

# SONEX / JABIRU INSTALLATION GUIDE

Rev G. 101408 (Aero-Classic Oil Cooler, 2200 Blister, Aluminum Exhaust Tunnel)



This guide was written to help you achieve a dependable, proven Jabiru engine installation in your Sonex airframe using the Sonex/Jabiru Installation Kit. This Sonex/Jabiru specific guide supplements the Sonex drawings, Jabiru-provided manuals, and AeroCarb manual, but does not replace them. Used together, these resources will help you duplicate the Sonex-recommended Jabiru installation which has been proven successful through hundreds of flight hours.



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## Materials List

The following materials will be needed to install your Jabiru engine. This list is also organized by supplier on the next page.

**Important: Your particular installation may require items not listed here. This is only a suggested list of the most commonly needed parts.**

## Engine Installation

- Jabiru 2200 or Jabiru 3300 engine.
- AeroCarb  
ACV-C03LS for the Jabiru 2200  
ACV-C04S for the Jabiru 3300
- AeroCarb Air Filter Assembly (ACV-C10-30)
- Sonex Engine Installation Kit (SNX-B10-10)  
Includes cylinder head baffles, oil cooler baffles, rivets, aluminum extrusions, bracket drawings, aluminum exhaust tunnels, and fuel pump block-off plate.
- Optional AeroConversion's Throttle Quadrant:  
ACV-Q01-01, Side Mount  
or  
ACV-Q01-03, Center Mount

## Fuel System Installation

- Gascolator  
Wick's P/N USH-GAS or equivalent
- AN816-6D Nipple, Qty. 1 (for Gascolator)
- AN816-6-2D Nipple, Qty. 1 (for AeroCarb)
- 06 Hose End, Straight  
Jeg's P/N 799-610020
- 06 90° Swivel Hose End  
Jeg's P/N 799-613160
- 06 Pro-Flex Hose, 6 feet  
Jeg's P/N 799-632060  
Note: This provides enough hose for both the fuel system and the oil cooler installation.
- 1/8NPT 45° Street Elbow (Weatherhead p/n 3350x2)
- 1/8NPT Fuel Drain
- AN3-7A Bolt, Qty. 2
- MS20365-1032 Lock Nut, Qty. 2
- AN960-1032 Washer, Qty. 2
- 5/16-18 x 3/4" long socket head cap screw, Qty. 2
- Grommet (MS35489-6 suggested)
- SCAT Tubing (Jabiru 2200 only)

## Cylinder Head Baffle Installation

In addition to the Sonex Engine Installation Kit, you will need:

- Baffle Rubber (Cowl Seal), 1/8" x 3" x 9' Long  
Wick's P/N SR3-1/8-ROLL

## Cockpit Controls

See AeroCarb Manual for installation options.

## Oil Cooler Installation

In addition to the Sonex Engine Installation Kit, you will need:

- Oil Cooler, Aero-Classics 8000075
- Straight Hose Fitting, Size 06, Qty 3  
Jeg's P/N 799-610020
- 90° Hose Fitting, Size 06, Qty 1  
Jeg's P/N 799-613160
- AN 816-6D, Straight Nipple, Qty. 2
- MS20822-6-6D, 06-3/8" to 3/8" 90° Fitting, Qty. 2
- AN3-5A Bolt, Qty. 6
- AN960-10 Washer, Qty. 12
- MS20365-1032 Stop Nut, Qty. 6
- MS21919-WDF8 Clamp, Qty. 1
- Baffle Seal

## Oil Breather Installation

- MS21919-WDF8 Clamp, Qty. 1
- MIL-H-6000 Oil Resistant Tubing
- Stainless Steel Hose clamp, 3/4", Qty. 2
- 1/2" Dia. x .035 Wall 5052-0 Tube

## Miscellaneous

- Wire Tie Wraps
- Anti-seize compound
- Electrical Wire
- Gasket sealer
- High-temp RTV
- Teflon paste
- Safety Wire

## Materials Shopping List by Supplier

**Important: Your particular installation may require items not listed here. This is only a suggested list of the most commonly needed parts.**

### Sonex Aircraft:

- Jabiru 2200 or Jabiru 3300 engine.
- AeroCarb  
ACV-C03LS for the Jabiru 2200  
ACV-C04S for the Jabiru 3300
- AeroCarb Air Filter Assembly, ACV-C10-30
- Sonex Engine Installation Kit, SNX-B10-10
- Optional AeroConversion's Engine Mount Bushings, ACV-J01-10
- Optional AeroConversion's Throttle Quadrant  
ACV-Q01-01, Side Mount  
or  
ACV-Q01-03, Center Mount

### Jeg's

1-800-345-4545

[www.jegs.com](http://www.jegs.com)

- Straight Hose Fitting, Size 06, Qty 4  
P/N 799-610020
- 90° Hose Fitting, Size 06, Qty 2  
P/N 799-613160
- 06 Pro-Flex Hose, 6 feet  
P/N 799-632060

### Wicks:

1-800-221-9425

[www.wicksaircraft.com](http://www.wicksaircraft.com)

- Oil Cooler, Aero-Classics 8000075
- Gascolator, P/N USH-GAS or equivalent
- MS21919-WDF8 Clamp, Qty. 2
- MS20822-6-6D, 06-3/8" to 3/8" 90° Fitting, Qty. 2
- AN816-6D Nipple, Qty. 3
- AN816-6-2D Nipple, Qty. 1
- 1/8NPT 45° Street Elbow (Weatherhead p/n 3350x2)
- 1/8NPT Fuel Drain
- MS20365-1032 Lock Nut, Qty. 6
- 5/16-18 x 3/4" long socket head cap screw, Qty. 2
- AN960-1032 Washer, Qty. 14
- MS20365-1032 Nut, Qty. 8
- AN3-7A Bolt, Qty. 2
- AN3-5A Bolt, Qty. 6
- Grommet (MS35489-6 suggested)
- SCAT Tubing (Jabiru 2200 only)
- Baffle Rubber (Cowl Seal), 1/8" x 3" x 9' Long  
Wick's P/N SR3-1/8-ROLL
- MIL-H-6000 Oil Resistant Tubing, 3"
- 1/2" Dia. x .035 Wall 5052-0 Tube, 5 feet

# Sonex/Jabiru Installation Guide

# PREPARING the FIREWALL

## Section Checklist (Rev. 10/04)

- Battery Box
- Locating the Voltage Regulator
- Locating the Starter Solenoid
- Gascolator Installation

These items are most easily installed with the engine mount in place, but before the engine is installed.

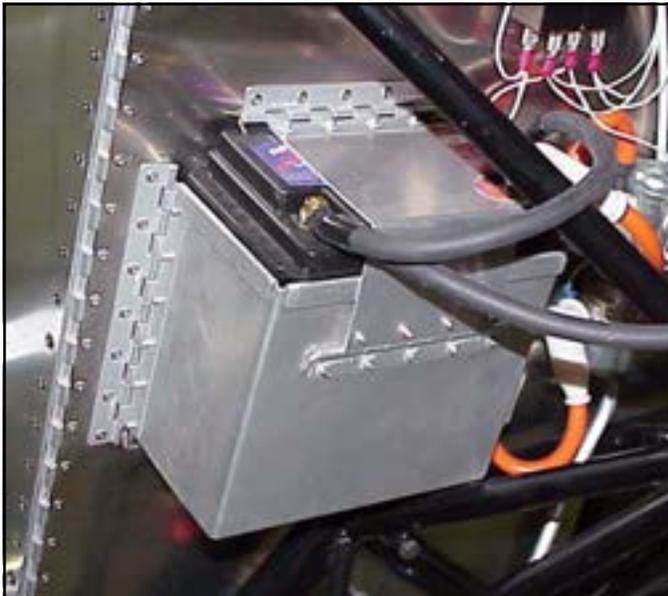
**Important: When choosing a mounting location for other items such as control boxes for electronic instruments (such as the MGL Stratomaster), carb heat boxes, etc., keep serviceability in mind and avoid interference with other firewall-forward components.**

## Battery Box (Rev. 10/04)

Sonex recommends the Odyssey PC625 battery.

It is best to position/build the battery box after the engine mount has been installed and the battery has been purchased to ensure a good fit. Detailed plans for a battery box using the Sonex recommended battery can be found in the aircraft plans.

The design of the engine mount for the Jabiru 3300 prevents the battery from being installed/removed through the top of the battery box. The battery box must be modified or mounted in a way which permits the battery to be easily serviced. The photo below shows a standard battery box which has been mounted to the firewall with piano hinge, which allows the entire battery box to be removed.



*The battery box for the Jabiru 3300 must be modified to allow removal of the battery. This box has been mounted with piano hinge, allowing the entire box to be removed for battery service.*

## Locating the Voltage Regulator (Rev. 10/04)

The Jabiru-provided voltage regulator includes a short pig-tail with a plastic plug to which the alternator wires from the engine attach. The two items to consider when positioning the regulator on the firewall are the length of the alternator wires, and the ease of future removal/replacement of the regulator.

Wiring the regulator is covered in the "Engine Wiring" section of this manual.

## Locating the Starter Solenoid (Rev. 10/04)

The Jabiru-provided starter solenoid should be mounted near the battery to minimize the wire length between the battery, the solenoid, and the starter. It should also be mounted for ease of future removal/replacement of the solenoid.

Wiring the starter solenoid is shown in the Jabiru-provided manuals.

# Sonex/Jabiru Installation Guide

## Gascolator Installation (Rev. 10/04)

Materials Needed:

- Gascolator (Wick's p/n USH-GAS)
- Teflon Paste
- 1/8NPT 45° Street Elbow (Weatherhead p/n 3350x2)
- 1/8NPT Fuel Drain
- AN3-7A Bolt, Qty. 2
- MS20365-1032 Lock Nut, Qty. 2
- AN960-1032 Washer, Qty. 2

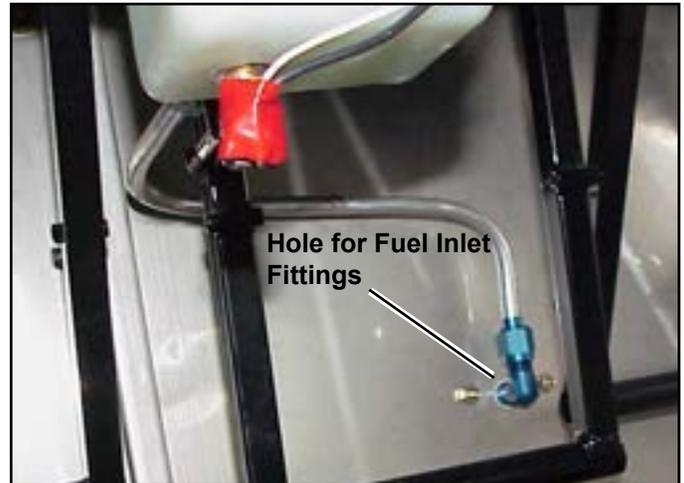
1. Apply teflon paste (**do not use teflon tape**) to the threads of a 1/8NPT, 45° street elbow (Weatherhead p/n 3350x2) and install it in the drain port of the gascolator.
2. Apply teflon paste (**do not use teflon tape**) to the threads of a 1/8NPT fuel drain and install it in the street elbow.



*The street elbow and fuel drain are installed before the gascolator is positioned on the firewall.*

# PREPARING the FIREWALL

3. Position the gascolator on the firewall so there is no interference between the engine mount and the fuel outlets, and mark the location of the gascolator mounting holes.
4. Determine the location for the 3/4" diameter fuel inlet hole and cut the hole in the firewall. This hole must correspond with the inlet on the gascolator. See photo below.



*A 3/4" hole is cut in the firewall to match the location of the fuel inlet on the gascolator. The installation of the fuel inlet fitting is described in "Fuel System Installation", page 13.*

5. Drill the 3/16" diameter mounting holes in the firewall and attach the gascolator with two (2) AN3-7A bolts, MS20365-1032 lock nuts, and AN960-1032 washers.

*Note: Installation of the gascolator's remaining fittings is described in "Fuel System Installation", page 13.*

# Sonex/Jabiru Installation Guide

# INSTALLING the ENGINE

## Section Checklist

- Bolt the Engine to the Engine Mount
- Trim the Cylinder Head Fins
- Trim the Oil Sump Fins

## Bolt the Engine to the Engine Mount

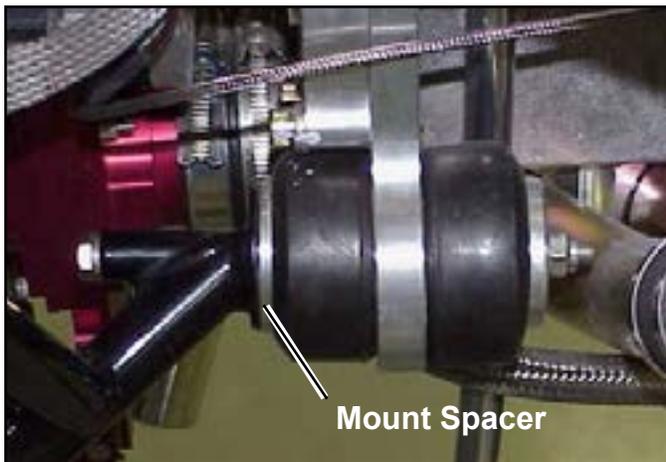
Bolting the engine to the engine mount is shown in the plans, however, these few notes may save you some time.

## Test Fit the Mounting Bolts

Before lifting the engine into place, test fit an engine mounting bolt in each of the four mounting pins. It may be necessary to clean powder coating residue from inside the pins to allow the bolts to pass through.

## Engine Spacers

Engine mounting spacers are provided with the Jabiru engine. In many cases these need to be fit to the lower mounting pins to achieve proper engine alignment.



*This photo of the lower right engine mount shows the Jabiru-provided spacer installed behind the mount bushing.*

## Mount Bushings

Sonex Aircraft recommends using the optional AeroConversion's mount bushings (part number ACV-J01-10) in place of the Jabiru-provided bushings. The Jabiru-provided bushings have shown a tendency to sag, requiring replacement, within 100 hours. The optional AeroConversions bushings are molded from a harder rubber and will not sag.

If the Jabiru-provided mount bushings are used, refer to the Jabiru-provided documentation for proper installation.

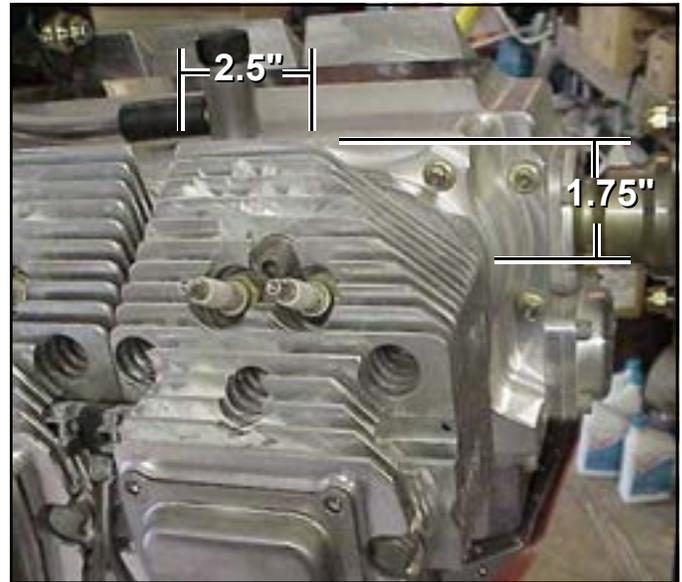
The engine mount bushings will go on the engine mount much easier if they lightly lubricated. Soapy water works well.

## Installing the Mount Bolts

The upper engine mounting bolts should be installed first. The lower mounting bolts must be inserted from the rear.

## Trim the Cylinder Head Fins

The fins of the front, right cylinder head need to be trimmed as shown in the photo below so they do not interfere with the cowling. This is easily done with a hacksaw. **Make sure the spark plugs are installed to prevent metal chips from entering the cylinders.**



*The fins of the front, right cylinder head must be trimmed to fit inside the cowl.*

The fin of each head receiving a spark-plug mounted CHT probe also needs to be trimmed so the CHT probe(s) can be fit over the exhaust port of each head. Make sure the trimmed fin is polished smooth so the CHT wire will not be cut on it.

*Note: If you are using the optional AeroConversions cylinder head bolt mounted CHT probe (part no. ACV-CHT-JAB-K or ACV-CHT-JAB-J) you do not need to trim the fin above the spark plugs.*



*The fin above a spark plug with a CHT probe must be trimmed if you are installing CHT probes under the spark plugs. Always install CHT probes over the exhaust port side of a cylinder head. Probe installation is described in the wiring section of this manual.*

## Trim the Oil Sump Fins

The fins of the Jabiru 3300 oil sump need to be trimmed to allow proper fit of the Sonex cowl.

**Important: Jabiru 2200 engines manufactured after mid-2007 require a modification to the cowling. This is described in the Cowling Preparation section of this manual.**

1. Trim depth of the fins to approximately 1/2" deep.
2. Round the top and bottom of the fins as needed to clear the cowl.



*The fins of the Jabiru 3300 oil sump are trimmed as required to fit the cowl without interference.*

# Sonex/Jabiru Installation Guide

## Section Checklist

- Remove the Fuel Pump
- Mount the AeroCarb
- Install the Throttle Cable
- Install the Mixture Cable
- Install the Fuel Line
- Install an Air Filter

## Remove the Fuel Pump

The AeroCarb relies on gravity fed fuel delivery in the Sonex.

1. Remove the two socket head cap screws that mount the fuel pump to the engine and remove the fuel pump, delrin spacer, gasket, and fuel pump push rod.



*The fuel pump and related parts are removed from the engine.*

2. Debur the edges of the fuel pump block-off plate supplied with the Sonex/Jabiru Installation Kit, apply gasket sealer, and install the plate with two 5/16-18 x 3/4" long socket head cap screws.



*The fuel pump block-off plate is installed in place of the fuel pump.*

# FUEL SYSTEM INSTALLATION

## Mount the AeroCarb (Rev. 10/04)

**Important:** These instructions supplement, but do not replace, the manual supplied with your AeroCarb.

1. Remove the Bing carburetor from the engine by loosening the hose clamp on the intake hose.
2. Install the AeroCarb on the intake hose with the fuel inlet down. Make sure the spigot is fully seated in the intake hose and tighten the hose clamp.

*Note: The design of the Jabiru 2200 engine mount requires the air cleaner be mounted on the firewall and connected to the AeroCarb with a length of scat tubing.*



**Hose Clamp Securing Aero-Carb to Intake Boot.**

*The AeroCarb (shown here with optional air filter housing) is installed vertically on the Jabiru to equalize the fuel/air mixture on each side of the engine. See note above for installing an air cleaner on the Jabiru 2200.*

# Sonex/Jabiru Installation Guide

## Install the Throttle Cable (Rev. 10/04)

**Important:** These instructions supplement, but do not replace, the AeroCarb manual supplied with your AeroCarb.

The recommended throttle installation is the AeroConversion's reversing throttle quadrant (Part number ACV-Q01-01, side mount, or ACV-Q01-03, center mount).



*The AeroConversion's reversing throttle quadrant is the recommended cockpit throttle control for the Jabiru installation. The side-mounted throttle is shown here, a center mount throttle is also available.*

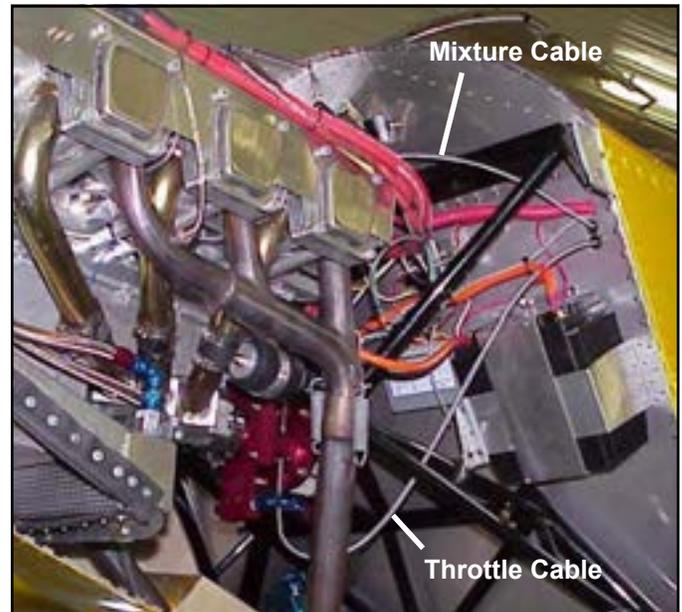
The throttle cable must be routed so it does not have any sharp bends. Ideally, the cable should pass through the firewall near the upper, right-hand (pilot's side) corner of the firewall.

**CAUTION: Do not allow the throttle cable to come in contact with the battery terminals.**

The throttle cable must also be kept clear of the exhaust pipe. This can be done by routing it between the tubes of the engine mount, or by securing it to the engine mount with cable ties.

Make sure the throttle's movement is not limited by interference with the spark plug or alternator wires. It may be necessary to slightly rotate the carburetor and/or re-route the spark plug wires.

# FUEL SYSTEM INSTALLATION



*The correct routing of the mixture and throttle cables is important to smooth operation.*

## Install the Mixture Cable

**Important:** These instructions supplement, but do not replace, the AeroCarb manual supplied with your AeroCarb. The recommended mixture cable for the AeroCarb is an A700 button lock cable. It must be routed with smooth curves, and must not be able to contact exposed electrical connections (such as the battery terminals), or come near the exhaust, which can melt the cable lining.

# Sonex/Jabiru Installation Guide

# FUEL SYSTEM INSTALLATION

## Install the Fuel Line

The fuel line must flow smoothly from the gascolator to the carburetor, with no part of the fuel hose rising higher than the carburetor fuel inlet. If the hose is higher than the fuel inlet at any point between the gascolator and the carburetor, an air pocket can form and hinder fuel flow.



*This view shows very clearly the fuel line routing and connectors. While the fuel connection at the carburetor should be installed exactly as shown, the use of a different gascolator may require slightly different fittings at the gascolator outlet.*

1. Apply teflon paste (**do not use teflon tape**) to the threads of an AN816-6D nipple and install it in the gascolator.
2. Apply teflon paste (**do not use teflon tape**) to the threads of an AN816-6-2D nipple and install it in the AeroCarb.
3. Install the 90° swivel hose end to the Pro-Flex hose.
4. Determine the proper length for the hose, including end fittings, and trim the hose.
5. Install a straight hose end fitting to the end of the Pro-Flex hose that attaches to the gascolator.
6. Install the hose assembly. **Do not use sealing compounds or teflon tape on these fittings.**

## Install an Air Cleaner

Materials Needed:

- AeroConversion Air Filter, ACV-C10-30
- SCAT Tubing (Jabiru 2200 only)

The AeroCarb has a 2.25" diameter intake bell which will accept a variety of aftermarket air filter housings, as well as the optional AeroConversions air filter assembly.

### Jabiru 3300

An air filter housing can be mounted directly to the intake bell of the AeroCarb, as seen in the photo to the left. Instructions for mounting the optional AeroConversion's air filter are included with the air filter.

### Jabiru 2200

The design of the Jabiru 2200 engine mount makes it necessary to mount the air filter remotely, and connect it to the carburetor with a length of SCAT tubing.

# Sonex/Jabiru Installation Guide

This oil cooler installation applies to the Jabiru 3300 only. Jabiru 2200 owners see page 14.

## Assemble and Attach the Oil Cooler

Materials Needed:

- Aero-Classics Oil Cooler, Model 8000075
- AN3-5A Bolts, Qty 6.
- AN960-10 Washer, Qty. 12
- MS20365-1032 Stop Nut, Qty 6
- Aluminum Extrusions (provided)
- Baffle Seal
- AAL-42 Rivets (provided)
- Locktite 242

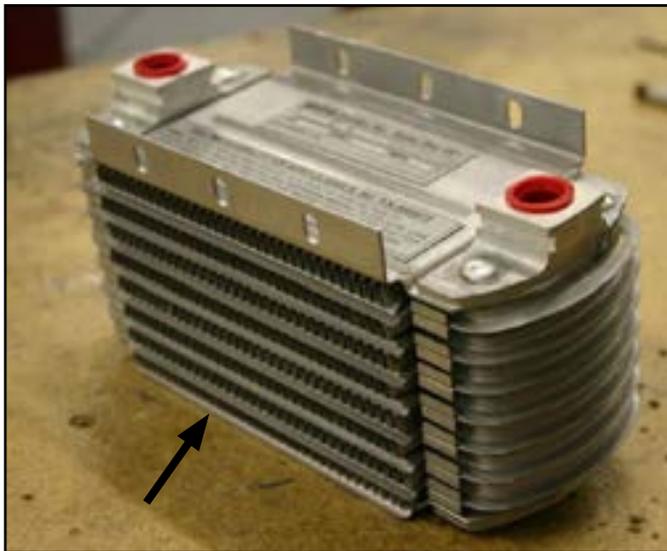
### Manufacture the Oil Cooler Brackets

1. Manufacture the three mounting brackets (SNX-P20-43L and -R, and SNX-P20-42t. The details for these brackets are in the back of this manual.

### Modify the Oil Cooler

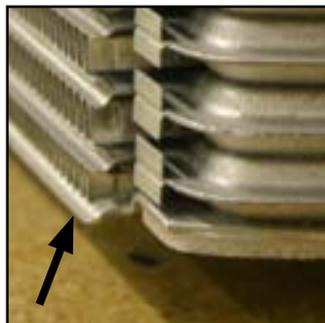
1. Remove a lower flange from the oil cooler to provide clearance for the cowling.

*Note: There is no left or right to the oil cooler so either lower flange can be removed.*



*Above, a lower flange has been removed to clear the cowling. The side with the flange removed is now the "front" of the oil cooler.*

*Right, a close-up after the flange has been removed.*

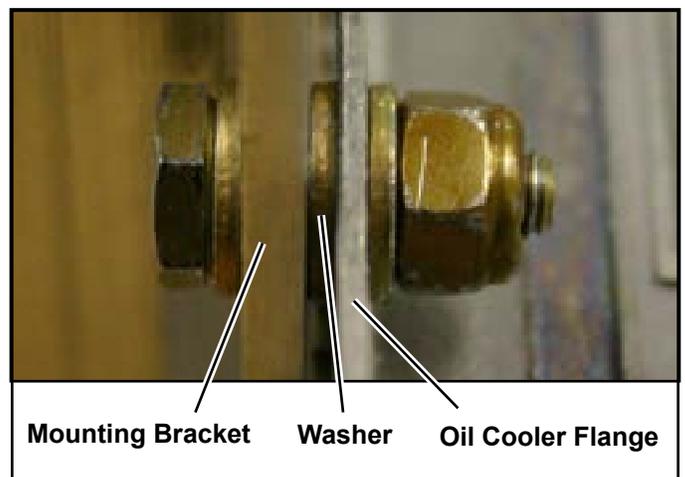
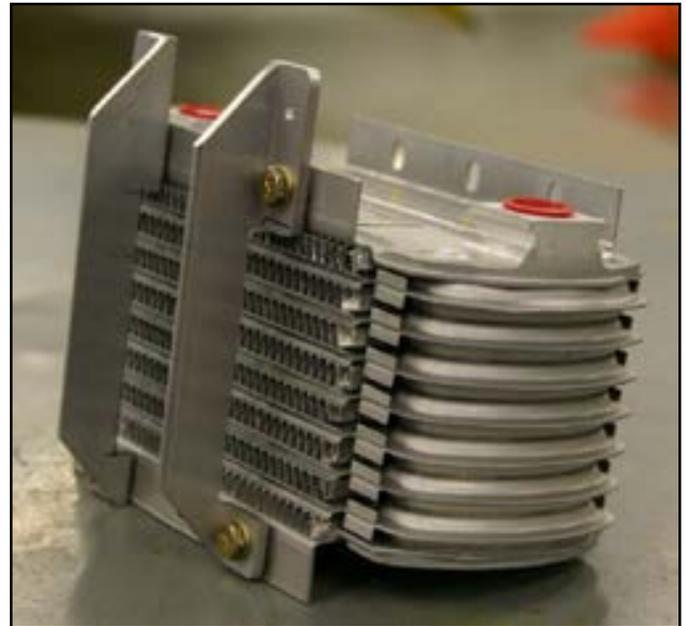


# OIL COOLER INSTALLATION

## Install the Oil Cooler and Shroud

1. Attach the -43L and -43R brackets to the "back" of the oil cooler, as shown in the photo below. The brackets are attached to the cooler with:
  - AN3-5A Bolt, Qty 4
  - AN960-10 Washer, Qty. 12
  - MS20365-1032 Elastic Stop Nut, Qty. 4

*Note: One washer may need to be placed between the bracket and the oil cooler's flange as a spacer to prevent the brackets from contacting the cooling fins.*



*If needed, an MS20365-1032 washer can be placed between the oil cooler flange and the aluminum mounting bracket to keep the bracket from contacting the oil cooler's fins.*

## Sonex/Jabiru Installation Guide

- Center the cooler mounting bracket on the oil cooler assembly and clamp it in place. The bottom of the vertical flange butts against the top of the oil cooler's flange.

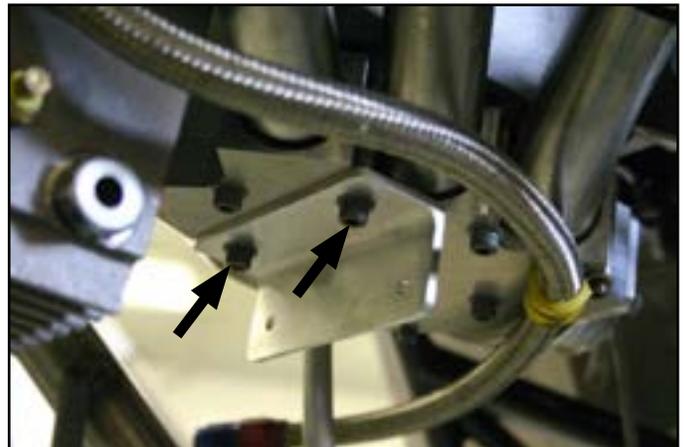


*Center the Cooler Mounting Bracket on the oil cooler, with the flange pointing forward, and clamp it to the Cooler Support Brackets.*

- Use the pilot hole in each Cooler Support Bracket as a guide to drill 3/16" holes through the brackets for AN3 hardware.
- Remove the front pair of cap screws from the bottom of the intake manifold. See photo next column.

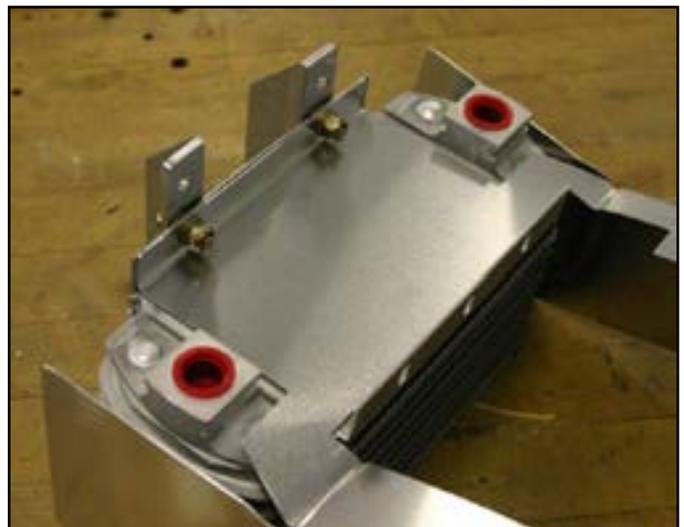
## OIL COOLER INSTALLATION

- Mount the oil cooler bracket (SNX-P20-42) to the bottom of the intake manifold with the two cap screws removed in step 4. Use Loctite 242 on the threads of the screws.

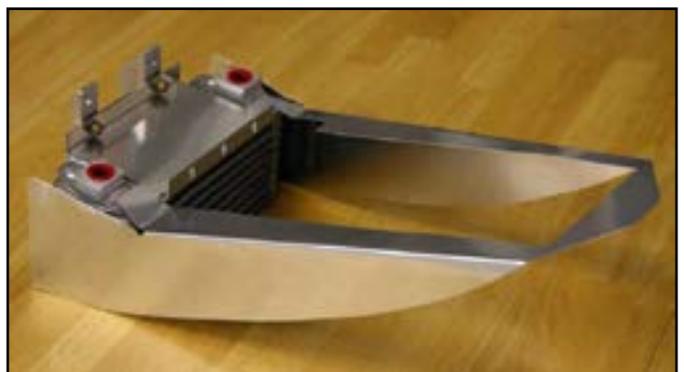


*Bracket SNX-P20-42 attached to the intake manifold.*

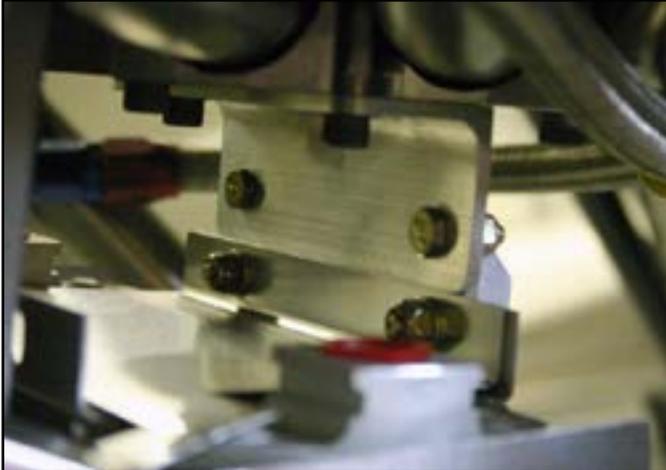
- Remove the upper nuts and washers from the oil cooler assembly, place the oil cooler baffle (SNX-P20-44) over the bolts and reinstall the washers and nuts. *Leave the nuts slightly loose. They will be tightened in step 7.*



*The oil cooler baffle is attached to the oil cooler assembly with the two upper bolts of the oil cooler assembly.*



7. Attach the oil cooler assembly to the cooler mounting bracket with:  
AN3-5A Bolt, Qty 2  
AN960-10 Washer, Qty. 2  
MS20365-1032 Elastic Stop Nut, Qty. 2

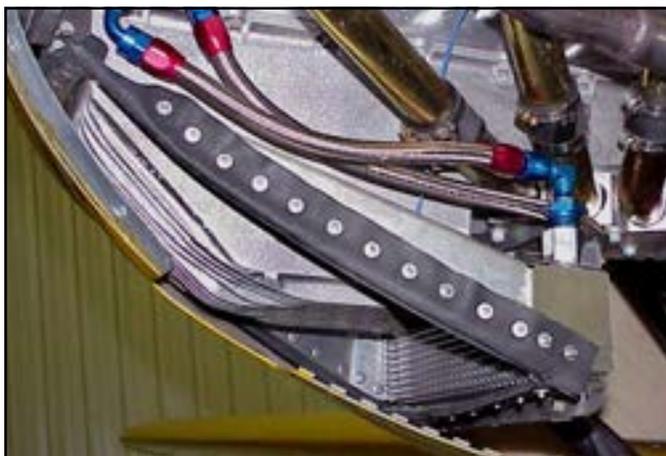


*The oil cooler assembly is seen here mounted to the oil cooler bracket with two AN3-5A bolts, washers, and stop nuts.*

8. Tighten the two nuts left loose in step 6.

*Note: The front of the oil cooler shroud is not physically attached to anything. It is held in place by the cowling.*

9. Fit one cowl half at a time and trim the oil cooler shroud to achieve a gap of 1/4" to 3/8" between the cowling and the baffles.
10. Install baffle seal material as needed to seal the gaps between the baffles, cowling, and oil pan. AAL-42 rivets were included with the kit for attaching baffle seal material (not included).



*Baffle seal must be installed to seal the space between the metal baffles, cowling, and oil pan.*

## Notes on Oil Cooling and Duct Sealing

A complete seal is not critical in most applications. In general, oil cooling needs drop as the ambient temperature drops. Flight testing has shown that in temperatures below approximately 50 degrees (F) air flow through the oil cooler will need to be partially to fully blocked to allow oil temperatures to rise to an acceptable level. The air flow can be blocked simply with tape over the cowl opening, or using more complex methods such as an aluminum plate in front of the oil cooler.

In hotter climates more complete sealing may be required to force all incoming air through the oil cooler.

Flight testing your aircraft in your climate is the only way to determine what level of sealing is needed to keep your engine oil in the correct operating range, as defined in your engine's operator's manual.

## Jabiru 2200 Oil Cooler Installations

The constantly changing Jabiru 2200 engine, together with its lack of a straight-pipe exhaust system, has made a Sonex-tested and approved oil-cooler installation a challenge. Our factory experience with the Jabiru 2200 is limited to the early engines which did not require an oil cooler.

Our recommendation to those installing a Jabiru 2200 is to install an AeroClassics 800075 oil cooler within a sealed system where the oil cooler gets its cooling air from a dedicated NACA duct and expels the cooling air near the exhaust tunnels. Care needs to be taken so the oil cooler's cooling air does not pressurize the low-pressure area inside the bottom of the cowl and cause a negative impact on cylinder cooling.

# Sonex/Jabiru Installation Guide

# OIL COOLER INSTALLATION

## Plumb the Oil Cooler

Materials Needed:

- AN816-6D Nipple, Qty. 2
- MS20822-6-6D elbow, Qty. 2
- 90° swivel hose end (Jeg's p/n 799-613160), Qty. 1
- Straight hose end (Jeg's p/n 799-610020), Qty. 3
- MS21919-WDF8 Clamp, Qty. 1
- 06 Pro-flex Hose
- Teflon Paste

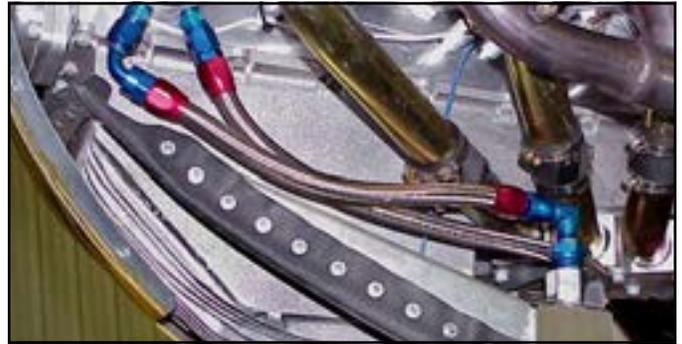
1. Remove the barbed fittings from the Jabiru-provided oil cooler adapter.
2. Drill through the existing hose fitting holes with a 7/16" drill and re-tap each hole with a 1/4 NPT tap.
3. Apply teflon paste (**do not use teflon tape**) to the threads of two (2) AN816-6D nipples and install them in the oil cooler adapter.
4. Install the oil cooler adapter and oil filter.



*The barbed fittings are removed from the Jabiru-provided oil cooler adapter and replaced with threaded hose fittings.*

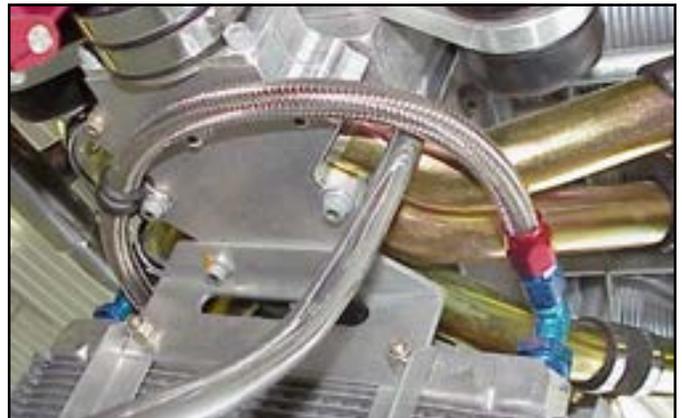
5. Apply teflon paste (**do not use teflon tape**) to the threads of two (2) MS20822-6-6D elbows and install one in each of the oil cooler's ports. The elbow on the left side of the engine must face forward, the elbow on the right side must face aft.
6. Install a 90° swivel hose end (Jeg's p/n 799-613160) on a 12" piece of Pro-Flex hose.

7. Determine the proper length for the hose to reach from the oil cooler adapter to the oil cooler fitting on the left side of the engine, including end fittings, and trim the hose.



*The installation of the oil hose on the left side of the engine is shown in this photo.*

8. Install a straight hose end fitting (Jeg's p/n 799-610020) to the end of the Pro-Flex hose that attaches to the oil cooler.
9. Install the hose assembly. **Do not use sealing compounds or teflon tape on these fittings.**
10. Install a straight hose end fitting (Jeg's p/n 799-610020) to the end of a 30" piece of Pro-Flex hose.
11. Determine the proper length for the hose to reach from the oil cooler adapter to the oil cooler fitting on the right side of the engine, including end fittings, and trim the hose. The hose should follow a path that eliminates sharp bends. See photo below.



*This photo, looking up at the bottom of the engine, shows the smooth bend the oil hose takes from the right side oil cooler port to the left side of the engine. While this is not an Aero Classic cooler installation, hose routing is the same.*

12. Install a straight hose end fitting to the end of the Pro-Flex hose that attaches to the oil cooler.
13. Install the hose assembly. **Do not use sealing compounds or teflon tape on these fittings.**
14. Secure the oil hose with a cushioned hose clamp (p/n MS21919-WDF8) mounted to the bottom of the intake manifold. Use an existing cap screw from the manifold to mount the hose clamp. Apply Loctite 242 to the manifold screw before re-installing it. See photo below.



*This photo identifies the cushioned hose clamp which secures the oil hose to the bottom of the intake manifold. While this is not an Aero Classic cooler installation, hose installation is the same.*

## Sonex/Jabiru Installation Guide

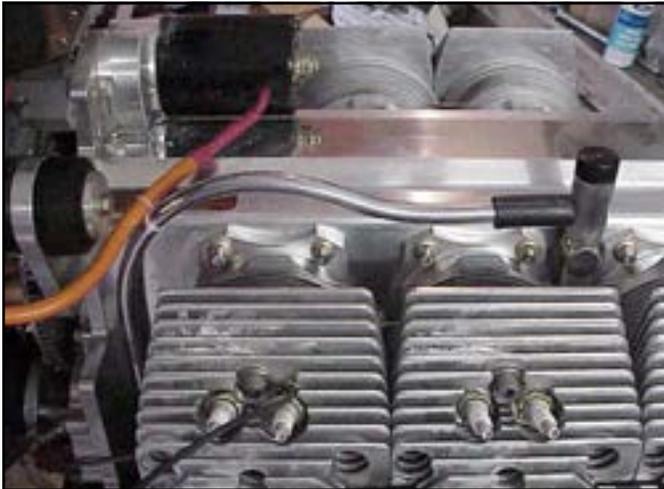
### Install an Oil Breather (Rev. 10/04)

Materials Needed:

- 1/2" Dia. x .035 Wall 5052-0 Tube
- MS21919-WDF8 Clamp, Qty. 1
- Stainless Steel Hose clamp, 3/4", Qty. 2
- MIL-H-6000 Oil Resistant Tubing

Form the oil breather tube from 1/2" dia. x .035 wall 5052-0 tubing.

The tube should curve upwards shortly after it exists the dipstick tube to allow oil to drain back into the case instead of venting overboard.



*The shape of the oil breather pipe is shown in this photo. The hose clamps have not yet been installed on the rubber mounting hose.*

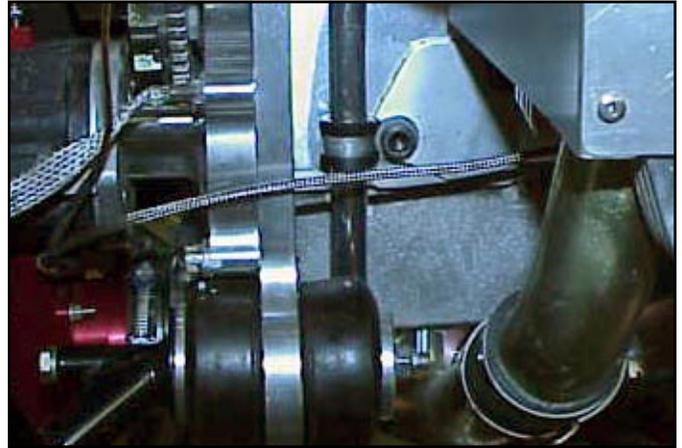
Drill a 1/8" hole at the top of the curve. This allows the crank case to breath in case the bottom of the breather tube freezes shut.

Form the tube to curve down behind the rear cylinder and vent out the bottom of the cowl.

Attach the breather tube to the dip stick tube with a piece of heat and oil resistant rubber tubing such as MIL-H-6000, and two hose clamps.

## OIL BREATHER INSTALLATION

The tube should be secured from vibration with an MS21919-WDF8 clamp at the fuel pump block-off plate.



*The breather can be secured from vibration with an MS21919-WDF8 clamp attached to the fuel pump block-off plate.*

# Sonex/Jabiru Installation Guide

# CYLINDER HEAD BAFFLES

## Section Checklist

- Install the Inter-cylinder Baffles (Jabiru 3300 only)
- Assemble and Install the Cylinder Head Baffles

## Materials Needed:

In addition to the Sonex Engine Installation Kit, you will need:

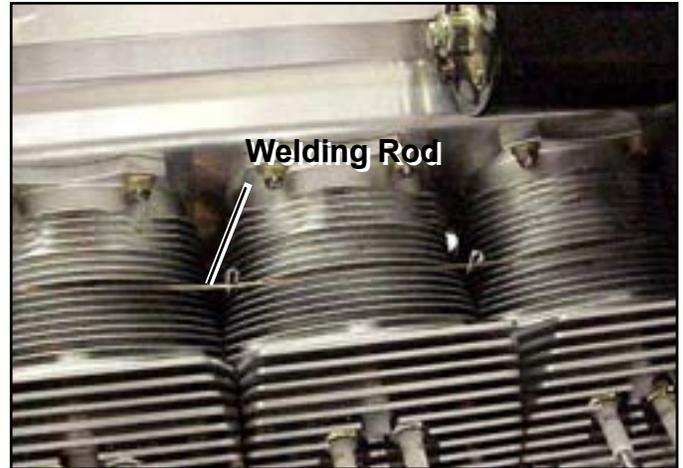
- Safety Wire
- Baffle Rubber (Cowl Seal), 1/8" x 3" x 9' Long

## Install the Inter-cylinder Baffles (Rev 10/04)

### Jabiru 330 Only

Inter-cylinder baffles are provided with the Jabiru engine to direct cooling around each cylinder.

The easiest method for installing these baffles is to pass the ends of a piece of safety wire through the holes in a baffle, pull the baffle up into position with the safety wire, and then secure the baffle in place by twisting the wire around a piece of welding rod laid across all of the cylinders.



*Here the safety wire which supports the inter-cylinder baffles can be seen secured to a welding rod laying across the cylinders.*



*This view, looking up at the bottom of the cylinders, shows one of the inter-cylinder baffles.*

# Sonex/Jabiru Installation Guide

## Assemble / Install the Cylinder Head Baffles

The cylinder head baffles are supplied pre-formed but un-assembled. Debur the edges of the baffles before assembling them.

*Jabiru 2200 Installations: Trim the rear of each baffle to a length that allows the rear bulkhead to be against the rear cylinders and flush with the back edge of the baffle.*

1. Attach the rear bulkhead to each baffle using CCP-42 rivets. The bulkheads are installed flush with the rear of each baffle. **Do not install any baffle seal material at this time.**



*Only a few CCP-42 rivets are needed to attach the rear bulkhead to each cylinder head baffles.*

2. Remove the two socket head cap screws from the top of each valve cover.

**Important: If your engine has oil lines which protrude between each valve cover, the baffles can be trimmed to eliminate the interference without any loss of cooling efficiency.**



*Newer engines have oil lines which interfere with the baffles. The baffles can be trimmed to eliminate the interference.*

# CYLINDER HEAD BAFFLES

3. Remove the spark plug wires from the spark plugs and let them hang out of the way.
4. Working from the back of the engine forward, slide each baffle into place over the cylinders. The baffles slide between the inner two fins of each cylinder, and over the outside of the valve covers.



*This photo illustrates how the baffle is installed between the inner two fins of each cylinder. This is typical for each baffle.*

5. If the baffle contacts the oil filter before it seats fully around the cylinders, trim the baffle to remove the interference.



*Trim the baffle above the oil filter as needed to allow the baffle to fully seat on the cylinders without contacting the oil filter.*

# Sonex/Jabiru Installation Guide

6. Temporarily install the screws in each valve cover.



The upper valve cover screws secure the baffles in place.

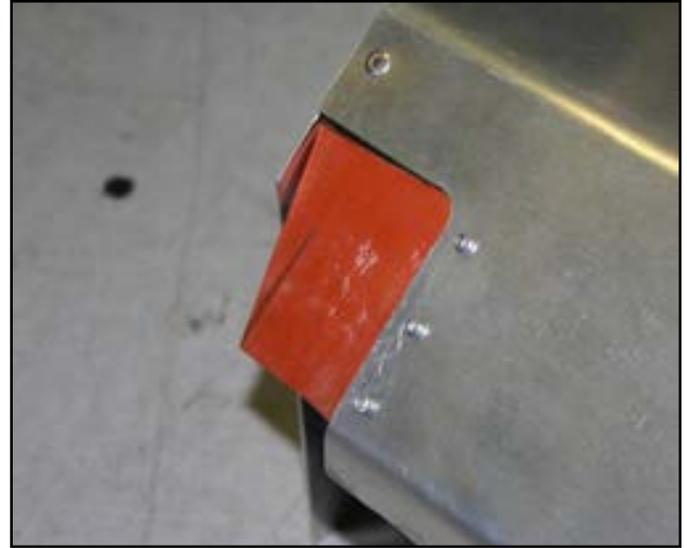
7. Fit one half of the cowl at a time and note any interference with the baffles. Trim the baffles to achieve a gap of 1/4" to 3/8" between the cowling and the baffles.
8. Install baffle seal material to seal the gap between the baffles and cowling. AAL-42 rivets have been included for this purpose.

*Note: Installing the baffle material on the inside surface of the cylinder head baffles will minimize loss of cooling air.*



The left cylinder head baffle is shown here with all of the baffle seals installed.

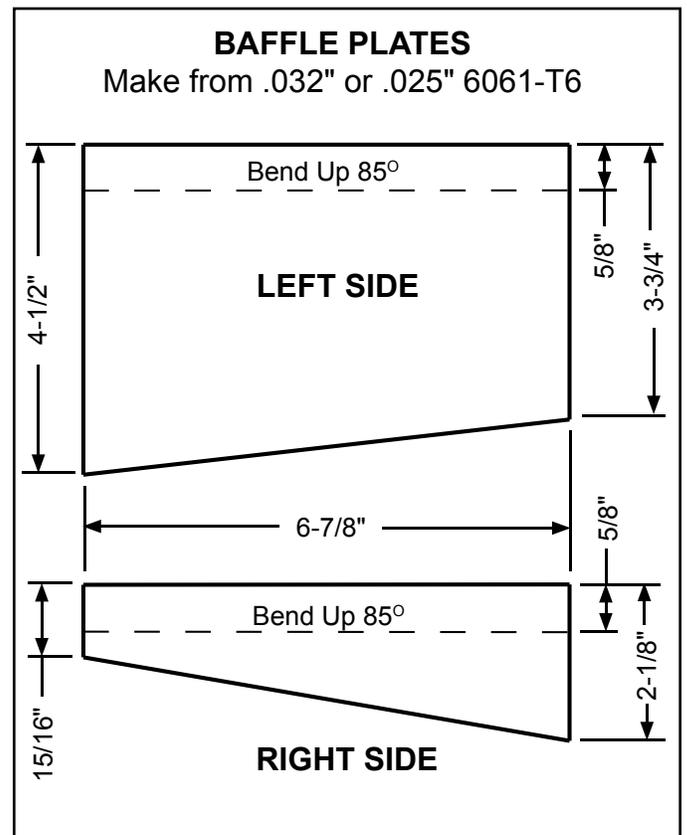
# CYLINDER HEAD BAFFLES



A small piece of baffle seal is installed where the baffle is notched to clear the rear engine mount.

9. Re-install the baffles.
10. Cut the lower baffle plates according to the reference dimensions in the drawing below.

*Note: It is a good idea to make a cardboard cut-out before making the final plates from aluminum. This also allows you to determine the attachment method you wish to use and modify the parts accordingly.*



# Sonex/Jabiru Installation Guide

11. The baffle plates may be installed in a variety of ways. The primary considerations in attaching the plate are that the front edge extends under the lip of the cowl and the back be close to the cylinders.

The photos below show the left plate installed with piano hinge, which allows easy removal without tools. Nutplates or sheetmetal screws may also be used if some simple modifications are made to the baffle plates.



*In this installation of a left baffle plate the plate is installed with piano hinge (below). To do this, the outside of the cylinder head baffle, where the hinge was attached, needed to be shortened.*

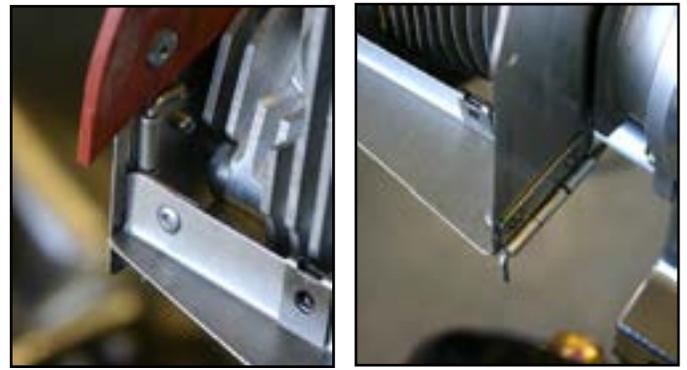


# CYLINDER HEAD BAFFLES

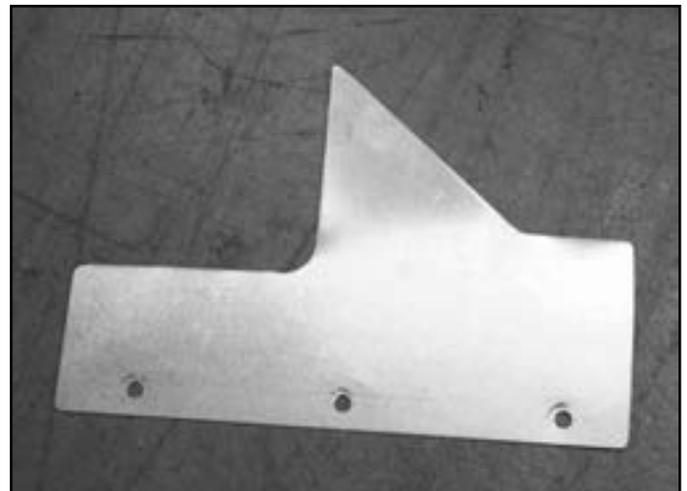
12. The photos below show the right plate installed with piano hinge.



*The right baffle is shown here installed with piano hinge for easy removal without tools.*



13. The vertical baffles are flat-plates which can be sized as needed to achieve the desired cooling. Multiple sets can be kept on hand for installation with seasonal temperature changes. The vertical baffle plates are easily installed using nutplates or U-Type Tinnerman fasteners.



*The vertical baffle plates are flat plates shaped as needed to achieve proper cooling for your particular installation and climate. They can be attached to the horizontal baffles with sheetmetal screws and U-type Tinnerman fasteners.*

# Sonex/Jabiru Installation Guide

# CYLINDER HEAD BAFFLES

## Final Installation

The baffles are most easily fit to the engine following this procedure:

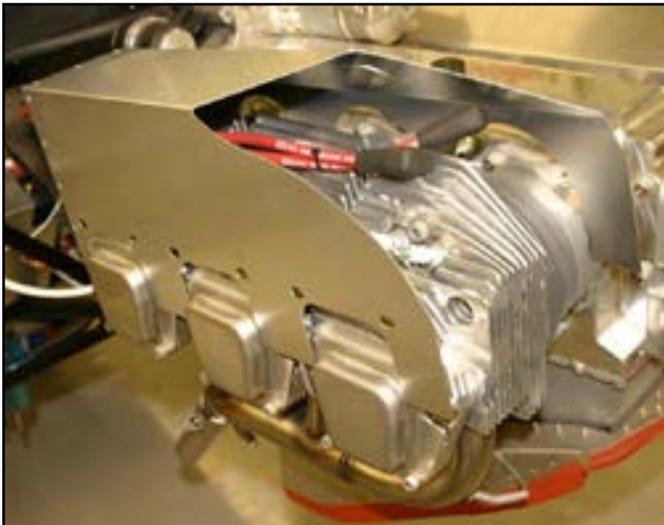
With the baffles removed from the engine:

1. Slide the spark plug wire grommet over all of the spark plug wires.



*The grommets provided with your kit are slid over the spark plug wires - one per side.*

2. Pass the spark plug wires through the hole in the back of each baffle. **Do not install the grommet in the hole at this time.**
3. Working from the back of the engine to the front, attach the spark plug wires to the plugs while guiding the baffles into place over the cylinders and valve covers.



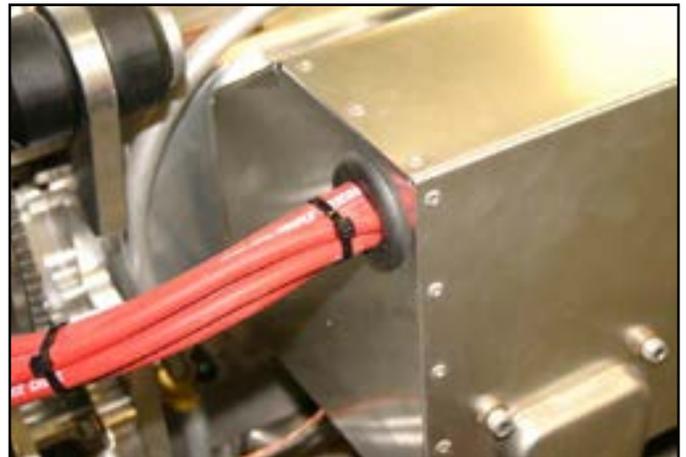
*Attach the plug wires back to front while you work the baffle into place over the cylinders and valve covers.*

4. Install the top screws in the valve covers to secure the baffles in place.
5. Install the horizontal baffle plates.
6. Install the vertical baffle plates.



*The left baffle fully installed.*

7. Press the spark plug wire grommets into place in the rear baffle plates.



*The spark plug grommet is pressed into the hole in the back of the baffle.*

## Bleed Air Tab

The right cylinder head baffle is provided with a half-moon tab on its upper surface. By bending this tab *down*, into the air flowing through the baffle, you can divert cooling air to the ignition module on the top of the engine.

*Note: The left cylinder head baffle is designed to allow air to escape the back of the baffle and cool the left ignition module.*

This section is a supplement to the electrical schematic in the Jabiru engine manual, as well as the specific instructions provided with your particular engine monitoring instrument(s), radios, etc.

## Section Checklist

*Note: Component wiring not mentioned in this chapter is covered in the Jabiru-provided engine installation manual.*

- General Guidelines
- Installing CHT Probes
- Installing EGT Probes
- Wiring the Oil Temperature Sender
- Wiring the Oil Pressure Sender
- Grounding the Engine
- Wiring the Voltage Regulator

## General Guidelines

Safe, trouble-free wiring is easily accomplished by using proper tools and materials, as well as carefully routing, protecting, and securing the wires.

The use of a high quality crimping tool, such as an Ideal model 30-429, and wire connectors properly sized for each wire is critical.

Care must also be taken to protect the wires from chaffing, vibration, and temperatures which could melt the insulation.

## CHT Probes

Two types of CHT probes are available:

**Spark-plug Ring Probes** - These probes are the most common and mount behind the compression gasket of a spark plug. These probes require trimming of the cylinder head fins (see page 7) and are subject to damage when the spark plugs are installed and removed.

**Cylinder Head Bolt Probes.** AeroConversions has developed a CHT probe that mounts under a cylinder head bolt. These probes do not require trimming of the fins and once installed remain undisturbed.

AeroConversions probes are available in both J- and K- type wire. Consult your instrument manufacturer's specifications for the proper wire type or instrument settings.

Part Number	Wire Type:
ACV-CHT-JAB-K	K-Type wire for Jabiru engines
ACV-CHT-JAB-J	J-Type wire for Jabiru engines

### Trimming or Extending the Probe Wire

The CHT wires can be trimmed or extended, if needed, without affecting their performance. The wire's length can be extended using aircraft-grade wire.

## Fitting Spark Plug Ring Probes

To fit the CHT probe on the spark plug, remove the compression washer from the spark plug, install the CHT probe over the plug, and re-install the compression washer.

**Important: Make sure the CHT probes are installed on the exhaust valve side of the cylinder. Installing the CHT probe on the intake valve side of the head will result in inaccurate temperature indications.**

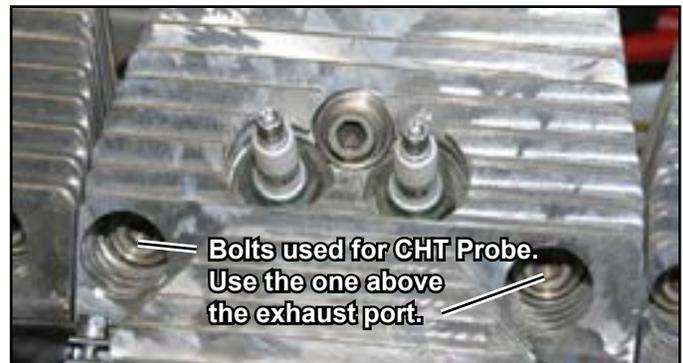
Run the wires of each CHT probe between the fins of the cylinder heads to the back cylinder and then between the fins down the back cylinder. This allows the cooling baffles to be installed and removed without interference from the CHT wires.



*A CHT probe installed on the left-rear cylinder. The CHT wires are routed between the cylinder fins to the rear cylinder, where they turn down and exit below the cooling shroud.*

## Fitting Cylinder Head Bolt Probes

*Note: Detailed instructions are included with the purchase of these optional probes from Sonex Aircraft.*



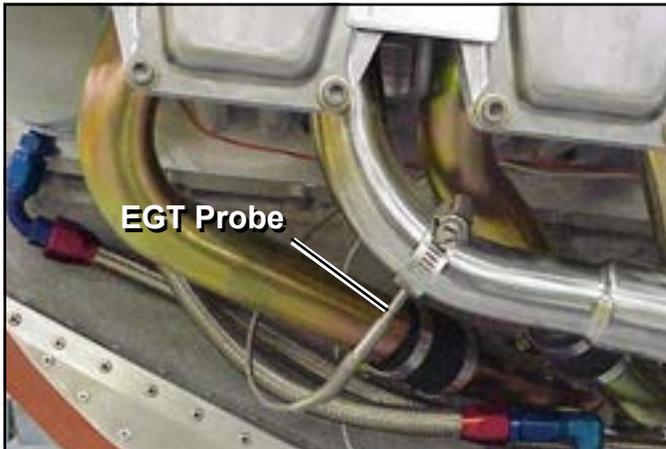
*A cylinder head bolt above an exhaust port is used for accurate temperature indications. On the left side of the engine (as viewed from the flywheel end) it is the aft bolt, on the right the forward bolt.*

## Installing EGT Probes

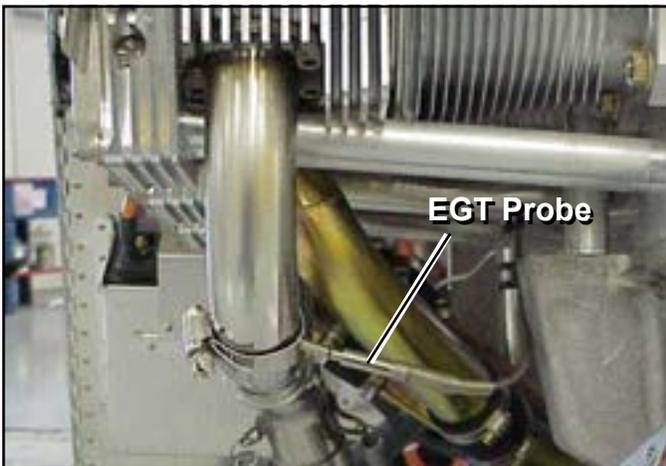
EGT probe(s) must be installed 4" from the exhaust port flange of the cylinder which is being monitored.

**Important: Do not trim the EGT probe wires.**

It is also important to consider the orientation of each probe to avoid interference between the probe and cowling.



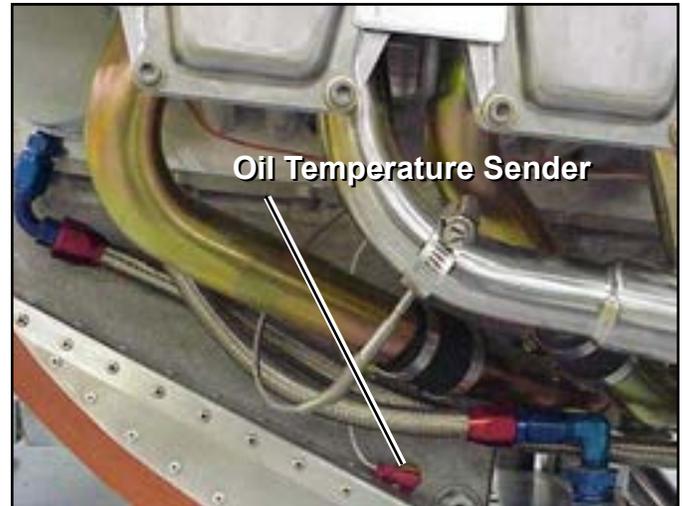
*An EGT probe installed on the left side of a Jabiru 3300.*



*An EGT probe installed on the right side of a Jabiru 3300. This probe is oriented towards the engine to prevent interference with the close-fitting cowl.*

## Wiring the Oil Temperature Sender

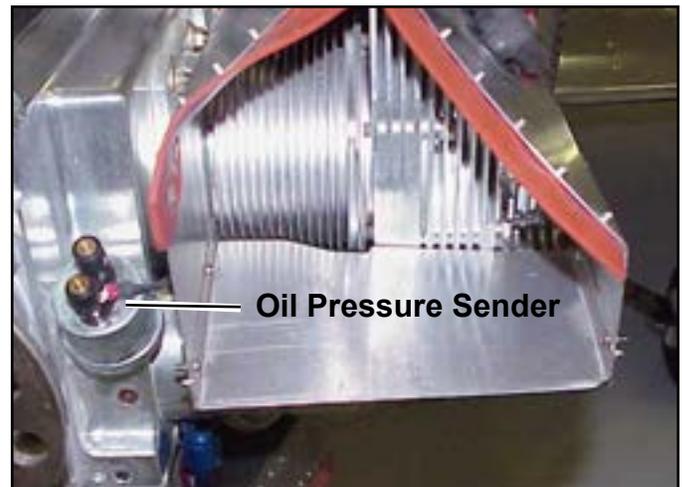
A wire which ends with a 1/4" insulated female spade terminal works well for the oil temperature sender. Trim the insulating material so the terminal will slide onto the sender, yet not come in metal-to-metal contact with the oil cooler shroud.



*An insulated female spade terminal is used at the oil temperature sender.*

## Wiring the Oil Pressure Sender

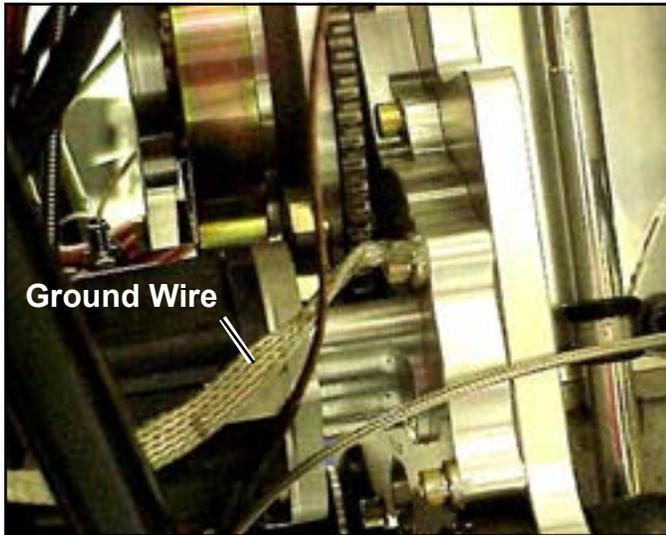
A wire which ends with a 1/8" or 3/16" ring terminal works well for the oil pressure sender. The wire must be attached to the terminal stamped "G".



*The wire for the oil pressure sender attaches to the terminal stamped "G".*

## Grounding the Engine

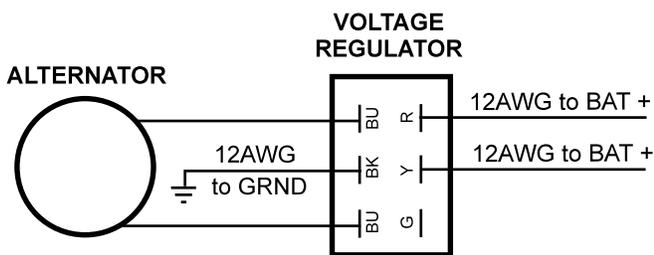
When grounding the engine it is important to attach the ground wire to the case, not to an engine mount bolt. The engine mounting bolts are insulated by the rubber engine mounts and do not provide a good ground path. Using one of the socket head cap screws from the accessory plate, as shown below, works well.



The engine ground wire must attach to the engine case, not one of the engine mounting bolts. This aircraft used a braided wire ground cable, however an insulated cable is typical.

## Wiring the Voltage Regulator (Rev. 10/04)

The very early Jabiru engines had 3-phase alternators which required special wiring consideration (see Jabiru-provided manuals). However, most engines manufacture have been fitted with single-phase alternators which must be wired as shown in this diagram.



VOLTAGE REGULATOR:	TO:
Blue Wire	Alternator Output Wire
Blue Wire	Alternator Output Wire
Black Wire	Airframe Ground
Red Wire	Positive Battery Terminal
Yellow Wire	Positive Battery Terminal
Green Wire	Unused

# Sonex/Jabiru Installation Guide

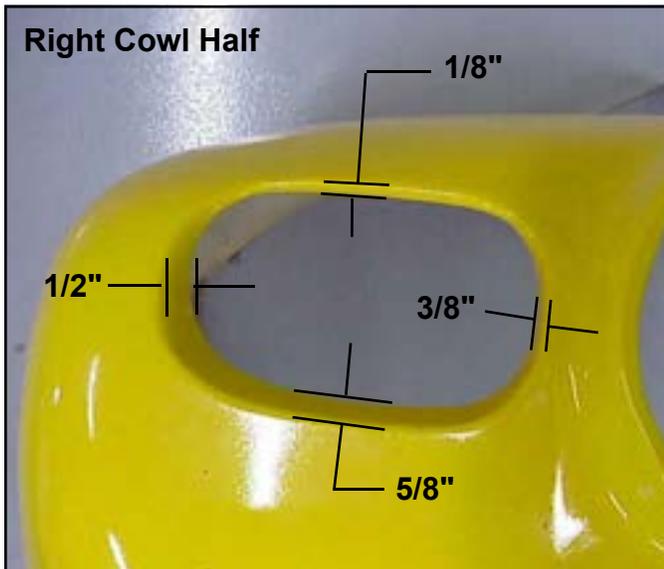
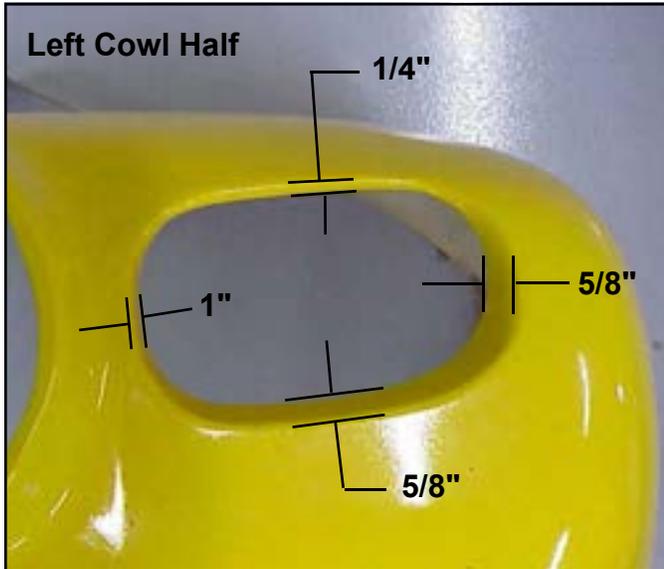
# COWL PREPARATION

## Section Checklist

- Cylinder Head Cooling Air Cut-outs
- Oil Cooler Inlet Cut-out
- Exhaust Cut-outs
- Jabiru 2200 Oil Sump Blister

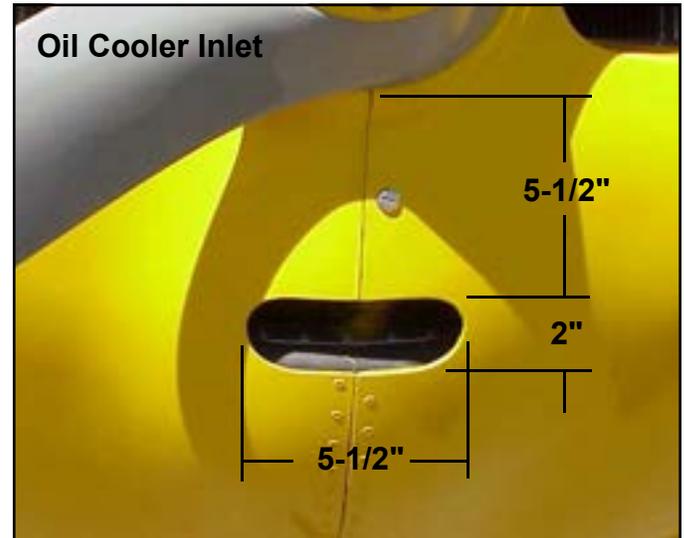
## Cylinder Head Cooling Air Cut-outs

These photos identify the depth of the cowl lips for the cylinder head cooling air.



## Oil Cooler Inlet Cut-outs

**Important:** The size of the oil cooler inlet must be as shown.



*This photo identifies the size and location of the oil cooler inlet.*

# Sonex/Jabiru Installation Guide

# COWL PREPARATION

## Exhaust Cut-outs (Rev. 10/04)

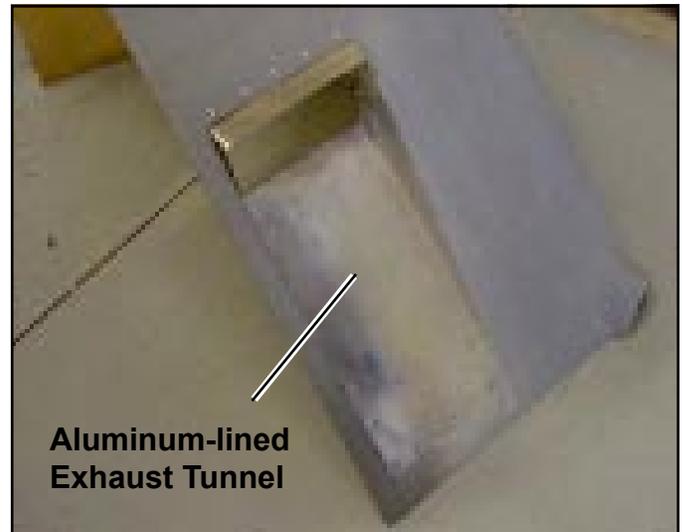
The size of the exhaust outlet(s) is a critical for proper cooling. The Sonex requires 47 to 50 square inches of outlet area for the cooling air.

The cowling provided with your kit is one of two types: a Jabiru cowl with premolded exhaust tunnels (detailed below), or a Jabiru or Universal cowl without exhaust tunnels, detailed on the next page.

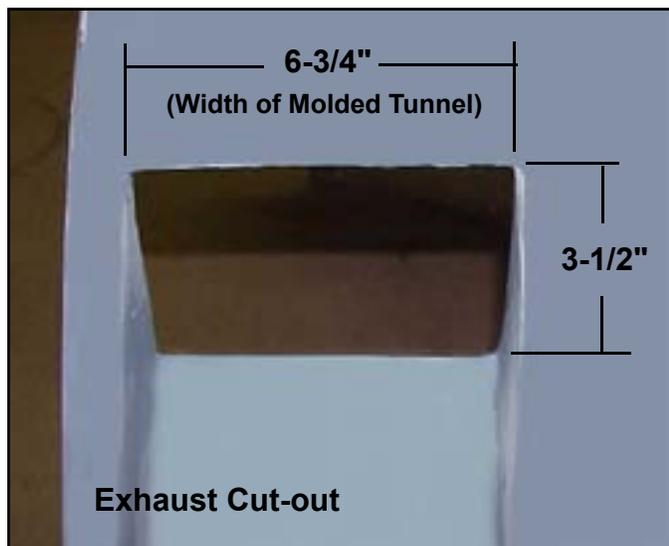
### Jabiru Cowl with Pre-molded Exhaust Tunnel

The Jabiru cowl with pre-molded exhaust tunnels was phased out in 2004.

The Jabiru cowl with pre-molded tunnels must have the exhaust outlets cut open to the proper size and have air deflector lips added, as shown in the accompanying photos. In addition, .025" aluminum sheet is riveted to the exhaust tunnel to protect the fiberglass from the hot exhaust gasses.



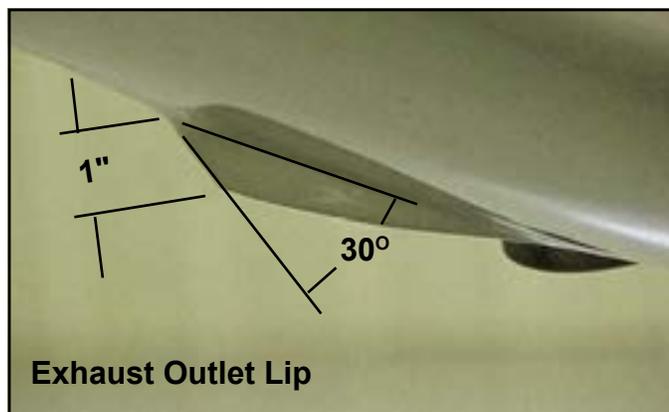
*This tunnel has been lined with .025" 6061-T6 aluminum to protect the fiberglass from the heat of the exhaust. The aluminum wraps around the inside as well, but only extends a few inches back.*



*This is a view of the exhaust cut-out before the lips are added.*



*This view of a completed cowl clearly shows the air deflector lips which are added to the front of the exhaust cut-out. These lips create a low pressure area which draws the cooling air through the cowl. These lips are particularly important when the airplane is in a climb attitude.*



*This exhaust lips can be molded from fiberglass, as shown here, or made from .025" aluminum and riveted in place.*

# Sonex/Jabiru Installation Guide

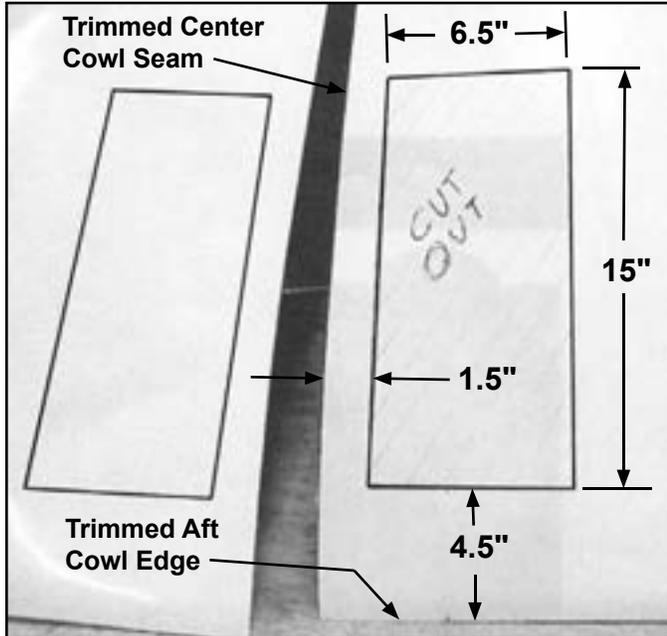
# COWL PREPARATION

## Cowlings without Pre-molded Exhaust Tunnels

Cowls without pre-molded tunnels require the installation of the laser cut aluminum exhaust tunnels, included with your Sonex Aircraft-provided firewall forward kit.

**Important:** The cowl tunnels are installed only after the cowling has been fit to the airframe. Installing the tunnels prior to fitting the cowl will result in inaccurate cowl tunnel positions.

1. Mark and cut the cowl cut-outs in your trimmed and fitted cowl (see photo).



A large cut-out is made in each lower cowl half to accept the aluminum exhaust tunnel. These cut-outs are made only after the cowl has been trimmed to fit the airframe.

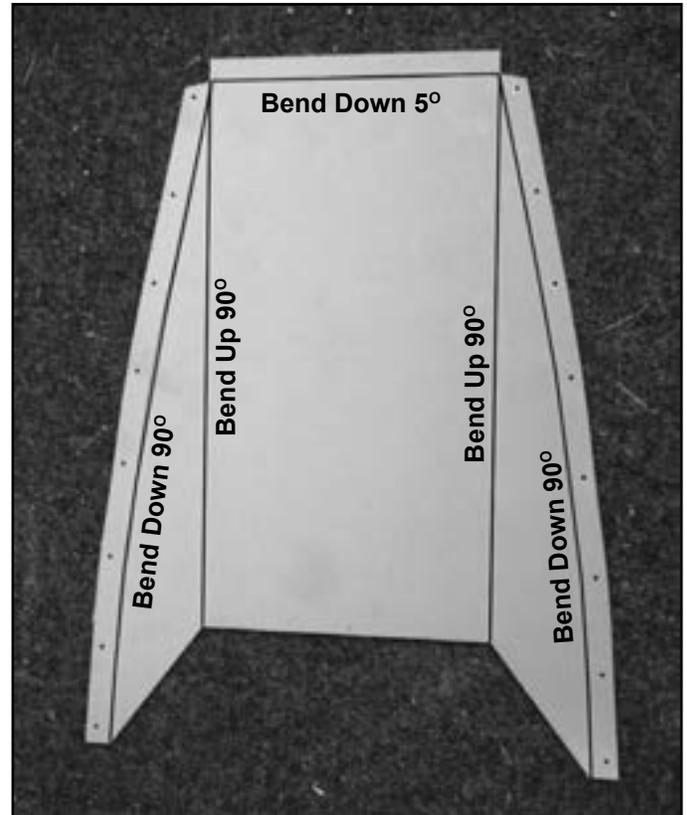
2. Make the flange forming tool shown below from scrap phenolic or a piece of hardwood.



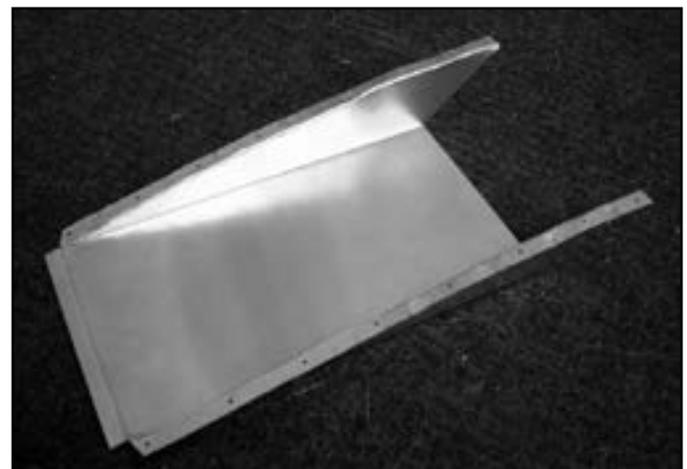
This home made tool will be useful for bending the 1/2" wide flanges on the tunnel.

3. Form each laser-cut tunnel (part number SNX-P20-45) as shown in the following photos. Flute between each pilot hole as needed to make the tunnel sides straight.

*Note:* The 1/2" wide flanges can be formed easily with the home made tool shown in the previous column.

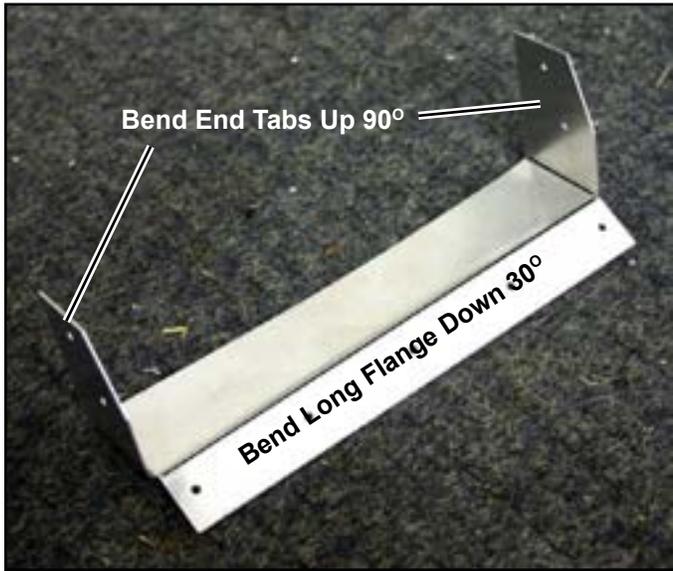


The tunnels are most easily formed by first bending the two straight bends up 90°, then use the flanging tool to bend each flange down 90°, and finally make the 5° bend at the rear.



The formed tunnel ready for installation.

4. Form each of the two deflector lips (part number SNX-P20-46) as shown in the photo, below.



*The formed deflector lip ready for installation.*

5. Rivet the tunnels and lips in place as shown in the photo below.



*Exhaust tunnel and deflector lip clecoed in place. Note that the flanges of each are inside the cowl.*

## Custom Exhaust Installations (Rev. 10/04)

Custom exhaust installations can set your airplane apart, but may also require extensive testing and modification to perfect.

If you do pursue a custom installation you will need to provide 47 to 50 square inches of outlet area for the cooling air. This must be placed in a low-pressure area of the cowl to function properly.

**Important:** Though counter-intuitive, providing larger inlet or exit cooling air openings than specified can actually decrease the effectiveness of the cooling air which passes through the cowl.

# Sonex/Jabiru Installation Guide

# COWL PREPARATION

## Jabiru 2200 Cowl Blister

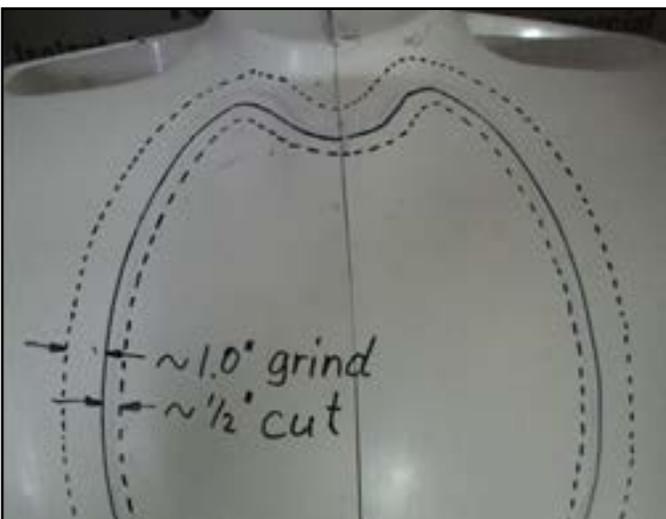
The introduction of a larger (fin-less) oil sump on the Jabiru 2200 engine requires the use of an optional add-on fiberglass blister (Sonex part number SNX-P16-22) available from Sonex Aircraft.

1. Fit the cowling to the airframe but do not install the lower piano hinge. While fitting the cowl you will need to remove some material to eliminate the interference between the cowl and the oil sum.
2. Position the blister on the bottom of the cowl and trace its outline. The back of the blister will be approximately 21" forward of the back of the cowl.



Hold the blister in position and draw its outline on the cowl.

3. Cut the cowl 1/2" inside the outline of the blister.



Draw the guidelines for cutting and grinding the cowl.

4. Grind the cowl at least 1" beyond the outside of the line. This is done to remove the gelcoat so the blister can be securely attached to the cowl with fiberglass and epoxy.



The cowl is shown here ready for the blister to be 'glassed in place.

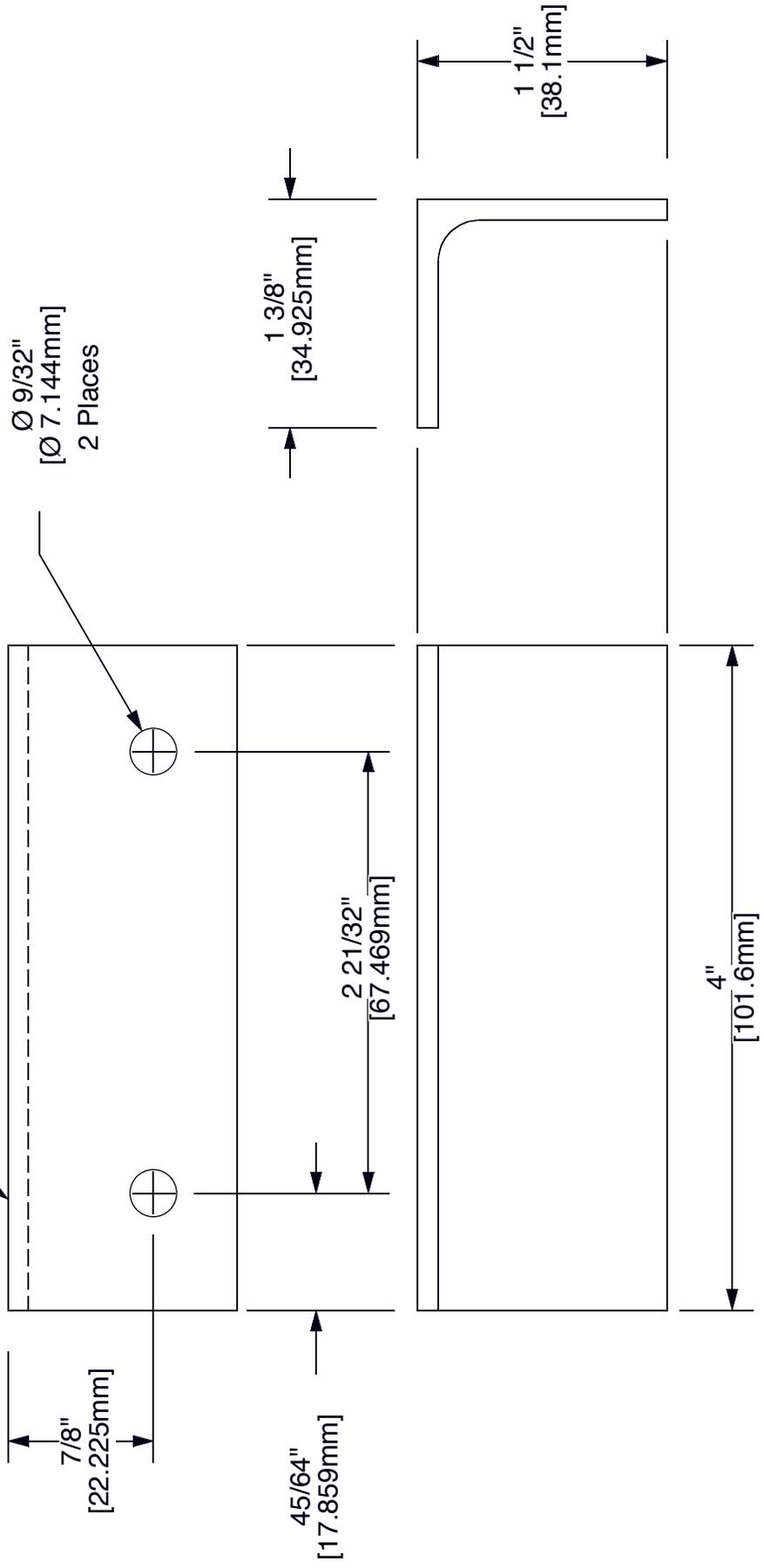
5. Remove the gelcoat at least 1" in from the edges of the blister.
6. Position the blister and attach it with fiberglass resin and cloth. Any fiberglass repair kit is acceptable, including the boat repair kits and car repair kits commonly found at automotive stores.
7. When the glass has cured add some layers of glass inside the cowl to cover the "step" between the cowl and the blister and to provide additional strength to the blister.
8. Fill and finish the cowl.
9. Split the cowl and install the lower piano hinge.

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Revision Letter

Change Description

**-42 Oil Cooler Support Bracket 1 Req'd  
Make From 2"x2"x1/8" Thick 6061-T6 Aluminum Angle**



**sonex** 3300 Oil Cooler Bracket

Drawing Scale	Drawing Number	Revision
FULL	SNX-P20-42	N/C

