



# SERVICE INSTRUCTION

SI-32-05  
Revision 2

## Dual Brake Modification

### SUBJECT / REASON / DESCRIPTION:

Brake lines B55 and B57 form loops on the reservoir side of the co-pilot master brake cylinders. This can make it difficult to “bleed” the brake system. Incomplete purging of air from the brake system may cause the brake pedal to feel “spongy” or prematurely worn.

A second issue concerns the shuttle valves. While the park brake is engaged the shuttle valves may allow pressure to drop such that the park brake becomes inoperative. Furthermore, if there is any leakage through the shuttle valves, the brake pedals may again feel “spongy”.

This service instruction addresses both these concerns by rerouting the brake lines to minimize the loops on the reservoir side of the brake system as well as removing the shuttle valves from the system.

Revision 2 has been released to clarify the installation of B133 Doubler and B137 Bracket. A reference dimension is given but the items need to be installed such that the B135 cross over tubes clear the front of the control console, see figure 4.

### COMPLIANCE:

Compliance is optional

### EFFECTIVITY:

All FBA-2C1 aircraft with dual brakes installed.  
Aircraft 57 and onwards have this Service Instruction embodied at manufacture

### APPROVAL:

This modification has been approved by FAC Engineering and TCCA where applicable.

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**SI-32-05 Rev 2**

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**MANPOWER REQUIREMENTS:**

It is estimated that the modification will take approximately 8 hours. This excludes labor necessary to open and close the aircraft, and work is performed by experienced personnel.

**SPECIAL TOOLS / EQUIPMENT:**

N/A

**PARTS LIST (BILL OF MATERIALS):**

Kit # FAC-SI-32-05 Rev 0

QTY	PART #	DESCRIPTION
1	B131	Brake Manifold
2	B133	Bracket, Cross Over Pipe
2	B135	Cross Over Pipe
2	B137	Doubler, Cross Bracket
1	B139	Brake Line, Solid
1	B51	Brake Line, Flex
4	AN837-4D	45° Bulk Head Fitting
4	AN960-716	Washer
4	AN924-4D	Nut
3	AN816-4D	Nipple, Flare Tube To Pipe Thread
2	AN525-832R8	Screw
1	B3	Brake Line, Flex
1	B25-4	Brake Line, Flex
2	AN929-4	Cap, Flared Tube Fitting

**WEIGHT & BALANCE:**

There is a negligible change in weight and balance.

**DRAWINGS/MANUALS:**

FAC2-M200 Maintenance Manual (MM)

**LOG BOOK CERTIFICATION:**

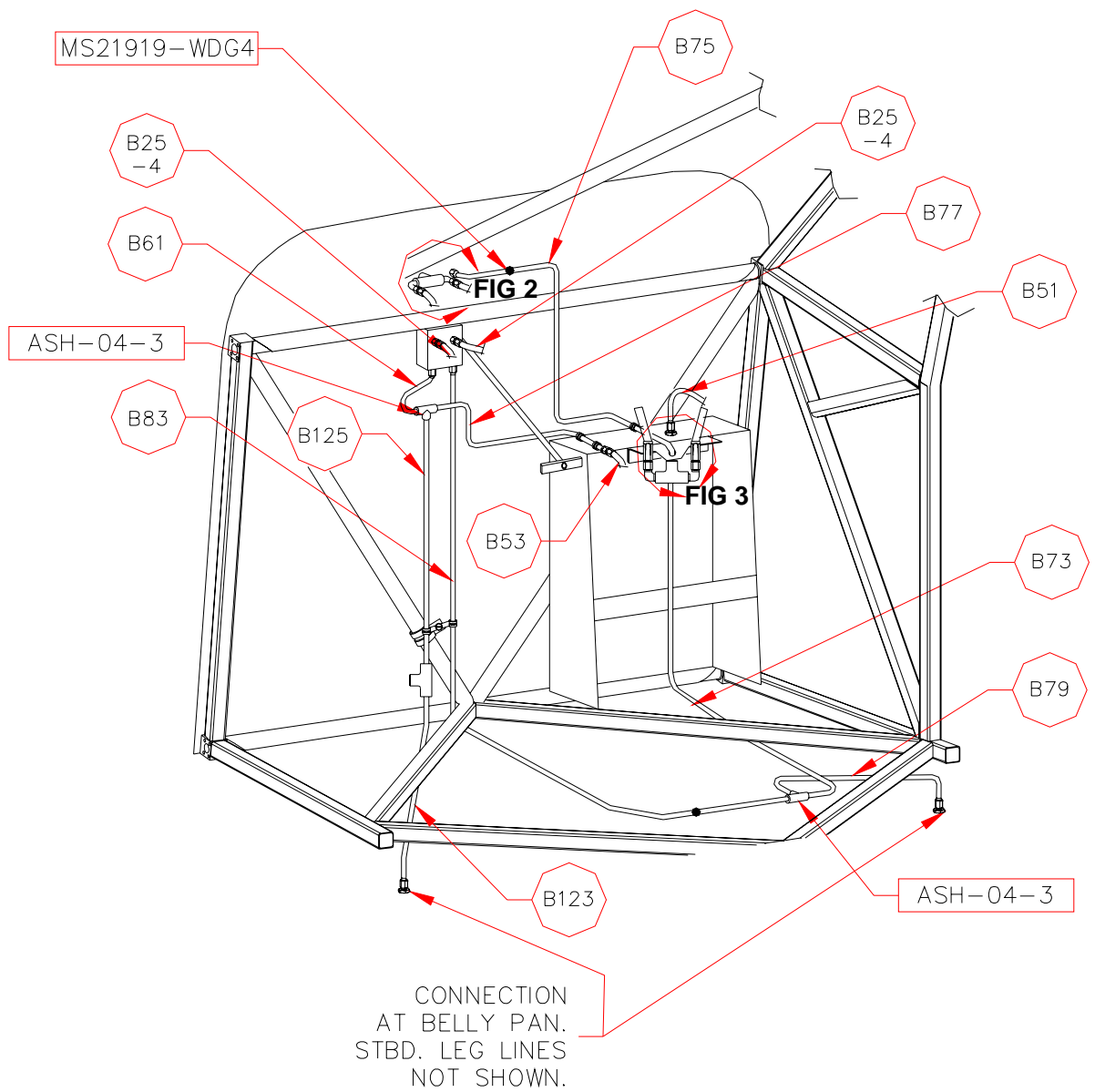
The “Dual Brake Modification” was accomplished per Service Instruction SI-32-05 Rev 1.

## IMPLEMENTATION INSTRUCTIONS:

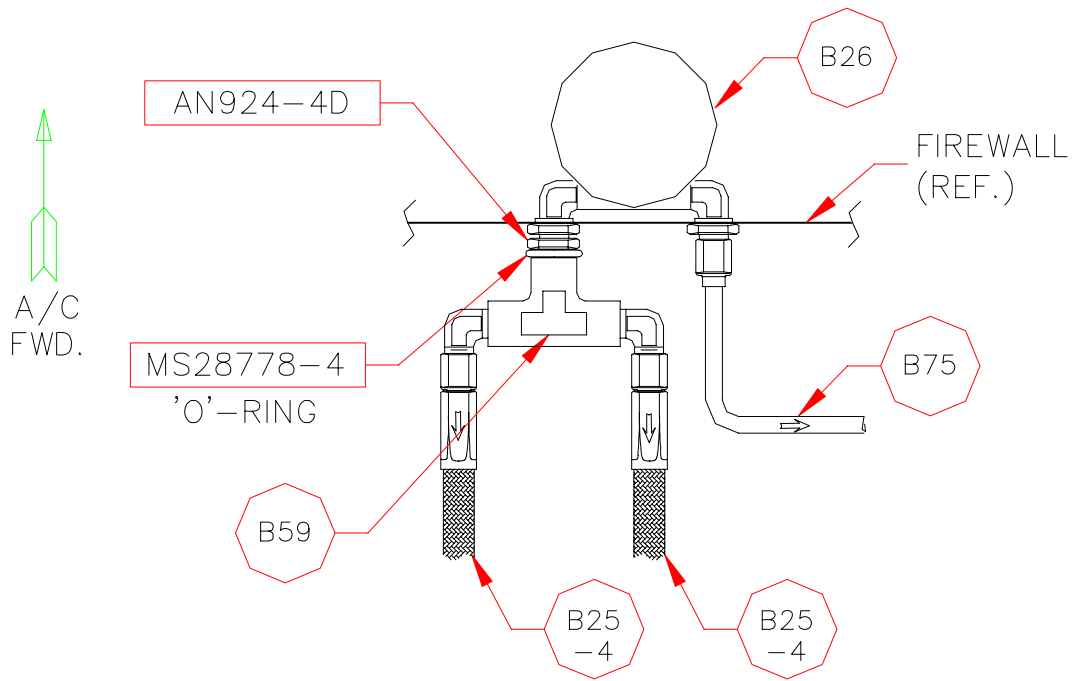
### WARNING:

**FAILURE TO DISCONNECT AND SECURE THE BATTERY GROUND COULD RESULT IN DAMAGE TO THE AIRCRAFT, ITS SYSTEMS OR INJURY TO SERVICE PERSONNEL**

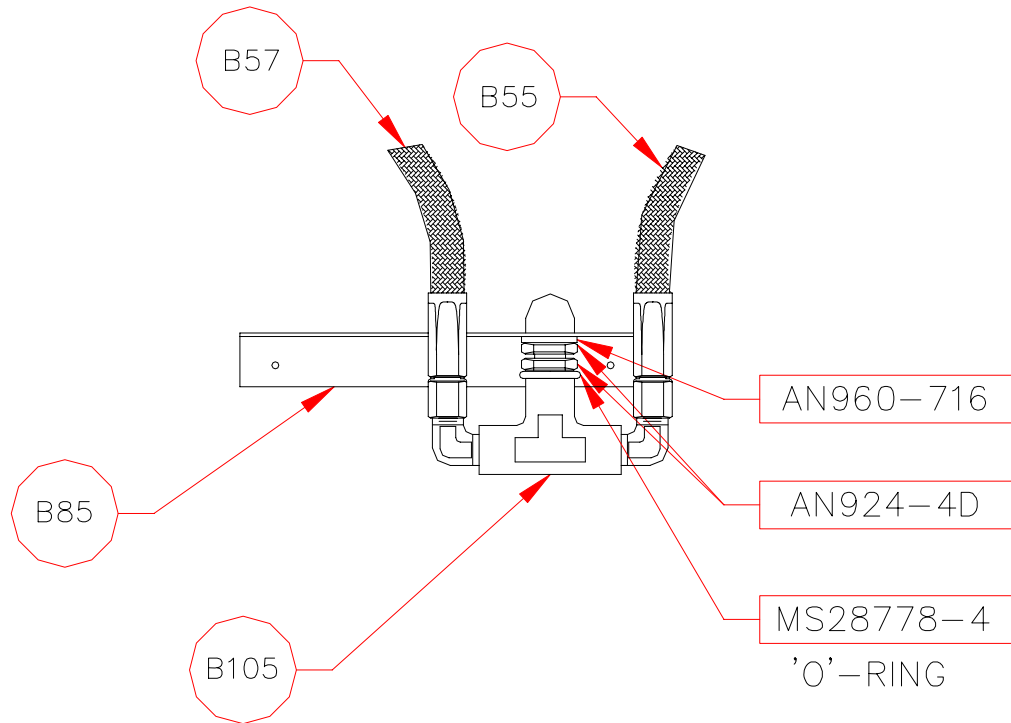
1. Gain Access to, and disconnect the ground wire (#50) from the battery in accordance with MM section 24-30-01.
2. Remove the forward belly pan cover B10 as shown in Figure 06-30-04 of the MM.
3. Chock the main gear wheels and drain the brake system of fluid. The exact procedure here will be a function of the installed gear on the aircraft, amphibian floats, (either Aerocet or Wipline) or wheel gear, see the relevant section in Chapter 32 of the MM.
4. Removal of the pilot and co-pilot seats is recommended to ease the installation process. See MM section 25-13.
5. Remove the co-pilot brake pedals complete with brake flex lines; see MM section 27-20.
6. Remove and discard B105 manifold, see Figures 1 and 3.
7. Remove and discard B85 bracket, see Figures 1 and 3.
8. Remove collector tank access panel located in cabin against firewall on starboard side.
9. Remove and discard B75 brake line. Note, the line is secured to the top of the control consol with a #4 Adel clamp. The bolt to which the Adel clamp is attached may drop free of the consol when the clamp is removed. Secure the bolt “in place” temporarily until this clamp is reinstalled later in this procedure. See Figure 1.
10. Remove and discard B73 brake line. Note, leave the AN837-4D bulk head fitting to which B73 was attached on the header tank case and cap it with an AN929-4 cap. This will ensure the header tank case remains sealed.
11. Remove and discard the shuttle valve, (P/N ASH-04-3), associated with B73.
12. Connect B83 and: B79-(Wheel Gear), B33-(Wipline Amphibian), B69-(Aerocet Amphibian) using an AN821-4D 90° flare union.
13. Remove and discard B77 brake line and Adel clamp. See Figure 1. Note, reuse clamp hardware to reseal hole in header tank case.
14. Disconnect both B25-4 pilot brake reservoir flex lines from B59 manifold. See Figure 2.
15. Remove and discard shuttle valve, (P/N ASH-04-3), associated with B61. See Figure 1.
16. Connect B61 and: B125 using an AN821-4D 90° flare union.
17. Remove and discard B59 manifold. Cap reservoir bulk head fitting with an AN929-4 cap.



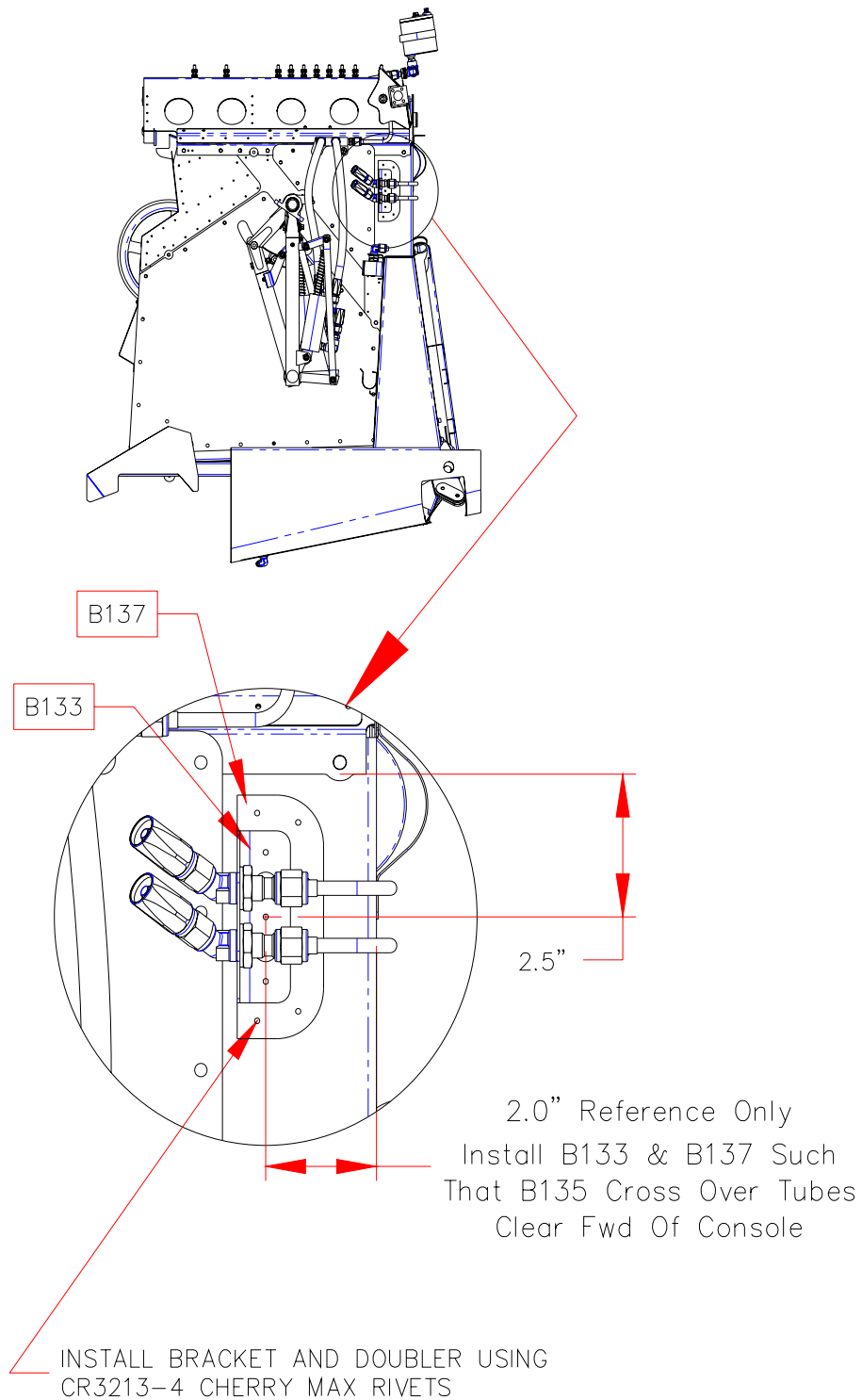
**FIGURE 1 EXISTING GENERAL DAUL BRAKE CONFIGURATION**



**FIGURE 2 EXISTING BRAKE SYSTEM DETAIL**

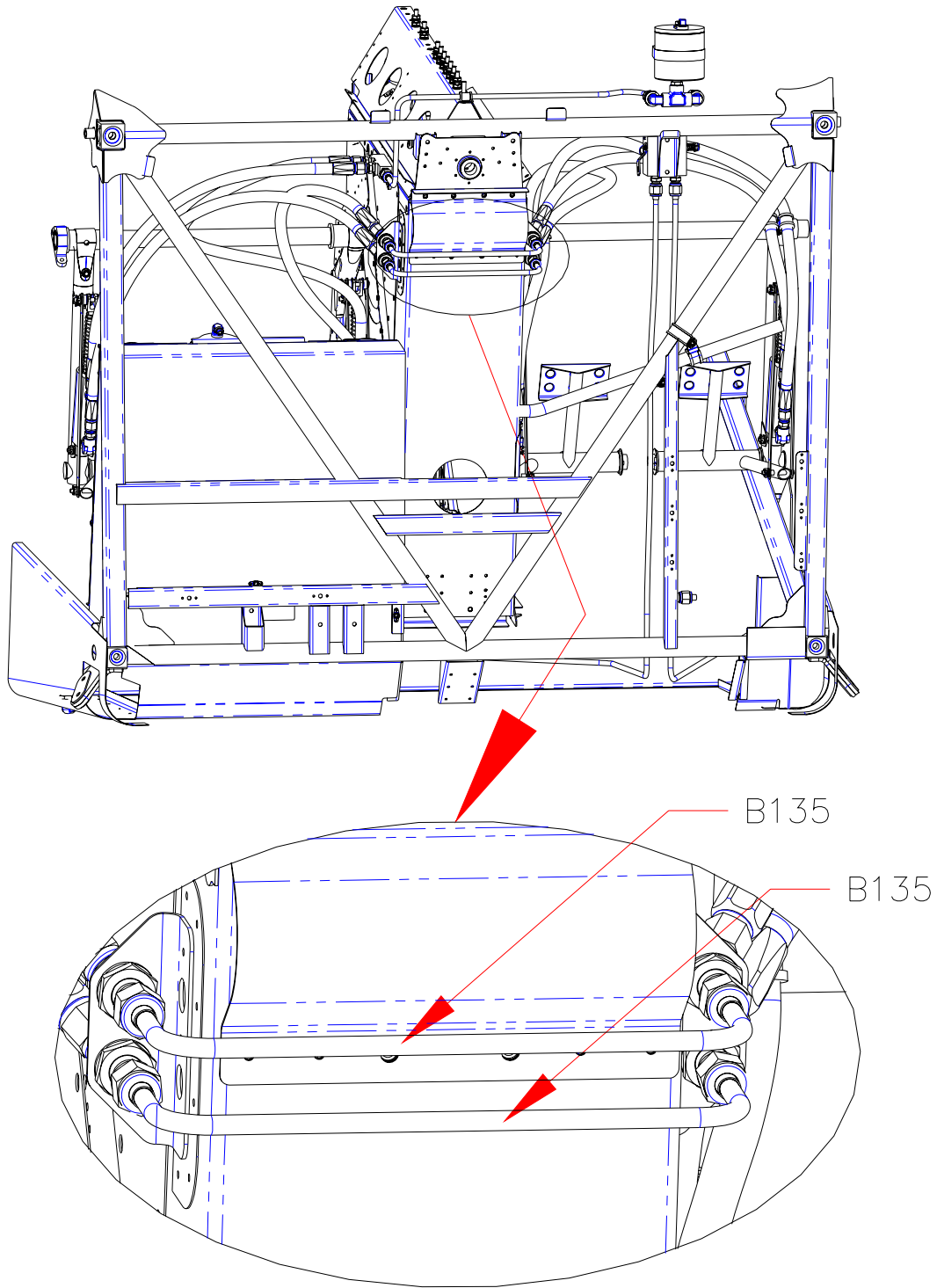


**FIGURE 3 EXISTING BRAKE SYSTEM DETAIL**



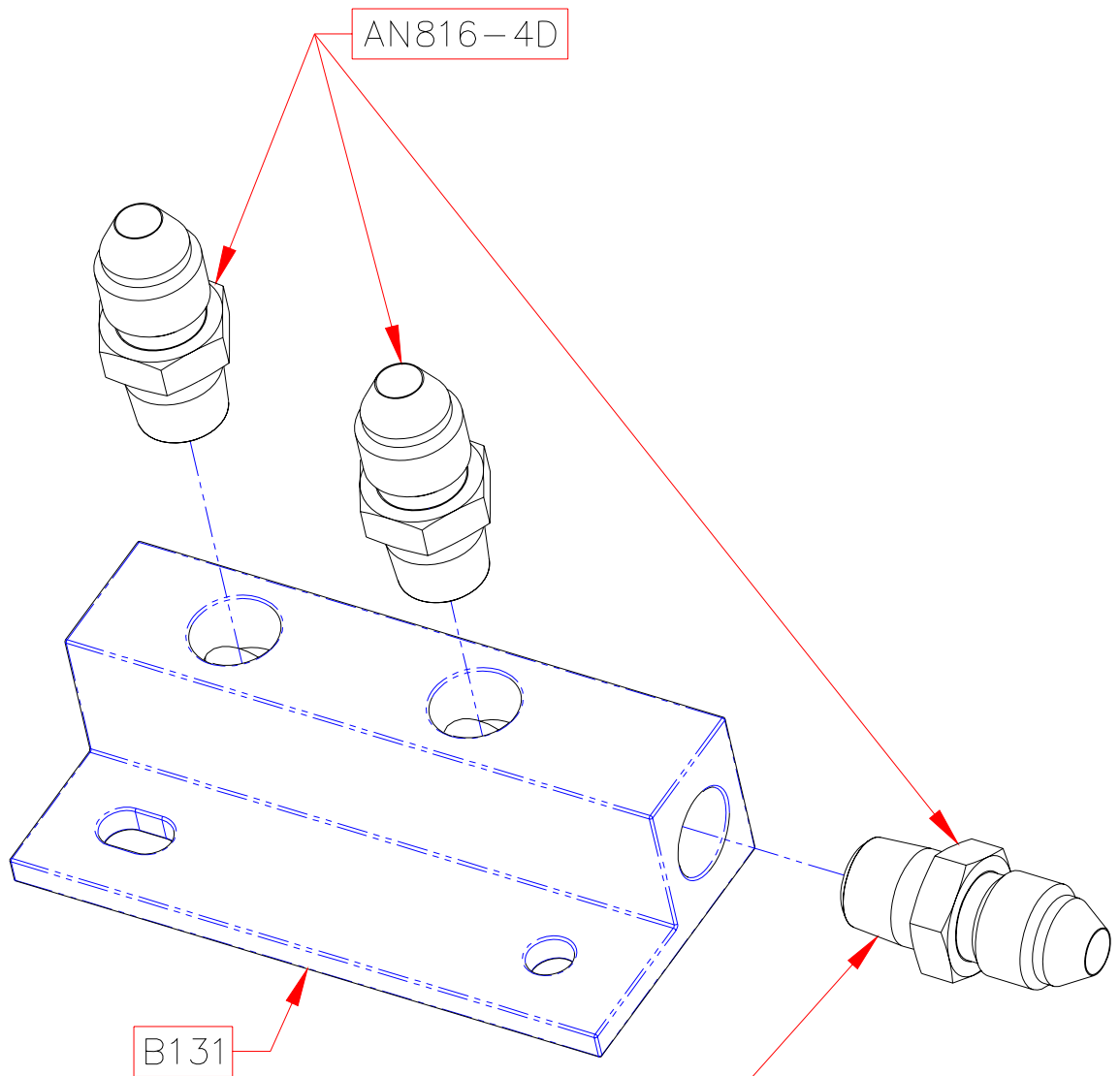
**FIGURE 4 - B133 & B137 INSTALLATION  
STRBD SHOWN - PORT SIDE OPPOSITE**

18. Locate and drill off B133 and B137 on console. See Figure 4, STRBD side shown install on PORT side also.
19. Install B133 and B137 using CR3213-4 Cherry Max rivets. *Note, the dimension given is reference only. Install B133 and B137 such that the B135 tubes clear front of consol.*
20. Install four AN837-4D 45° bulkhead fittings onto the B133 Bracket as shown in Figure 4. The fittings should be angled up approximately 45° and only finger tight at this time.
21. Install the two B135 Cross-Over Tubes, as shown in Figure 5, finger tight only.
22. Install three AN816-4D fittings into B131 per Figure 6.
23. Install B131 c/w fittings onto side of consol as shown in Figure 7.
24. Install B139 Brake Reservoir Line per Figure 8. Note; the stud to which the #4 adel clamp is attached may drop free when the jam nut is removed.
25. Remove and replace the co-pilot right reservoir line with the B3 flex line per Figure 9. Remove and replace the co-pilot left reservoir line with the B51 flex line per Figure 9.
26. Install B51 & B25-4 flex lines, (co-pilot pressure), to B135 cross over tubes per Fig 10.
27. Install the pilot reservoir flex lines, (B25-4s) to the B135 cross over tubes per Figure 11. Note that the pilot left reservoir line attaches to the lower B135 tube and thus connects to the co-pilot left pressure line. Note that the pilot right reservoir line attaches to the upper B135 tube and thus connects to the co-pilot right pressure line. The point is, the pilot's left brake pedal SHALL be connected to the co-pilot's left brake pedal and the right pedals are also connected. ***DOUBLE CHECK THIS CONNECTIVITY.*** See Figure 13.
28. Install the pilot pressure flex lines, (B25-4s), to the park brake valve as shown in Figure 12. Note, the right line attaches to the right I/P port and the left attaches to the left I/P port.
29. Next, ensure that the flex lines are routed to provide clearance from abrasion thru the rudder pedals entire travels. Additional clamping, lacing cord or other standard means to prevent abrasion may be installed to achieve this goal.
30. Tighten all hardware and fittings. Double check to ensure all fittings and hardware are tight.
31. Fill and bleed the brake system per Section 32 42 of the MM
32. Test brake system: Check for leaks, “spongy” pedals, park brake operation. **ENSURE THAT THE RIGHT BRAKE PEDALS CONTROL THE RIGHT BRAKE CALIPER AND THAT THE LEFT BRAKE PEDALS CONTROL THE LEFT BRAKE CALIPER. SEE STEPS 27 & 28.**
33. Reinstall all covers and fairings.
34. Reinstall the pilot and co-pilot seats.
35. Ensure the master switches are off and the propeller arc is clear then reconnect the battery. Always connect the ground wire, (50-2), last.
36. The aircraft should now be taxied and fully maneuvered as well as using the brakes to hold against a brief application of power to test the installation. Afterward the connections should again be checked for leaks and pedal “firmness” before returning the aircraft to service.



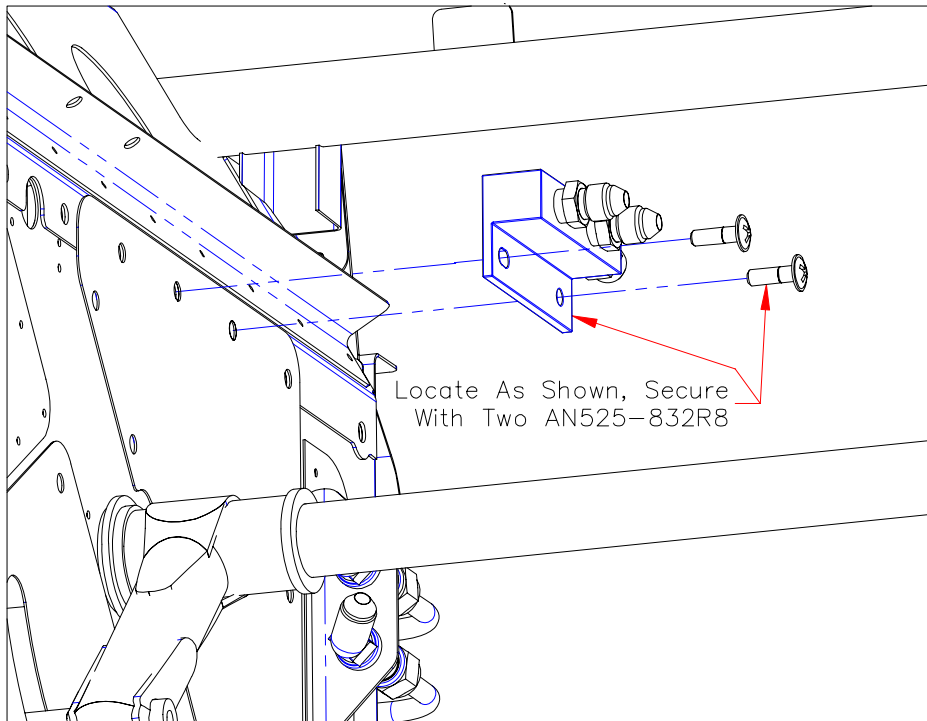
**FIGURE 5 B135 CROSS OVER PIPES INSTALLATION  
VIEW LOOKING - AFT FIREWALL HIDDEN**



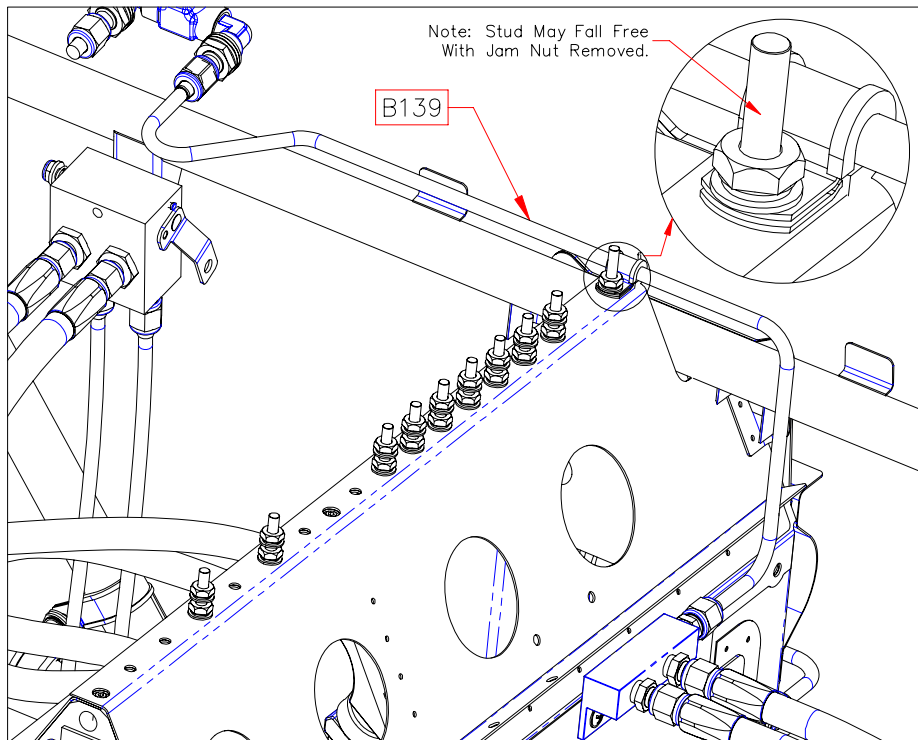


Apply Loctite 561  
or Loctite 565  
or Sealube  
Apply Sparingly  
All Male Threads

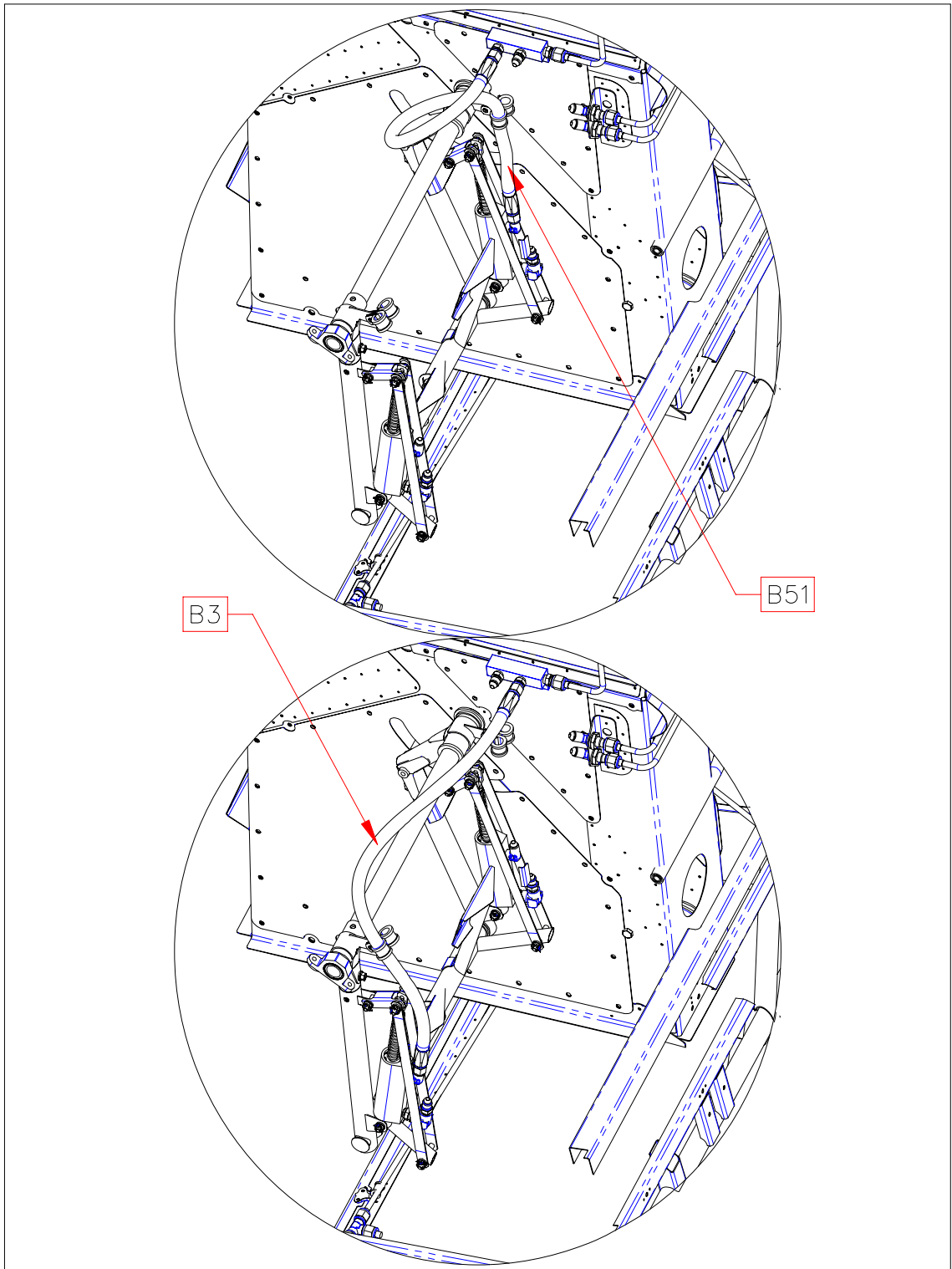
**FIGURE 6 B131 MANIFOLD ASSEMBLY**



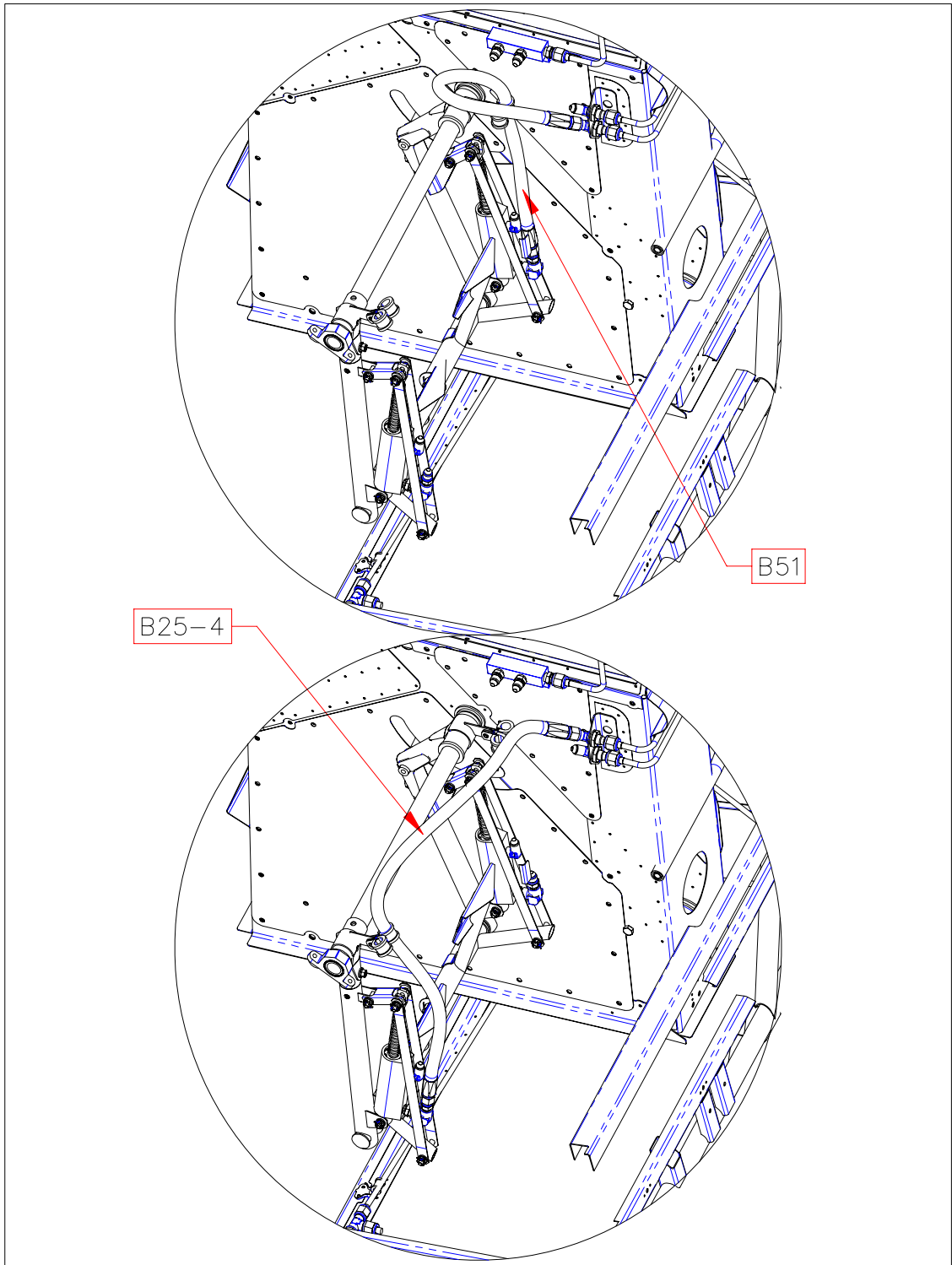
**FIGURE 7 B131 MANIFOLD INSTALLATION**



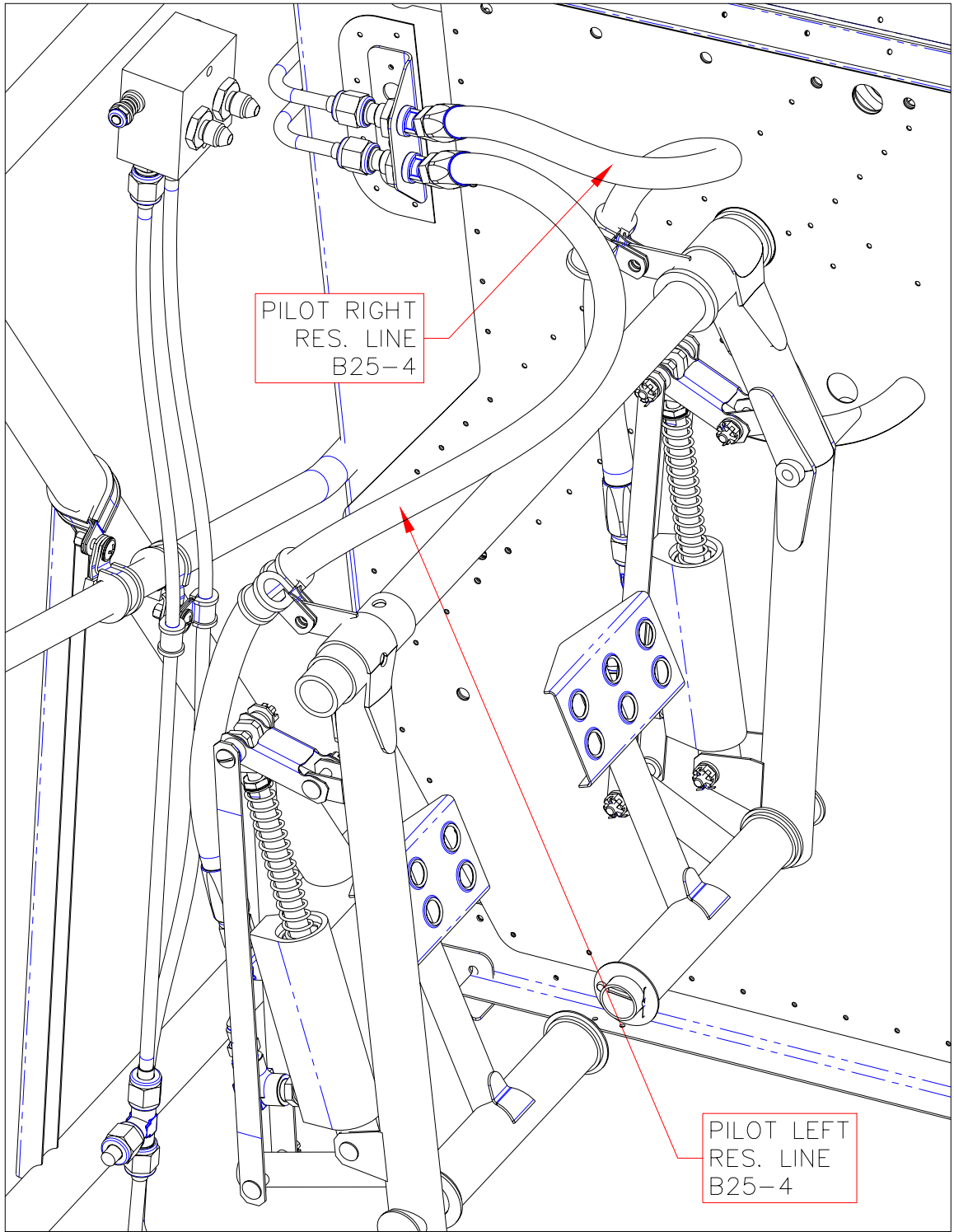
**FIGURE 8 B139 BRAKE RESERVOIR LINE INSTALL**



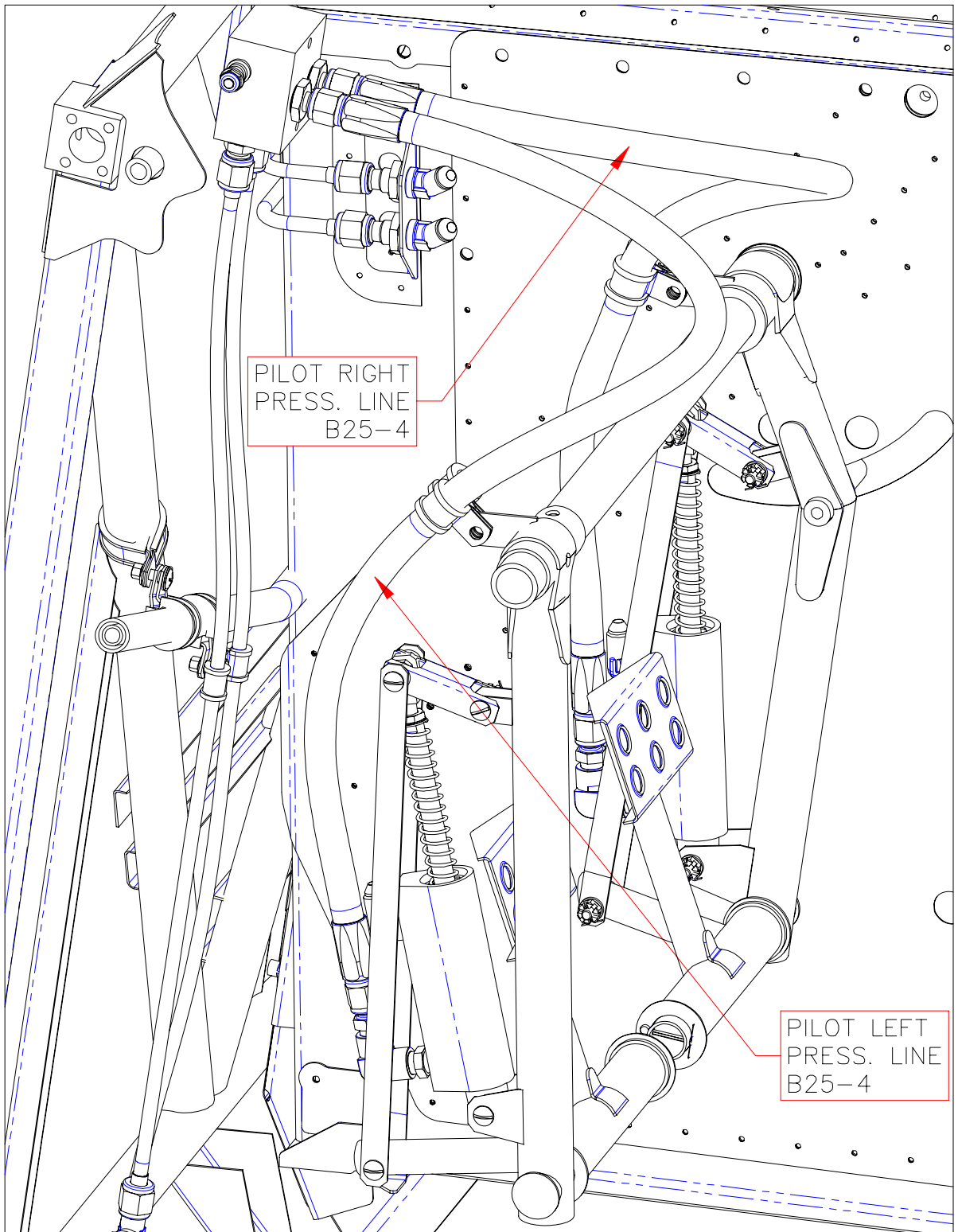
**FIGURE 9 B51 & B3 INSTALLATION (CO-PILOT RESERVOIR LINES)**



**FIGURE 10 B51 & B25-4 INSTALLATION (CO-PILOT PRESSURE LINES)**



**FIGURE 11 PILOT RESERVOIR LINE INSTALLATION, (B25-4s)**



**FIGURE 12 PILOT PRESSURE LINE INSTALLATIONS, (B25-4s)**

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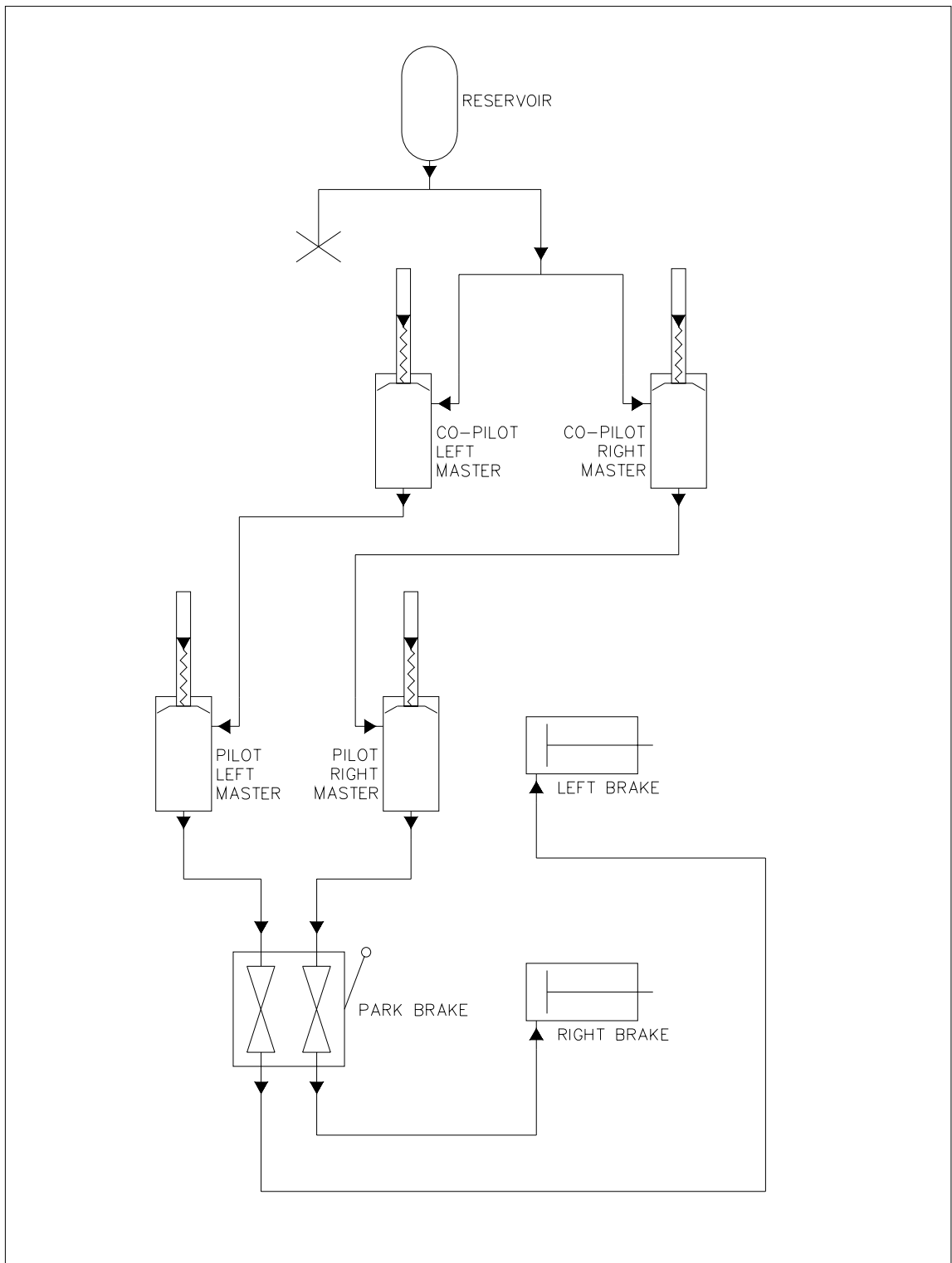
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**FIGURE 13 GENERAL ARRANGEMENT DUAL BRAKES SCHEMATIC**