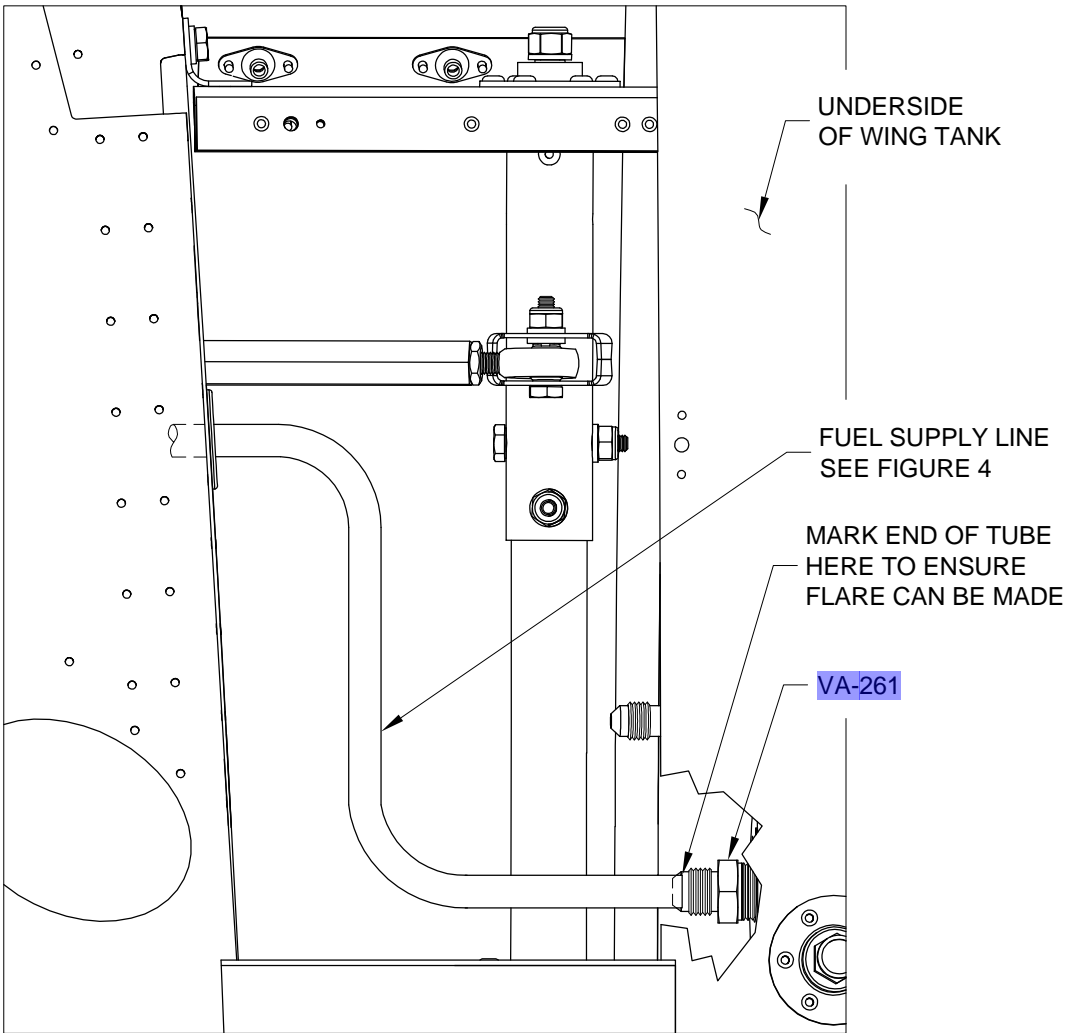
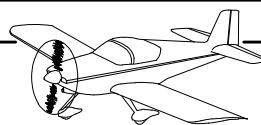


FIGURE 3: MEASURE FUEL SUPPLY LINE (BOTTOM VIEW)



Step 1: Mark an entry point of your choice on the **F-1070-L** Mid Fuselage Side Skin for the pitot line. See Figure 2. This hole will be drilled after wing removal but prior to final assembly. Generic system routing holes have been provided in the fuselage bulkheads so that a line may be routed to the instrument panel. Due to the various possibilities and configurations the actual routing is left to the builder.

Step 2: Trim each end of the VA-256 Flap Pushrod per Figure 1 dimensions. Deburr and if necessary clean up the threads with a 1/4-28 UNF tap.

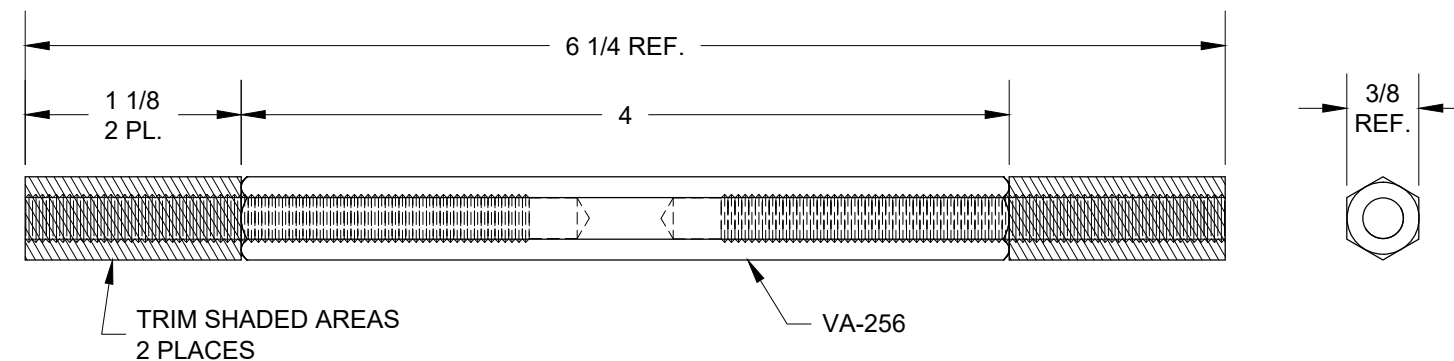


FIGURE 1: CUT FLAP PUSHROD TO LENGTH

Step 3: With the flaps not yet installed on the wing, fully extend (flaps up position) the flap motor shaft. If not already in place install the CM-4M rod end bearing into the flap as shown in Figure 2 and as per Page 22-8, Figure 5.

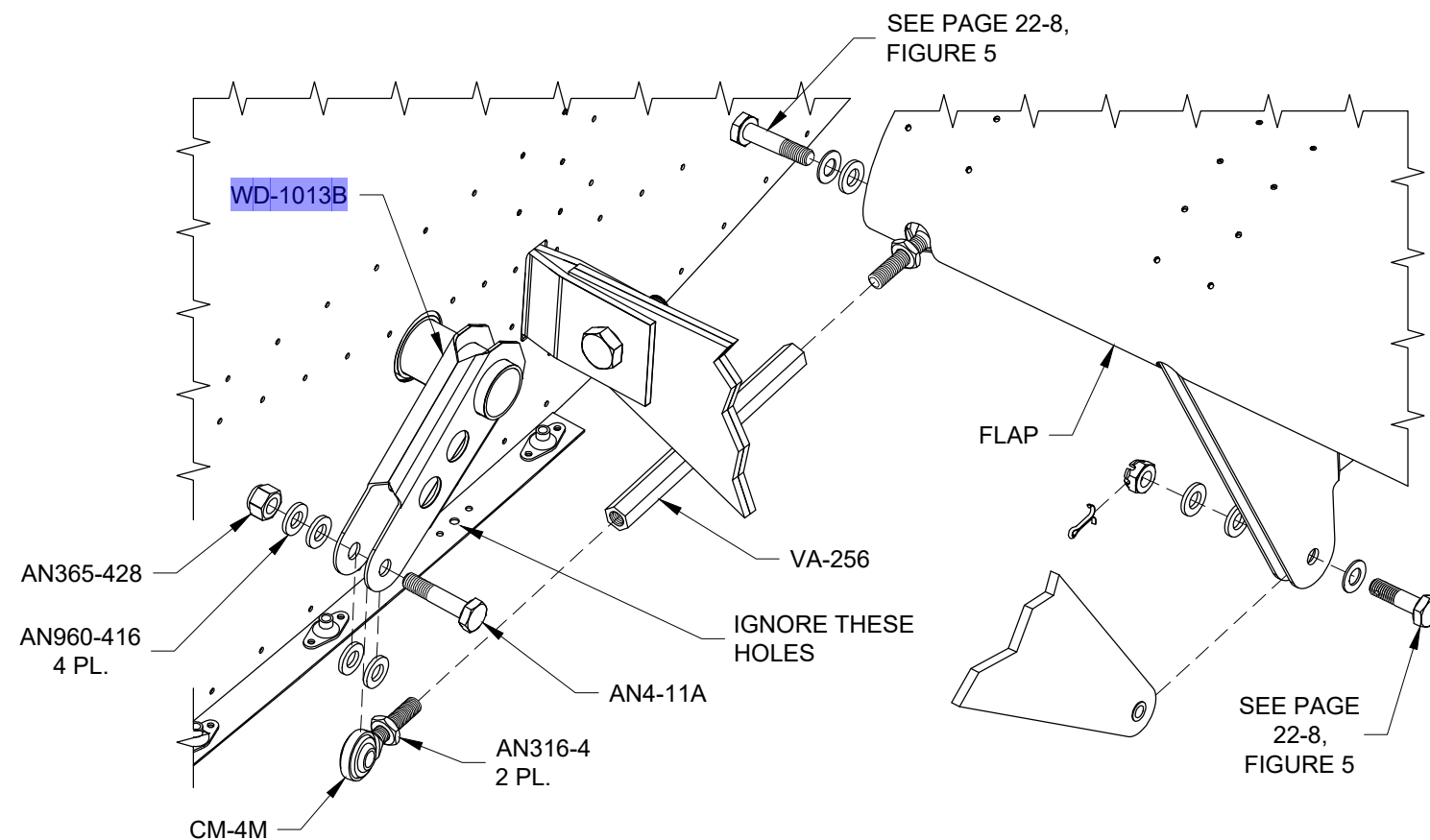


FIGURE 2: EXPLODED VIEW

Step 3 (continued): Install a jam nut onto the rod end bearing mounted in the flap as shown in Figure 3.

Install the VA-256 Flap Pushrod onto the rod end bearing mounted in the flap as shown in Figures 2 and 3.

Install a jam nut onto the rod end bearing that will eventually mount in the **WD-1013B** Flap Horn then install them into the other end of the flap pushrod as shown in Figure 3.

Step 4: Install the flap onto the wing as per Figure 2. Trim the inboard edges of the flap skins if/as req'd to allow the flap to rotate into position and to create a 1/16 minimum gap between flap and fuselage.

Rotate the flap upward until its inboard leading edge makes solid contact with the **W-1007C** Rear Spar Doubler Plate (not shown) and temporarily support the flap in this position.

Rotate the Flap Pushrod Assembly up into the **WD-1013B** Flap Horn clevis and check for fit. Adjust if/as req'd the length of the flap pushrod assembly until it can be bolted to the flap horn using the hardware shown in Figure 2. Don't forget the two washers that straddle the rod end bearing inside the flap horn clevis. To optimize flap pushrod/**WD-1013B** clearance it may be necessary to place both washers to one side of the rod end bearing. Operate the flap and check for interference. Tighten the jam nuts.

WARNING: After final adjustment each rod end bearing must have at least HALF of its threads engaged in the VA-256 Flap Pushrod so that it will be impossible for the flap pushrod to back off the rod ends.

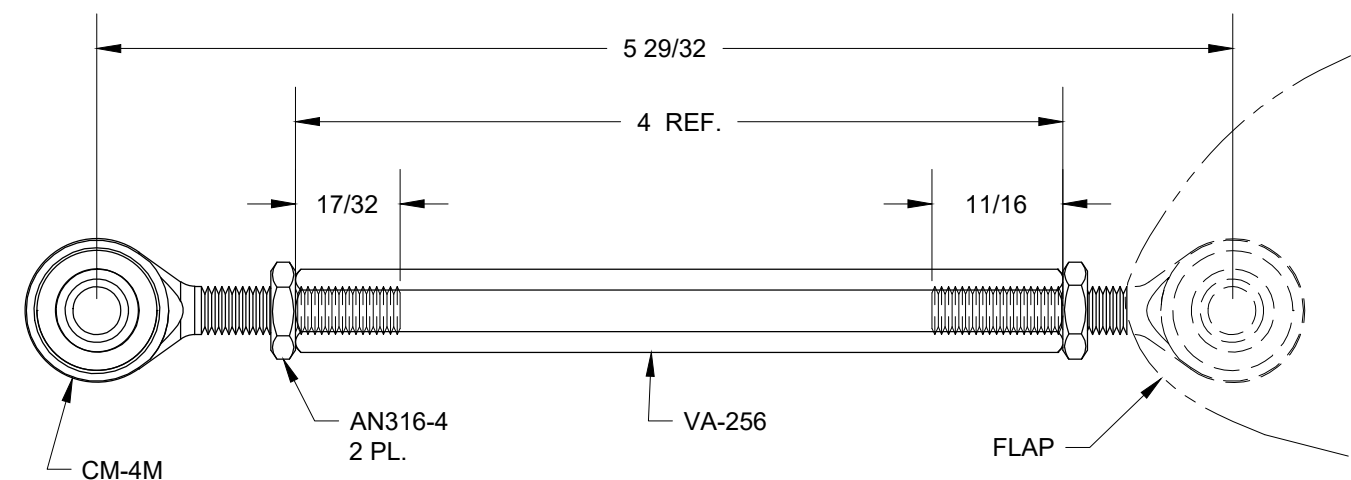
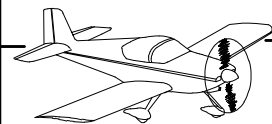


FIGURE 3: THEORETICAL FLAP PUSHROD ASSEMBLY LENGTH



Step 1: Cleco the F-1099G-L Wing Root Fairing Support to the F-01069-L-1 Fwd Side Skin as shown in Figure 1.

Step 2: Final-Drill #19 then deburr and dimple all 5/32 diameter holes in F-1099B Lower Wing Root Fairing. These holes are depicted in Figure 1 wherever screws are shown.

Install a snap bushing into the lower wing root fairing as shown in Figure 1.

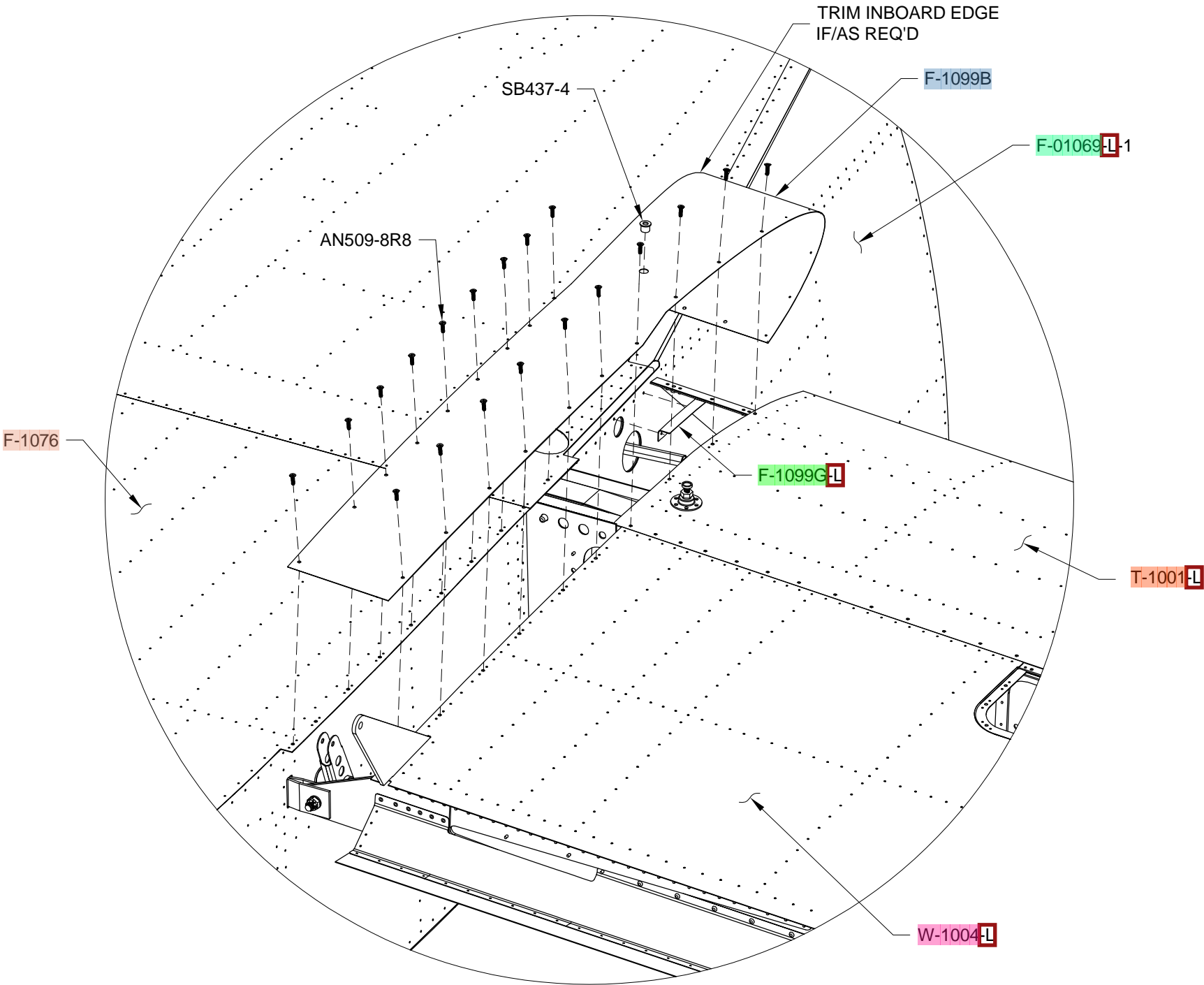


FIGURE 1:
ATTACHING THE LOWER WING ROOT FAIRING
(SOME PARTS OMITTED FOR CLARITY)
(AIRCRAFT VIEWED AS IF INVERTED)

Step 3: Attach the F-1099B Lower Wing Root Fairing to the T-1005B Shim, T-1001-L Fuel Tank Skin, F-1076 Center Bottom Skin, and to the W-1004-L Bottom Inbd. Wing Skin with the hardware shown in Figures 1 and 2.

Match-Drill #40 and cleco the tank skin at the five locations shown in Figure 2 using the 3/32 holes in the lower wing root fairing as guides. Final-Drill #19 the same holes.

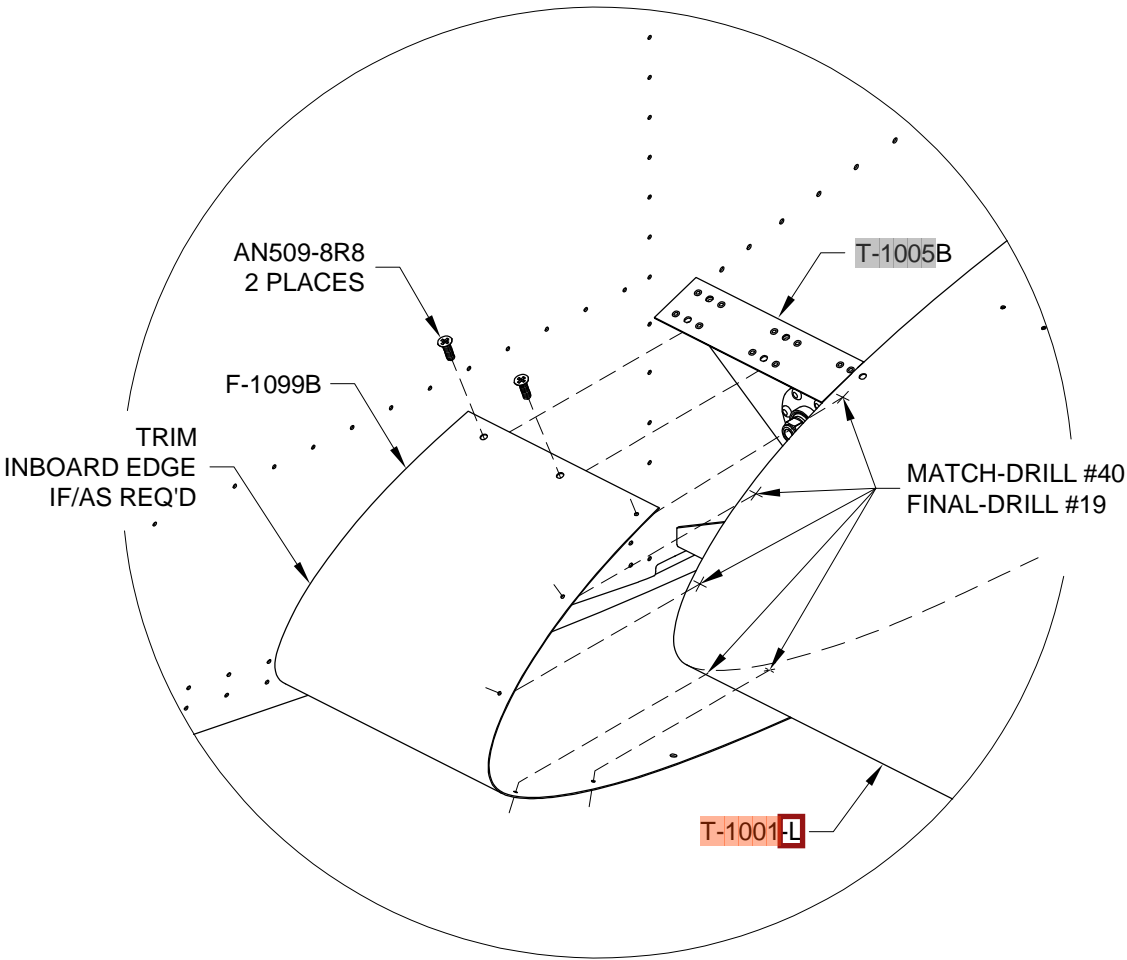
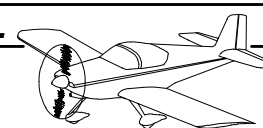


FIGURE 2:
MATCH-DRILL FUEL TANK SKIN



Step 1: Make from material AT0-032x1/4 soft aluminum tubing the left F-Vent Line Fuselage Vent Line as shown in Figure 1. After bending to the radius shown slide the coupling sleeve onto the short leg before flaring as it cannot be slid around the radius afterward. Flare the end of the tube as shown in Figure 1.

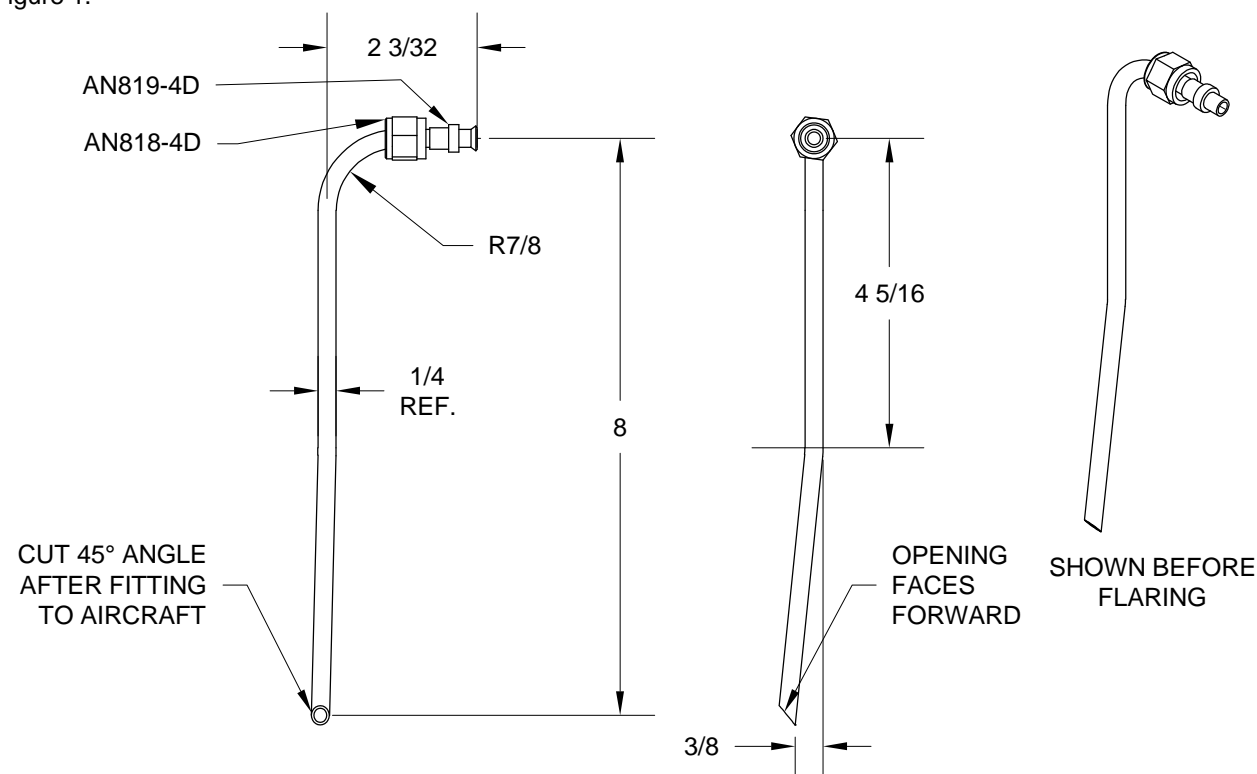


FIGURE 1: FABRICATING THE FUEL VENT LINE

Step 2: Install the F-Vent Line Fuselage Vent Line. Slip the non flared end into the snap bushing and mate the flared end to the union bulkhead, tube/tube fitting at the tank root rib as shown in Figure 2. Slide the coupling sleeve up to the flared end then tighten the coupling nut finger tight. Since the wing will be removed later do not fully tighten the nut for now. Check for fit. Adjust the tubing if req'd to minimize preload. About one inch of tubing should protrude from the F-1099B Lower Wing Root Fairing. Mark the exit end of the tube so that it may be cut to length after disassembly.

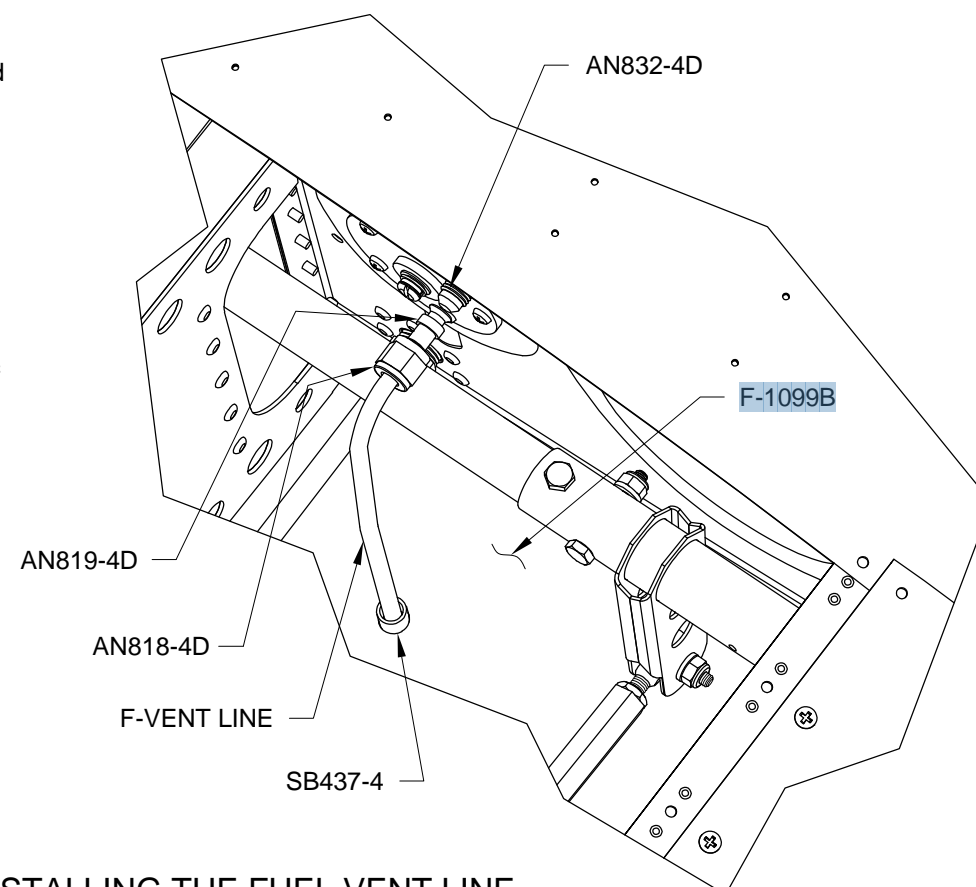


FIGURE 2: INSTALLING THE FUEL VENT LINE

Step 3: Cleco the F-1099F-L Wing Root Fairing Support to the F-01069-L-1 Forward Side Skin as shown in Figure 3. Cleco the F-1099E-L and F-1099H-L Wing Root Fairing Supports to the F-1070-L Mid Side Skin as shown in Figure 3.

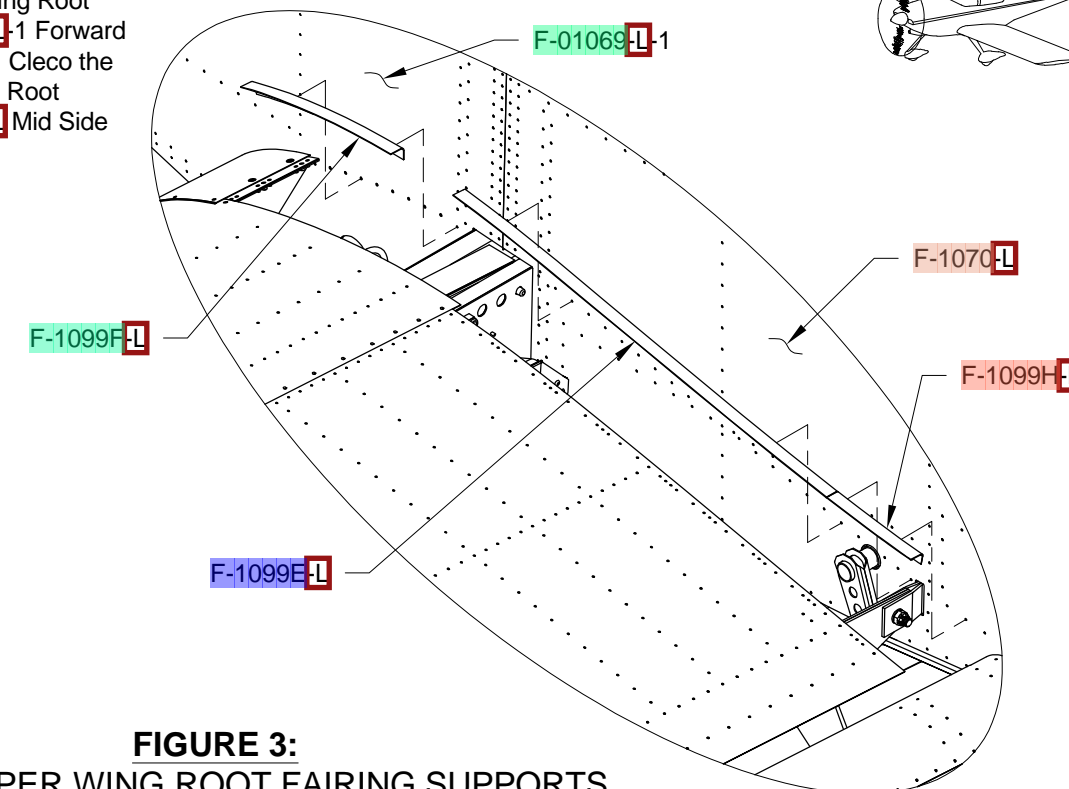


FIGURE 3: CLECO UPPER WING ROOT FAIRING SUPPORTS

Step 4: Fit the F-1099C Wing Walk Spacer on top of the wing spar assembly and into the gap between the center section assembly as shown in Figure 4. Check for fit and trim as req'd. Do not glue the spacer until the F-1099A Upper Wing Root Fairing has been positioned and match-drilled. This will provide an opportunity to check for the correct elevation of the spacer before final installation.

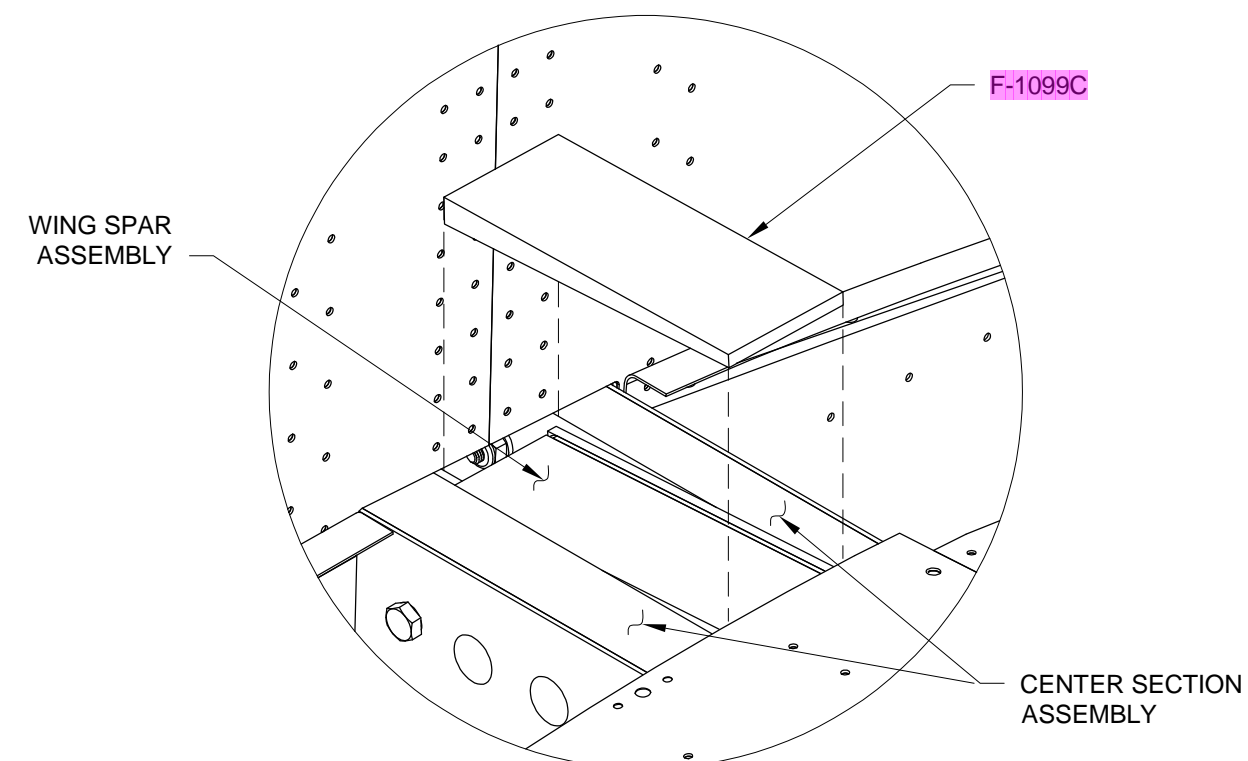
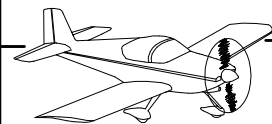


FIGURE 4: FITTING THE WING WALK SPACER



Step 1: Cut apart the F-1099D Wing Root Fairing Stiffeners as shown in Figure 1. Parts are shown unbent.

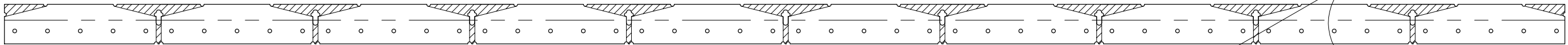


FIGURE 1: CUTTING APART THE STIFFENERS

Step 2: Cleco the F-1099D Wing Root Fairing Stiffeners to the F-1099A Upper Wing Root Fairing as shown in Figure 2. Final-Drill #40 the rivet attach holes. Disassemble, deburr, and dimple the parts. Prime as desired. Attach the stiffeners with the rivets called out.

NOTE: One wing root fairing stiffener faces the opposite direction.

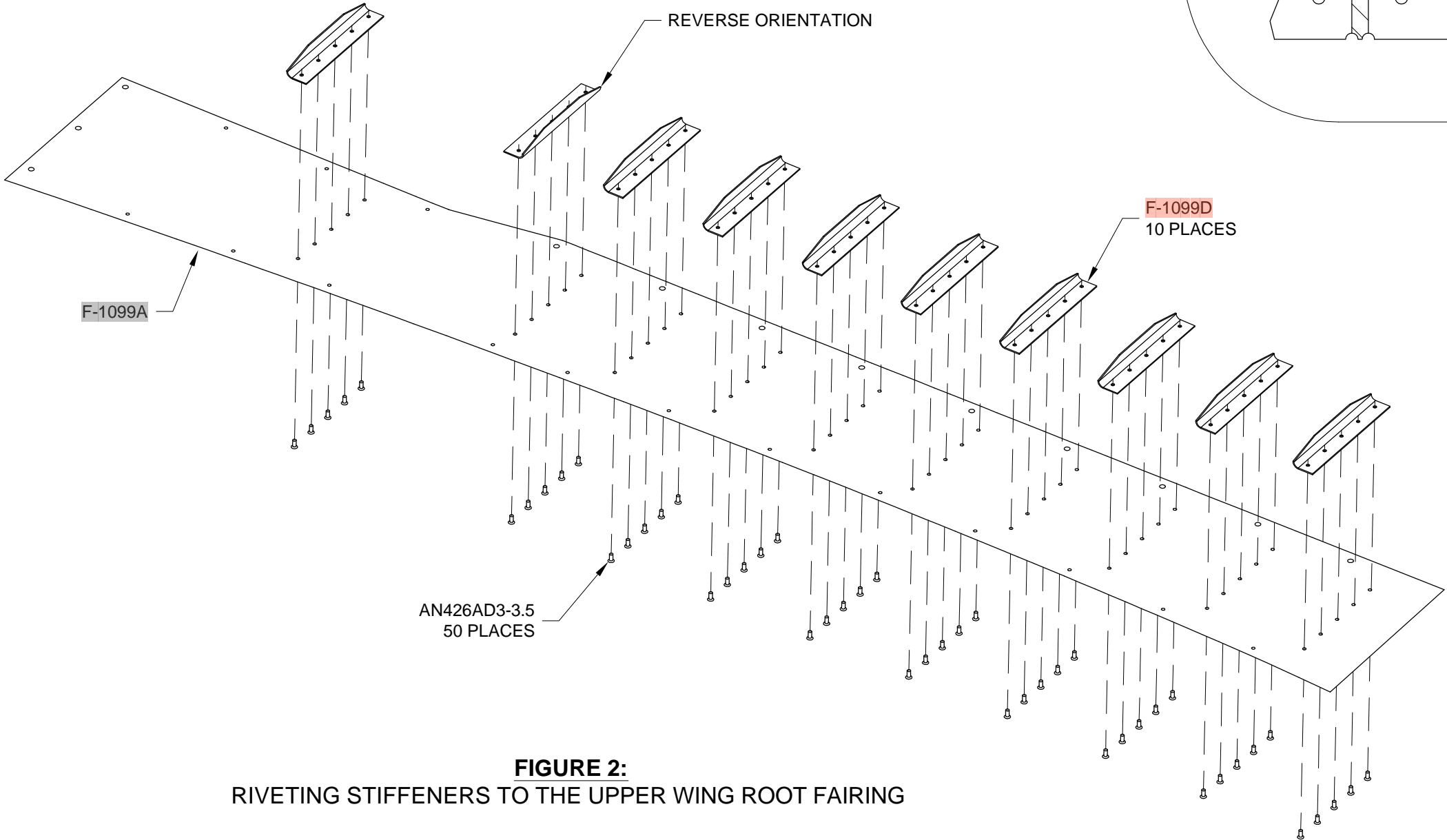
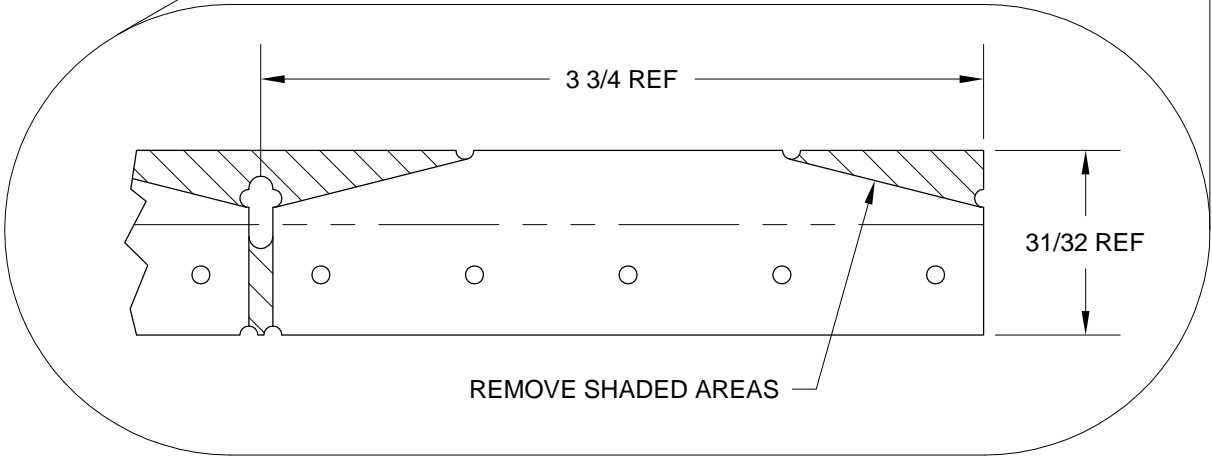
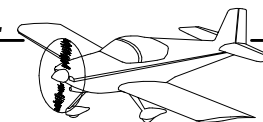


FIGURE 2:
RIVETING STIFFENERS TO THE UPPER WING ROOT FAIRING



Step 1: Align the F-1099A Upper Wing Root Fairing to the inboard edge of the W-1002-L Top Inboard Wing Skin, to the T-1001-L Fuel Tank Skin and to the T-1005-L/T-1005B Tank Attach Bracket and Shim. Inspect the upper wing root fairing in the area of the F-1099C Wing Walk Spacer and adjust the spacer if/as req'd. When satisfied attach the upper wing root fairing with the hardware called out in Figure 1.

Match-Drill #40 and cleco the F-1099E-L, F-1099F-L, and F-1099H-L Wing Root Fairing Supports and the fuel tank skin using the holes in the upper wing root fairing as guides. Final-Drill #19 the same holes.

Remove the upper wing root fairing and the wing walk spacer. Deburr and dimple all of the #19 holes in the upper wing root fairing.

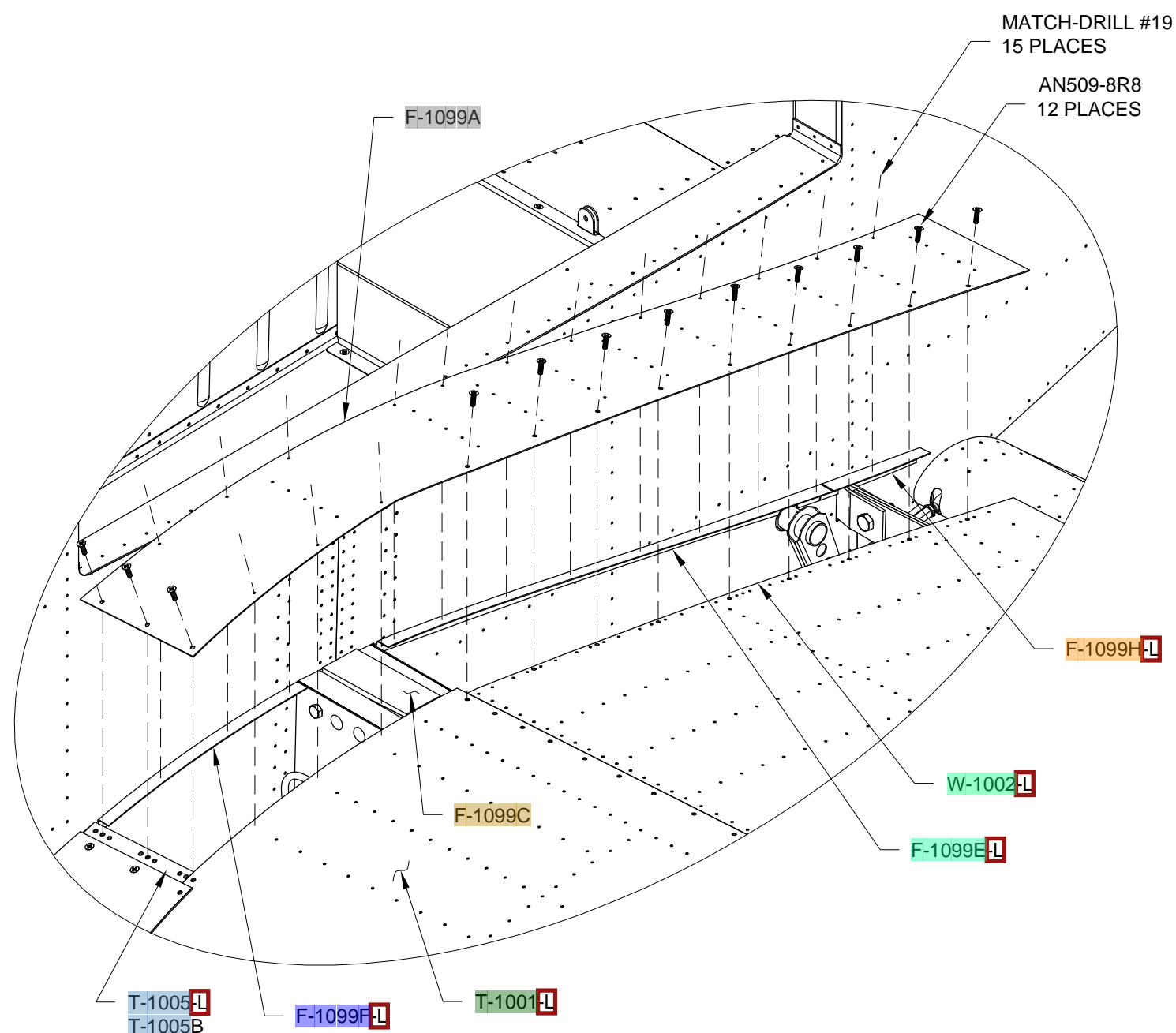


FIGURE 1:
MATCH-DRILLING WING ROOT FAIRING SUPPORTS

Step 2: Remove the F-1099B Lower Wing Root Fairing. Deburr and dimple the five #19 holes used as drill guides earlier as shown in Figure 2.

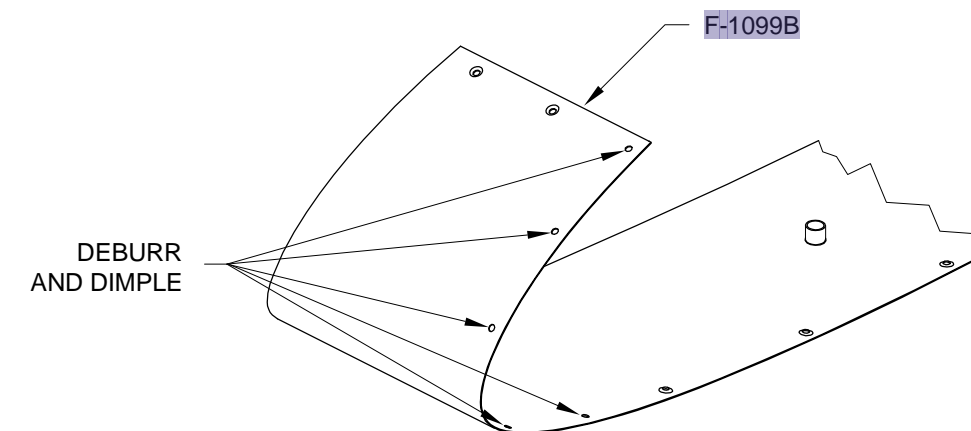


FIGURE 2:
DEBurr AND DIMPLE THE LOWER WING ROOT FAIRING

Step 3: Remove all wing root fairing supports. Final-Drill #40 F-1099E-L, F-1099F-L and F-1099H-L Wing Root Fairing Supports for the nutplate rivet holes using a K1100-08 nutplate as a guide. Deburr these holes. Dimple the #40 holes for AN426AD3 rivets. Dimple the nutplates to receive the dimple in the angle for the nutplate attach rivets. Deburr the #19 holes then dimple them to receive the dimpled F-1099A Wing Root Fairing. Prime if/as desired. Except for the four to be attached later, rivet the nutplates in place using the hardware callouts in Figure 3.

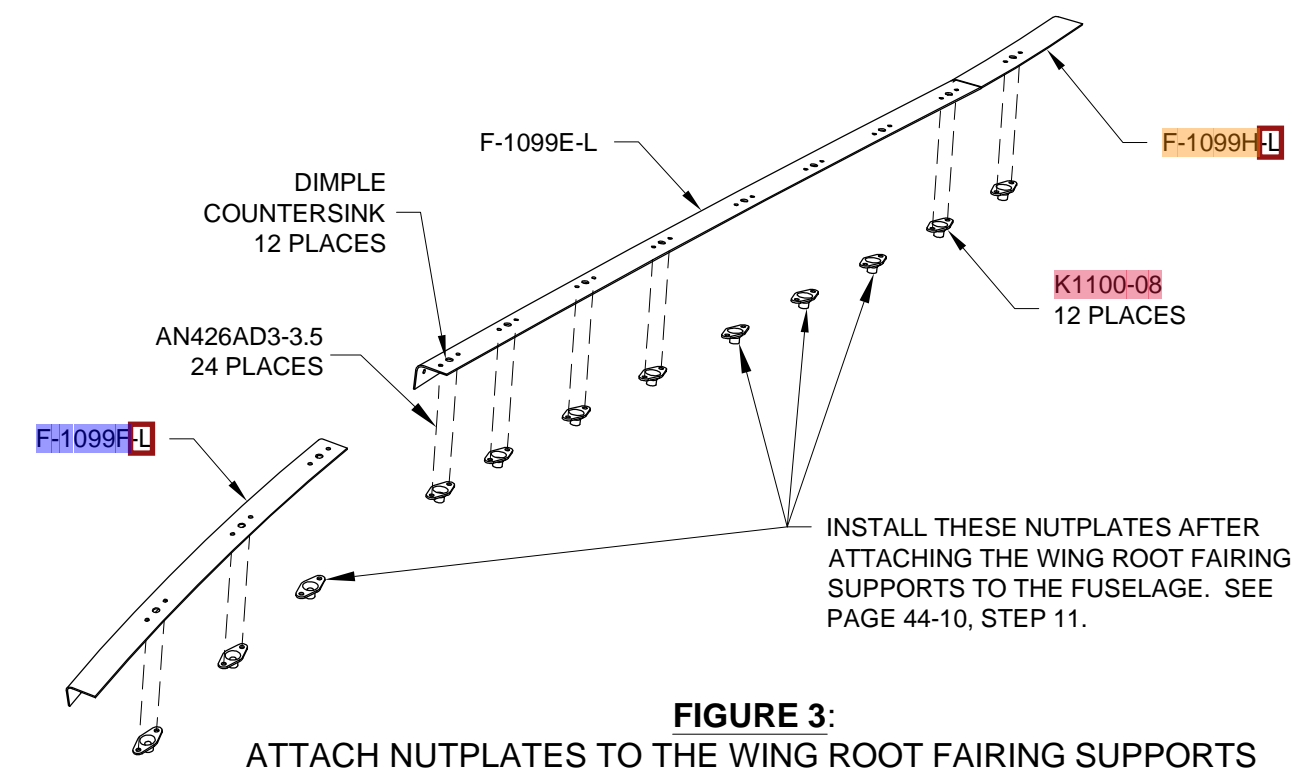
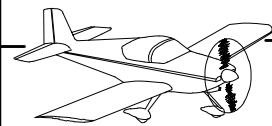


FIGURE 3:
ATTACH NUTPLATES TO THE WING ROOT FAIRING SUPPORTS



Step 1: Remove the F-Vent Line Fuselage Vent Line.

Disconnect the VA-256 Flap Pushrod.

Disconnect the F-1064 Aileron Pushrod.

Step 2: Unbolt the rear spar from the F-1005B Rear Spar Attach Bars.

Step 3: Support the wing. Remove the drift pins from the wing spar/center section and remove the wing.

Step 4: Deburr the hole in the rear spar and the holes F-1005B Rear Spar Attach Bars.

Step 5: Final-Drill #40 and machine countersink the T-1001-L Fuel Tank Skin for the nutplate rivet attach holes as shown in Figure 1. Deburr and dimple the #19 screw holes in the tank skin. Rivet the nutplates to the fuel tank skin as per the callouts in Figure 1.

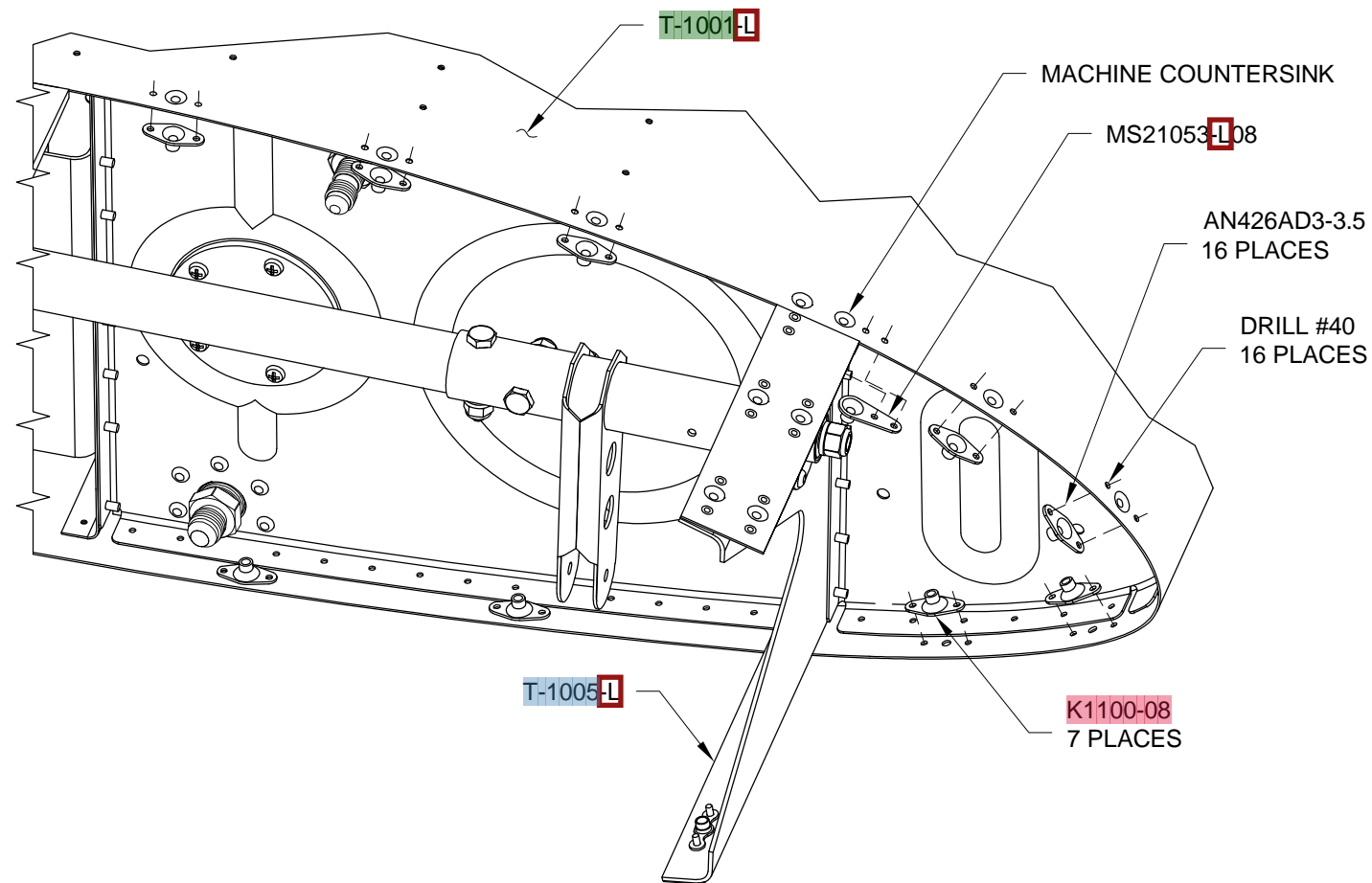


FIGURE 1:
ATTACH TANK SKIN NUTPLATES

Step 6: Cut the fuel supply line to the length marked earlier. Slide a coupling nut over the end of the tube followed by a coupling sleeve and flare the end of the tube as shown in Figure 2.

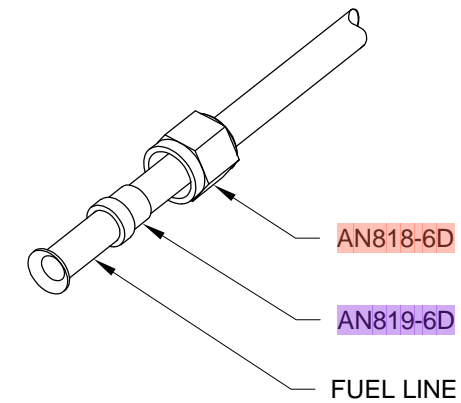


FIGURE 2: ASSEMBLE FUEL SUPPLY LINE

Step 7: Install snap-bushings or equivalent for the pitot system entry points into the fuselage. These positions are to be determined by the builder.

Step 8: Rivet the F-1099F-L and the F-1099G-L Wing Root Fairing Supports to the F-01069-L-1 Forward Side Skin and rivet the F-1099E-L and the F-1099H-L Wing Root Fairing Supports to the F-1070-L Mid Side Skin using the rivets shown in the callouts in Figure 3.

Step 9: Rivet the three nutplates omitted on Page 44-9, Step 3 to the F-1099E-L Wing Root Fairing Support Angle as well as the one nutplate for the F-1099F-L Wing Root Fairing Support Angle.

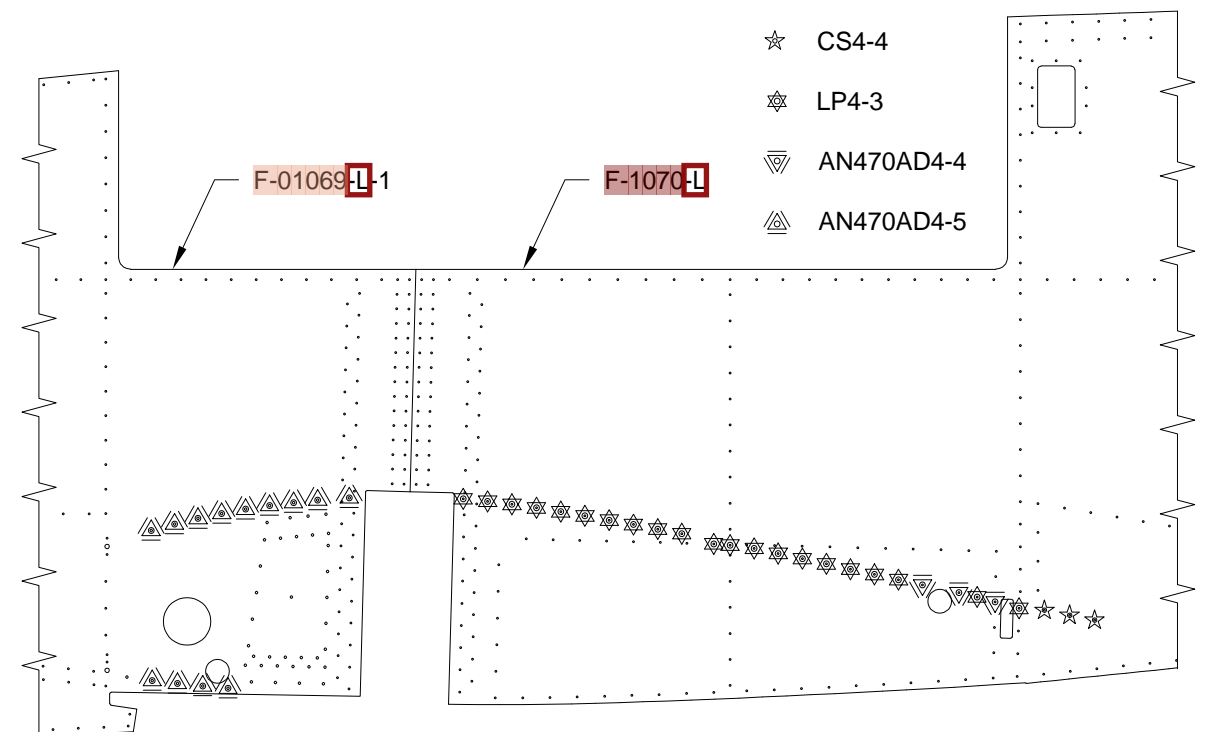


FIGURE 3: ATTACH WING ROOT FAIRING SUPPORTS

The following steps may be performed at the builders convenience.

Step 1: Pin the wing to the fuselage using the same drift pins from Page 44-3, Step 1.

NOTE: When installing the wing lubricate the NAS bolts with LPS #1,2 or 3 (available in a spray can). In lieu of that a light coat of ordinary motor oil will do.

CAUTION: Do not lubricate the threaded portion of the bolt as this will cause the bolts to be incorrectly torqued.

Install the bolts called out in Figure 1 in the remaining six holes. Replace the two drift pins with the hardware called out in Figure 1. See Section 5 under the heading 'Nut and Bolt Torques' for the appropriate torque values.

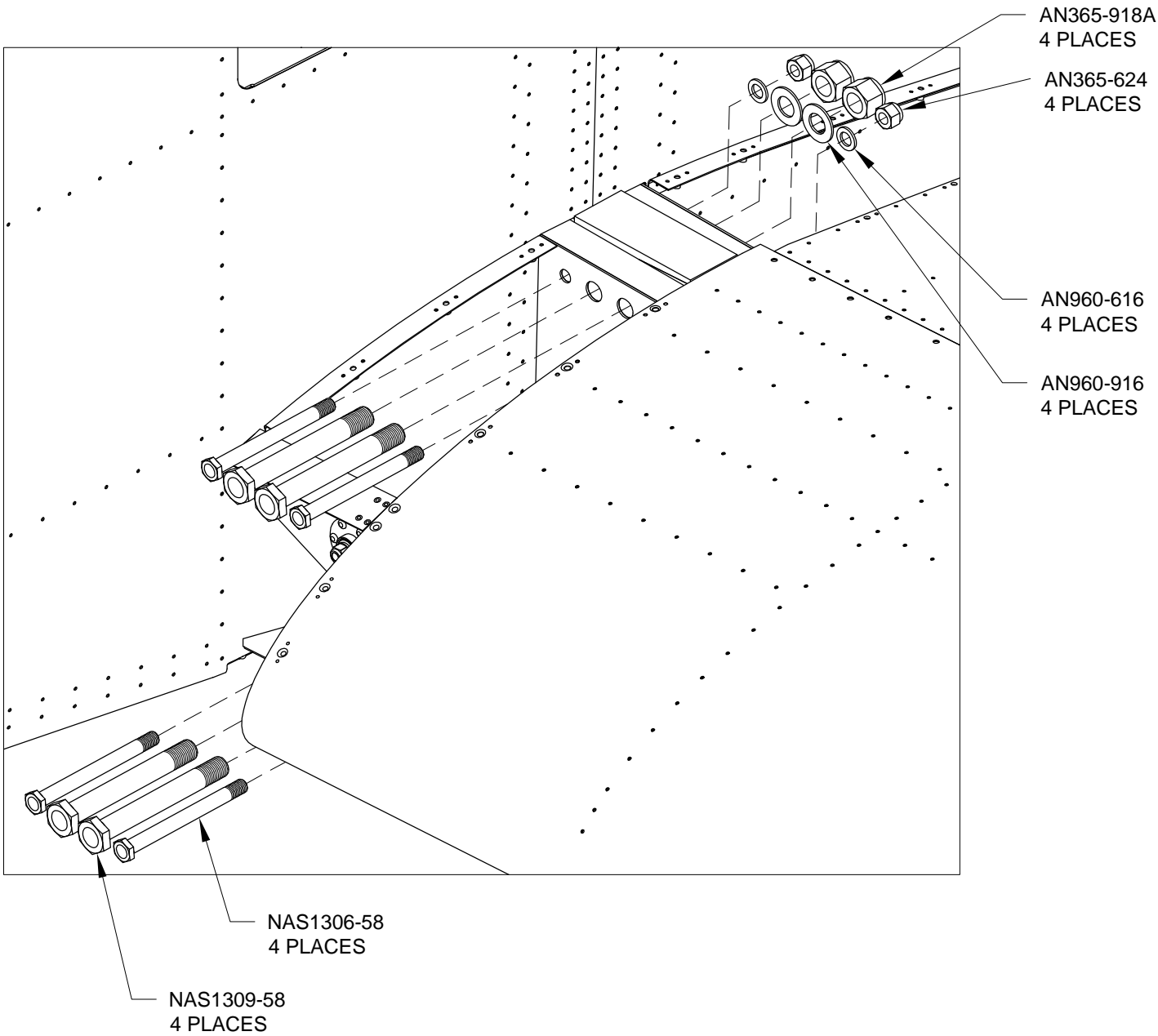


FIGURE 1: FINAL WING ATTACHMENT

Step 2: Install the **F-1004J** Center Section Upright Bar (not shown) hardware as called out in Figure 2.

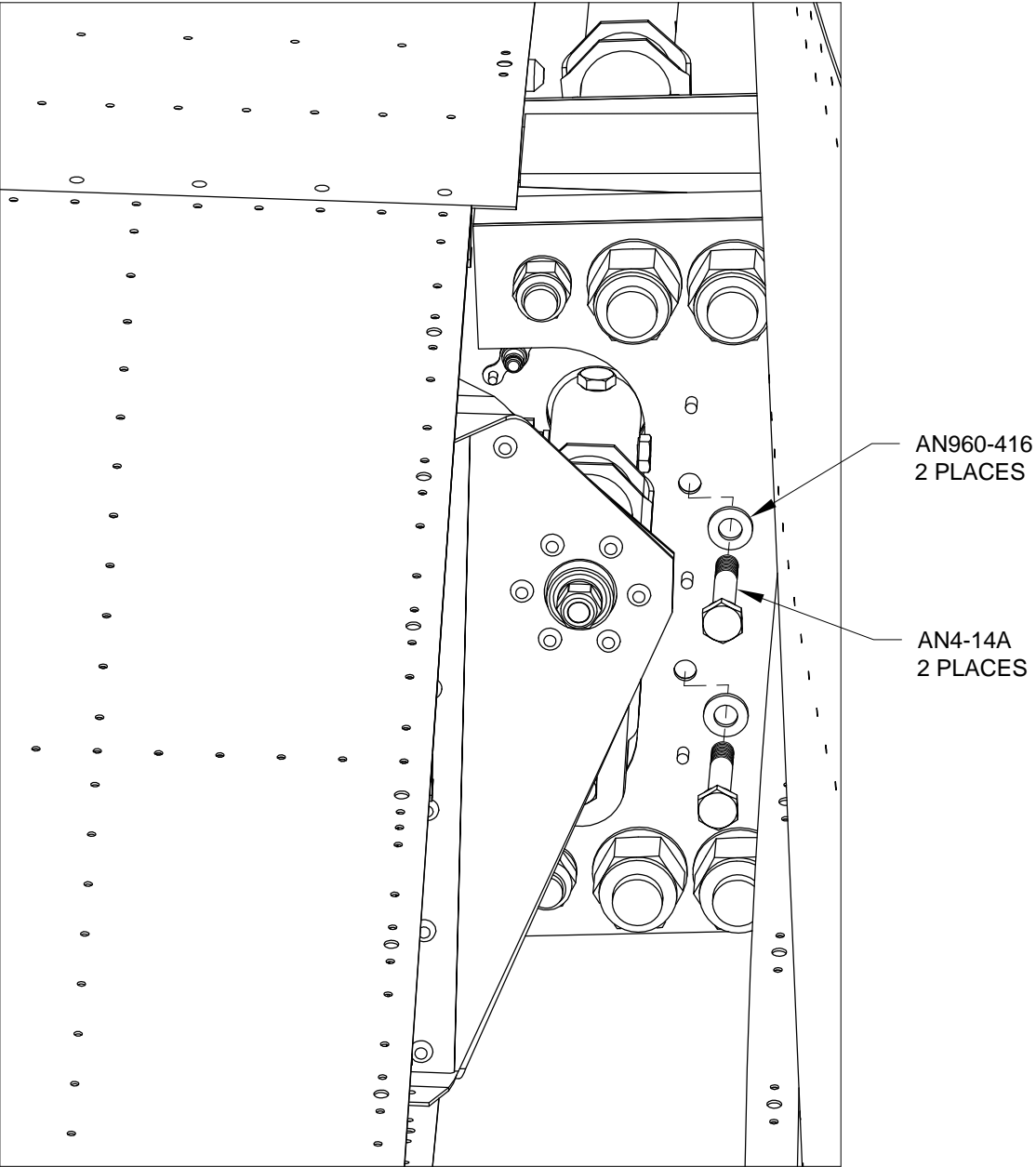
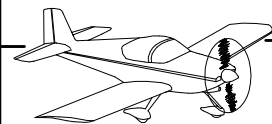


FIGURE 2: INSTALLING CENTER SECTION UPRIGHT BAR HARDWARE
REAR VIEW



Step 1: Reinstall the rear spar attach hardware. See Page 44-3, Figure 3. Don't forget the cotter pin.

Step 2: Reinstall the F-1054-L Tank Attach Angle hardware. See Page 44-3, Figure 4.

Step 3: Reinstall the F-1064 Aileron Pushrod Assembly attach hardware. See Page 44-4, Figure 1.

Step 4: Connect the fuel supply line to the VA-261 Fuel Strainer fitting using the hardware shown in Figure 1.

Step 5: Reinstall the VA-256 Flap Pushrod Assembly. See Page 44-5, Figure 2.

Step 6: Reinstall the F-1099B Lower Wing Root Fairing. Five additional AN509-8R8 screws are required beyond those depicted on Page 44-6, Figures 1 and 2.

Step 7: Reinstall the F-Fuel Vent Fuselage Fuel Vent line. See Page 44-7, Figure 2.

Step 8: Permanently install the F-1099C Wing Walk Spacer, gluing it to the top of the spar with RTV or Proseal. See Page 44-7, Figure 4.

Step 9: Reinstall the F-1099A Upper Wing Root Fairing. Fifteen additional AN509-8R8 screws are required beyond those depicted on Page 44-9, Figure 1.

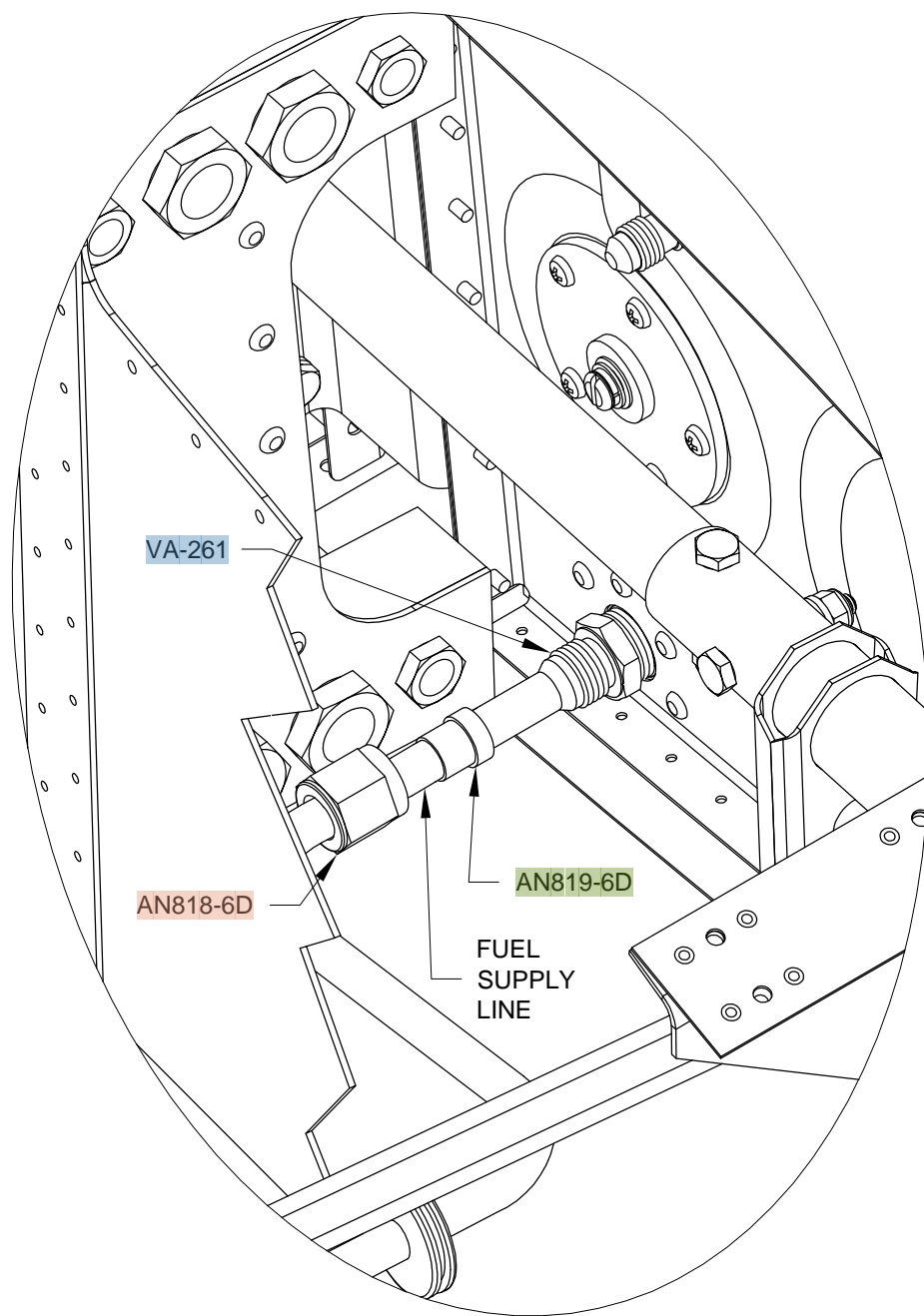


FIGURE 1: CONNECTING THE FUEL SUPPLY LINE