Process
Fit Mount to Firewall
Fit Mount to Engine
Fit Mount & Engine to Firewall
Fit Air Filter Box
Cabin Heat Mixer Box
Battery Support
Oil Recovery Bottle
Firewall Fuel System
Regulator & Solenoid
Ram Air Cooling Ducts
Control Cable Termination
Choke Cable
Throttle Cable
Oil Cooling System
Cowls
Propeller
Spinner

CH601-650 Suggested

Installation Sequence

List sequence above is a logical build order but certainly is not the only sequence that will work. Builders can mix and match as desired. The manual procedures are only a general guide to the proper installation of a Jabiru engine and firewall forward system and are not represented as mandatory or required procedures.. Each builder should become familiar with standard aircraft practice as outlined in various FAA Advisory Circulars, books by Tony Bingelis (available from EAA) Bob Nuckols (aeroelectric connection) and others and continue installing a firewall forward system only after fully understanding the basic principles involved.

Inventory:

Unpack the kit box and check items against the inventory parts list. Sub kits will be in boxes or Ziploc bags with parts labels on them.


THROTTLE EXTENSION FOR
Note: To facilitate the use of
mounted to the carburetor. Rat
loose any of the mounting hard
1) To locate the third hole, ma
the bracket 3/4 in. Now ma
hole. It should be roughly
aluminum material this bra
drill ("jumbo") is recommend
other two holes. Reinstall
2) When unpacking the throt
the same sequence and or
by removing the cotter pi
3) Place one washer on the s
on the carburetor such th
4) Slide the stepped bushing
the small end of the bush
5) Install the throttle lever e
bushing and the "nut" po
carburetor. This assures
6) Place the other washer on
make it snug. Secure by
September 6, 2005
JabiruUSA
Flight Center, LLC
Zenith 601
FWF Kit
JU310-48
1 – JU330 Throttle Arm Extension
1 – Friction Throttle Cable
1 – ¼" Cable End Adjuster w/ 2 nuts
1 – Cable End Swivel ¼ inch w/ set screws


JabiruUSA
Flight Center, LLC
Zenith 601
FWF Kit
JU129 Oil Recovery System
1 – JU129-1 Oil Bottle Clamp
1 – JU129-2 Oil Bottle
2 – 3/16 Blind Rivet
2 – Hose Clamp
3.5 – Rubber Oil Vent Hose
SAE 30R2 TYPE 3 12.5 mm (1/2) 8-3005
PARKER 5139-8 W.P. 2.5 MPa (400 PSI)

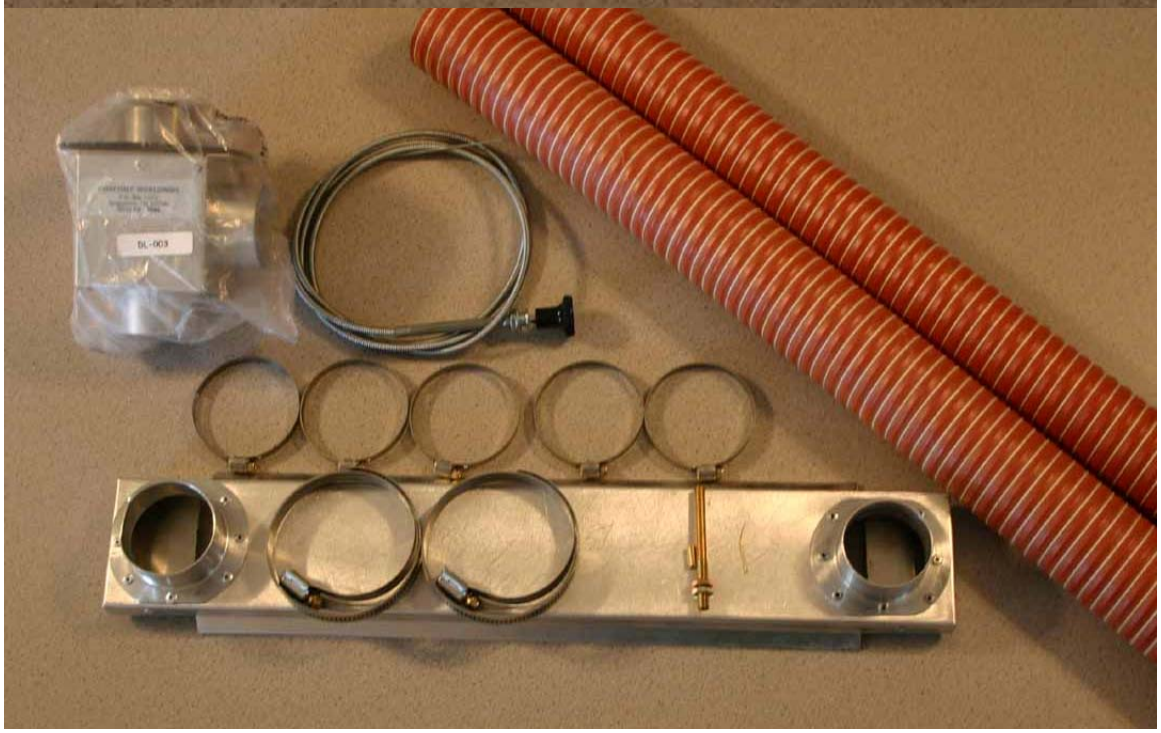

JabiruUSA
Flight Center, LLC
Zenith 601
FWF Kit
JU800-1Z
Firewall Side Mount Hardware
4 – AN960-616 Washer
4 – AN363-624 Locking Nuts


JabiruUSA
Flight Center, LLC
Zenith 601
FWF Kit
JU500 Fuel System Firewall
Forward
1 – Bulkhead Fuel Fitting
3 – Hose Clamp
2 ft – ¼ ID Neoprene Fuel Hose
2 ft – Firesleeve #10
3 ft – 3/16 ID Plastic Line


Zenith 601
FWF Kit
JU800-2
Engine Side Mount Hardware
4 – AN960-416 Washer
4 – AN363-428 Locking Nuts
4 – AN4-31A Bolts


JabiruUSA
Flight Center, LLC
Zenith 601
FWF Kit
JU120-601
1 - JU1001-601 Lower Cowl
1 - JU1002-601 Upper Cowl
1 - JU123 Airdam Lower Cowl
8 – Tinnerman Washer #8
8 - #8-32 x 5/8 Countersunk Machine Screw
8 – MK1000-8 Nutplate
50 3/32 Flush Blind Rivet
13 – Camloc Receptacle
1 – Camloc 27s#-4
10 – Camloc 26S8-6
2 – Camloc 26S8-2
3" Aluminum Piano Hinge w/ 4" pin
1 – Oil Door Hinge Bracket


JabiruUSA
Flight Center, LLC
Zenith 601
FWF Kit
JU305 Choke Components
1 – Choke/ Carb/ Cabin Heat Cable
1 – Brass Cable Ferrule
1 – AN380-1-4 cotter pin
1 – Brass Cable End Adjuster w/ 2 nuts



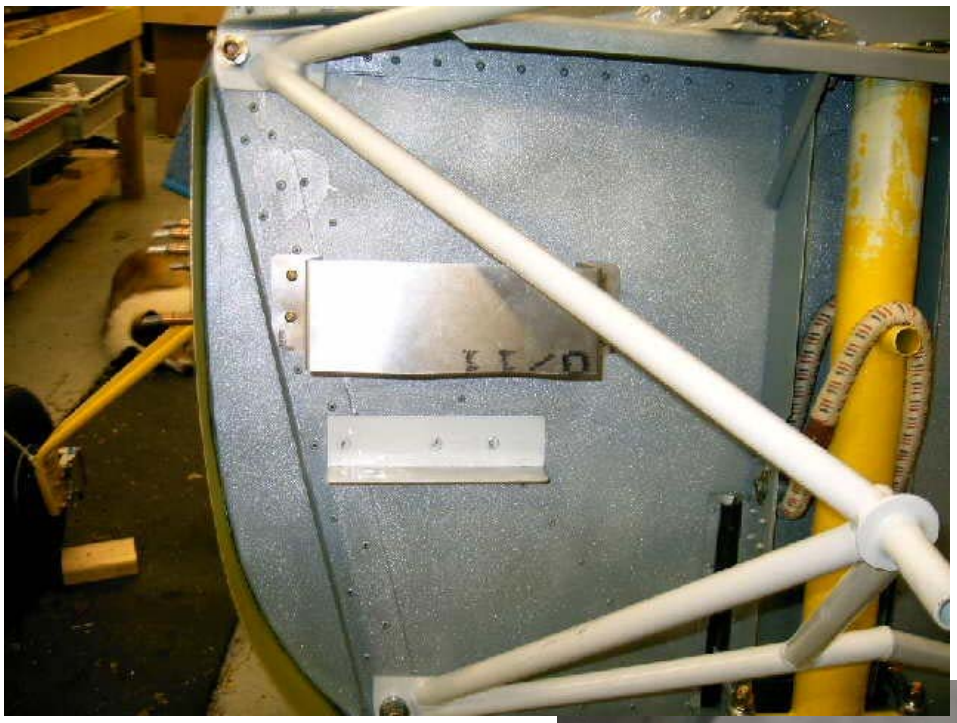

JabiruUSA
Flight Center, LLC
Zenith 601
FWF Kit
JU625 Battery Box Assembly
1 - JU625-1 Battery Hold Down
1 – Aluminum Angle Battery Base Support
3 – 3/16 Blind Rivet
4 – MK1000-8 Nutplate
8 – 3/32 Flush Blind Rivet
4 - #8 – 32 x 1 Machine Screw
16" Adhesive Back Foam Liner

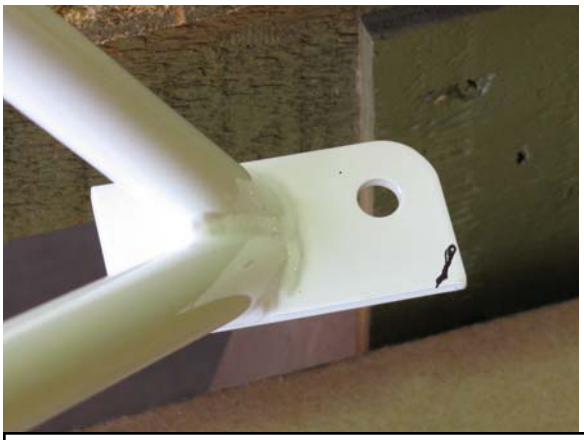

K&N
HIGH-FLOW AIR FILTER
FILTRE À AIR À DÉBIT ÉLEVÉ
FILTRO DE AIRE DE ALTO FLUJO
Designed to Increase Horsepower & Acceleration
Washable / Reusable
Conçu pour assurer une augmentation de la puissance et de l'accélération
Lavable/Réutilisable
Diseñado para aumentar la potencia y la aceleración
Lavable/Reutilizable
33-2008-1
AIR FILTER
FILTRE À AIR
FILTRO DE AIRE


JabiruUSA
Flight Center, LLC
Zenith 601
FWF Kit
JU714
9" Spinner Kit
1 – JU714-1 Spinner Cone
1 – JU714-3 Spinner Back Plate
6 - #8 x ½ csk SS Machine Screw
6 – MK1000-8 Nut Plate
12 – 3/32 Flush Head Blind Rivet
6 – Tinnerman Washer - #8

The engine mount may have to be trimmed so that the mount pads that contact the firewall will fit correctly on the firewall. These four pads have been left over size to allow builders to trim to match their firewall and to allow room to match firewall components that may have been installed slightly “off” from the standard plans.

1. Position the upper two mount pads in the correct position and mark for trimming so that the pads fit along the curved bottom outside corners of the firewall. The mount pads should fit inside the overhanging fuselage skin.
2. Now check the lower pads for fit. The holes in the mount should line up with the holes in the firewall. Mark the pads for trimming if necessary.
3. Remove mount from firewall and trim off excess lower pad material. See photos 2 and 3.





5. Reposition the mount on the firewall. The mount should be in its normal shape and the mount pads should be near their final position.
6. Push the center pads up and under the stiffener shelf to line up the bolt holes.
7. The predrilled mount holes should line up with the bolt holes in the fire-wall. If a bit of extra clearance is needed you can stretch the hole in the engine mount horizontally.

Take care not to stretch the mount itself as it is possible to distort the mount so that the mount will not fit the engine.

8. Prep & Paint Mount

Clean all manufacturing oils or oxidation from the steel tubes of the mount. Use steel wool and a solvent to loosen deposits. Wipe clean and dry with a soft cloth.

Prime the mount with a good self etching primer (available at most auto stores).

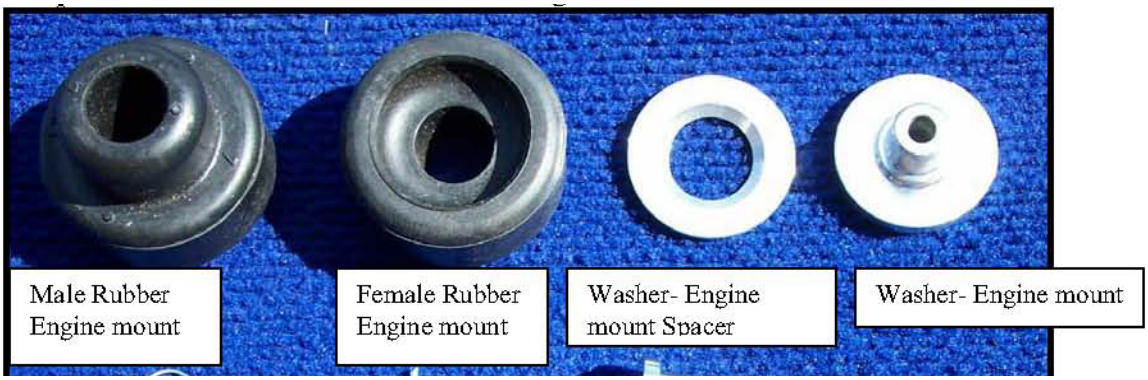
Top coat with a good spray enamel like Rustoleum Hi Performance. We suggest a light color like white or light gray as it makes it easier to spot any cracks that might occur during the life of the mount.

9. When satisfied with the mount fit remove mount and go on to step two: Fit Mount to Engine.
10. If building with the single throttle system be sure to install the throttle arm extension onto the carb. Much easier to install before engine is on mount or on the airplane.

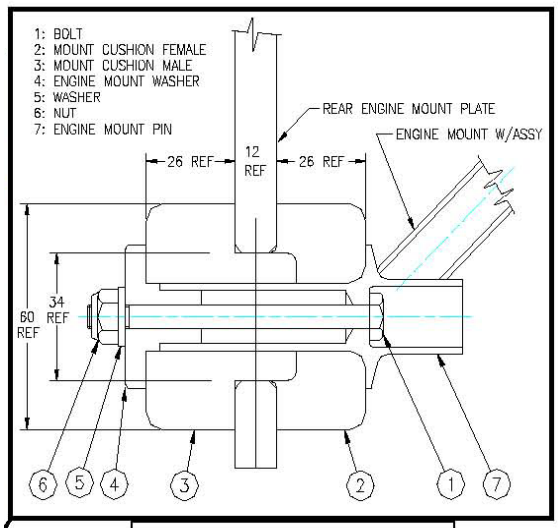
Builders may find it easier to mount the engine to the engine mount and then mount the assembly to the firewall. However, it is not necessary to attach mount to engine first and the mount can be attached to the firewall if the builder prefers.

There are a few procedures that are easier to do before the engine is mounted to the firewall, though. Attaching the throttle arm extension, installing the electric carb heat, and attaching the throttle cable is easier to do with the carb off the engine and on the bench. See the instructions for those procedures.

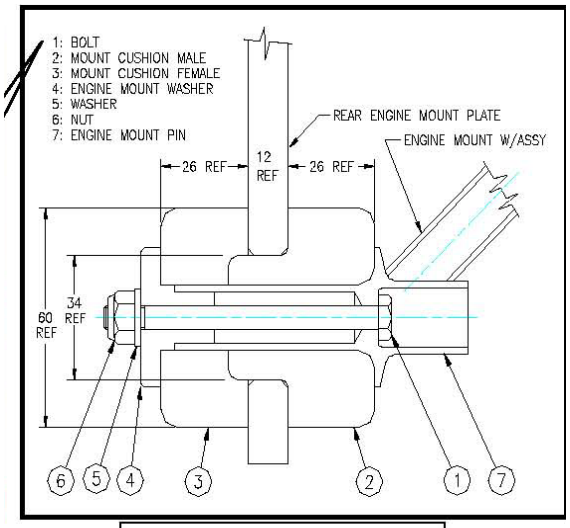
1. Locate the engine mount cushions and hardware in photo 1 that came with the Jabiru engine is the accessory bag. Also find the engine mount bolts, washers, and nuts from the FWF kit.



2. Refer to the mount cushion assembly drawings below.
3. Install the female half of the mount cushion on the top mount pins.
4. Install the male half of the mount cushion on the bottom mount pins.
5. Stand the engine up on its prop flange.



Top Engine mount Rubber

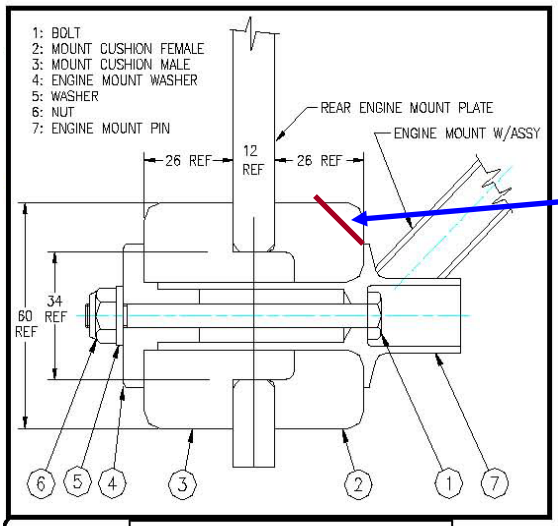


Bottom Engine mount Rubber

Trim Female Cushion

On the top two engine mount pins the female cushion is put on first. The female mount cushion that will go on the upper right side of the engine must be trimmed a bit to provide clearance for the ignition module. This is most easily accomplished on a band saw but a hack saw or similar tool will do the job as well.

Complete this job as you trial fit engine to engine mount



Top Engine mount Rubber

Remove rubber shoulder with a bevel cut. Rotate cushion so that the beveled area is over the ignition module lead. Remove enough so that the cushion does not interfere with or contact the module or lead. Remove only in an area just large enough to provide clearance for the module and lead. Do not bevel the entire radius of the cushion!

On the bottom two mount pins the male cushion goes on first.

6. Lower the mount down onto the engine, inserting the male cushions on the bottom pins into the engine back plate.
7. Insert the AN4-31A mount bolt in the top mount pins
8. Install the male half of the cushion onto the engine mount pin and into the engine back plate.
9. Install the mount washer into the end of the mount cushion and engine mount pin.
10. Using an extended length socket to hold the bolt in place, compress the mount cushion and mount washer until the mount bolt extends far enough through the mount washer to get the washer and AN363-428 nut started. See photo below.

11. Tighten the nut until the mount washer bottoms on the engine mount pin. There should be about two threads showing on the mount bolt.
12. Repeat for other mount bolts.

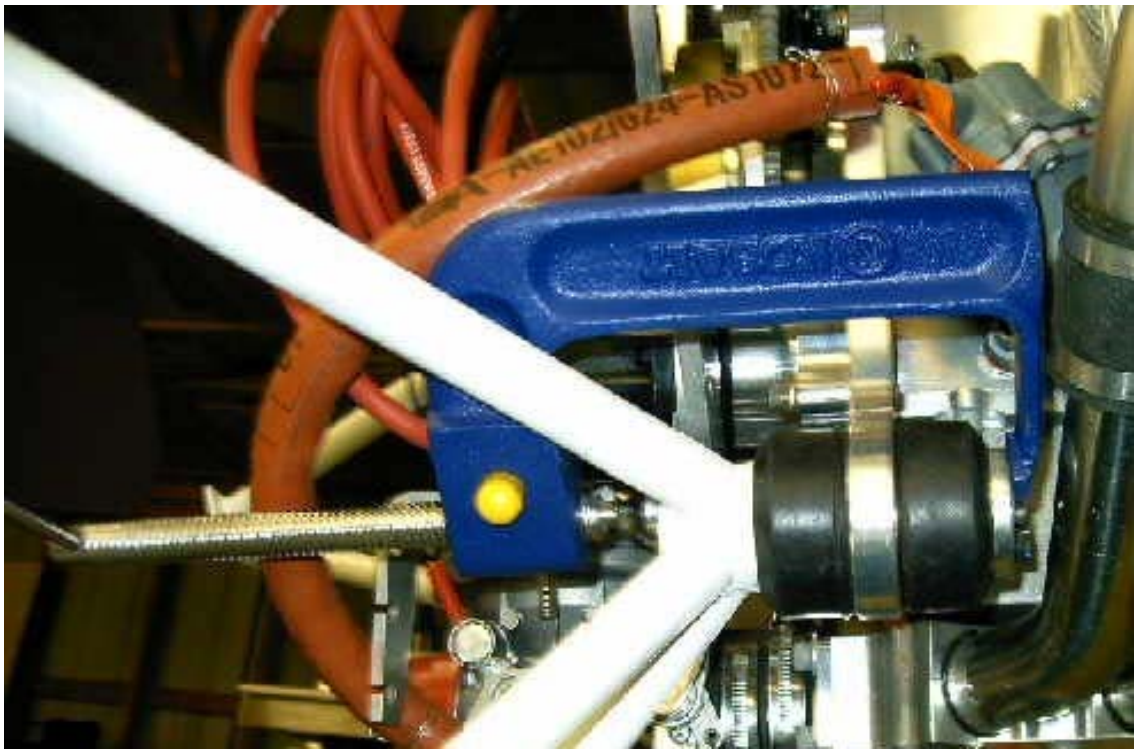
Builders may find it easier to mount the engine to the engine mount and then mount the assembly to the firewall. There are a few procedures that may be easier if done before final engine installation:

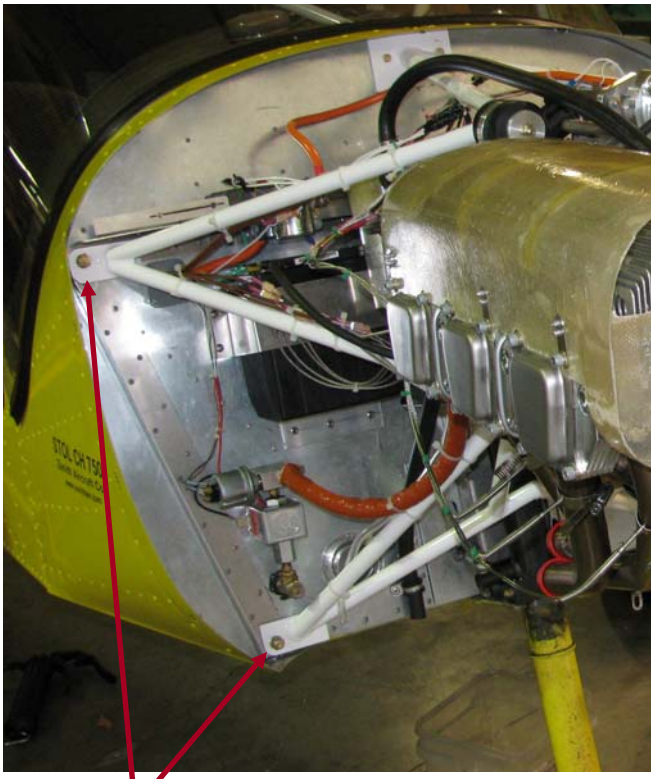
1. Single throttle carb throttle lever extension is easier to install before engine is on the plane (not needed for dual throttle option)
2. Female mount cushion for the upper right mount should be beveled for ignition module clearance

Once those tasks are complete and the engine is on the mount use an engine hoist (or a few strong helpers) to lift the engine and mount into position for a temporary fit up. Install the bolts and nuts in all firewall mounting holes and lightly snug up the bolts. Typically a builder would temporarily hang the engine and then locate the positions of other accessories on the firewall. Using the photos and instructions in other sections of this manual locate the accessories by holding in place and marking their perimeter or mounting hole locations with a Sharpie marker.

See page three for list of items to locate on the firewall

One builder has made a neat Mount Cushion Compressor. He used an inexpensive C clamp from Lowes and notched out the end of the clamp large enough to get a nut on the AN4-31A mount bolt. Photos below.





Install AN6-7A bolts with AN960-616 washer and AN363-624 Locking Nuts (4 places) with nuts on engine side of firewall. Torque to 24 ft lbs

Airbox

Place the carb heat air filter / mixer box on the firewall on the left side of the aircraft below the shelf on the firewall. Try to position the box so that the outlet to the carb is as closely lined up to the carb inlet as possible. The less down or up angle in the SCAT duct from airbox to carb inlet the better.

Check to see that there is clearance under the firewall stiffener shelf for the flapper door cam to operate freely and for the cable to attach to the cam.

Mark the outline of the airbox with a felt tip marker.

Keep airbox as high as possible so that outlet to carb is horizontally in line with carb throat.

Keep airbox to the outboard edge of the firewall as far as possible against the diagonal aluminum angle stiffener.

Cabin Heat Mixer Box (optional)

If installing cabin heat locate the mixer box close to the center of the aircraft to the right side of the nose leg channel.

Mark the location with your marker

Battery Support & Clamp

Locate the battery on the right side of the firewall under the stiffener shelf. Keep it as high as you can to allow more room for other firewall items to be installed later. Also – keep the battery as far toward the outside of the aircraft as possible to allow as much room for other components as you can.

Mark the outline of the battery.

See photo previous page

Oil Recovery Bottle

Locate the Oil Recovery Bottle in an open space on the right side of the firewall where it does not conflict with cabin heat or battery.

The bottle does not have to be vertical but can be slanted to help with the fit.

Mark the outline of the bottle.

Fuel fitting

Fuel should pass through he firewall on the right side. Hose will run from the Firewall to the pump mounted on the right rear side of the engine.

Locate the fuel fitting on the firewall where it will not conflict with other firewall counted items.

Mark the location.

Starter Solenoid

Since the battery is on the right side of the aircraft and the starter cable comes back quite naturally toward the right side of the engine, it is natural to locate the solenoid close to the battery on the firewall stiffener shelf.

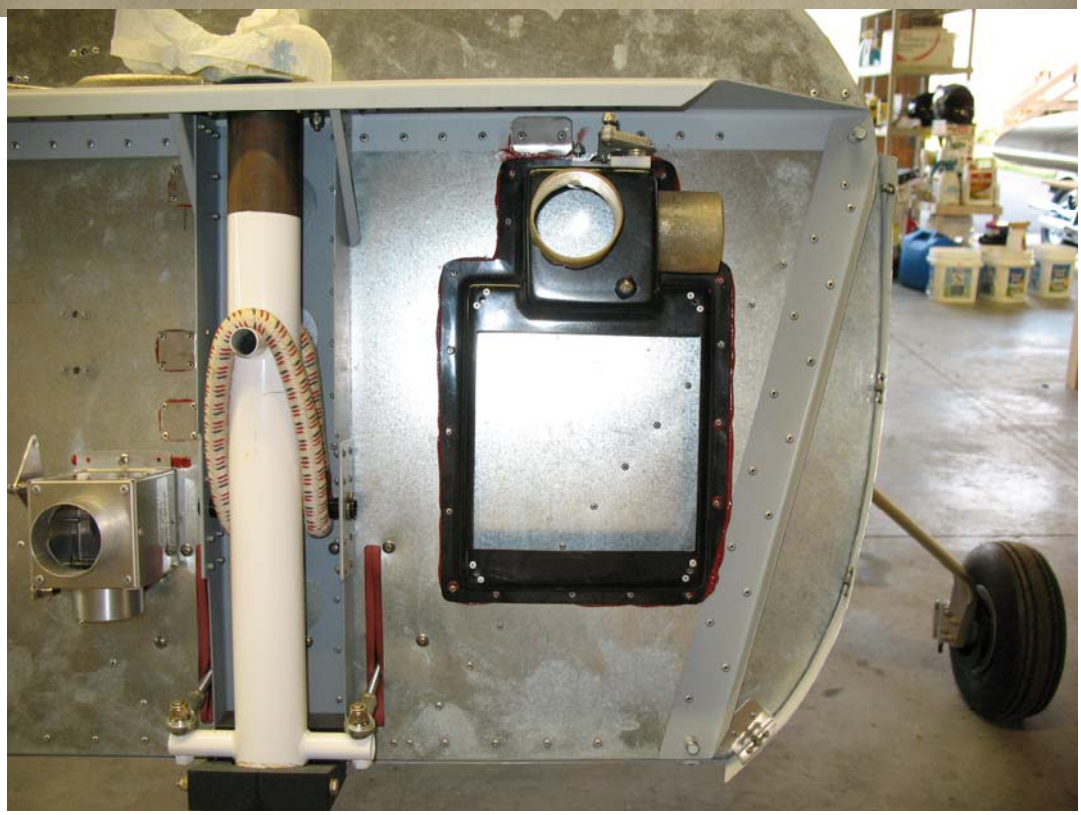
Regulator

Locate the regulator on the shelf as well near the battery. Make sure that solenoid and regulator are located so as not to interfere with the dual throttle cross rod if dual throttles are being installed.

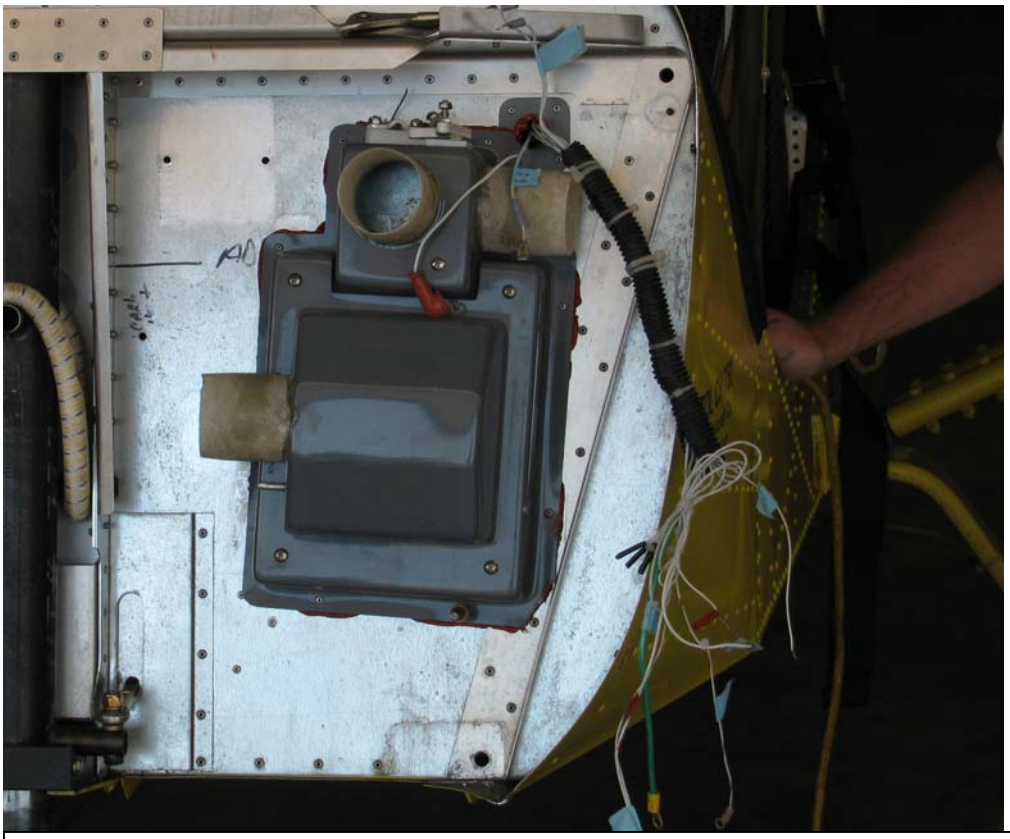
After firewall items are located **it may be easier to remove engine** to permanently install those items that are on the firewall.

Final engine installation then is accomplished by installing all bolts and tightening to the appropriate torque for aircraft AN bolts.

1. Remove the airbox top from the airbox base
2. Position the base per your previous markings on the firewall
3. Drill one hole in each corner of the base and one additional hole in the center of the long side of the base through the airbox flange and through the firewall with a 1/8 inch drill.
4. Temporarily secure the airbox in place with Cleco's.
5. Finalize the drilling by drilling one hole in each corner of the base and one additional hole in the center of the long side of the base.
6. Remove base, scuff the flange and coat edge with silicone sealant
7. Reinstall base with 6 x 1/8 dome head rivets.
8. Insert K&N air filter
9. Replace airbox top and screw to base with the #8 screws provided.



These photos show more rivets than necessary. More won't hurt but are not needed.



Cabin Heat Mixer Box

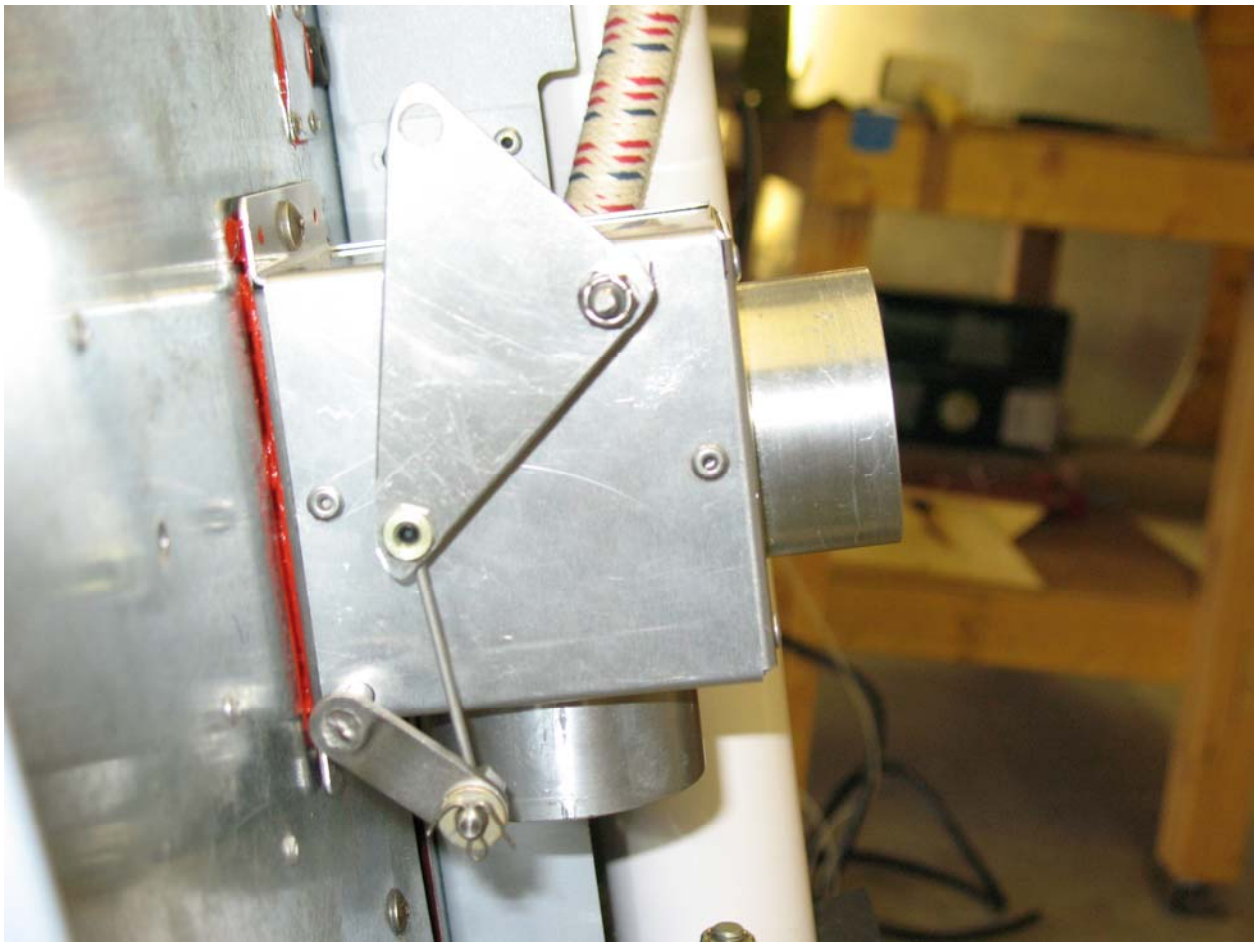
With a 2” hole saw cut a hole in the firewall per your earlier mark for the cabin heat mixer box

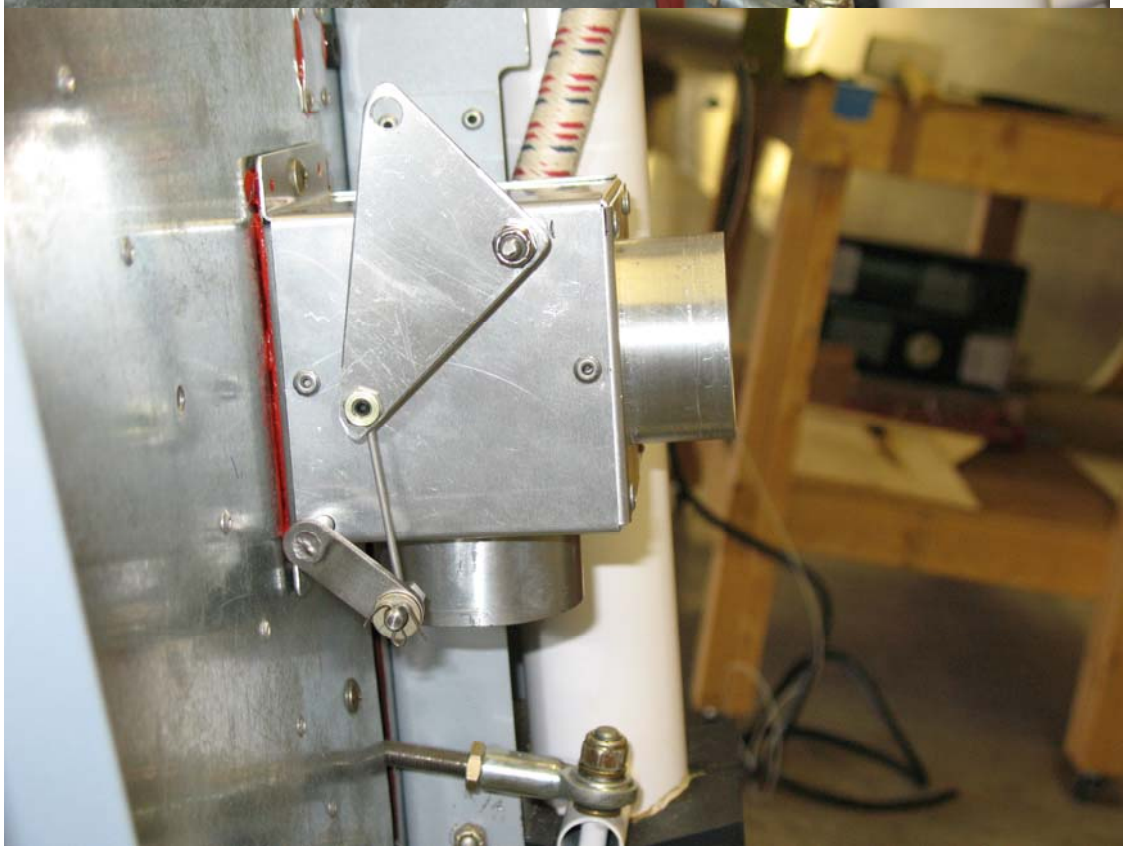
Deburr hole

Install box with 4 x 1/8 inch rivets

Typically builders would locate the cabin heat box on the co-pilot side of the firewall just outboard of the center nose leg channel. However the location is not critical and builders can locate the box in any location where it may fit.

Many builders choose to fabricate a bell crank to reverse the direction of the cabin heat box flapper door. This may be easier than running the actuator cable up from the bottom. See photos below for details. Scrap aluminum from the airframe kit can be used.





Battery Support & Clamp

Locate the battery on the right side of the firewall under the stiffener shelf. Keep it as high as you can to allow more room for other firewall items to be installed later. Also – keep the battery as far toward the outside of the aircraft as possible to allow as much room for other components as you can.

Mark the outline of the battery

Install the 1.5 inch x 6" aluminum angle battery support at the bottom of your battery layout mark so that it is centered on the battery. Install with 3 x 3/16 blind rivets.

Install the battery hold down clamp about 1.5 inches down from the top of the battery. Predrill two 1/8 inch holes in each side of the battery hold down clamp each hole about ½ inch in from the edge.

Hold the clamp in place (you may want to position the battery on the support and place the clamp around the battery as you do this step) and drill through the predilled holes in the clamp and through the firewall. Hold with Cleco's

When satisfied with the fit drill out the holes in the firewall to 5/32 and install the MK1000-8 nut plates on the cabin side of the firewall behind each of the four holes.

Drill out the holes in the clamp to 3/16

Install battery and battery clamp and secure with the four #8 screws provided.

A battery is not supplied with the firewall forward kit. We recommend an Odyssey PC625 battery. It is available on line at the lowest price. Try Googling for Odyssey PC625 or try www.batteries4everything.com as one source.


PC680
STOP

Oil Recovery Bottle

Locate the Oil Recovery Bottle in an open space on the right side of the firewall where it does not conflict with cabin heat or battery.

The bottle does not have to be vertical but can be slanted to help with the fit.

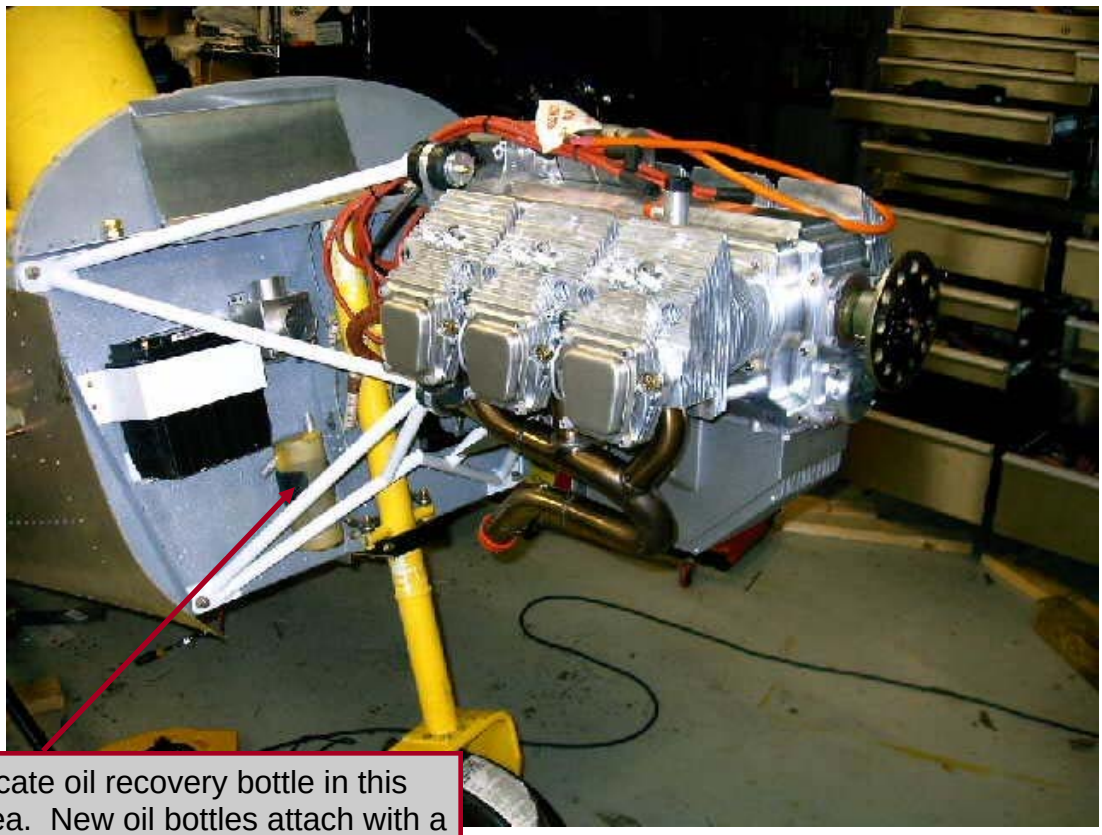
Mark the outline of the bottle.

Predrill two 3/16 holes through the oil bottle clamp evenly spaced on the flat part of the clamp.

Place the clamp on your mark and drill through the predrilled holes and on through the firewall

Using the 3/16 rivets, secure the clamp to the firewall.

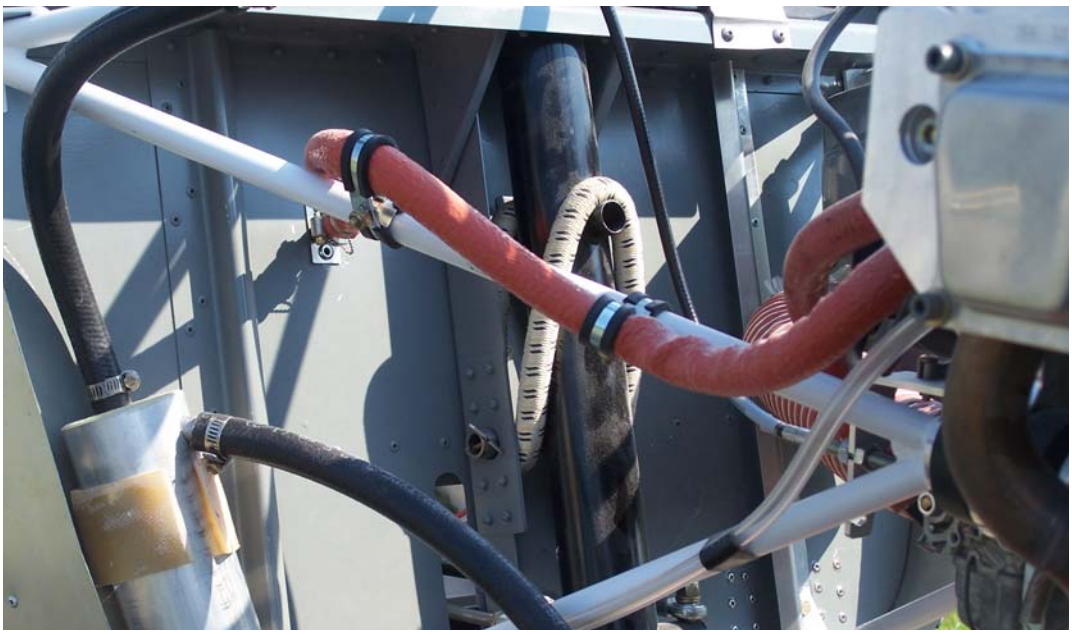
Slip the bottle into the clamp.



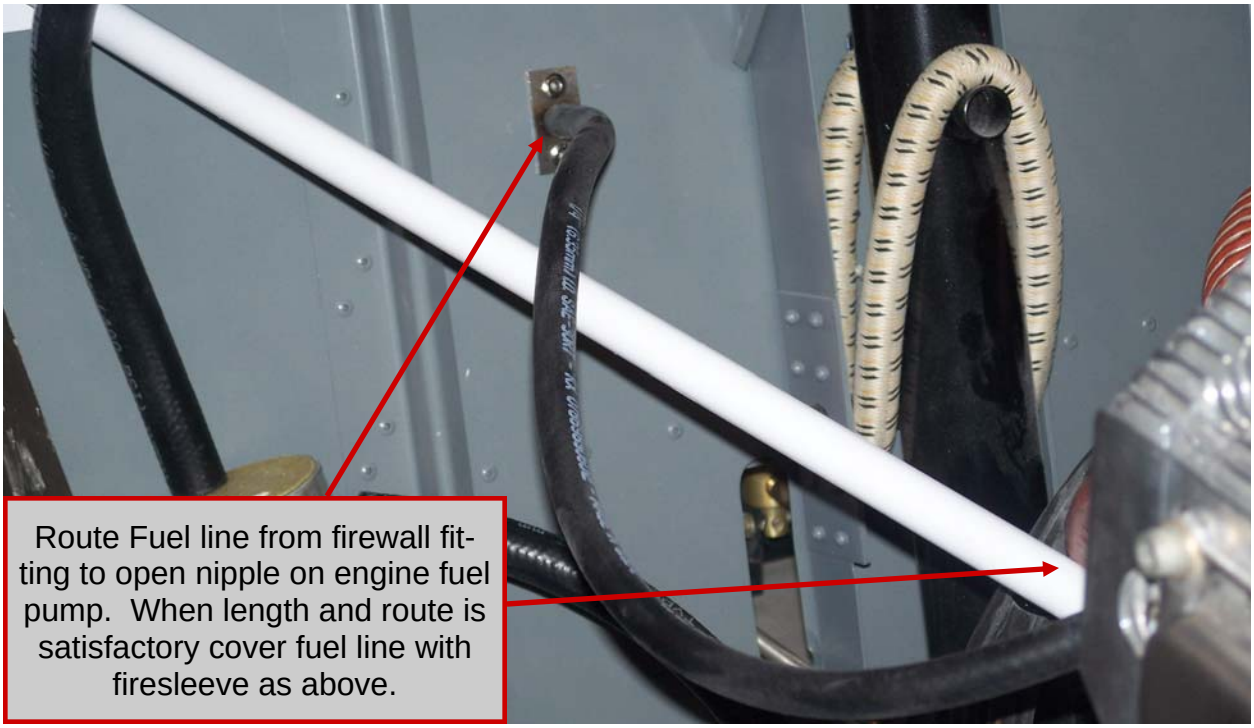
Locate oil recovery bottle in this area. New oil bottles attach with a clamp on top and bottom. Bottle may optionally be mounted to engine mount with cushioned clamps

Locate Fuel Fitting on Firewall

Locate the fuel fitting on the right hand side of the firewall in an open area below the stiffener shelf. Take note in locating the fitting that there is sufficient clearance on the



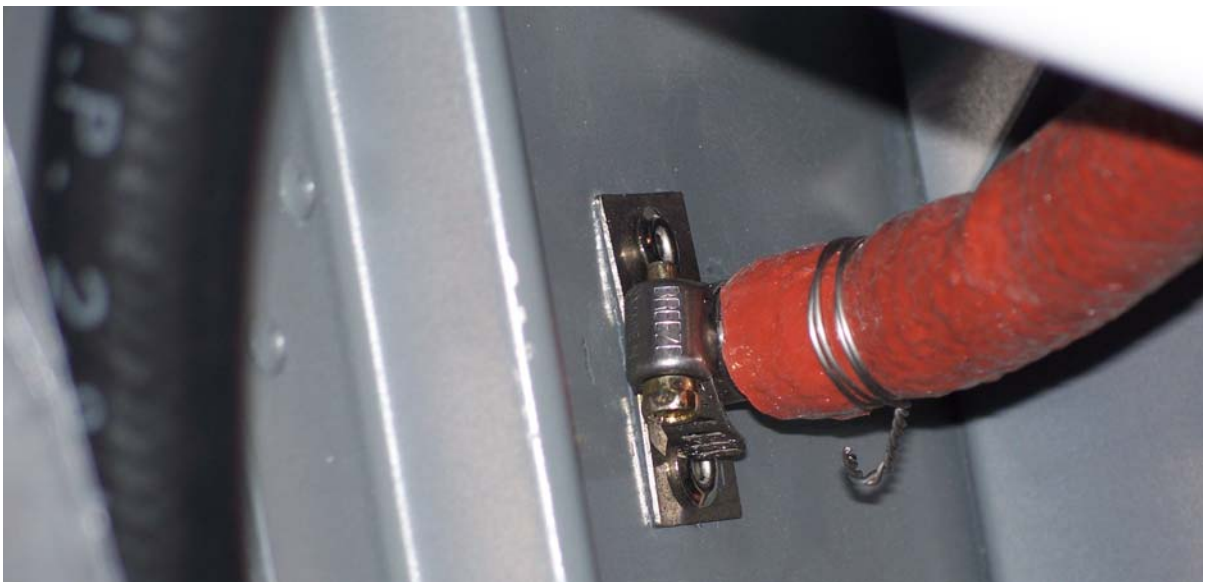
cabin side of the firewall so that the fuel line running to the fitting does not interfere with the rudder pedals. See photos for general position. Rivet the fitting in place with 3/16 rivets provided.



This photo shows the cockpit side of the firewall fitting installed and angling toward the left side of the fuselage where the fuel line will come from.

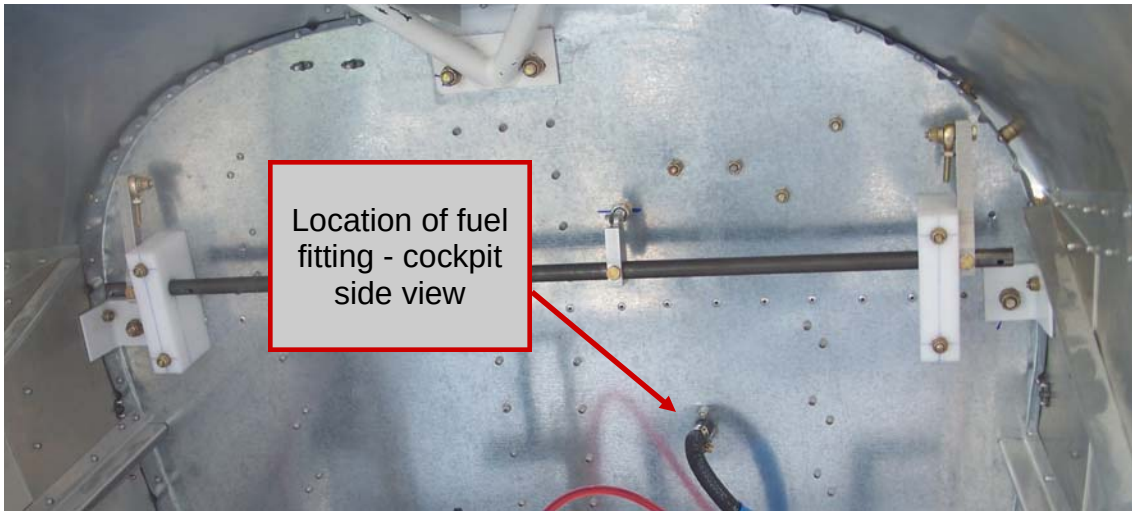
Measure the fuel line to length for routing to the fuel pump on the rear right side of the engine.
Install firesleeve over the fuel line completely covering the rubber line right up to the fittings at firewall and fuel pump.

Secure the ends of the firesleeve with a few wraps of safety wire.
Clamp the ends of the fuel line to the fitting and the fuel pump with the worm drive clamps provided.



Secure the fuel line to an engine mount member with cushioned clamps or other straps.

See photo below of the cabin side of the firewall fuel fitting.



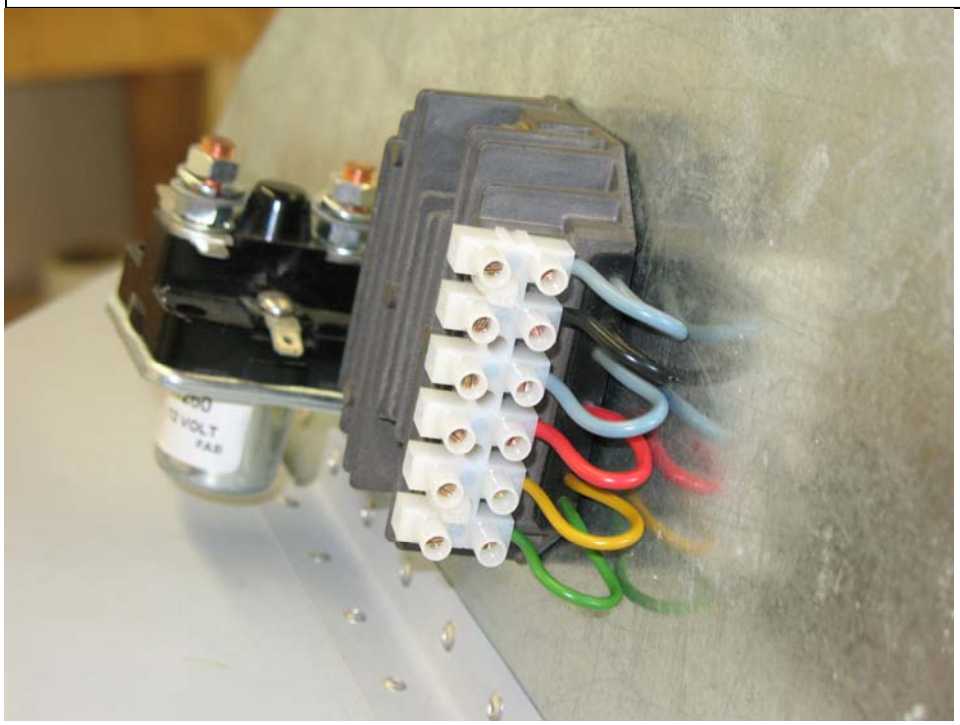
Starter Solenoid

Since the battery is on the right side of the aircraft and the starter cable comes back quite naturally toward the right side of the engine, it is natural to locate the solenoid close to the battery on the firewall stiffener shelf.

Regulator

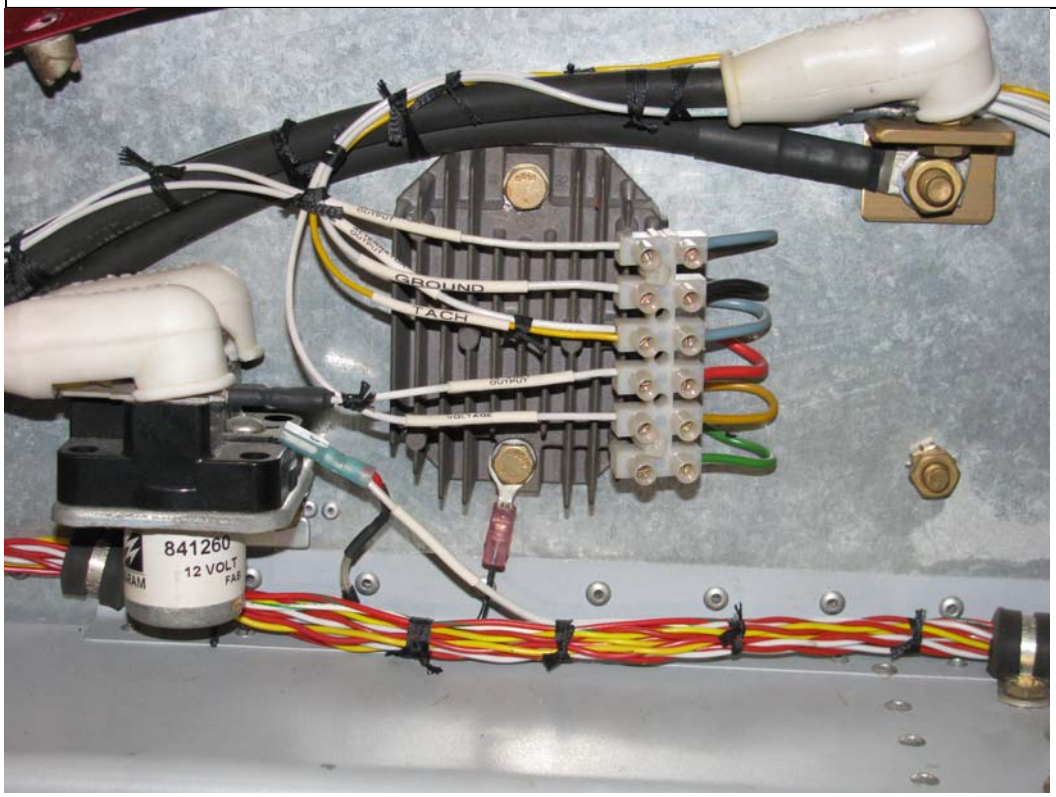
Locate the regulator on the shelf as well near the battery. Make sure that solenoid and regulator are located so as not to interfere with the dual throttle cross rod if dual throttles are being installed.

The electrical connector pictured is a neat way to connect the regulator to the various input and output wires involved in the charging system. This connector is available at most radio shack stores or other similar retail outlets.

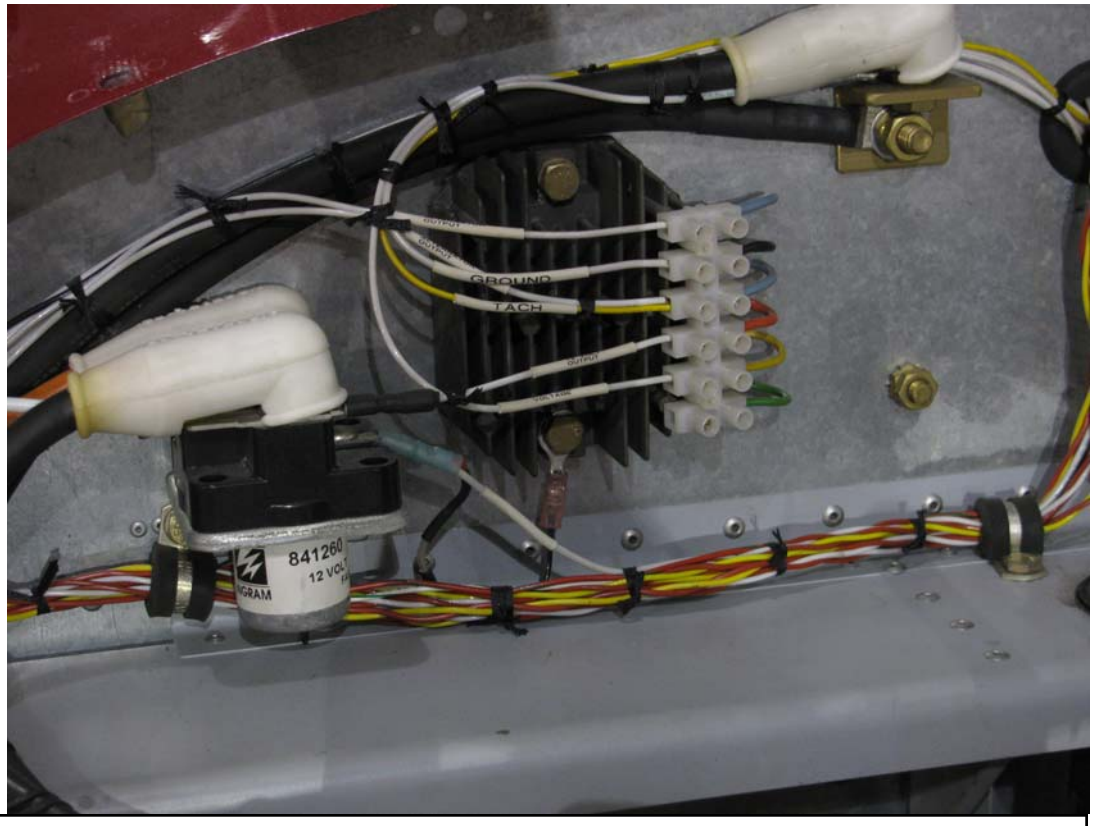


This photo shows the electrical connector. A small hole is drilled into the regulator fins to accommodate a small plastic cable tie at each end. The connector is then zip tied to the regulator.

The photos shown are from a Zenith CH601 but firewall is identical to the CH750 with the exception of the upper center engine mount position.



Photos shown are an example of a neatly installed and neatly wired charging system typical of what can be done on Zenith CH601/650 and CH750 aircraft.



Starter Solenoid

The starter solenoid cab be mounted on the firewall above the stiffener shelf or attached to the shelf itself – either top or bottom side. Make sure you mount it within reach of the starter cable on the engine.

Bolt in place with spare AN3 bolts. Make sure the base of the solenoid is grounded (should be no problem with the all metal Zenith – just make sure firewall is grounded to battery)

Regulator

Mount the regulator on the firewall above the shelf somewhere near the battery.

Bolt to the firewall with spare AN3 hardware

Wiring instructions are in the installation manual on the CD that came with your engine.

The installation manuals are also found in the “MANUALS” section of Jabiru’s website: www.jabiru.net.au

Pre-Paint>Fuselage>Engine>Fit ram air cooling ducts

Objectives of this task:

In this task the ram air cooling ducts will be assembled and fitted to the engine.

The final step, where the front of the ducts are trimmed to length to match the bottom cowling, cannot be performed until the bottom cowling has been fitted to the fuselage and so that step is included as part of the *Fit cowling* task that follows this task.

Air enters the front of the ducts and is routed up by low air dams, through the fins on the cylinder heads and barrels and then downwards at the rear by a pre-fitted angled baffle.

An aluminium tube directs cooling air from each duct to the nearest magneto coil.

Materials required:

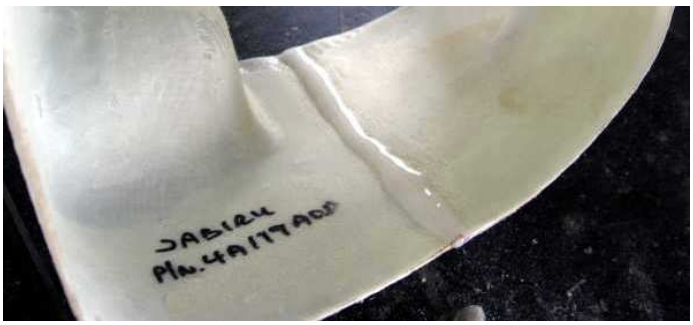
Epoxy resin and AF303 glass fibre cloth (from the bag labelled "*Extra Cloth*")

5-minute Araldite and flock

Assemble the ducts

Use a length of masking tape on the join line at the bottom of each duct inlet to hold the join firm and prevent Araldite/flock from leaking through.

Mix a small batch of 5-minute Araldite and flock and apply to the top of each join as shown at right:

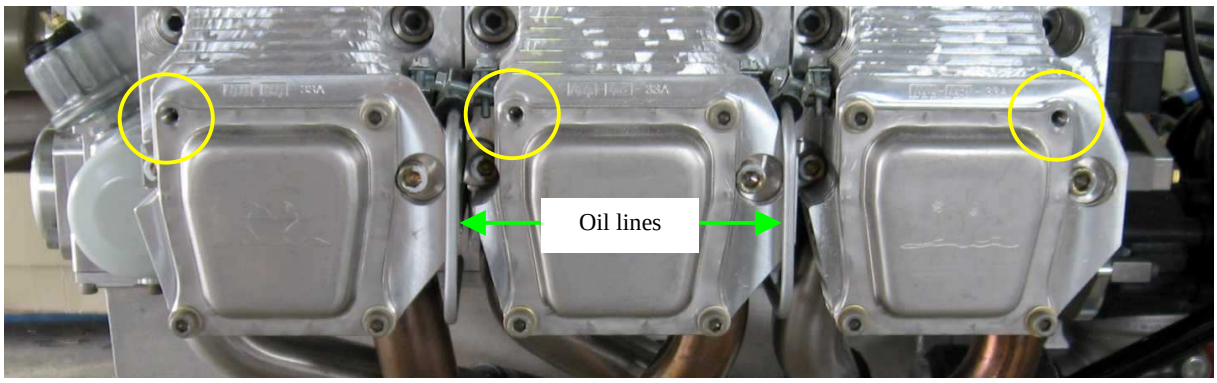


Next the front air dams will need to be cut to size. Take the length of glass fibre sheet with the curved edge, hold it against the rear of the duct inlet with the curve towards the top rear of the duct and mark around the bottom of the duct then cut to shape as shown above.

Tape the air dam into place. Mix a small batch of 5-minute Araldite and flock and use it to fix the air dam into place. Leave to cure, then sand away any rough edges.

Remove the masking tape and roughen the underside of the duct and the back of the air dam.

Mix a small batch of resin and brush 2 layers of AF303 glass fibre cloth to the underside of each duct, covering the join line and wrapping up around the back edge of the air dam. Leave overnight to cure.

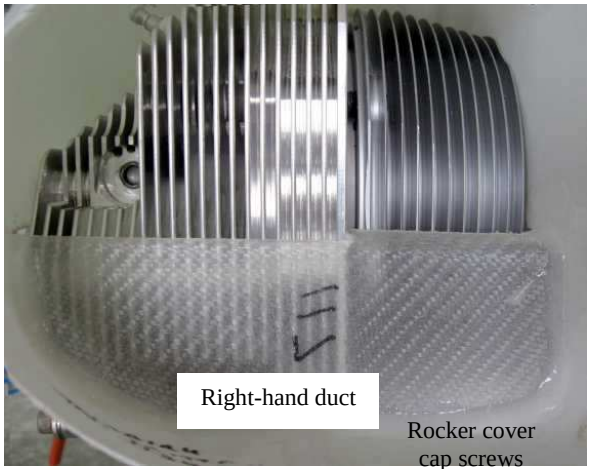


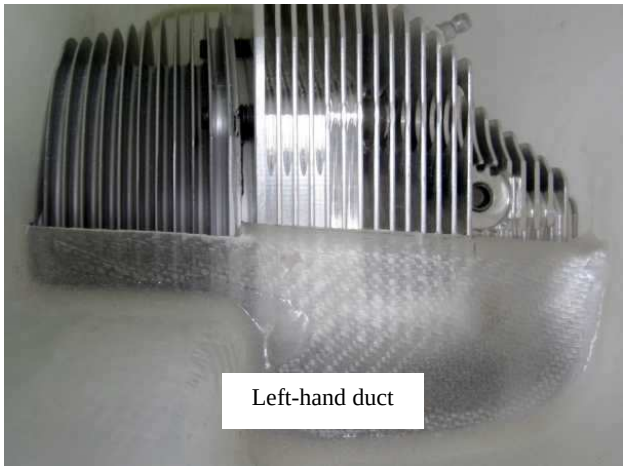
Test fit the ducts

Fitting the ducts will require adjustments to be made in several areas: firstly the oil lines to the rockers will need to be accommodated, then the rear baffle and the air dams will need to be adjusted and then the sequence repeated perhaps 2 or 3 times until the fit is correct.

Remove the 2 front and 1 rear rocker cover cap screws (circled top), test fit the duct and mark the locations for the cutouts around the oil lines (arrowed above). File out a notch for each oil line until the duct clears them by 1-2mm all round.

Leave the cap screws out and set aside until the final fitting of the ducts is complete.





The front air dams will need to be trimmed to fit around the fins on the cylinder heads and barrels. The final fit must have the air dams only just touching the fins as shown above.

It may take few trial fits so take your time and get the fit just right.

Left-hand duct, shown here upside down. The pencil marking is on the rear baffle

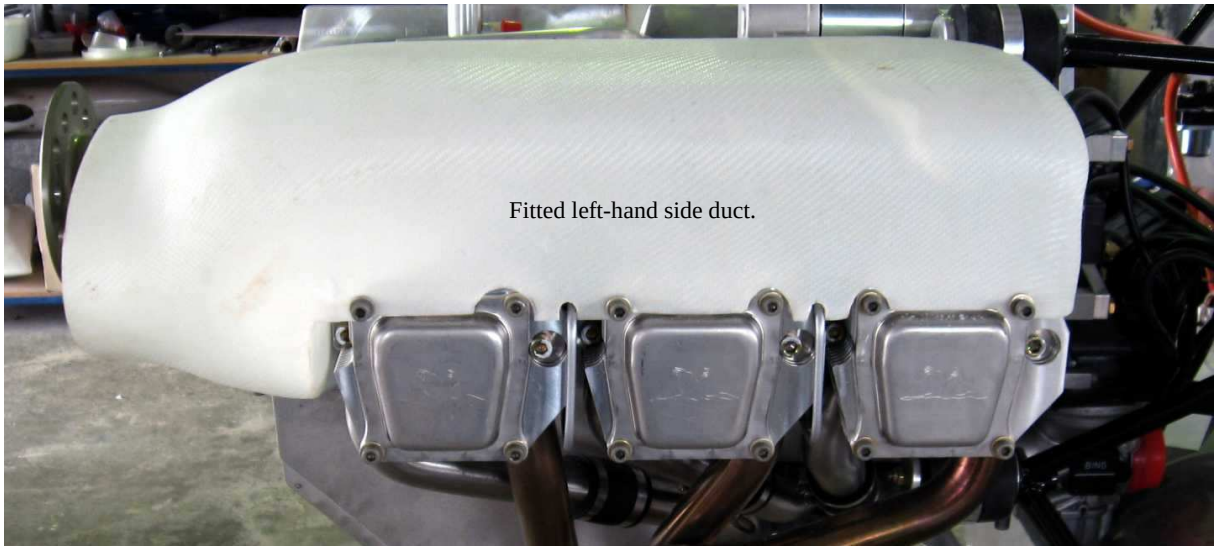
The baffles at the rear of each duct will need to be trimmed to allow the duct to sit down correctly. Test fit and trim until the inside of the duct sits down on the barrels, between the fins as shown above right, and the outside sits just on the top of the rocker covers.

Once the rear baffle and air dams are fitting correctly you can mark and drill each of the 3 rocker cover holes (circled in the photo at the top of the previous page) to ¼" and temporarily mount both ducts using the cap screws.

Mark a point on the inside of the duct directly above each front cylinder and drill a 3/32" hole, then flock and rivet the supplied right angle spring bracket into place as shown at right, placing a washer on the rivet inside the duct.

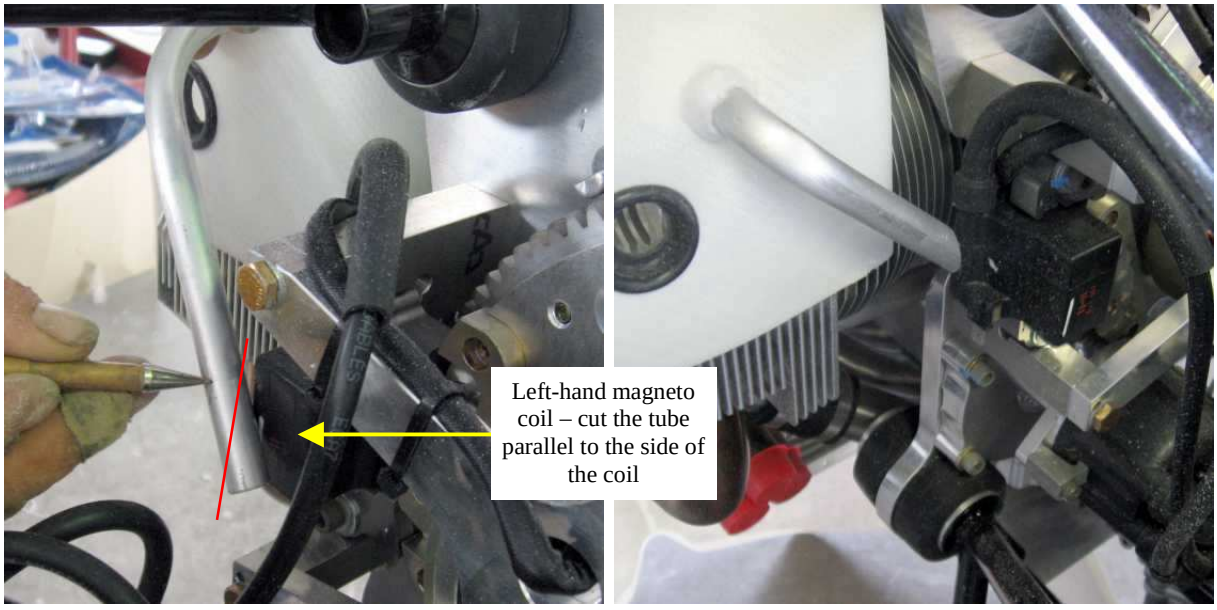
Fit a loop of lock wire around the cylinder between the third and fourth fin and through the bottom of the spring and twist it off.

The spring may be unhooked at the bracket end to remove the duct.



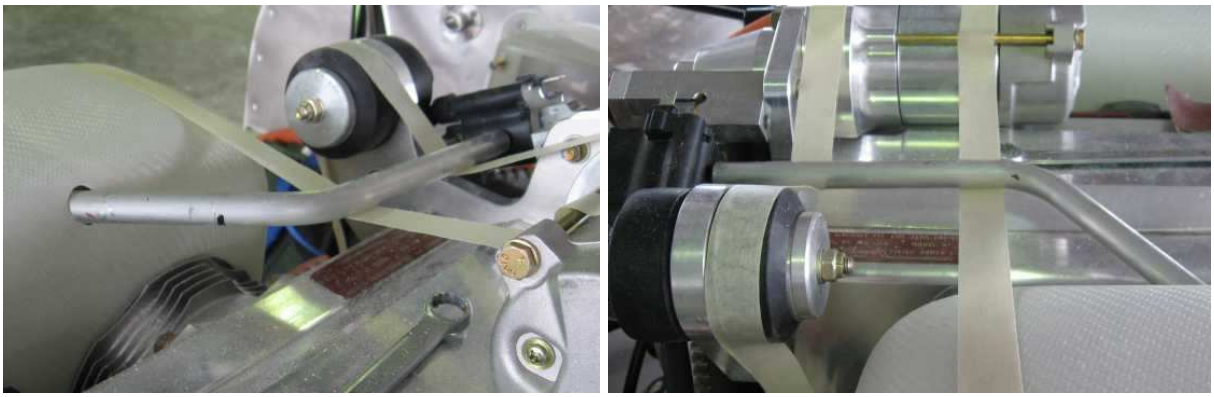
Fitted left-hand side duct.

Fit the magneto coil cooling tubes



Starting with the left-hand duct, drill a ½" hole at the top centre rear of the duct and slip the 90° curved aluminium tube into place. Aim the lower end of the tube at the centre of the left-hand magneto coil, mark the tube at an angle parallel to the side of the coil, remove the tube and cut along the mark. Shorten the top end of the tube as required – it should fit about 1½" to 2" (40-50mm) inside the duct.

Refit the tube to the duct and hold it in position with masking tape. Mix a small batch of 5-minute Araldite and flock and fix the tube to the duct. Leave to cure, then remove the duct and apply flock around the tube on the inside of the duct to provide strength. Leave to cure.



The right-hand duct will require a ½" hole on the inside top curve as shown above left, then follow the same procedure of holding the 45° tube in place with tape and flocking into place.

Leave to cure, then remove the duct and apply flock around the tube on the inside of the duct to provide strength. Leave to cure.

Refit both ducts and leave them in place.

This completes the *Pre-Paint>Fuselage>Engine>Fit ram air cooling ducts* task.

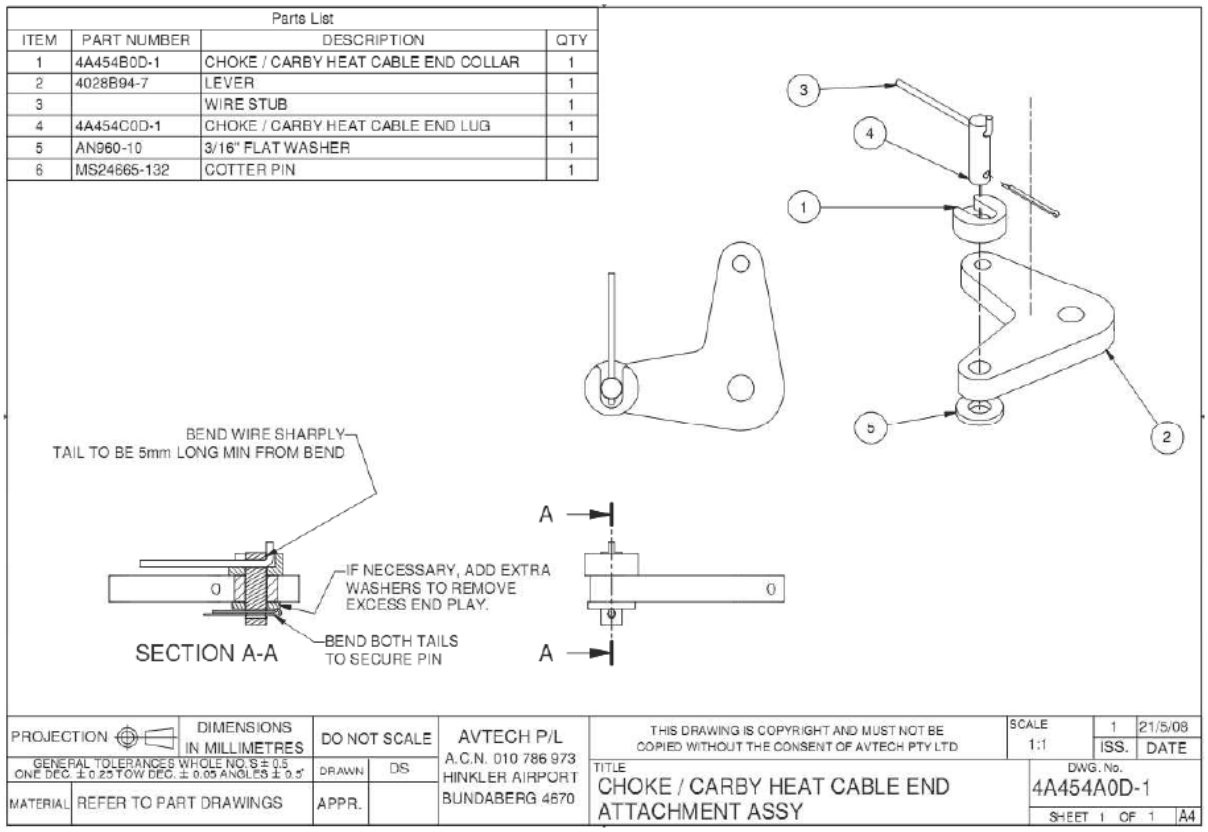
Choke, Carb Heat and Cabin Heat

Choke cable, cabin heat cable and carb heat cables are all terminated the same way. Run the cables through the firewall in as direct a manner as possible.

Attach cable wire to the device using the method below.

Parts List

ITEM	PART NUMBER	DESCRIPTION	QTY
1	4A454B0D-1	CHOKE / CARBY HEAT CABLE END COLLAR	1
2	4028B94-7	LEVER	1
3		WIRE STUB	1
4	4A454C0D-1	CHOKE / CARBY HEAT CABLE END LUG	1
5	AN960-10	3/16" FLAT WASHER	1
6	MS24665-132	COTTER PIN	1



PROJECTION	DIMENSIONS IN MILLIMETRES	DO NOT SCALE	AVTECH P/L A.C.N. 010 786 973 HINKLER AIRPORT BUNDABERG 4670	THIS DRAWING IS COPYRIGHT AND MUST NOT BE COPIED WITHOUT THE CONSENT OF AVTECH PTY LTD	SCALE 1:1	1 ISS.	21/5/08 DATE
GENERAL TOLERANCES WHOLE NO. S ± 0.5 ONE DEC. ± 0.25 TOW DEC. ± 0.05 ANGLES ± 0.5°		DRAWN DS		TITLE CHOKE / CARBY HEAT CABLE END ATTACHMENT ASSY	DWG. No. 4A454A0D-1		
MATERIAL REFER TO PART DRAWINGS		APPR.			SHEET 1 OF 1		A4

Choke Cable Installation

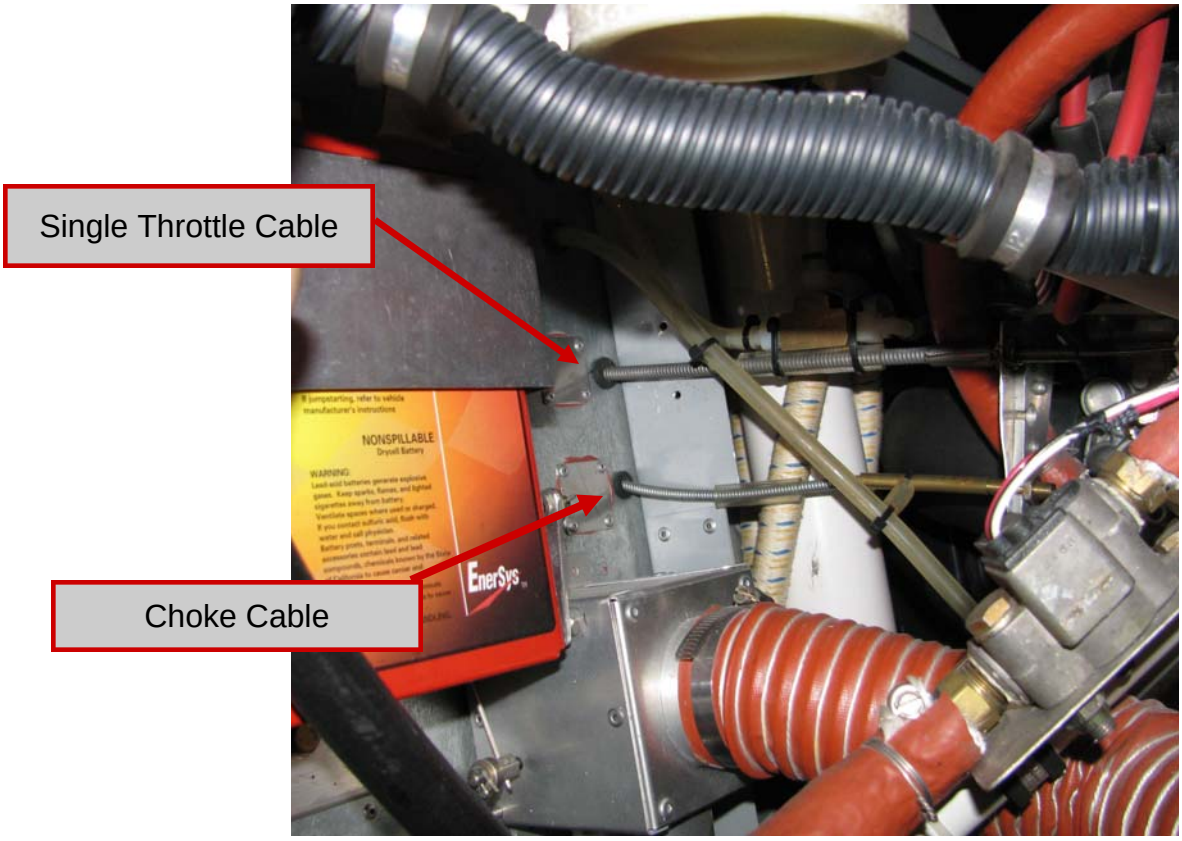
The choke cable must be routed from your panel, through the firewall, and to the carb cable bracket.

Locate a spot for a hole through the firewall that will be directly aft of the lower hole in the carb bracket and very close to the starboard side of the nose leg channel.

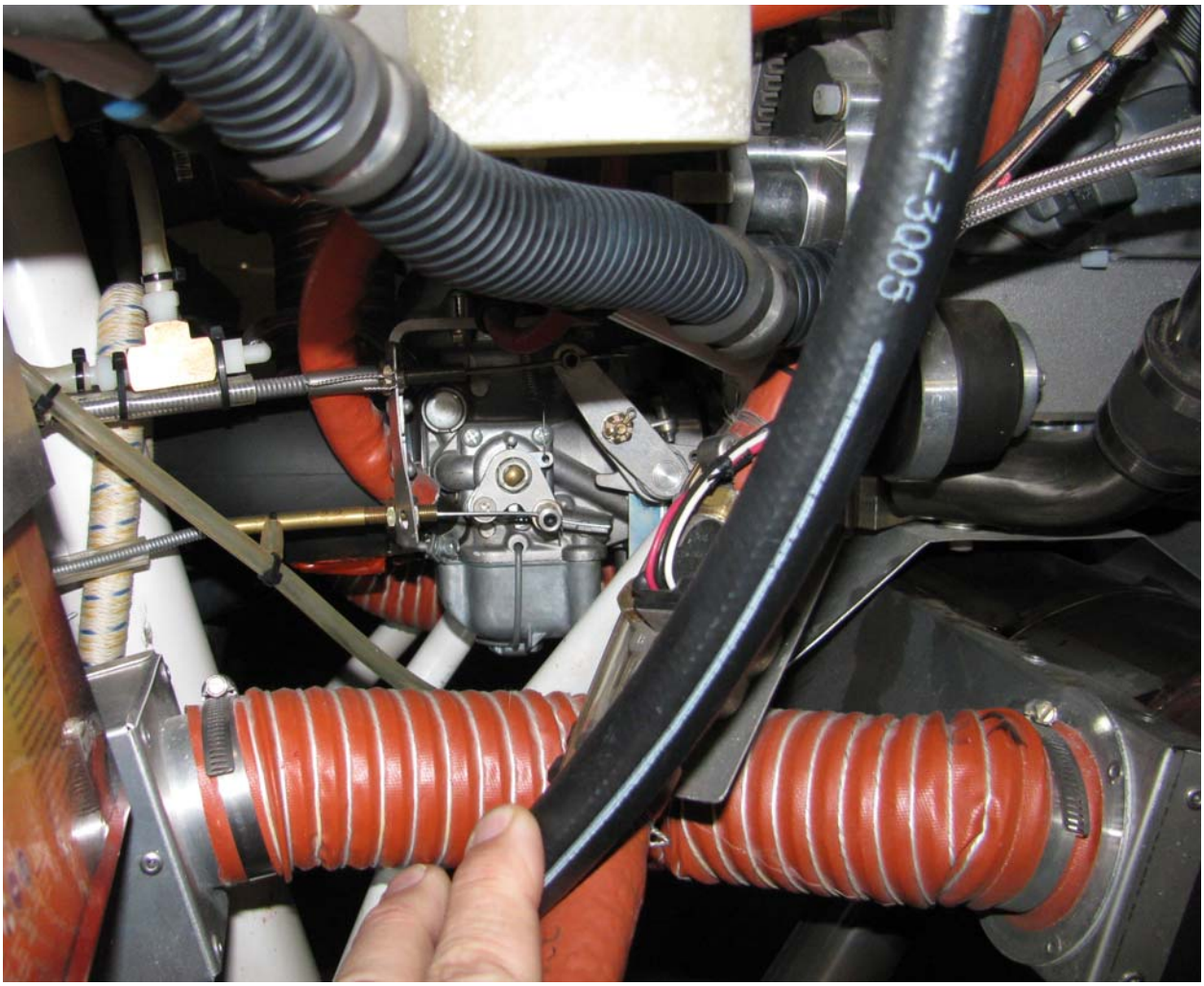
Drill 3/8 through the firewall

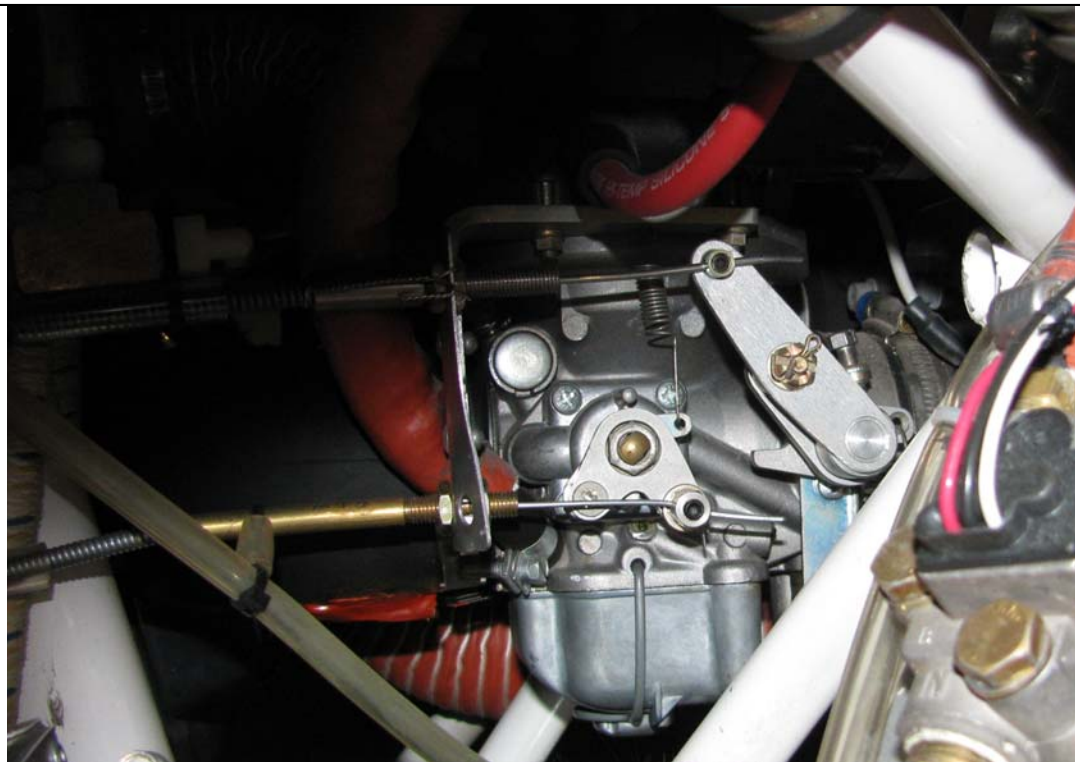
Insert a 3/8 grommet in the hole

Route choke cable from panel, through grommet, and through the bottom hole in the carb bracket.



Hold the cable end adjuster up to the cable to mark where the cable should be cut off.
Pull wire back through the sheath and cut off spiral sheath.
Clean up the end of the sheath.
Insert cable end adjuster on the end of the sheath
Swage the adjuster on to the end of the sheath
Insert adjuster into bracket and install jam nuts on either side of bracket.
Push the choke wire back through the sheath to the fully closed position.
Follow cable termination procedure from Section 11 to attach choke cable wire to carb choke arm
Adjust jam nuts so that the choke knob on the panel is all the way in when the choke is closed.
Check for full travel and rotation of choke arm and adjust if necessary.





Attach throttle arm extension if not already done. (see section 4.0)

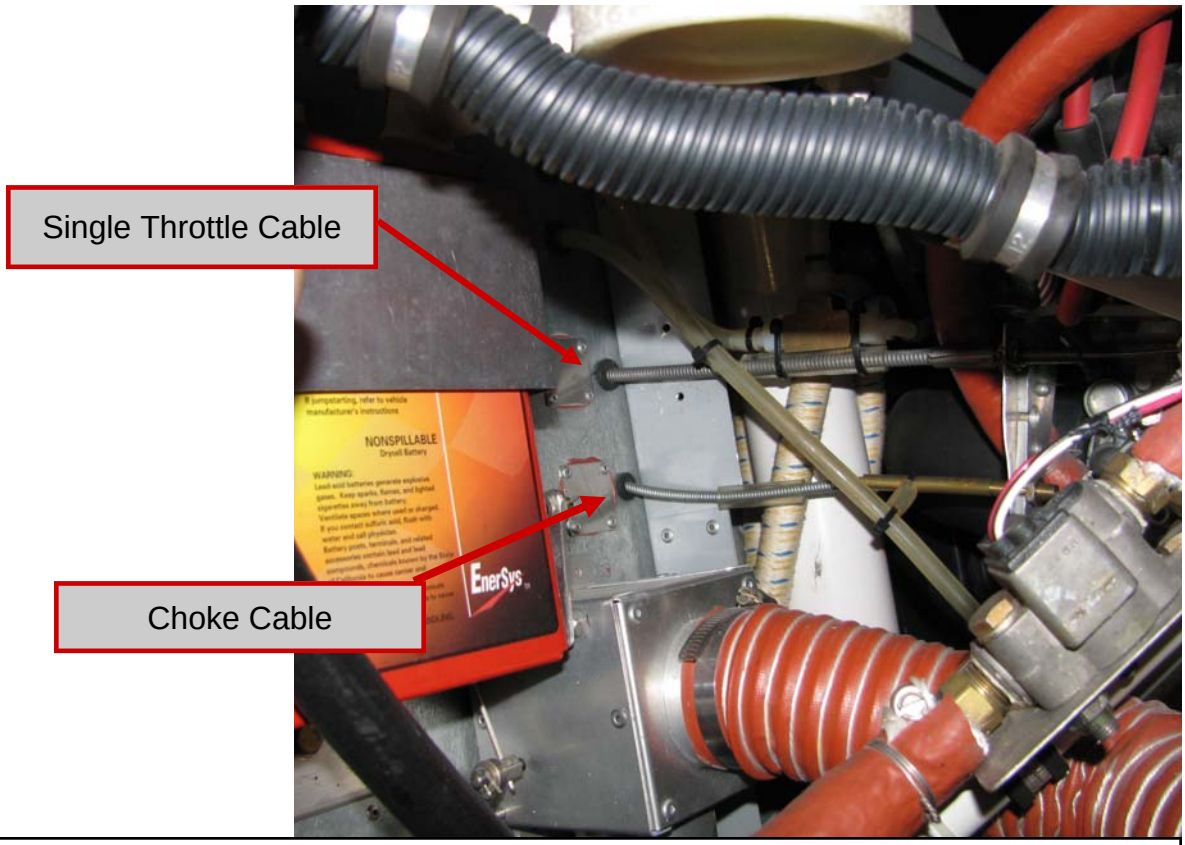
Route throttle from panel forward through firewall. The cable should exit the firewall very close to the nose wheel channel directly behind the top hole in the carb bracket. Install a grommet or cable safe (not supplied) in the firewall.

With the throttle cable in place, mark the length needed for the installation. With the cable in place this mark should be ¾ inch behind the carb bracket. Do not cut too short!

Remove the cable from the panel and firewall. Remove the center wire from the throttle cable sheath. Cut the sheath to length.

Clean up the cut end so that the spiral winding does not interfere with the center wire.

Install the 5/16 cable end adjuster and crimp on to the cable sheath with a swage tool. Swage on two places. Insert the center wire while swaging and crimp until a slight restriction is felt in the center wire. Release swage tool and the restriction should go away. The cable end adjuster needs to be crimped firmly to the sheath but not so tight as to bind the center wire.
Reinstall cable through panel and firewall.
Install one 5/16 jam nut on the cable end adjuster.



Insert adjuster into carb bracket and install the second jam nut.

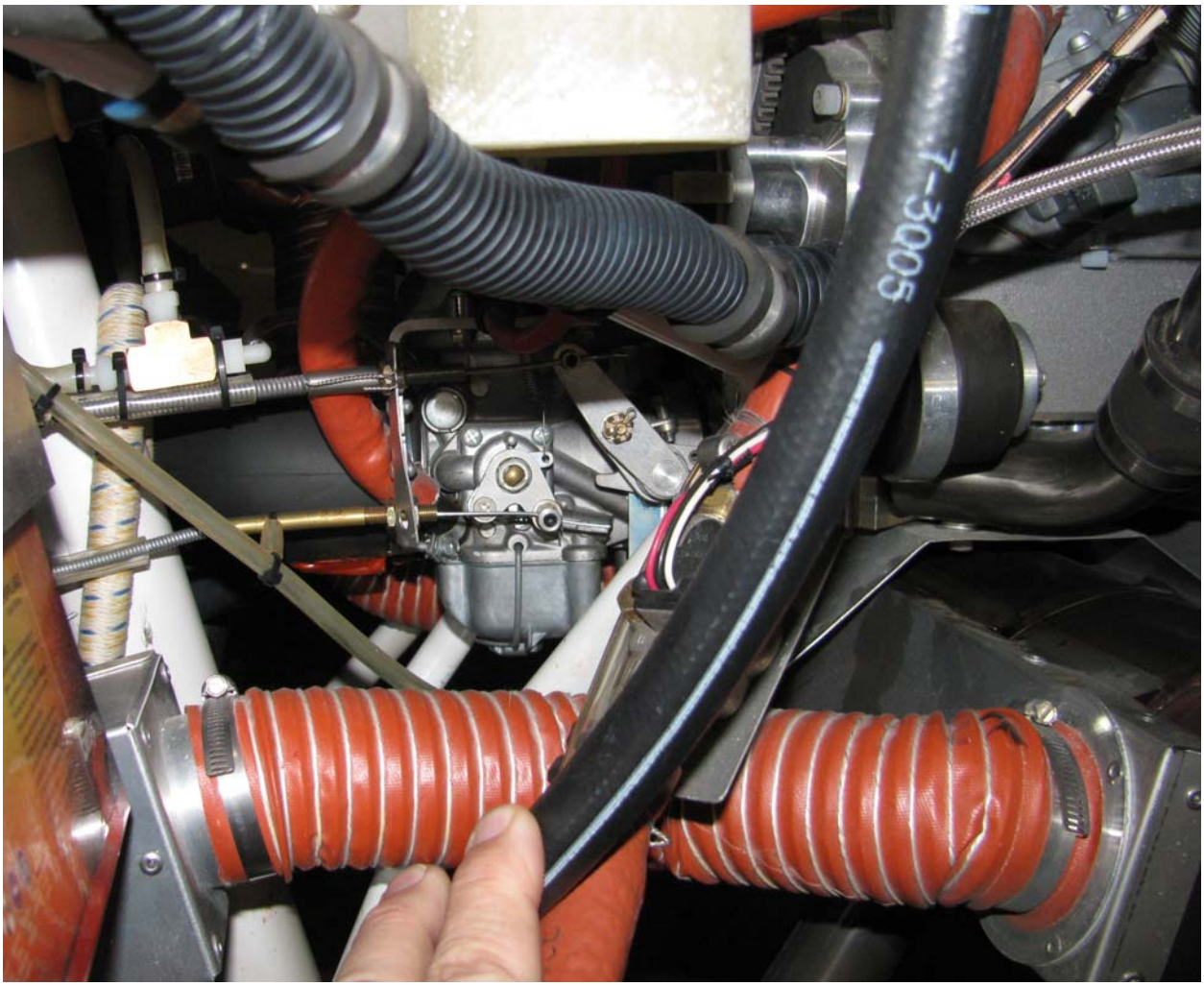
Feed center wire through the sheath.

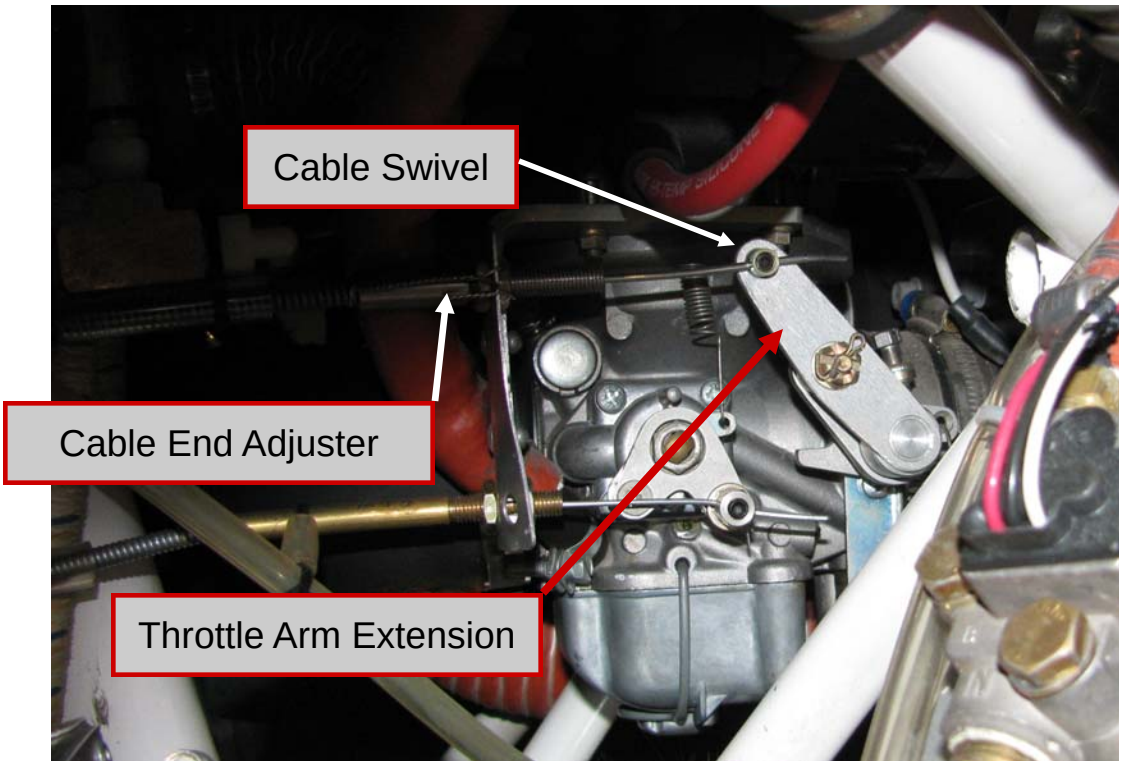
Install the ¼ inch cable swivel into the throttle arm.

Feed cable wire through the swivel.

Tighten the allen screws in the swivel from both sides.

Trim off extra throttle wire length.




Cable Swivel
Cable End Adjuster
Throttle Arm Extension

Photos and description show a Zenith CH701. Procedure is the same for a CH601-650

Locate Cable End at Firewall

Measure up from the stiffener shelf 2.25 inches and starboard from the center stiffener 1.25 inches. Drill a 3/8 hole.

Split Jam Nut

Place the outer jam nut on the end of the throttle cable with the round ball on it in a vise. With a hack saw or rotary cutter cut a slot in the jam nut so that the jam nut can be removed from the throttle cable end adjuster.

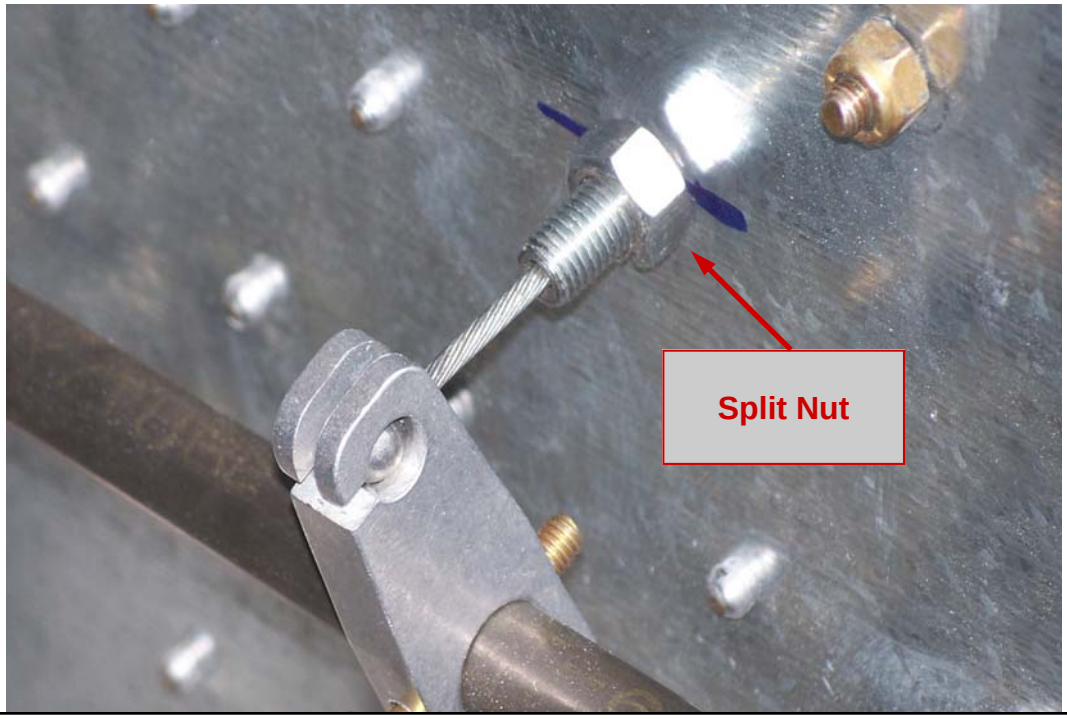
Install Cable End to Firewall

Remove the split jam nut.

Insert the cable end adjuster into the hole you drilled in the firewall.

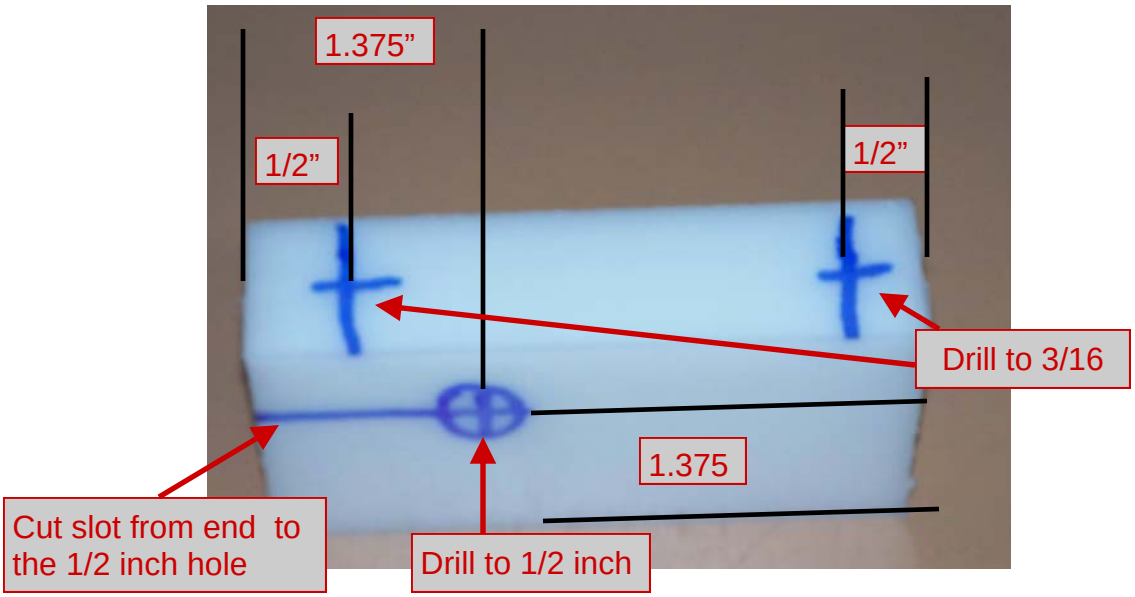
Install the split nut onto the cable end adjuster on the aft side of firewall.

Adjust cable end so 1/2 inch of the adjuster protrudes form the aft firewall.



Prepare Throttle Support Blocks

Locate the 1x2x8” acetal block and cut it into 2 pieces 1x2x4”
Mark and drill per the dimensions in the photos below.

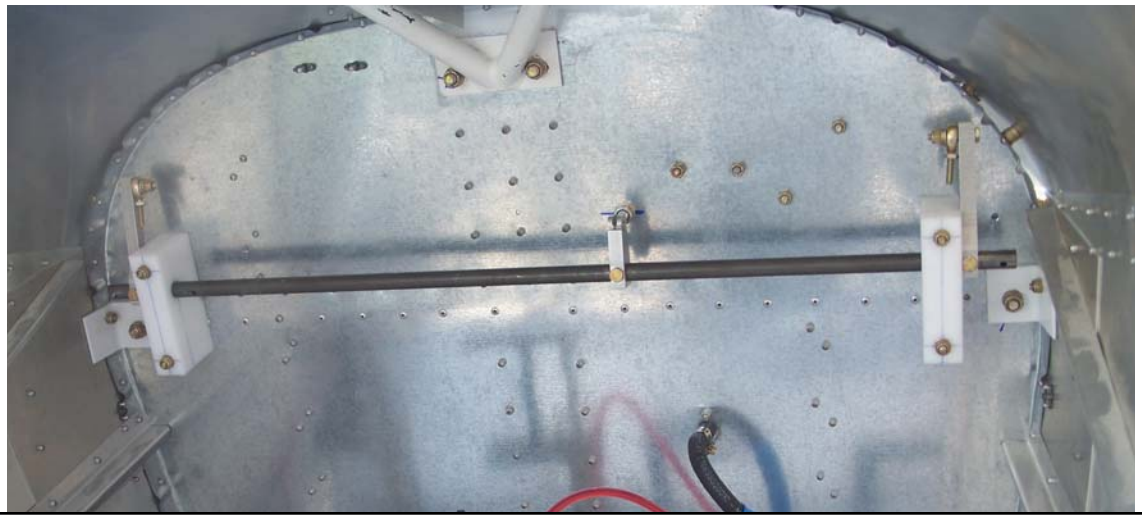


Assemble Throttle Cross Rod

Install the throttle output lever (the short lever) onto the cross rod. The slot will be facing to the rear.
Install the two throttle input levers about 1.5 inches in from each end.
Do not drill at this time.
Install the two support blocks on the ends of the cross rod.

Attach Cross Rod Assembly to Throttle System

Attach the output lever to the throttle cable by inserting the swaged ball into the receiver.
Adjust the position of the output lever on the shaft so that the cross rod is cen-



tered on the firewall.
Position the output lever against the cable end adjuster and drill a 3/16 hole through the output lever and cross rod. Install a AN3-11A bolt to hold the position.
Level the cross rod across the firewall and position the support blocks at the outer ends of the cross rod in a position where they will not interfere with other fittings (angle iron bracket, etc) on the firewall.
Drill through the support blocks and firewall and install the four AN3-23A bolts with the heads forward of the firewall and the nylock nuts and washer on the aft side of firewall. Snug up the bolts.
With the output lever up against the cable end adjuster, position the input levers so that they are snug against the support blocks and the top ends are about 1/2 inch from the firewall. Drill through the input levers and cross rod and install

AN3-11A bolts.
Install rod ends on the outboard sides of the input levers and secure with AN3-11A bolts, washers, and nylock nuts.

Assemble Throttle Push Pull Rods

Insert the 1/4—28 threaded rod and jam nut into aluminum push pull rod
Install throttle knobs on ends of push pull rods.
When panel is in place attach the push pull rods through panel (drill 1/2 inch hole and mount a 1/8 acetal cushion block with 3/8 hole behind panel to support push pull rod)
Attach to the male rod ends on the input levers using a jam nut to hold position.

Attach Cable to Carb

Turn one jam nut off the end of the carb end cable adjuster.
Insert the cable through the slot on the upper hole in the carb bracket
Insert the drive pin from the throttle cable into the throttle arm on the carb. You may have to sand away any excess solder that is on the cable drive arm to get it into the carb throttle arm.
Place a 5/8 washer over the cable drive arm behind the carb throttle arm and secure with a cotter pin.
Reinstall the jam nut and adjust cable length so that when throttles are pushed all the way in that the throttle arm on the carb reached the stop on the carb.

Zenith Firewall Forward Oil Cooler Installation

1 – Oil Cooler
8 – AN363-1032 Nut
8 – AN970-3 Washer
4 – AN3-7A Bolt
4 – AN3-5A Bolt
2 – AN4-42A Bolt
2 – AN363-428 Nut
2 – Aluminum Tubing 3-½" long ¼" ID
2 – Aluminum Angle 1"x1"x1/8"x4"
2 – Aluminum Angle 1"x1"x1/8"x6-1/2"
4 – Grommet 9/16" OD
1 – Braided Oil Line 2' long
3 – 050-FCM-1012 AN6 Straight Hose Fitting
1 – 050-FCM-4022 AN6 45 Degree Hose Fitting
2 – 050 FCM-2003 1/8 NPT – AN6 Adapter
2 – 050 FCM-???? 3/8 NPT – 45 Degree AN6 Adapter

Step 1. On the two 6 ½" aluminum angles mark two holes one inch in from each edge. When marking these holes make sure that you take into account the OD of the aluminum tubing spacers. If you make the holes too far on the bottom edge of the angle then the spacers will hit the top of the oil cooler. Drill these holes out to 1/8".

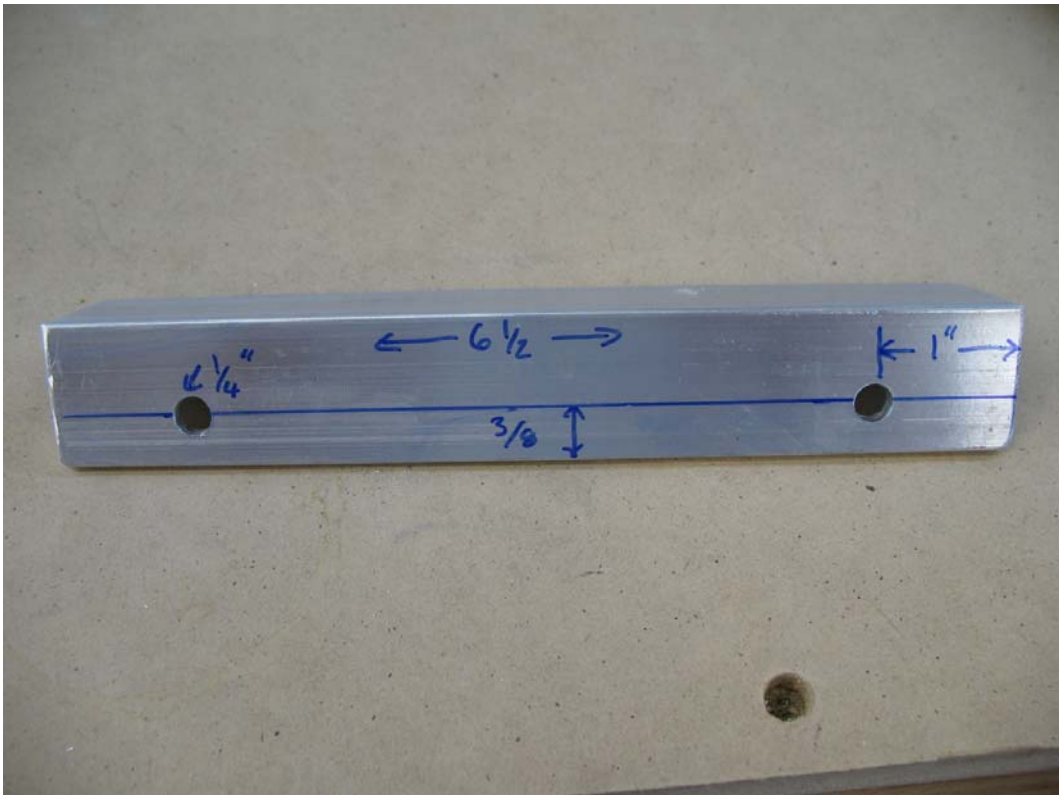


Figure 1

Step 2. Center the 6-1/2” aluminum angle on the top flange of the oil cooler with the bottom of the angle flush with the bottom of the oil cooler flange. The top of the angle goes towards the center of the oil cooler. Back drill through the angle into the oil cooler flange. Drill out to ¼”. Repeat for the other angle

Figure 2

Figure 3

Step 3. Trim the ¼” ID aluminum tubing spacers as needed to fit between the oil cooler flanges

Figure 4

Step 4. On the 4" aluminum angle:

1. On one face of the angle trim off 3/8" of material leaving 5/8"

Figure 5

2. On the other face of the angle make a cutout 1 ½" wide by 5/8" deep to clear the oil cooler fittings

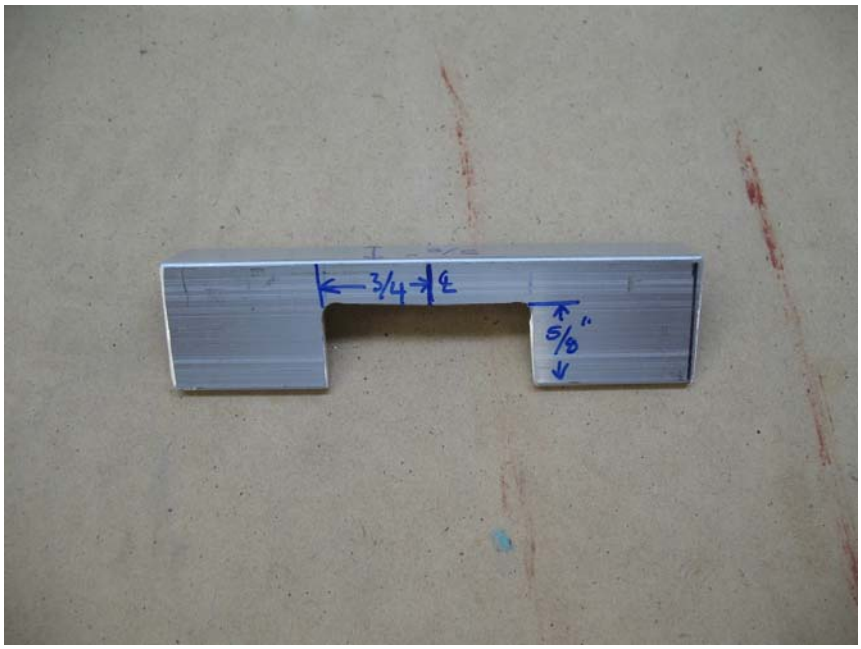


Figure 6

3. On the cutout side of the angle drill two 1/8” pilot holes 5/8” in from each side and centered on the angle

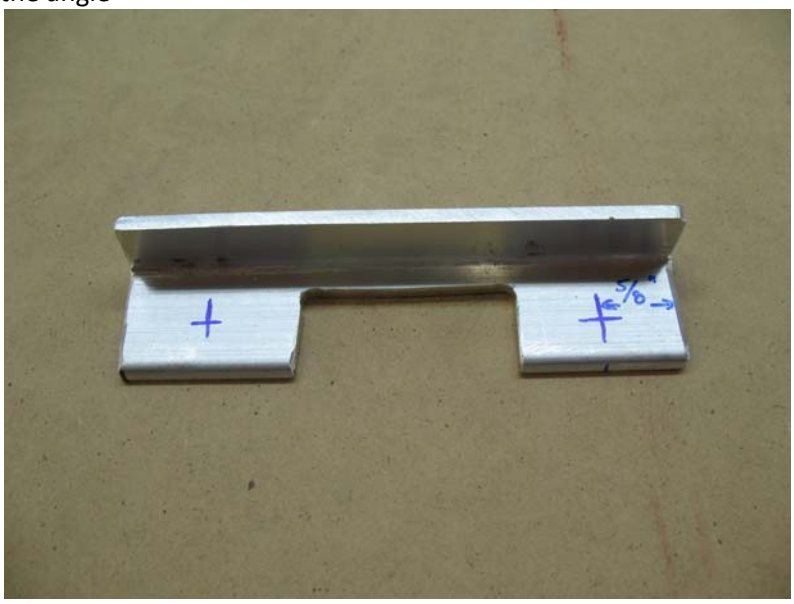


Figure 7

Step 4. Measure the distance between outer most oil pan fins. This measurement should be approximately 4-3/8”. Transfer this measurement onto the 6-1/2” oil cooler brackets.

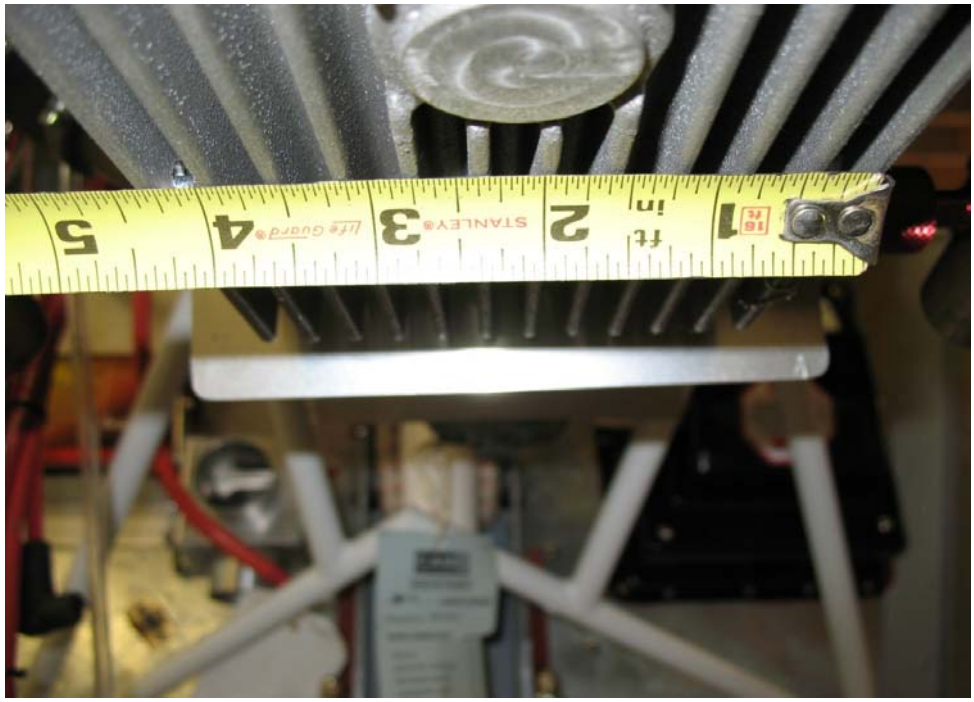


Figure 8

Figure 9

Step 5. Clamp the 4” angles to the oil cooler angles with the cutout clearing the cooler inlets and the inboard edge against the measurements you just made. Back drill through the pilot holes into the oil cooler angles. Before back drilling the second bracket clamp it in place and check the fit against the oil pan fins. Drill all holes out to 3/16” for the AN3-7A bolts.

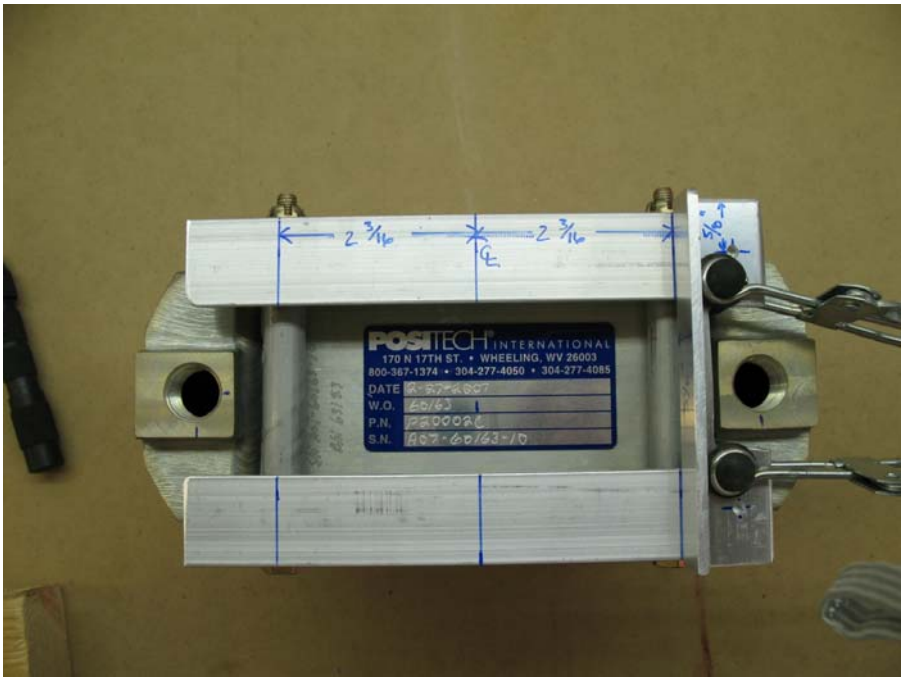


Figure 10

Step 6. Mark two 1/8" holes on the 5/8" face of the 4" angles (see figure 11 next page). Mark these holes ½" in on each end of the angle. Carefully measure the height of the oil pan fins and take into account that you will be using a nut between the fins. If you drill too high on the fin then the nut will end up hitting the bottom of the oil pan and you will not be able to get a bolt through it.

Figure 11

Step 7. Place 4” bracket on the side of the oil pan. Line up the bottom front edge of the angle to the front edge of the oil pan. Back drill through 4” angles into oil pan fins. You will have to drill through two fins to make room for the correct length bolt.

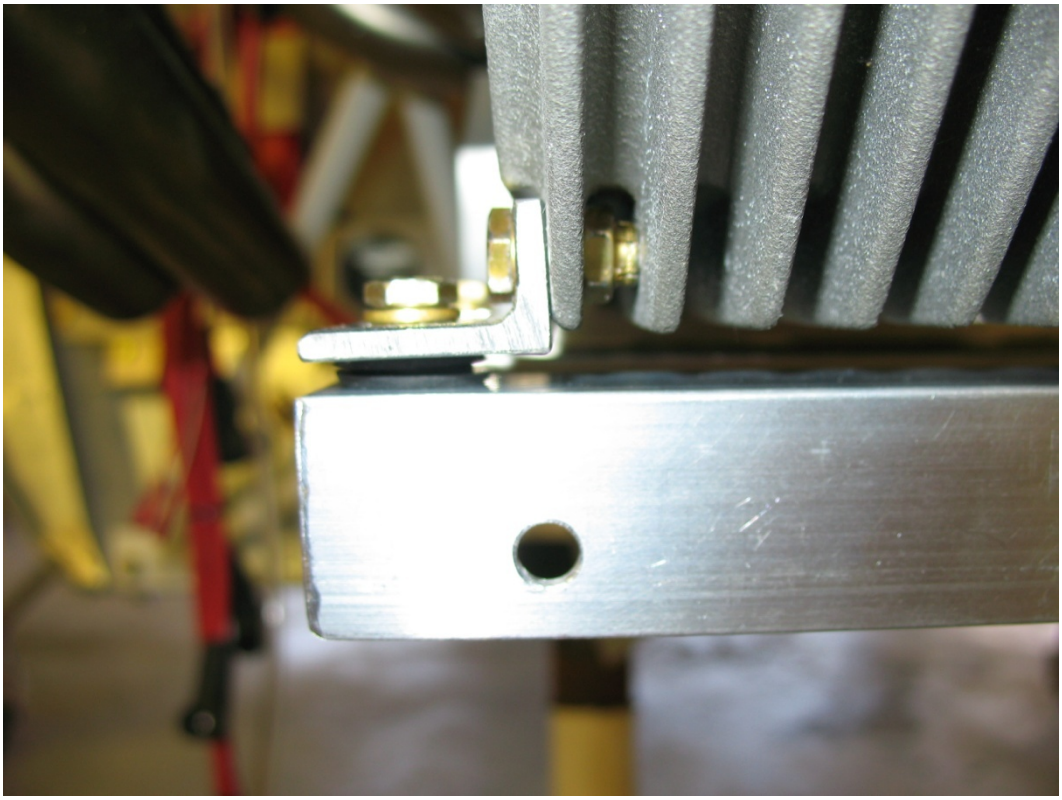


Figure 12

Assembly

Step 1. Make sure all holes are de-burred and all sharp edges removed from the brackets.

Step2. Assemble oil pan brackets to oil pan using AN3-5A bolts and metal locknuts.

Step 3. Assemble oil cooler brackets to oil pan brackets using AN3-7A bolts, nuts and washers. Place grommet between oil pan bracket and oil cooler bracket. Finish with metal locknuts.

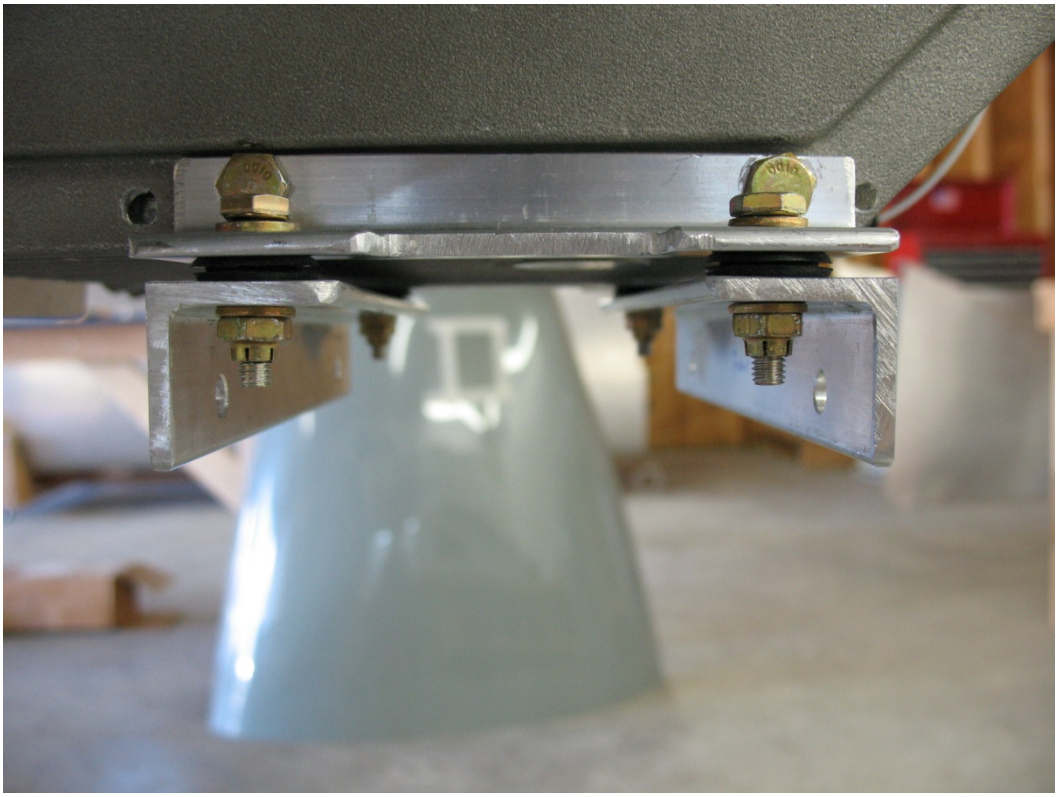


Figure 13

Step 4. Screw 3/8 NPT – 45 Degree AN6 Adapter fittings into oil cooler. Don't forget to use a thread sealant such as Permatex 2B.

Step 5. Temporarily bolt the oil cooler to the brackets using the AN4-42A bolts and spacers. Put the lower cowl in place and note the offset of the oil cooler in the cowl inlet. Remove cowl and oil cooler.

Figure 14

Step 6. Fabricate a mounting flange for the baffle material out of scrap L angle and aluminum from the Zenith kit.

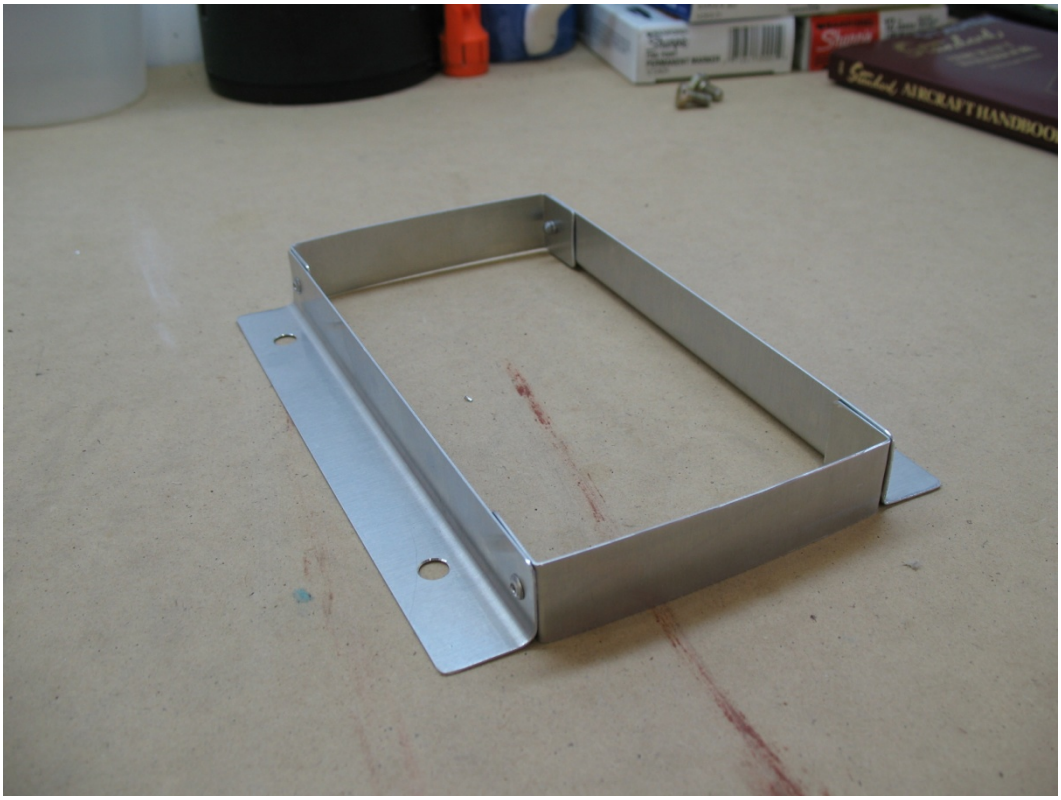


Figure 15

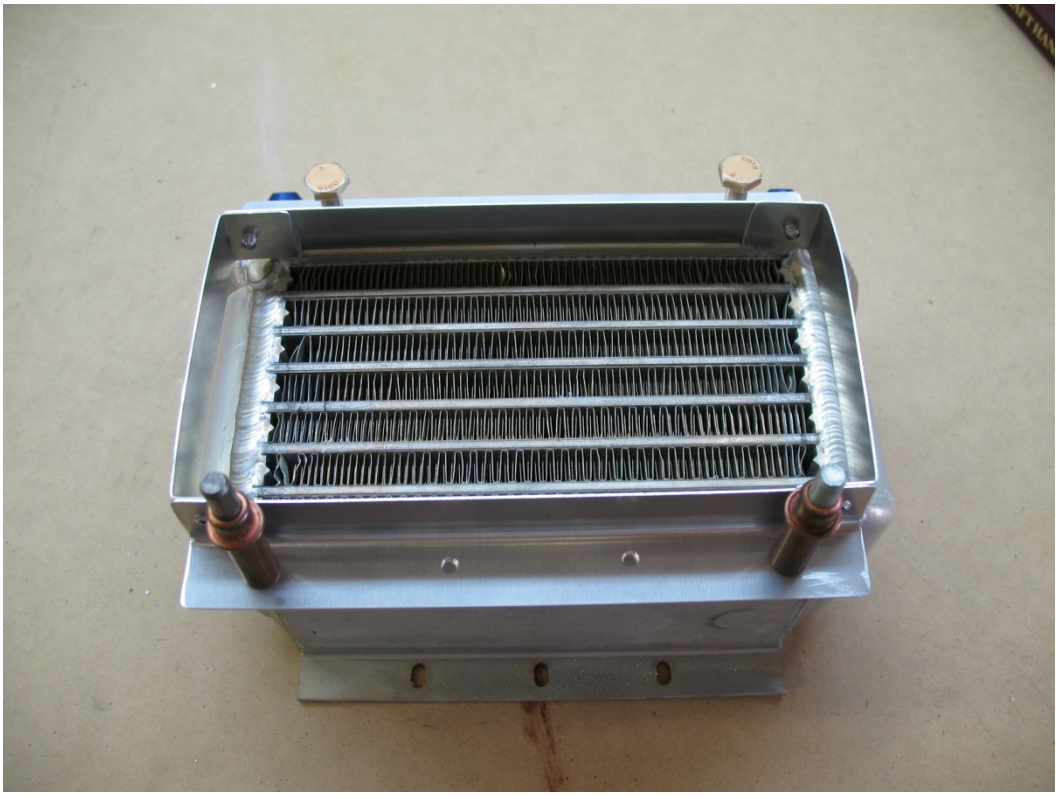


Figure 16

Note: Flange is offset to the left. This was done to center the baffle on the inlet in the cowl.

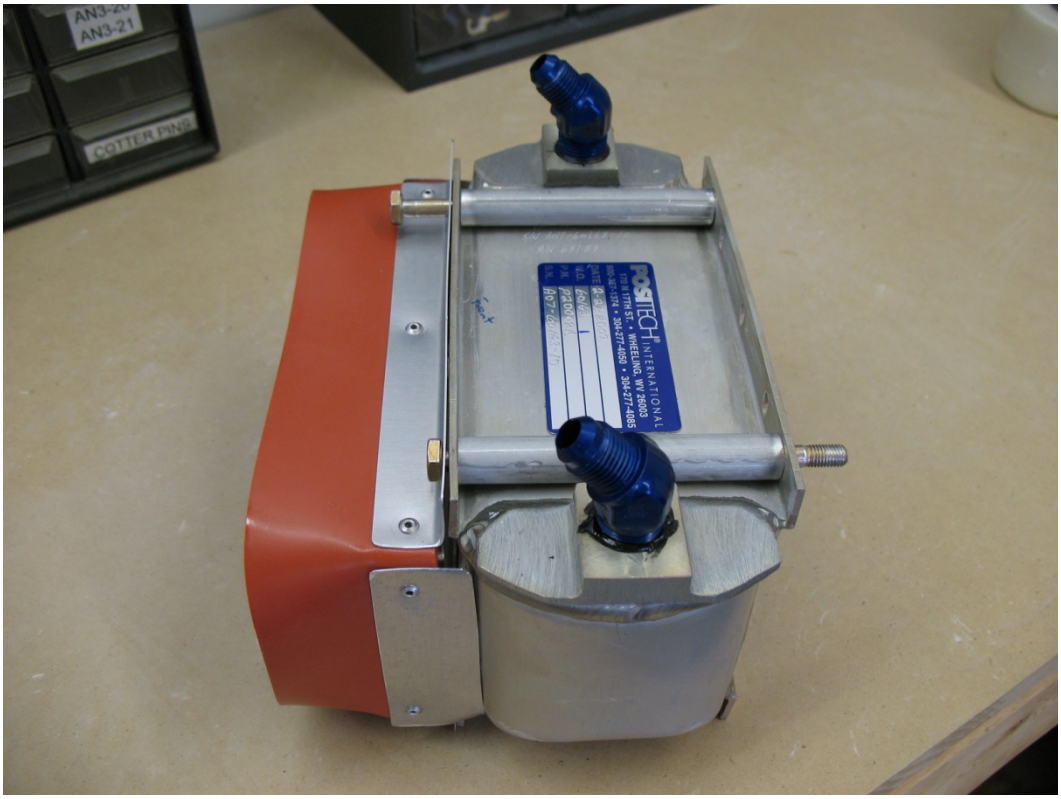


Figure 17

Sandwich the baffle material between the flange and pieces of scrap aluminum.

Figure 18

Step 7. Bolt oil cooler in place using AN4-42A bolts, spacers and metal locknuts.

Step 8. Locate oil cooler by-pass plate and oil filter extension fitting sent with the Jabiru engine. Remove the barb fitting from the by-pass plate and replace them with the 1/8 NPT – AN6 Adapter fittings.

Figure 19

Step 9. Remove the oil filter. Screw on the oil filter extension fitting and snug down.

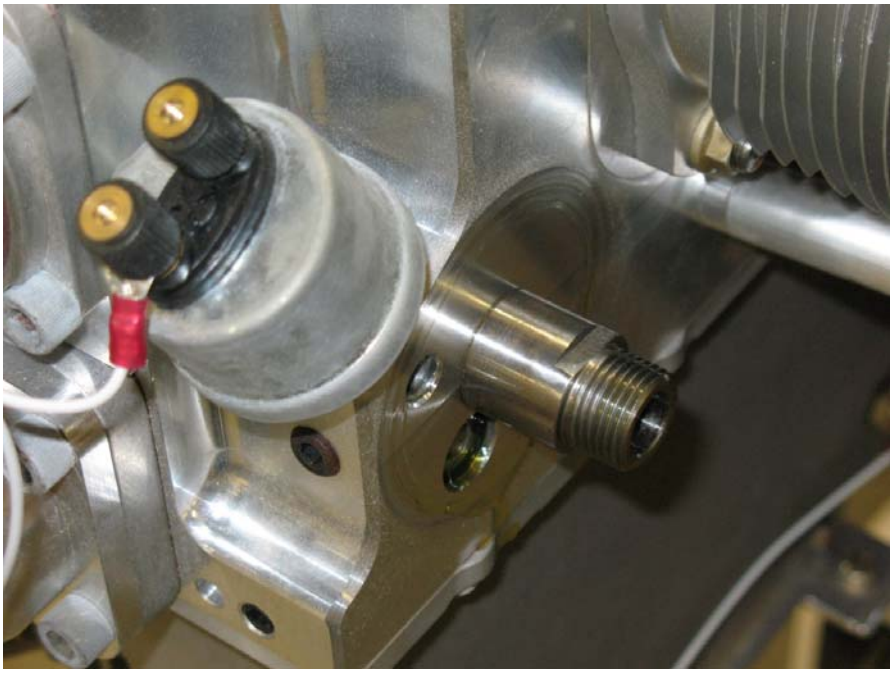


Figure 20

Step 10. Lightly lubricate the oil ring on the oil cooler by-pass with engine oil. Slide the by-pass over the fitting and orient the plate so that the rear AN-6 fitting is pointing down. Re-install the oil filter.

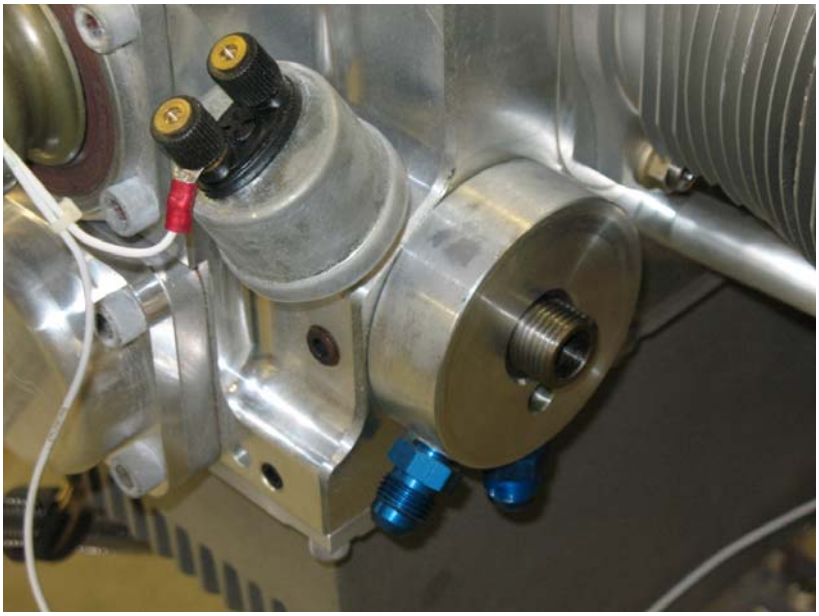


Figure 21

Step 11. Carefully measure and fabricate the oil lines. For instructions on fabricating the oil lines please visit *http://www.usjabiru.com/zenithch601installation-instructions.html* and download the "Stainless oil cooler line assembly" instructions. The oil line running straight down to the left (pilots) side of the oil cooler uses two straight fittings. The oil line that runs to the right side uses a 45-degree fitting at the oil filter and a straight fitting at the cooler.

Figure 22

Secure the oil line as needed to minimize vibration.

Figure 23

Pre-Paint>Fuselage>Firewall forward>Fit propeller flange extension

Objectives of this task:

To remove the universal propeller flange that is shipped with the engine and fit the model-specific propeller flange extension to the crankshaft. While this is a straightforward mechanical task it is most definitely a **critical** task and care must be taken.

The universal propeller flange is lock wired in place, however the depth of the propeller flange extension makes the use of lock wire almost impossible and so we use a strong Loctite to keep the flange securely fitted. This means that the cleanliness of all threads is critical.

This task will require 2 people: 1 to stop the crankshaft from moving and 1 to loosen and later tighten the cap screws. This task is intended to be performed by the kit builder with the engine mounted to the aircraft. In the factory we do this task while the engine is fitted to a mobile engine stand so some of the photos will be slightly different to what the kit builder could expect to see.

Materials and equipment required:

Loctite 620 and lockwire

Thread cleaner – Loctite 7471 or Acetone

5/16” Hex drive socket, or alternately a 5/16” Allen key cut straight and fitted to a 5/16” socket

Torque wrench, set to 30 ft/lbs or 40 Nm

Remove the universal flange



The universal flange is held in place by 6 x 3/8” UNF Allen head cap screws, all of which will be reused.

Cut and remove the lock wire from the 6 cap screws, then heat the cap screws with a heat gun in order to loosen the Loctite.

Lock the engine from turning by holding a large blade screwdriver in the ring gear teeth between the starter motor and the adjacent alloy block (circled in the photo above right).

Crack each cap screw in turn to break the Loctite seal and remove each cap screw and the related washer.

Set the cap screws and washers aside for later use.

Remove the flange and discard.

Clean and prepare the screws and hub



Clean the cap screw threads with a wire brush – make sure that there is no residual Loctite in the threads. Clean all threads with cleaning solvent (Loctite 7471 cleaner or Acetone) and dry.

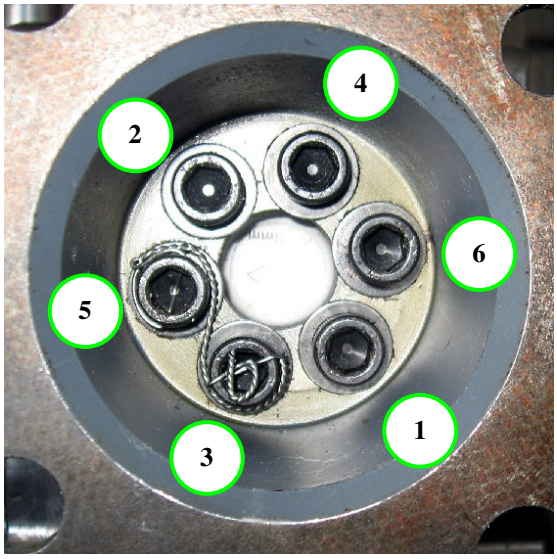
Run a 3/8" UNF flat bottomed tap all the way into each bolt hole in the hub, apply a cleaning solvent (Loctite cleaner or Acetone) into each hole and then blow dry with compressed air. ***Check that each thread is absolutely clean and dry before proceeding***.

Fit the propeller flange extension

Set your torque wrench to 30 ft/lbs or 40 Nm and place it on top of the engine.



Apply a few drops of Loctite 620 to each screw hole, place the propeller flange extension on the hub and fit the 6 cap screws and washers.



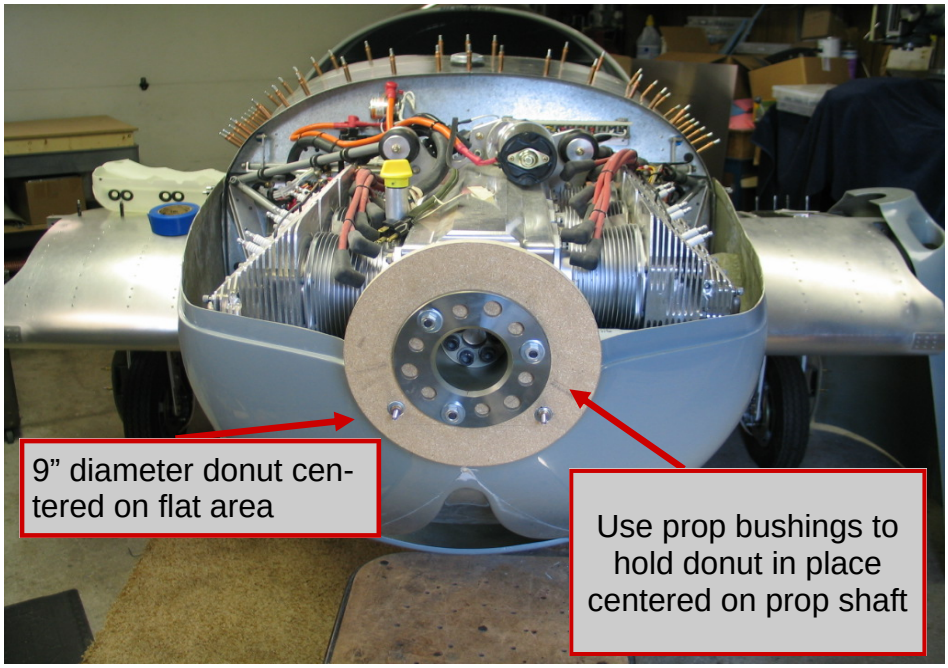
Have your helper lock the engine from turning and tighten all the cap screws firmly then torque each cap screw to 30 ft/lbs or 40 Nm, working in a criss-cross pattern as shown at right. Re-check each cap screw, applying steady pressure on the torque wrench until the torque value is reached.

Re-check the torque values again and then lockwire each pair of cap screws together. Lockwiring cap screws in extended propeller flanges is very difficult. Jabiru only lockwire cap screws in standard propeller flanges.

This completes the *Pre-Paint>Fuselage >Firewall forward>Fit propeller flange extension* task.

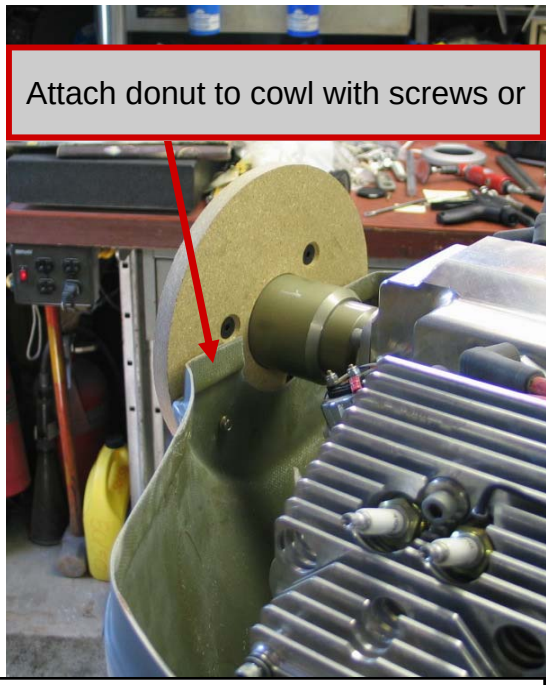
1.1 In simple terms, the cowls are installed by fitting the bottom cowl to the fuselage and attaching with screws to the fuselage and then fitting the top cowl and attaching it to the fuselage and bottom cowl with Camlocs.

1.2 One positioning jig will make installation much easier. Fabricate a “donut” from 3/4 inch thick chipboard or plywood. Cut the inside hole of the donut to 2.75 inches in diameter and make the donut 9 inches in diameter on the outside to match the spinner size. *If using the Cummins aluminum spinner you will need to make the plywood donut about 1/8 inch thicker or shim the donut against the prop hub to account for the thicker spinner back plate*.



1.3 Place the original prop hub that you removed from the crankshaft on the donut. Center the hub and with a 5/8 hole saw drill through three of the prop hub holes so you can insert the engine prop bushings later on.

1.4 Cut the donut in half (don’t cut through the holes in the hub area.. Position one half against the upper cowl spinner flange (the



flat area that falls just behind the spinner) and temporarily attach it to the upper cowl with a few self tapping screws inserted from the inside of the cowl into the wood block.

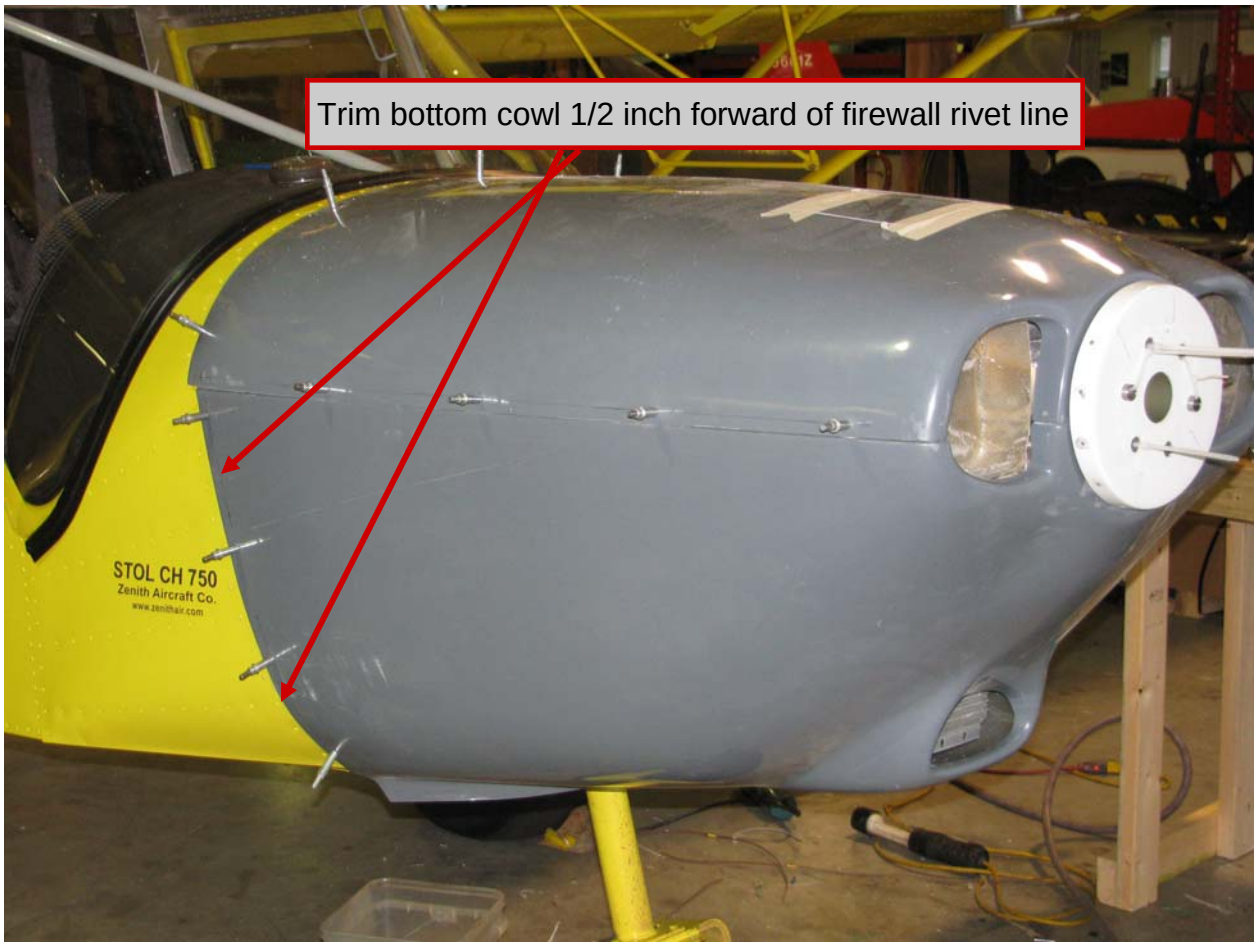
1.5 Attach the lower cowl to the other half of the donut in the same manner.

1.6 **Bottom Cowl**

1.6.1 Lift the lower cowl into place and secure the rear end in approximately the right place on the fuselage with tape. Position the front with the donut just behind the prop hub (on the prop hub extension) and secure with the prop bushings from the engine accessory pack and some temporary bolts or screws.

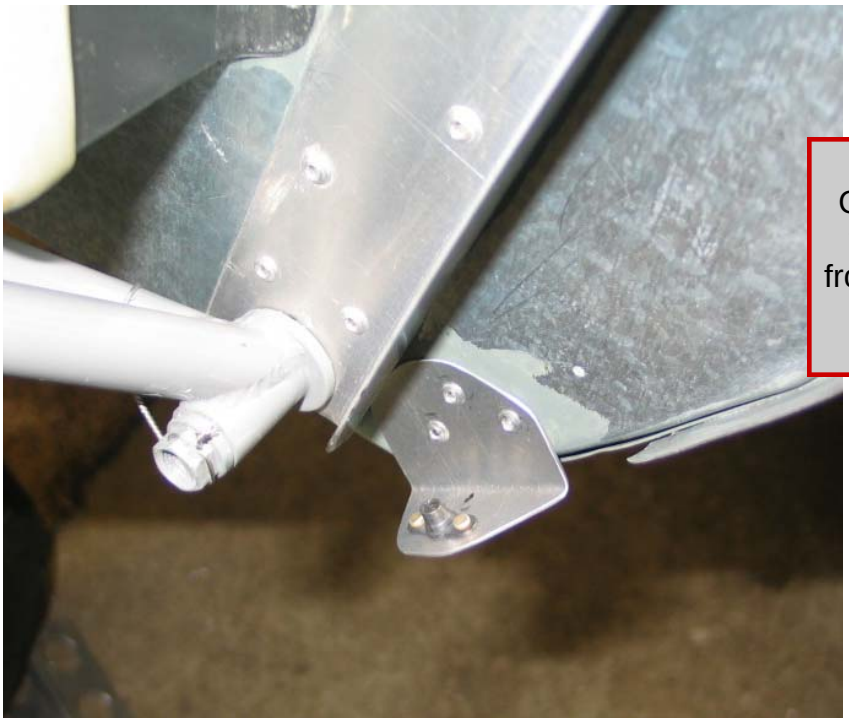
1.6.2 The inside radius of the donut should fit around the shaft of the prop hub extension and hold the front of the lower cowl in place.

1.6.3 Continue with the fitting of the rear of the cowl against the fuselage. Adjust the bottom cowl so that it is even on each side.



1.6.4 The rear of the cowl is made a bit long so that a builder can trim it to his liking. We would suggest trimming to about a half inch forward of the firewall rivet line.

1.6.5 Once the cowl is trimmed, drill three holes for temporary attachment of the cowl to the fuselage. Drill to 1/8 inch and cleco the cowl in place.

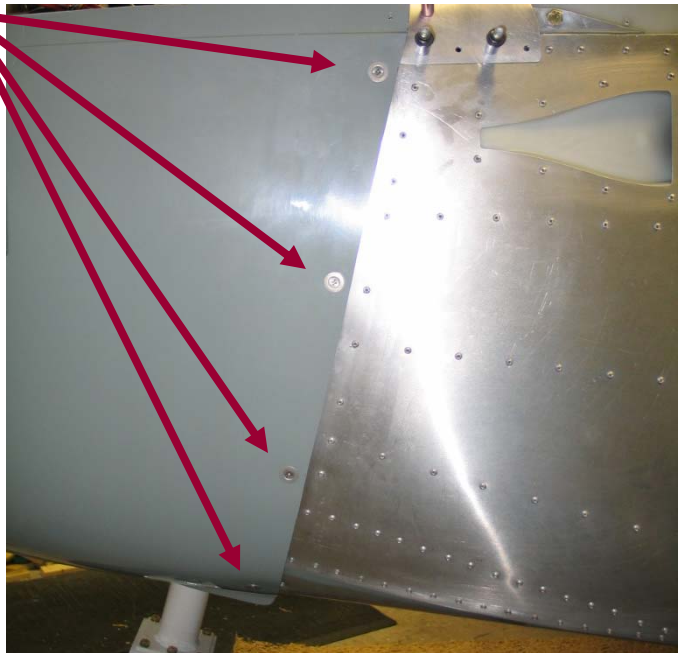


Optional bottom cowl attach bracket fabricated from spare or scrap aluminum sheet stock.

1.6.6 Fabricate a bottom attach bracket from some .032 aluminum scrap from the Zenith kit and attach to the firewall per the photo at left. Position the bracket so that the bent tab is in contact with the cowl. When happy with the fit, rivet to the firewall and then drill the final bottom cowl attach holes and cleco cowl in place.

1.6.7 To complete attachment of the bottom cowl, remove the cowl and drill the holes in the sides of the fuselage out to 5/32 inch and install the MK1000-8 nutplaces behind the holes. Be sure to countersink or dimple

Countersink cowls so that Tinnerman washers are flush with surface



the holes for the 3/32 flush rivets that attach the nutplates. Before final riveting of the nutplates, drill the hole out to 3/16 to give a bit more clearance to the #8 machine screw that will hold the cowl.

1.6.8 Using a stop countersink bit, countersink the holes that you drilled in the sides of the lower cowl so that the Tinnerman washer will fit flush with the surface.

1.6.9 Reinstall the lower cowl using the donut in the front and the #8 taper head screws and Tinnerman washers in the rear.

1.6.10 Once the nutplates are in place, trim the side skin of the fuselage to suit using the photo as a guide.

1.7 **Top Cowl**

1.7.1 **Hint: One of the keys to good cowl fit is to pull the upper cowl tightly down around the fuselage at the rear of the upper cowl. Trimming need to be finished before the cowls can be pulled tightly together. Some gaps may appear at the rear of the top cowl if not pulled tightly down.**

1.7.2 If not already done attach the remaining half to the donut to the front of the top cowl in the same manner as the lower cowl. Place the upper cowl on the airframe and secure in the front at the donut and prop hub.

1.7.3 Center the top cowl on the fuselage and hold in place with tape at the rear upper end. Mark the rear of the upper cowl for trimming (it will be a bit long especially at the sides) and trim to suit. We would suggest

matching the length at the sides with the lower cowl and then keeping a consistent distance from the firewall rivet line over the top.

1.7.4 The upper cowl will attach with 5 Camlocs on each side and two Camlocs over the top rear. The top cowl was molded just a bit oversize to allow for some variation in the size of the airframe that might occur in some cases and most likely may need some trimming along each side to fit snuggly in the joggle joint.

1.7.5 When satisfied with the rear trim, again fasten the rear in place with tape. Try to center the upper cowl on the fuselage before taping. Using some more tape, pull the sides of the top cowl down over the lower cowl and mark for trimming for a good fit in the joggle joint. Trim with a long sanding block with 80 grit paper or a Permagrit abrasive block.

1.7.6 When cowl is trimmed to fit, installation of the Camlocs can begin. Use a 1/8 drill to initially drill the Camloc locations and clecos to fasten the top and bottom together. Start at the front and locate a Camloc about midway in the front flange. For the sake of symmetry, drill each side in the same location. Insert clecos to hold the cowls together.

1.7.7 Mark the sides of the cowl to evenly space 4 Camlocs on each side. Plan on locating the most forward Camlocc about six to eight inches behind the bend at the front and the rear Camlocs about 5/8 inch forward of the trailing edge of the upper cowl. Locate the holes so that they are slightly below the center line of the joggle joint. Again, make each side the same. Drill to 1/8 inch and install clecos to hold the cowls together.

1.7.8 Finally , evenly space the two Camlocs on the top rear of the upper cowl. Drill to 1/8 and install clecos to hold the cowls in place.

1.7.9 Installation of the Camloc receptacles is next. Camloc receptacles are installed similar to nutplates. Drill the 1/8 holes in the loawe cowl hole out to 5/16. Insert a 5/16 bolt into the hole and into a Camloc receptacle (the bolt keeps the Camloc centered in the hole) and use a 3/32 drill to backdrill the Camloc attach holes. Counter sink the Camloc attach holes so the 3/32 rivets will be flush and rivet the camloc body in place.

1.7.10 Drill a 1/4 inch hole in the upper cowl for the Camloc insert. Make a small notch in one side of the hole to allow the pin to fit through. On the sides of the cowl the Camloc receptacles are installed on the back side of the joggle joint and #6 Camloc inserts are used. At the top rear the bod-


Trim the upper cowl for a smooth transition to lower cowl
Z601XL
CRAFTSMAN

Please note—if using the round position jig but are planning on using the Aluminum spinner option - the thickness of the jig will have to increase by about 3/16 inch. This can be accomplished with spacer washers between aft side of prop flange and the cowl positioning jig.

Sensenich Wood Propeller

The Sensenich wood prop uses AN6 attachment bolts. Drill out the propeller drive bushings (supplied with the engine accessory kit) to 3/8 inch. Mount the bushings in a vice cushioned with wood (paint stir sticks work well), cloth or cardboard. These bushes are easy to drill – just keep drill straight

Drill Prop Crush Plate to 3/8 inch. Drill only the six holes on the 4.375 inch diameter hole pattern.

Install an AN6-45A bolt in each prop drive bushing

Insert bushings and bolts into prop hub from rear.

Slide spinner back plate over bolts & bushings (spinner will have to b e completed first)

Slide prop over bolts and bushings

Install crush plate over bolts

Install a AN960-616 washer over prop bolt

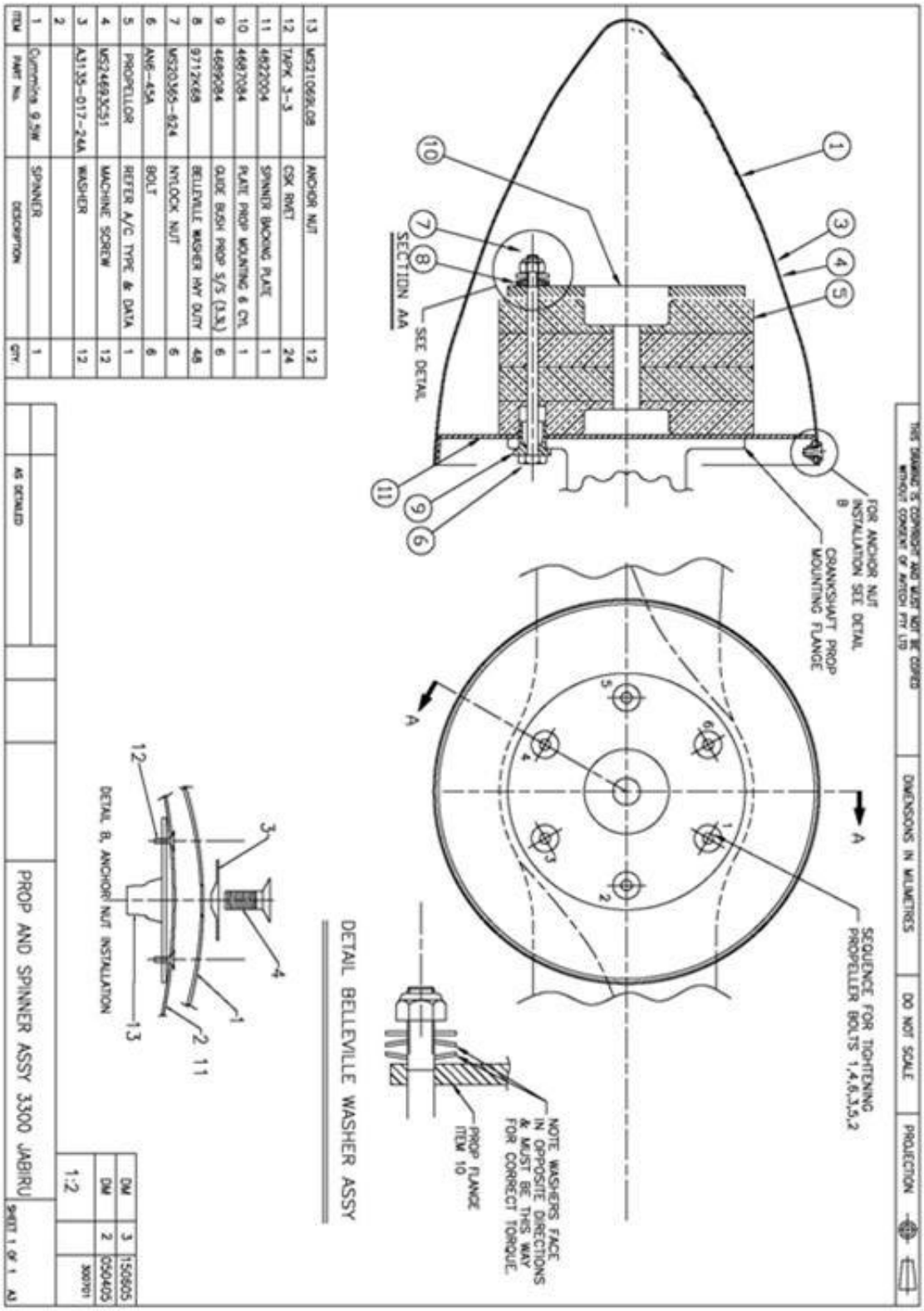
Install two Belleville washers over each prop bolt. The washers go concave face to concave face.

Install AN360-624 nylock nuts

Tighten to 18 ft lbs in a diagonal pattern – first torquing to 12 ft lbs and then to 18 ft lbs.

Refer to prop installation drawing next page

For additional reference and propeller maintenance guides visit Sensenich Wood Propeller at www.sensenichprop.com



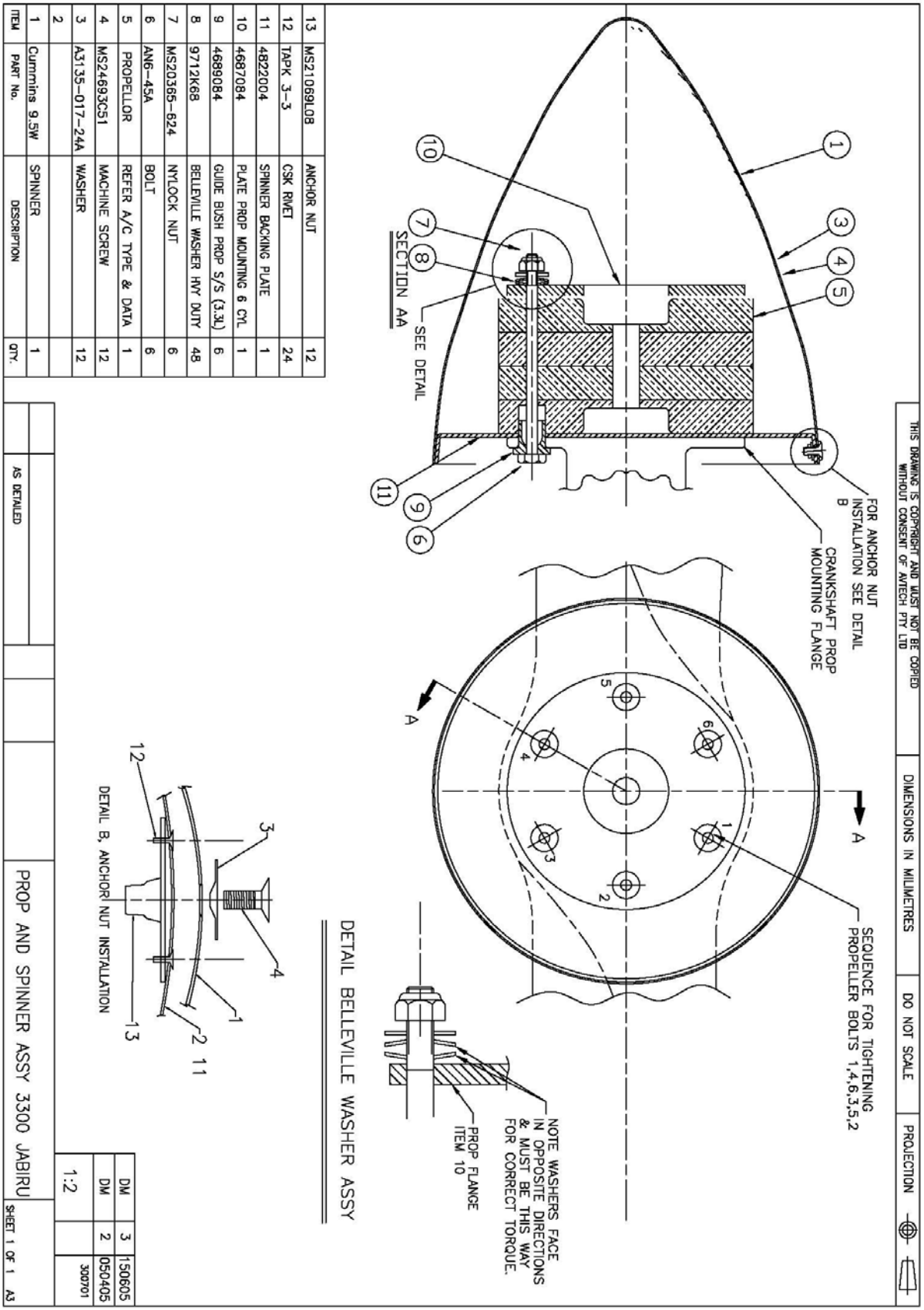
ITEM	PART No.	DESCRIPTION	QTY.
1	Cummins G-5W	SPINNER	1
2			
3	A3135-017-24A	WASHER	12
4	MS24693C51	MACHINE SCREW	12
5	PROPELLOR	REFER A/C TYPE & DATA	1
6	AN6-45A	BOLT	6
7	MS20365-624	NYLOCK NUT	6
8	9712X68	BELLEVILLE WASHER HVY DUTY	48
9	4689084	GUIDE BUSH PROP S/S (3.5)	6
10	4687084	PLATE PROP MOUNTING 6 CYL	1
11	4872004	SPINNER BACKING PLATE	1
12	TAPK 3-3	CSK RIVET	24
13	MS21069L08	ANCHOR NUT	12

DM	3	150605	
DM	2	050405	
		300701	

Prop & Spinner

Prep spinner (fiberglass spinner only)

1. Expand holes in spinner back plate to 5/8 inch
2. Set back plate on workbench , install prop bushings and bolts from bottom
3. Position prop over bushings and bolts
4. Cover prop blades with masking tape to avoid scratching prop when fitting spinner cone
5. With a piece of poster board make a template of the prop opening in the spinner
6. Transfer template to spinner cone and cut out
7. Cut small at first and then expand until the rim of the spinner sits flat on the work bench and the prop has 1/8 inch clearance (minimum) from spinner cone.
8. Mark five evenly spaced locations for attachment screws around base of spinner—four holes between the blades on each side
9. Drill to 1/8 and secure with clecos
10. Mount nutplates on inside of spinner back plate (see drawing for details)
11. Expand holes in spinner back plate to 5/32
12. Expand holes in spinner cone to 5/32 and bevel to accept Tinnerman washers (see drawing for details)
13. Place indexing marks on spinner & back plate so prop & cone will be in the same position when installed on the aircraft.
14. Install spinner back plate first on prop hub
15. Then install prop making sure prop is properly aligned on spinner plate.
16. Torque prop to 18 ft lbs (Sensenich Wood Prop - if using another manufacturer prop torque to prop maker's instructions)
17. Install Spinner cone keeping alignment marks in proper alignment.



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5	PROPELLOR	REFER A/C TYPE & DATA	1
6	AN6-45A	BOLT	6
7	MS20365-624	NYLOCK NUT	6
8	9712K68	BELLEVILLE WASHER HVY DUTY	48
9	4689084	GUIDE BUSH PROP S/S (3.3L)	6
10	4687084	PLATE PROP MOUNTING 6 CYL	1
11	4822004	SPINNER BACKING PLATE	1
12	TAPK 3-3	CSK RIVET	24
13	MS21069L08	ANCHOR NUT	12

DM	3	150605	
DM	2	050405	
		300701	

Cummins Polished Aluminum Spinner

The optional Cummins Polished aluminum spinner requires no trimming and no nut plate installation. It is ready to install right out of the box!

The advantage is that the spinner takes several hours less work and it is perfectly balanced and runs exactly true without adjustment. We think it looks better as well.

The disadvantage is that it costs a few hundred dollars more. We think it is worth it!

Be careful not to tighten the spinner cone attach screws too tight. Tighten only enough so that the clear plastic washers just begin to compress. Over tightening will ultimately result in a cracked spinner cone