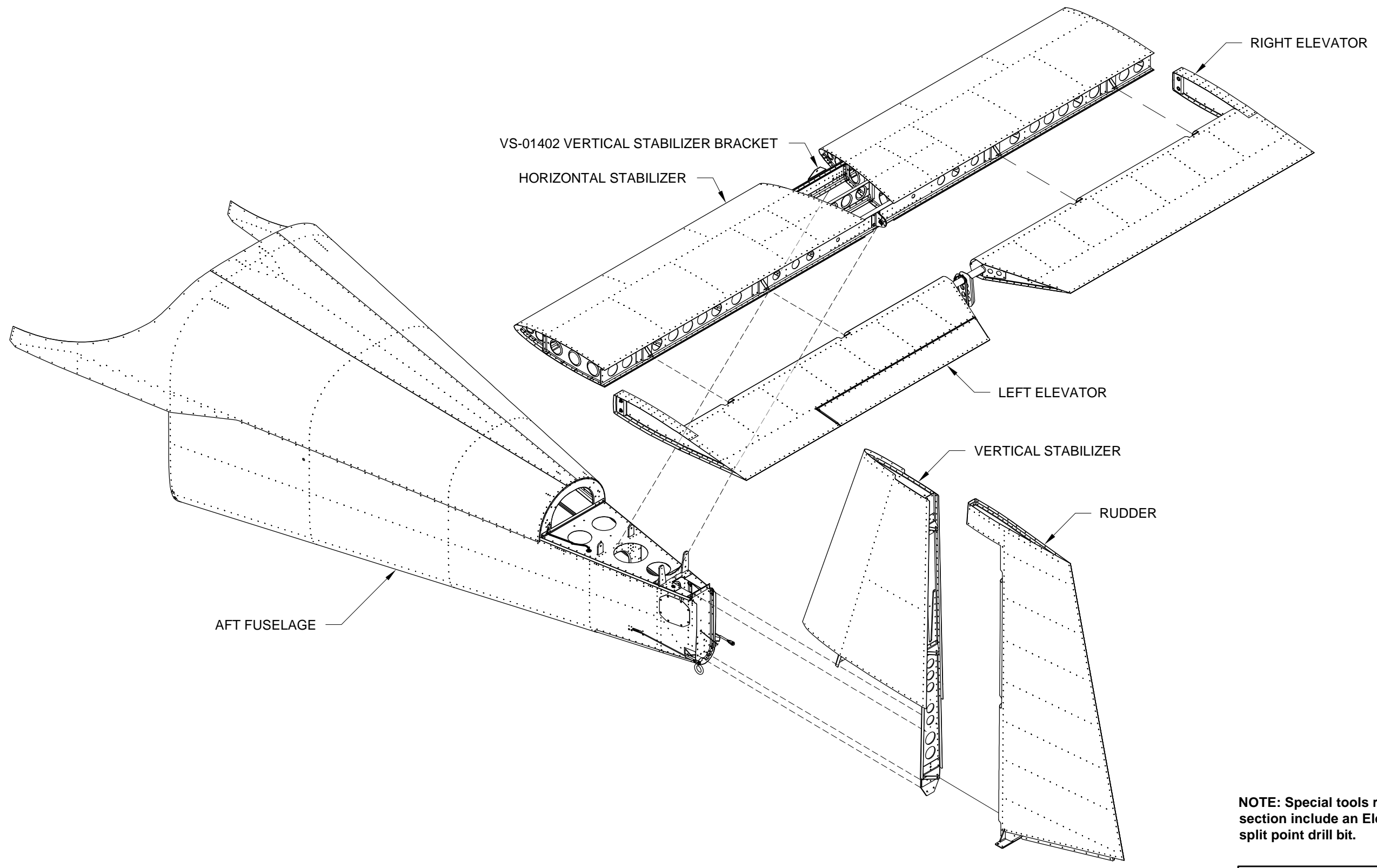
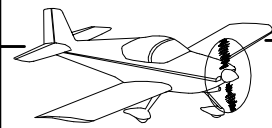


SECTION 11: EMPENNAGE ATTACH



NOTE: Special tools required to complete this section include an Electronic Level and a #30 split point drill bit.



NOTE: Use plain nuts where possible during temporary installation for greater ease of construction.

The Elevators, Rudder, Rudder Cables, Horizontal and Vertical Stabilizers can be final installed any time during the building process.

Step 1: Install the rod end bearings and jam nuts into the Left and Right Elevator as shown in Figure 1.

Tighten the nuts after getting as close as possible to the the rod end bearing engagement distance shown in Figure 1.

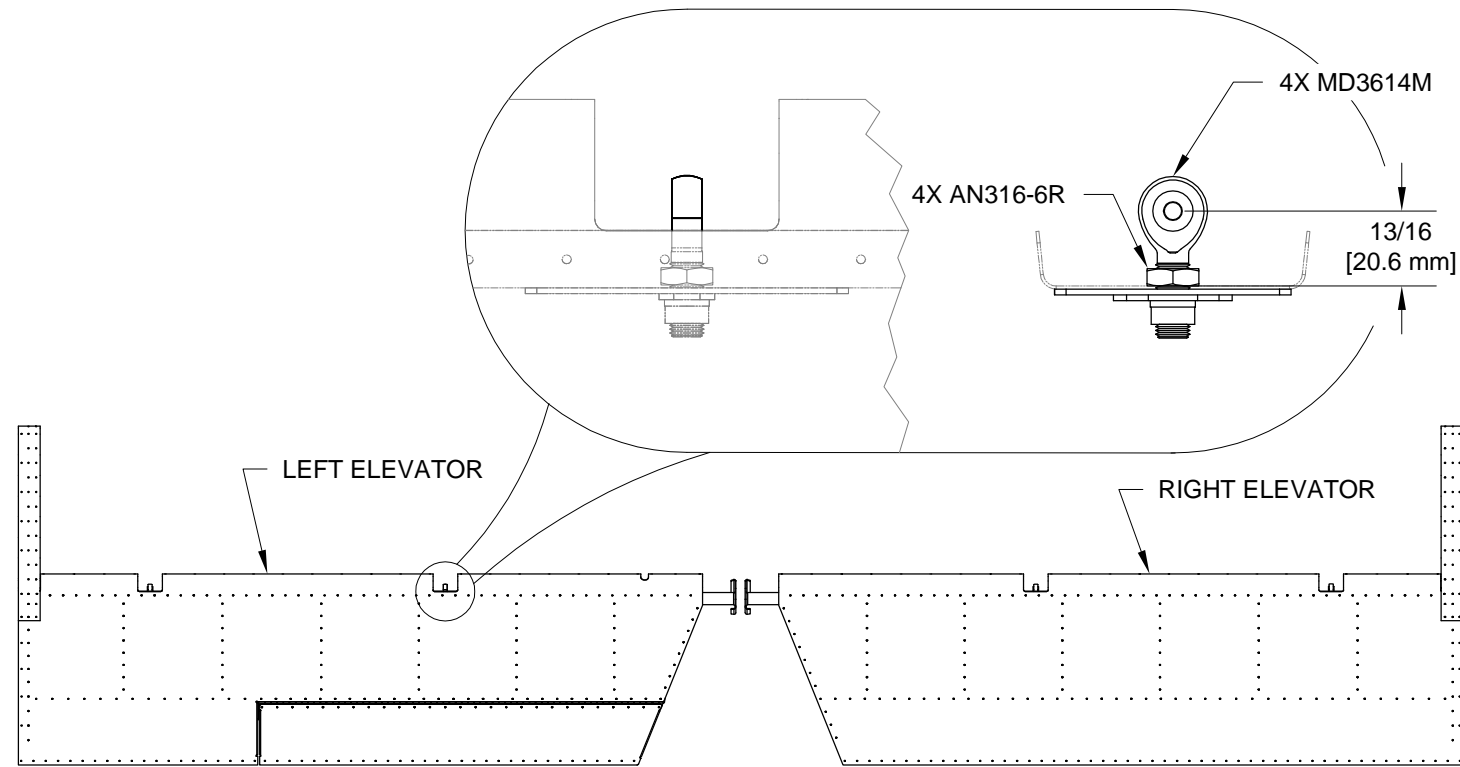


FIGURE 1: ROD END INSTALLATION

Step 2: Attach the Left Elevator to the Horizontal Stabilizer as shown in Figure 2.

Step 3: Check that orientation of the horizontal stab is correct. The "TOP" markings shall face up.

Step 4: Secure the Elevator in the "trail" position by placing strips of duct tape over the gap between the Elevator Counterbalance Arm and the Horizontal Stabilizer.

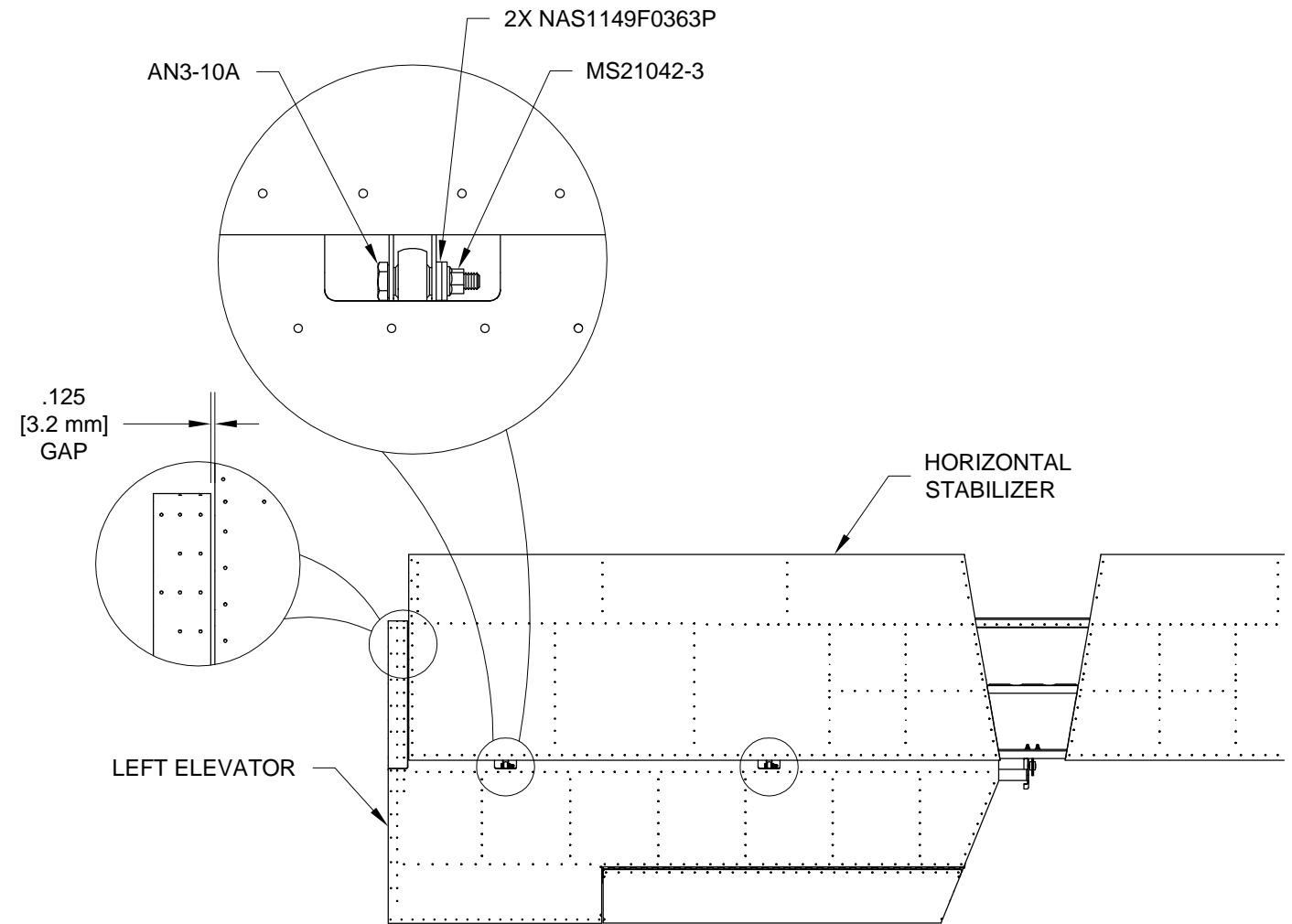


FIGURE 2: ELEVATOR INSTALLATION



Step 1: Fabricate a spacer from wood or plastic as shown in Figure 1.

NOTE: If necessary, reduce the diameter of the E-Drill Bushing to ensure a snug fit. Mount the bushing in a drill press and hold a file against it as it spins until the proper diameter is achieved. See Figure 1 and Figure 2.

Step 2: Insert the Elevator Horn Spacer between the top of the WD-605-L-1 Elevator Horn and the HS-911 Inboard Hinge Bracket as shown in Figure 2.

Lightly clamp the Horn to the Hinge Bracket.

Step 3: Insert the E-Drill Bushing into the VA-146A Flange Bearing as shown in Figure 2.

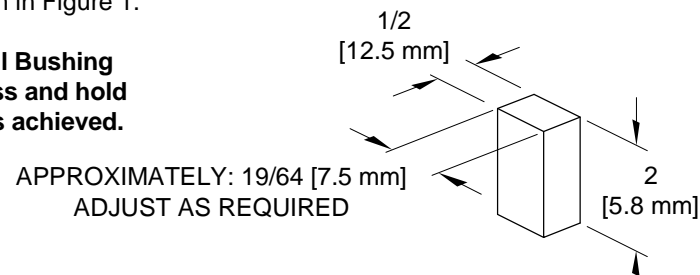


FIGURE 1: ELEVATOR HORN SPACER

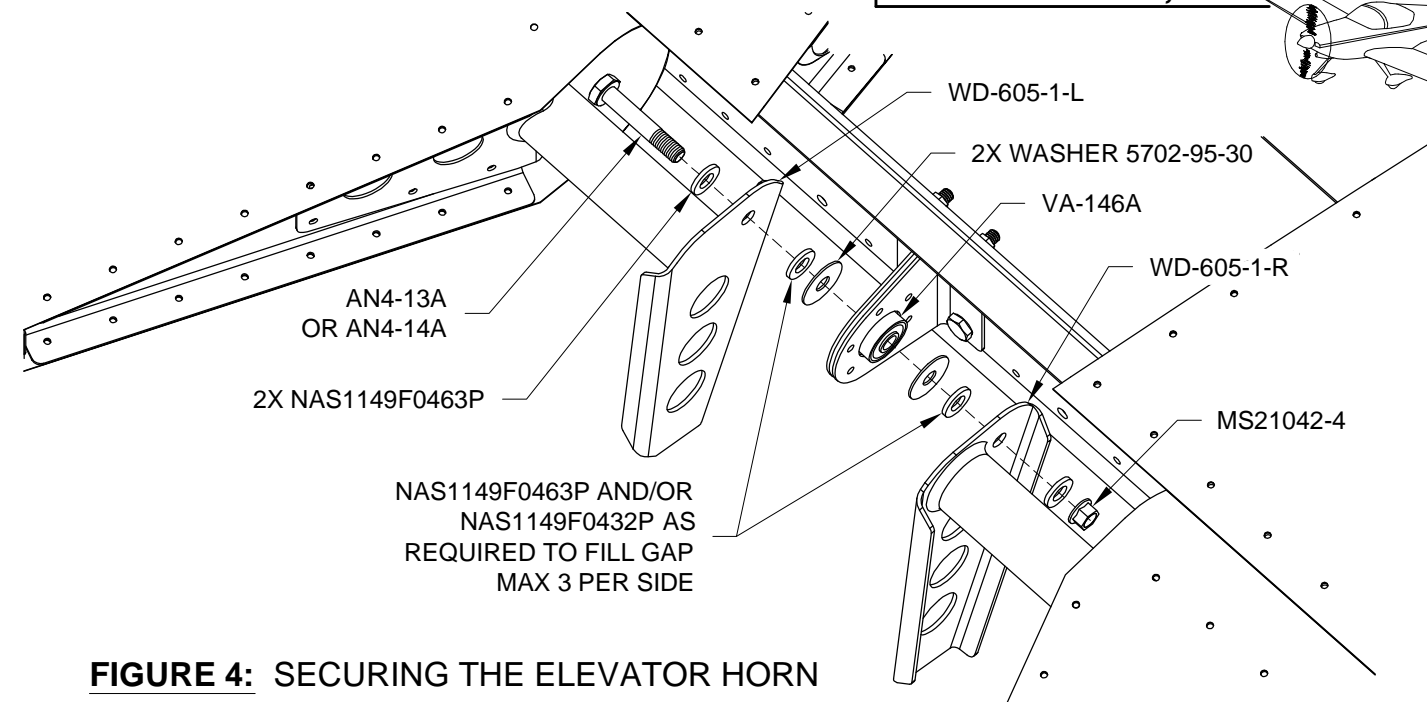


FIGURE 4: SECURING THE ELEVATOR HORN

NOTE: The required bolt grip length can vary due to stacking of manufacturing tolerances. Be sure to use the correct length bolt.

If the gaps are removed by tightening the bolt without washers, binding in the rod end bearings will occur.

Completely fill the gaps between the WD-605-1 Elevator Horns and the VA-146A Flange Bearing with the washers shown in Figure 3.

Once the washers are determined, use a sharpie pen to label the outboard face of each Elevator Horn with the hardware used to simplify final assembly and maintenance.

Step 7: Secure the WD-605-1 Elevator Horns to the Horizontal Stabilizer as shown in Figure 4.

NOTE: With both Elevators in the "trail" position, there will most likely be a mismatch in position between the bottoms of the WD-605-L-1 and WD-605-R-1 Elevator Horns. One elevator horn may be aft of the other and/or lower than the other.

Step 8: Secure both Elevators in the "trail" position as described on Page 11-02, Step 4.

Step 9: Locate the hole indicated by the "DRILL #40/ FINAL-DRILL #12" call-out in Figure 5 by selecting the AFT MOST elevator horn and making a mark 1/2 [12.7 mm] from the front flange. On the same elevator horn, make a mark 3/8 [9.5 mm] from the bottom end of the UPPER horn. Locating the hole in this way guarantees proper edge distance for the hole in both horns.

On these marks, center-punch, then drill a #40 hole into the selected elevator horn ONLY. The hole will be match-drilled into the second elevator horn on the next page.

Step 10: Final-Drill #12 the #40 hole drilled in Step 9.

NOTE: Although either elevator horn could have been drilled, this hole is shown drilled in the right elevator horn in the figures on the next page.

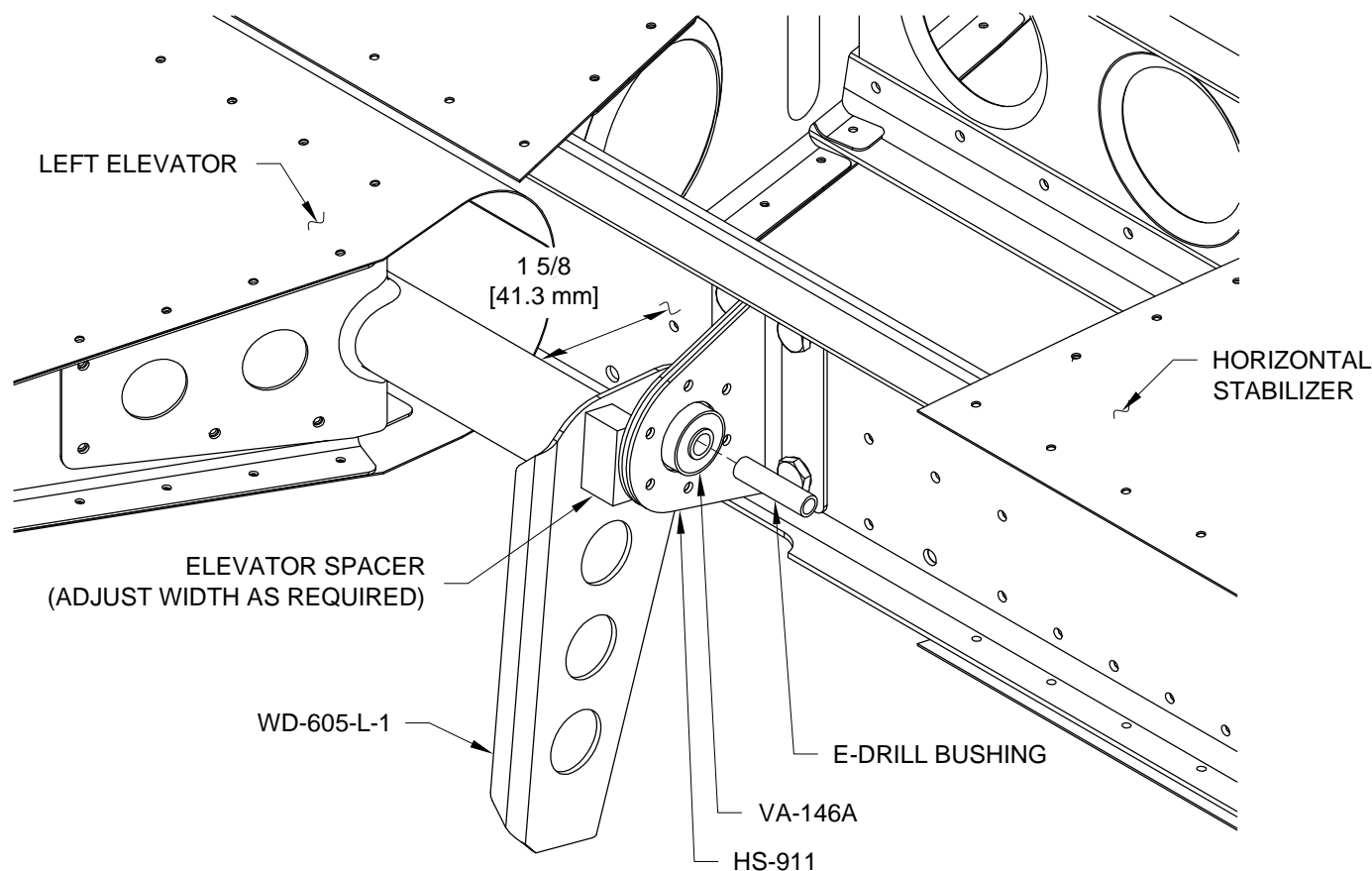


FIGURE 2: MATCH-DRILL ELEVATOR HORN

NOTE: Verify the minimum distance from the Horizontal Stabilizer Rear Spar web to the Elevator Torque Tube is 1 5/8 [41.3 mm] as shown in Figure 2. Readjust the Elevator rod end bearings as necessary to achieve this distance prior to drilling.

Use a split point #30 drill bit to prevent chattering.

Step 4: Match-drill #30 the WD-605-L-1 Elevator Horn using the E-Drill Bushing as a guide.

Remove the Left Elevator from the Horizontal Stabilizer

Step 5: Use a step drill to enlarge the #30 hole in the WD-605-L-1 Elevator Horn to 1/4.

Step 6: Repeat Steps 2-4 on Page 11-02, and Steps 2-5 on this page for the Right Elevator.

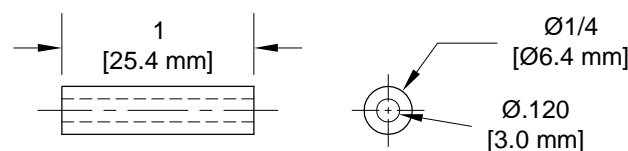


FIGURE 3: E-DRILL BUSHING

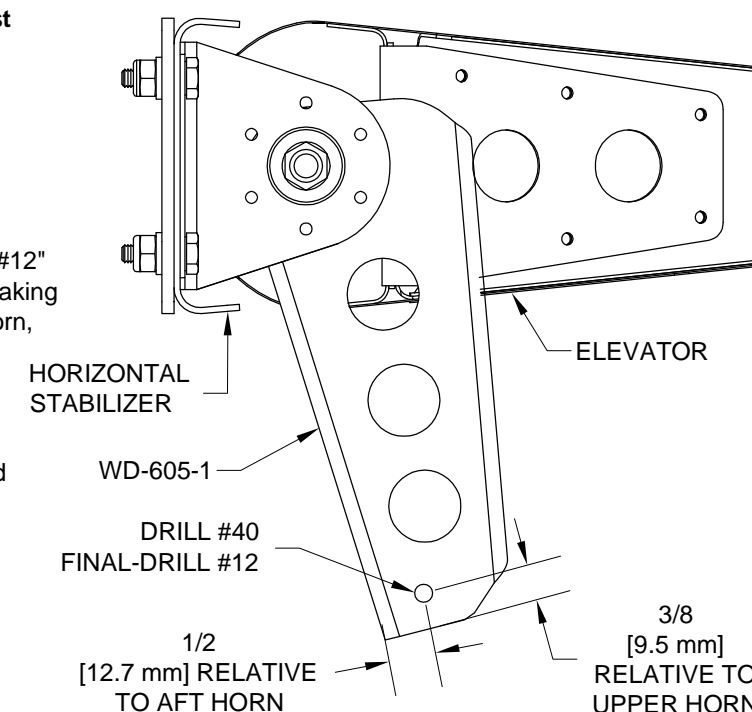


FIGURE 5: ELEVATOR PUSHROD BOLT HOLE



Step 1: Measure the gap between the WD-605-L-1 and WD-605-R-1 Elevator Horns as shown in Figure 1.

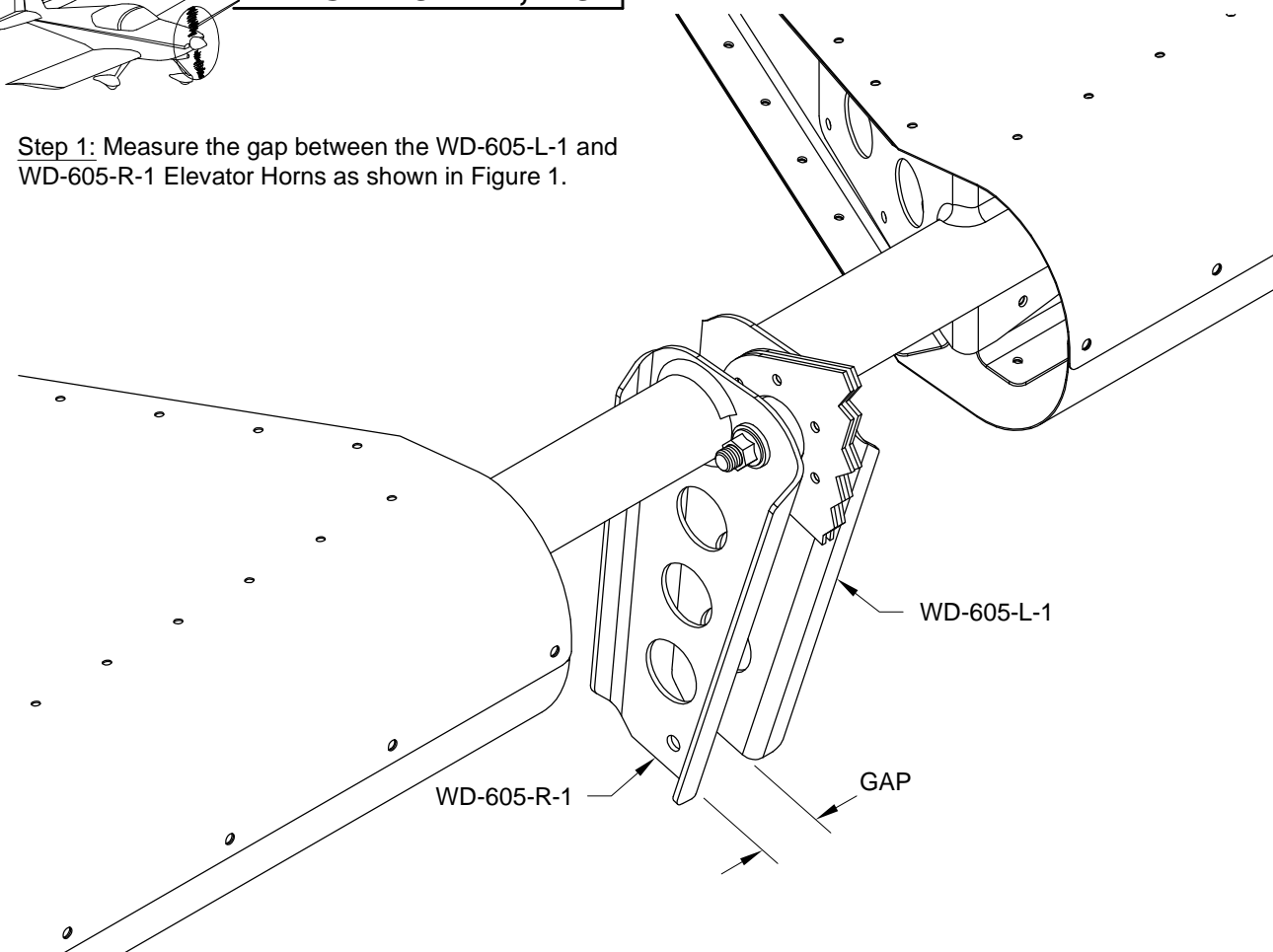


FIGURE 1: MEASURE ELEVATOR HORN GAP

NOTE: The drill guide block will be used to keep the bit perpendicular when drilling from one elevator horn to the other.

A stack-up of blocks is acceptable if a single block of the correct thickness is not available.

It is critical that the hole is perpendicular to the face of the block.

Step 2: Make a Drill Guide Block from wood, plastic, or metal as shown in Figure 2.

Drill a #12 hole in the block using a drill press.

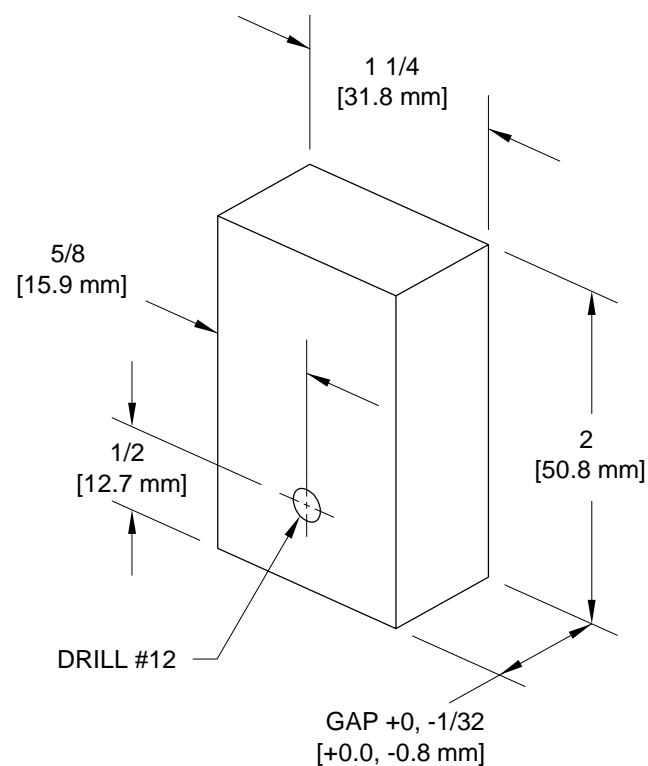


FIGURE 2: DRILL GUIDE BLOCK

Step 3: Insert an AN3 bolt through the drilled WD-605-1 Elevator Horn and the Drill Guide Block as Shown in Figure 3.

Verify that both elevators are aligned in the "trail" position.

Clamp the elevator horns and drill guide block together as shown in Figure 3.

Remove the AN3 bolt from the elevator horn and block.

NOTE: Drill the hole as square as possible.

Step 4: Match-Drill #12 the opposite WD-605-1 Elevator Horn using the drilled elevator horn and Drill Guide Block to aid alignment as shown in Figure 3.

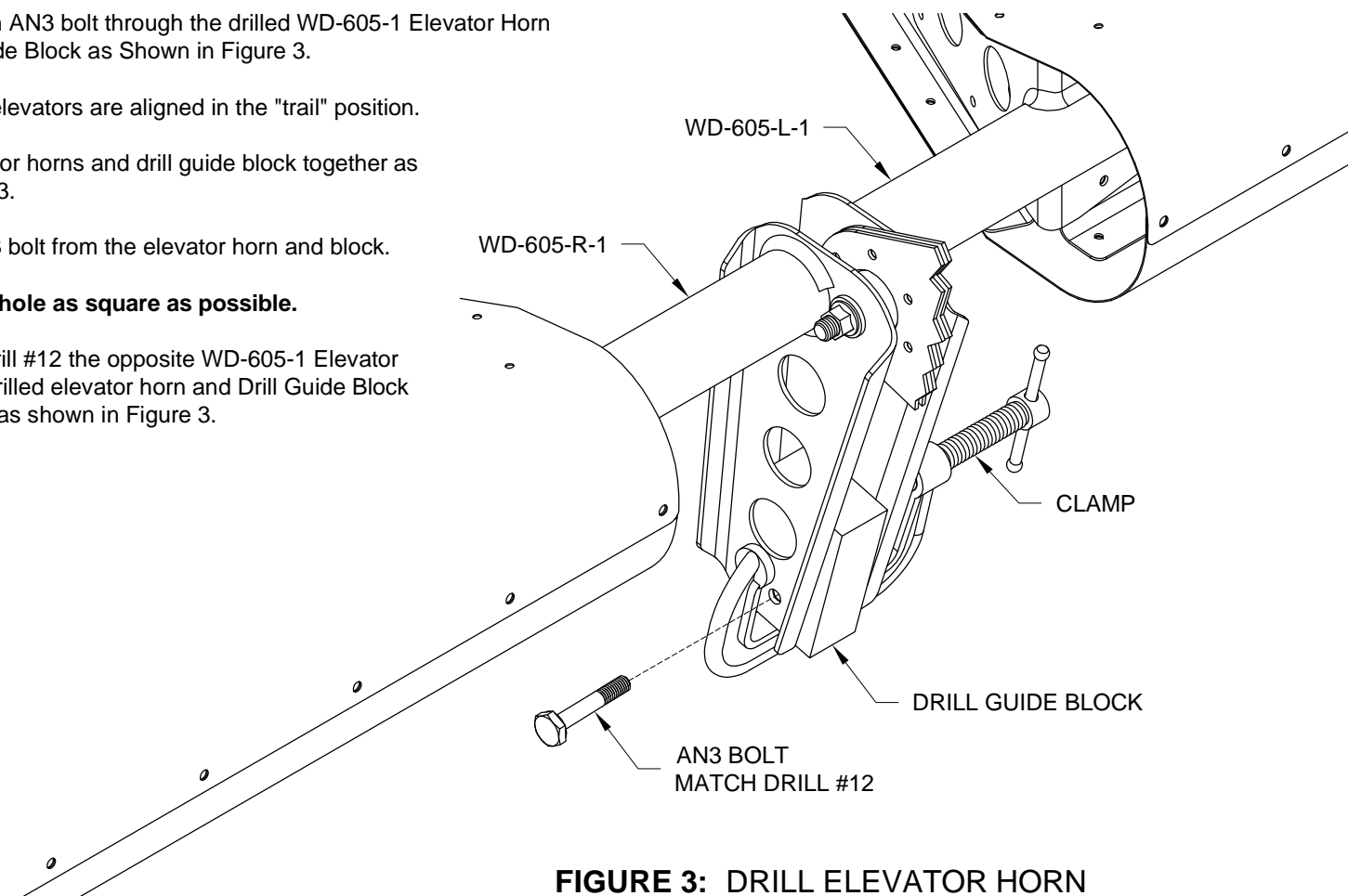
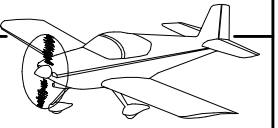


FIGURE 3: DRILL ELEVATOR HORN

Step 5: Remove the clamp and drill guide block from the WD-605-1 Elevator Horns.

Remove the Elevators from the Horizontal Stabilizer.

Deburr the holes in the elevator horns.



Step 1: Position the Horizontal Stabilizer on the Aft Fuselage as shown in Figure 1 & Figure 2.

Bolt and cleco the Horizontal Stabilizer to the Aft Fuselage as shown in Figure 2.

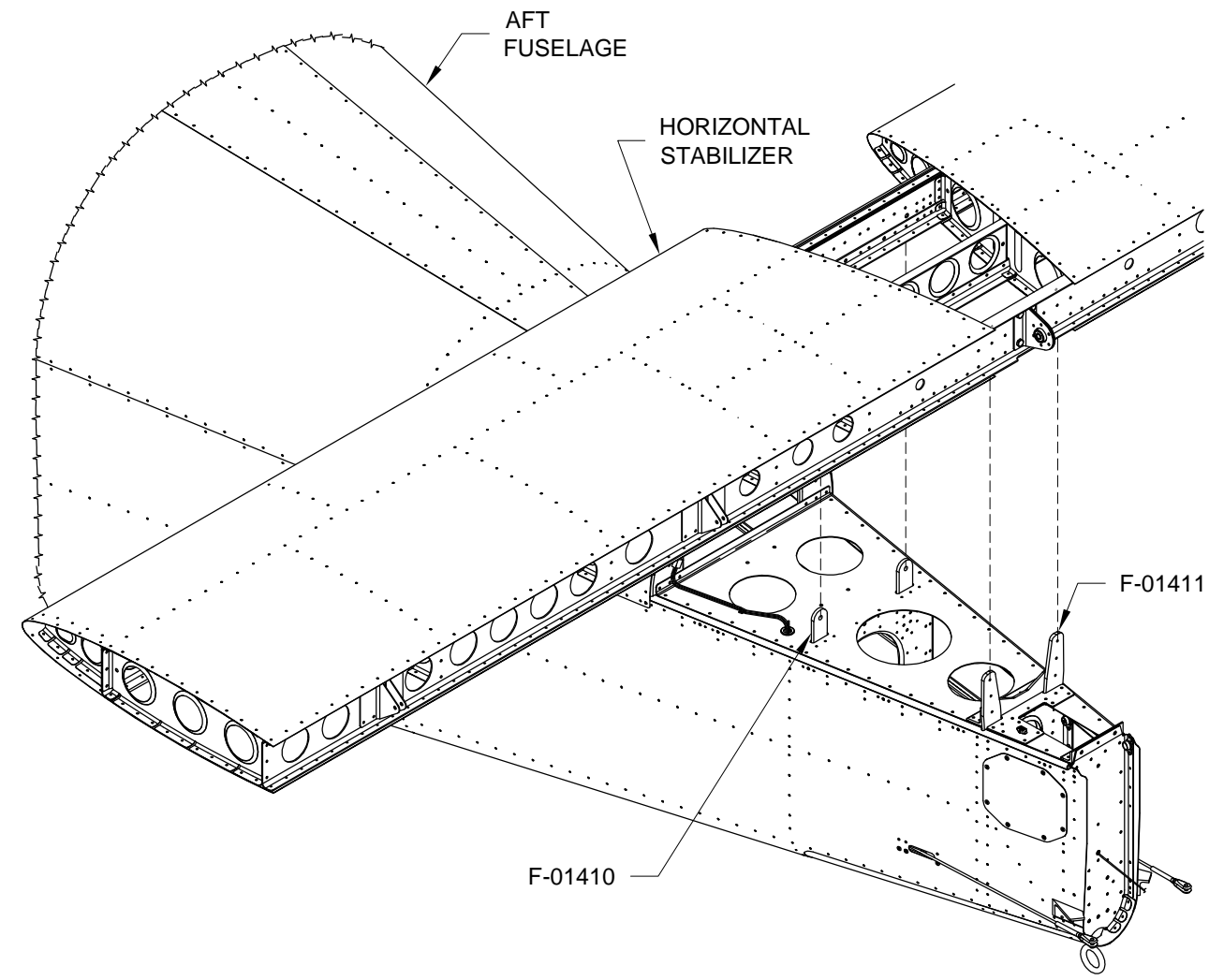


FIGURE 1: POSITION HORIZONTAL STABILIZER

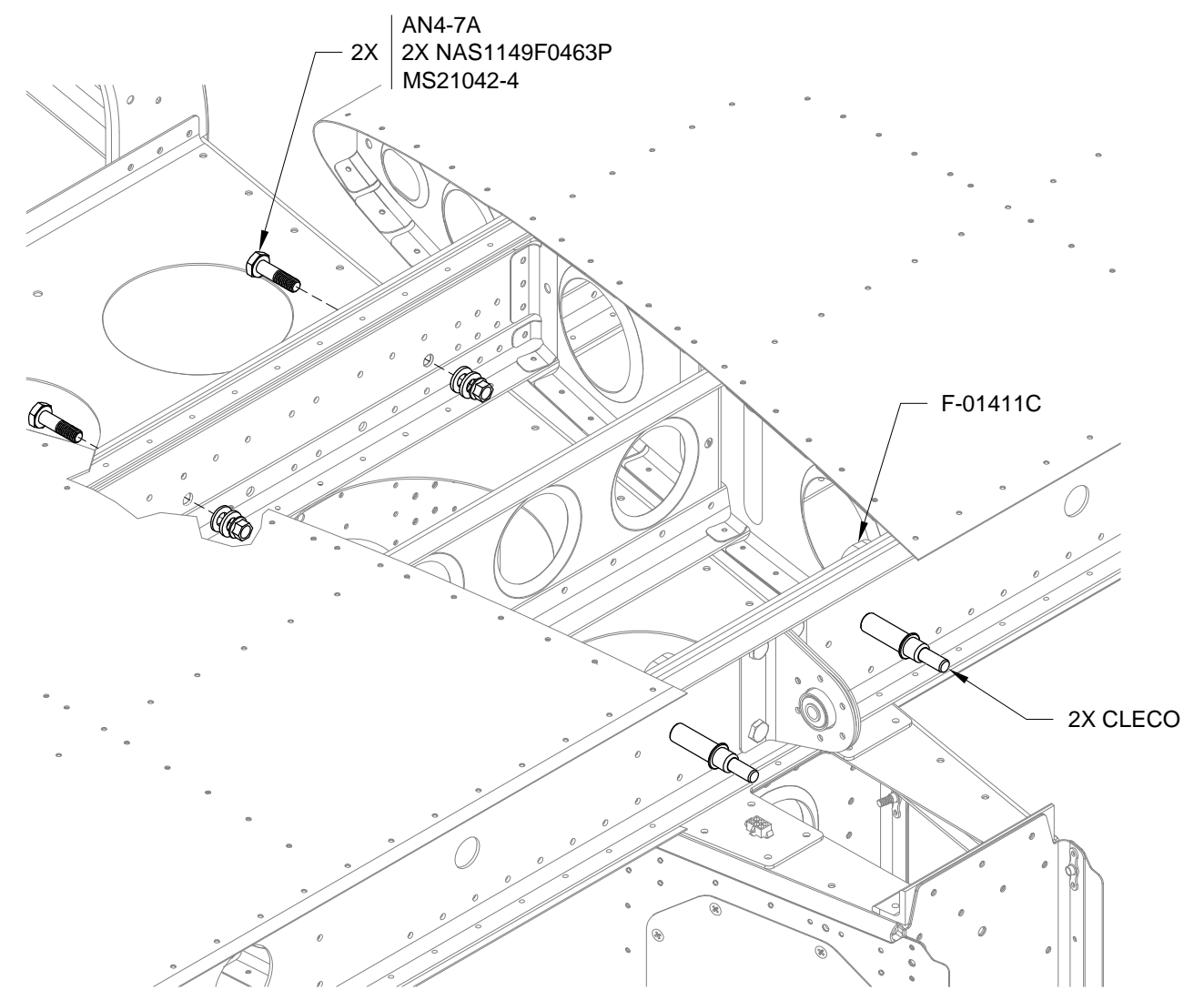
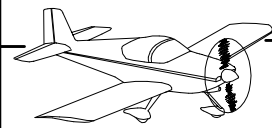


FIGURE 2: SECURE HORIZONTAL STABILIZER



NOTE: Drill perpendicular to the spar web.

Step 1: Final-Drill 1/4 [6.4 mm] the holes in the Aft Spar of the Horizontal Stabilizer and the F-01411 Bulkhead as shown in Figure 1.

Install the hardware as shown in Figure 1 as the holes are final-drilled.

Remove the clecos.

NOTE: The VS-01402 Vertical Stabilizer Bracket tab is bent aft when oriented correctly.

Step 2: Install the VS-01402 Vertical Stabilizer Bracket onto the Horizontal Stabilizer as shown in Figure 2.

Step 3: Remove the F-14112 Plate Covers from the Aft Fuselage.

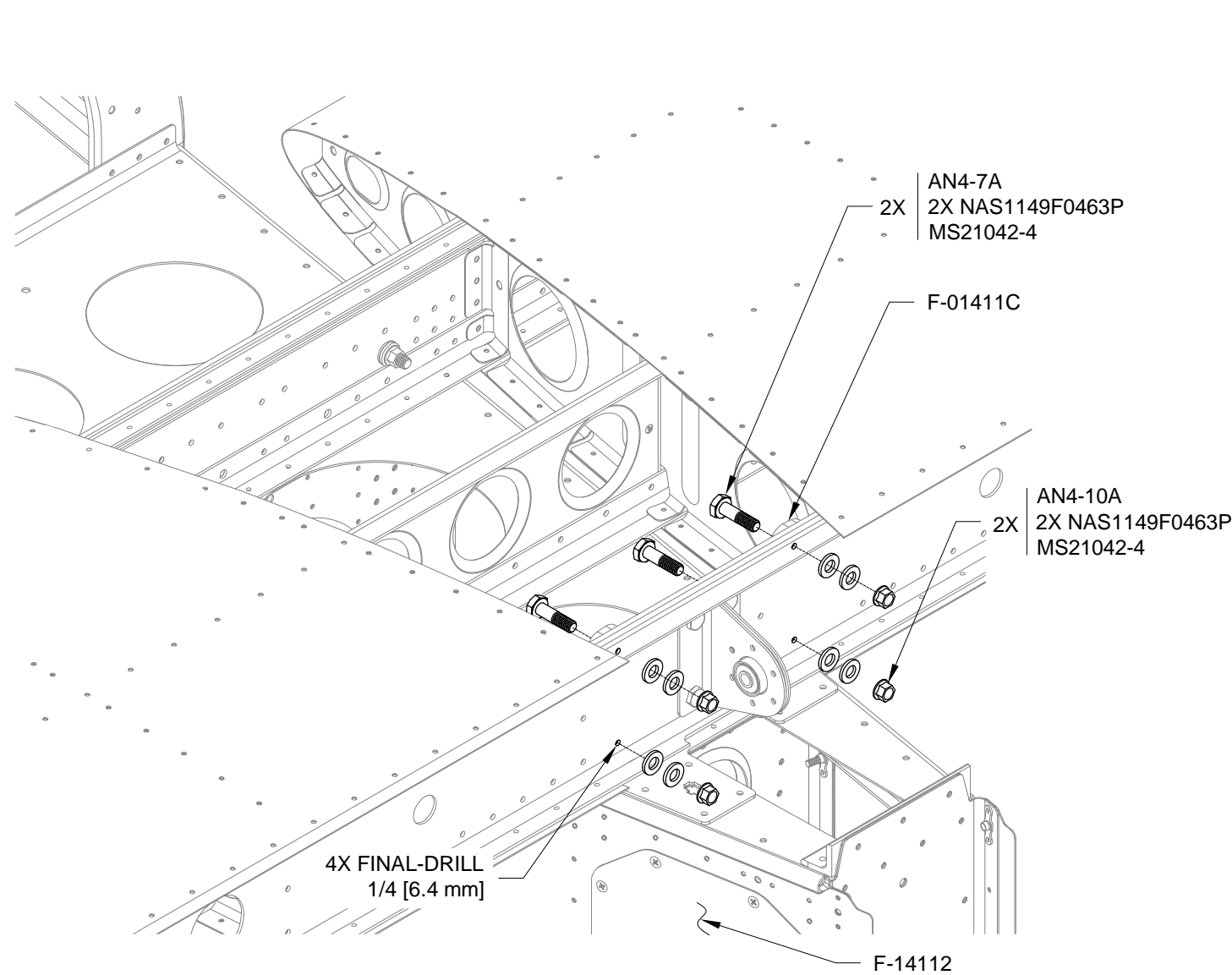


FIGURE 1: REAR SPAR ATTACH

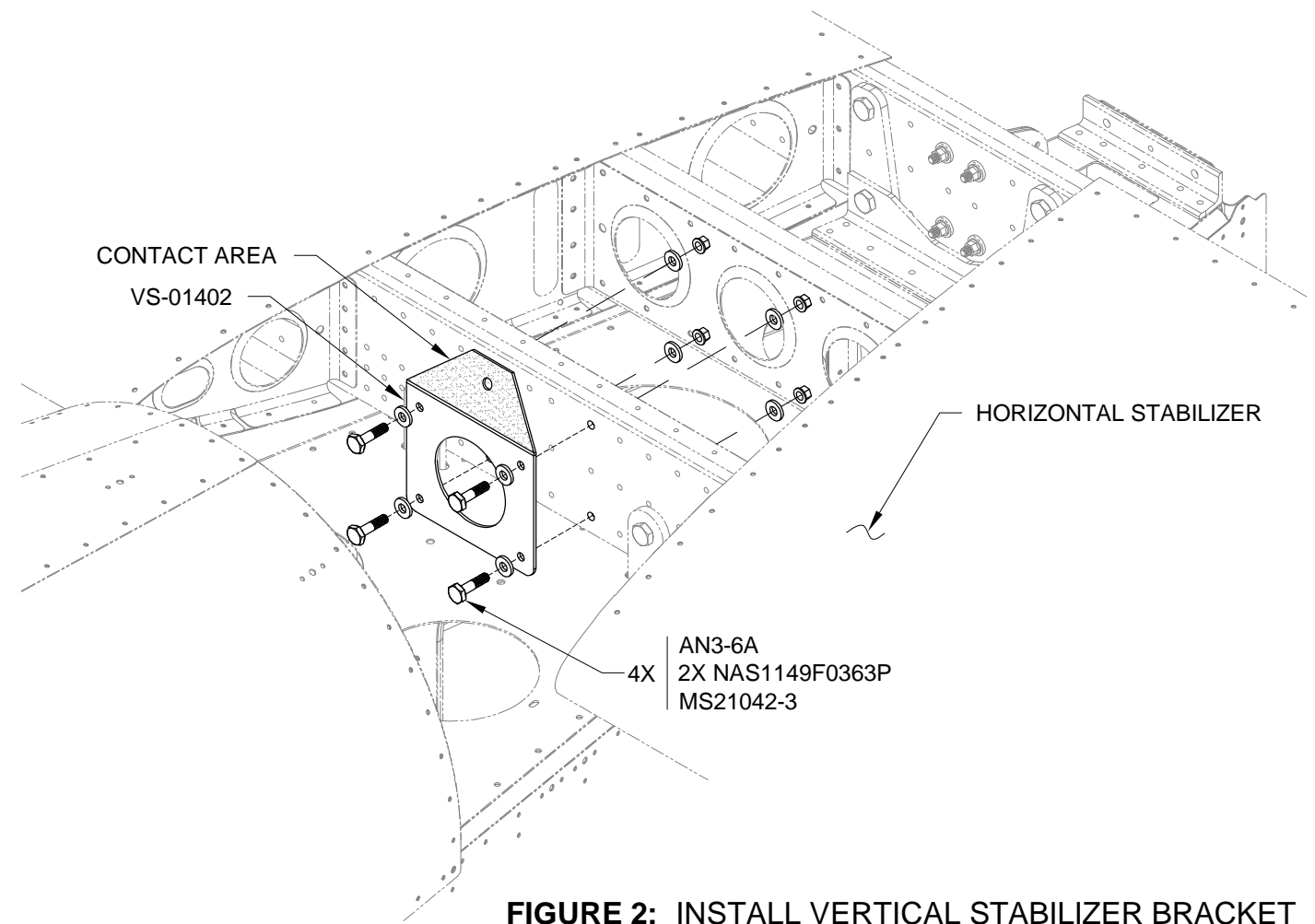
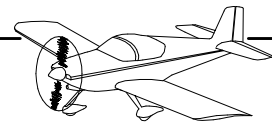


FIGURE 2: INSTALL VERTICAL STABILIZER BRACKET



Step 1: Route the L1082 (WHT) Wire from the WH-00057 Aft Fuselage Harness through the systems hole in the rear spar of the Vertical Stabilizer as shown in Figure 2 and Figure 3.

NOTE: If desired, the ability to easily remove the Vertical Stab can be preserved by delaying wiring operations related to the Rudder until after the completion of Section 36.

Step 2: Slide an 18" length of heat shrink over the L1082 (WHT) and L729 (BLK) Wires as shown in Figure 1. Do not secure the heat shrink at this time.

Step 3: Crimp the Ring Terminal on to the L729 (BLK) Wire as shown in Figure 1.

Step 4: Use a voltmeter to verify that the L729 (BLK) has a low resistance connection to the airframe. Remove paint as necessary.

NOTE: When locating the Vertical Stabilizer on the Aft Fuselage, be sure the front spar is forward of the VS-01402 Vertical Stabilizer Bracket as shown on Page 11-08, Figure 1.

When the Vertical Stabilizer front spar is attached, the leading edge of the Vertical Stabilizer is offset slightly to the left, causing the rear spar to twist. The single washer shown in Figure 2 and Figure 3 between the Vertical Stabilizer and the Aft Fuselage accommodates for this twist.

Step 5: (Tri-Gear) Attach the Vertical Stabilizer and L729 (BLK) Wire to the Aft Fuselage as shown in Figure 2.

Step 5: (Tail Dragger) Attach the Vertical Stabilizer and L729 (BLK) Wire to the Aft Fuselage as shown in Figure 3.

Step 6: Allow for generous bend radii, then use a piece of tape to secure the L729 (BLK) Wire and loose ends of the L1082 (WHT) Wire and To the Vertical Stabilizer.

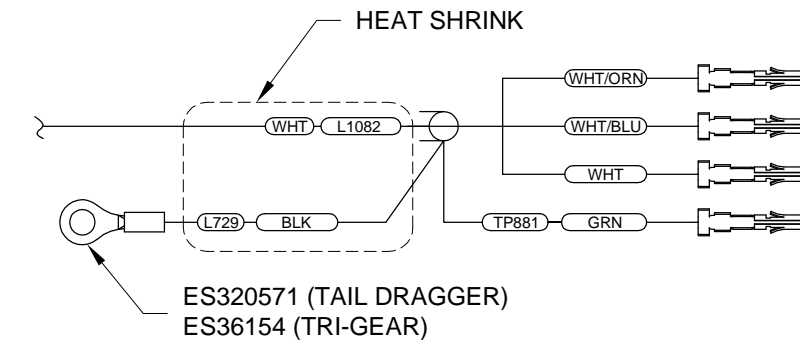


FIGURE 1: RING TERMINAL INSTALLATION

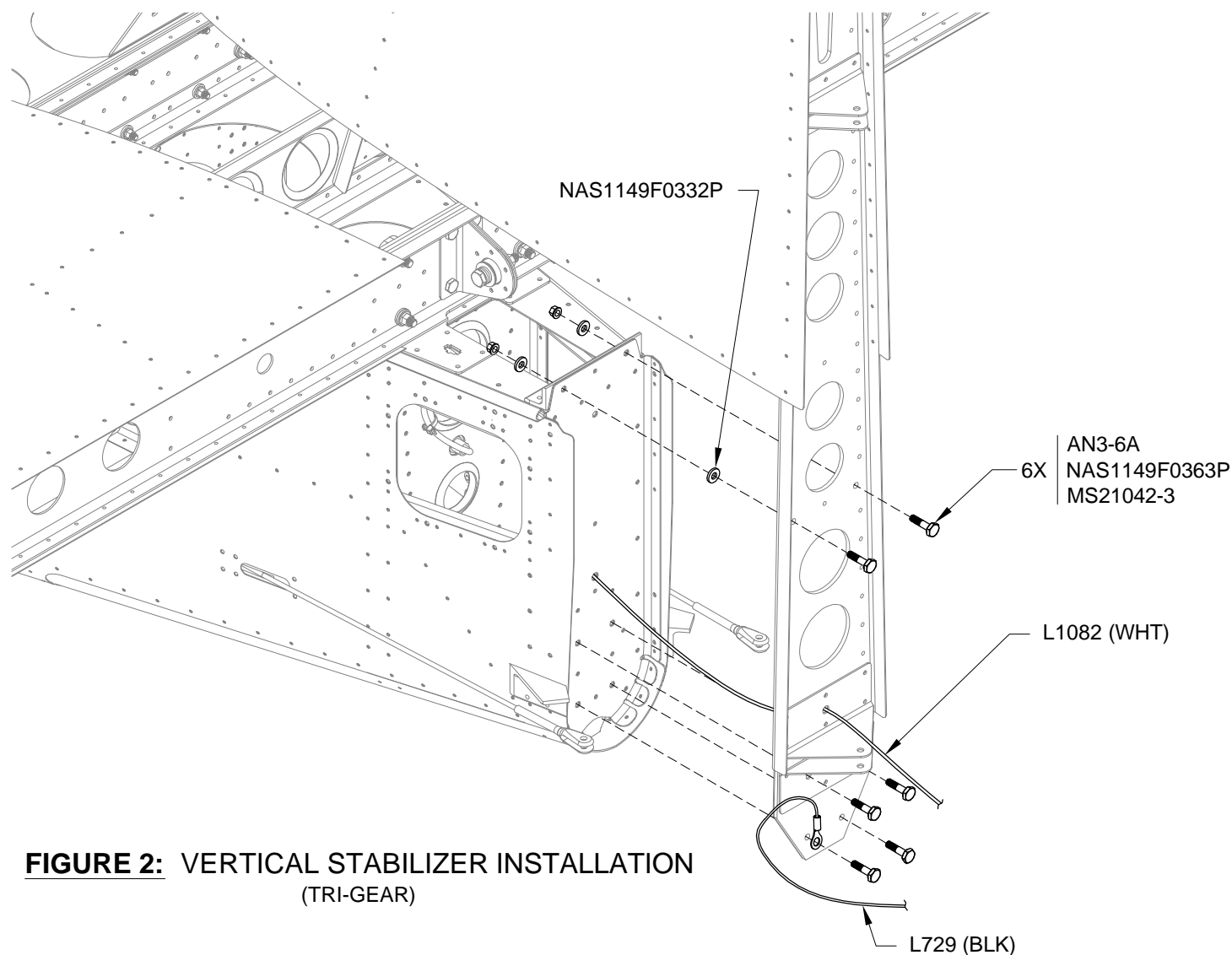


FIGURE 2: VERTICAL STABILIZER INSTALLATION (TRI-GEAR)

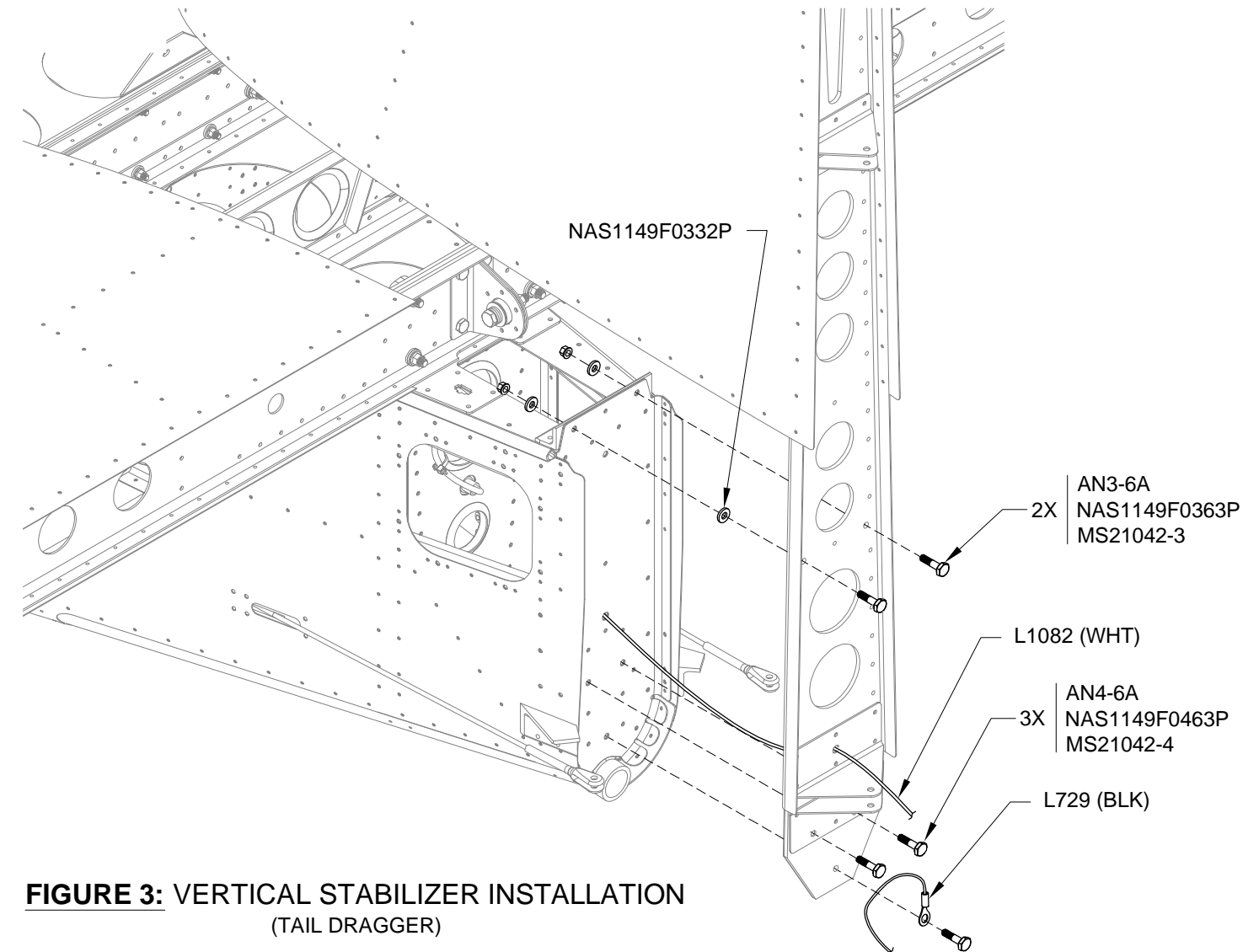
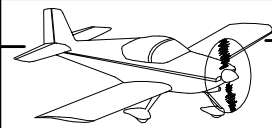


FIGURE 3: VERTICAL STABILIZER INSTALLATION (TAIL DRAGGER)



Step 1: Apply a thin coating of Anti-Seize paste to the contact area of the Vertical Stabilizer Front Spar and VS-01402 Vertical Stabilizer Bracket as shown in Figure 1 and on Page 11-06 Figure 2.

Step 2: Bolt the front spar of the Vertical Stabilizer to the VS-01402 Vertical Stabilizer Bracket using the hardware called out in Figure 1.

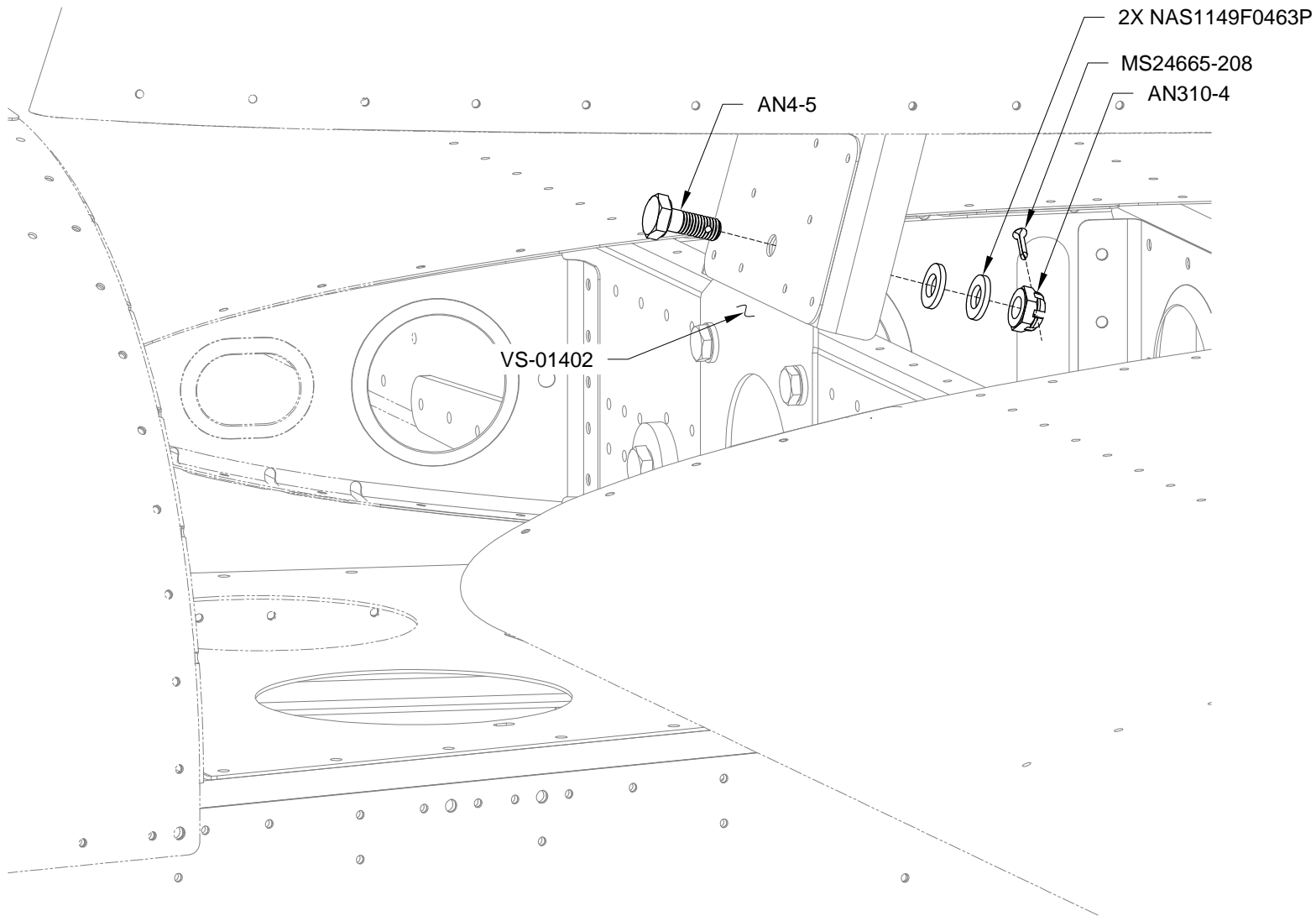


FIGURE 1: VERTICAL STABILIZER FRONT SPAR ATTACHMENT

Step 3: Install the jam nuts and rod end bearings into the Rudder as shown in Figure 2.

Tighten the nuts after getting as close as possible to the the rod end bearing engagement distance shown in Figure 2.

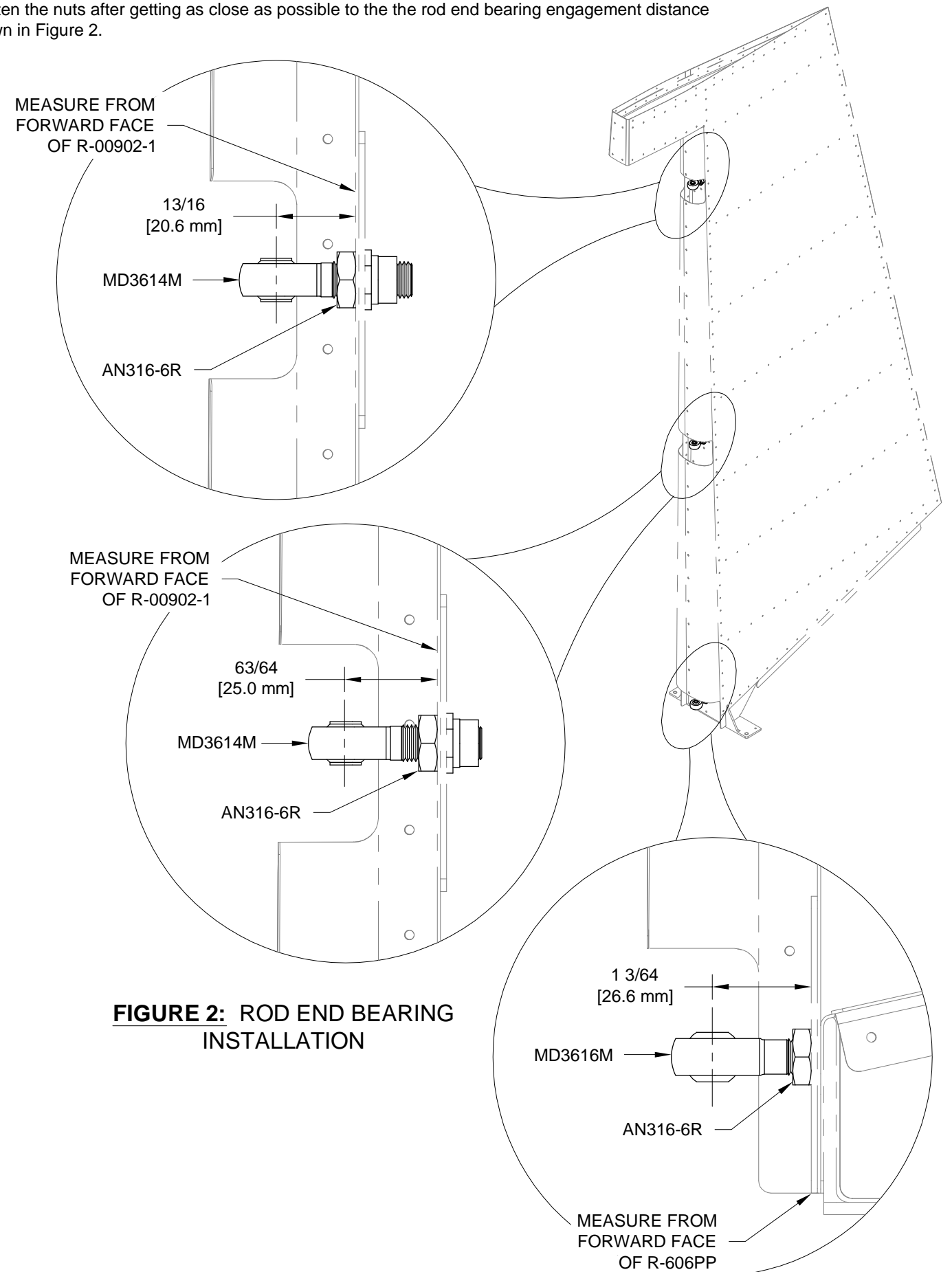
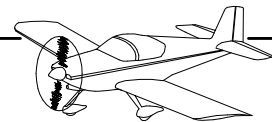


FIGURE 2: ROD END BEARING INSTALLATION



Step 1: Attach the Rudder to the Vertical stabilizer using the top and bottom rod end bearings as shown in Figure 1. Leave the middle rod end bearing unattached for now.

NOTE: The Rudder must swing freely without binding.

Step 2: Secure the Left and Right Elevators in the "trail" position as described on Page 11-02, Step 4.

Fully deflect the Rudder against the F-14113 Rudder Stops.

With the Rudder against the stops, the clearance between the inboard trailing edge of the trim tab and the adjacent Rudder skin should be approximately as shown in Figure 2.

Step 3 (If Required): If more Rudder deflection is required, file the rudder stops as necessary.

Step 4: File the F-01473-L & -R Aft Fuselage Side Skins as necessary to eliminate any rubbing when the Rudder is deflected. Do not file beyond the flanges in the F-01412B Bulkhead. See Figure 2.

NOTE: It may be desirable to remove the Rudder and sight down the Rod End Bearings, using a piece of paper as a backdrop to ensure proper alignment.

Step 5: If necessary, adjust the center Rudder Rod End Bearing to align with the holes in the VS-411PP Hinge Brackets (a bolt should be able to easily slip in place).

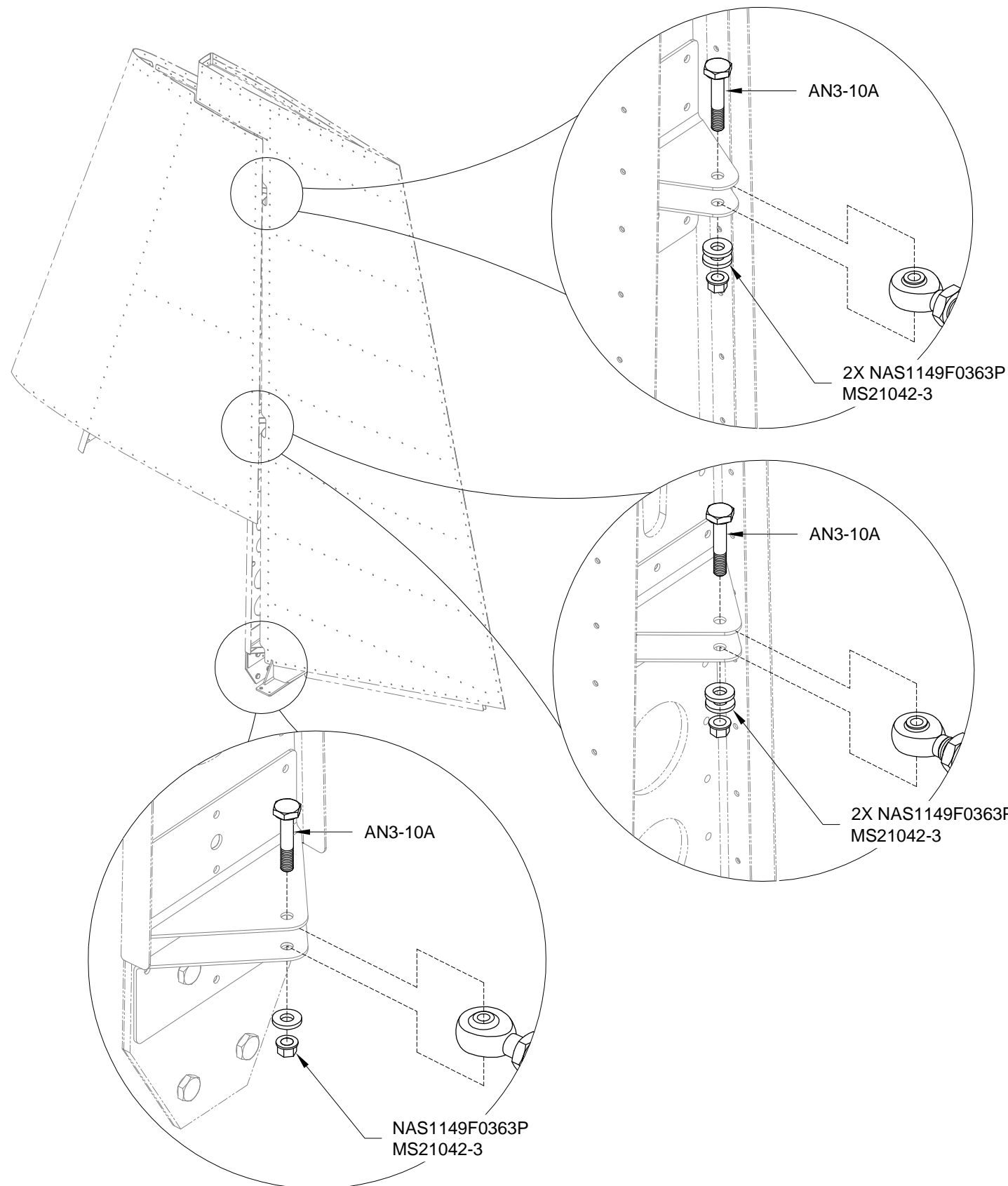


FIGURE 2: RUDDER INSTALLATION

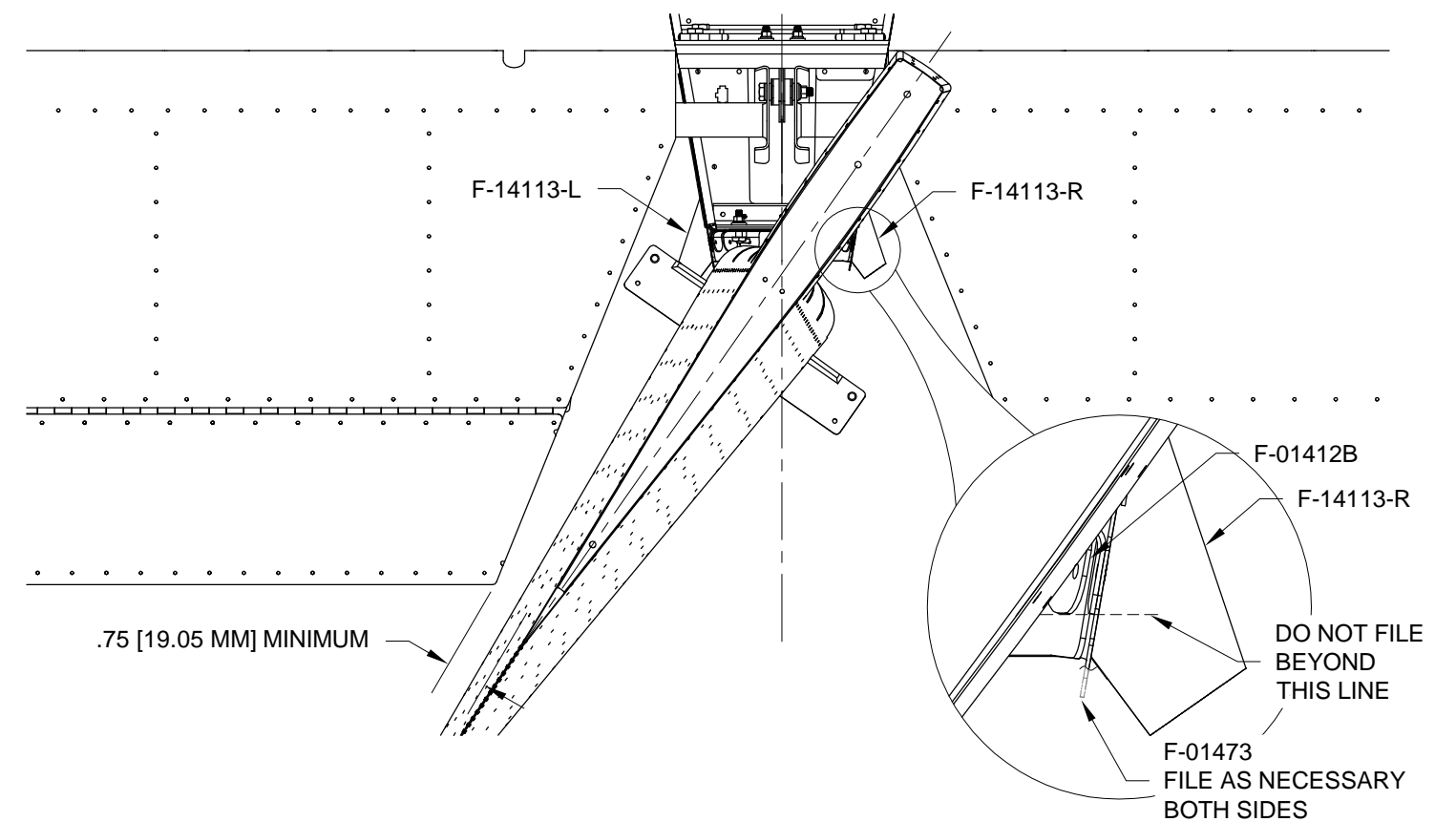


FIGURE 2: RUDDER DEFLECTION
(HORIZONTAL AND VERTICAL STABILIZERS NOT SHOWN)



Step 1 (If Required): If less Rudder deflection is required, fabricate a pair of Offset Tabs of the required thickness to achieve the desired Rudder deflection. See Figure 1 and the template on Page 11-11.

Center punch the holes in the offset tabs, but do not drill them yet.

Clamp the offset tabs to the R-405PD Rudder Horn as shown in Figure 1.

Match-drill #40 the holes in the offset tabs into the rudder horn as shown in Figure 1 and the Template on Page 11-11.

Deburr the offset tabs and dimple the holes.

Machine Countersink the rudder horn to fit the dimples in the offset tabs.

Deburr the holes in the the rudder horn.

Rivet the offset tabs to the rudder horns using a proper length AN426AD3 Rivet. See Section 5.4 for more information.

Step 2: Attach the CS-00014 Rudder Cables to the Left and Right R-405PD Rudder Horns as shown in Figure 2.

Step 3: Connect C409P to C409J as shown in Figure 2. Use a plastic tie wrap to secure the wires to the Elevator Torque Tube.

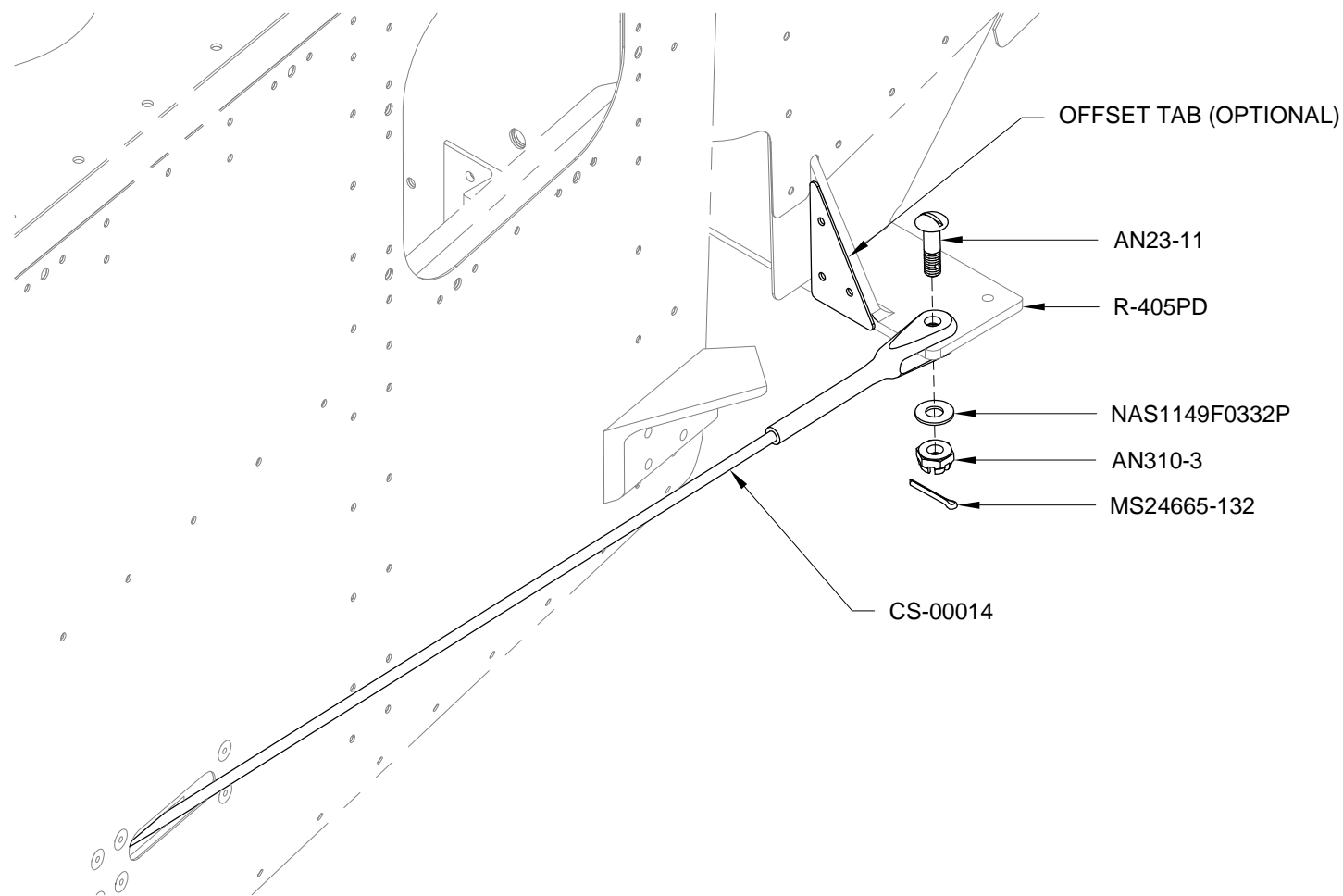


FIGURE 1: RUDDER CABLE ATTACHMENT & OFFSET TAB INSTALLATION
(LEFT SIDE SHOWN)

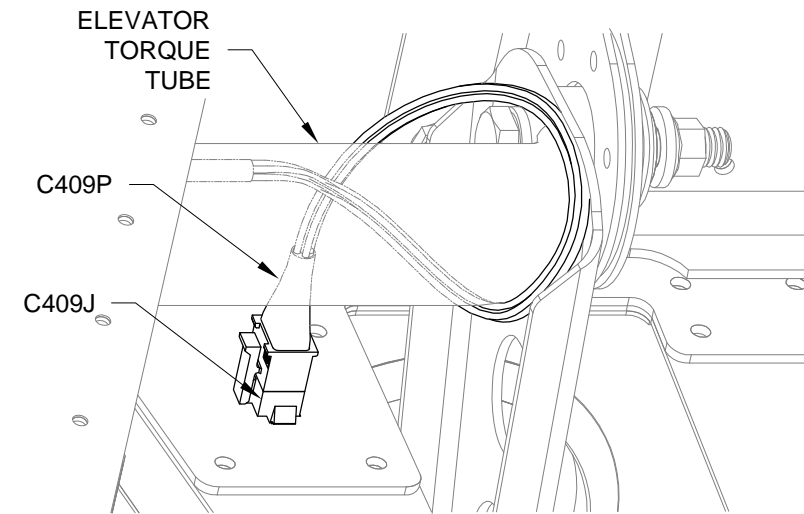


FIGURE 2: CONNECT ELEVATOR TRIM WIRES

Step 4: Route the the L1082 (WHT) Wire as shown in Figure 3. Keep the wire moderately taught forward of the Vertical Stabilizer Rear Spar and angled slightly downward and left as it passes aft through the Vertical Stabilizer systems hole as shown in Figure 3

Secure the wire in the Vertical Stabilizer systems hole using RTV sealant.

Step 5: After the sealant has cured, route the L1082 (WHT) Wire through the center of the HW-00004 Tie-Wrap Clip.

Find the point along the L1082 (WHT) wire where there is enough slack in to allow the wire to rotate through the full range of Rudder deflection without stretching or excessive drooping.

Wrap this point on the L1082 (WHT) wire in Friction Tape to seat it in the tie-wrap clip.

Secure the Friction Tape in the tie-wrap clip using a tie-wrap.

Step 6: Ensure the L729 (BLK) Wire has enough slack to allow the wire to rotate through the full range of Rudder deflection without stretching or excessive drooping.

Use a heat gun to secure the heat shrink, L1082 (WHT) and L729 (BLK) Wires as shown in Figure 3.

Coil And secure the L1082 (WHT) and L729 (BLK) Wire to the underside of the Rudder using a piece of tape.

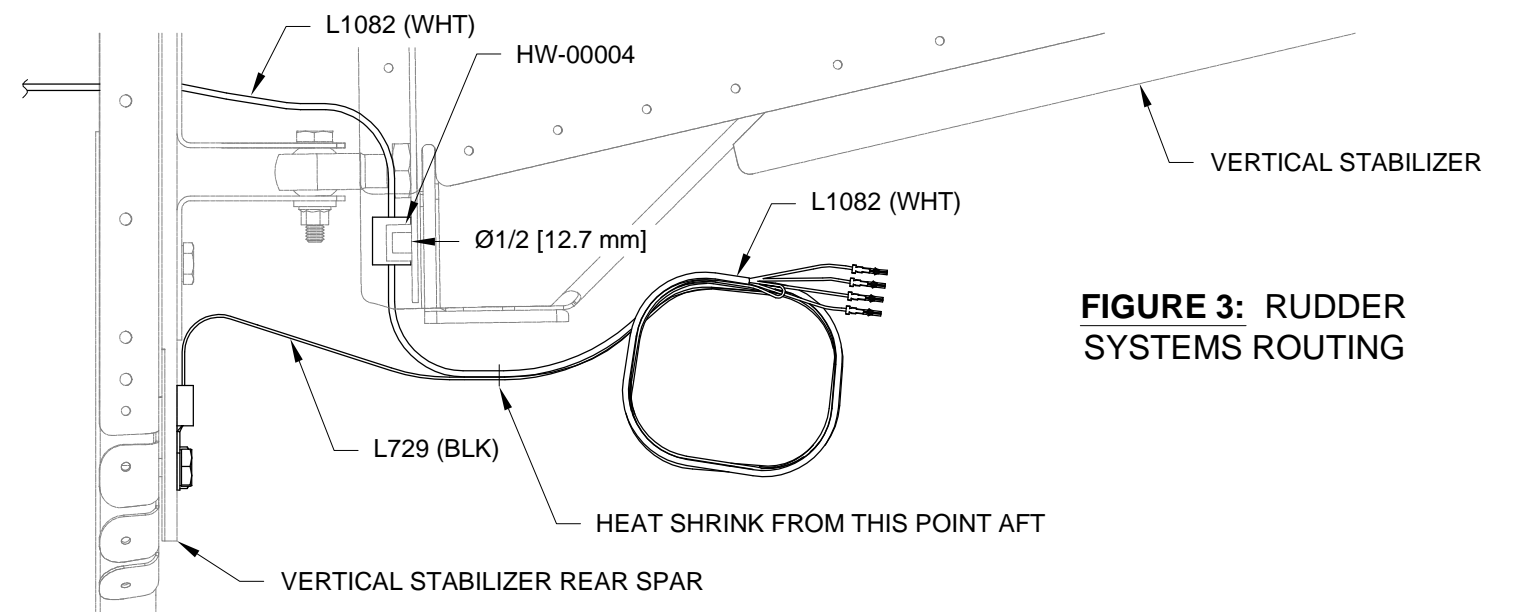
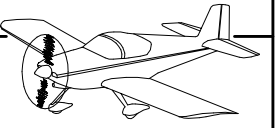


FIGURE 3: RUDDER SYSTEMS ROUTING



**NOTE: CHECK THAT THE PRINTED SCALE IS 1:1
PER SECTION 3 BEFORE USING THE TEMPLATE!**

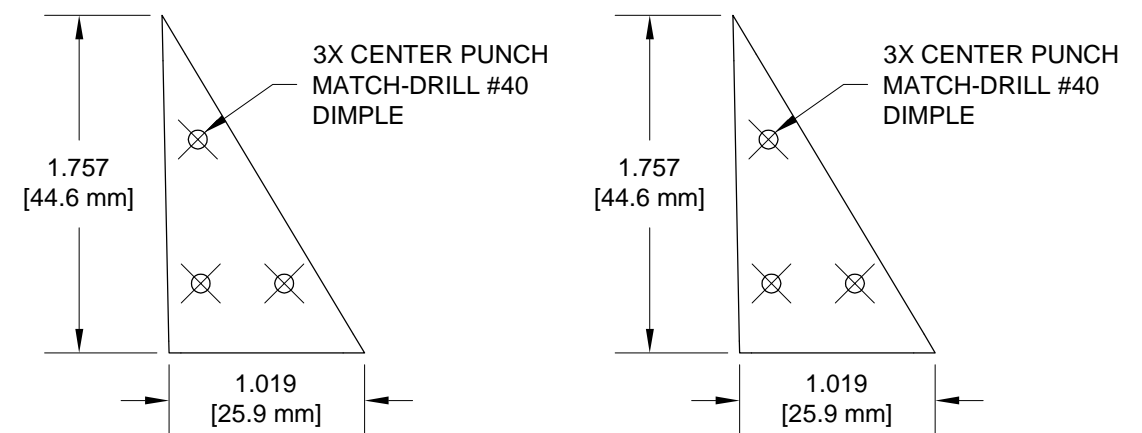


FIGURE 1: OFFSET TABS TEMPLATE



THIS PAGE INTENTIONALLY LEFT BLANK