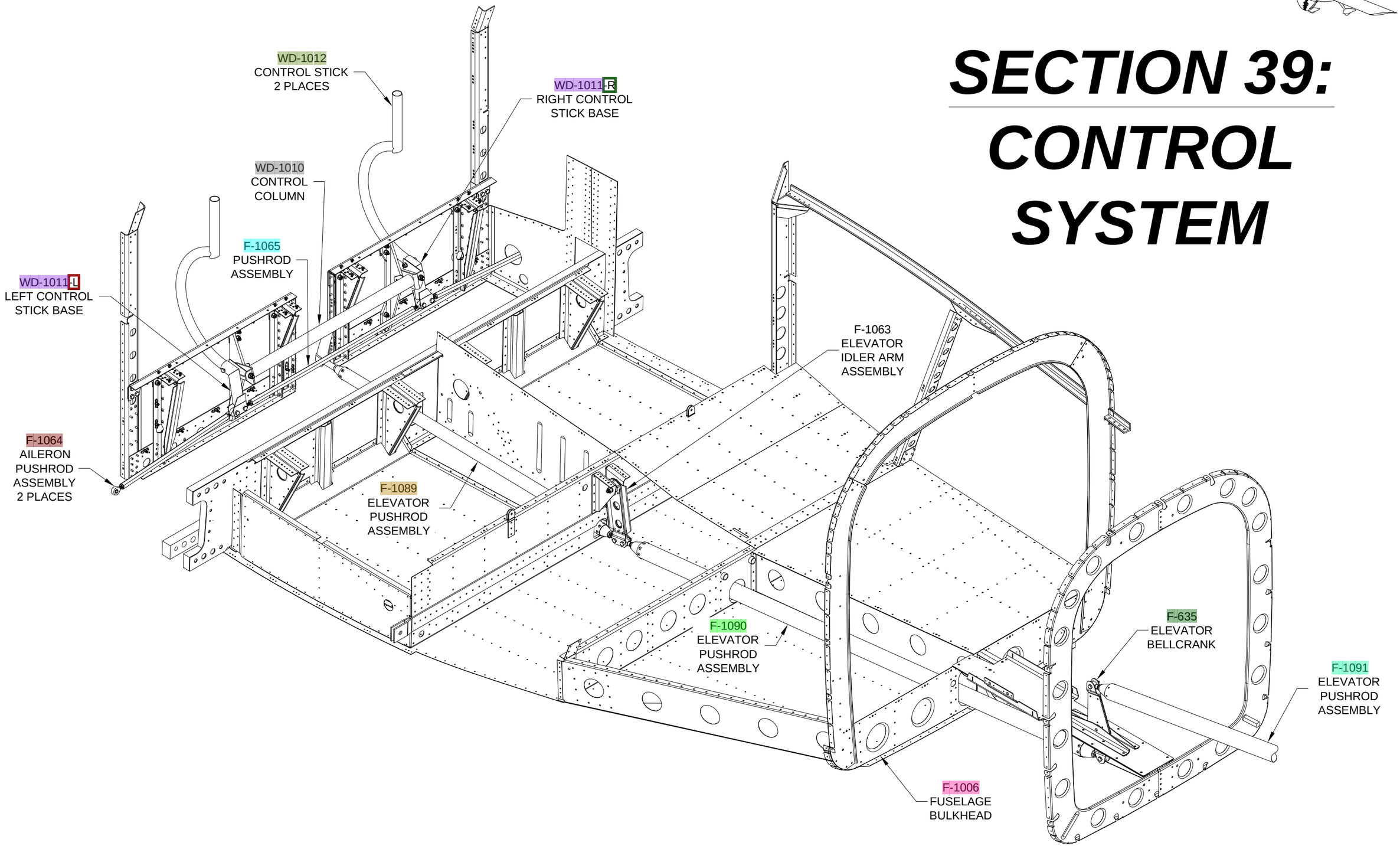
SECTION 39: CONTROL SYSTEM



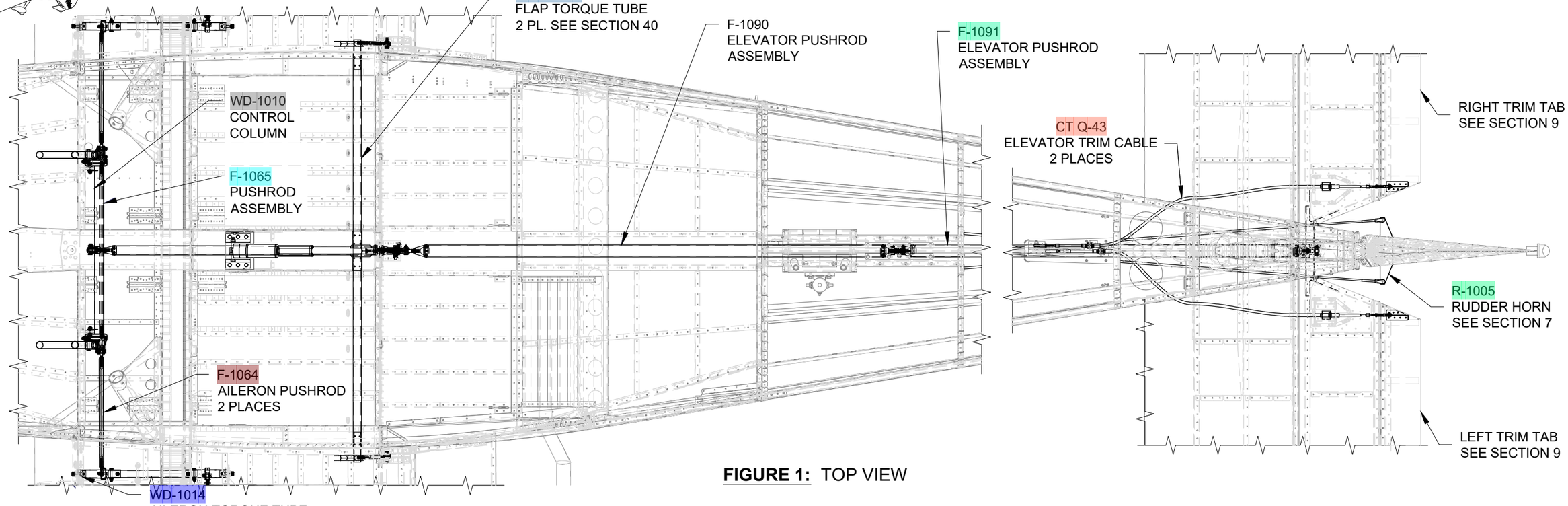


FIGURE 1: TOP VIEW

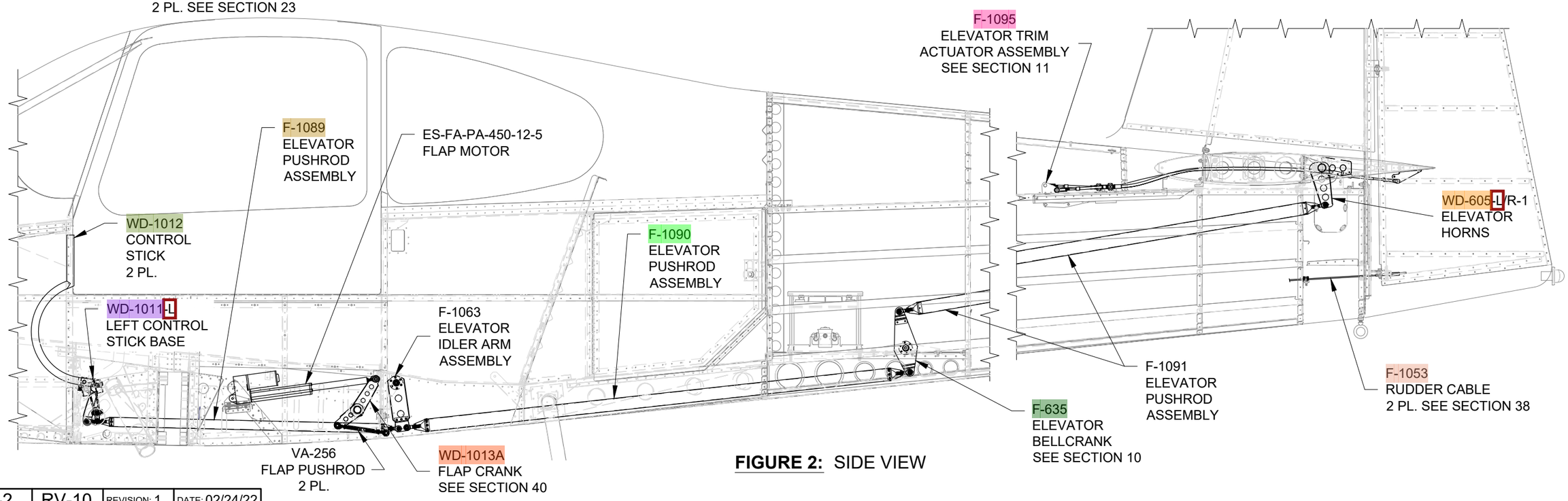


FIGURE 2: SIDE VIEW

Step 1: Fabricate the F-1089 Elevator Pushrod (Fwd) by cutting one piece of AT6-035 X 1 1/8 to the length shown in Figure 1.

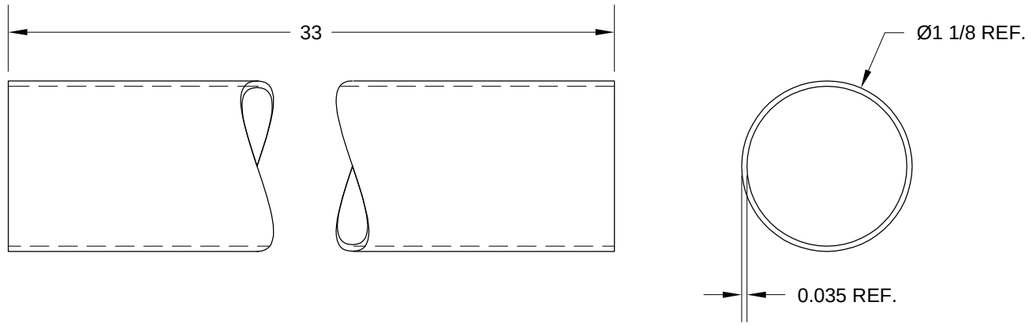


FIGURE 1: ELEVATOR PUSHROD (FWD) FABRICATION

Step 2: Final-Drill the VA-111 threaded rod end for safety wire as shown in Figure 2.

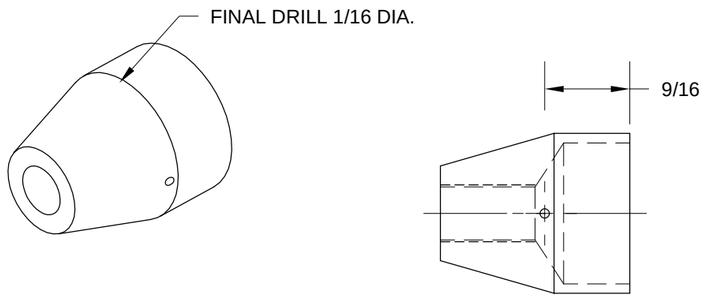


FIGURE 2: DRILL THREADED ROD END

Step 3: Cut out Page 39-11, Figure 1 and use it as a wraparound template for locating the rivet holes in both ends of the F-1089 Elevator Pushrod (Fwd). Use clear tape to make the template into a ring and align it with the end of the pushrod. Center-punch the "cross hairs" in the wraparound template. Remove the template and use a #40 drill to make six pilot holes in each end of the pushrod. Deburr the hole edges on the inside of the pushrod tube.

Step 4: Insert a VA-111 Threaded Rod End into the end of the F-1089 Elevator Pushrod (Fwd). Proper engagement of the threaded rod end in the elevator pushrod is when the end of the tube coincides with the edge of the taper in the threaded rod end. See Figure 3.

Match-Drill #30 the threaded rod end using the pilot holes in the elevator pushrod as drill guides. Insert clecos in the holes as match-drilling progresses around the circumference of the elevator pushrod.

Repeat until threaded rod ends have been match-drilled to both ends of the elevator pushrod.

Mark the threaded rod ends so that they can be reinstalled in the same position as when they were match-drilled. Remove the threaded rod ends from the elevator pushrod and deburr all holes in all parts and prime all parts inside and out. Allow primer to fully cure before permanently installing the rod ends. **CAUTION: Seized bearings have resulted from wet primer finding its way to the rod ends.**

Permanently install the threaded rod ends to the elevator pushrod using the rivets called-out in Figure 3.

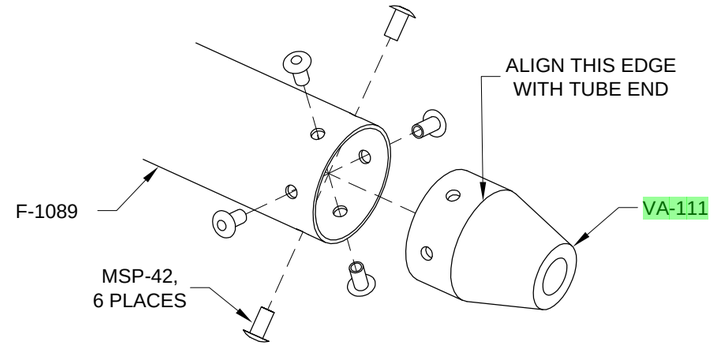


FIGURE 3: THREADED ROD END INSTALLATION

Step 5: Install the rod end bearings and jam nuts into the VA-111 Threaded Rod Ends as shown in Figure 4. Theoretically the correct engagement of the rod end bearings yields a bearing center-to-bearing center length of 37 13/32 inches. The rod end bearing engagement may need to be adjusted during installation of the F-1089 Elevator Pushrod Assembly.

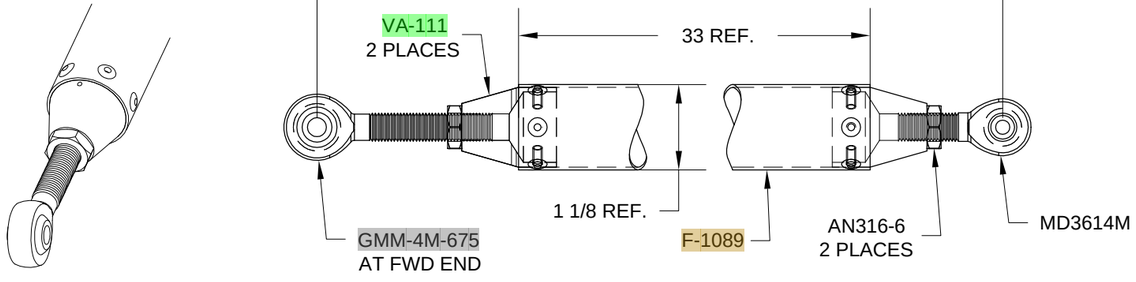


FIGURE 4: ROD END BEARING AND JAM NUT INSTALLATION

Step 1: Safety wire the forward end of the F-1089 Elevator Pushrod Assembly which has the GMM-4M-675 rod end bearing installed as shown in Figure 1. Form a loop that loosely encircles the bearing to the right side of the rod end. This loop will be pinned by the attach bolt.

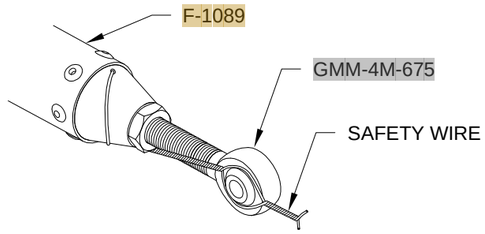


FIGURE 1:
SAFETY WIRE ELEVATOR PUSHROD ASSEMBLY

Step 2: Fabricate one F-1090 Elevator Pushrod (Mid) by cutting one piece of AT6-035 X 1 1/2 to the length shown in Figure 2.

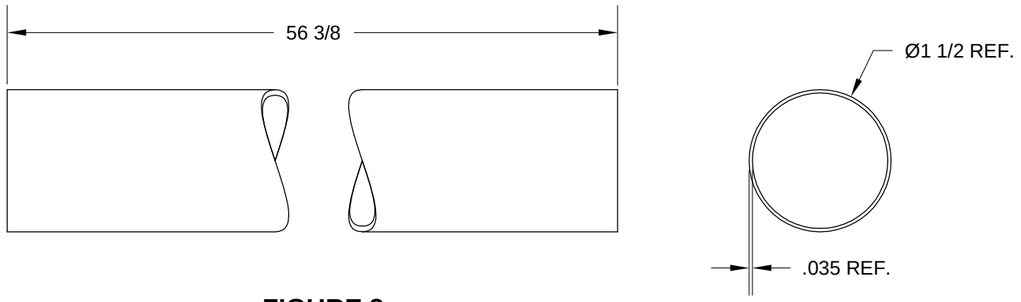


FIGURE 2:
ELEVATOR PUSHROD (MID) FABRICATION

Step 3: Cut-out Page 39-11, Figure 2 and use it as a wraparound template for locating the rivet holes in both ends of the F-1090 Elevator Pushrod (Mid). Use clear tape to make the template into a ring and align it with the end of the pushrod. Center-punch the "cross hairs" in the wraparound template. Remove the template and use a #40 drill to make six pilot holes in each end of the pushrod. Deburr the hole edges on the inside of the pushrod tube.

Step 4: Insert a VA-101 Threaded Rod End into the end of the F-1090 Elevator Pushrod (Mid). Proper engagement of the threaded rod end in the elevator pushrod is when the end of the tube coincides with the edge of the taper in the threaded rod end. See Figure 3.

Match-Drill #30 the threaded rod end using the pilot holes in the elevator pushrod as drill guides. Insert clecos in the holes as match-drilling progresses around the circumference of the elevator pushrod.

Repeat until threaded rod ends have been match-drilled to both ends of the elevator pushrod.

Step 4 (continued): Mark the threaded rod ends so that they can be re-installed in the same position as when they were match-drilled. Remove the threaded rod ends from the elevator pushrod and deburr all holes in all parts and prime all parts inside and out. Allow primer to fully cure before permanently installing the rod ends. **CAUTION: Seized bearings have resulted from wet primer finding its way to the rod ends.**

Permanently install the threaded rod ends to the elevator pushrod using the rivets called-out in Figure 3.

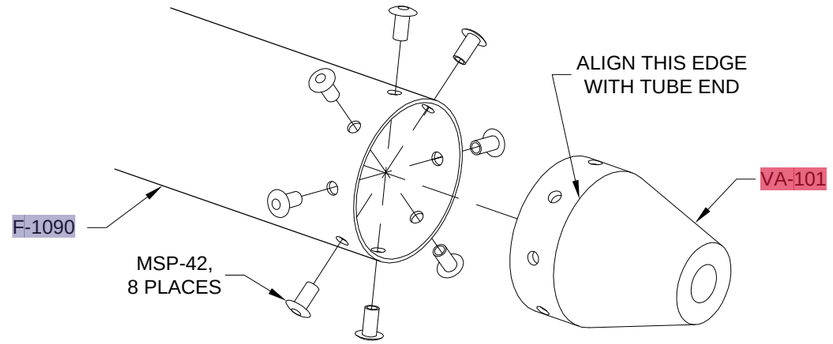


FIGURE 3:
THREADED ROD END INSTALLATION

Step 5: Install rod end bearings and jam nuts into the VA-101 Threaded Rod Ends as shown in Figure 4. Theoretically the correct engagement of the rod end bearings yields a bearing center-to-bearing center length of 60 13/16 inches. The rod end bearing engagement may need to be adjusted during installation of the F-1090 Elevator Pushrod Assembly.

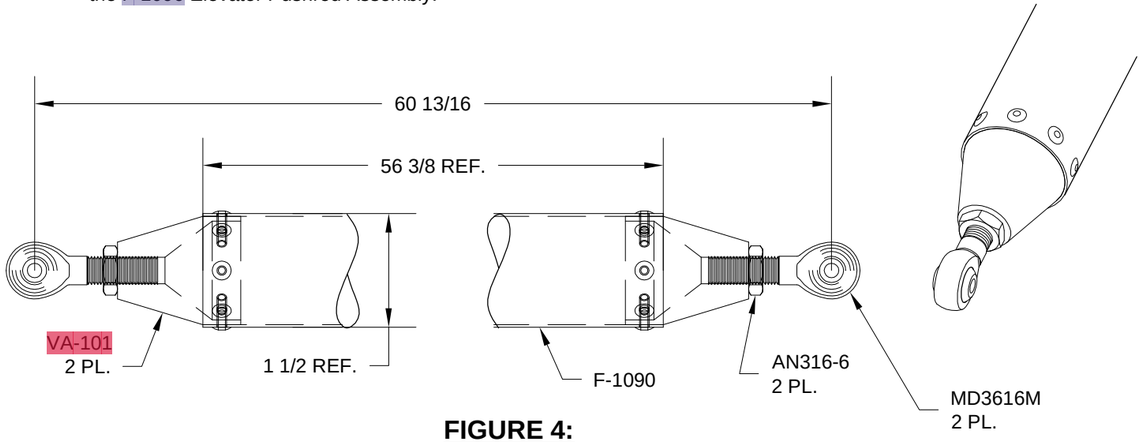


FIGURE 4:
ROD END BEARING AND JAM NUT INSTALLATION

Step 1: Assemble two F-1064 Aileron Pushrod Assemblies as shown in Figure 1.

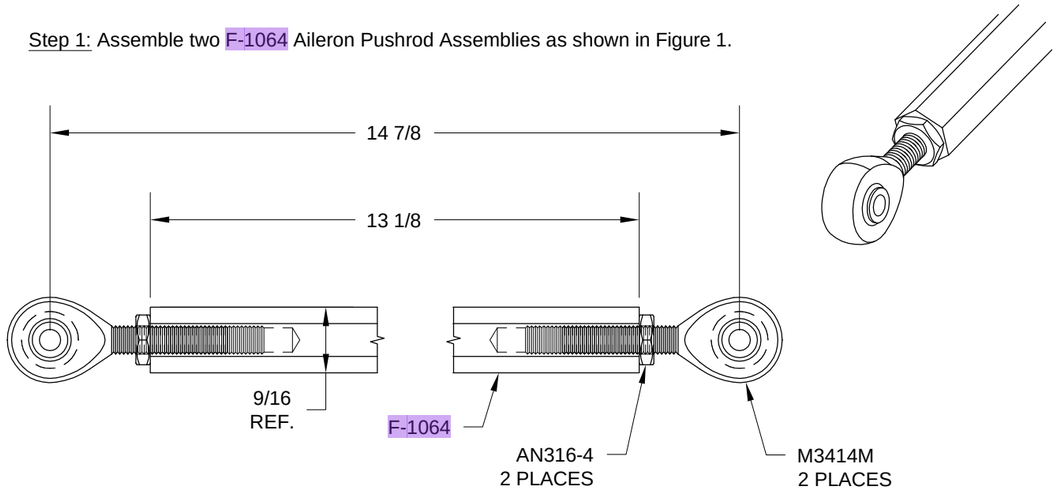


FIGURE 1: ASSEMBLING THE AILERON PUSHROD

Step 2: Assemble the F-1065 Pushrod Assembly as shown in Figure 2.

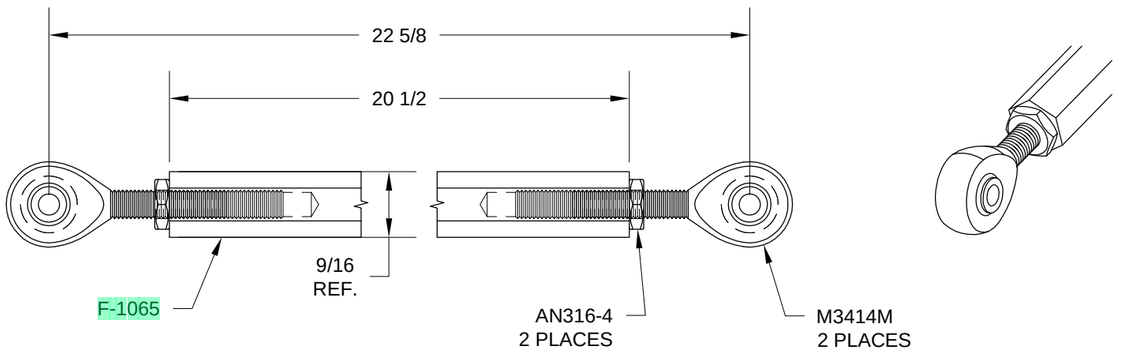


FIGURE 2: ASSEMBLING THE F-1065 PUSHROD

Step 3: Remove the F-1035 Battery/ Bellcrank Mount, see Page 10-23.

Install the F-1089 Elevator Pushrod Assembly by feeding it forward through the aft side of the F-1006 Fuselage Bulkhead and into the position shown on Page 39-1. Make sure the forward end is forward.

Install the F-1090 Elevator Pushrod Assembly by feeding it forward through the aft side of the F-1006 Fuselage Bulkhead and into the position shown on Page 39-1.

Reinstall the battery/ bellcrank mount.

Step 4: Attach the F-1090 Elevator Pushrod Assembly to the Bellcrank Assembly using the hardware called out in Figure 3.

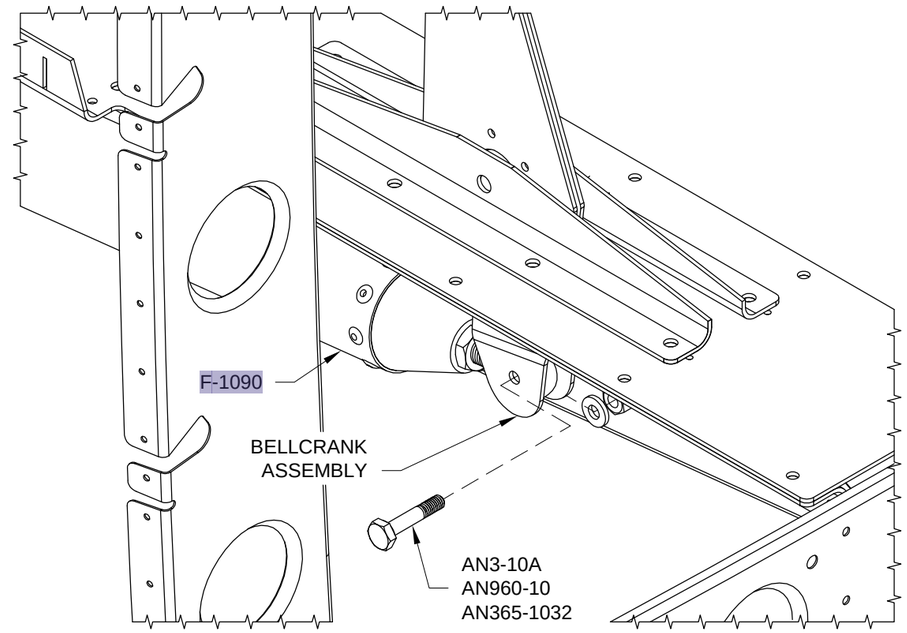


FIGURE 3: PUSHROD TO BELLCRANK ASSEMBLY

Step 1: Fabricate the F-1063C Spacer from AS3-063 as shown in Figure 1. Draw a horizontal centerline to use as a guide when match-drilling the part in the next step.

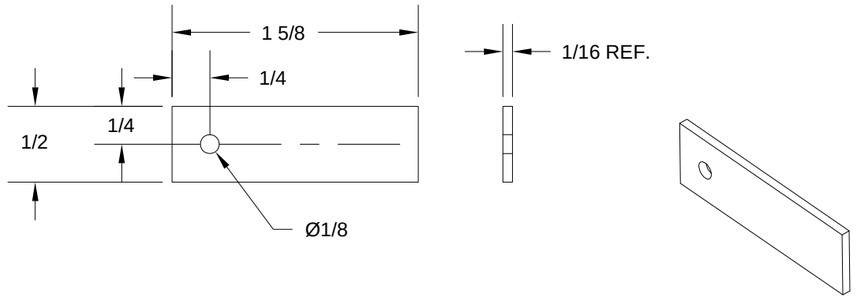


FIGURE 1: FABRICATE SPACER

Step 2: Cleco the two F-1063A Elevator Idler Arms, the F-1063C Spacer, and the VA-146 Flange Bearing together as shown in Figure 2. Adjust the spacer so that the centerline intersects the centers of the two pre-punched holes in the elevator idler arm. Match-Drill and final-drill as per the callouts. Disassemble and deburr all holes and edges. Prime if/as desired. Rivet the assembly together using the hardware shown in Figure 2.

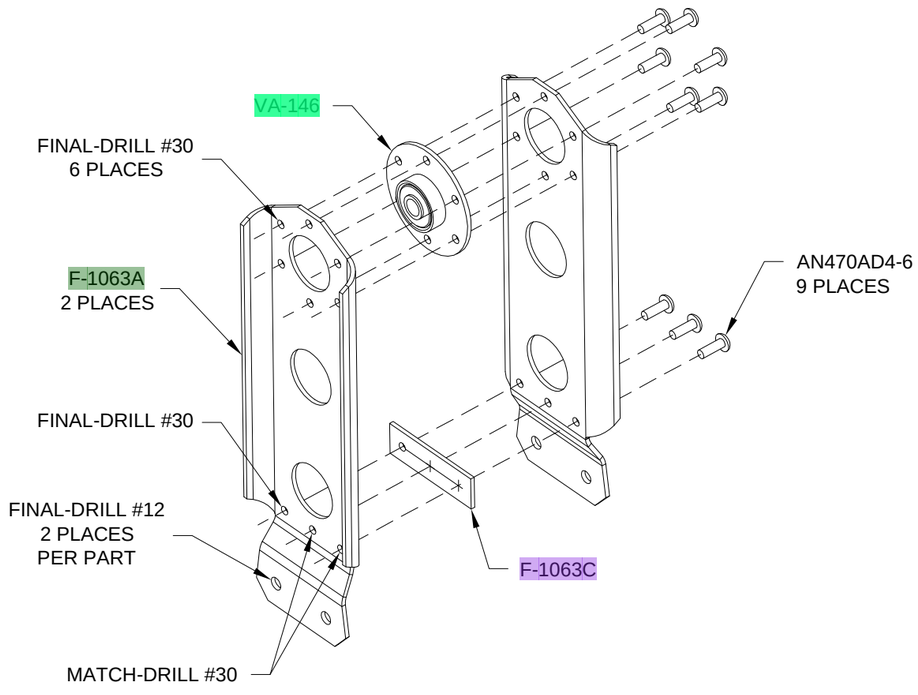


FIGURE 2: DRILL AND RIVET ELEVATOR IDLER ARM

Step 3: Bolt the F-1063 Elevator Idler Arm Assembly to the F-1063B Idler Arm Brackets using the hardware shown in Figure 3.

Bolt the F-1089 Elevator Pushrod Assembly to the elevator idler arm assembly using the hardware shown in Figure 3.

Bolt the F-1090 Elevator Pushrod Assembly to the elevator idler arm assembly using the hardware shown in Figure 3.

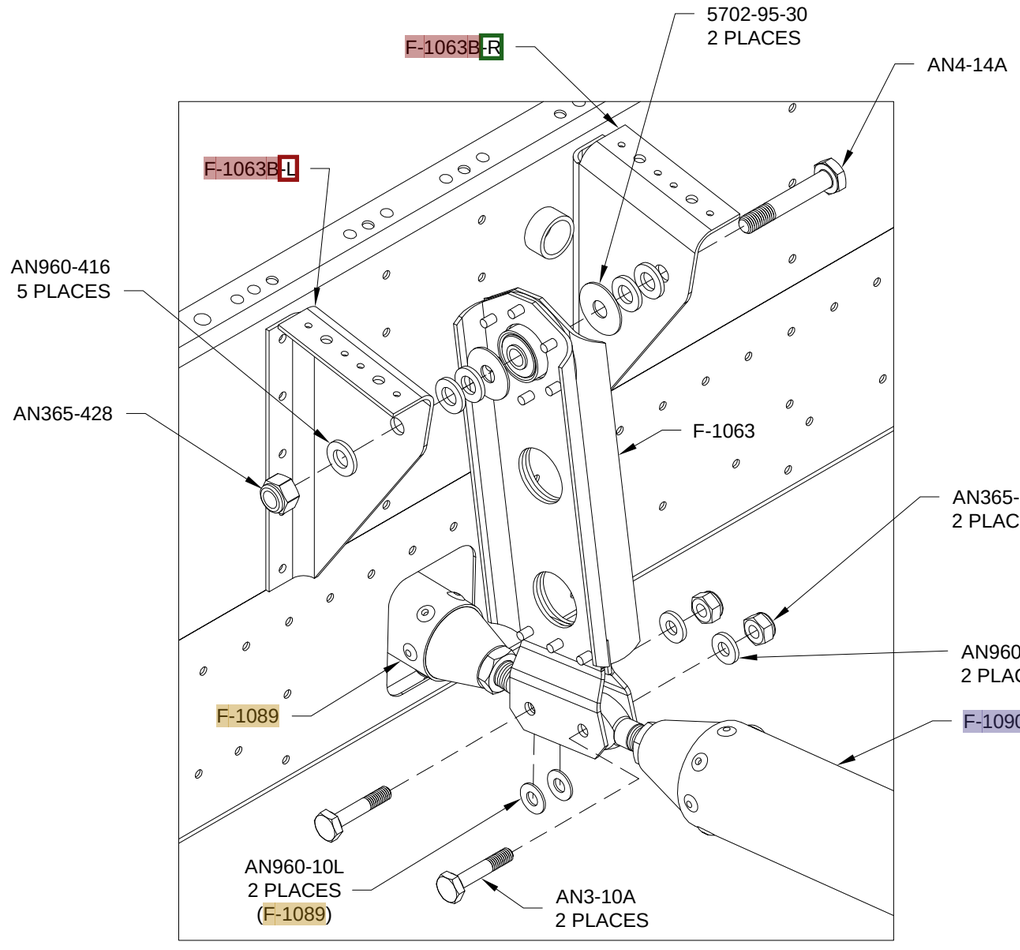


FIGURE 3:
ATTACH THE ELEVATOR IDLER ARM ASSEMBLY AND ELEVATOR PUSHRODS (F-1063B-L/R SHOWN EXPLODED)

Step 1: Clamp the WD-1011-L Left Control Stick Base to a drill press table as shown in Figure 1. Insert a WD-1012 Control Stick into the control stick base as far as it will go. Rotate the control stick until it is planar with the surface of the table. Match-Drill #12 through the assembly using the hole in the control stick base as a guide. Support the control stick base with a block if necessary. Disassemble the parts and deburr. Repeat this step for the WD-1011-R Right Control Stick Base and the other control stick.

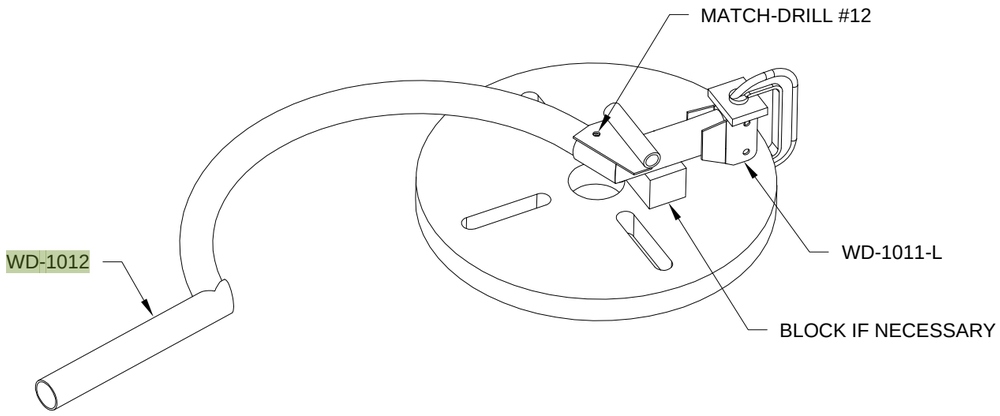


FIGURE 1: MATCH-DRILL CONTROL STICKS WITH CONTROL STICK BASES

Step 2: Final-Drill the WD-1010 Control Column as shown in Figure 2.

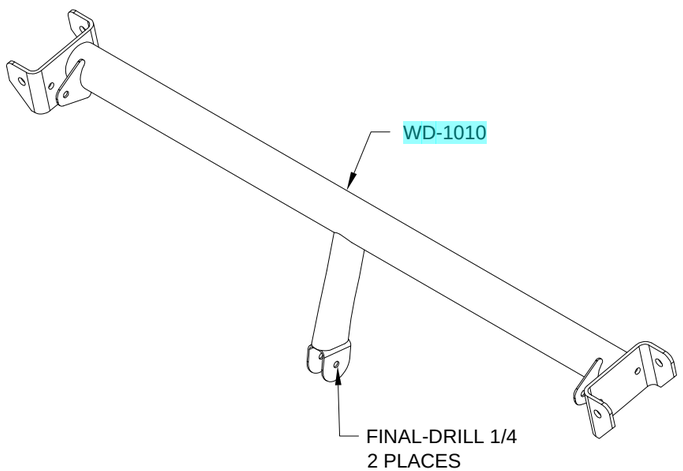


FIGURE 2: FINAL-DRILL CONTROL COLUMN

Step 3: Final-Drill the WD-1011-L Left Control Stick Base and the WD-1011-R Right Control Stick Base as shown in Figure 3.

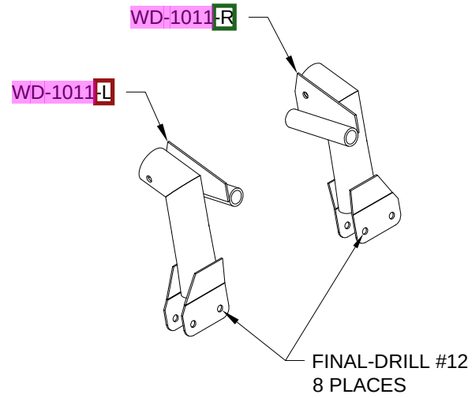


FIGURE 3: FINAL-DRILL CONTROL STICK BASES

Step 4: Install the WD-1010 Control Column onto the F-1033-L and F-1033-R (not shown) Control Column Mounts using the hardware shown in Figure 4. The right side is a mirror image of the left. The control column should rotate freely on the control column mounts.

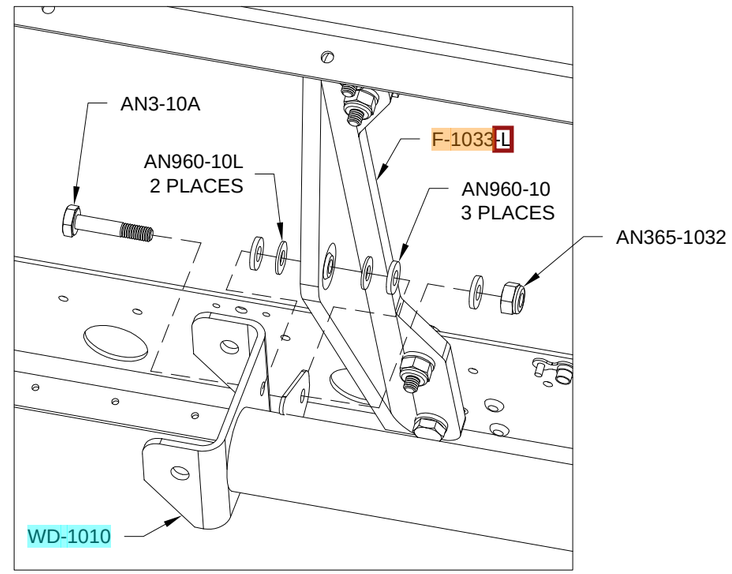


FIGURE 4: CONTROL COLUMN INSTALLATION (LEFT SIDE SHOWN)

Step 1: Check that the length of both of the BUSH-BS .245 X .375 X 2.313 Control Stick Base Bushings is between 2 1/4 inches and 2 5/16 inches. Check that an AN4 bolt will fit the inside diameter of the control stick base bushings and ream if required. Deburr the ends of the control stick base bushings so that they slide easily inside the WD-1011 Control Stick Bases. See Figure 1.

The pivot tube of the control stick base must be about .010" shorter than the control stick base bushing. File the ends of the control stick base pivot tubes if/as required to achieve the correct length. Deburr the inside edges of the control stick base pivot tubes. See Figure 1.

Insert a control stick base bushing into each control stick base as shown in Figure 1.

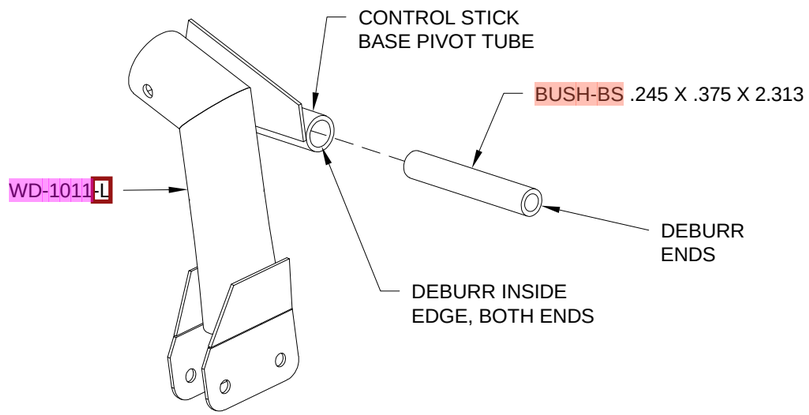


FIGURE 1: CONTROL STICK BASE BUSHING INSTALLATION

Step 2: Bolt the WD-1011-L Control Stick Base to the WD-1010 Control Column using the hardware shown in Figure 2.

If the BUSH-BS .245 X .375 X 2.313 Control Stick Base Bushing is too long to fit into the control column it must be trimmed along with the control stick base pivot tube to maintain the length differential described in the previous step.

Repeat for the WD-1011-R Control Stick Base.

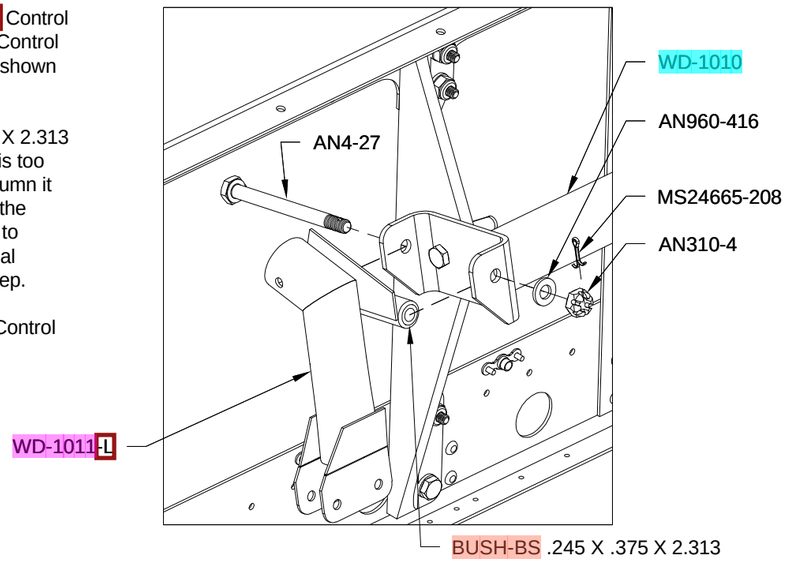


FIGURE 2: CONTROL STICK BASE INSTALLATION

Step 3: Install the F-1065 Pushrod Assembly into the WD-1011-L and the WD-1011-R (not shown) Control Stick Bases using just the bolts and nuts shown in Figure 3 for now. Leave the nuts finger tight.

Install the WD-1012 Control Sticks into the control stick bases using the hardware shown in Figure 3. Move the control sticks through their full range of motion and check for interference. **NOTE: When F-1043D-L/R Cover Panels are later installed check for interference with control sticks and trim the cover panels if/as necessary for clearance.**

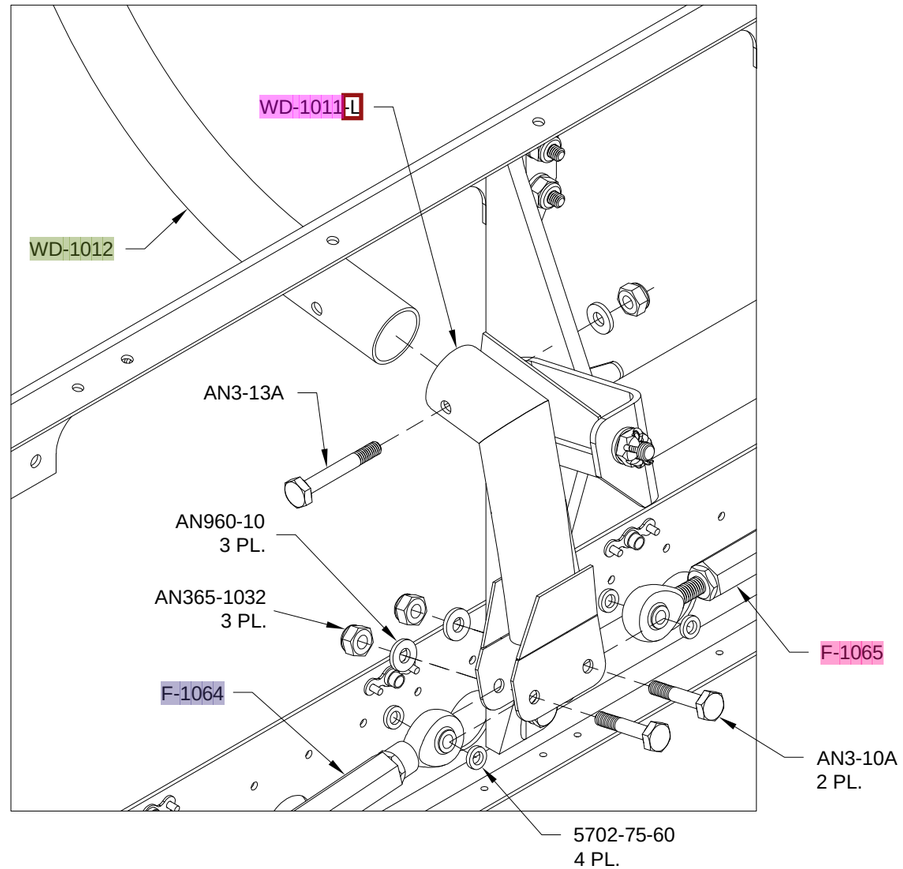


FIGURE 3: CONTROL STICK AND PUSHROD INSTALLATION

Step 1: Adjust the length of the F-1065 Pushrod Assembly until the WD-1012 Control Sticks are parallel as shown in Figure 1. Measure from inside to inside at the top of the control sticks and compare to same at the bottom of the control sticks. When the two measurements are equal the control sticks are parallel. **NOTE**: **The dimensions shown in Figure 1 are for reference purposes only and need not match the builders actual measurements.**

Tighten the jam nuts. Bolt the pushrod assembly into the WD-1011-L and -R Control Stick Bases using the hardware shown on Page 39-8, Figure 3.

Step 2: Bolt the F-1064 Aileron Pushrod Assemblies into the WD-1011-L and -R Control Stick Bases using the hardware shown on Page 39-8, Figure 3.

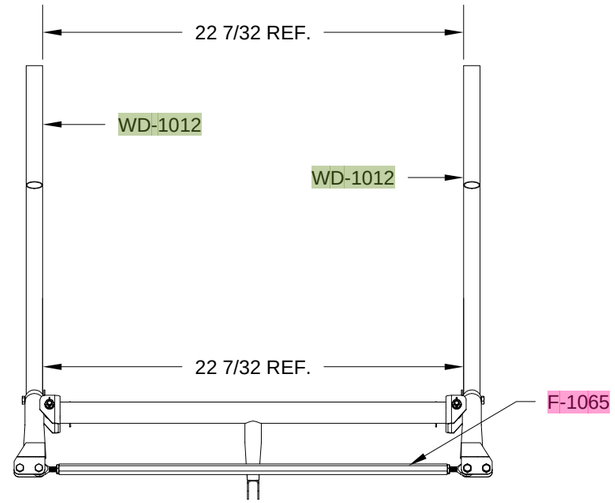


FIGURE 1: MAKE CONTROL STICKS PARALLEL

Step 1: Fabricate a simple gauge from the dimensions given in Figure 1. Material is not provided in the kit.

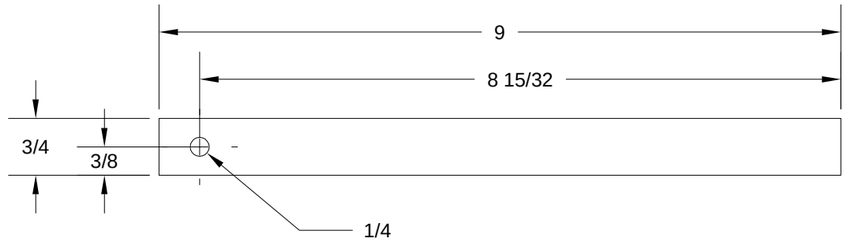


FIGURE 1: FABRICATE MEASURING JIG

Step 2: Check the neutral position of the WD-1010 Control Column. Clamp the F-635 Elevator Bellcrank in its neutral position. See Page 11-7. Insert an AN4 bolt through the gauge. Lower the gauge and bolt into the tunnel and slip the bolt through the control column center clevis pinning the F-1089 Elevator Pushrod (Fwd) as shown in Figure 2. When the aft end of the gauge is butted up against the F-1004A Center Section Bulkhead the control column is in its neutral position. Adjust the F-1089 and/or F-1090 Elevator Pushrod lengths if/as required to move the control column to its neutral position.

WARNING: In the final installation both pushrod ends must have over half the thread engaged (except where safety wire is used) making it impossible for a bearing to back off the pushrod if both ends are pinned.

Perform a final check of the control system once the elevators are installed. Move the control sticks through their full range of motion. The WD-605-L/R-1 Elevator Horns should contact the elevator stops before the control sticks make contact with any other structure.

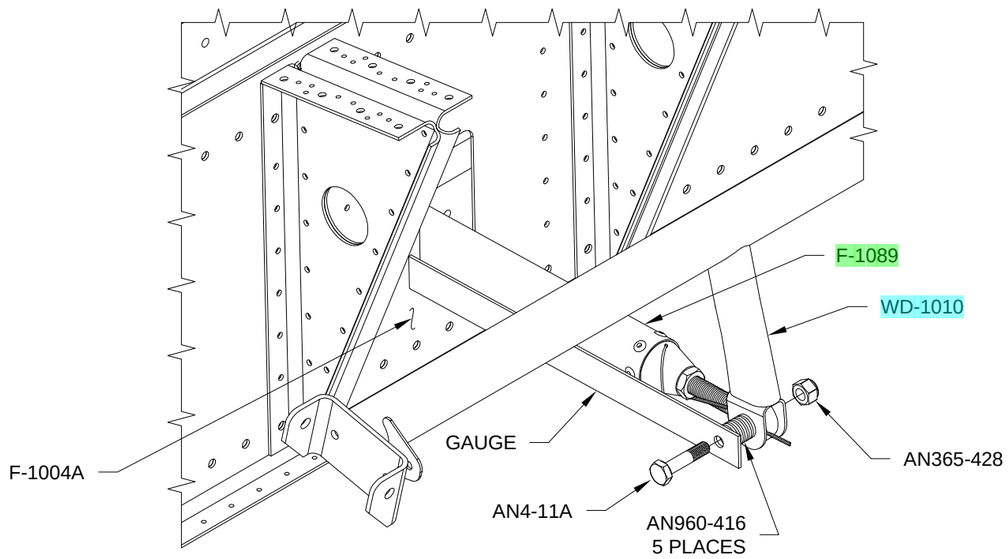


FIGURE 2: CONTROL COLUMN NEUTRAL POSITION

Step 3: Bolt the F-1089 Elevator Pushrod Assembly to the WD-1010 Control Column using the hardware shown in Figure 3. The loop in the safety wire goes aroung the bearing, passing between the rod end housing and the WD-1010 Control Column clevis and is captured by the AN4 bolt as shown in Figure 3. The safety wire should not interfere with anything at this connection.

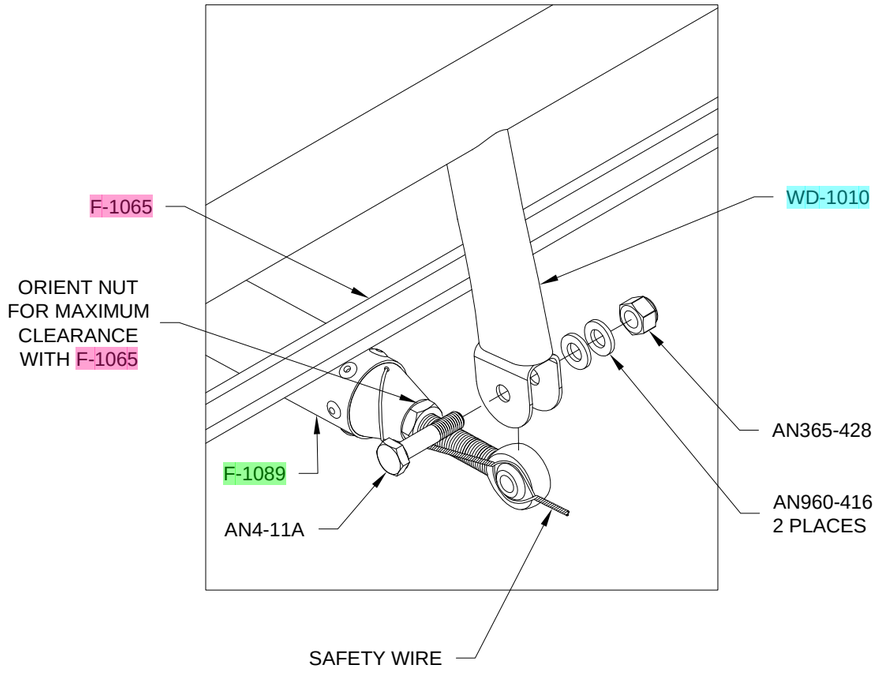


FIGURE 3: ELEVATOR PUSHROD (FWD) INSTALLATION

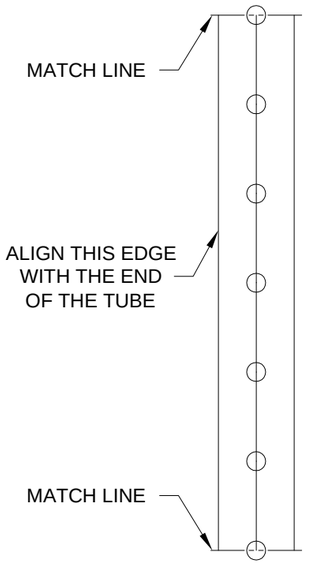


FIGURE 1:
F-1089 PUSHROD
RIVET HOLE
LOCATION TEMPLATE

10 9/16
[268.3 mm]

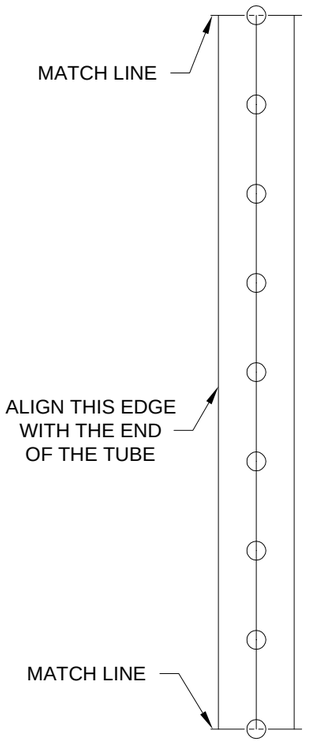


FIGURE 2:
F-1090 PUSHROD
RIVET HOLE
LOCATION TEMPLATE

16
[406.4 mm]

NOTE: CHECK PRINTED SCALE 1:1 PER SECTION 3 BEFORE USING THE TEMPLATE! ”

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