Vans RV-10 with Beringer full brake kit and with Control Approach rudder pedals

Produced by Michael Elstien RV-10 Builder

Assisted by Steve - Aircraft Specialty Flightlines

NOSE WHEELS

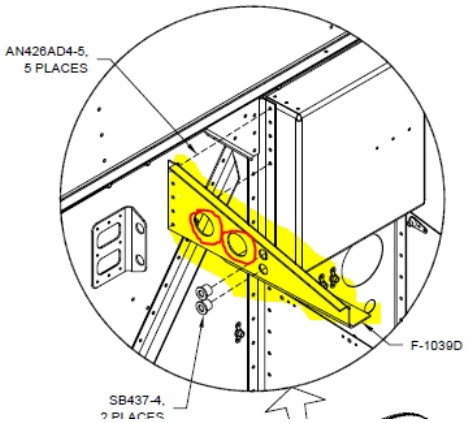
1. Introduction

This document will provide the necessary information and additional materials suggested to accomplish the installation of the Beringer full brake kit into an RV-10 with control approach rudder pedals. This document can also be used as a guide for the full Beringer brake kit into an RV-10 with factory supplied brake pedals, the builder would need to check the fittings at the brake calipers for proper fit and clearances.

This installation deviated from Beringer's instructions in one major way. Beringer wanted the ALIR (Anti-Lock In-Line Regulator) to be mounted under the panel in the center, above the tunnel. Specifically, they wanted it mounted on the F1039D bracket. I did not like this position, fearing it would interfere with anything I may elect to do in the future with a throttle quadrant or center console. It also made the brake hoses longer and the routing was less efficient than where I elected to mount the ALIR, on the left side of the pilot's leg well. This location shortened the hoses and puts the ALIR out of the way. Once the ALIR is calibrated, getting access to the knob will not be required and it is probably easier at this location than where Beringer wanted it. I was even able to use the mounting plate Beringer provided, although it took me a few days to figure that out☺

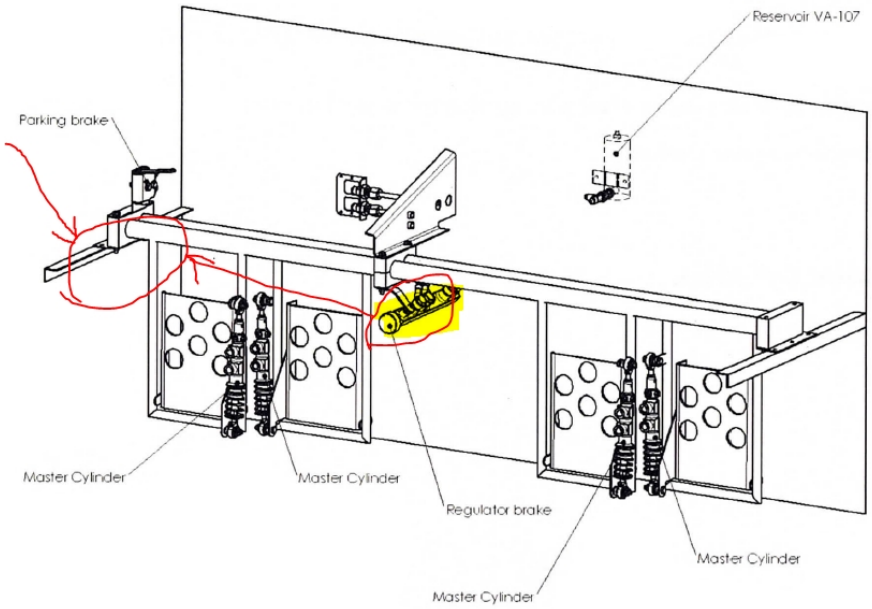
This document may be long, but this is actually quite easy. All that is needed to be modified is the Beringer ALIR mounting plate. The modification includes shaving a little off one edge and match drilling one AN3 bolt hole.

Note: This location is why longer bolts are required. See the materials list in this document.



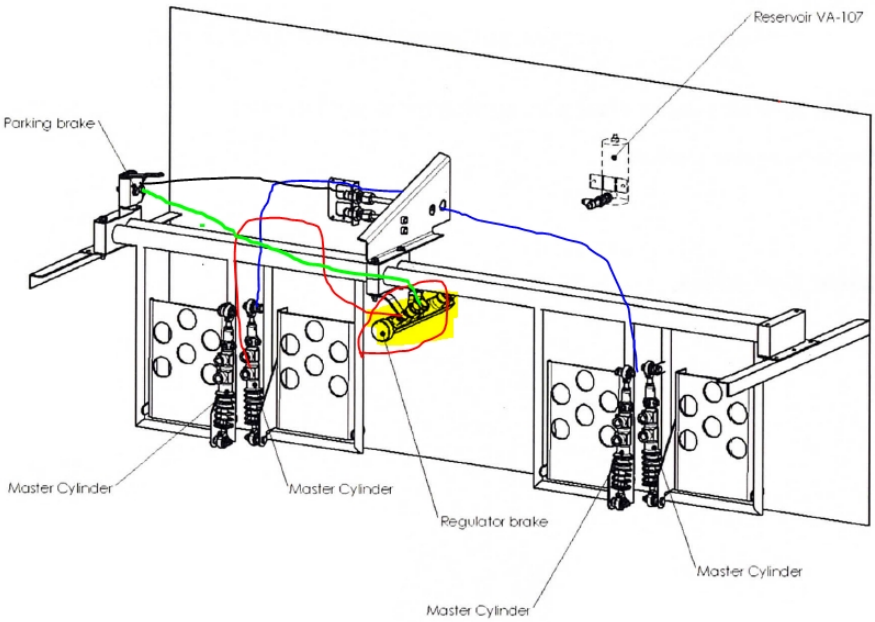
This is the from the manual

Below is a picture out of the Beringer RV-10 installation manual. I did not want to mount the ALIR as per Beringer recommendations. The location interfered with potential future items and the hose routing would have needed to crossover 2 times, adding length, cost and weight.



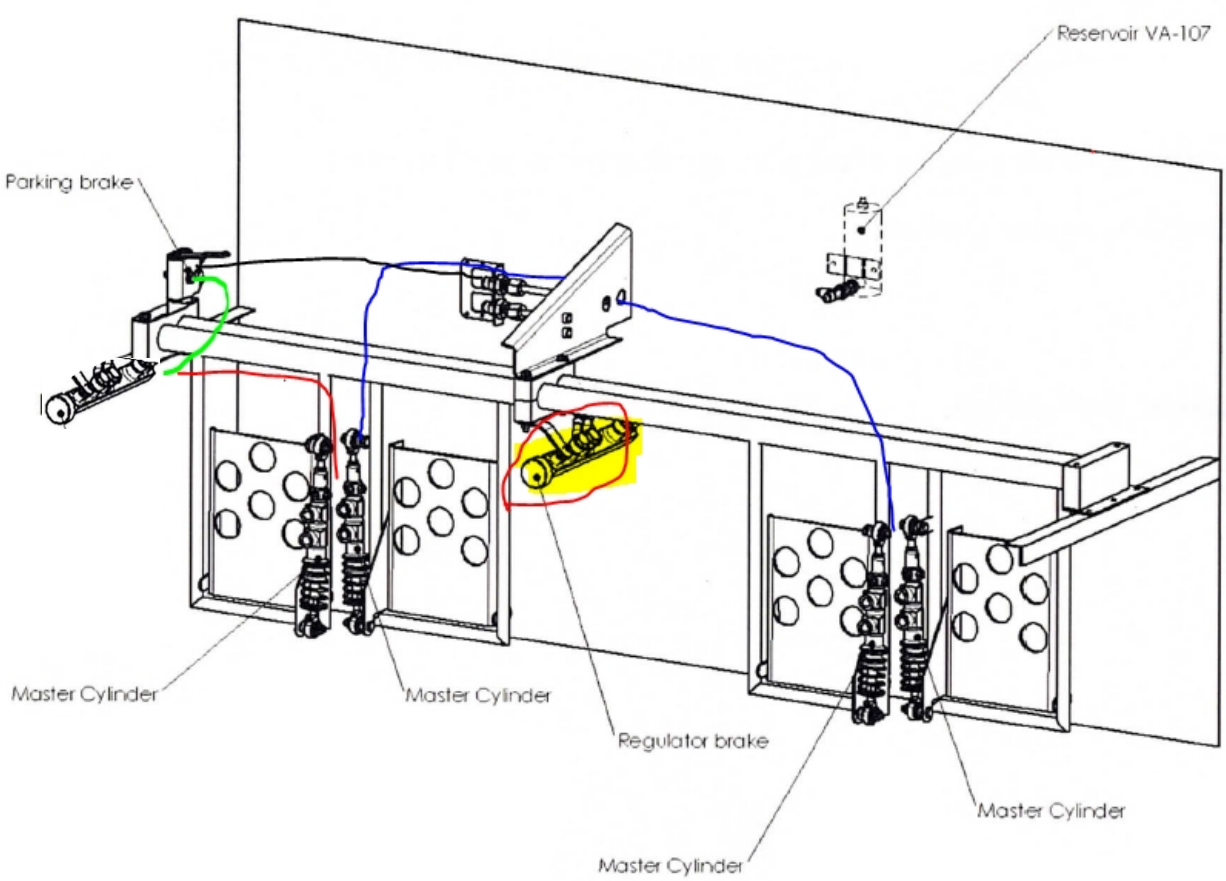
If the ALIR was mounted as per Beringer plans, the routing of the hoses would look like the below picture.

Blue to Red, to Green to Black. Observe the back and forth of the hoses.



Moving the ALIR to the left side, beneath the parking brake and rudder pedal bearing blocks, the hose lengths are minimized, saving cost and weight and complexity of future wiring and mechanical interference. The number of hoses are the same, but simpler. And we can use the same Beringer flat mounting bracket, with two (2) small mods.

Blue to Red, to Green to Black. Observe the more efficient and cleaner routing of the hoses.



Inventory

1.1. What is needed for this installation:

1.1.1. Aircraft Specialties RV-10 full Beringer brake package

- Full includes hoses for the brake reservoir, master brake cylinders, ALIR, parking brake, tunnel and under the front seats to the exterior of the airplane by the gear leg weldments (towers) NOTE: On the website you will need to order the Beringer Crossover package, Firewall to Center Tunnel Hose Kit, and Center Tunnel to Cabin exit hose kit. The reason these kits are independent is that some builders may choose to build rigid tubes from the firewall to the cabin exit point as per the stock

Vans plans. This ordering allows you to break out the crossover portion of the cabin and only order the hose kit you need.

1.1.2. RV-10 Kit fuselage kit (QB or non-QB

- Parts that can be excluded from the fuselage kit.
    - Brake pedals
    - Brake lines
    - Calipers
- Parts that can be excluded from the finish kit
    - Brakes
    - Axels
    - Tires
    - 1
    - 1
    - 1
    - 2

1.1.3. Beringer full RV-10 Brake package

- Included in the kit
    - 2 Calipers
    - 1 Parking Brake
    - 1 ALIR system (anti-Lock in-line regulator)
    - Misc. parts
    - 1 Front Wheel and tubeless tire and Axle
    - 2 Main Wheels and tubeless tires and axels
- Parts form the Beringer kit that can be omitted
    - Hoses and hose fittings except for:
        - Banjo Bolts
        - Copper washers
        - gear leg hoses and fittings

1.1.4. Miscellaneous items suggested for the complete installation as described within this document

- Loctite 567 Thread sealant, used once on brake reservoir NPT thread

- Qty 2 AN837-4D, 45 degree bulkhead fittings used in rear tunnel on my plane, your mileage may vary
- QTY 2 (up to 8) AN92404D AN bulkhead nuts- Surprisingly these do not come with the bulkhead fittings
- Qty 2 AN832-4 Steel bulkhead fitting to replace Aluminum ones. I wanted steel mounted on firewall on these pressurized brake lines.
    - Do not forget steel nuts
- Caterpillar grommet for .062 material
    - MS21266-2N 2 feet is enough
        - Sky Geek has 12 inch strips for $0.22, not critical, shop around.
- While you are buying grommet, the Panduit GEE36F-C is very valuable for edging all those lightening holes in wings and fuse where you are about to run wires.
- Epoxy for adhering grommet (West System is what I used it was on hand)
- Optional Several (2-4) cable tie mounts that can be affixed to the floor of the tunnel to secure the brake lines, if deviating from plans. (See instructions within this document.
    - Note: I am planning on Full EFII (electronic fuel injection and ignition) which required a modification to the fuel system.
- Qty 2 AN-23A bolts. These bolts are used in place of the -22A bolts Vans provides for mounting the rudder tube mounting block to the left side of the fuselage. The extra length is due to the added thickness of the parking brake bracket
- Qty 2 AN3-6A bolts. These bolts are used in place of the -5A bolts supplied by vans to mount the left F-1039B bearing block mount plates.
- Fitting caps for keeping stuff from getting inside open ended fittings while building

2. Detailed Installation Instructions

2.1. Installing the parking brake and the ALIR

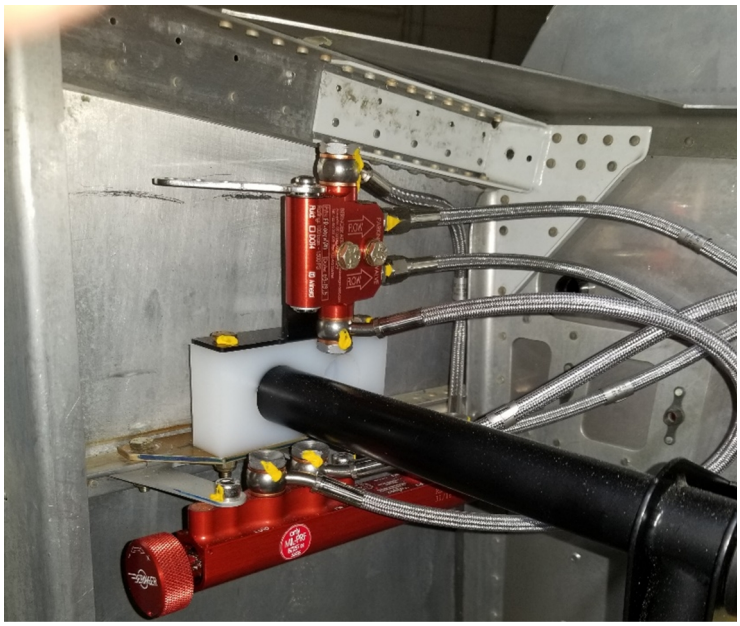
- The installation of the Beringer master cylinders is covered in the Control Approach and Beringer documentation.

- I**n**stallation of the parking brake and ALIR should take place during or after the installation of the rudder pedals, preferable during. I suggest installing the rudder pedals first before doing any hoses. But know they will come back out.

- Install the F1039B and the Rudder Pedal bearing block F-1039A as appropriate to your rudder pedals. The bearing block and the bearing block mount will probably

be removed several times so you might as well use older nylon lock nuts until final assembly, and then use new ones.

- Once the rudder pedals are where you think you want them (front-to-back), it is time to mount the parking brake and ALIR. Study the picture on left for the order of assembly of the devices. The parking brake will be assembled per Beringer instructions.

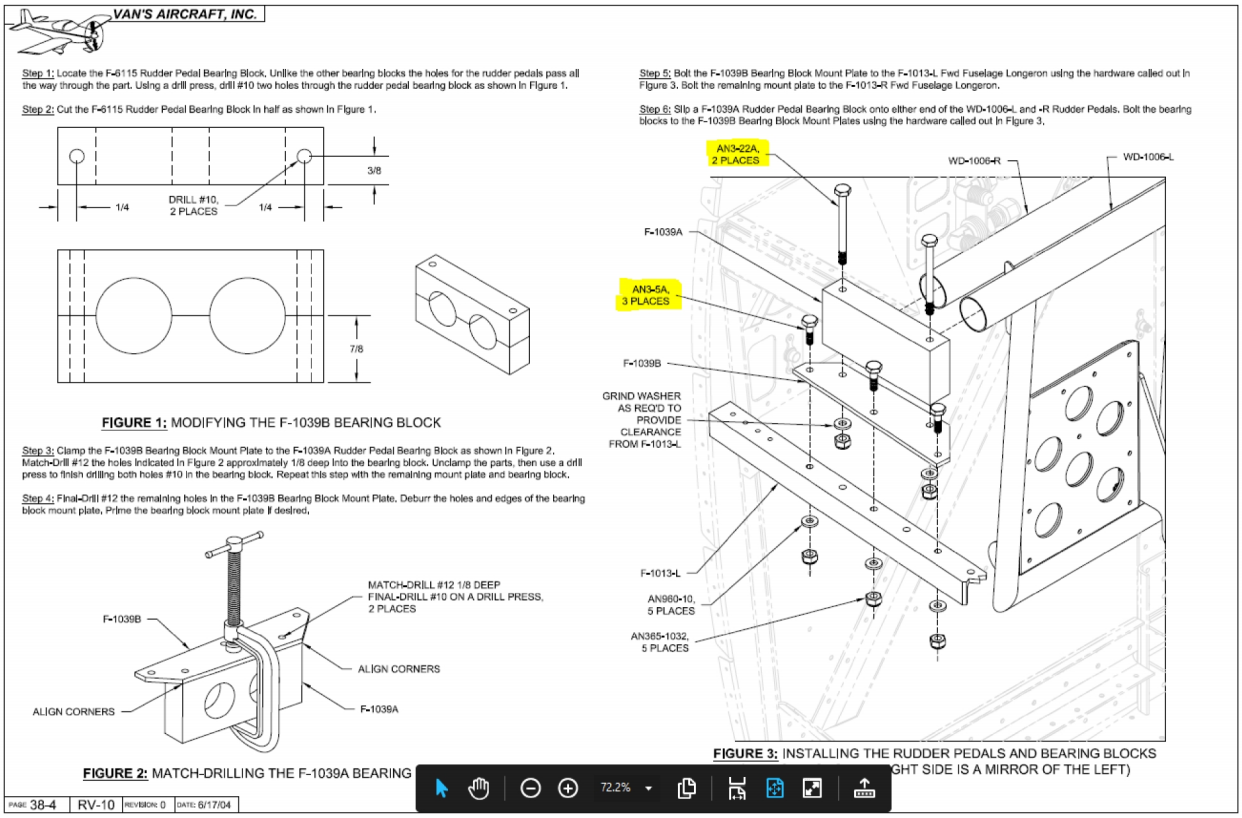


- From the Vans instructions, perform all these tasks only on the left F1039A Rudder Pedal bearing Block. Two changes are to the bolt callouts outlined in yellow.

    - Replace the qty 2 AN3-22A bolts with qty 2 AN2-23A bolts. This is required only on the left side of the plane
    - Replace the qty 2 AN3-5A bolts with qty 2 AN3-6A bolts. The bolts to replace are the two furthest from the firewall. This is required only on the left side the plane

- You have the ability to mount the F1039B Block mounting plate in 2 locations. One location uses one set of holes on the F1013-L stinger that moves the block and rudder pedals closer to the firewall and one set that moves them closer to the pilot.

    - I am 6 feet tall, so I used the set closer to the firewall. The rudder mounting block has 2 holes for the rudder pedals. Control Approach rudder pedals only have one cross bar and will only need one of the 2 holes in the bearing block. I used the holes closest to the pilot to allow for better movement of the pedals and clearance of the firewall.



VAN'S AIRCRAFT, INC.

Step 1: Locate the F-6115 Rudder Pedal Bearing Block. Unlike the other bearing blocks the holes for the rudder pedals pass all the way through the part. Using a drill press, drill #10 two holes through the rudder pedal bearing block as shown in Figure 1.

Step 2: Cut the F-6115 Rudder Pedal Bearing Block in half as shown in Figure 1.

FIGURE 1: MODIFYING THE F-1039B BEARING BLOCK

Step 3: Clamp the F-1039B Bearing Block Mount Plate to the F-1039A Rudder Pedal Bearing Block as shown in Figure 2. Match-Drill #12 the holes indicated in Figure 2 approximately 1/8 deep into the bearing block. Unclamp the parts, then use a drill press to finish drilling both holes #10 in the bearing block. Repeat this step with the remaining mount plate and bearing block.

Step 4: Final-Drill #12 the remaining holes in the F-1039B Bearing Block Mount Plate. Deburr the holes and edges of the bearing block mount plate. Prime the bearing block mount plate if desired.

FIGURE 2: MATCH-DRILLING THE F-1039A BEARING

Step 5: Bolt the F-1039B Bearing Block Mount Plate to the F-1013-L Fwd Fuselage Longeron using the hardware called out in Figure 3. Bolt the remaining mount plate to the F-1013-R Fwd Fuselage Longeron.

Step 6: Slip a F-1039A Rudder Pedal Bearing Block onto either end of the WD-1006-L and -R Rudder Pedals. Bolt the bearing blocks to the F-1039B Bearing Block Mount Plates using the hardware called out in Figure 3.

FIGURE 3: INSTALLING THE RUDDER PEDALS AND BEARING BLOCKS
GHT SIDE IS A MIRROR OF THE LEFT)

72.2%

PAGE 38-4 | RV-10 | REVISION: 0 | DATE: 6/17/04

- Now for the modifications and mounting of the Beringer parking brake and ALIR.
    - Before disassembly of these parts, check the location of the parking brake and its bracket. The parking brake location is fixed, based on the location of the rudder pedal bearing block. It uses the qty 2 AN3-23 bolts for mounting. No need to mount it yet, but double check it will fit in your airplane without interference.
    - More importantly, the ALIR location should be checked. Locate the ALIR mounting bracket. In the Beringer directions, it looks bent, but it comes from Beringer Flat. Do not bend it as it works just fine in the flat configuration.
    - Shown below is a picture of the ALIR bracket as provided by Beringer. Notice that is flat.
    - Hold the ALIR bracket in place under the stinger. Use the hole in the bracket furthest from the firewall to capture the location to the AN3-6A bolt furthest from the firewall.
        - Note, the edge of the bracket, colored yellow in the picture below. It may need to be shaved down so the red hole can be used to capture the AN3-6A bolt and not have interference with the F1013 – L stringer. Not much needs to be taken off. I used

my 3M ScotchBrite wheel. Any type of saw or cutting tool will probably take too much off.

- Now is the time to shave that bracket down so you can use the existing hole for mounting the bracket using the AN3-6a bolt that attached the Rudder bearing mount.

- In the picture below, there is one extra hole in this bracket (Blue), that extra hole will be drilled soon and will capture the second AN3-6A bolt. The hole circled in red is one of the existing holes in the bracket and the one we want to use to capture the second AN3-6A bolt, the bolt furthest from the firewall. (it is also possible to flip the bracket around and use the other hole) to capture the same AN3-6A bolt. The fitting check will help determine which

way the bracket wants to be in you plane.

  - After you modified your ALIR bracket to capture that furthest from the firewall AN3-6A bolt (trim the bracket to enable both existing holes in the bracket to work on the same bolt, providing you options in orientation)
  - Mount the ALIR to the bracket as shown using the socket head bolts provided by Beringer. Finger tight is all that is needed at this time. The ALIR will be coming on and off the bracket several times during fitting of the bracket and while attaching the banjo bolts and hoses.
- Study the picture below to better understand the orientation and how things are positioned and mounted. In the picture below, you are viewing the bracket from below, looking up from the floorboard.

  - The pilot seat is to the left and firewall is to the right.
  - The AN3-23A Bolts and nuts used to mount the Rudder Pedal bearing Block (and the Parking Brake bracket) clear the F1013-L angle and the ALIR mounting plate
  - I ended up flipping my bracket around and used the existing hole on the middle AN3-6 bolt. I found this position provided better access to the ALIR mounting screws.
  - The bottom edge of the mounting bracket clears the flange of the F1013-L stringer because it was shaved down enough for the exiting bolt hole to work but still kept good edge distances to the AN3-6A bolt holes.
  - One of the existing holes in the ALIR bracket (far left) is unused
  - The second AN3-6A bolt and nut is in a new hole that needed to be drilled (near the unused hole).
  - Note there are 2 unused holes on the F1013-L stringer. These are the additional holes described earlier that could be used to move the rudder pedals closer to the pilot. (to the left in this picture)

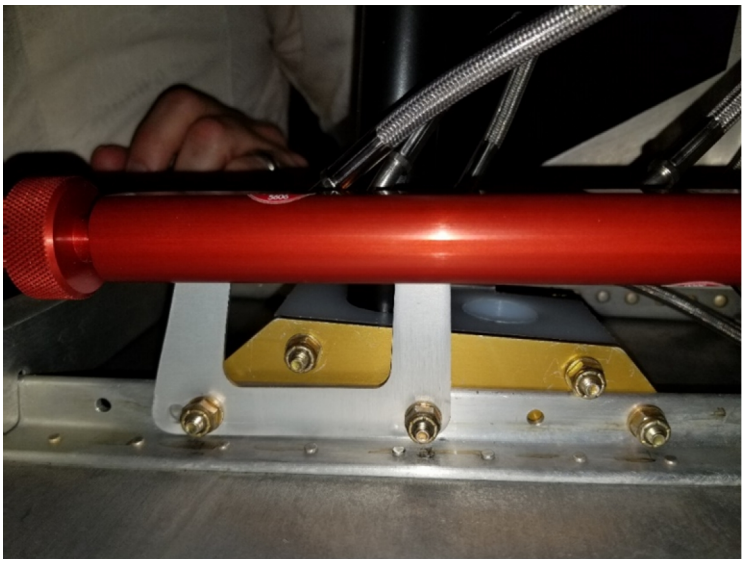
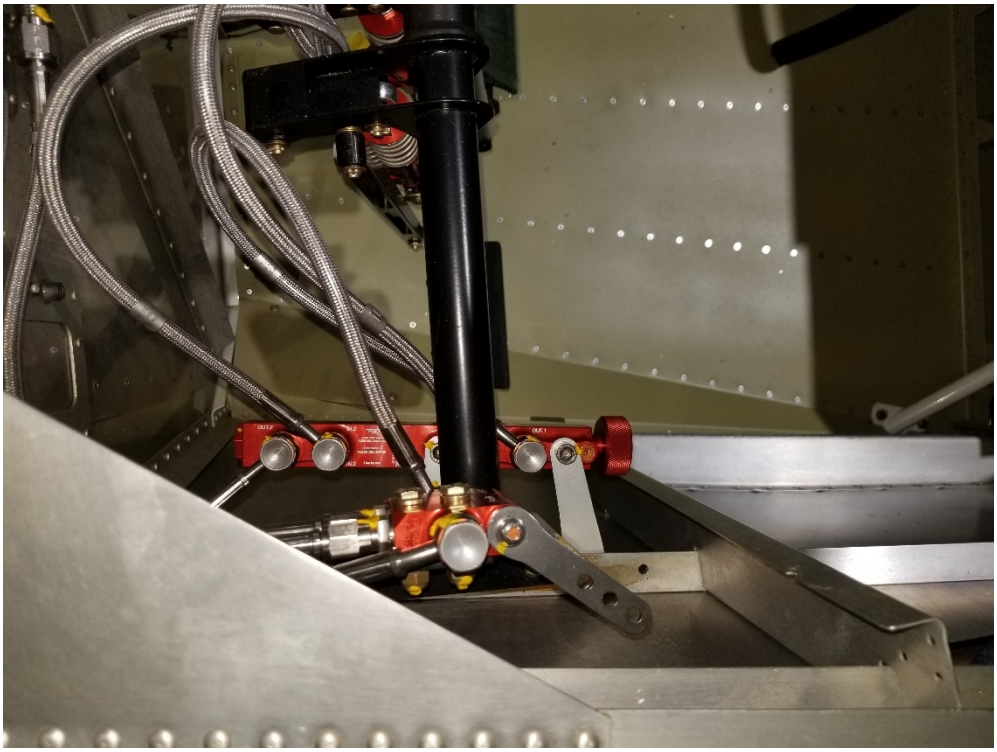


Figure 1 Picture of the ALIR looking up from the floor board

- In the picture below, you are viewing the bracket from directly above. In this picture you cans see there is good access to one mounting bolt and 3 banjo bolts. The second mounting bolt and 4th banjo bolt are obstructed from the top by the Rudder tube. I found this to be acceptable because the rudder tube was several inches above it and I could get a banjo bolt on and off either by lowering the ALIR by loosening the mounting bolts and as is. Once on, I would make it finger tight and then once the ALIR was mounted and secured again, I could get a wrench on it.

- Try the bracket several ways before drilling the final hole. If you want to drill multiple holes, go ahead. Please observe acceptable edge and hole-to-hole distances.



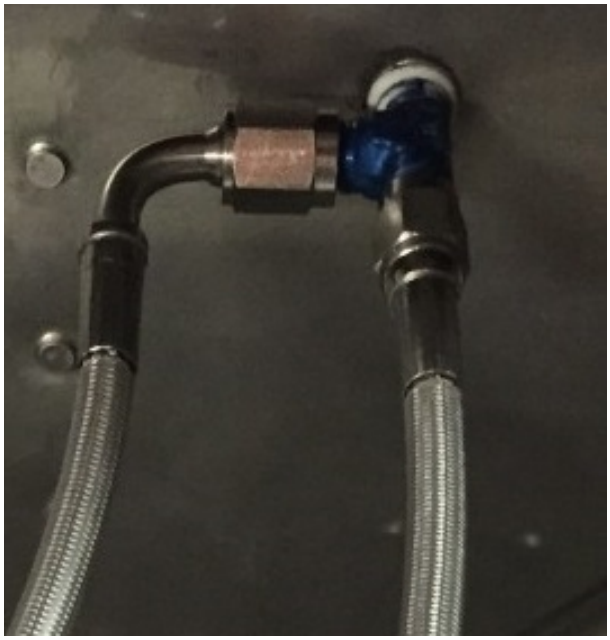
- It is very hard to access the AN3-6A bolts with the Rudder pedal beating block mounted, we will need to remove the left side F1039A and F1039B parts from the airplane.
- On a bench lay out the F1039A, F1039B, Beringer parking brake bracket and ALIR mounting bracket and F1039B Rudder bearing mounting bracket.
- Take the F1039B rudder bearing mounting bracket and the ALIR mounting bracket and using one AN3-6A bolt mount them to the place as shown above or as desired for best fit and access as determined earlier (flipped bracket and front or middle hole). Note, just attach using 1 bolt. Tighten slightly and make use you use washers.
- Drilling the second mounting hole is now just a simple act of match drilling the hole from the top through the F1039B and F1013-L into the ALIR

mounting bracket. Clamp in place and make sure the ALIR bracket is not toughing the F1013-L flange but that there will be enough edge distance. Drill using #12 drill.

-

2.2. The Brake Reservoir Fittings

- After the rudder pedals are installed (Control Approach or Vans stock pedals)
- Start by mounting the brake reservoir to the engine side of the firewall per plans with the 2 AN bolts and stacked washers.
- Install the included AN826-3D fittings into the reservoir with thread sealant and clock in the orientation shown..
    - Keep the flares clean, wipe them down with a clean, non-lint cloth prior to mating to help insure a tight no-leak connection.
    - Do not use any sealant on the flare or the flare threads
    - Torque to specification while keeping clocking as shown. I apply torque seal after torqueing every bolt as proof to myself that it has been torqued. You will that in later pictures.



Note: Always try to cap/seal the ends of any open fittings when not in use. Reuse the caps provided ad or buy some additional caps.

2.3. General guidelines and recommendations for routing hoses

- The following directions will be for the right brake pedal. Follow these same directions for the left side. I suggest doing just the right side completely and then the left side completely (or vice/versa) so that you do not get left and right mixed up along the way.

- It is also recommended to NOT use the copper washers at this time. This is a loose fit trial. Use the Banjo bolts but just your fingers to screw tem in, finger tight is perfect for now.

- The order in which you mount the hose-end matters and will affect the routing and fit. When using a hose with a banjo fitting on one end and an AN fitting on the same hose, it is recommended to attach the AN fitting first, not even finger tight, just engage the threads, allowing the hose to swivel and allowing for the best "fit" of the hose routing and banjo fitting.

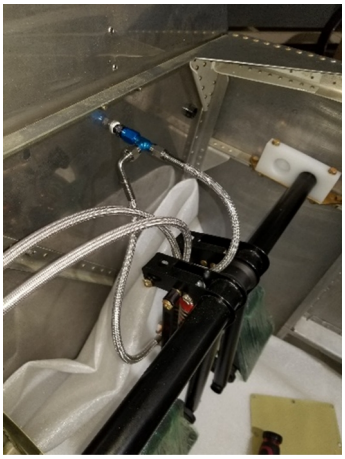
- When installing a hose with a banjo fitting on both ends, it may be required to swap ends or to rotate the banjo 180 degrees etc. I think there are 4 ways to mount the hose. Trial and error will produce the proper way to mount them so the hose is properly routed and has minimal stress on any fitting. Take your time, these are great hoses that hopefully will never have to come off again.

- Another good practice is to try to orient the hose outside the plane and route it the way you think it will be routed and determine if the fitting alignment looks right, then attach it to the fittings.

VERY IMPORTANT NOTE: BELOW IS A DESCRIPTION OF HOSE ROUTINGS. DUE TO THE POSSBILITY OF A HOSE BEING MISLABELED OR MISINSTALLED, BUILDER MUST TRACE HOSE CONTINUITY FROM BRAKE PEDAL THROUGH THE SYSTEM TO ENSURE THAT THE CORRECT BRAKE IS BEING ACTUATED BY THE CORRECT PEDAL. GO FROM THE COPILOT PEDAL TO MAKE SURE THE RIGHT PEDAL IS ATTACHED TO THE RIGHT PILOT PEDAL AND VICE VERSA. THEN TRACE FROM THERE TO THE ALIR VALVE, PB VALVE, AND CABIN EXIT POINT ENSURING THAT THE CORRECT PEDALS ACTUATE BRAKES ON THE CORRECT SIDE OF THE AIRCRAFT.

2.4. The Brake Reservoir to Rudder pedal fittings.

- Using the hoses provided by Aircraft Specialty, locate the H1 hose, attach the AN fitting to the T fitting installed on the firewall to reservoir. The right hand hose attaches to the male AN fitting coming straight out.

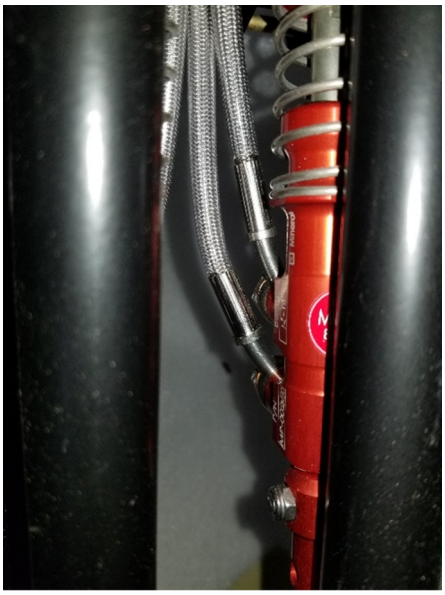


- This hose (H1) bends down between the rudder pedals and attaches to the IN port on the right hand cylinder on the co-pilots set of rudder pedals.

- Hose H2 goes with the 90 degree fitting on the Tee and attaches to the Left Copilot Pedal IN.

    - Note- The Beringer master cylinders are supposed to be mounted on the Control approach rudder pedals in a way that the "Out" port is on the bottom, closest to the floor board.
        - "Out" and "In" are labeled on each cylinder, please check that you are using the IN port for this cable. This cable will also not see any pressure on it. It runs directly to the atmospherically vented brake reservoir.

Note: when using Vans standard rudder pedals with Beringer master cylinders, they mount so the "Out" port is on the top.



- Using a banjo bolt, try attaching the banjo fitting to the "In" port on the co-pilots right hand master cylinder. The banjo bolt should be angled up and as per the picture to the right. This picture is taken showing the gap between the left and right pedals.

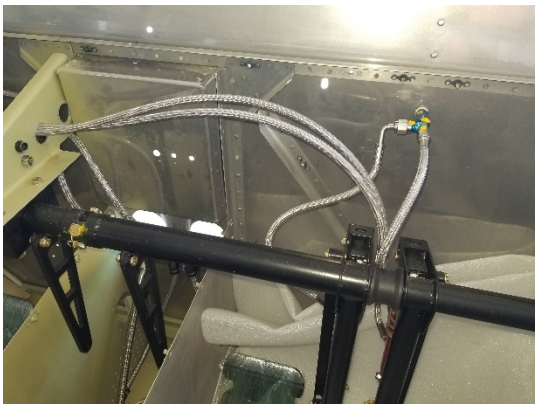
- If the banjo fitting is not angled this way remove the hose from the master cylinder and from between the rudder pedals, pulling it straight out from the AN fitting (which is engaged and loose) and rotate the hose on the AN fitting 180 degrees and try again. It should work this time.

2.5. Co-pilot right brake to Pilot right brake

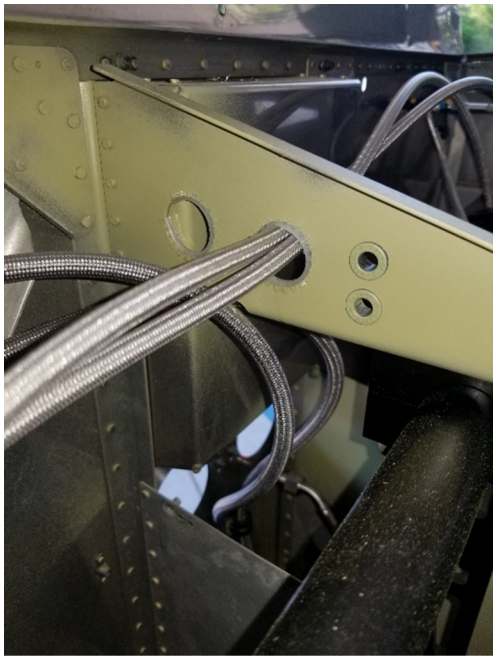
- Locate the H3 and H4 hose. These two hoses are identical and are the crossover hoses.

- Using the picture above, loosely attach it using a banjo bolt to the "OUT" port of the co-pilot right hand brake pedal master cylinder.

- Route the hose between the left and right co-pilot brake pedals, up and out of the way to provide free movement of the pedals. Route the hose between one of the larger holes in the F1039D rudder bracket. I suggest using the .062 caterpillar grommet around 360 degrees of these holes to protect any items passing through it.



- The plans call for this hose to run through the two smaller holes with bushings. This is not possible due to the hose fittings being on the hoses already.



- After going throught the hole, route the hose from the top of the rudder pedals down the middle, between the left and right pilots side pedals and attach it to the "IN" port of the Pilots right rudder pedal master cylinder. Agan, the banjo fitting should be pointed torward the left (between the right and left peddals and up)

2.6. Pilot right brake master cylinder to ALIR (Anti-Lock In-line regulator)

- Locate the H5 hose. Attach it to the ALIR Right hand Brake IN first using the orientation as shown below. It is the second (toward the firewall) hose in this

picture. This picture was taken from the pilot's seat looking toward the firewall. The black bat is the single control approach cross tube.

- H6 is The pilot Left Rudder Pedal out to ALIR IN.

- Note that depending on how you mounted the Control approach rudder pedals or if you have the Vans stock Vans pedals, your clearance for attaching this banjo bolt may be impeded. By the rudder cross bars. If this is the case, simply unscrew the ALIR and attach the banjo bolt (finger tight) when the ALIR is off the bracket, or dropped down from the bracket by loosening the bracket bolt. Once the banjo bolt is on, there should be sufficient clearance to apply a wrench and the proper torque even when the ALIR is firmly attached.

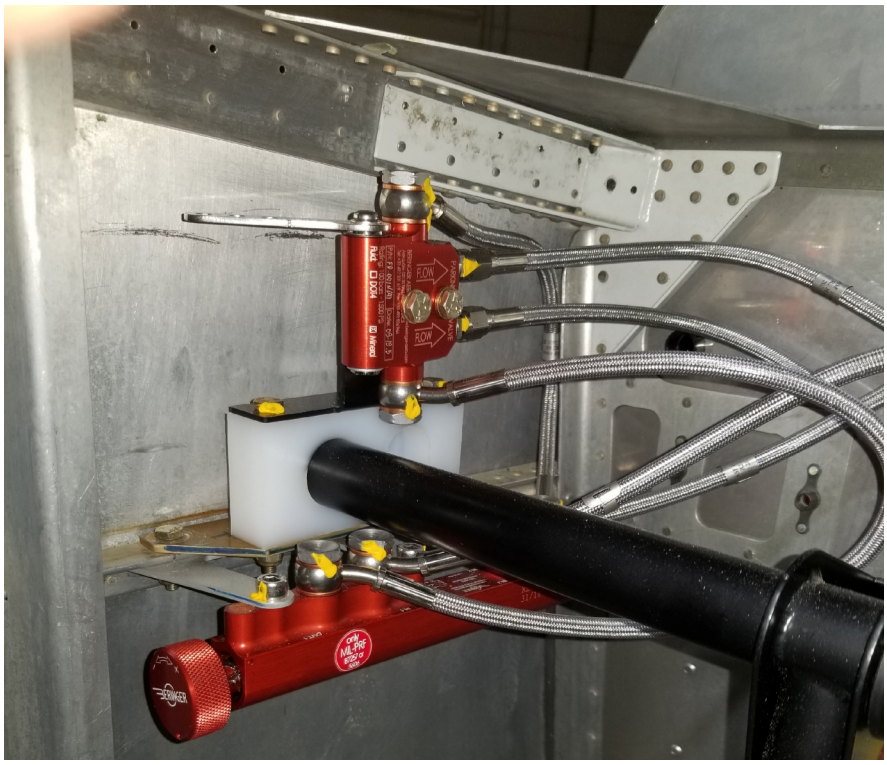
  - Route the hose under the rudder cross bar and then come down the middle of the pilots rudder pedals and attach the other end to the pilots right rudder master cylinder Out port. Check that the Banjo fitting "wants" to fall into the proper orientation. It is possible that the hose needs to be reversed (swap fittings) or that the banjo fitting on the ALIR port just needs to swivel a bit to

make the other banjo fitting lay flat. It is tough to describe why this is so, but after a while, you will figure it out.

2.7. Pilot brake ALIR Out to right brake parking brake in.

- Using Hose H7, route it from the ALIR Out 1 port to the bottom port on the parking Brake. In the picture below, it is the left most hose on the ALIR. Notice how the banjo bolts and fittings are positioned.

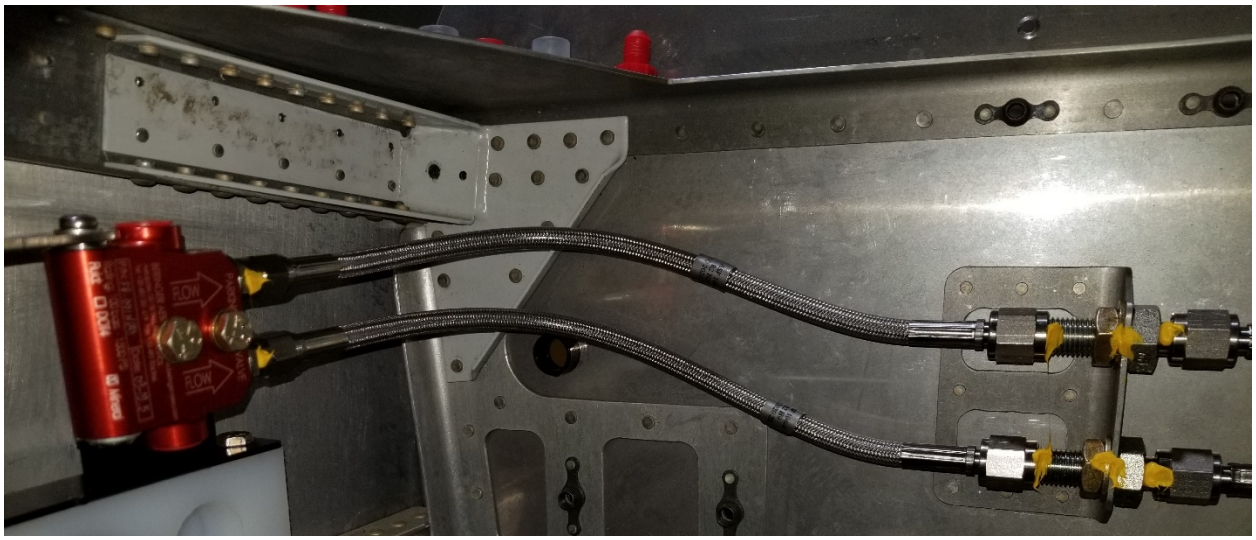
- H8 Is ALIR out 2 to PB Top



2.8. For Right hand parking brake to firewall transition bracket

- Using the H9 hose, insert it into the bottom Flow Out port of the parking brake and to the bottom bulkhead fitting on the firewall.

- The picture below shows the routing. (Note the brake lines cross over each other in the tunnel)



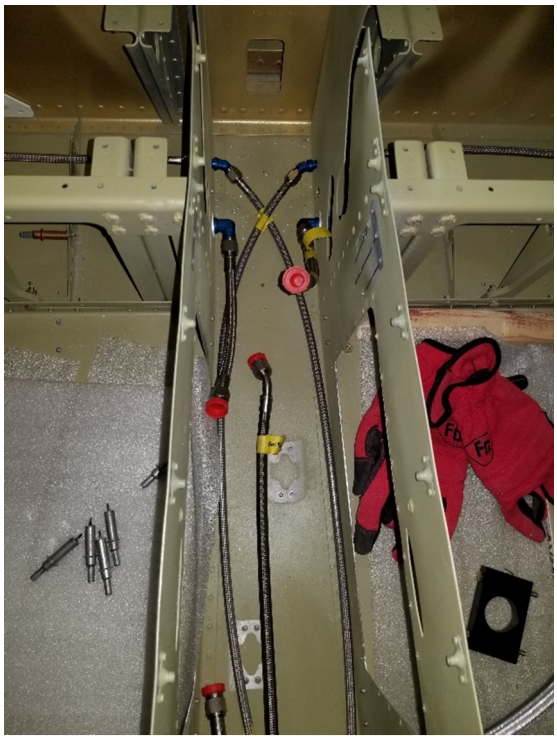
2.9. From the firewall transition bracket to the rear of the tunnel.

- You will have two hoses. They will be labeled ASF102-1 (Or 102-4) RXH1 and H2. (The H1 hose is 1" shorter than the H2 hose due to the routing dimension difference. Attach the two hoses to the firewall bulkhead fitting, down the front of the firewall between the scat tube opening and then route and secure per Vans plans.

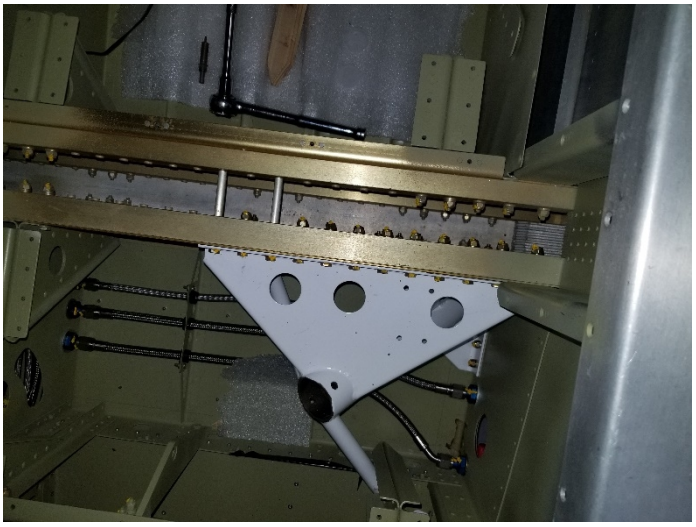
    - I deviated a little from the vans plane due to my dual pump arrangement. I fastened the hoses in a few places according to Vans but then I also secured them to the bottom of the tunnel using cable ties. I also exiting the rear tunnel using 45 degree fittings. I thought it would allow less stress on these hoses. See picture below.
        - Note: be on the lookout for the single nutplate on the firewall that may be a #10 nutplate.

Note: I removed the filter and pump brackets in the tunnel because was not using them. You can see the primer outline of them.

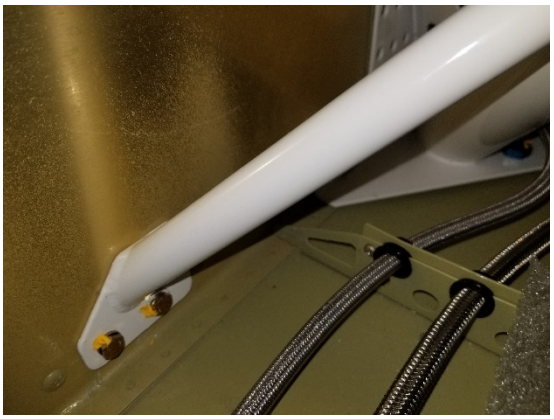
2.10.

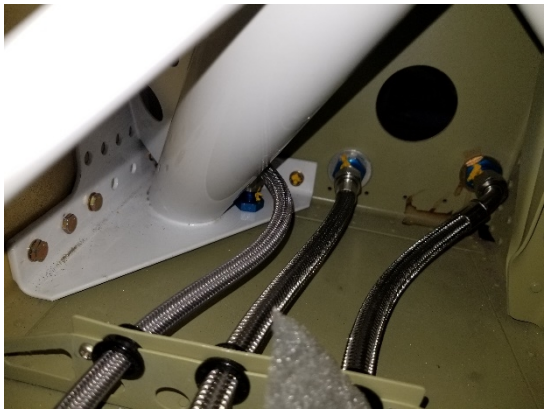


2.11. The last 2 lines go from the tunnel bulkhead through the gear tower weldment. This follows the Vans normal process. Both these hoses are the same dimensions and will be labeled “ASF102-2 or 102-5” RXH1 and H2. “X” stands for revision number. The important part is that you pick the hoses that are 102-2 or 102-5 and are labeled H1 and H2. I needed to open the holes in the cable brackets to accommodate the new lines. I saw that someone had 3D printed new brackets that fit perfectly.



2.12.



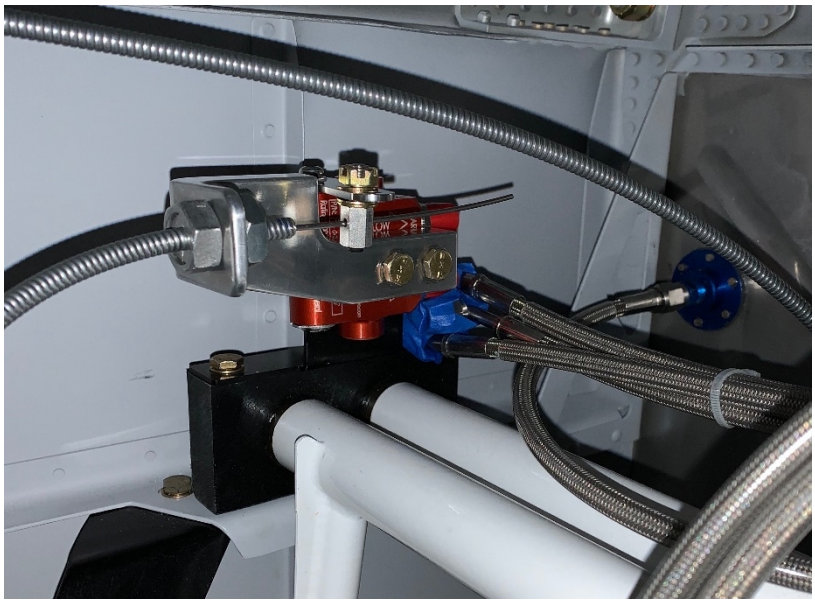


3. Additional Steps and Left Brake Line

- For the left hand brake lines, follow the same process
- Once all the hoses are installed, but not yet tightened, check for proper movement of the rudder pedals.
- Check the hoses for rubbing or abrading potential on any sharp edges, rivet heads/tails or any other potential cause for failure. Take the necessary actions to prevent the abrasion of the hoses to occur.
- After all steps above are completed to the builders satisfaction, it is now time to add the copper washers, 2 per banjo fitting and torque to specifications
- One on top between the banjo bolt and the fitting
- One on the bottom, between the hose fitting and the port on the Beringer device.
- Copper washers should only be used one time and discarded.

OPTIONAL ITEM:

Aircraft Specialty Flightlines offers a premade Bracket that attaches to the BERINGER PB valve and serves as a mounting location for your cables. If purchasing this bracket, it will make the installation easier for your PB cable mount. If utilizing this bracket, the following items will need to be purchased also.



1. A-730 Glide Free control It can be purchased from Spruce)
2. Spruce Part # 05-16245–This is the end that mounts into the parking brake valve and fits with the A-730 glide cable.

Appendix

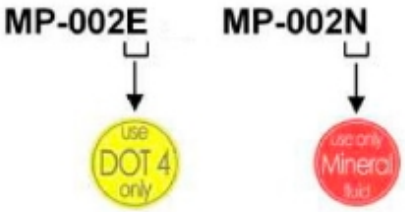
3.1. Brake Fluid Requirements

Brake master cylinders and attachments

CAUTION:

The seals inside the brake master cylinders are specific for each type of brake fluid.

- It is not possible to put DOT4 brake fluid in a master cylinder with seals for MINERAL (MIL) fluid and it is not possible to put MINERAL brake fluid in a master cylinder with seals for DOT4 brake fluid.
- The letter **E** means for DOT4 brake fluid
- The letter **N** means for MINERAL (MIL) brake fluid



3.2. ALIR – Anti-Skid In-line Regulator

3.3.

"ALIR" anti-skid

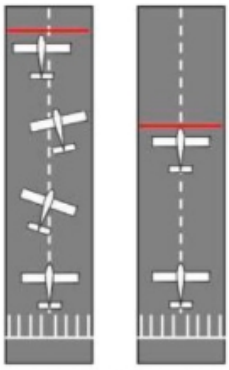
Many accidents occurring on the ground are due to a bad control of the brakes. <u>Avoid all these risks with the BERINGER ALIR on your aircraft</u>

The BERINGER ALIR system improves the control of the brakes and helps the pilot to control the brakes.
This Anti-skid in Line Regulator allows the control of the direction on the ground with differential braking. It avoids wheel locking and risk of nose over when applying full effort on the braking pedals.
It reduces the stopping distance.

<u>The BERINGER ALIR system is included in most wheel & brake kits.</u>

ALIR System Anti Lock In line Regulator

A real advance in terms of safety



Without ALIR **With ALIR**

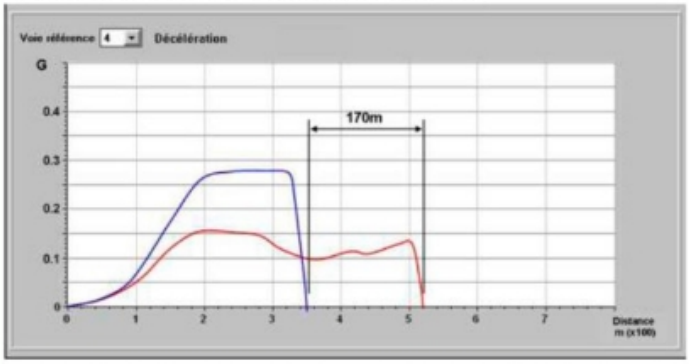
The ALIR system allows the control of the direction on the ground with differential braking.

The system can be installed on certain old aircraft.

EMERGENCY BRAKING : comparison:

- Blue curve: with ALIR: the pilot applies full braking without any control (similar to a car ABS)
- Red curve: without ALIR: no regulation, the pilot must control the braking

(in both cases, conditions are the same: same plane, same brakes)
Weight of the aircraft: 1200 kg, braking speed: 70 Kt



Nota: BERINGER brake pads used int the ALIR system have a friction coefficient that increases with the temperature allowing an increase of the deceleration when the lift decreases on the wings.

Installs in-line; regulates in case of emergency overpressure

- Prevents nose over and improves safety
- Low hysteresis
- Adjustment range: 10 -40 bars (or 20-50 bars), with thumbwheel
  - Machined from solid on CNC
  - For DOT4 **<u>OR</u>** MINERAL (MIL) brake fluid
  - 2 inputs, 2 outputs (thread: M10x1)

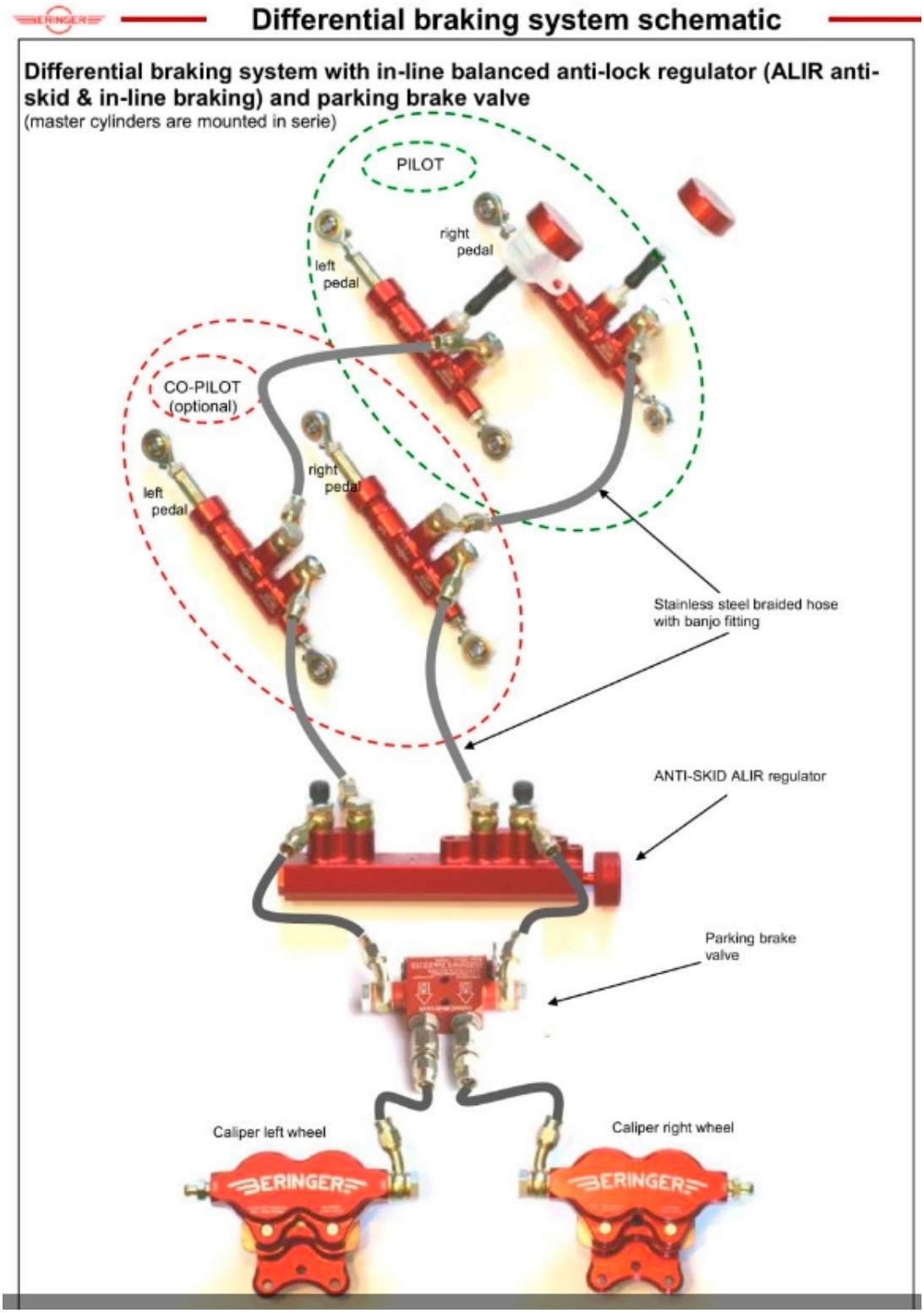
(See schematic page 30)

ALIR PRESSURE REGULATOR allowing a +/- 1 bar maximum reference pressure and an equipressure left-right .

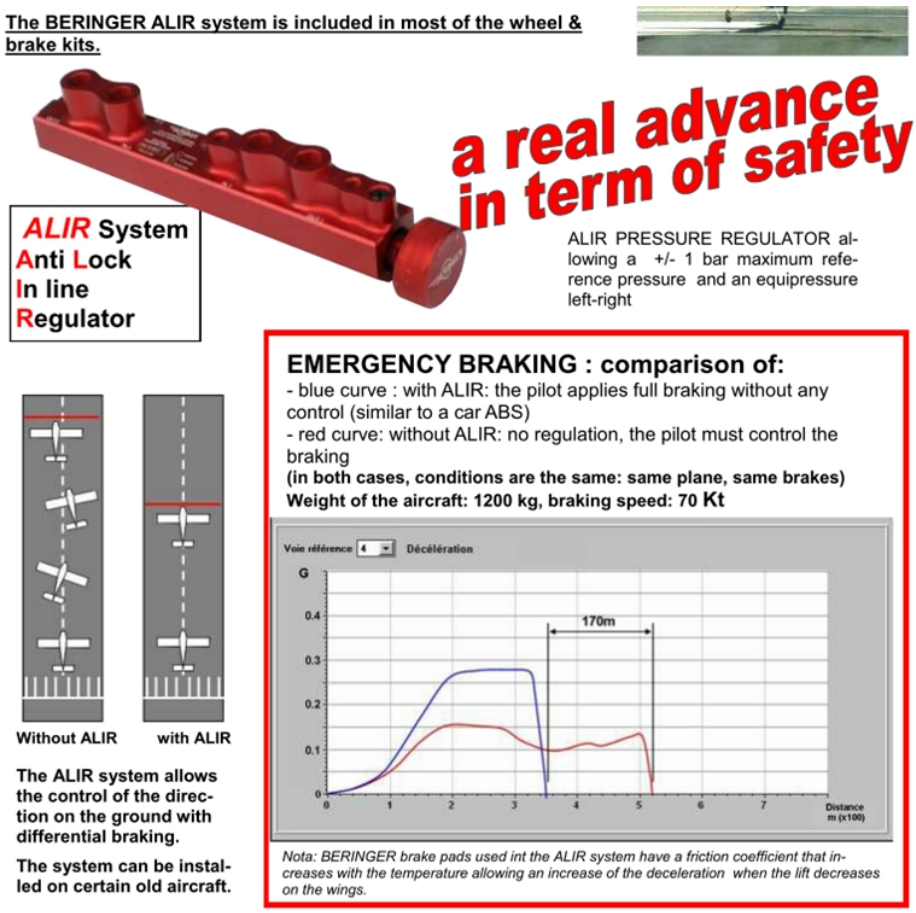
P/N	Description	Weight oz	Weight g	Brake fluid	Price
RE-001E	In-line balanced anti-lock regulator 10 to 40 bars	11.64	330	DOT4	182
RE-001N	In-line balanced anti-lock regulator 20 to 50 bars	11.64	330	MIL	182

 All prices are quoted in USD without tax - Prices and descriptions are indicative and are not contractual. Cat. IndB Mar 2018

3.4. Schematic of connections



3.5. Beringer's ALIR



3.6. Panduit Grommet GEE36F-C.

I purchased a 100 foot reel off eBay for 30 dollars. I sue this everywhere a wire or conduit runs through a lightening hole, even if the wire or conduit is supported by a clamp. Great insurance and

piece-of-mind. Use a quick setting adhesive so you are not constantly waiting. I used the West System epoxy with the 205 quick hardener.

3.7. Incorrect Plan call-out on firewall screw

- At least on my QB kit, I found a few “off-plan” challenges the factory provided to me. My QB is from 2006, so they may have corrected this issue, or mine could have been a one-off.

- The nut-plate on the firewall that is used to capture BOTH Adel cushioned clamps of the brake lines was a #10, not a #8 as called out in the plans. Well, this was a royal pain. Trying to get 2 Adel clamps around 1 screw in a tight place without the seats in was not fun. It was the first time I actual sat in the plane☺ then when I went to tighten the #8 screw, and felt it skipping threads, I was overcome with dread. No! I do not want to remove a defective nut plate on the firewall. I tried a #10 and it worked perfectly.

- I do believe the other nutplates were correct, although I did not use all of them because of the fuel system and flexible bake hose routing wanted to fall in the middle of the tunnel.

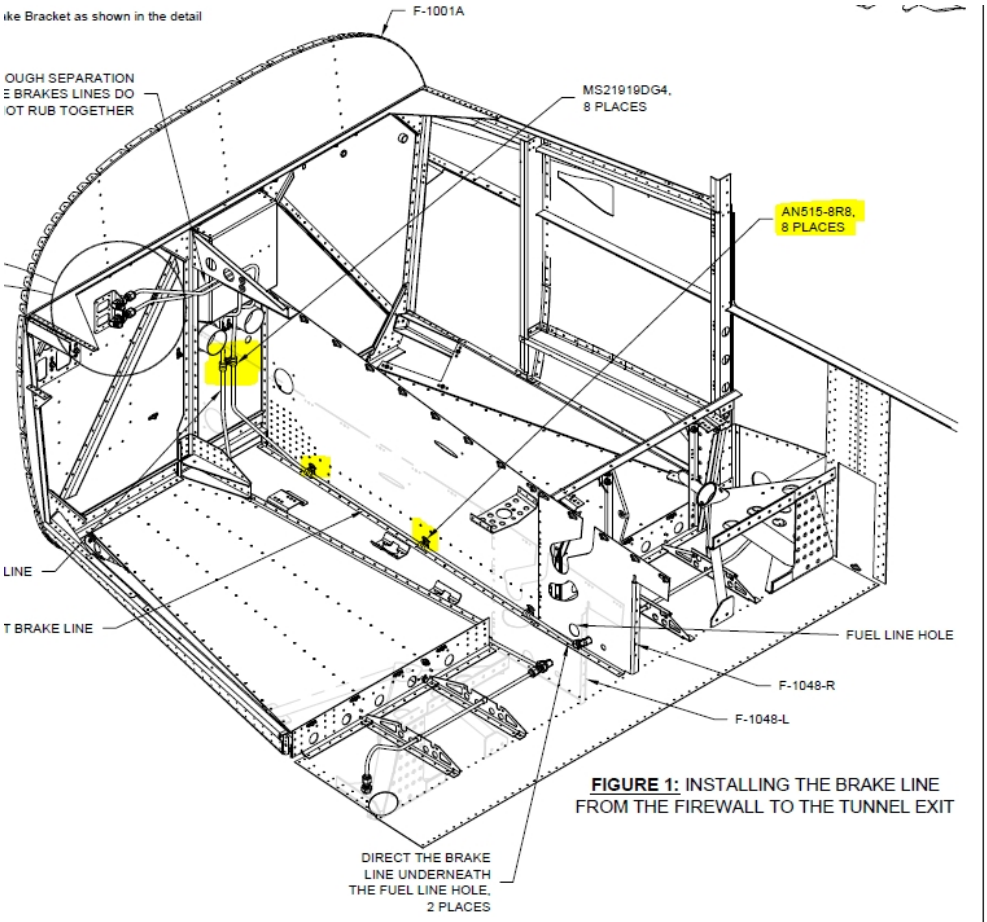


FIGURE 1: INSTALLING THE BRAKE LINE FROM THE FIREWALL TO THE TUNNEL EXIT

4.

4.1. AN837-4D 45 degree AN fitting. What I used for through rear tunnel. Vans ships with 90 degree fittings. Use what works for you. Notice no nut comes with these.

AN837 ELBOW FLARED TUBE, BULKHEAD AND UNIVERSAL 45°

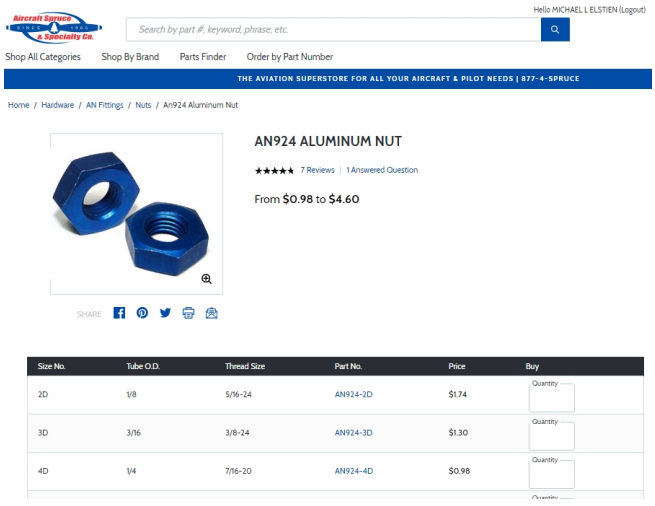
★★★★½ 2 Reviews | 1 Answered Question

From $11.50 to $29.50

SHARE

Size No. Steel	Size No. Alum	Tube O.D.	Thread Size	Buy Steel
-	2D	1/8	5/16-24	--
3	3D	3/16	3/8-24	$17.90 Quantity

4.2. Nuts for the -4 Bulkhead fittings. Wow, a buck a nut.



Size No.	Tube O.D.	Thread Size	Part No.	Price	Buy
2D	1/8	5/16-24	AN924-2D	$1.74	Quantity
3D	3/16	3/8-24	AN924-3D	$1.30	Quantity
4D	1/4	7/16-20	AN924-4D	$0.98	Quantity

4.3. Hose caps – Plastic

Having these plastic caps available while building will prevent things from getting inside your hoses. Search for what sizes you need. For the brakes you may need -3 and -4. Reuse what Aircraft Specialties provides when possible.


ebay
Shop by category
Search for anything
eBay > eBay Motors > Parts & Accessories > Car & Truck Parts > Other Parts
Plastic AN Fitting Cap and Plug Kit, 72 Pi