BVM PNP Yak 130

1:4.85 Scale

GO FLY GOLD

Length: 94”, Wing Span: 79” with Missile Rails

Weight: 32-34lbs Dry

Fuel Capacity: 4.0L, Smoke Capacity: 2.5L

CONSTRUCTION AND OPERATION MANUAL

Version 2 April 2024

Vne: Speed to Never Exceed = 175 MPH
Limit Engine Thrust to 36 lbs

Equipped with HV Servos and should not be operated below 7.2 volts

CCU Pressure should be 75 PSI MAX

BVM

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YAK 130

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Introduction

Thank you for purchasing the BVM Yak 130 PNP. This model represents the latest in manufacturing technology and completion for the R/C jet enthusiast. The factory has expertly crafted and thoroughly inspected all aspects of the model. Only a small amount of work is required to complete the assembly of your Yak 130.

This manual contains instructions for safety, operation, and maintenance. It is essential to read and follow all the instructions and warnings in the manual. Please read the entire manual to become familiar with the processes and procedures before you begin to assemble your aircraft.

Disclaimer

Bob Violett Models Inc. assumes no liability for the operation and use of these products. The owner and operator of these products should have the necessary experience and exercise common sense. Said owner and operator must have a valid Academy of Model Aeronautics license with a Turbine Waiver if operated in the U.S.A.

This is a sophisticated jet model aircraft. It must be operated with caution and common sense and requires some basic mechanical ability. Failure to operate this product in a safe and responsible manner could result in injury or damage to the product or other property.

Notice: Do not use incompatible components or alter this product in any way outside of the instructions provided by BVM, Inc. The BVM Yak 130 has been designed and flight tested around 140N class engines. Damage to the aircraft may result from exceeding this thrust limitation (36 lbs).

BVM Products

Received with the Instruction Package that is sent from BVM

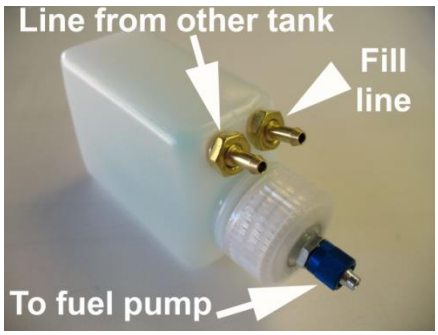
Laser Cut Ply U.A.T. Tray
Laser Cut Ply Gyro Mount
#2 Button Head Screws
Carbon “L” Bracket
#10 Screws to replace Turbine Mounting Screws
8” Tie Wraps for Equipment Board
4” Tie Wraps for Wires and Air Lines
Yak-130 Construction and Operation Manual
Laser Cut Ply Alternate Rear Service Mount

Recommended Accessories

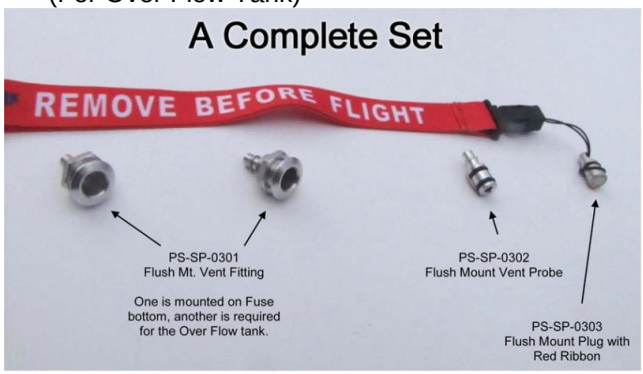
Available at BVMJets.com

You may have some of these products in your shop, but if not, refer to this list.

- ☐ Spektrum 12120 Power Safe Receiver
- ☐ Spektrum X-Plus 8 Expansion Module
- ☐ Demon Aero Cortex Gyro
- ☐ 2 x 7.4v Batteries 3000 mAh each.
- ☐ 140N engine of your choice.
- ☐ BVM UAT — BVM 6044
- ☐ BVM Velcro Package — PA-SR-0081
- ☐ Perma-Grit Rotary Rod (coarse) — RF-6C
- ☐ PermaGrit Sanding Strip — FXT-103
- ☐ BVM “O” Clips — PA-SR-0026
- ☐ BVM Over Flow Tank — BVM 6037
- ☐ Flush Mount Vent Fitting (For Over Flow Tank) — PS-SP-0301
- ☐ Flush Mount Vent Plug (For Over Flow Tank) — PS-SP-0302

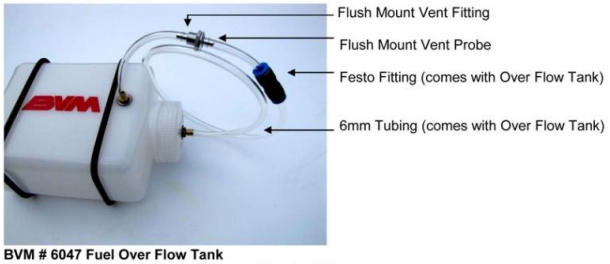


BVM Ultimate Air Trap



A **Smoke System** will require a complete second set of the parts.

Velcro Package



BVM # 6047 Fuel Over Flow Tank
Can be used with Flush Mount fittings or Standard fittings.

YAK 130

List of Adhesives/Lubricants

Available at BVMJets.com

- ☐ BVM Qt Poxy — BVM #9580
- ☐ BVM Aeropoxy — BVM #9566
- ☐ Zap-A-Goo — PT-12
- ☐ Slo-Gap — PT-20
- ☐ Zap-A-Gap — PT-02
- ☐ Pacer Z-42 — PT-42
- ☐ Super O-Lube — BVM #5779
- ☐ Axle Super Lube — BVM #5784
- ☐ BVM Dry Lube — BVM #1947
- ☐ BVM Thin Lube for “O” Rings — BVM #1945

The BVM Thin “O” Lube is the only lube that should be used for any pneumatic system.

Thin Lube and Applicator

Available Options

Available at BVMJets.com

Warbirds 15” Pilot

V-WB 15" Jet Pilot

Required Tools

From Hardware Supply Stores

- ☐ 3mm long driver
- ☐ Metric Allen wrench set
- ☐ 9/64” Long Ball Driver
- ☐ 90° Head Dremel Tool

Unpacking

Carefully remove items from the box. Open each package and inspect for shipping damage. After reading this entire manual, get familiar with the major kit components.

Note: Damaged parts must be reported to BVM within 7 days of receiving your kit.

Become familiar with the work completed at the factory. It is important that you inspect and approve this work now. It is much easier to make changes before the fuselage is assembled.

NOTE: The plastic bubble wrap that protects the parts during delivery can be used on the work bench to protect.

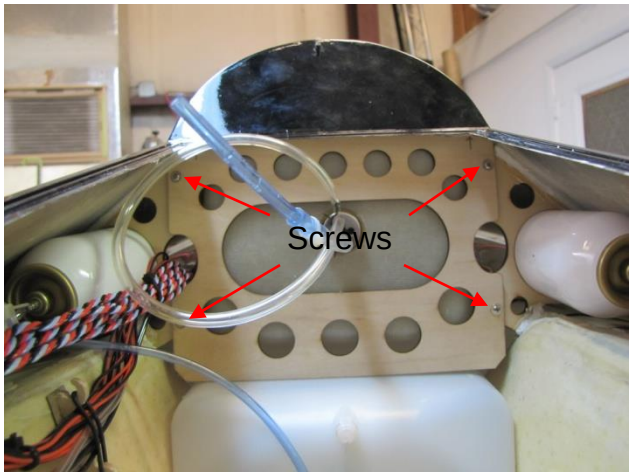
☐ Un-wrap the rear fuselage wires and tubing leaving the bundles as shown.

The 3 bundles are from left to right:

Servo Extension Wires,

Pneumatic Tubing,

Light System Wires.



☐ Remove the Fuel Tank Retention Former by backing out the (4) Phillips head screws.

Joining the Aft Fuse to the Forward Fuse 4 Pin System

See next page for 6 Pin System.

Sequence:

- Test join the 2 fuse sections.
- Then separate the aft and forward sections.
- Install the Inlet Ducts.
- Then join the aft and forward fuse sections.

☐ Access the bag with the (4) fuse aluminum pins and remove the 3mm SHCS from both ends of the aluminum pins.
NOTE: Post January 2016 production models have (6) fuse aluminum pins.

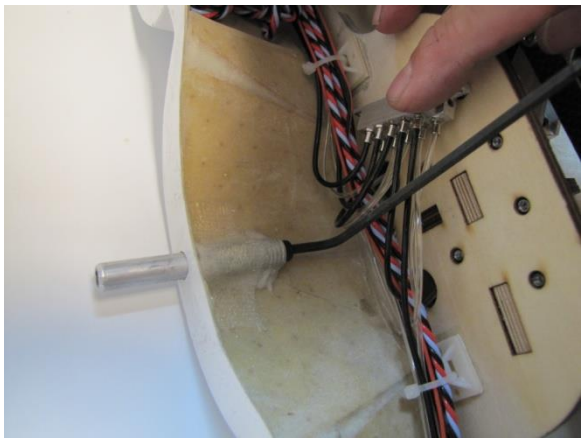
☐ Install (4) Aluminum Joiner Pins at the 12, 3, 6, and 9 o'clock positions of the Aft Fuse section.

☐ Apply Z-42 to each 3mm x13mm, then install from the rear into the aluminum pins.

NOTE: A 3mm "L" Hex wrench works well.

Pin @ 12 o'clock

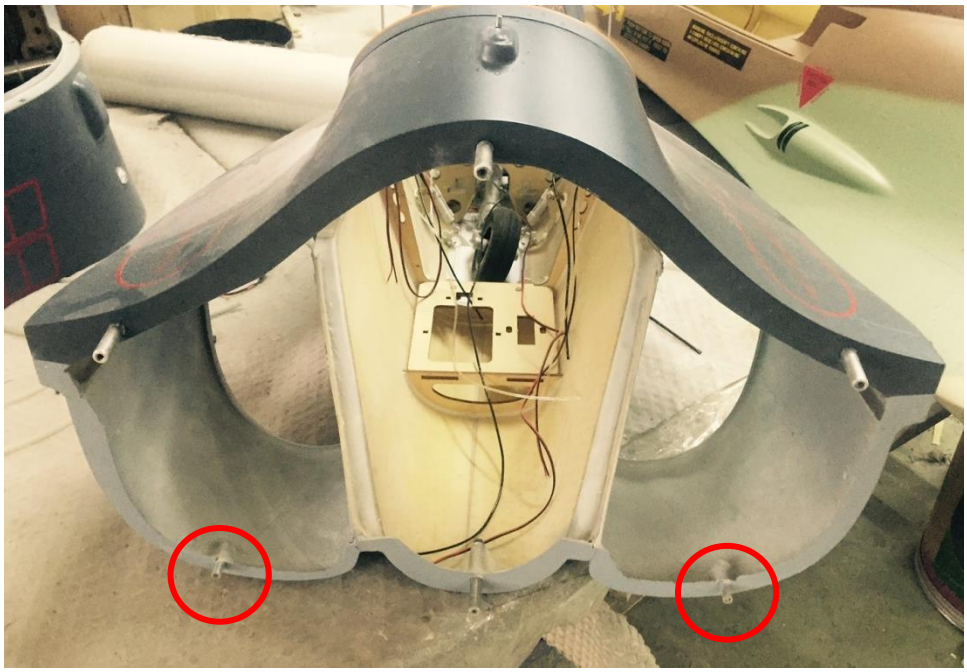
Pin @ 3 o'clock



Pin @ 6 o'clock

Pin @ 9 o'clock

For Post January 2016 models- 6 Pin System



- ☐ Install (4) Aluminum Joiner Pins at the 12, 3, 6, and 9 o'clock positions of the Aft Fuse section. See previous page photos.
- ☐ Apply Z-42 to each 3mm x13mm, then install from the rear into the aluminum pins.

- ☐ Install the final (2) Aluminum Joiner Pins at the 5, and 7 o'clock positions of the Forward Fuse section. This is necessary because the inlets will block access to the pins from the front.

- ☐ Apply Z-42 to each 3mm x13mm, then install from the front into the aluminum pins.

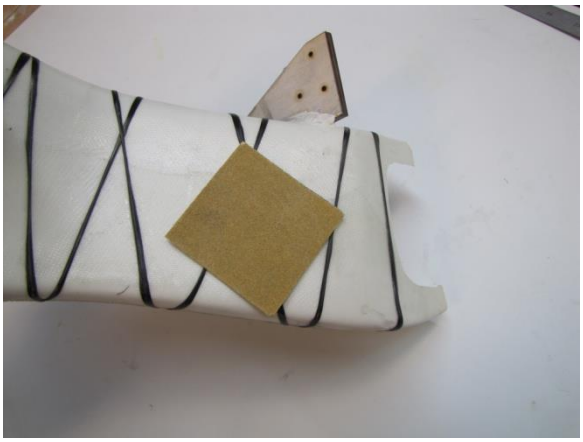
For all models

- ☐ Apply Vaseline to the alignment pins to aid assembly.

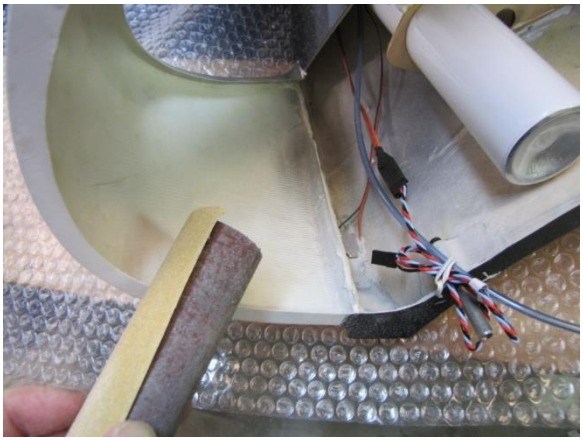
- ☐ On a flat, foam covered surface, carefully align the pins in the Aft section with their receptacles in the Fwd section and slide the fuse halves together and install the remaining 3mm SHCS from the Fwd section. You need to move the Air Tanks to access the 3 and 9 o'clock position screws.

Inlet Duct Installation

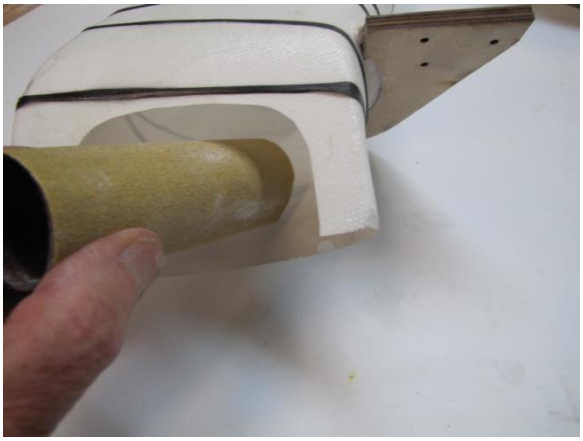
This is the most challenging part of the assembly process. Some modeling skills and experience will come in handy.



☐ Use #80 grit to sand the entire outside of the inlets to remove all sharp splinters and edges of the carbon cord and fiberglass.

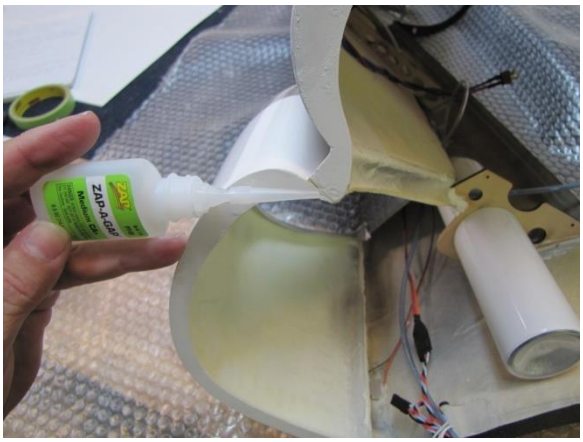


☐ Use a round hand sanding tool, with #80 grit, to smooth the edges of the fuselage flanges. This eases the inlet duct installation.

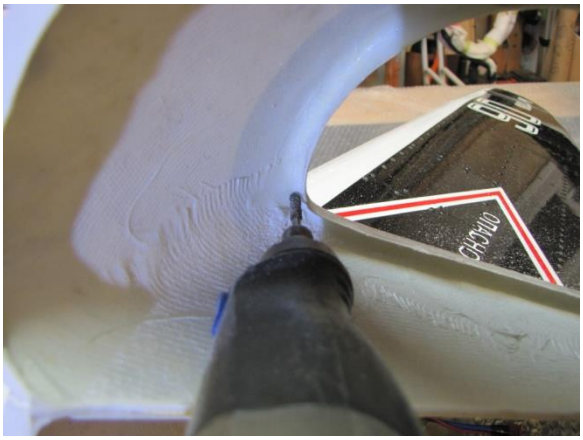


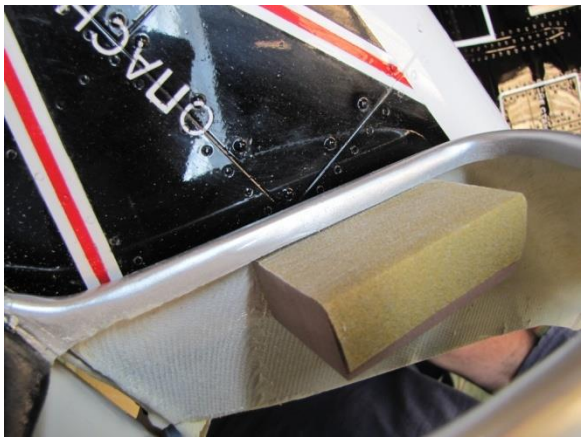
☐ It may be necessary to smooth the inside edges of the inlet duct.

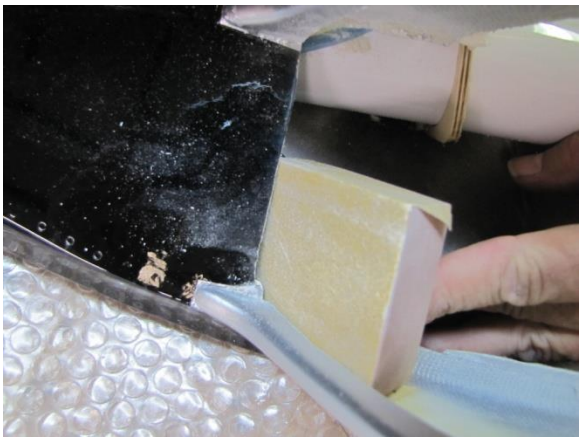
☐ Use medium Zap-A-Gap to glue these lap seams together if needed. They might have gotten jarred during packing and shipping.



☐ Inspect the Inlet Cowl Lip; use a Dremel rotary rod grinder (#RF6C) to remove excess resin globs from the fuselage inlet lip that might interfere with the inlet duct fit.



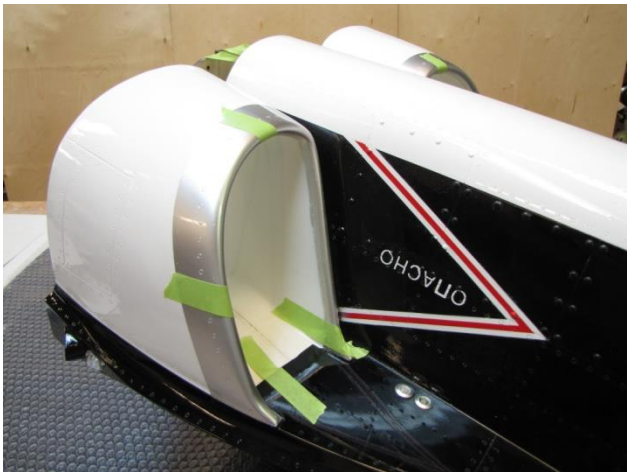




☐ Following the trial fitting of the Inlet Duct, use an #80 grit sanding block to straighten the aft edge of the inlet lips if needed.

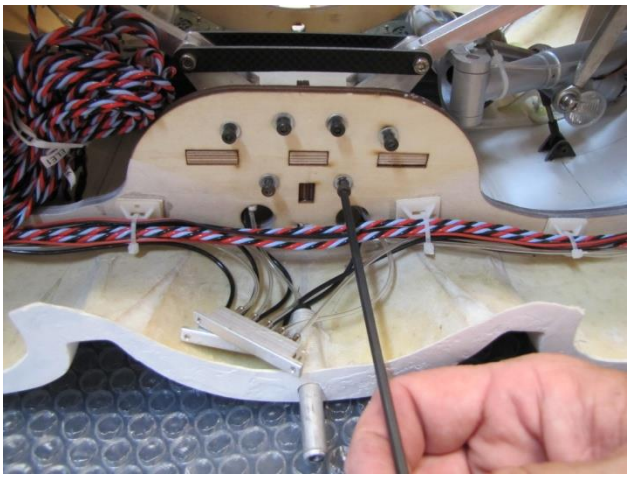
☐ Place the inlet ducts into the Fwd fuse section and tape them to the fuse in 3 or 4 places.

Right Inlet Shown



Left Inlet Shown

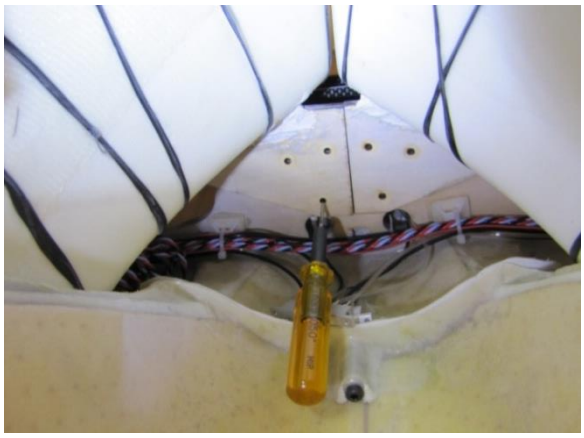
☐ Remove the (6) 2.5mm x 14mm SHCS from the Inlet retaining former in the Aft fuse. A long 2.5mm Hex wrench is handy.



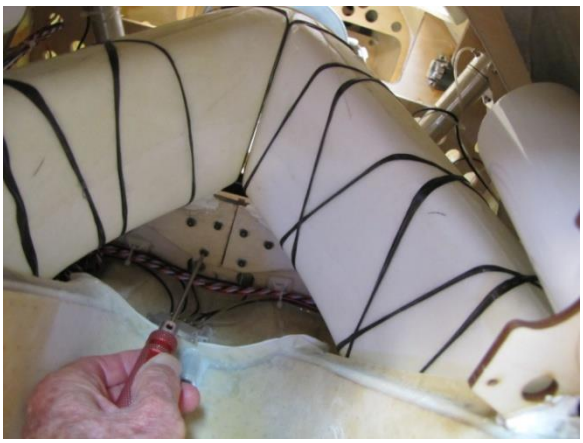
☐ Align the (4) Aluminum pins and slide the fuse halves together.

Apply a thin wipe of Vaseline to the alignment pins to aid assembly.

☐ Use a pointed awl to align the holes in the inlet plywood bracket to those in the fuse former.



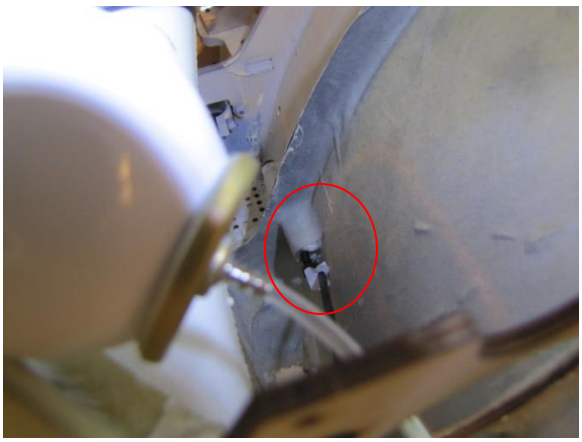
☐ With the awl in one hole set, install (2) 2.5mm x 14mm SHCS per duct side. Remove the awl and install the remaining SHCS.



A Neat Trick

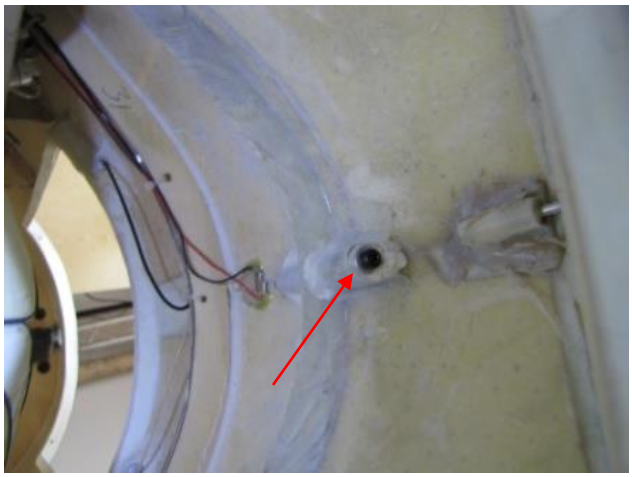
☐ Use a scrap of notepad paper on the bolt head and push the Hex wrench into the socket.

This will help hold the bolt onto the wrench to get it into the tight 3 and 9 o'clock Aluminum pins.



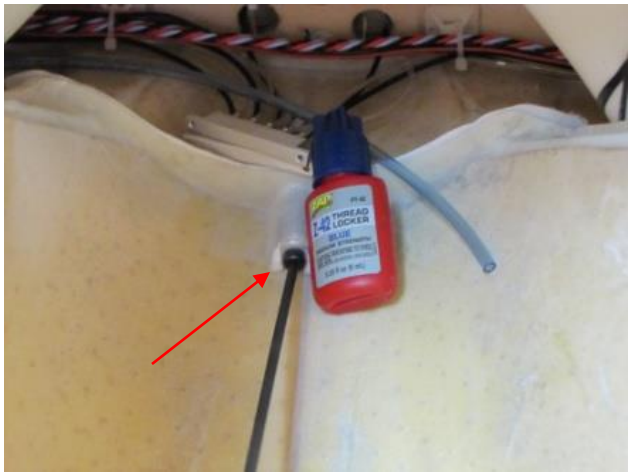
☐ Install the (4) 3mm x 14mm SHCS from the forward side of the fuse half. Access is through the Cockpit opening. Use a drop of Z-42 on each SHCS.

NOTE: Both air storage tanks have been pushed aft at this time to get access to the bolts at the 3 and 9 o'clock positions.

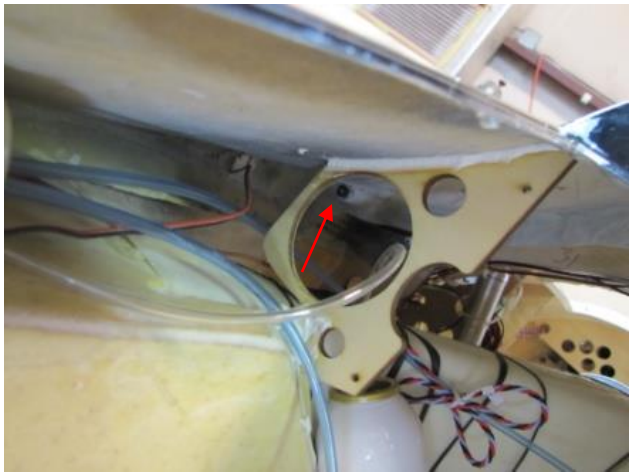


12 o'clock

3 o'clock



6 o'clock



9 o'clock

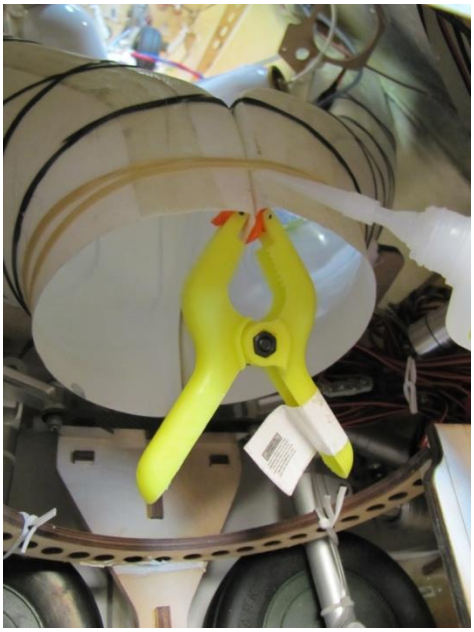
Spot Gluing the Inlet Ducts into the Fuse

(See also next page.)

NOTE: The aft end of the Inlet Ducts is temporarily held together with (2) #64 rubber bands. Use clothes pins or small clamps to hold for cure.

☐ Use Zap-A-Gap or Slo-Zap to glue the Aft bottom and top of the Inlet Ducts at the rear end.

Bottom Joint

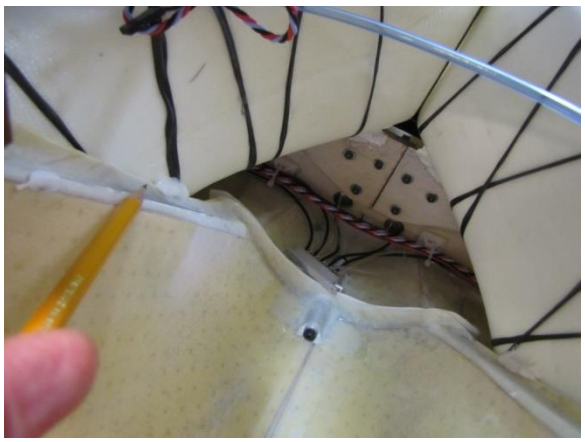


Top Joint

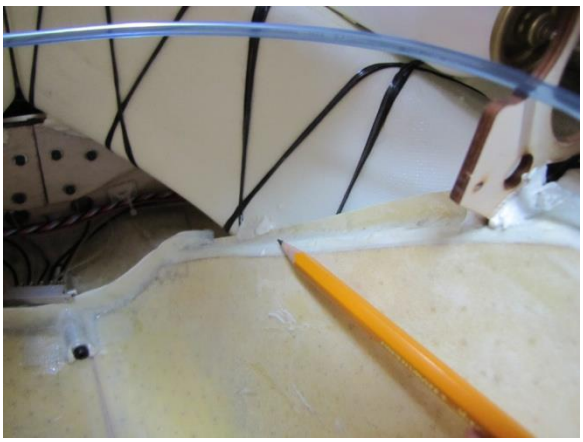
☐ Use dabs of a thickened epoxy glue to secure the Inlet Ducts to the fuse as shown below.

Aeropoxy is convenient for this task.

NOTE: If Inlet Ducts ever need to be removed, use a Dremel fiber cut-off wheel to separate the joint.



Right Side



Left Side

Alternate Method for Gluing Inlets

NOTE: The Aft ends of the Inlet Duct are held together with #64 rubber bands.

☐ For a permanent bonding of the (2) Inlet Ducts, Use Aeropoxy.

☐ Inject a small amount between the aft center flanges of the duct.

☐ Apply to bottom, center span, and top junctions. Wipe excess away.

☐ Hold together for cure with clothes pins or plastic clamps.

☐ Remove the rubber bands.

Bottom

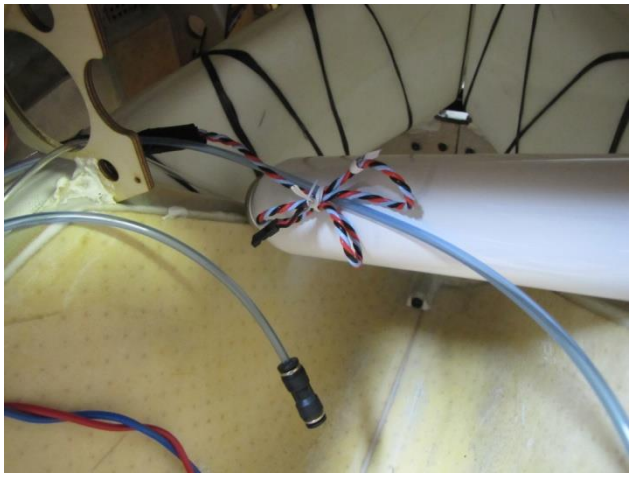
Top

☐ It will be necessary to trim the bottom and top Inlet center web to allow room for the turbine F.O.D. screen. A 90° Dremel tool with a drum sander works well.

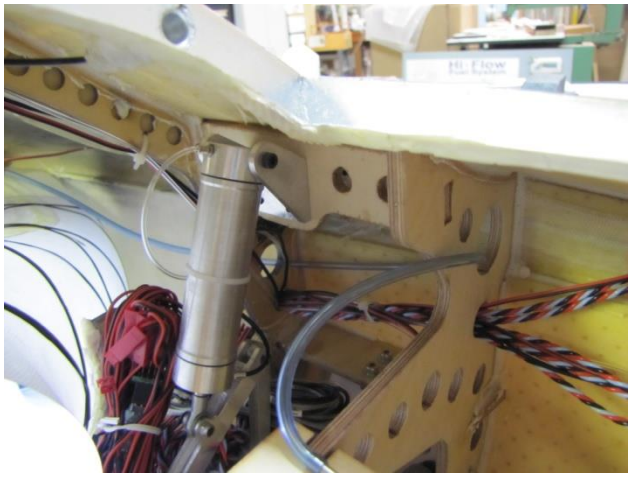
Routing Servo wires, Light wires, and Air Lines

Smoke Pump

NOTE: Some modelers opt to use the smoke tank for extra engine fuel to extend flight time.

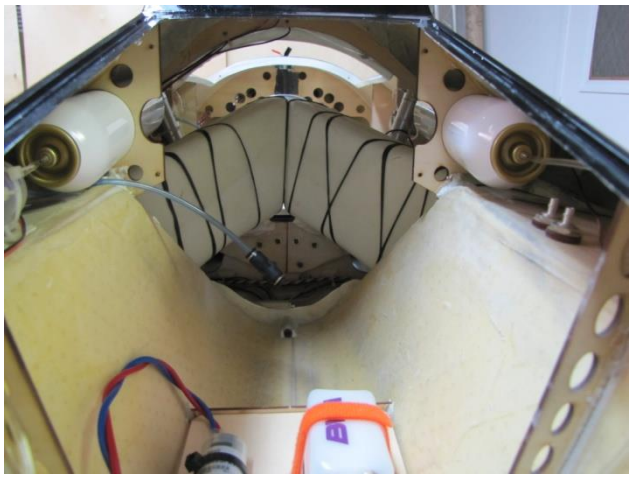


☐ Separate the smoke pump servo wire from the smoke pump oil line and route the servo wire forward towards the nose of the aircraft.



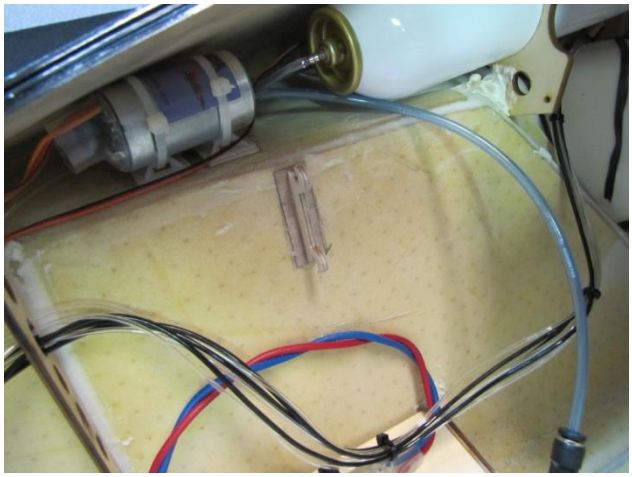
☐ Route the blue smoke oil line aft through the (2) formers and connect to the pre-installed metal smoke line.

☐ Place the Air Tanks back into their original positions.

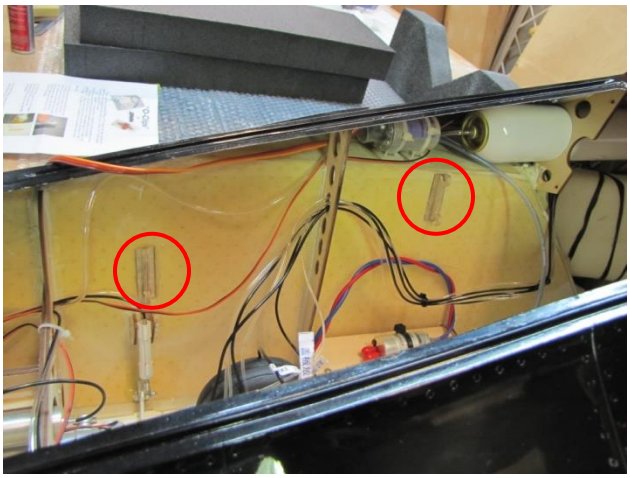


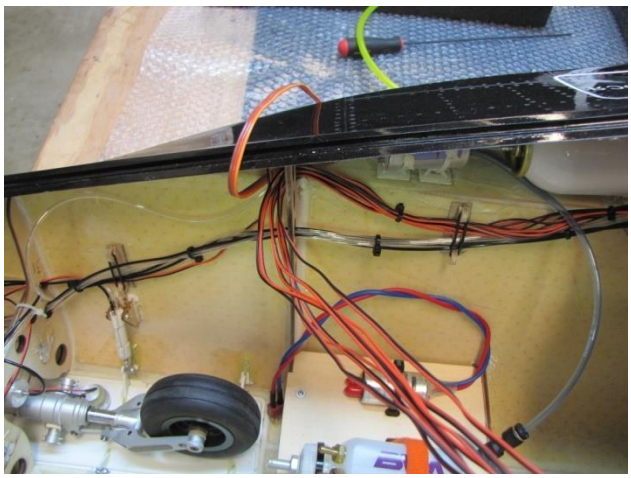
Air Lines

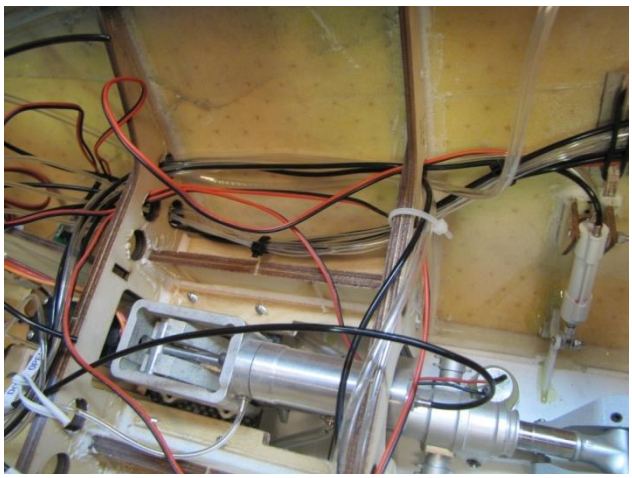
☐ Unwrap the bundle of Air Lines and route them forward and through the former as shown.



☐ Install (2) of the Large BVM “O” Clips (part # PA-SR-0026) at the locations shown in the photo.







☐ Use 4” Tie Wraps and BVM “O” Clips to secure the Air Lines. Continue to route forward as shown.

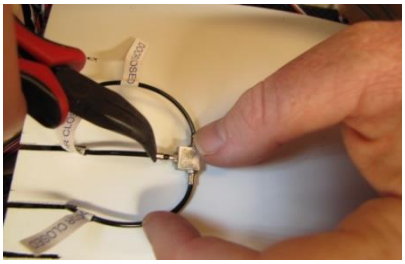
Connect the Air lines to the Air Valves

☐ Connect the clear “BRAKE” line to the top of the Brake Air Valve. Use the 2mm Air Line Collars provided to secure the Air Line to the Valve.

Slide the chrome collar over the tube; slide the tube onto the fitting, slide the collar over the fitting to secure. Do not allow the tubing to slide too far over the barb.

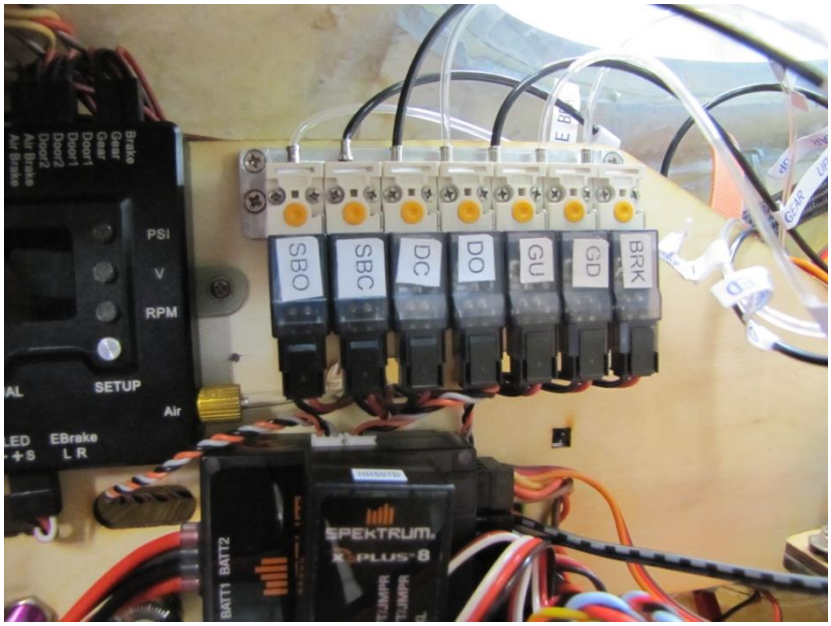
Important! Do not use wire cutters to grab the collar, they will crush and damage the fitting.

Hint: Warm the tubing with a heat gun to help the collar slide over the tubing.



☐ Connect the black Air Line labeled “THEN TAKE IT BACK” to the top of the Speed Brake Close Air Valve.

☐ Connect the clear Air Line labeled “RELEASE BRAKE” to the top of the Speed Brake Open valve.



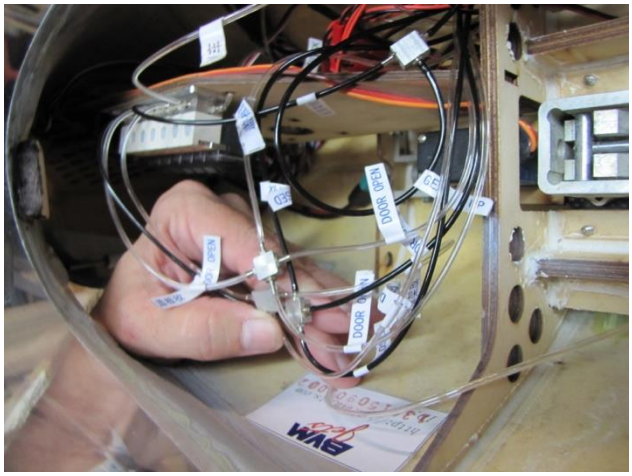
From Left to Right:

Speed Brake Open
Speed Brake Close
Doors Close
Doors Open
Gear Up
Gear Down
Brake

Connect the Air Line 3 way/4 way Blocks

NOTE: Use the 2mm Air Line Collars to secure connections.

- ☐ When installing the Air Lines, place the black “DOOR CLOSED” line onto the “4 way block” with the other black “DOOR CLOSED” air lines.
- ☐ The clear “DOOR OPEN” line onto the “DOOR OPEN” 4 way block.
- ☐ The black “GEAR UP” line onto the “GEAR UP” 3 way block.
- ☐ And the clear “GEAR DOWN” line on the “GEAR DOWN” 3 way block.



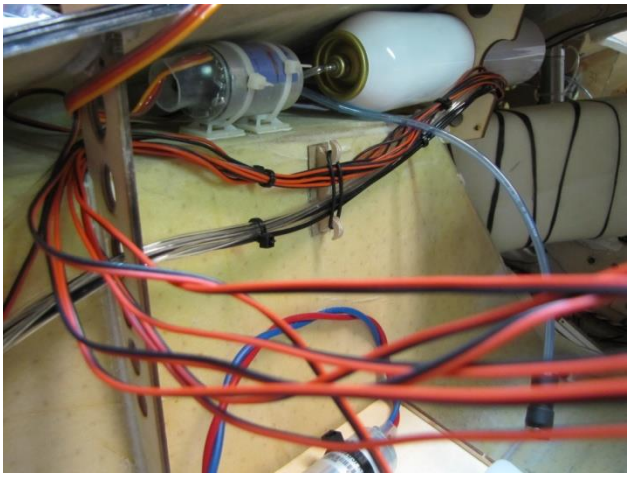
Light Wires

- ☐ Untie the bundle of light wires from the aft side of the fuse joint.

  Do not disconnect any of the boards at this time.

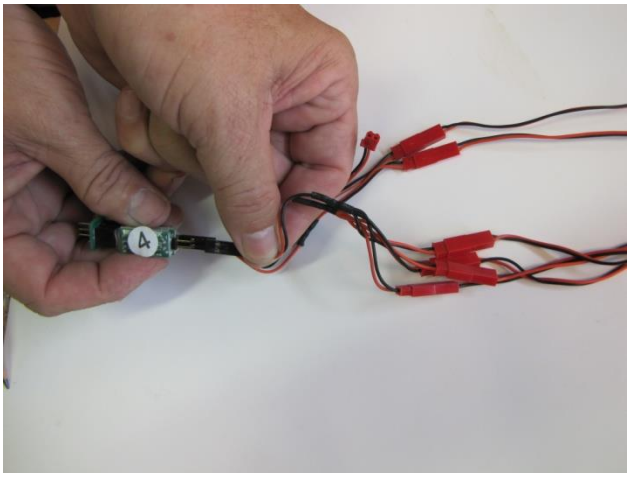
Picture of the Light wire shows a single #4 wire/circuit board, a #4 bundle wire set and #2 bundle wire set attached to a common circuit board.

☐ Route all the wire sets forward through the fuse as shown. Use the “O” Clip installed during the Air Line portion to secure to the fuse side wall.

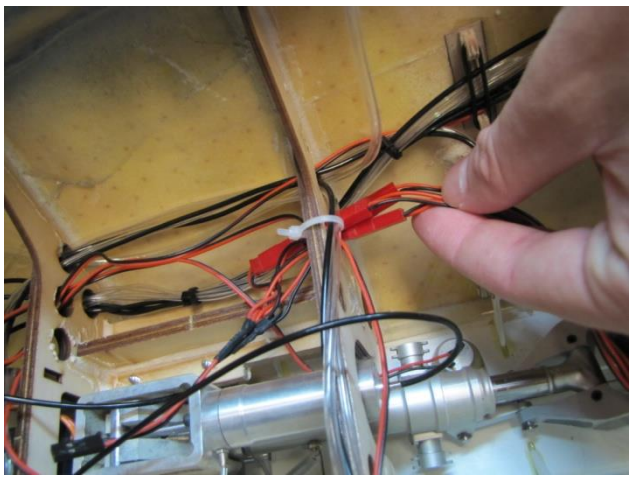


☐ Disconnect the #4 circuit board from the (4) wire bundle.

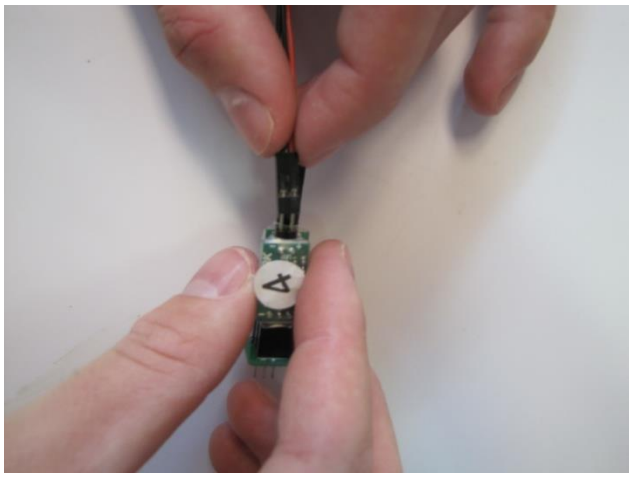
Do not route the single #4 set at this time.



☐ Route the (4) wire bundle, through the Nose Gear Former as shown.

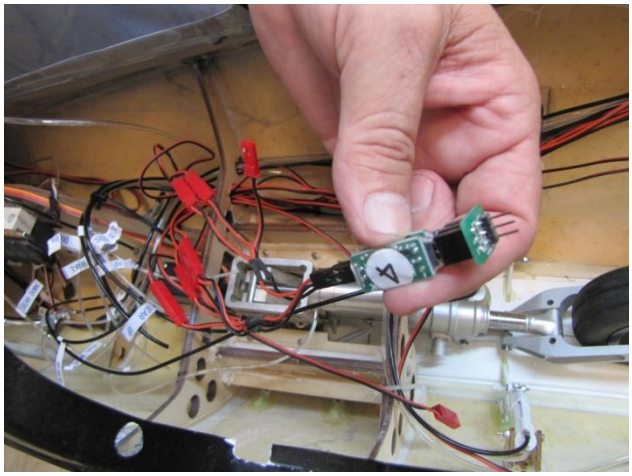


- ☐ Plug the (4) wire bundle into the #4 circuit board.
- ☐ Disconnect the #2 circuit board and route the wires as in the previous step.

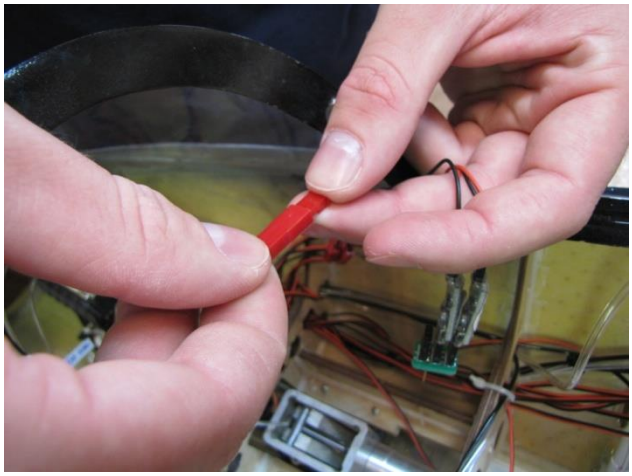


- ☐ Continue routing the #2 wires through the next former as pointed to by the pencil in the photo.

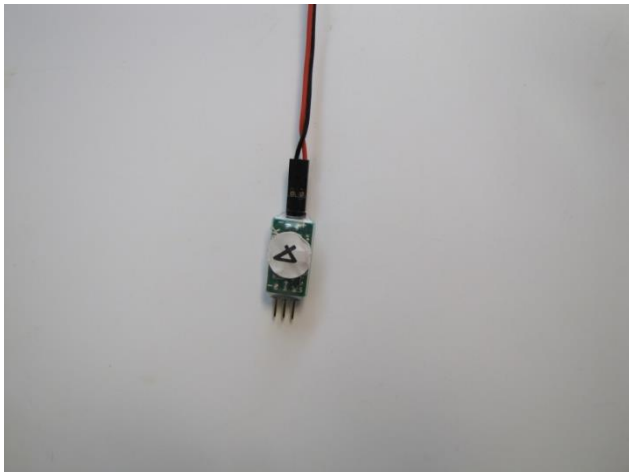
- ☐ Reconnect the #2 wires into the #2 circuit board.
- ☐ Again, disconnect the #4 wire bundle and route it through the same place as the #2 wires. Then reconnect to their circuit board.



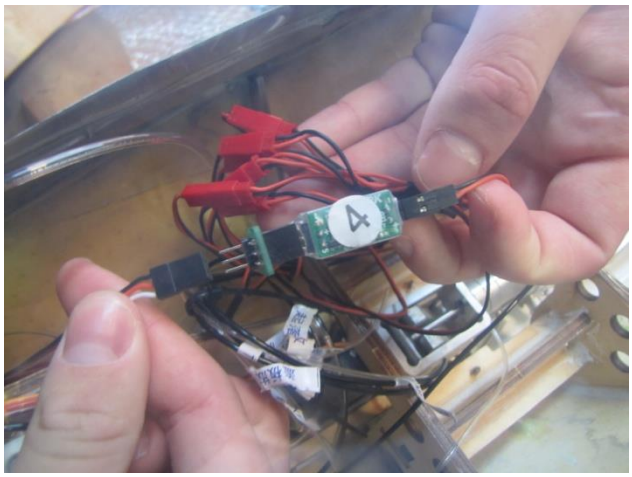
- ☐ Locate and connect the Nose Gear Landing Lights wire to the matching JST RCY connector coming off the #2 circuit board.



- ☐ Locate the single #4 circuit board and route the wires using the same methods as the previous wire sets.
- ☐ Connect this set to the remaining(open) slot on the common circuit board along with the #4 and #2 bundles.

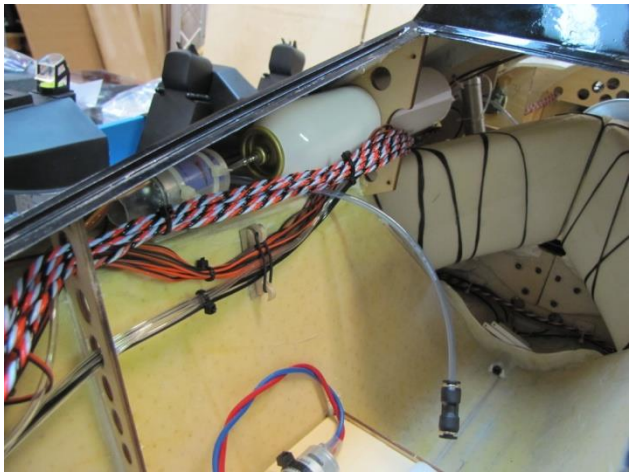


- ☐ Locate the servo lead wire from the “LED” slot on the Central Controller and connect it to the common circuit board containing the #2 and #4 circuit boards.



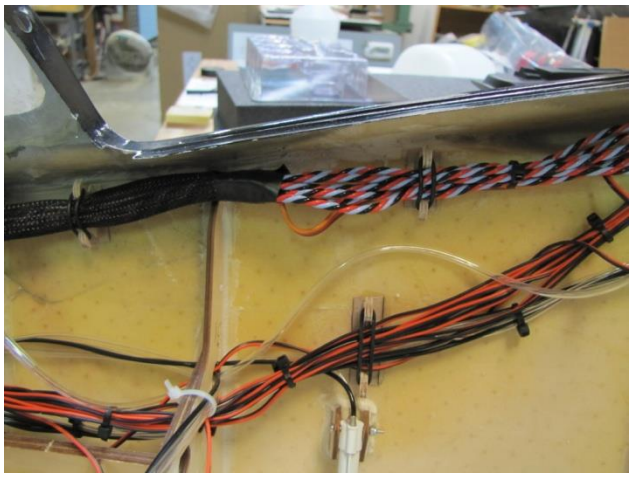
Servo Wires

☐ Untie the bundle of servo wires and route forward as shown. Use 4” tie wraps to hold the wires neatly in place.

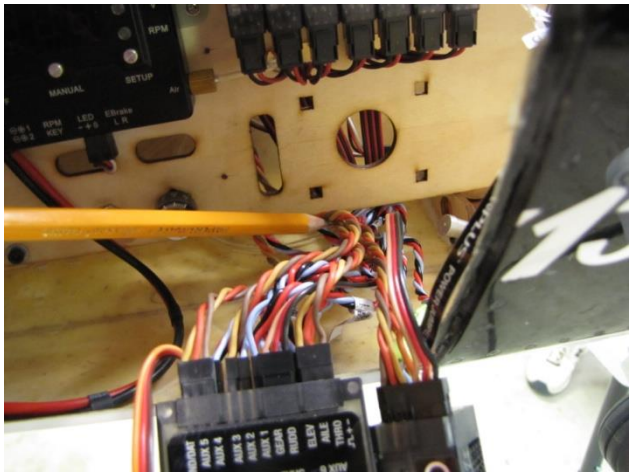


☐ Add a 12” piece of Wire Loom (BVM# PA-SR-0026) to cover the wires at the front cockpit area.

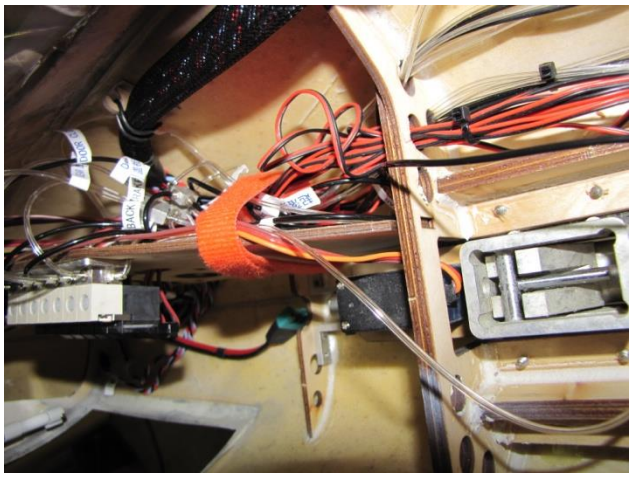
☐ Install (2) small “O” Clips in the areas shown to secure the wires to the fuse.



- ☐ Route the wires under the former containing the Central Control Module to allow connection to your receiver.

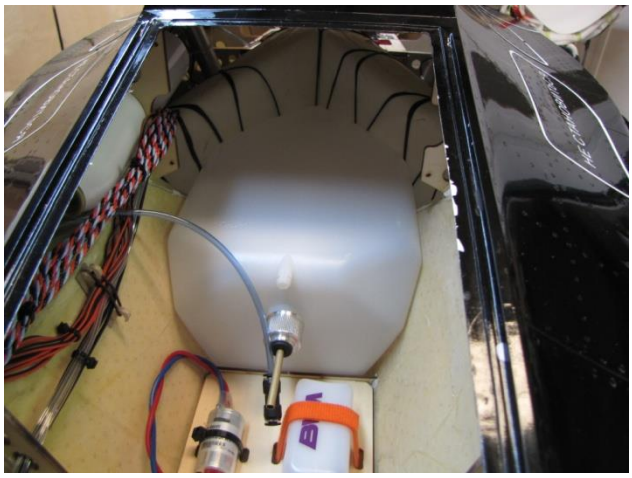


- ☐ A 12” piece of Velcro works great to bundle the wires and air lines. This keeps them out of the way of the cockpit.



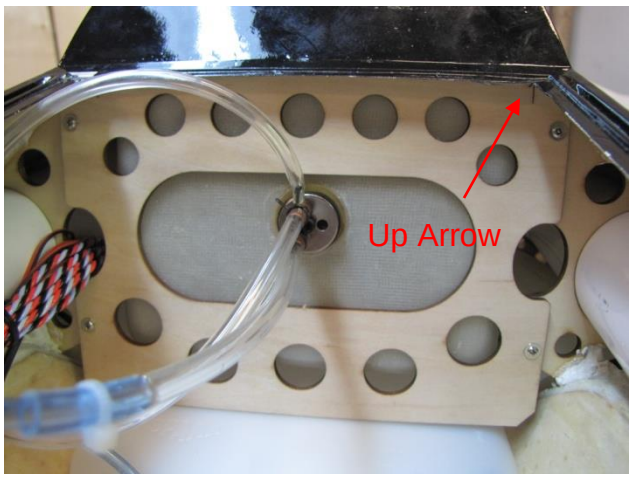
Fuel/Smoke Tank

NOTE: Please read Cockpit installation portion of this manual to have an understanding of the clearances for the tubing.



☐ Place the Main Fuel Tank into position.

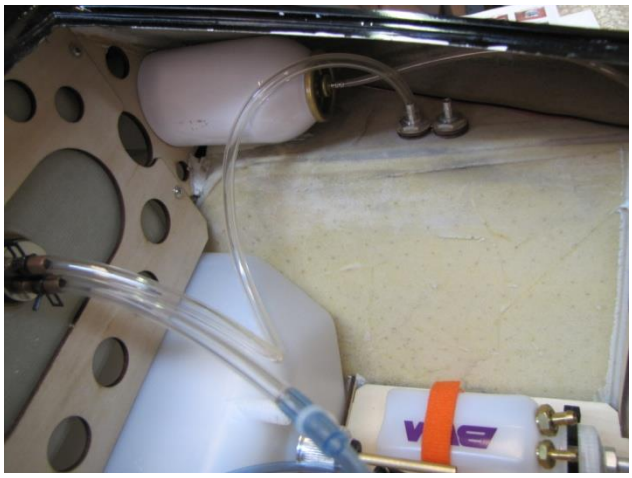
☐ Place the Smoke Tank into the space above the Main Tank. Make sure to identify the overflow vent tube from the clunk tube.



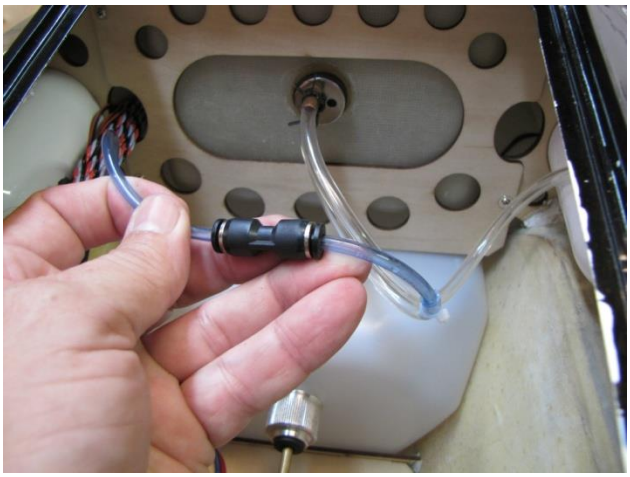
☐ Install the Smoke Tank Retention Former using the (4) Phillips head screws. Notice the up arrow.

IMPORTANT:
Check that the clunks flop around freely in the tanks. Re-check this if the model has ever been held or transported nose down.

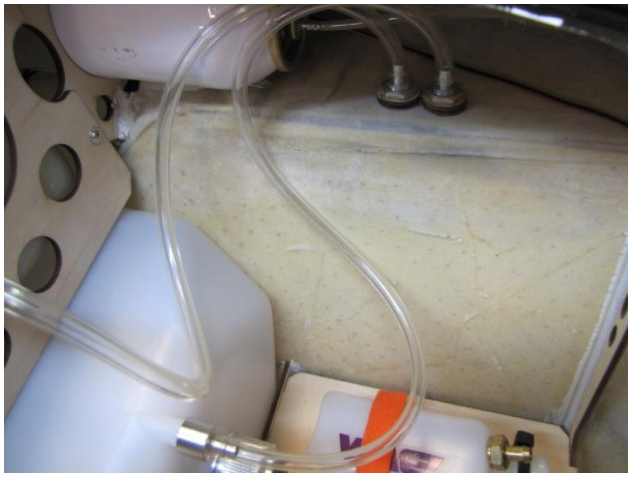
☐ Connect the Smoke Tanks overflow/vent tubing to the aft Flush Mount fitting.



☐ Connect the Clunk line tubing (the tube with the blue tubing) with the Festo fitting from the smoke pump. Use enough tubing to allow clearance for the Cockpit Tub.



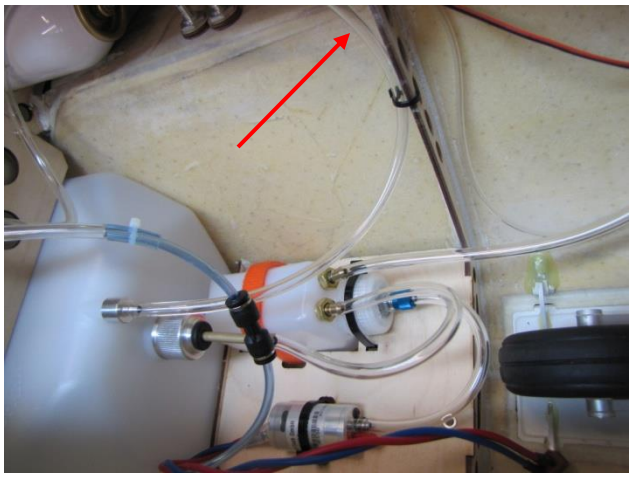
Connect the Main Fuel Tank overflow/vent tubing to the forward Flush Mount fitting.



☐ Install the BVM U.A.T. (follow the U.A.T. instructions) and the turbine Fuel Pump onto the BVM supplied tray.

☐ Connect the Main Fuel Tank Tubing to the U.A.T. Connect the U.A.T. to the Fuel Pump. Make sure the retracted Nose Wheel does not interfere with either tubing.

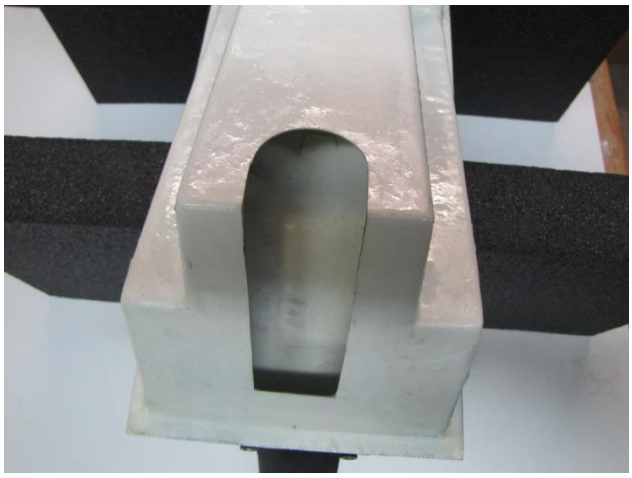
NOTE: The routing of the turbine fuel line from the fuel pump is discussed later in this manual.



☐ Connect the Fuel Fill Line to the Fill Line fitting on the U.A.T. Make the fuel line long enough for convenient fueling access.

See also page 33 for alternate fueling servicing.

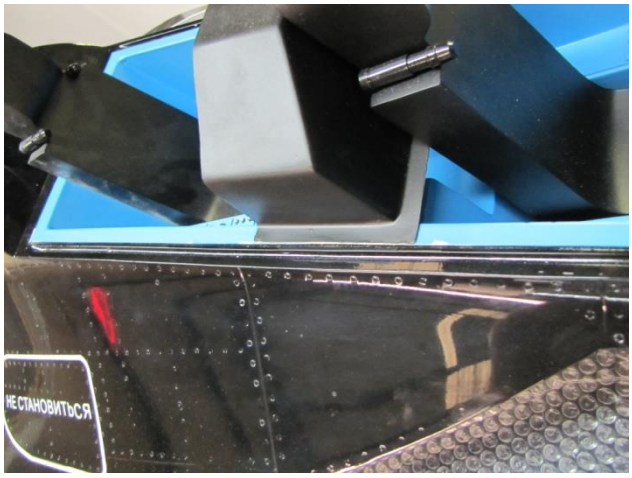
Cockpit Installation



☐ This opening in the cockpit tub allows clearance for fuel tank tubing.

YAK 130

- ☐ Test fit the Cockpit to make sure the fuel lines do not interfere. Make any adjustments necessary to fuel line placement for a proper fit.



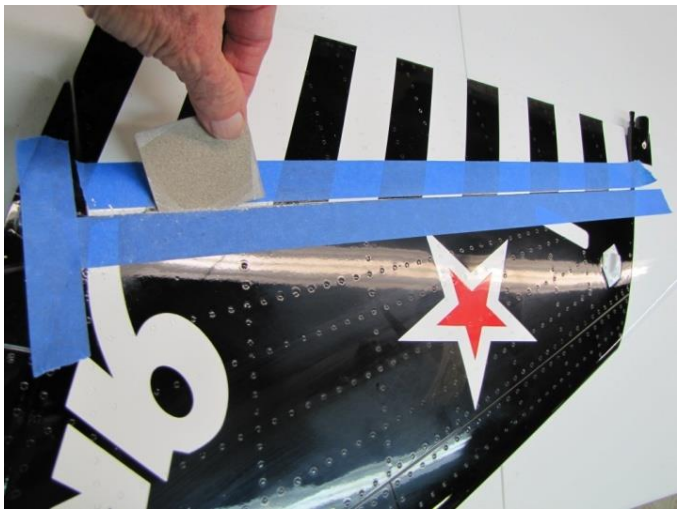
- ☐ There is a wood block that captures the front edge of the cockpit tub.

- ☐ To install the pilot(s) you will need to shorten the legs to fit into the space.

Vertical Fin and Rudder

The Yak 130's Fin/Rudder is very easy to remove for transit purposes. Just (2) screws and (2) electronic plugs are used to mount/release them. Use a 9/64 hex head wrench to loosen/tighten the screws.

The Fin and Rudder come out of the box ready to mount.



The rudder should travel 1-1/4" left and right measured at the top. If your Yak rudder travel is a bit shy, the following technique will help.

- ☐ Apply masking tape as shown to protect the painted surfaces.
- ☐ Use Perm-Grit #103 (BVM# FXT-103) Flex Strips cut to about 2" in length to grind a bit of the fin trailing edge away.

- ☐ The rudder control arm is accessed from a hole in the left side of the fin. Tighten it securely with a 3/32" hex wrench.
- ☐ Apply Dry Lube to the carbon rods and mating aluminum bracket receptacles. Connect the light and servo plugs. Slip the Fin Rods onto the receptacles. Securely tighten with the 9/64" Hex wrench. Holes in the fin base provide access.

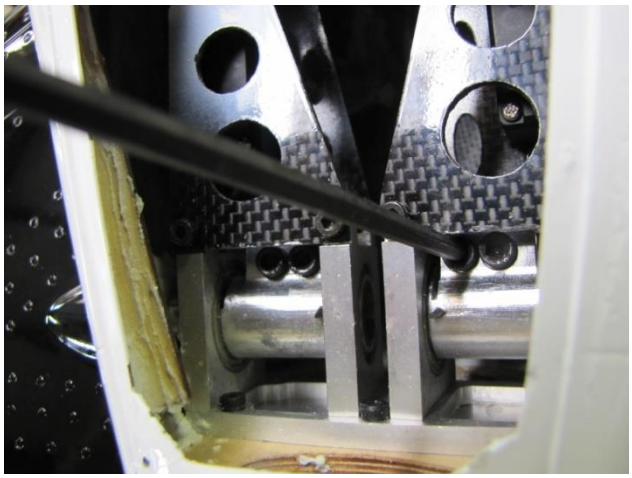
"Dry Lube" is a very handy product for all mechanical joints and has good anticorrosion properties.

- ☐ Apply a drop or two of BVM's Dry Lube (#1947) to both metal ball links and a drop of Z-42 to the servo arm screw.

Stab Installation

☐ Remove the access cover on the bottom of the fuse below the Stab area. The access cover is held in place with (4) Phillips Head Screws.

☐ Insert the Stab tube, aligning the slot on the tube with the pin in the receptacle. Do this for the left and right Stabs.

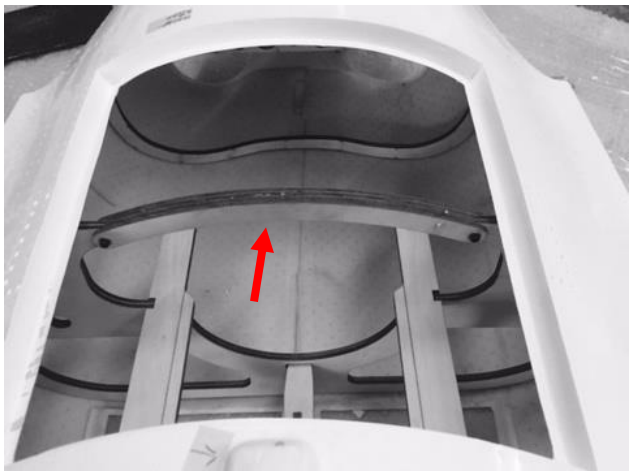


☐ Tighten the (2) screws securely on each of the Stab Brackets with a 9/64 hex wrench.

☐ Replace the access cover.

Turbine Installation

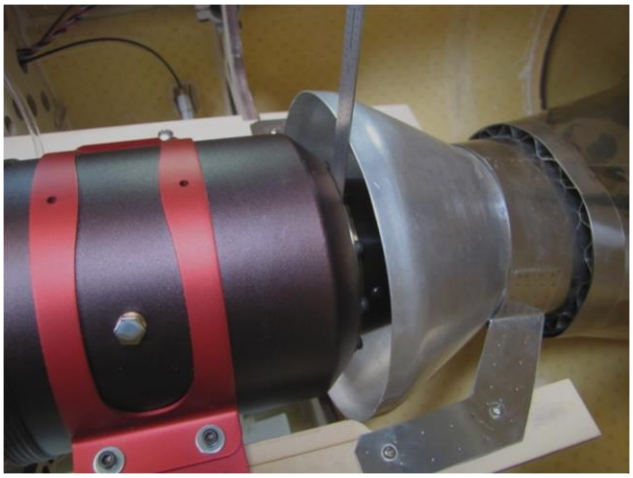
☐ Remove the Arch Brace shown in the photo. It can be re-installed after the engine is mounted.



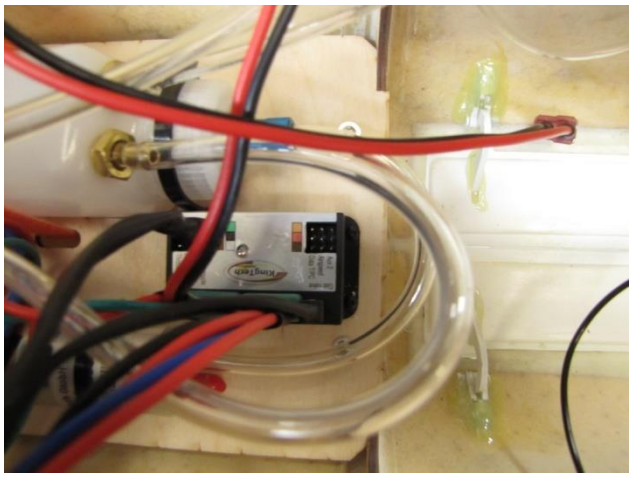
☐ Drill a small hole (1/16”-3/32”) on each side of the main gear door formers for accidental fuel over flow exit points.

☐ With the same drill. Drill through the Tailpipe bell and the bottom of the fuse for another fuel spill exit point.

☐ Install the F.O.D. Screen onto the turbine. Then angle the motor down into the tailpipe and then straighten it out into the Inlet.

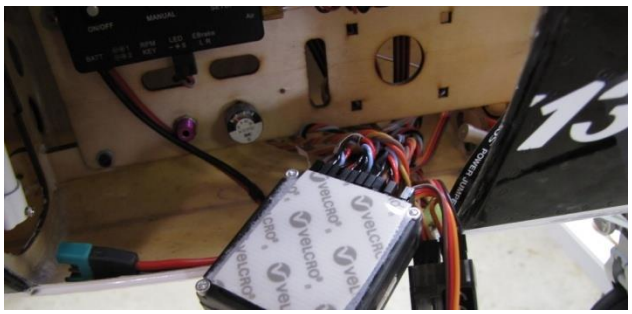


☐ Adjust the motor per the instructions provided with your turbine. Look through the tail pipe to assure that it is positioned center and straight in the tailpipe opening. Mark and drill pilot holes for the turbine mounting screws supplied with your turbine. Coarse thread wood screws suffice to mount the turbine to the plywood. After screws have been set, remove each and treat the hole with thin C.A. to toughen the threaded holes in the plywood.



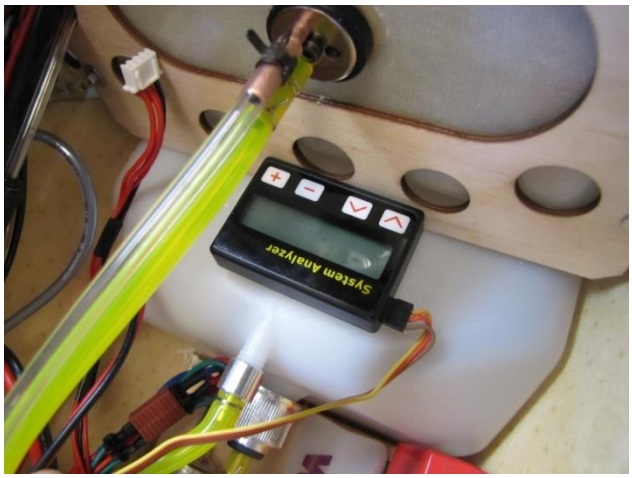
☐ To install the turbine ECU, BVM used the space on the UAT mount tray. It is convenient and does not interfere with the cockpit tub.

Photo show's location of the factory installed Air Fill Valve and Air Pressure Gauge in the forward accessory hatch.

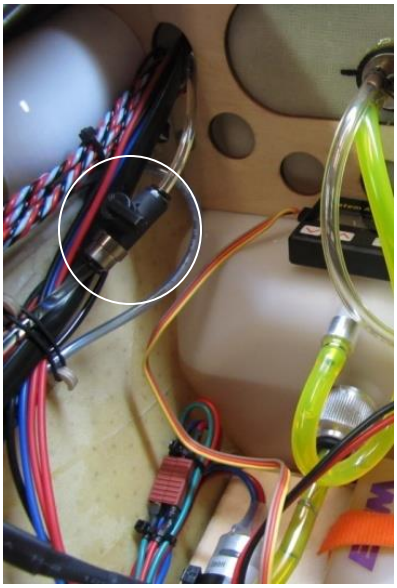


YAK 130

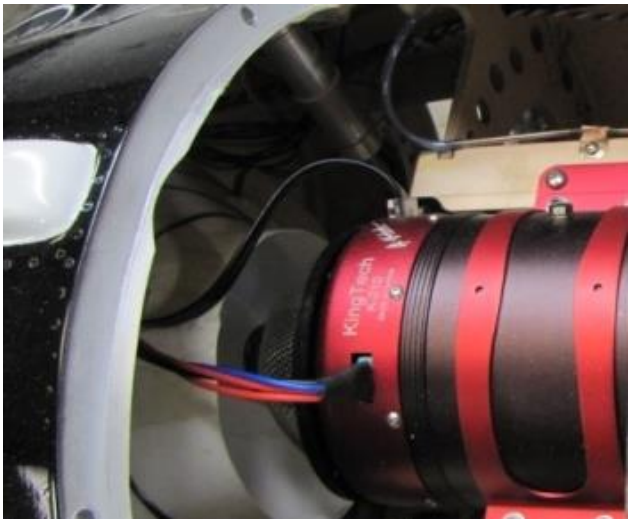
NOTE: This set-up requires the Cockpit Tub to be removed for fueling and starting engine. See Alternative System on following Page.



- ☐ At BVM, we like to run the engine with the System Analyzer/GSU always handy. The advantage of this is that you can always access the internal diagnostics when needed. We located ours on top of the main tank using Velcro for quick access. Observing the numbers (especially the E.G.T.) during start-up is a good safety practice.



- ☐ Install the fuel filter in a vertical position on the fuse wall. Route the fuel line from the fuel pump to the filter.
- ☐ From the filter, install the on/off valve in the area aft of the “O” clip prior to exiting the forward fuse area. Use the “O” clip to secure the fuel tubing in place. Exit aft to the cockpit area through the same location as the servo wires and route.



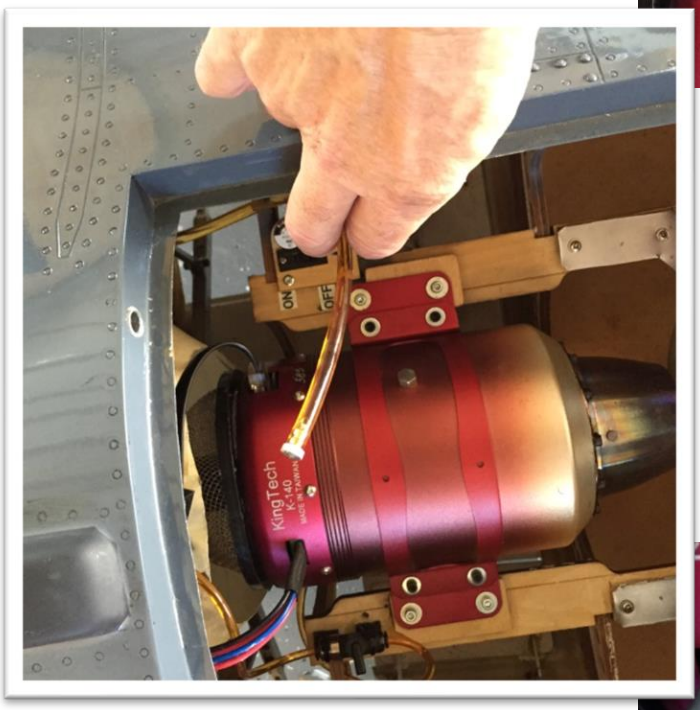
- ☐ Use a small “O” clip on top of the Inlet to route and secure the Turbine Fuel, Power, and ECU cables and plug them into their respected locations.

Alternate Equipment Service Location

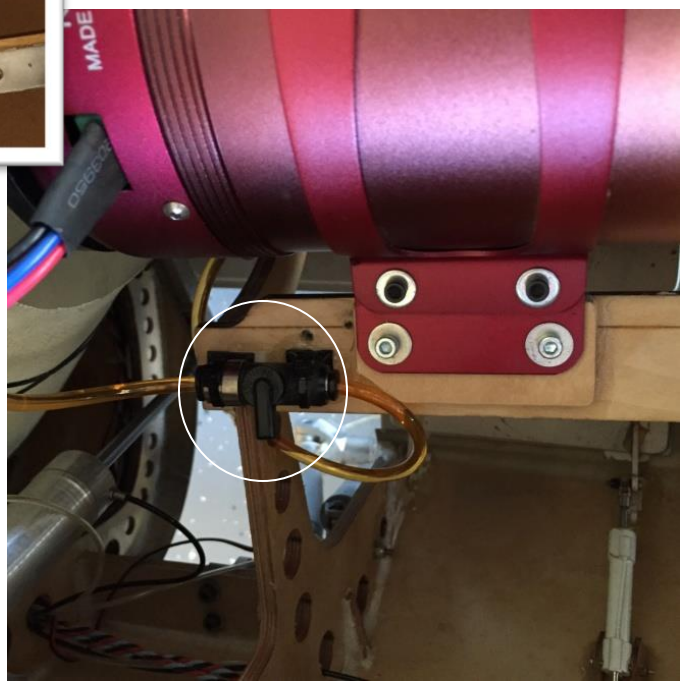
With Speed Brake Hatch Removed

Note: Spacer blocks under Turbine mount are not required for production models.

The Air Fill Valve along with the Air Pressure Gauge and Receiver On-Off Switch can be relocated to the engine area for an alternative start-up operation.

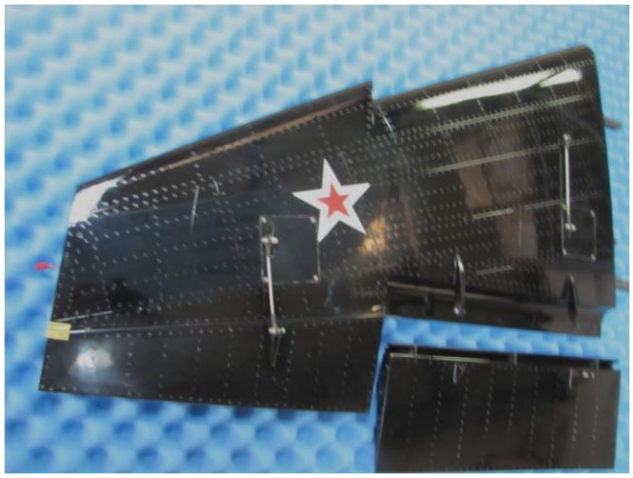


The Fuel fill line and the fuel on-off valve were also relocated to the same location as shown in the photos.

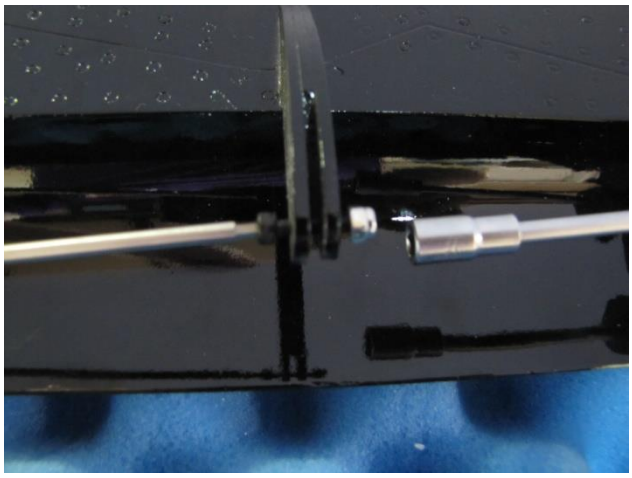


Wing Prep and Installation

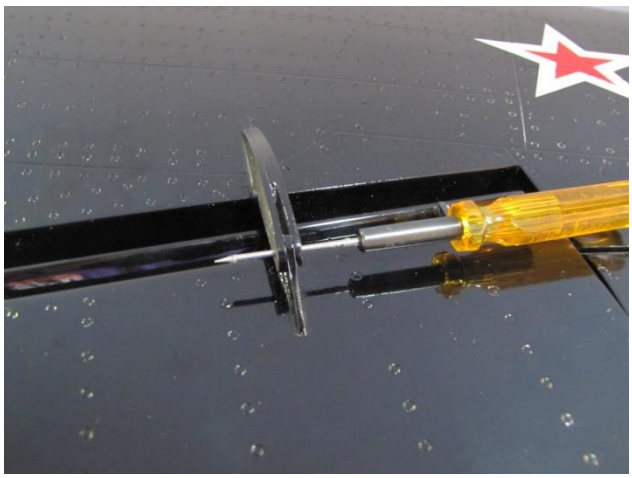
Flap Install



☐ Match up the Wing with the correct Flap. The large control horn is the inside hinge and control horn. The small horn is a hinge only.



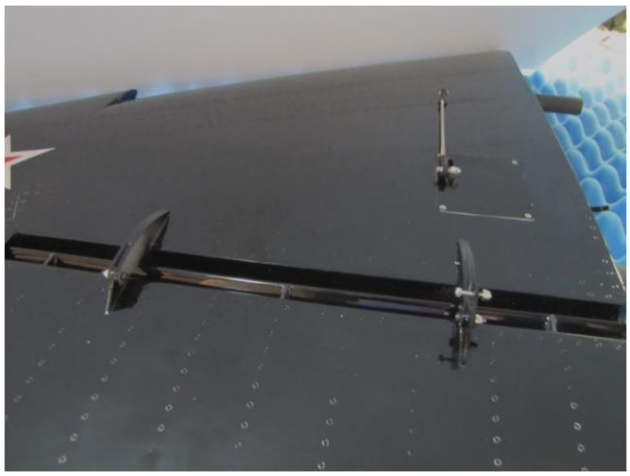
☐ Remove the (2) 2mm SHCS and (2) 5mm lock nuts from the wing side of the Flap hinge.



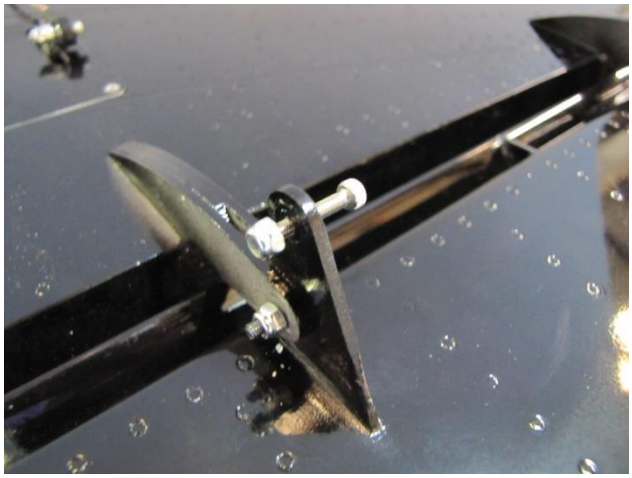
☐ Use a small awl to line up the horns.

☐ Install the (2) 2mm SHCS and (2) 5mm lock nuts.

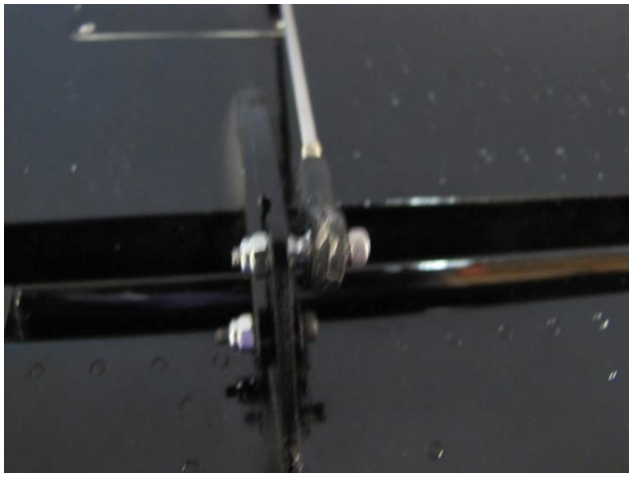
DO NOT OVER TIGHTEN, the flaps need to move freely.



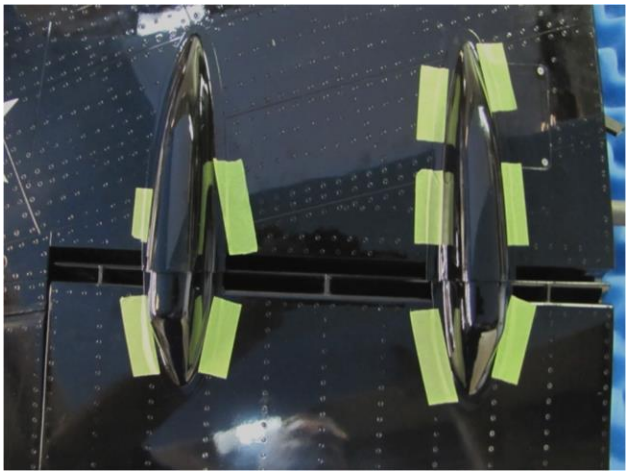
☐ Remove the 2mm SHCS and 5mm lock nut from the top of the Control Horn.

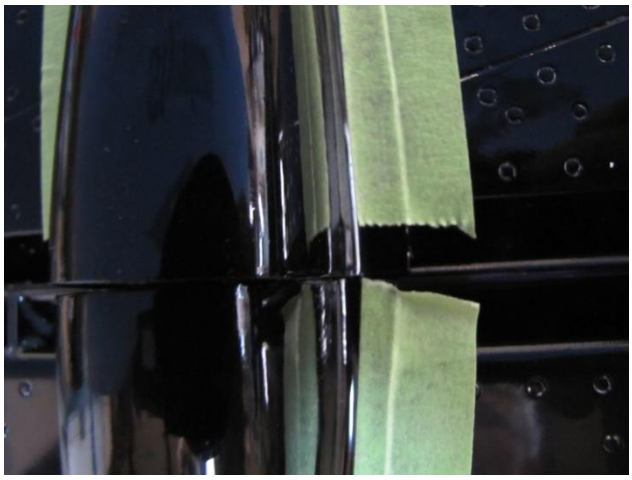


☐ Insert the 2mm SHCS through the ball link and then through the control horn. Install the 5mm lock nut securely.



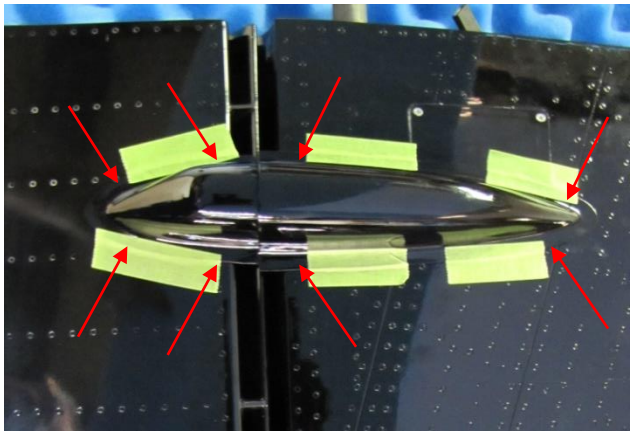
Flap Actuator Fairings



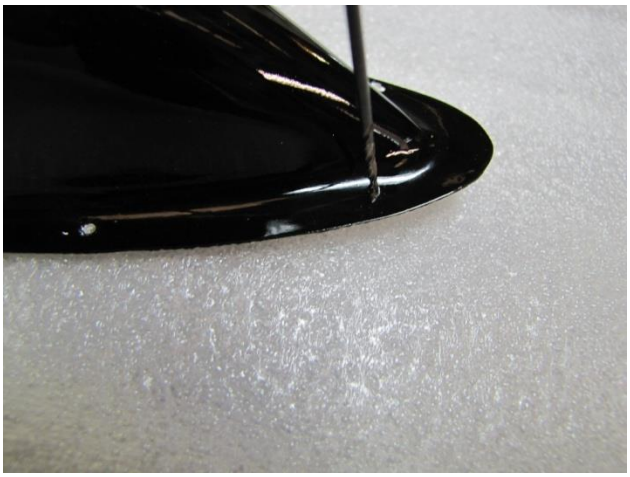


☐ Tape in place the (2) large (6”) and (2) small (3”) Flap Actuator Fairings. The leading edge of the small fairing is centered over the leading edge of the Flap. The trailing edge of the large fairing is located by a 1/16” overlapping of the leading edge of the small fairing.

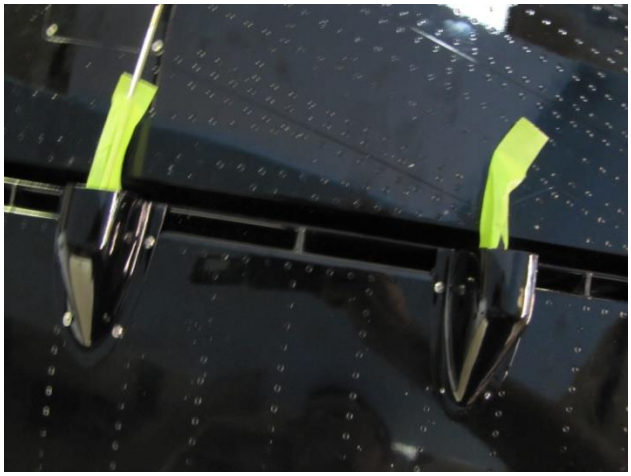
☐ Drill (4) small pilot hole through each of the Flap Actuator Covers and wing surface. Locate the holes centered in the flanges of the covers about where the arrows are. Try to use locations in line with the rivet marks on the wing surface. Be sure to avoid the servo cover area.



☐ Remove the fairings one section at a time and slightly enlarge the pilot holes to allow clearance for the attaching screws.

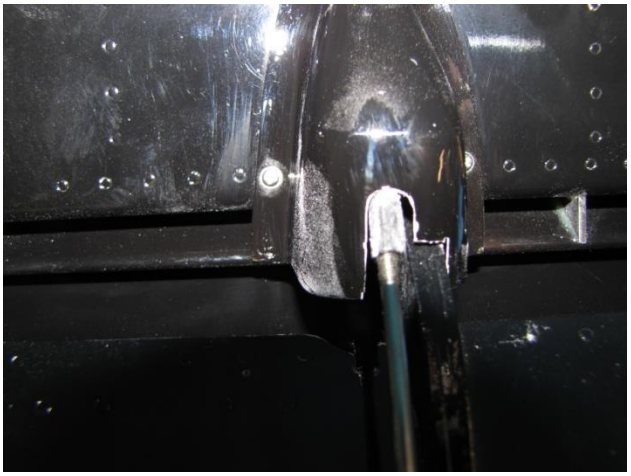


☐ Install the small fairings using the small Phillips screws supplied. Tape off the hinges, and control rod to protect them.



☐ Trim the small fairing to allow it to move properly. Remove small amounts and test repeatedly until a desired movement is achieved. You will need to notch for the hinge and the control rod clearance on the inboard fairing.

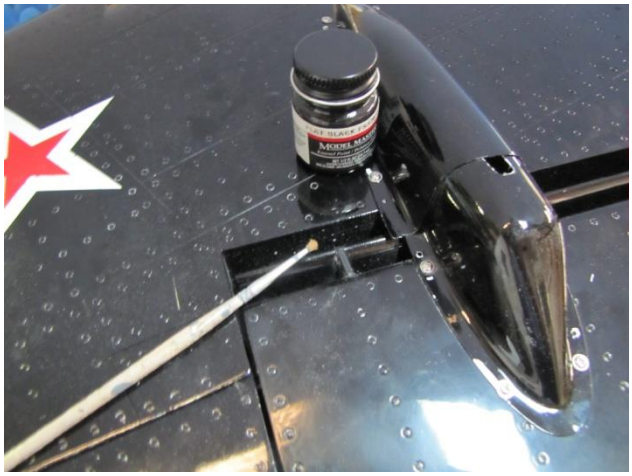
See Flap Deflections page 52.



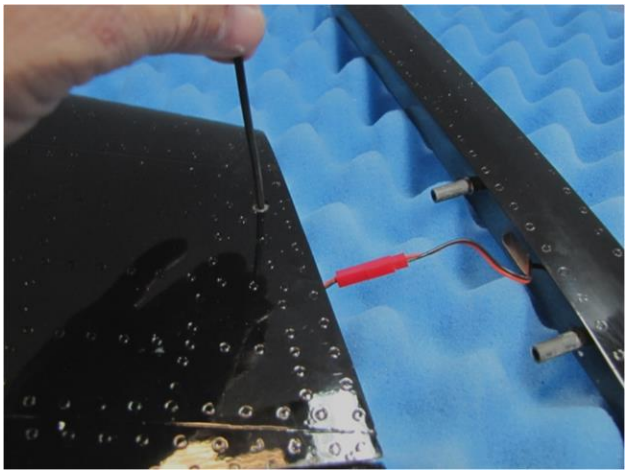
☐ Install the large fairing with the screws provided.

Repeat the steps for each of the Flap Actuator Covers on both wings.

☐ Use Model Masters (or similar) paint to color the screw heads and notches in fairings. Also touch-up the Aileron metal rod and servo arm.

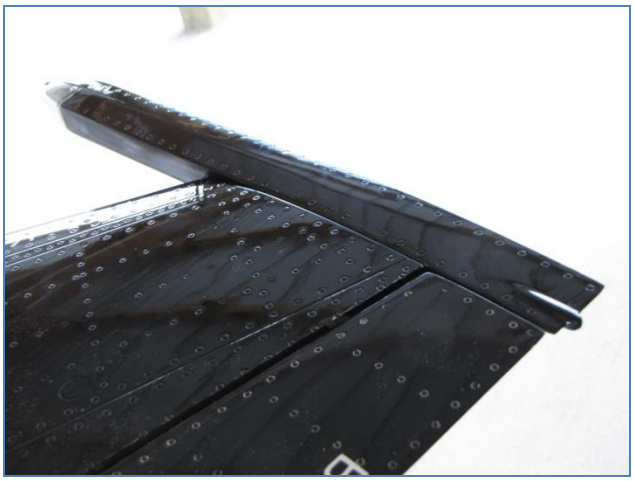


Wing Tip Missile Rails



☐ Match up the corresponding Missile Rail to the corresponding Wing. The Missile Rails should be scribed with and L or R to indicate sides. If there is not a L and R, on the Rail. The proper Rail will line up with the centered Aileron.

☐ Loosen the 3/32” SHCS and connect the electrical wire to the Missile Rail connection.

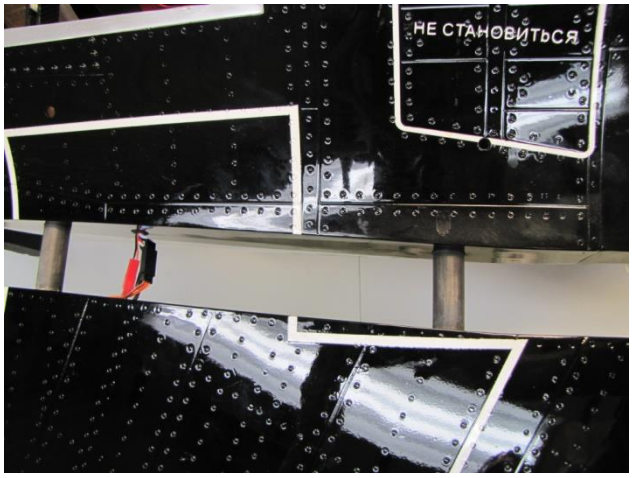


☐ Install the Missile Rail by aligning the (2) pins and receptacles. Tighten the 3/32” SHCS to secure the Missile Rails to the Wing.

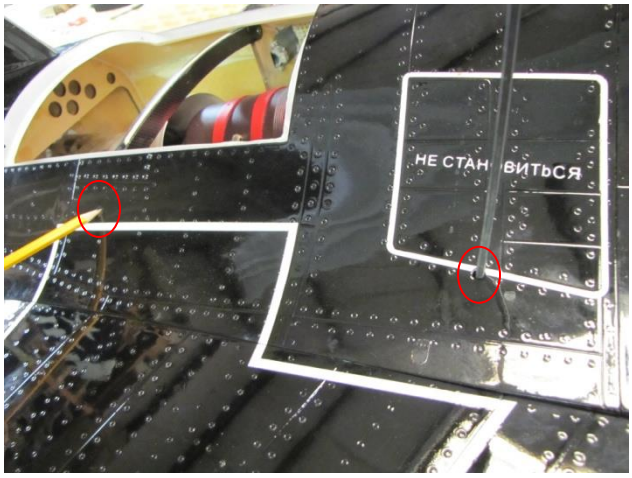
☐ Weigh each wing on an appropriate scale. The wings should be within (1) ounce of each other for a good flight trim.

If ballast is needed, glue it into the Aileron Servo pocket.

Wing Installation



- ☐ Slide the wing partially into the wing tubes and connect the Aileron, Flap, and Light wires. Use servo clips or tape to secure the wires together.



- ☐ Push the wing flush with the fuselage and tighten the (2) 9/64 SHCS on each wing.

Main Wheels and Brakes

NOTE: The Tires on the Yak 130 are not inflatable.

NOTE: Periodic preventative maintenance of all landing gear systems is the modelers challenge to keep things from coming loose.

NOTE: The wheels should be removed so that the axles and bushings can receive lubrication.

☐ There are (2) set screws on the back side of the main gears lower strut. Use a 2mm Hex head wrench to first tighten the screws to mark the steel axles, then back out the screws a few turns to allow the wheel axle to be removed.

☐ Tap the axle such that the cap cover pops loose.

☐ Where you see the set screw marks on the axle, use a Dremel fiber cutting disc to make 1/4” wide flat spots on the axle centered on the screw point marks. A vertical mark on the end of the axle helps align the flat spots with the set screws on re-assembly.

☐ Apply BVM's "Super Lube" to the axle and bushings in both sides of the wheel.

☐ Apply a thin finger wipe of BVM "O" lube to the inside surface of the brake drum. A very small amount helps to keep the brakes from grabbing.

NOTE: A taxi test will confirm that the braking action is smooth and sufficient.

NOTE: The brakes are either "on or off" in function. The "on" condition does not lock-up the wheels.

☐ Re-assemble the wheel/axle onto the strut for a trial fitting. Check that the set screws are engaging the flat spots on the axles properly.

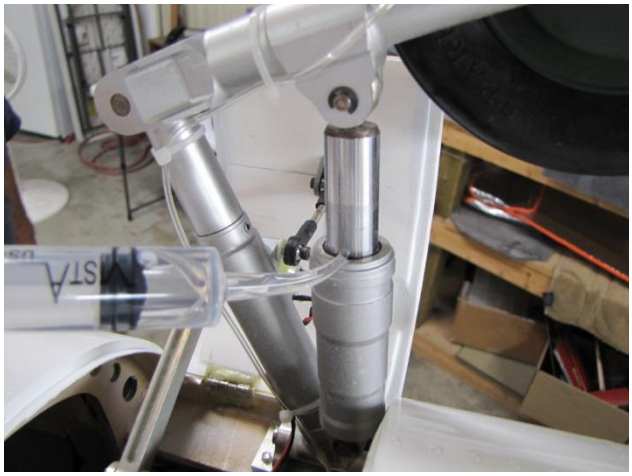
NOTE: There should be a white Teflon washer on each side of the wheel.

☐ For final assembly, apply a drop of Z-42 to each set screw and tighten them securely.

Nose Wheel

Nose Wheel Axle Assembly

- ☐ It will require (2) 2mm hex wrenches to remove and re-assemble the Nose Wheel for similar lubrication on the axle and bushings.



- ☐ Use the BVM Thin Lube for “O” Rings kit (BVM# 1945) on the strut cylinders.

  The BVM Thin “O” Lube is the only lube that should be used for any pneumatic system.

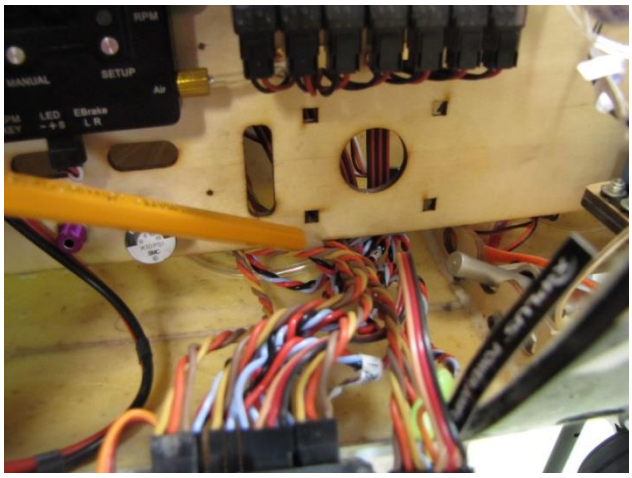
  Inject a few drops into the Air Fill Valve occasionally to keep the system “wet”.

- ☐ The BVM Jets Dry Lube (BVM# 1947) works well on all moving joints of the landing gear system.

Radio Equipment Installation

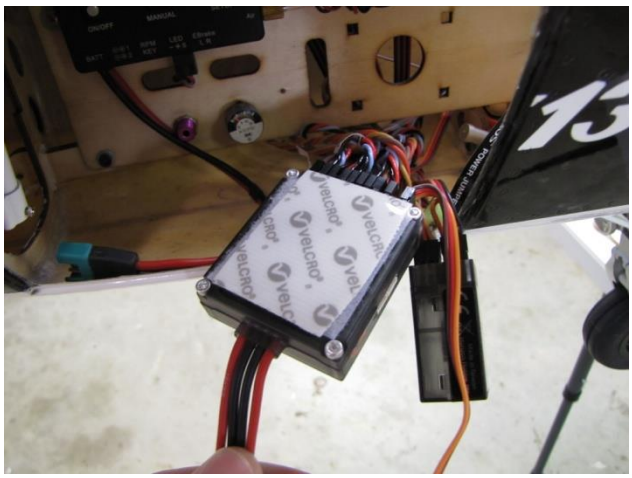
Receiver

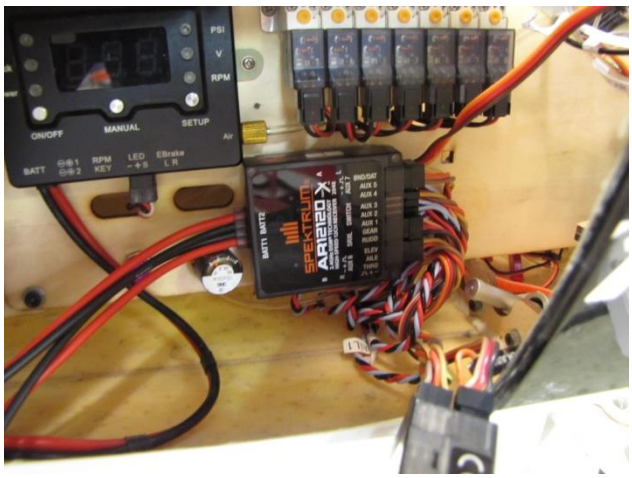
☐ Route the Central Controller's wires under the plywood former as shown. This allows the RX to be mounted to the former.



☐ Apply a Zap finish to the plywood former to prepare the surface for adhesive backed Velcro.

NOTE: It may be necessary to use a servo extension wire from your ECU throttle slot to the RX. For our model we used a 24" servo extension wire.





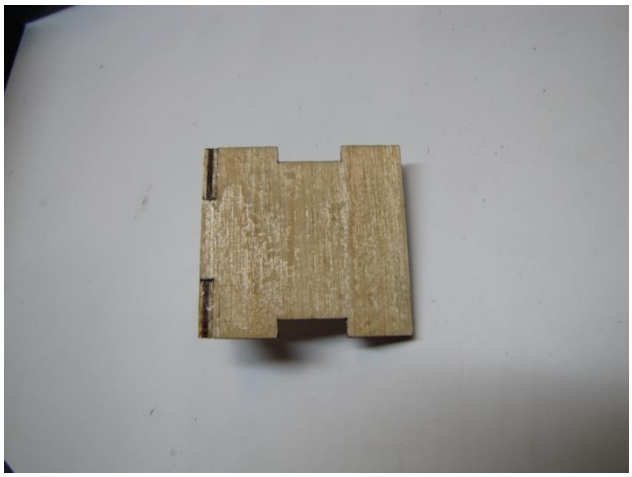
☐ Connect all your RX wires as recommended by the instructions for your receiver.

☐ Apply adhesive backed Velcro to your receiver and mount as shown.

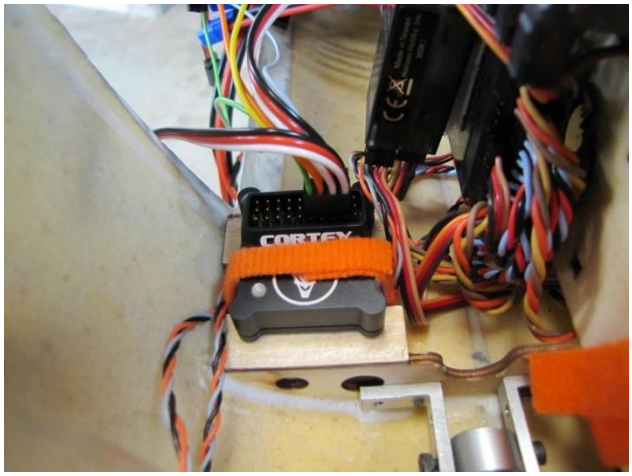
Gyro Mount

☐ Assemble the Gyro Mount. A 90° block is handy to achieve the proper angle. Work on a piece of wax paper or food wrap.

☐ Apply a Zap finish to the top of the Gyro Mount.

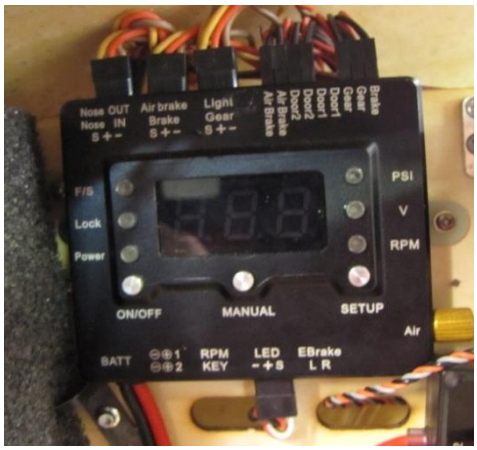


A Demon Aero Cortex Gyro is shown here. BVM includes additional instructions with this unit.



☐ Glue the Gyro Mount to the fuse and the front side of the front Nose Gear former as shown. Use adhesive backed Velcro or the mounting tape that is supplied with your Gyro. For added security, use a 6” piece of 1/2” Velcro strap.

Central Control Unit Instructions



A) ON/OFF (Power Switch): Hold this button down to turn on the power.
Caution: Even if power is turned off, the LED remains on which indicates power is connected to this controller.
Make sure to always disconnect the receiver battery after a day of flying; otherwise, the battery will be slowly exhausted by this control unit!

NOTE: The **BATT** connection is only used for set up and testing the Black Box when no Receiver Battery is connected. It is not intended to be used in normal operation.

B) Manual button
B-1) Long press- Holding this button down will retract the gear.
NOTE: This function only works when the transmitter is not on. This is very useful for bench operation, etc.

B-2) **Short press**-Tap this button to turn the landing gear Failsafe on or off. When it's turned on, failsafe (F/S) LED is green and height is displayed in screen.
Example: When the screen displays 002, the height setting is 2 meters. Press again to turn off this function. Screen reads "OFF".

NOTE: Refer to section "C-4)" to change the height setting value.
The landing gear failsafe is a method of protecting your airplane from an accidental retract of the gear while it is sitting on the ground below the setting (ex: 002: below 2 meters). If the plane is sitting on the ground and a retract command is given, the gear will not retract. If you want to bypass this feature, toggle the F/S off by tapping the "Manual" button, this will turn the F/S LED red.

C) Setup button
C-1) Short press- Tap this button and the screen will display "PSI", "V" (Voltage) and "RPM". The corresponding LED of each function will be on when it is displayed.

Note: BVM does not use the RPM function of this controller.

C-2) Long press- Holding this button down when "**PSI**" is displayed will enter the "Pressure Loss Protection Setup". This feature will deploy the landing gear in the event of a leak. Increase the feature by 10PSI with each press, max. is 60PSI. Hold the "SETUP" button down and the setting will be saved. Press the "SETUP" button again and "V" will be displayed.

C-3) Long press- Holding this button when "**V**" is displayed will enter the "gear door time-lapse setup". Increase 1 second with each press, max setting is 15s.
Function: The gear door time lapse setting indicates to the nose wheel steering servo when to be on or off. When gear is up, the nose wheel steering servo is not active. When gear is down, nose wheel steering servo is active.
This procedure is on a time-lapse. The lapsed time is N-3 seconds. N is lapsed time of the gear door. When it's set up at 8 seconds, the recovery time of nose wheel is 8-3=5 seconds. Control recovers in 5 seconds after sending gear down command. Change the time-lapse of nose wheel by changing time-lapse of gear door. Hold the "SETUP" button down and the setting will be saved. Press the "SETUP" button and "RPM" will be displayed.

C-4) Long press this button when "RPM" is displayed to enter the height setting for the Landing Gear Failsafe (F/S) setup. If the airplane is below your height setting, the landing gear will not retract to protect your airplane from an accidental retract of the landing gear. The minimum setting is "002" which means 2 meters, max is "010" which means 10 meters.
Hold the "SETUP" button down to save the setting and exit the menu or it will automatically exit in 5 seconds.

LED's Definition

Blue LED: Corresponds to the landing gear.
ON: Landing gear is deployed.
OFF: Landing gear is retracted.
FLASHING: Sequencer is not receiving transmitter signal or the gear switch is not in the correct position. Turn on or check the transmitter, make sure switch is in the correct position to eliminate the flashing.

IMPORTANT! : When the blue LED is on, make sure the landing gear is deployed! This is how the controller identifies the status of gear. Failure to do so will result in the landing gear retracting when Pressure Loss Protection is commanded. If the direction of gear down and corresponding gear door is incorrect, reverse it by switching the polarity of the appropriate gear and door 2-wire connections.

Red LED: Corresponds to PSI.
FLASHING: "Pressure Loss Protection" feature has been commanded. The landing gear will deploy automatically; the "Manual" button or transmitter switch will become deactivated and will not work. The pressure will have to be raised to a pressure higher than the previously set value **(Refer to C-2).** Resetting the value to "000" will eliminate the flashing.

Green LED: corresponds to Landing gear Fail-Safe (F/S).
When this function is on (Green LED), height protection is activated. If the airplane is sitting ground level while a retracting command is sent from transmitter, the controller will not execute this command until the plane flies up to an altitude of set value. If you need to test your landing gear on the ground, short press the manual button
(Refer to B-2) to turn this function off. When the LED is red, the function is deactivated.)

Servo Wire Ports
Nose OUT- Steering servo connects to this port.
Nose IN- Connects to the steering channel of your receiver.

Air brake- Air brake outlets: Not used
Brake-Landing gear brakes: Connects to the brake channel that you designate.

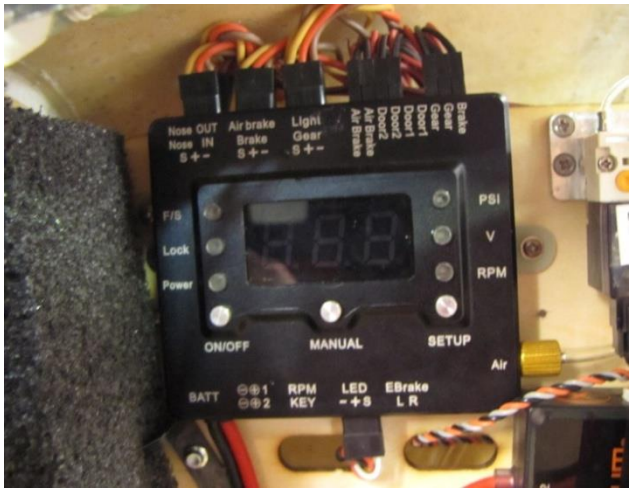
Light-Light control outlets- Connects to the light channel that you designate.
Gear- Connects to the Gear channel that you designate.
NOTE: A 3-step switch needs to be defined for the lights. First step, navigation lights on. Second step, gear lights on. Third step, all lights off.

LED outlets
Both outlets are for the light system. Refer to page (17)

Light Connections

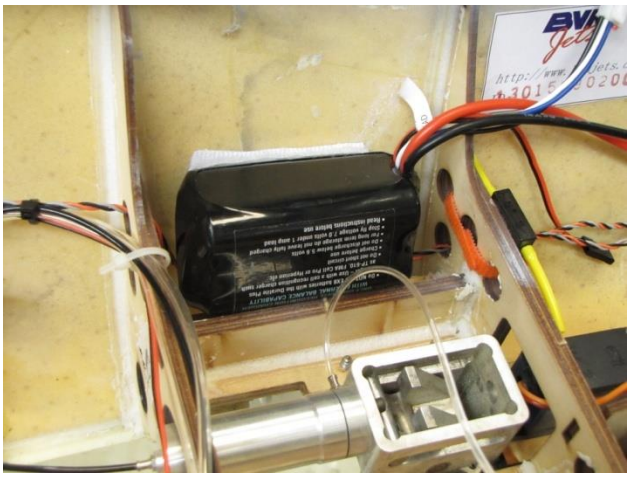
Note: The lights receive power through all leads from the RX to the Central Control Unit (Nose IN, Brake, Light, Gear)
An optional battery can supply power through the “BATT” lead.

NOTE: Verify the polarity of all connections before applying power.



Mounting RX Batteries

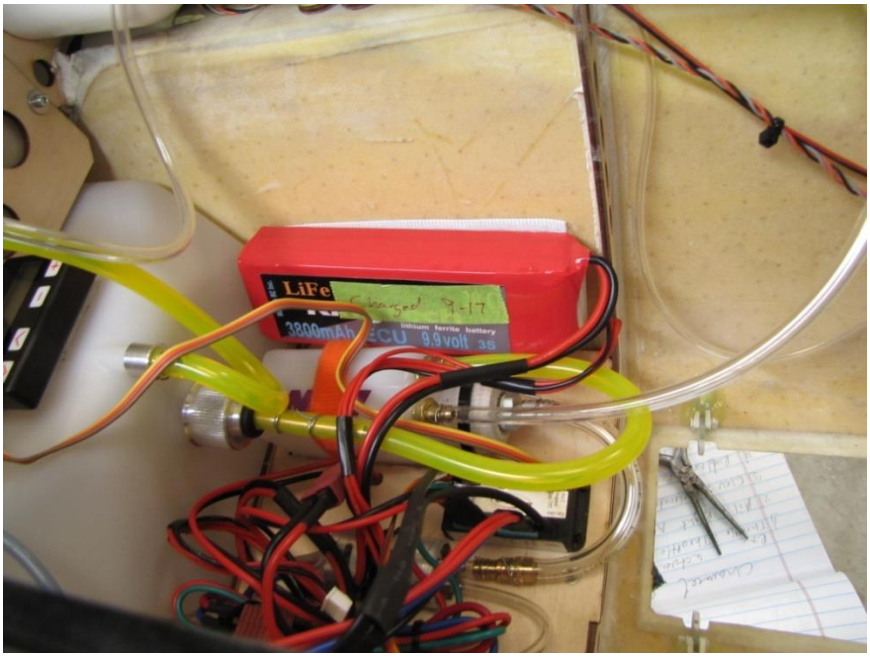
NOTE: The prototype Yak utilized (2) Duralite EXB 3000 mAh packs, one is located in the nose section, the other next to the Nose Gear Retract Unit.



- ☐ Use sticky back Velcro and Velcro strap to mount the batteries as shown.
- ☐ Ensure that the cockpit tub clears the batteries.

Mounting ECU Battery

The Prototype Yak-130 balanced with the ECU battery located as shown below.



External Scale Details

Use these photos to locate the (4) external scale detail parts.

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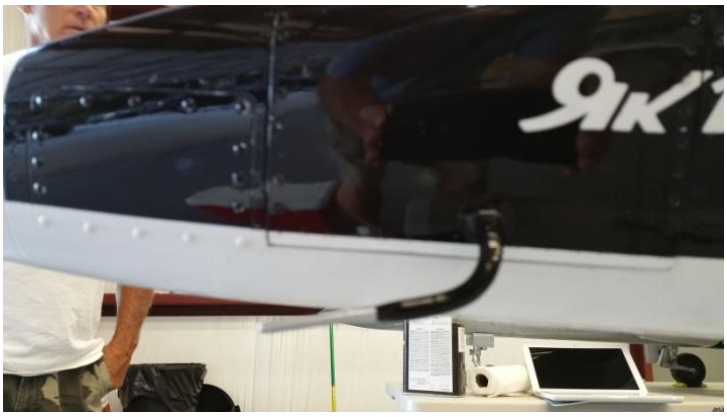
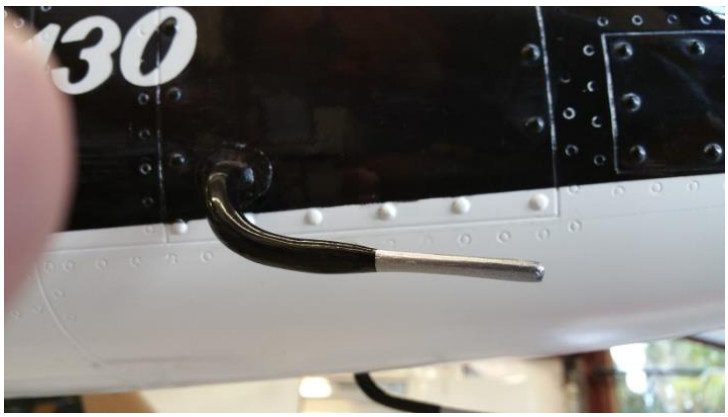
Glue on with a thick C.A..



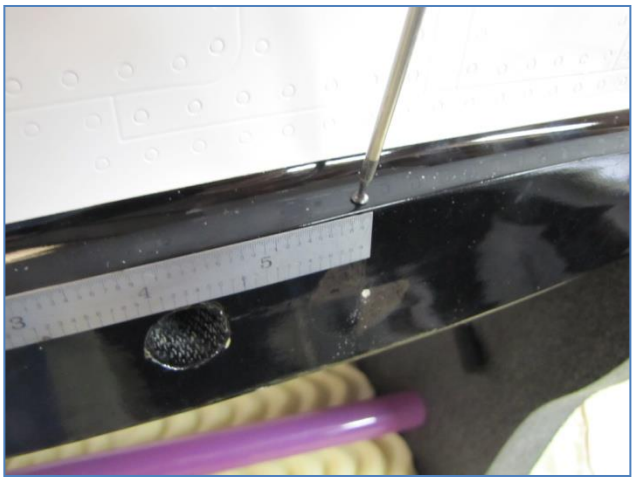


Center of Gravity

The C/G is 6” aft of the leading edge fairing on the fuselage as shown.

The C/G is also located by the factory with ink on the side of the wing fairing.

☐ Drill a 1/16” hole on the bottom side of the wing root fairing at the 6” point.



☐ Install a #2 button head screw for ease of locating when model is fully assembled.

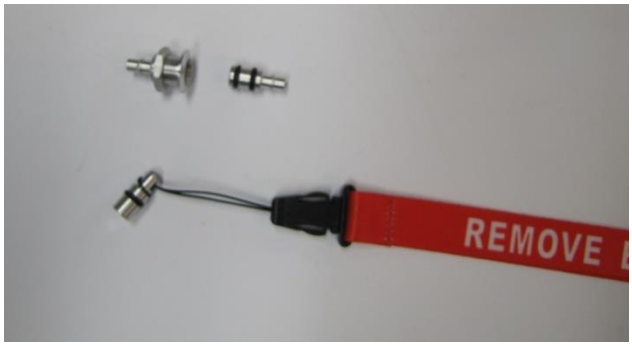
☐ Repeat this process for the other side.

Balancing the Model

1. Referencing the button head screws.
2. Balance the model fully assembled.
3. Empty fuel tanks
4. Gear in the down position
5. Full U.A.T.
6. With a correct Center of Gravity, the model should balance close to level. Nose or Tail could tip down.

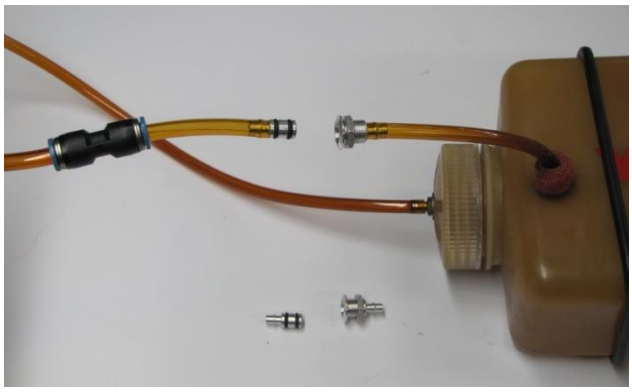
Flush Mount Vent and Overflow System

- ☐ A flush mounted vent system is used on both the fuel and smoke systems. A magnetic vent plug with red “Remove Before Flight” tag and BVM Overflow/Taxi tank conversion fittings are provided.



- ☐ Install the fittings to your overflow/taxi tank. Use an overflow tank while fueling to prevent spillage and to ensure fuel tanks are full before flight.

Use BVM Overflow tank Part #BVM6037



Gyro Sense

While still in your shop, check that the control surfaces move in accordance with the transmitter stick commands with the gyro “OFF”. Now, check that the gyro corrective action is in the proper direction on all 3 axes. Check with the gyro selected to the low rate and high rate condition. Move the models nose to the left, as if you were sitting in the cockpit, and the rudder should correct with a movement to the right. Check also the correct gyro action in the roll and pitch axes.

It is BVM’s practice on a first gyro assisted flight to take-off with the transmitter 3 position gyro assigned switch in the “OFF” position. Climb to a safe altitude and trim the model for the various flight configurations and speed. Then, at a medium speed, turn the gyro “ON” to the “Low Rate” position and check the trims and gyro for correct sensing and flight stability. If anything is not right, immediately select the “OFF” position with the transmitter 3 position switch. You may even brief your “caller” to do so if you prefer.

If all is good in the “Low Rate (gain)”, you can try the “High Rate” operation. Fine adjustment of the “Low Rate” and “High Rate” percentages can be dialed in after a few flights in various wind conditions.

We generally utilize the “High Rate” selection for landing, especially if the wind is a bit gusty and crossed. As is always good practice in aviation; “err on the safe side”.

Control Surface Deflections and Expo Settings

NOTE: Use the medium rate travels for the first flight with appropriate rate switches in the mid position. Expo values vary with pilot preferences.

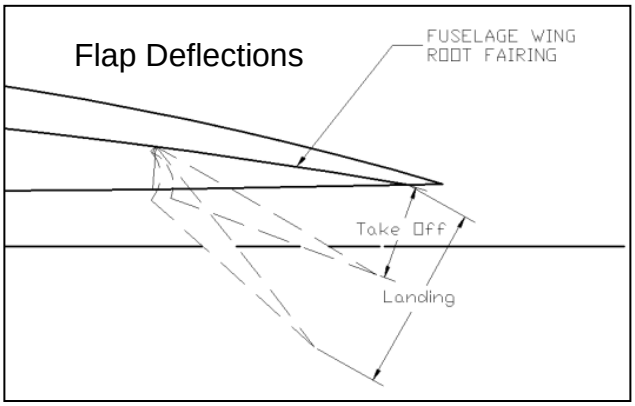
Control	High Rate	Expo	Medium Rate	Expo	Low Rate	Expo
Stabilator (measured at the T.E.)	Up 1-5/16” Down 1-1/16”	Up 17% Down 21%	Up 1-1/4” Down 1-1/4”	Up 18% Down 22%	Up 1” Down 1”	Up 8% Down 12%
Aileron (measured at the Outboard Tip)	+/- 3/4”	10% / 10%	+/- 5/8”	10% / 10%	+/- 1/2”	10% / 10%
Rudder (measured at the Top)	+/- 1.25”	10% / 10%	+/- 1”	8% / 8%	+/- 3/4”	0% / 0%

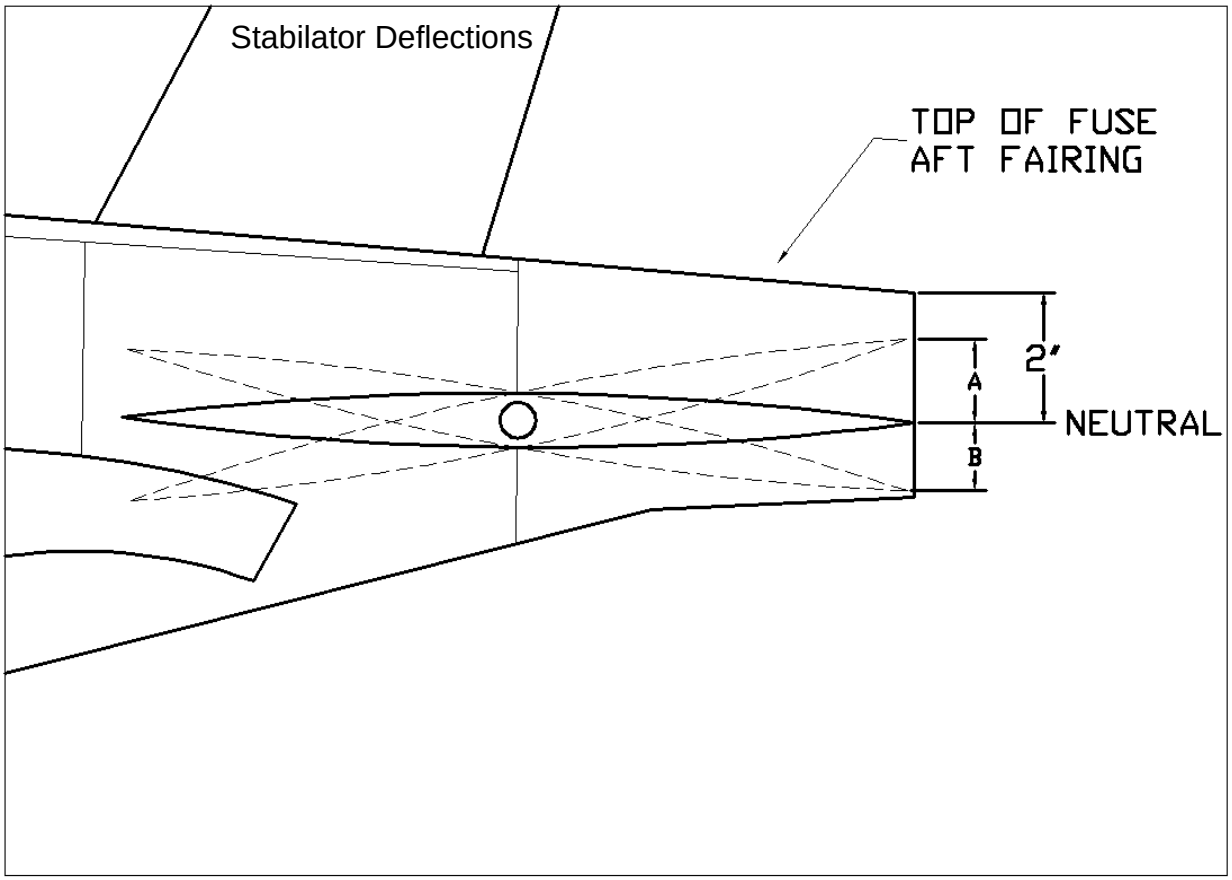
Note: The BVM Demo plane is setup using the following Expo percentages. Positive values are used on Spektrum and JR radios, Futaba uses negative.

Flaps Take Off 3/4”
Landing 2”

Note: Measure from fuselage wing root fairings

Stabilator= Neutral at 2” from fuse top.
A= Up To pitch nose up
B= Down To pitch nose down





Connecting RX wires

The wires are labeled from the factory. If you are using the DX18, the program is available from BVM. Follow the chart below to connect the servos.

Spektrum 12 Channel Receiver + Spektrum X Plus 8 Expander Module Chart								
RX Port	**Throttle**	**Aileron**	**Elevator**	**Rudder**	**Gear**	**Aux1**	**Aux2**	
Control	Throttle	Right Ail	Right Elev	Rudder	Left Flap	Left Ail	Right Flap	
RX Port	**Aux3**	**Aux4**	**Aux5**	**Aux6**	**Aux7**	**X+3**	**X+4**	**X+5**
Control	Brakes	Left Elev	Gyro	Nose Steering	Speed Brake	LED	SMK	Gear

DX18 and DX18QQ Transmitter File

The BVM Demo models are setup on Spektrum DX18 transmitters. The file, if requested, has all the mixes, rates, expos, and settings done for you. Setting the sub trim and travel adjustment must be accomplished by the modeler for the specific aircraft.

Important!!! Check the direction of all flight controls before each flight.

Switch/Lever/Trimmer	**Channel**	**Output**
Switch A	Channel 5/Gear	Landing Gear, Down is Down
Switch B	X+1/Channel 11/	Lights, Down is off, Up is on
Switch C	Elevator Rates	Up (0) is High
Switch D	Flight Modes Flap System	Up is Normal flight Mid is Take Off Flaps Down is Landing Flaps
Button I	Throttle Cut	Throttle Cut
L. Trim	Steering Trim/Aux 6	Down for Right Steering Trim Up for Left Steering Trim
Switch F	Aileron Rates	Up (0) is High
Switch G	Rudder Rates	Down/Away (0) is High
Switch H	Aux 5/Smoke	Down (0) Smoke off Up (1) Smoke on
Right Lever	Aux 2/Brakes	Up/Away – Brakes off Down/Pulled – Brakes on

First Flight Profile

Fuel System Check

Shipping and handling the model can sometimes result in the fuel pick-up clunk(s) getting stuck in the forward end of the fuel tank(s).

Hold the model nose up and shake it a bit. You should be able to hear the clunk tapping the aft end sides of the tank(s) as it should.

Remove the flush mounted over flow plug. Test fill and empty the tank(s) with fuel and note if the tanks are bulging or sucking in more than just a small amount. If the fuel is not flowing freely, there may be a restriction. Check it out before flight.

The fuel filter should be mounted in a vertical position to allow any trapped bubbles to flow through on the first power up.

Flight Time

The BVM demo model's transmitter timers are set for 6 min. On the first flight, land one minute early to check fuel consumption. Adjust the flight timer accordingly.

Taxi Test/Engine Run Up

A taxi test should include a radio range check with the engine running at various power levels. Check that the wheel brakes are adequate, and the stopping action is without skidding or pulling left or right. Be sure to shake the aircraft and push fore and aft with the engine at half or more power, this will help remove any trapped air bubbles in the fuel system.

Gyro

Refer again to "Gyro Sense" on page 51.

It is BVM's practice on a first flight, to take-off with the transmitter 3 position gyro assigned switch in the "OFF" position.

Takeoff

Begin the takeoff roll by slowly advancing the throttle. The YAK 130 will lift off with very little up elevator. It there is a crosswind, hold a small amount of aileron into the wind and apply opposite rudder as required.

Trim

Once in the air, establish a medium cruise speed to set the trims. The aircraft should fly straight and level when "hands off". When the flaps and landing gear are extended, a few clicks of up trim maybe required.

Slow Flight Testing

To best prepare for the practice approaches, first climb to a safe altitude and trim the model for all flap settings and landing gear extended. Execute nose high power-on approaches. As soon as the nose falls through, add full power and establish level flight again.

Note if a wing (right or left) drops. That wing might be heavier than the other.

Following 3-4 approaches to stall you will become familiar with the Yak's gentle stall characteristics and feel more confident about the first practice approaches and go-around's.

Save all of the aerobatic stuff for future flights. Get the approaches and landings accomplished first and gain confidence in the Yak-130.

Properly set-up, the Yak executes take-off's and landings with ease.

Practice Approaches

A few minutes of the first flight, should be devoted to practice approaches and go-around's. It is beneficial to become familiar with the low speed handing of the aircraft before the first landing.

Landing

Landing the Yak-130 is like most jets, "power on" during the approach. It is best to land slightly nose high, touching on the main wheels first, then retard the throttle to idle and apply the speed brake and wheel brakes.

RX Battery Consumption

Note: BVM prototypes used (2) 3000 mAh Magnum-ion EXB batteries. See BVMJets.com
(2) 4000 mAh Lipo batteries will also work

The average flight using the lights consumes about 500 mAh. Use this data and results of the first few flights to calculate how many flights you can achieve from your system. The use of the smoke pump will consume more mAh per flight.

BVM is synonymous with "Success Jets." It is very important to us that you are successful with our products. This extensive manual reflects our sincerity. As always, your comments and suggestions on BVM products are appreciated.

Pilot’s Notes: