

TOTAL PERFORMANCE
VAN'S AIRCRAFT

14401 Keil Road NE, Aurora, Oregon, USA 97002

PHONE 503-678-6545 • FAX 503-678-6560 • www.vansaircraft.com • info@vansaircraft.com

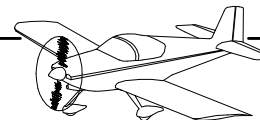
Service Letters and Bulletins: www.vansaircraft.com/public/service.htm

REVISION DESCRIPTION:

Page 33-09 REV 1: Added 'Step 2: See the "REMOVE THIS TAB, BOTH SIDES" call-out near Detail A. Modify four SB375-4 Snap Bushings as shown.'

Remaining steps repaginated.

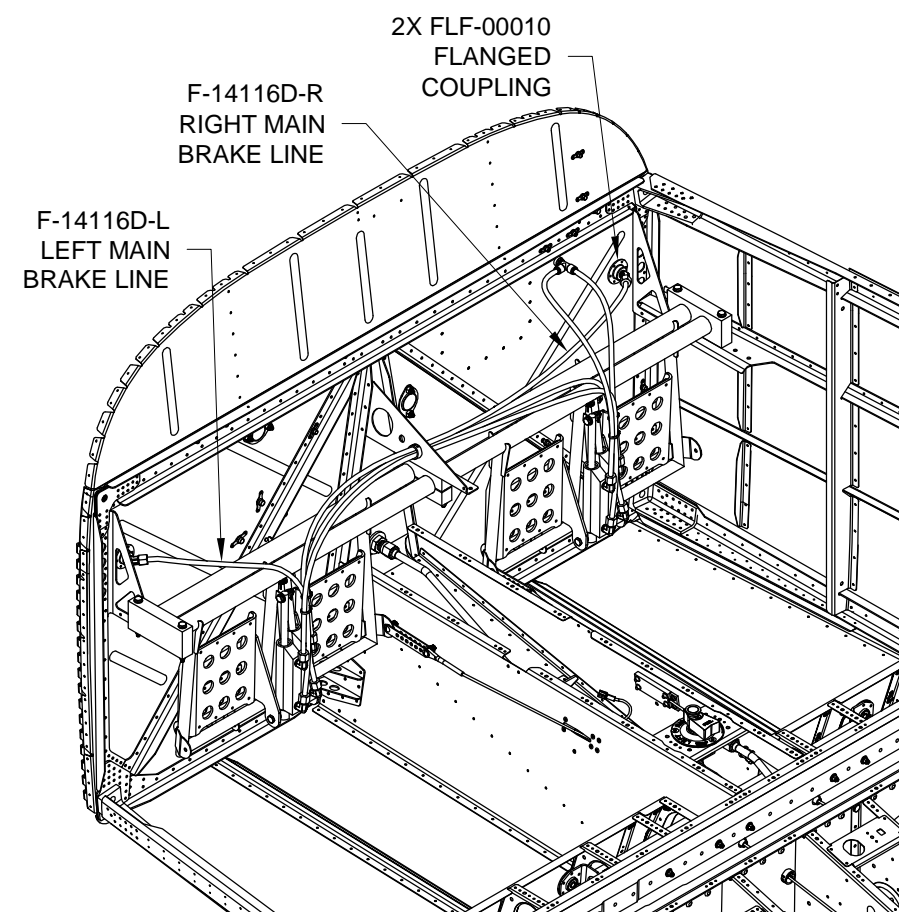
In Step 3 and Step 4, "modified snap bushings" was "snap bushings".



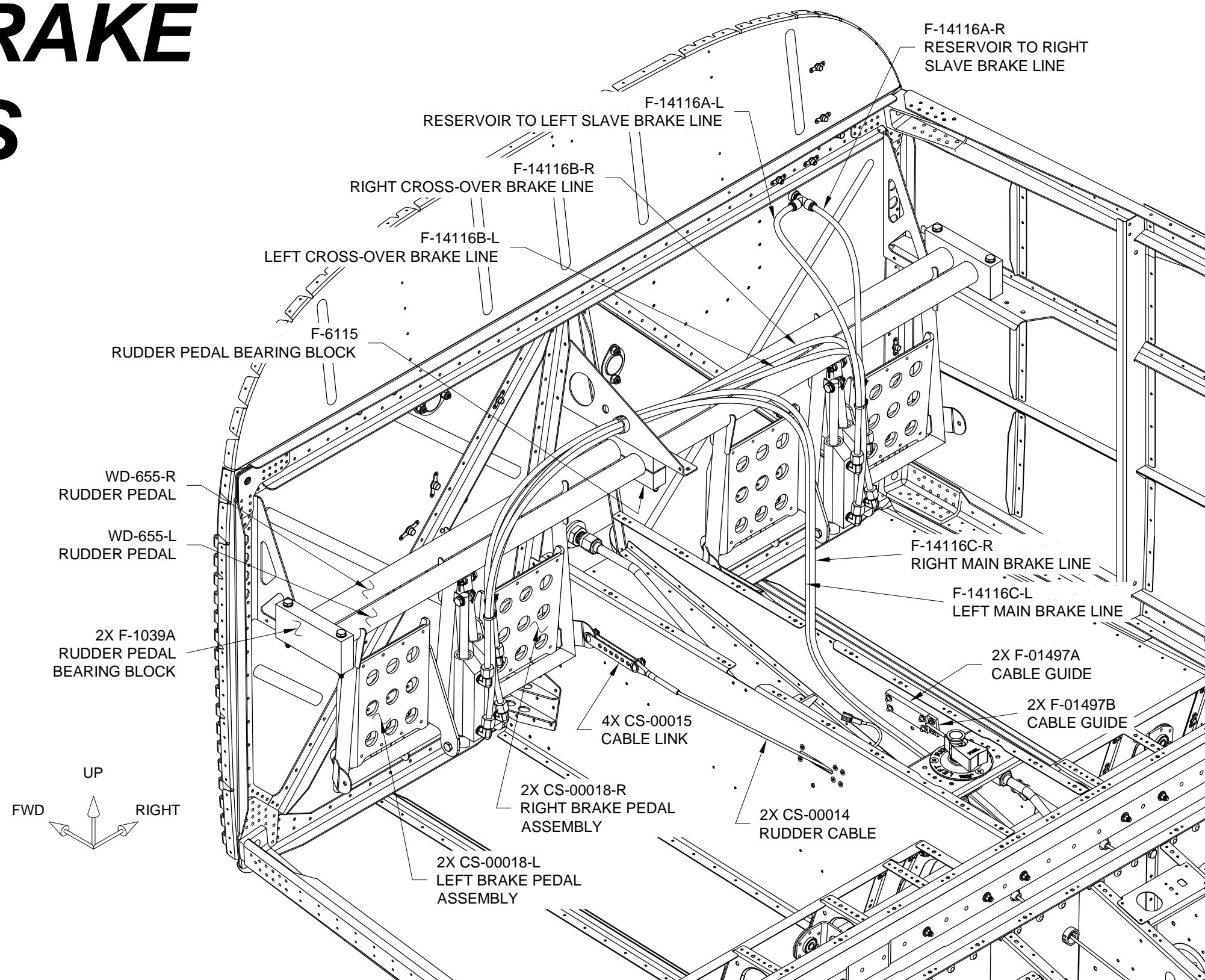
SECTION 33:

RUDDER & BRAKE

SYSTEMS



(TAIL DRAGGER)



(TRI-GEAR)

NOTE: Four brake pedals will be assembled: two CS-00018-L Left Brake Pedal Assemblies and two CS-00018-R Right Brake Pedal Assemblies for brake activation from each side of the aircraft. The two left brake pedal assemblies are identical to each other. The two right brake pedal assemblies are identical to each other.

Step 1: Separate the four CS-00018A Brake Pedal Pads. See Figure 1.

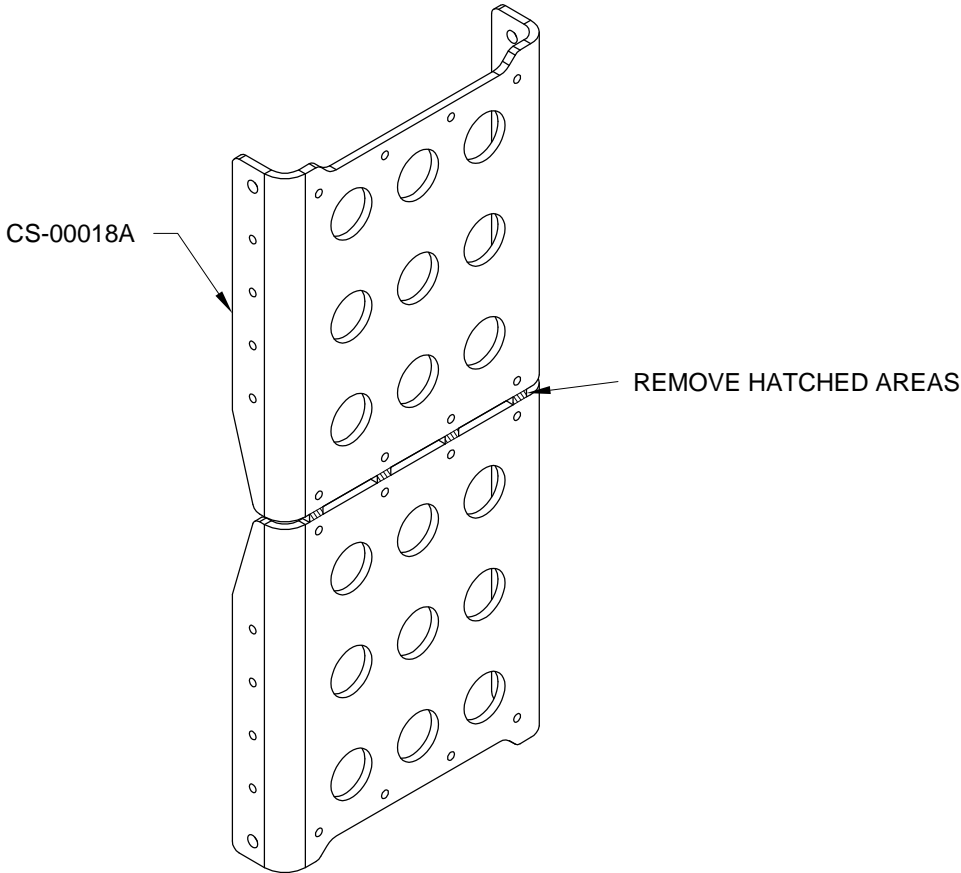


FIGURE 1: BRAKE PEDAL PADS
(ONE SET SHOWN)

Step 2: Separate the four CS-00018B Brake Pedal C-Channels and Bearing Block Template as shown in Figure 2.

Retain the bearing block template for use later in this section.

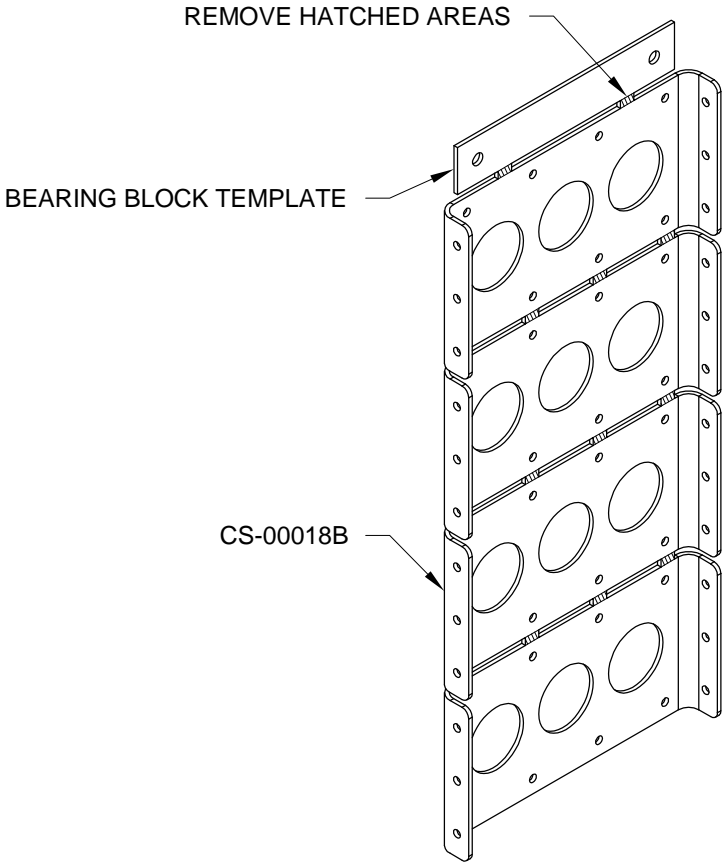


FIGURE 2: BRAKE PEDAL C-CHANNELS

Step 3: Separate the eight CS-00018C Brake Pedal Z-Channels. See Figure 3.

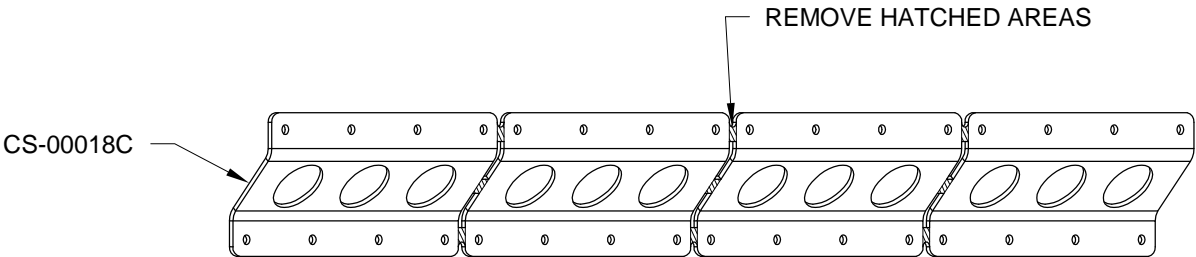


FIGURE 3: BRAKE PEDAL Z-CHANNELS
(ONE SET SHOWN)



Step 1: Fabricate four F-1097 Spacers from AT6-058X5/16 6061-T6 aluminum tubing as shown in Figure 1.

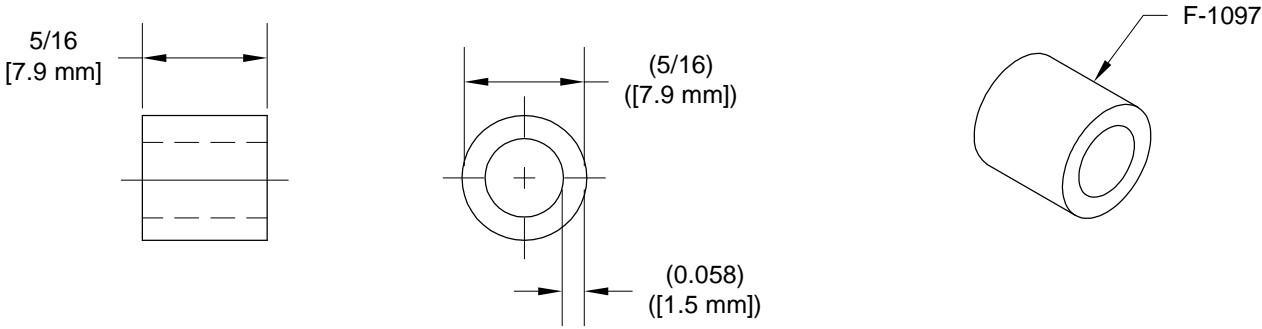


FIGURE 1: SPACERS
(ONE SPACER SHOWN)

NOTE: Refer to Figure 2 for the following steps:

Step 2: Cleco together the CS-00018A Brake Pedal Pads, CS-00018C Brake Pedal Z-Channels, CS-00018B Brake Pedal C-Channels, and F-1052B Brake Pedal Side Plates to create the four brake pedal assemblies. See Page 33-04, Figure 1 for additional reference.

Step 3: Final-Drill #12 the holes for the brake pedal hinge points and brake master cylinder attach points.

Step 4: Final-Drill #30 all of the remaining holes common to the CS-00018A Brake Pedal Pads, CS-00018C Brake Pedal Z-Channels, CS-00018B Brake Pedal C-Channels, and F-1052B Brake Pedal Side Plates.

Step 5: Disassemble the four brake pedals and deburr all of the holes.

Step 6: Prime/paint the parts if/as desired.

Step 7: Cleco, then rivet the CS-00018A Brake Pedal Pads, CS-00018B Brake Pedal C-Channels, and F-1052B Brake Pedal Side Plates.

Step 8: Cleco, then rivet the CS-00018C Brake Pedal Z-Channels.

Hereafter refer to these four parts as the CS-00018-L & -R Left and Right Brake Pedal Assemblies, respectively.

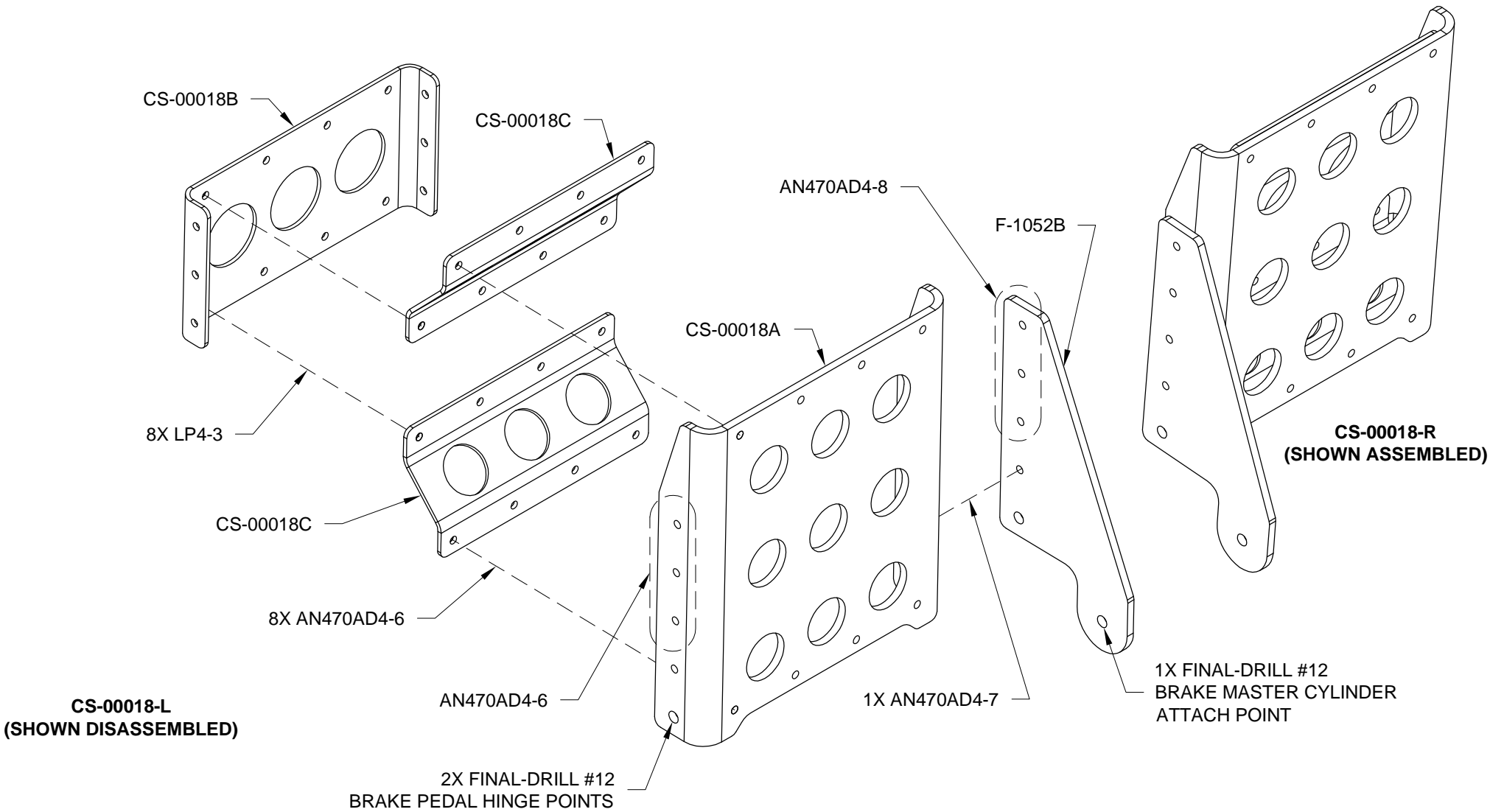


FIGURE 2: BRAKE PEDAL ASSEMBLIES
(LEFT SIDE SHOWN)



Step 1: Final-Drill #12 all holes in the WD-655-L & -R Rudder Pedals as shown in Figure 1.

Step 2: Apply a thin coating of AeroShell #5 (or equivalent) wheel bearing grease to the bearing areas of the bolts as shown in Figure 1.

Step 3: Attach the four CS-00018-L & -R Left and Right Brake Pedal Assemblies to the WD-655-L & -R Rudder Pedals as shown in Figure 1.

A balance must be struck between freeplay and friction such that both are minimized. The brake pedal assemblies must be secure but must also rotate by gravity alone before the cotter pins are installed.

Due to manufacturing tolerances, it may be necessary to use a different mix of washers than what is shown in Figure 1. If required, use a heavy soft-faced hammer to make slight adjustments to the brake pedal mounting tabs.

Tighten the nuts and bolts until they are finger-tight. **DO NOT** use standard torque values.

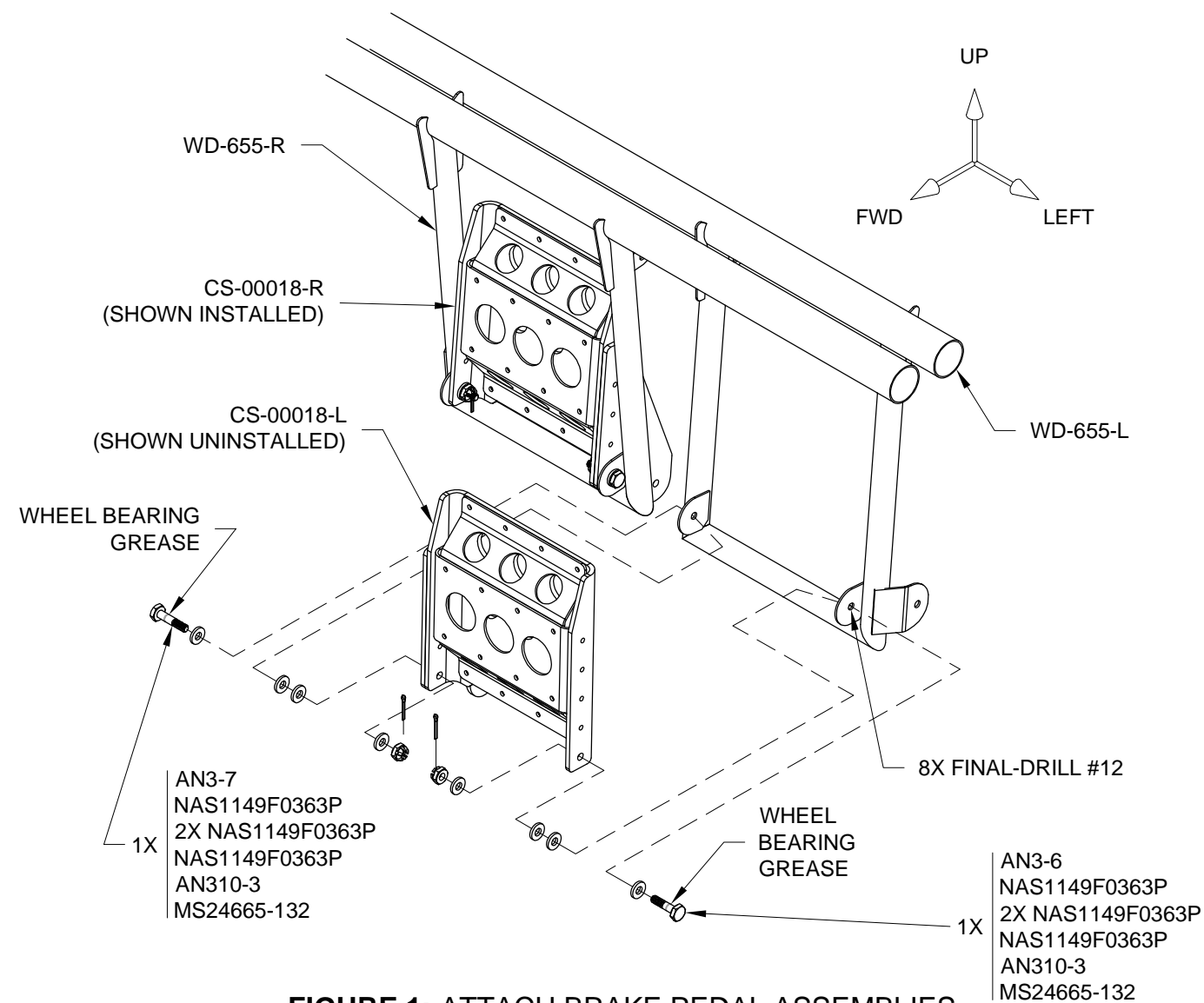


FIGURE 1: ATTACH BRAKE PEDAL ASSEMBLIES
(LEFT SIDE SHOWN)

Step 4: Apply pipe thread sealant to the threads of eight F 69-F-04X02 Brass Elbows and install the brass elbows into the four Brake Master Cylinders as shown in Figure 2.

Note the clocking of the lower brass elbows. See Figure 3.

Step 5: Apply a thin coating of AeroShell #5 (or equivalent) wheel bearing grease to the bearing areas of the lower bolts as shown in Figure 2.

Step 6: Attach the four Brake Master Cylinders to the WD-655-L & -R Rudder Pedals and F-1052B Brake Pedal Side Plates as shown in Figure 2.

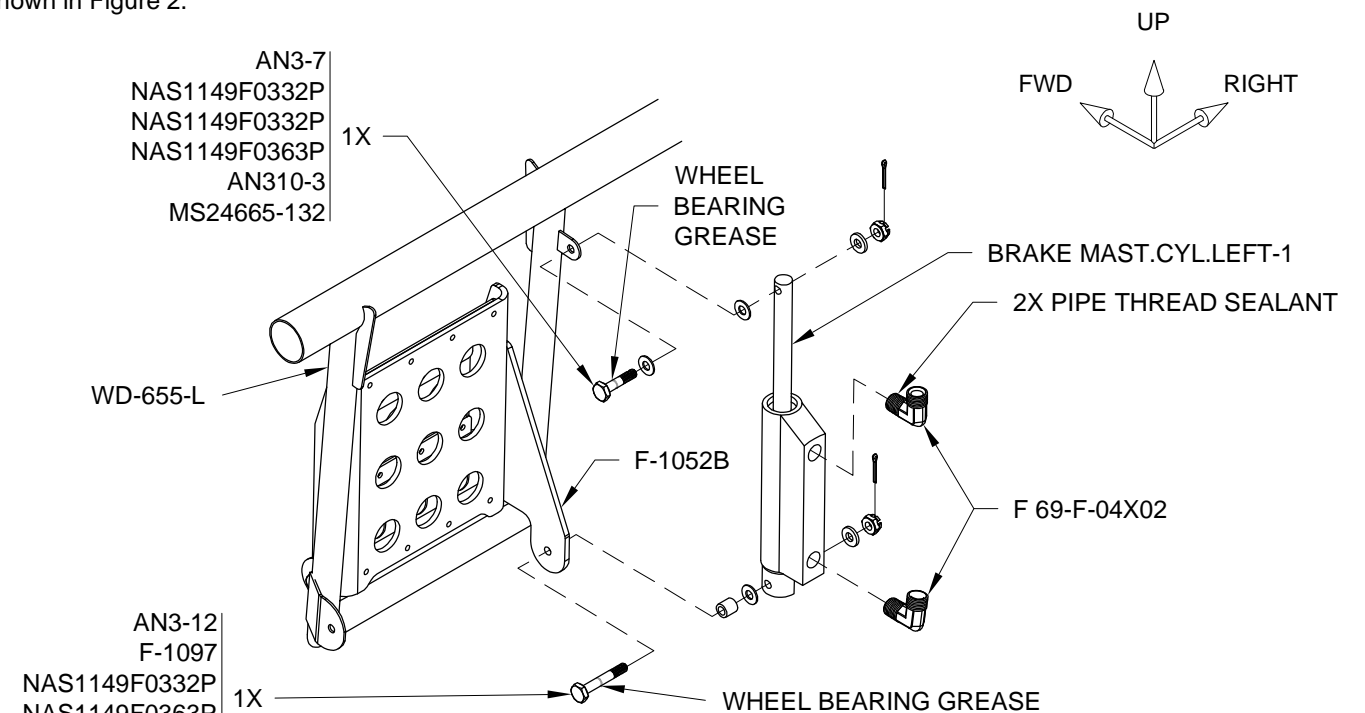


FIGURE 2: INSTALL BRAKE MASTER CYLINDERS
(LEFT SIDE SHOWN, LEFT BRAKE PEDAL ONLY)

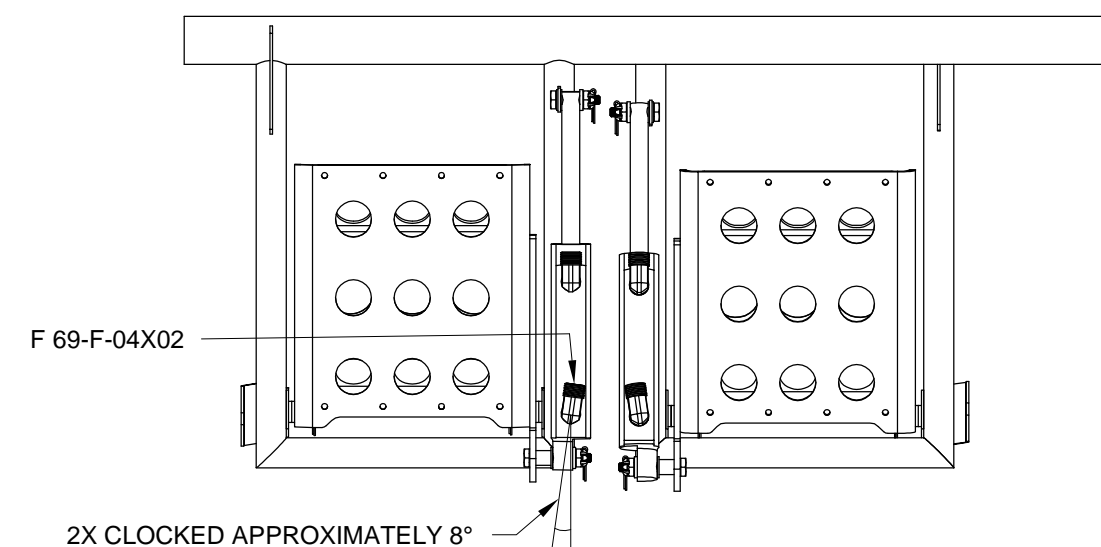
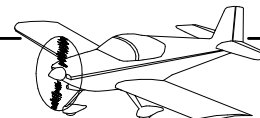


FIGURE 3: BRASS ELBOW CLOCKING
(AFT SIDE VIEW LOOKING FORWARD, LEFT SIDE SHOWN, RIGHT SIDE IS MIRROR IMAGE)



Step 1: Align the bearing block template with the first F-1039A Rudder Pedal Bearing Block as shown in Figure 1. Clamp in position.

Match-Drill #12 two holes in the rudder pedal bearing block approximately .125 [3.2 mm] deep using the bearing block template as a guide. Remove the template. Mark the bottom side as shown in Figure 1.

Final-Drill #10 the two holes completely through the rudder pedal bearing block using a drill press.

Step 2: Repeat Step 1 for the second F-1039A Rudder Pedal Bearing Block.

Step 3: Repeat Step 1 but align the F-6115 Rudder Pedal Bearing Block with the F-14104 Support Angle as shown in Figure 2. See Page 33-06, Figure 1 for reference.

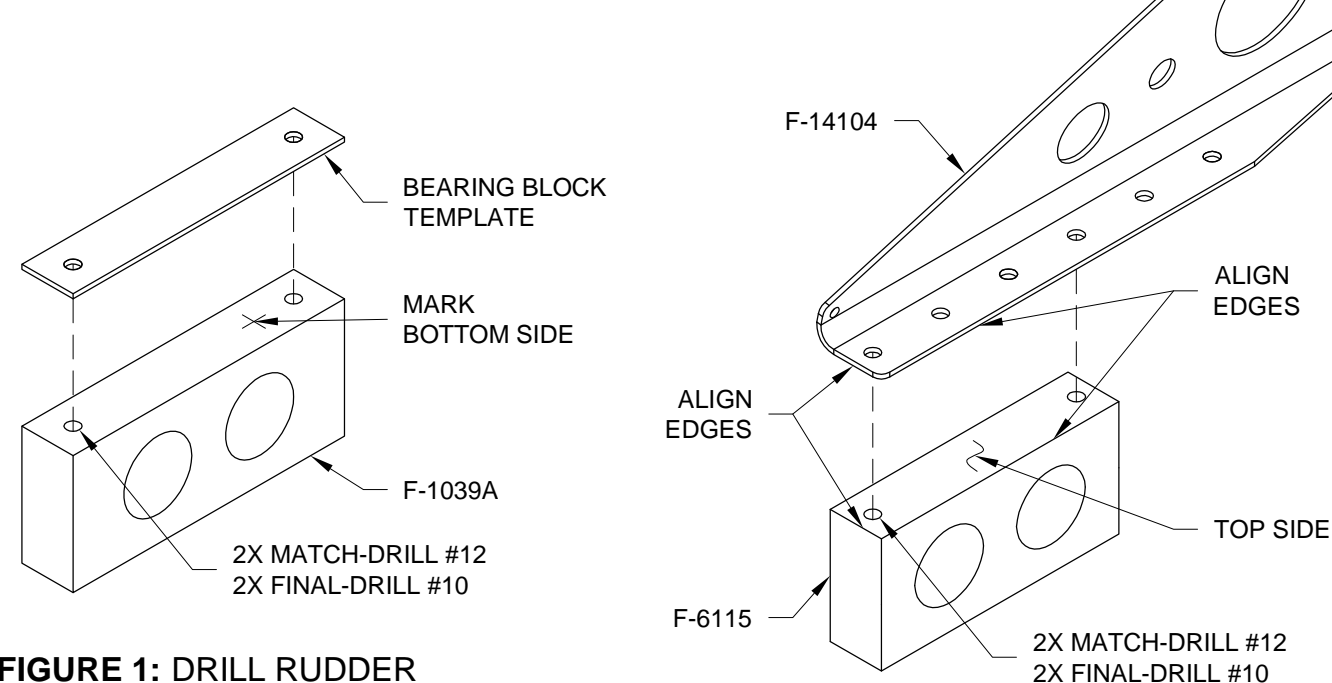


FIGURE 1: DRILL RUDDER PEDAL BEARING BLOCKS

FIGURE 2: DRILL RUDDER PEDAL BEARING BLOCK

Step 4: Use a hacksaw or bandsaw to cut the F-6115 Rudder Pedal Bearing Block in half. Mark the halves so that they can be reassembled in their original configuration. See Figure 2.

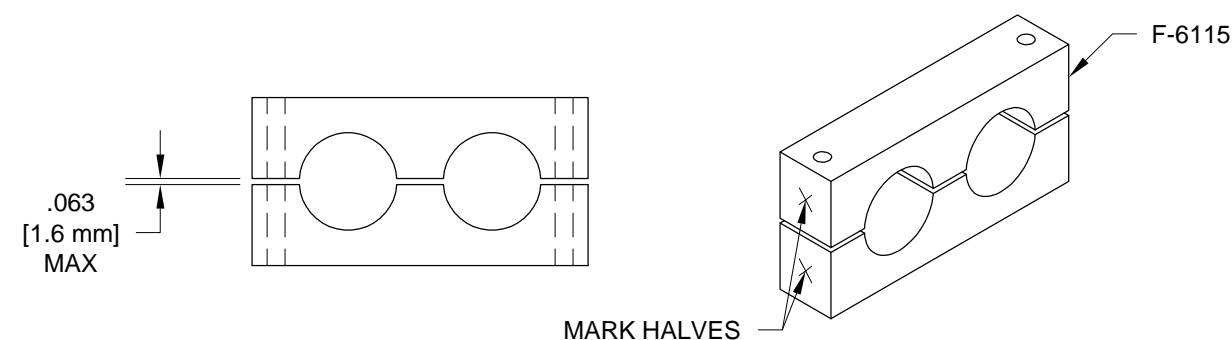


FIGURE 3: SPLIT RUDDER PEDAL BEARING BLOCK

NOTE: For a Tail Dragger aircraft, consider installing the FLF-00010 Flanged Couplings at this time. See Steps 1-4 on Page 33-10.

Step 5: Lightly sand the end faces of the WD-655-L & -R Rudder Pedals to remove powder coating and any burrs.

Step 6: Apply a thin coating of AeroShell #5 (or equivalent) wheel bearing grease to the bearing areas of the WD-655-L & -R Rudder Pedals in order to decrease friction and inhibit corrosion. See Figure 4.

Step 7: Slip one F-1039A Rudder Pedal Bearing Block onto each end of the WD-655-L & -R Rudder Pedals with the top side of the blocks facing up.

NOTE: Figure 4 depicts the rudder pedals in their most forward position for reference only. Three positions are possible, adjust as desired.

Step 8: Attach the F-1039A Rudder Pedal Bearing Blocks and WD-655-L & -R Rudder Pedals to the F-01419-L & -R Stiffeners as shown in Figure 4.

Tighten the nuts and bolts just enough to increase the turning friction of the bolts in the blocks. **DO NOT** use standard torque values.

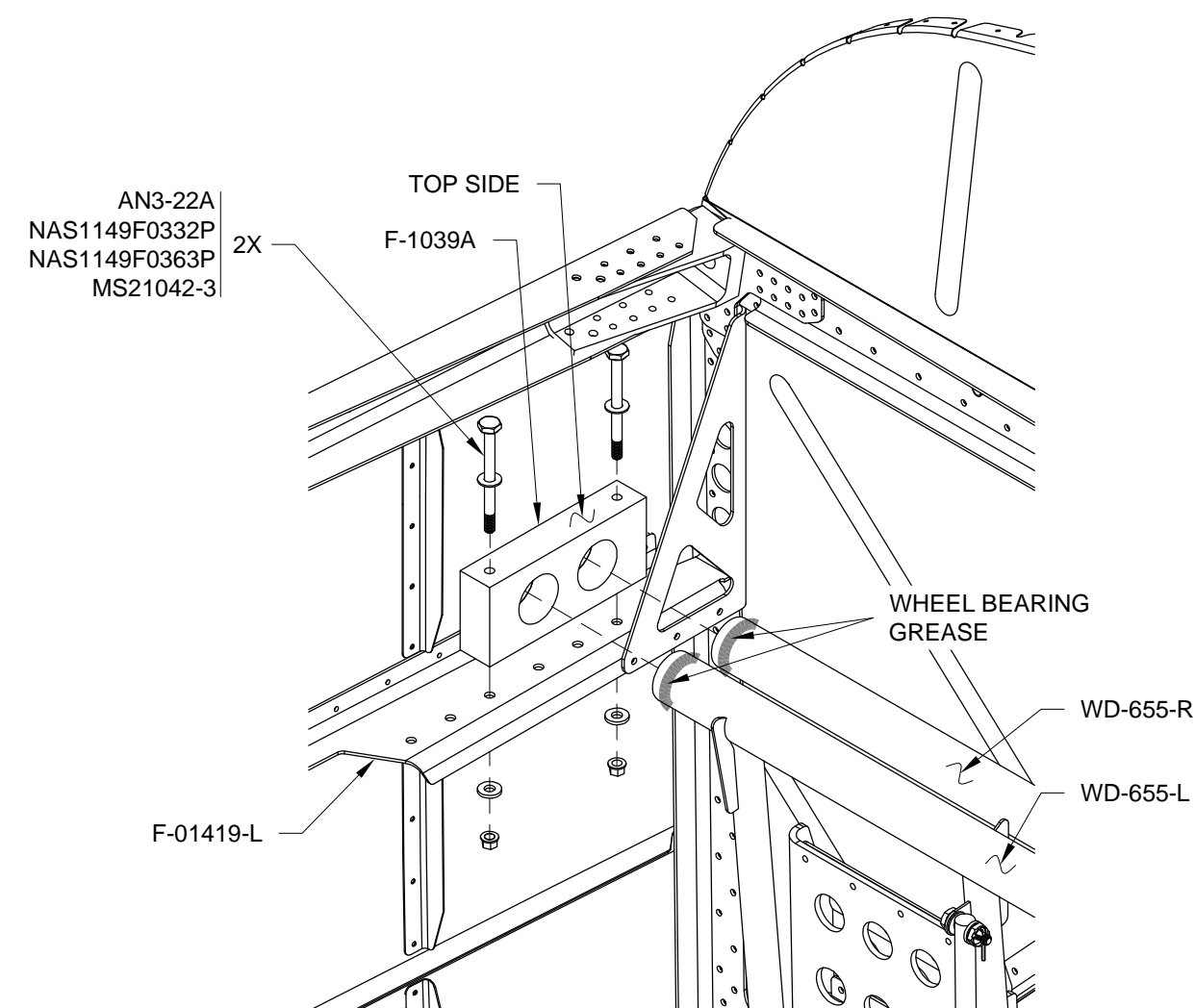
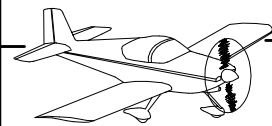


FIGURE 4: INSTALL RUDDER PEDALS
(LEFT SIDE SHOWN)



Step 1: Attach the upper and lower halves of the F-6115 Rudder Pedal Bearing Block to the F-14104 Support Angle as shown in Figure 1. The assembled halves must match their original configuration.

Tighten the nuts and bolts just enough to increase the turning friction of the bolts in the block. **DO NOT** use standard torque values.

If rudder pedal friction is excessive, place a second thin washer between the rudder pedal bearing block halves.

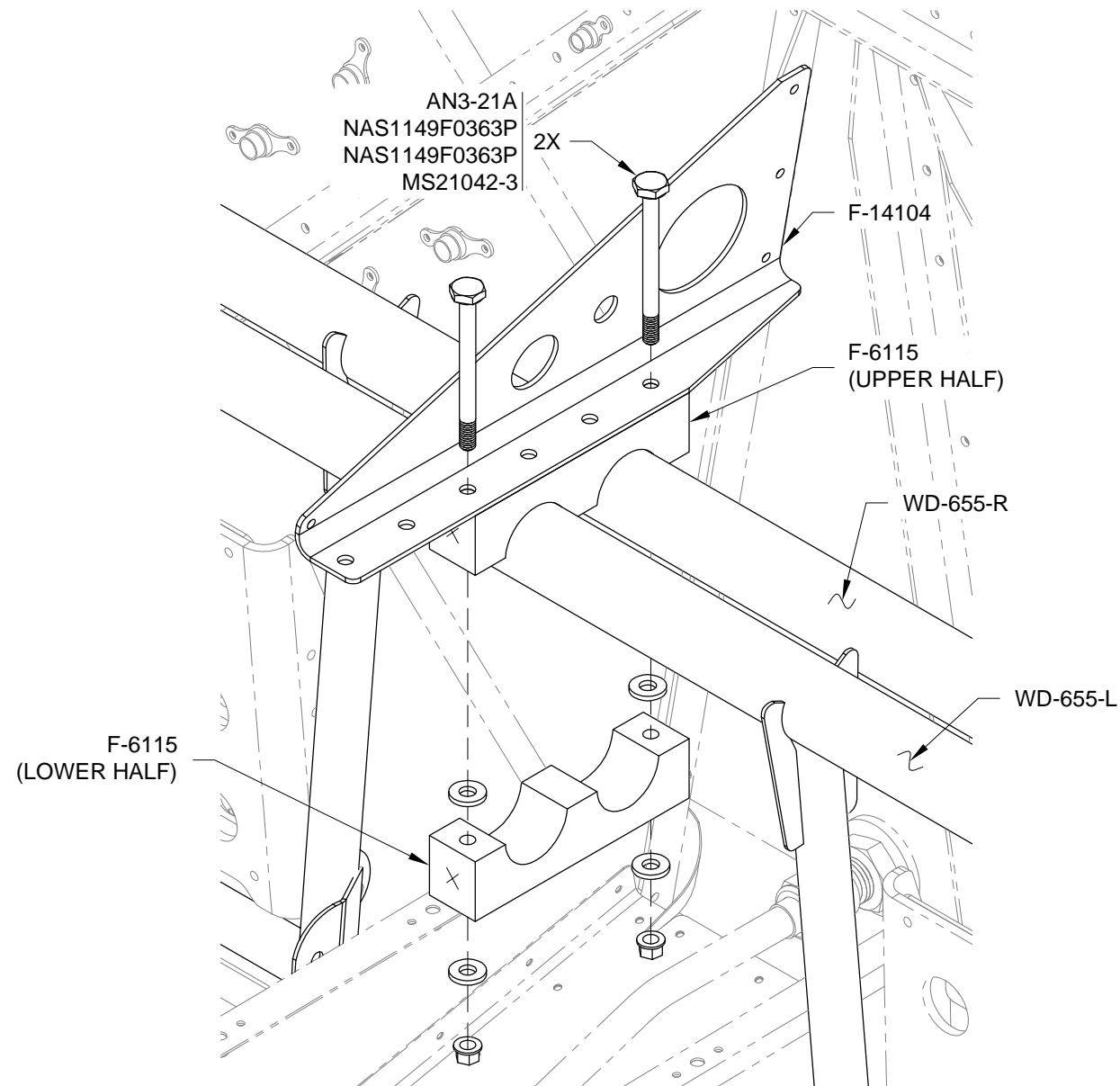


FIGURE 1: INSTALL RUDDER PEDAL BEARING BLOCK

Step 2: Check the attachment of the VA-107 Brake Fluid Reservoir to the forward side of the F-01401B-R Firewall Side. If the holes in the reservoir attach tabs do not align with the nutplate holes in the firewall side, use a file to slot the holes in the reservoir attach tabs. See Figure 2.

Step 3: Clean with solvent (acetone or isopropyl alcohol) the outer diameter of the VA-107 Brake Fluid Reservoir nipple and the forward face of the F-01401B-R Firewall Side around the reservoir mating hole. Allow the cleaned areas to dry completely.

Apply a bead of fuel tank sealant to the outer diameter of the brake fluid reservoir nipple to seal where the reservoir mates with the F-01401B-R Firewall Side as shown in Figure 2.

Step 4: Attach the VA-107 Brake Fluid Reservoir to the forward side of the F-01401B-R Firewall Side as shown in Figure 2.

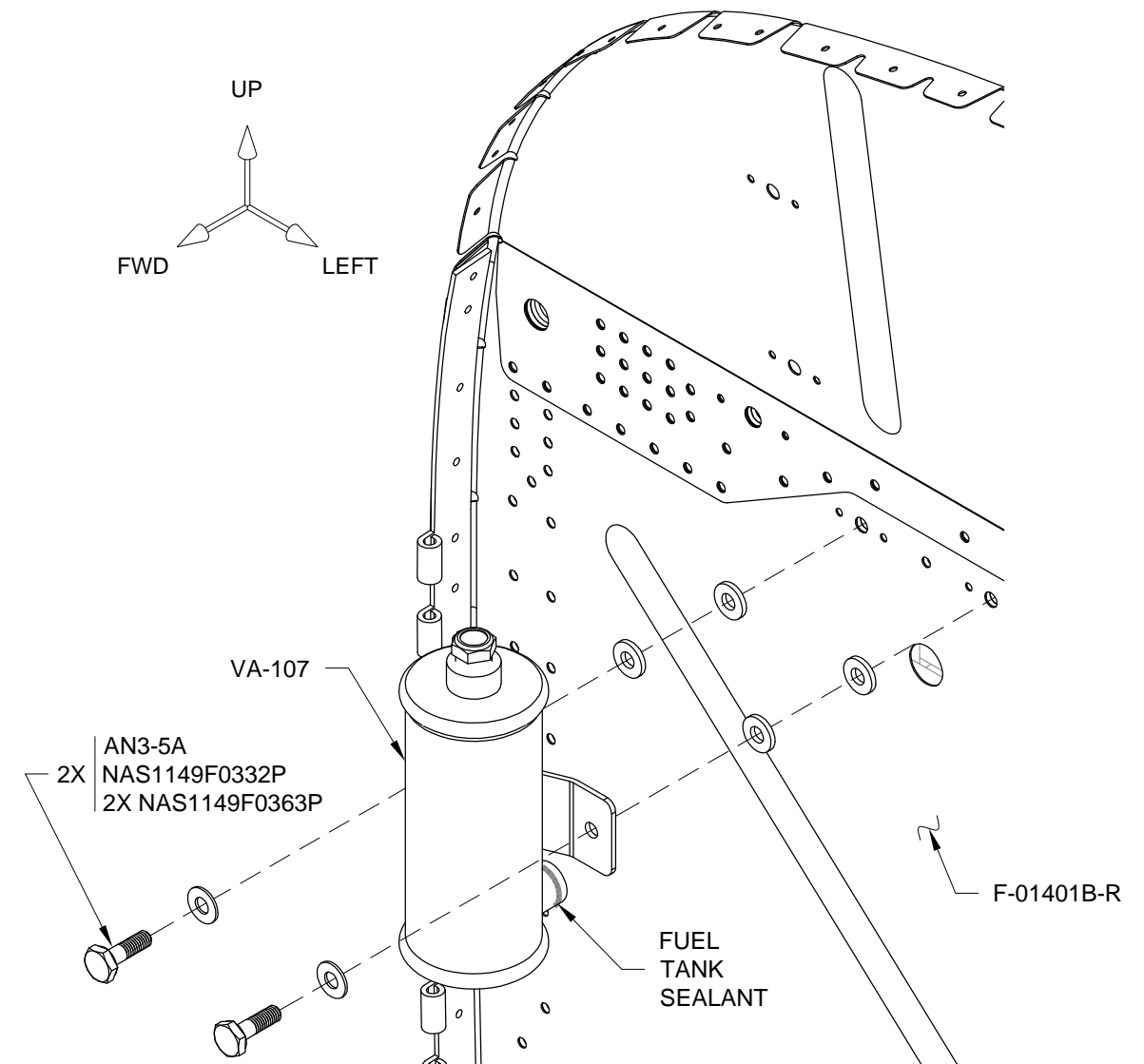
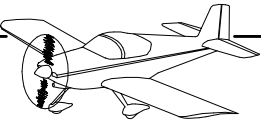


FIGURE 2: BRAKE FLUID RESERVOIR



NOTE: Refer to Figure 1 for the following steps:

Step 1: Apply pipe thread sealant to the end of the FLF-00004 Push to Connect Tee that will be threaded into the VA-107 Brake Fluid Reservoir.

Thread the push to connect tee into the brake fluid reservoir oriented as shown in the detail view.

Step 2: Cut to length the F-14116A-L & -R Reservoir to Left and Right Slave Brake Lines from PT-062X1/4 Plastic Tube. See Figure 1 for the length of each brake line.

Step 3: Install compression fittings (nut, sleeve, and brass insert) onto one end of each brake line as described in Section 5.22

Step 4: Connect the compression fittings (nut, sleeve, and brass insert) to the upper F 69-F-04X02 Brass Elbows in the brake master cylinders on the right side of the fuselage. Tighten the compression fittings as described in Section 5.22.

Step 5: Mark the free ends of the brake lines 1/2 [12.7 mm] from the end of each line.

Insert the free ends of the brake lines into the FLF-00004 Push to Connect Tee up to the marks. The marks must reach/touch the ends of the push to connect tee.

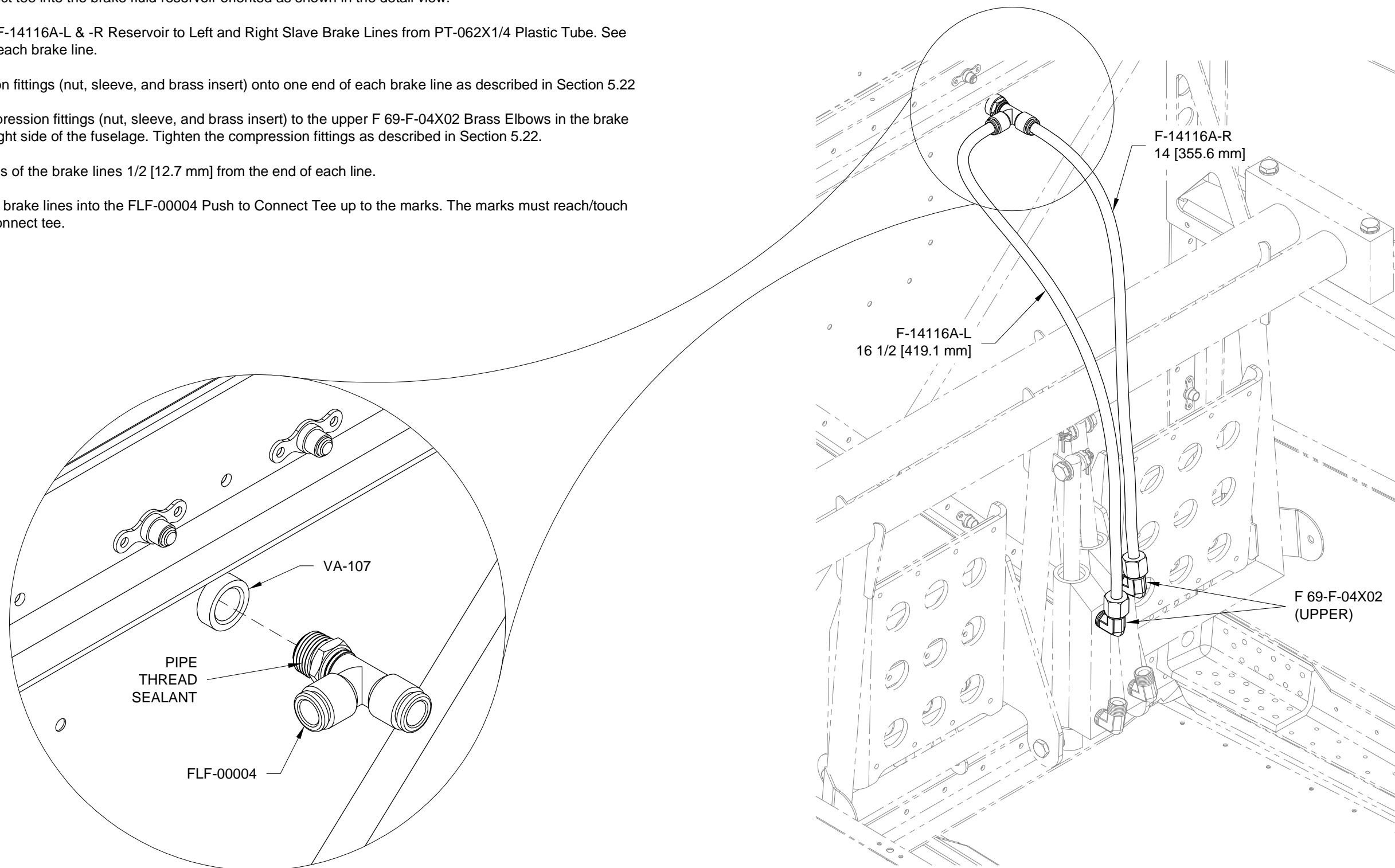
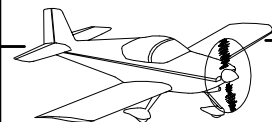


FIGURE 1: RESERVOIR TO SLAVE BRAKE LINES



NOTE: Refer to Figure 1 for the following steps:

NOTE: The F-14116B-L Left Cross-Over Brake Line connects the two left-foot brake master cylinders. The F-14116B-R Right Cross-Over Brake Line connects the two right-foot brake master cylinders.

Step 1: Cut to length the F-14116B-L & -R Left and Right Cross-Over Brake Lines from PT-062X1/4 Plastic Tube. See Figure 1 for the length of each brake line.

Step 2: Install compression fittings (nut, sleeve, and brass insert) onto one end of each brake line as described in Section 5.22.

Step 3: Connect the compression fittings (nut, sleeve, and brass insert) to the upper F 69-F-04X02 Brass Elbows in the brake master cylinders on the left side of the fuselage. Tighten the compression fittings as described in Section 5.22.

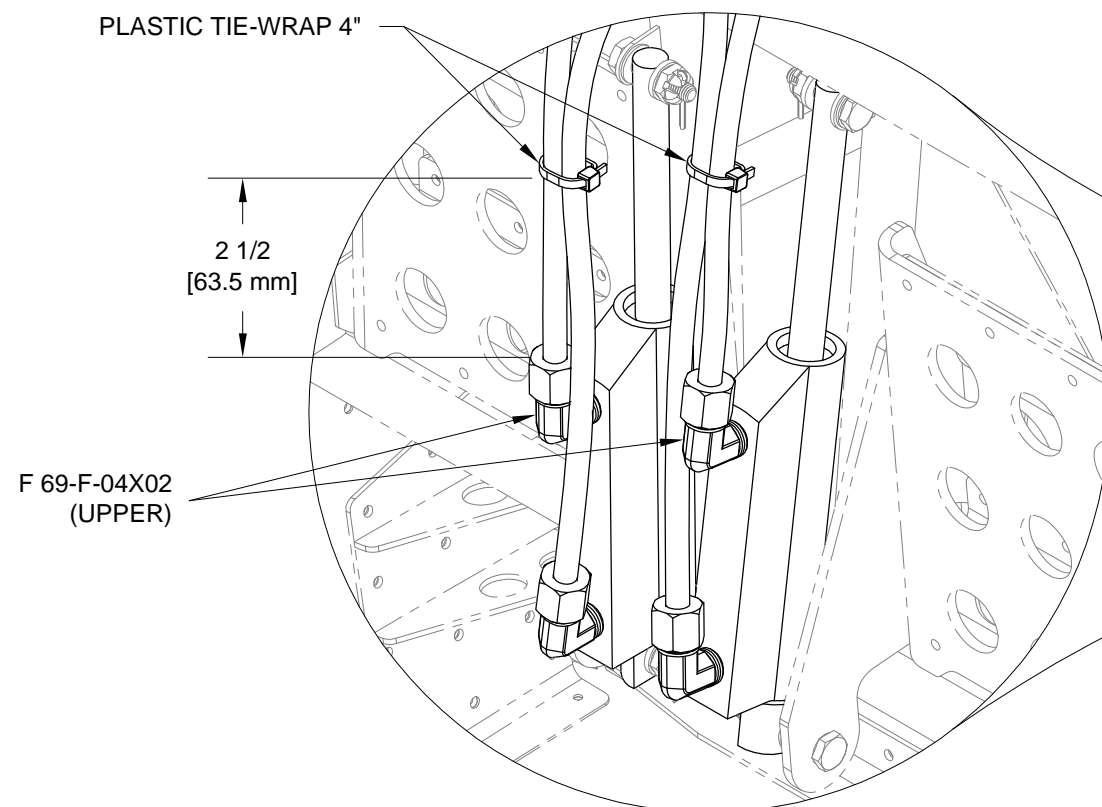
Step 4: Install a snap bushing in the F-14104 Support Angle as shown.

Step 5: Route the free end of each brake line to the right and through the snap bushing in the F-14104 Support Angle.

Step 6: Install compression fittings (nut, sleeve, and brass insert) onto the free end of each brake line as described in Section 5.22.

Step 7: Connect the compression fittings (nut, sleeve, and brass insert) to the lower F 69-F-04X02 Brass Elbows in the brake master cylinders on the right side of the fuselage. Tighten the compression fittings as described in Section 5.22.

Step 8: Install one tie-wrap around the left-foot brake lines and one tie-wrap around the right-foot brake lines above the upper brass elbows in the brake master cylinders on the right side of the fuselage as shown in the detail view.



F 69-F-04X02
(UPPER)

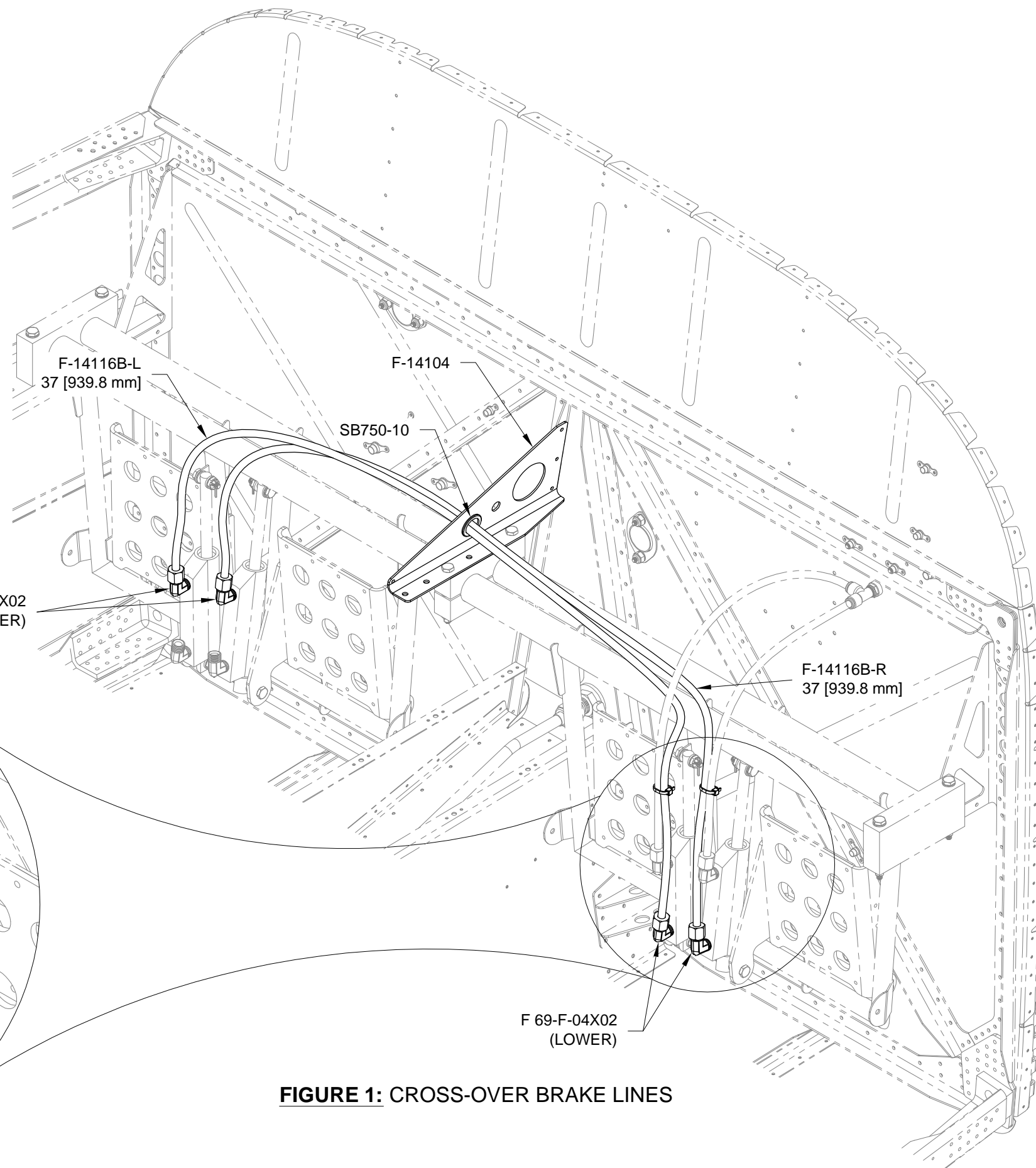
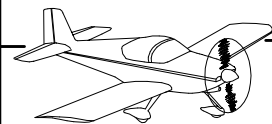


FIGURE 1: CROSS-OVER BRAKE LINES



Follow this page for a Tail Dragger aircraft. Refer to the previous page for a Tri-Gear aircraft.

NOTE: Refer to Figure 1 for the following steps:

Step 1: Drill a 13/16 [20.6 mm] hole in each F-01401B-L & -R Firewall Side using a step drill. See Detail A for the locations of the holes. The dimensions shown are symmetrical about the aircraft centerline. Measure from the aft side, drill from the forward side.

Step 2: Insert the FLF-00010 Flanged Couplings into the 13/16 [20.6 mm] holes from the aft sides of the F-01401B-L & -R Firewall Sides.

Match-Drill #40 the six 3/32 [2.4 mm] holes in each flanged coupling into the firewall sides.

Step 3: Clean with solvent (acetone or isopropyl alcohol) the forward side of each FLF-00010 Flanged Coupling flange and the aft side of the F-01401B-L & -R Firewall Sides where the flanged couplings will mate. Allow the cleaned areas to dry completely.

Apply a ring of fuel tank sealant to the forward side of each flanged coupling flange between the coupling body and the six holes.

Step 4: Rivet the FLF-00010 Flanged Couplings to the F-01401B-L & -R Firewall Sides as shown in Detail B. Orient each rivet so that the manufactured head is on the forward side of the firewall.

Step 5: Install one F 179CA-4-2 brass elbow in each FLF-00010 Flanged Coupling. Clock the elbows inboard and slightly above horizontal.

Step 6: Cut to length the F-14116D-L & -R Left and Right Main Brake Lines from PT-062X1/4 Plastic Tube. See Figure 1 for the length of each brake line.

Step 7: Install compression fittings (nut with sleeve attached and brass insert) onto one end of the F-14116D-L & -R Left and Right Main Brake Lines as described in Section 5.22.

Step 8: Connect the compression fittings on the ends of the left and right main brake lines to the left and right FLF-00010 Flanged Couplings, respectively, as shown in Detail B. Tighten the compression fittings as described in Section 5.22.

Step 9: Route the free end of the F-14116D-R Right Main Brake Line inboard through the snap bushing in the F-14104 Support Angle.

Step 10: Install compression fittings (nut, sleeve, and brass insert) onto the free ends of the F-14116D-L & -R Left and Right Main Brake Lines as described in Section 5.22.

NOTE: The F-14116D-L Left Main Brake Line connects to the left-foot brake master cylinder. The F-14116D-R Right Main Brake Line connects to the right-foot brake master cylinder.

Step 11: Connect the compression fittings to the lower F 69-F-04X02 Brass Elbows on the left side of the fuselage. Tighten the compression fittings as described in Section 5.22.

Step 12: Install one tie-wrap around the left-foot brakes lines and one tie-wrap around the right-foot brake lines approximately 2 1/2 [63.5 mm] above the upper F 69-F-04X02 Brass Elbows on the left side of the fuselage.

Step 13: Block all inlets and outlets to the brake system using plastic caps and plugs (or equivalent). **DO NOT** allow contaminants to enter any part of the brake system.

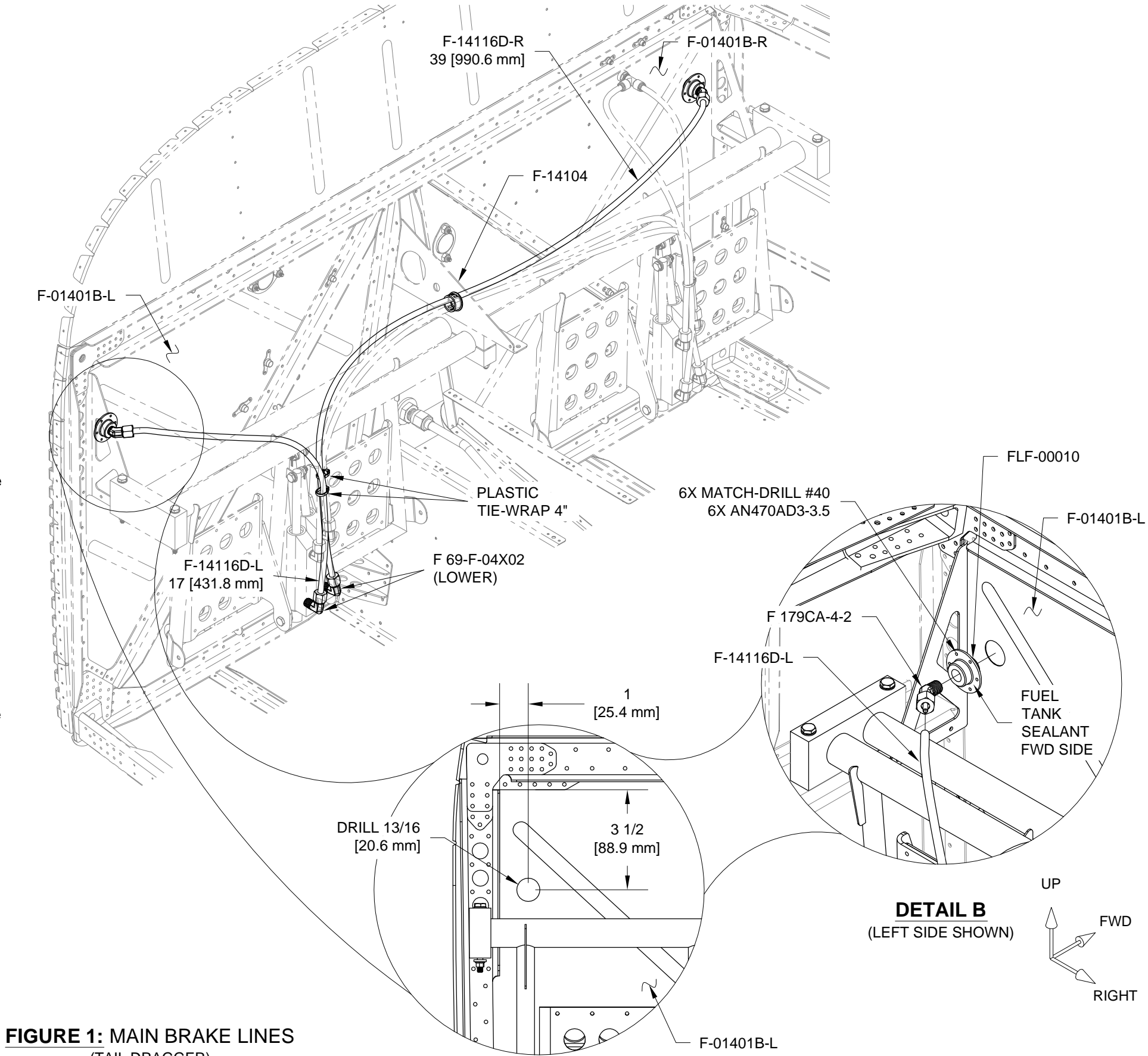
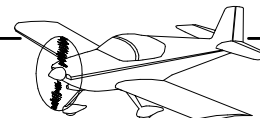


FIGURE 1: MAIN BRAKE LINES
(TAIL DRAGGER)

DETAIL A
(VIEW AFT SIDE LOOKING FORWARD, LEFT SIDE SHOWN,
RIGHT SIDE MIRRORED)



NOTE: Refer to Figure 1 for the following steps:

Step 1: Install snap bushings in the F-01430 Baggage Floor Stiffener, F-01405A Bulkhead Bottom Channel, forward flange of the F-01447-L Baggage Floor and F-01404A Aft Center Section Bulkhead.

NOTE: The rudder cable from the right side of the rudder crosses in the aft fuselage and is routed forward along the left side of the fuselage. The rudder cable from the left side of the rudder crosses in the aft fuselage and is routed forward along the right side of the fuselage.

Step 2: Route the CS-00014 Rudder Cables forward from the aft fuselage through the snap bushings in the F-01406B Bulkhead and through the snap bushings just installed.

Step 3: Route the rudder cables forward through the holes in the F-01403A Forward Center Section Bulkhead and out through the slots in the F-01451-L & -R Tunnel Sides.

Step 4: Position the polyethylene sleeve as shown in the detail view. The polyethylene sleeves come pre-installed on the CS-00014 Rudder Cables.

Step 5: Attach the polyethylene sleeves to the F-01451-L & -R Tunnel Sides using the cushioned clamps and hardware as shown.

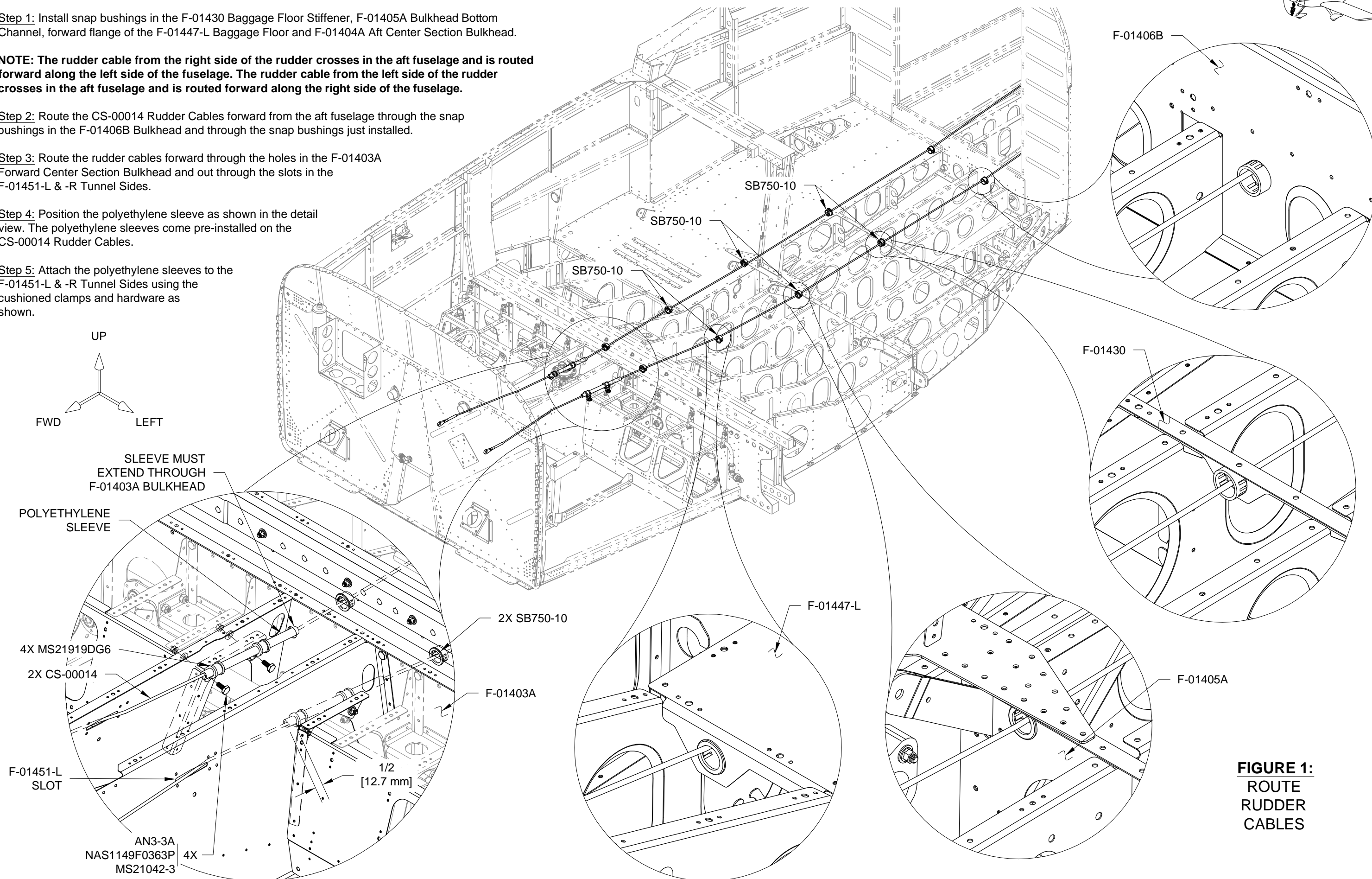
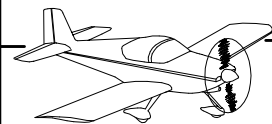


FIGURE 1:
ROUTE
RUDDER
CABLES



Step 1: Separate the four CS-00015 Cable Links as shown in Figure 1.

Step 2: Prime the CS-00015 Cable Links. Paint the cable links as desired.

Step 3: Final-Drill #12 the eight holes in each CS-00015 Cable Link to remove excess primer/paint.

NOTE: Figure 2 depicts the CS-00014 Rudder Cables attached to the aft-most holes in the CS-00015 Cable Links for reference only. Seven holes are available, adjust as necessary to account for rudder pedal position.

Step 4: Attach the two CS-00014 Rudder Cables to the CS-00015 Cable Links as shown in Figure 2.

Step 5: Attach the cable links to the WD-655-L & -R Rudder Pedals as shown in Figure 2.

A balance must be struck between freeplay and friction such that both are minimized. The cable links must be secure but must also move easily.

Tighten the nuts and bolts until they are finger-tight. **DO NOT** use standard torque values.

Step 6: Locate the two remaining F-01497B Cable Guides that were separated in Section 10.

Step 7: Machine countersink the holes in the F-01497A & B Cable Guides to fit the dimples in the F-01451-L & -R Tunnel Sides.

Step 8: Rivet the F-01497A & B Cable Guides inboard to the F-01451-L & -R Tunnel Sides such that the rudder cables are captured between the cable guides. Place a washer between the cable guides and the end of each rivet before setting the rivet. See Figure 2.

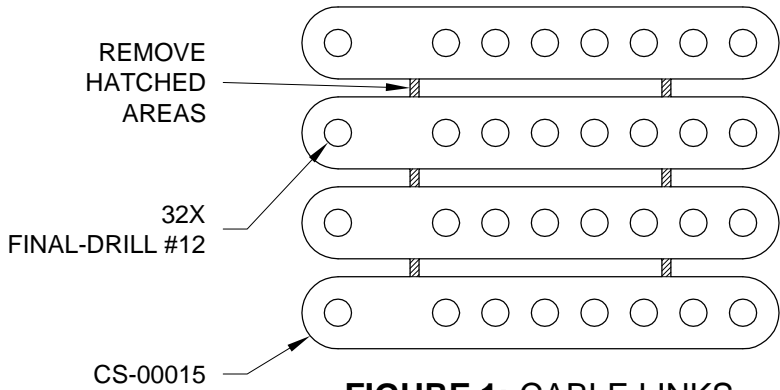


FIGURE 1: CABLE LINKS

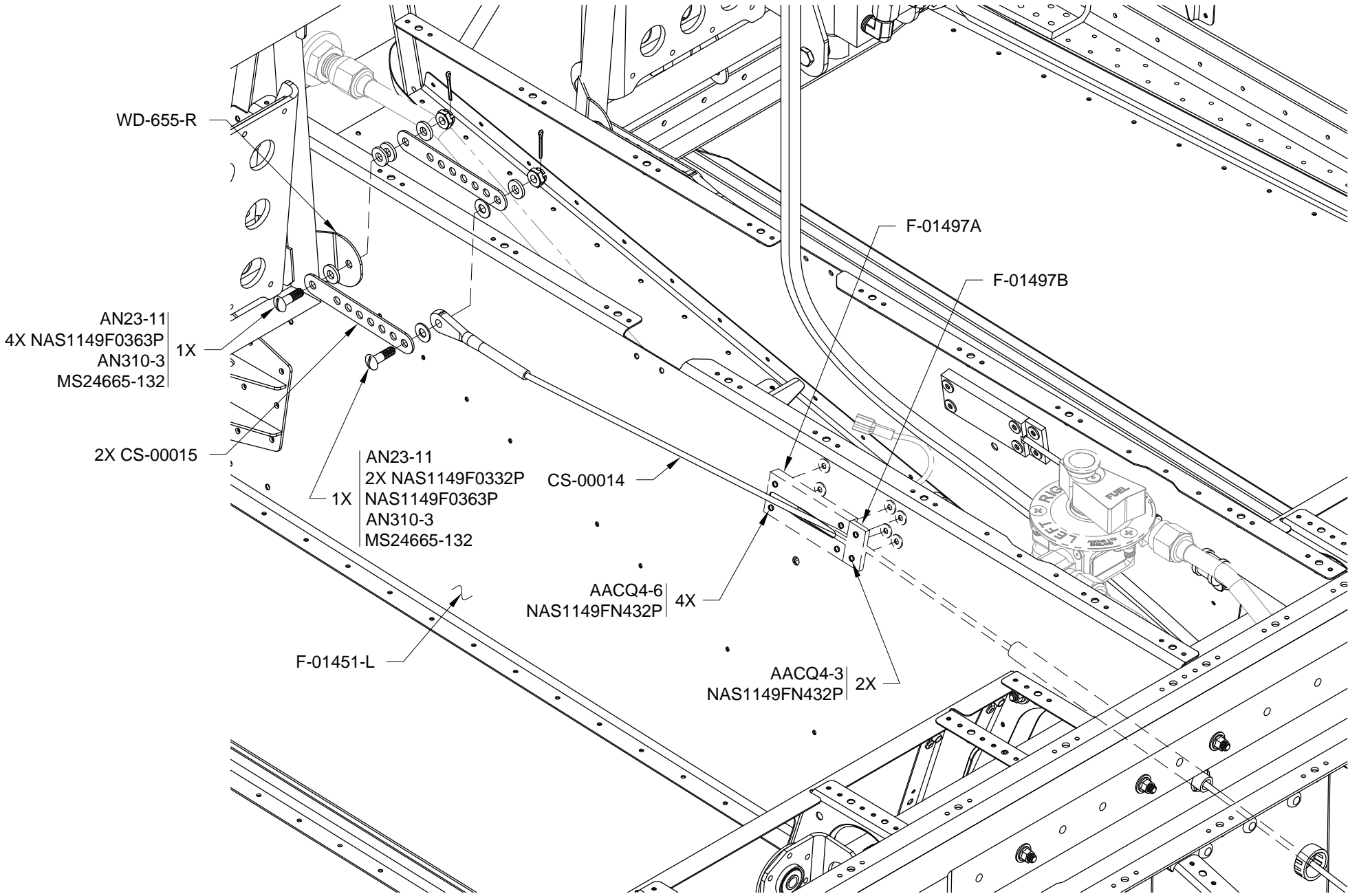


FIGURE 2: CONNECT RUDDER CABLES
(LEFT SIDE SHOWN)

