

VAN'S AIRCRAFT

TOTAL PERFORMANCE

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NOTIFICATION 16-12-14

Date Released: December 14, 2016
Date Effective: December 14, 2016
Subject: Angle-Of-Attack Installation
Affected Models: RV-12
Required Action: Optional Installation
Time of Compliance: Optional Installation
Supersedes Notice: N/A

Labor Required / SLSA Warranty Allowance: 6.5 Hours / N/A

Level of Certification: (Owner, LSA Repairman Inspection - *not applicable to SLSA*), LSA Repairman Maintenance, A&P

Synopsis: This Notification allows the installation of an Angle-Of-Attack (AOA) system on the RV-12.

Method of Compliance:

Step 1: Purchase the RV-12 AOA RETRO KIT.

Step 2: Remove both wings, both Seat Backs and Bottom cushions, F-1227 Seat Ramp Cover, Flap Detent Bracket Assy, F-1228 Seat Floor Cover, F-1229 and F-1206E or F-00081 Baggage Floor Covers, F-1207F or F-00102 and F-00103 Baggage Bulkhead Corrugation, and the Left F-00032 Fuselage Side Cover.

Step 3: Place the left wing upside-down on padded sawhorses or table.

Step 4: Remove the VA-195H Access Hatch from the left wing.

Step 5: Drill #30 a hole for the SD-42-BSLF AOA Pressure Port Rivet on lower surface of the left wing as per Figures 1 and 2.

Set the SD-42-BSLF rivet until it is tight in the skin without breaking the mandrel off.

Drive out the mandrel. Place a block of wood with a 3/16 in. hole behind the rivet so as to not distort the wing skin while driving out the mandrel.

Step 6: Drill #30 hole in the J-channel directly above the AOA port rivet, see Figure 3.

Step 7: Route the PT 1/8 CLR plastic tubing from the AOA port rivet up to the J-channel. Secure the tubing with a tie-wrap. This increase in elevation of the tubing will help to prevent water incursion into the plastic tubing and allow water to drain after flight through rain.

Step 8: Use RTV sealant to secure the PT 1/8 CLR plastic tubing to the shop head of the SD-42-BSLF AOA port rivet. Dry-fit the plastic tubing to the rivet then build a wide bead of RTV sealant to hold the tubing to the wing skin/rivet (do not get RTV sealant inside the tubing or the rivet).

Step 9: Install PT 1/8 CLR plastic tubing in the wing.

On retrofit installations secure the PT 1/8 CLR tubing with RTV sealant and tie-wraps in the upper skin J-channel from the AOA port rivet to the second rib from the wing root.

Make sure to use RTV sealant to prevent the tubing from chafing where it crosses the edge of the J-channel.

On new-build installations use the W-00032B AOA Drill Template as in Step 11 to drill #30 pilot holes in seven W-1208 Nose Ribs, from the second inboard rib to the stall warning bay inboard nose rib, see Figure 4.

Use a step drill to enlarge the seven pilot holes to 3/8 in. and deburr.

Install seven BUSHING SB375-3 snap bushings.

Route the PT 1/8 CLR tubing through the SB375-3 snap bushings just installed.

Step 10: Separate the W-00032 AOA Drill Template into the W-00032A and the W-00032B AOA drill templates, see Figure 5.

Step 11: Cleco the W-00032B AOA drill template to the left inboard W-1208 nose rib using the two holes that coincide with the ES-00081 Standoff attach points (temporarily remove standoffs if installed), see Figure 4 and KAI 16-04.

Drill #30 a pilot hole at the location indicated by the AOA drill template.

Remove the AOA drill template.

Use a step drill to enlarge the #30 pilot hole to 15/32" and deburr.

Re-install the ES-00081 Standoffs (if removed).

Step 12: Fabricate a Plastic Tubing Adapter from a piece of PT-035X1/4 plastic tube 3/4 in. long, see Figure 6.

Step 13: Push the wing root end of the PT 1/8 CLR plastic tubing 3/8 in. into the plastic tubing adapter and seal with RTV.

NOTE: The FLF-00012 fitting is designed to allow the nuts to only come off one end. Proper installation of the fitting takes advantage of this feature.

Thread one nut all the way onto each fitting until it will not go on any further, this becomes the “fixed” nut, see Figures 6 & 7. Tighten the “non-fixed” nut to 10 in. lbs. when installing these fittings.

Step 14: Install a FLF-00012 bulkhead fitting in the left inboard W-1208 nose rib with the “fixed” nut end oriented inboard, see Figure 10.

Step 15: Install the plastic tubing adapter and PT 1/8 CLR plastic tubing into the outboard end of the wing FLF-00012 fitting. The plastic tubing adapter will go 1/2 inch into the FLF-00012 fitting, see Figure 7.

Step 16: Install the PT-035X1/4 plastic tubing in the fuselage.

Route the tubing from the ADAHRS to the F-1203A bulkhead along the same path as the Aft Pitot Tube, then through the left side F-1215 seat rib snap bushings out to the left F-00034A Wing Electrical Bracket, refer to KAI 31B-23 and KAI 31B-24.

It is helpful to cut the end of the plastic tubing at an angle to make it easier to thread the tubing through the wires and tubes running in the tunnel area. Cut all plastic tubing ends square before installing into any fittings.

Secure the plastic tubing with tie-wraps.

Step 17: Move the flight controls through all extents multiple times to confirm there is no interference between any tubing or wires and any flight controls or the flaperon linkage. Inspect for interference with the flaps in all positions.

Step 18: Install FLF-00007 fitting in the AOA port on the ADAHRS, refer to KAI 42N-02 for Garmin and KAI 42C-10 for Dynon.

Step 19: Connect the PT-035X1/4 plastic tubing to the AOA port fitting on the ADAHRS.

NOTE: The length of the aluminum connector tube is critically important and dependent on proper installation of both FLF-00012 fittings.

Step 20: Fabricate the Aluminum Connector Tube from the piece of AT6-049X1/4 aluminum tube, see Figure 5.

Use the W-00032A AOA Drill Template as a guide for the length and radius of the aluminum connector tube.

Radius both ends of the aluminum connector tube .032 in. The ends of the aluminum connector tube must be free of burrs, nicks and scratches.

Wipe a thin coating of Dow Corning #4 silicone lubricant (or equivalent) on both ends of the aluminum connector tube before insertion into the FLF-00012 fittings.

Step 21: Remove the F-00034-L Wing Electrical Bracket from the F-1226-L Seat Floor Ramp, see KAI 31B-24.

Step 22: Remove the ES-00077 Floating 8 Pos Connector Female from the F-00034-L wing electrical bracket.

Step 23: Deburr and edge prep the F-00034A Wing Electrical Bracket.

Step 24: Tap 8-32 the four holes that attach the wing electrical bracket to the seat floor ramp and prime (if desired).

Step 25: Attach the ES-00077 Floating 8 Pos Connector Female to the F-00034A wing electrical bracket.

Step 26: Install the FLF-00012 fitting in the F-00034A wing electrical bracket, see Figure 8.

Step 27: Install the FLF-00015 Guide on the outboard end of the fuselage FLF-00012 fitting. Apply a couple drops of Cyanoacrylate (CA) Glue to the exposed threads of the FLF-00012 fitting and attach the Guide with firm "finger-tight" pressure, see Figure 8.

The FLF-00015 Guide compresses the FLF-00012 fitting release ring, allowing the aluminum connector tube to slide freely in and out of the FLF-00012 fitting during wing installation and removal.

Verify that the FLF-00012 fitting release ring is compressed by inserting and removing the aluminum connector tube. The aluminum connector tube must not lock into the fuselage FLF-00012 fitting. Remove the aluminum connector tube.

Step 28: Install the PT-035X1/4 plastic tube from the ADAHRS AOA port into the "fixed" nut end of the FLF-00012 fitting.

Step 29: Install the wing electrical bracket to the F-1226-L seat floor ramp, see KAI 31B-24.

Step 30: Attach the W-00032A AOA Drill Template to the outside of the left F-00032 Fuselage Side Cover using #8 screws and nuts, see Figure 9.

Match drill #19 the pilot hole.

Remove the AOA drill template.

Use a step drill to enlarge the pilot hole to 3/4 in. and deburr.

Step 31: Install the left F-00032 Fuselage Side Cover.

Step 32: Fully insert the aluminum connector tube into the "fixed" nut end of the wing FLF-00012 fitting until it will not go in any further, see Figure 10.

Step 33: Verify the aluminum connector tube does not come out of the wing FLF-00012 fitting unless the release ring is depressed.

NOTE: AOA Aluminum Connector Tube engagement depth must be verified and fall within acceptable limits to avoid damage to AOA system components and maintain AOA system integrity.

Step 34: Test the aluminum connector tube engagement depth into the fuselage FLF-00012 fitting. It would be helpful to have an assistant for the following steps.

Locate the W-00032A AOA Drill Template, it has a small notch that is used as a go, no-go gauge to measure the aluminum connector tube engagement depth O-ring, see Figure 11.

Install the supplied 1/4 in. I.D. O-ring on the exposed end of the aluminum

connector tube approximately 1/4 in.

Install both wings and engage both spar pins.

Perform the rear wing spar play inspection, as per “*ELIMINATING PLAY IN THE RV-12 REAR WING SPAR*” document, available from the “*Construction FAQs*” web page at vansaircraft.com. If excessive rear wing spar play is found, complete the repairs called out in that document before proceeding.

Remove the left wing far enough to access the aluminum connector tube without disturbing the engagement depth O-ring.

Using the W-00032A AOA Drill Template, gauge the distance from the fuselage end of the aluminum connector tube to the engagement depth O-ring, as per Figure 11.

Acceptable limits of engagement measured from the fuselage end of the aluminum connector tube to the nearest edge of the engagement depth O-ring are 17/32 in. minimum and 19/32 in. maximum.

If your measurement is less than the minimum, move the wing FLF-00012 fitting inboard by adjusting the FLF-00012 fitting nuts. Each full turn of the FLF-00012 fitting nut equals .040 in. adjustment. Adjust as necessary and re-test engagement depth.

If your measurement is more than the maximum, shorten the aluminum connector tube by 1/32 in., radius the end of the tube and re-test engagement depth.

NOTE: During initial AOA system installation testing the AOA tubing will be temporarily connected to the ADAHRS pitot port. Do not fly the airplane without connecting all AOA, pitot and static tubing to the proper ADAHRS ports.

NOTE: When performing any AOA, Static or Pitot system pressure test on a Dynon SkyView system it is required to be at Software Version 15.0.4 (or greater) and all testing must be performed in the SETUP MENU > HARDWARE CALIBRATION > ADAHRS CALIBRATION > PITOT/STATIC TEST MODE.

Step 35: This test must be used to test AOA system plumbing integrity during initial AOA system installation.

Install both wings and engage both spar pins.

Disconnect the pitot tubing from the ADAHRS pitot fitting, connect the AOA tubing to the ADAHRS pitot fitting.

Using a 35cc syringe, push the plunger in to 7.5cc, use modeling clay to hook-up the syringe and a vacuum hose to the AOA port.

Turn on the EFIS (see Dynon NOTE above), use the syringe to slowly, carefully push air into the AOA port. Look for an airspeed indication on the EFIS, push-in the syringe until 130 kt indicates.

Move the left wing tip back and forth, as per the “*ELIMINATING PLAY IN THE RV-12 REAR WING SPAR*” document, while performing the AOA system leak test to verify AOA system integrity.

Start stopwatch and note the airspeed _____ kts after one minute.

Maximum allowable AOA system leak rate is 10 kt in one minute.

If the AOA system does not hold test pressure for the required time inspect the modeling clay to wing seal before inspecting other AOA system components. Inspect and repair or replace any faulty AOA system components, as necessary. Re-test AOA system plumbing integrity.

Reattach the pitot and AOA tubes to the proper ADAHRS port fittings.

NOTE: The AOA system plumbing must pass this leak test during every inspection and every time the wings are removed and installed.

Step 36: After the AOA system has been properly calibrated in flight, this test is used to test AOA system plumbing integrity during every inspection and every time the wings are removed and re-installed.

See the Dynon Note above. It will be necessary to use two syringes. Pressurize the pitot system to 130 kt while simultaneously pressurizing the AOA port, as described in the initial test above. Watch the EFIS AOA indication. Increasing AOA port pressure will cause the EFIS AOA indicator to move from green to red. Do not apply more pressure than necessary to move the AOA indication into the red zone. Stop pushing-in the syringe.

Move the left wing tip back and forth, as per the “*ELIMINATING PLAY IN THE RV-12 REAR WING SPAR*” document, while performing the AOA system leak test to verify AOA system integrity.

The maximum allowable AOA system leak rate is less than full AOA indicator scale, from red to green, in one minute.

If the AOA system does not hold test pressure for the required time inspect the modeling clay to wing seal before inspecting other AOA system components. Inspect and repair or replace any faulty AOA system components, as necessary. Re-test AOA system plumbing integrity.

Step 37: Install the VA-195H Access Hatch.

Step 38: Verify the pitot and AOA tubes are attached to the proper ADAHRS port fittings.

Step 39: Install the F-1227 Seat Ramp Cover, Flap Detent Bracket Assy, F-1228 Seat Floor Cover, F-1229 and F-1206E or F-00081 Baggage Floor Covers, F-

1207F or F-00102 and F-00103 Baggage Bulkhead Corrugation, and both Seat Backs and Bottom Cushions.

Step 40: Configure, calibrate and test your EFIS to display AOA information using the Dynon or Garmin AOA setup instructions, as necessary. Also refer to the Van's Aircraft "readme" file that pertains to your EFIS system for additional information.

AOA calibration must be done in flight, take all necessary precautions.

Step 41: Make a logbook entry indicating compliance with Notification 16-12-14.

Step 42: Place a copy of this notification in the back of the Maintenance Manual for your aircraft. Note the addition of this notification to the bottom of the Maintenance Manual table of contents.

NOTE: This system would work just as well with D-180 equipped airframes, although the old style interface connectors with the tabs in UHMW would need to be updated to use the ES-00077 & ES-00078 Floating Electrical Connectors and associated hardware. Contact Van's Aircraft for guidance.



Figure 1: AOA Port location measurements on bottom of left wing. Note: Outboard end of wing is shown on the left.

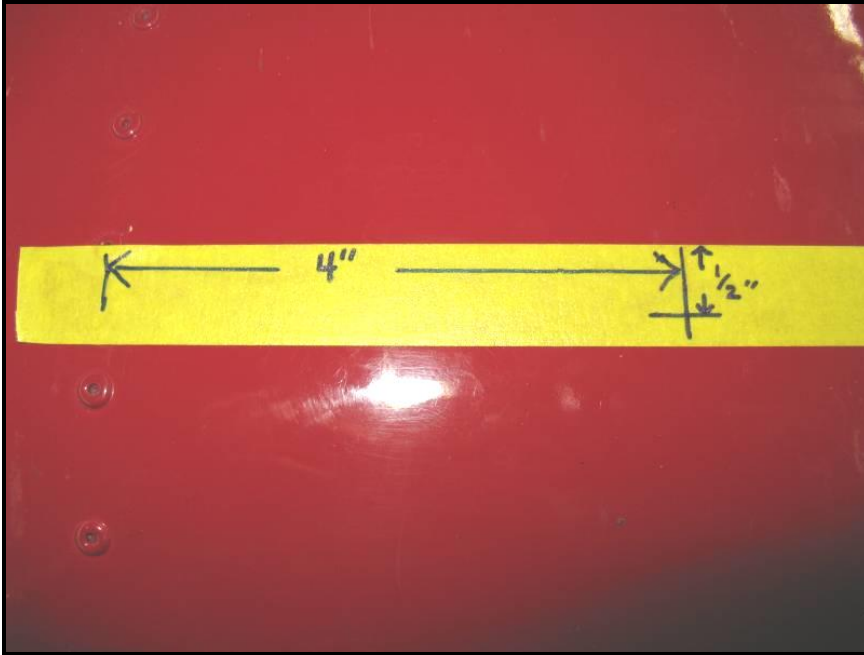


Figure 2: Close-up view of Figure 1.



Figure 3: Drilling J-channel above the AOA port rivet for a tie-wrap.

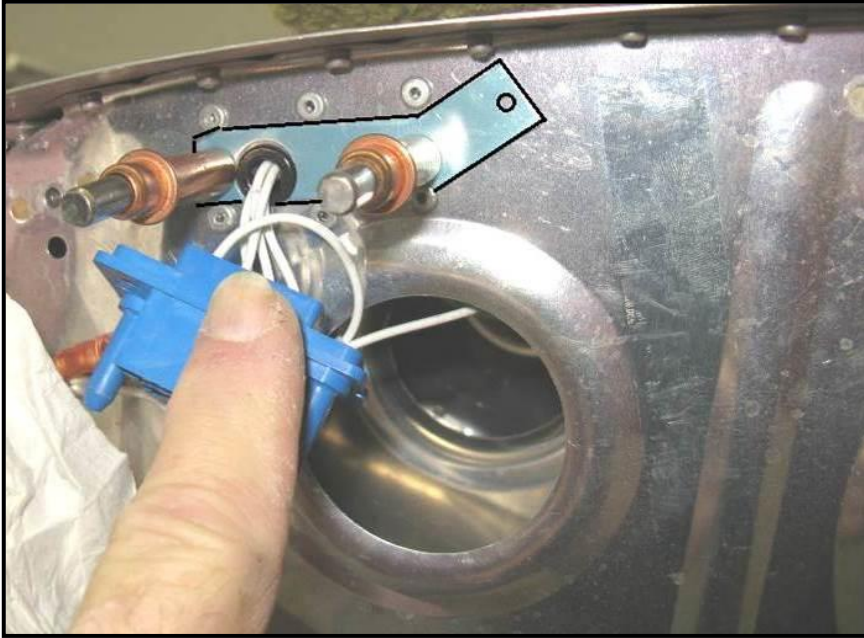


Figure 4: Left Wing W-1208 Nose Rib with W-00032B AOA Drill Template Colecoed in position. NOTE: The wing is shown upside down in this photo.

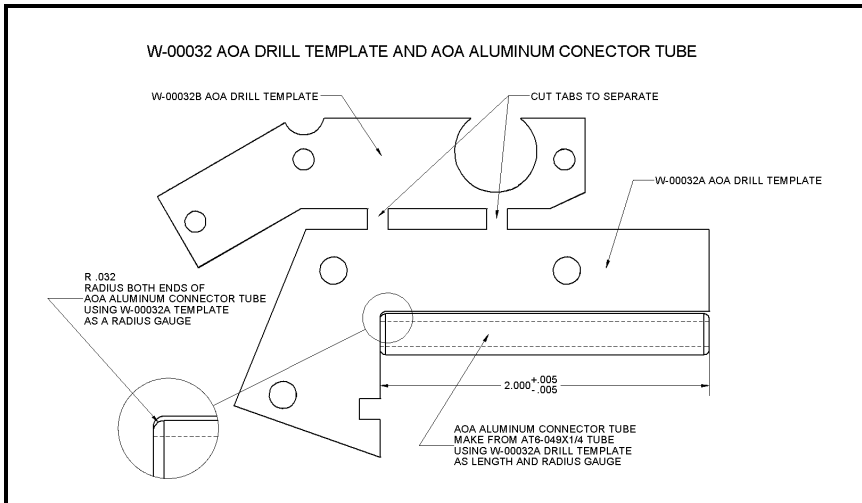


Figure 5: AOA Drill Template Identification and AOA Aluminum Connector Tube fabrication guide.



Figure 6: Plastic Adapter Tube made from PT-035X1/4, 3/4 in. long with “fixed” nut shown on right.



Figure 7: Plastic Adapter Tube fully inserted (1/2 in.) into the Wing FLF-00012, with the “fixed” nut shown on left. Not shown is the “non-fixed” nut already installed on the PT 1/8 CLR tubing and the tubing then inserted through the FLF-00012 mounting hole in the nose rib.

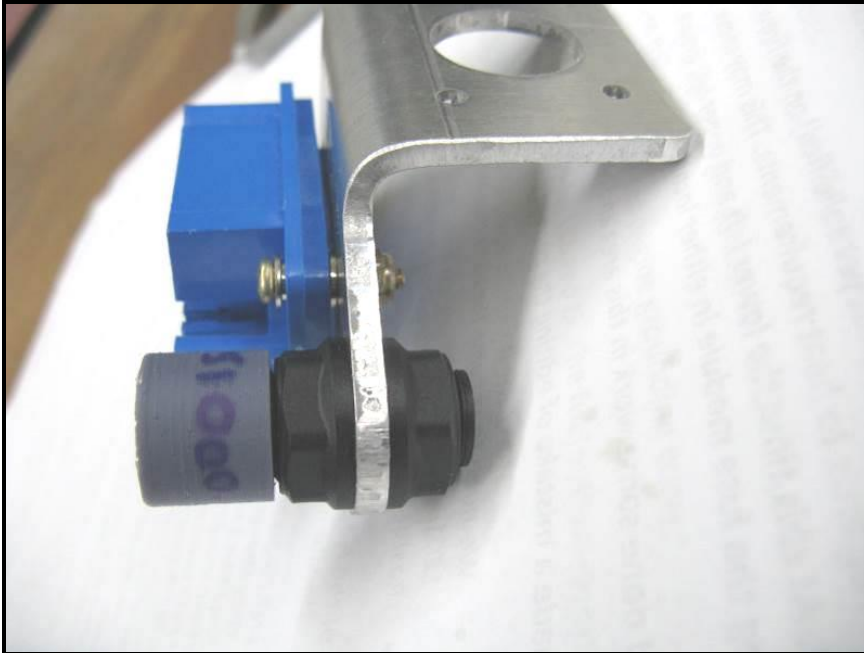


Figure 8: ES-00077 Electrical Connector, FLF-00012 Fitting and FLF-00015 Guide installed on F-00034A Bracket. Note: “Fixed” nut end faces inboard, as shown on the right.

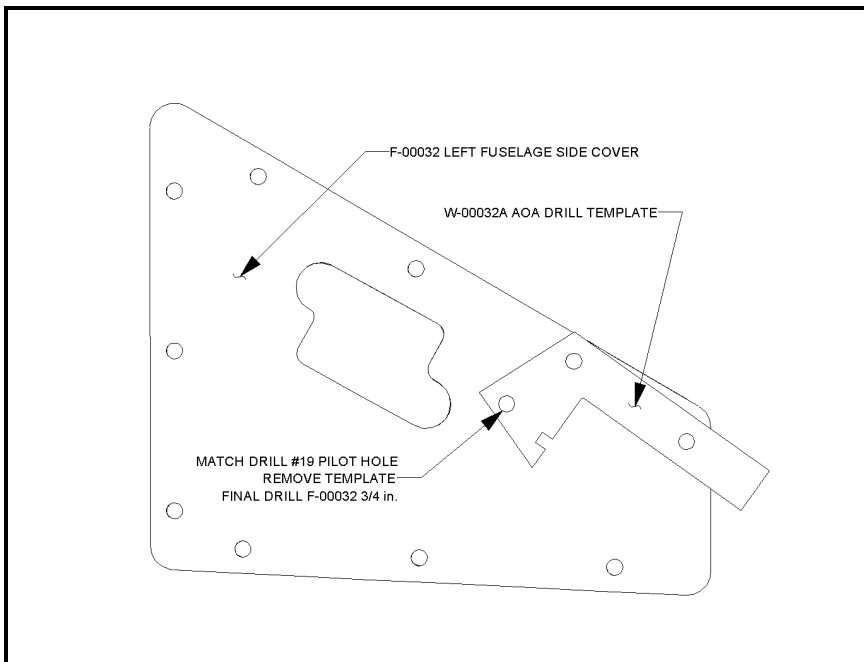


Figure 9: W-00032A AOA Drill Template located on left F-00032 Fuselage Side Cover.

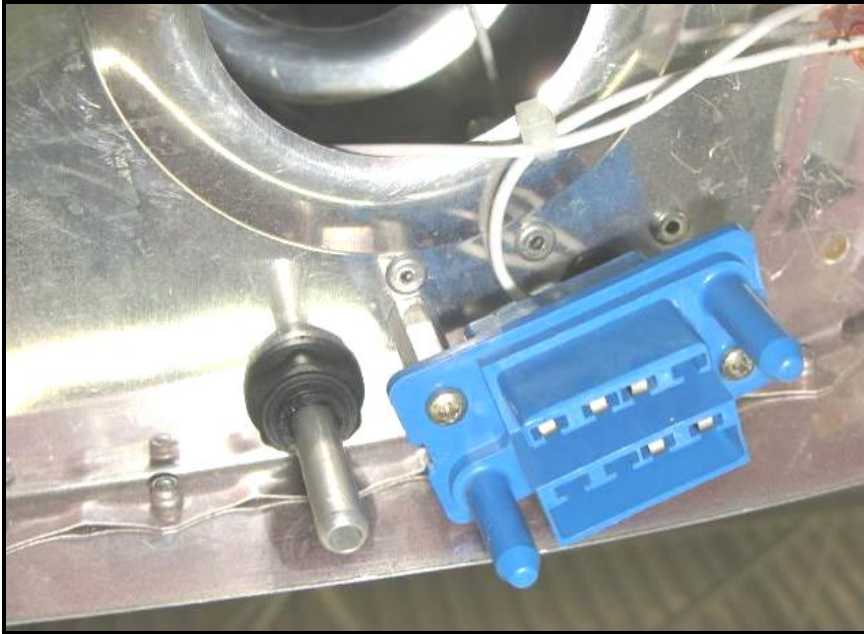


Figure 10: Wing FLF-00012 fitting installed with the AOA Aluminum Connector Tube fully inserted. FLF-00012 “fixed” nut end faces inboard, as shown. NOTE: The wing is shown correct side up in this photo.

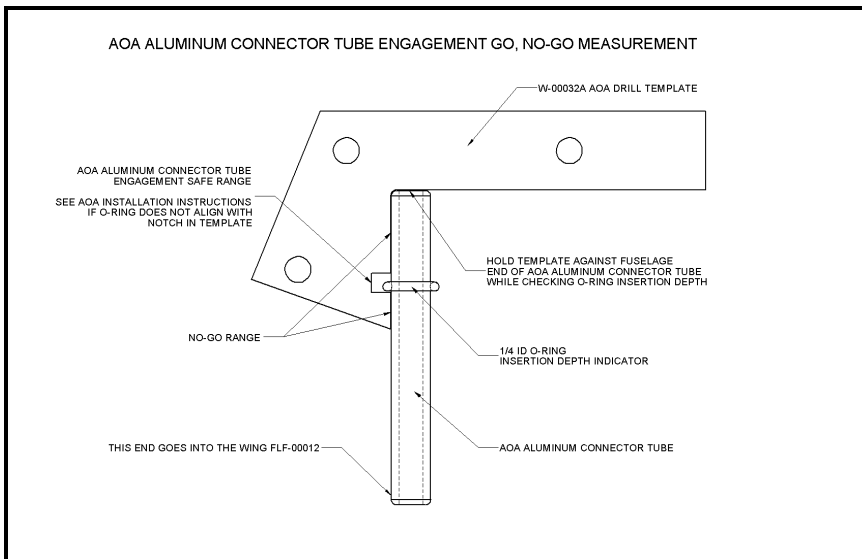


Figure 11: AOA Aluminum Connector Tube engagement measurement.

PART NUMBER

Purchase the “RV-12 AOA RETRO KIT” from Van’s Aircraft.