AeroConversions

A Product Line of Sonex Aircraft LLC

511 Aviation Road Oshkosh, WI 54902
Tel. (920)-231-8297 Fax. (920)-426-8333
www.aeroconversions.com

AeroVee Turbo Radiator Installation

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The AeroConversions' AeroVee Turbo Radiator is a self-contained turbo cooling system intended to greatly reduce or eliminate “turbo coking” and turbo seizing caused by extreme temperature soaking of the bearing block after engine shut-down. The system is highly recommended for AeroVee turbos running on 100LL Avgas and semi-synthetic oil.

Installation Guidelines

Each installation will need to be adapted to the particular air-frame it is being installed on. These guidelines, together with the following resources, will help you achieve a functional installation. The following additional resources can be down-loaded from: www.aeroconversions.com/support/manuals.html

- ❑ ACV-T06 Bill of Materials / Shopping List
- ❑ Drawing ACV-T06, Turbo Cooling System (Schematic)
- ❑ Drawing ACV-T06-07, Radiator Plenum Drawing

The system prototype is installed and has been tested on a B-Model Waiex. An over-view photo of that installation is included on page 3.

Radiator

Cushioned clamps (AN 742) can be used to secure the radiator to the motormount.

B-Model Airframe
Mount the radiator/fan assembly horizontally on the left side of the firewall.

Legacy Airframe
Mount the radiator/fan assembly vertically on the left side of the motor mount.

Catch Can

Mount the catch can as high as possible. The filler neck must be above the radiator.

Coolant Hoses

Route the coolant hoses in a manner that prevents trapping air.

Vent Tube

A vent tube must be installed on the barbed fitting of the catch can's filler neck. The end of the vent tube must be routed over-board, out the bottom of the cowl. The vent tube allows the re-lease of excessive pressure from the system. When the coolant is hot avoid the vent tubes's outlet to avoid serious burns.

Water Pump

Mount the pump lower on the firewall than the radiator. It should be positioned to facilitate hose installation and mini-mize hose length.

Cowl Vents

Top cowl vents are highly recommended.

Two 4” dia. vents cut in the top of the cowl provide outlets for ambient and forced cooling air after shutdown. 4” diameter louvered aluminum soffit vents work well.

Switch / System Wiring

Wire the system to the “hot” side of the Master switch to allow operation when the Master switch is turned off. This is particu-larly important for automatic operation with the thermostat.

A 3-position switch installed in the panel allows these pump/fan operation modes:

Off - Pump and fan will not run

Automatic - The thermostat controls the operation of the pump and fan. The system turns on/off at approximately the thermostat's rated temperature

On - Pump and fan will run until the switch is manually turned off.

An indicator light wired to the switch and placed next to the switch in the panel indicates when the system is running.

Bearing Block Temperature Sender

Install a temperature sender under the thermostat to monitor the turbo bearing temperature. Unused CHT or EGT inputs on most EFIS systems will work for this purpose. Our prototype installation uses a large diameter CHT probe held in place by the thermostat.

Coolant

High-temperature waterless coolants (Evans Coolant EC10064 or equivalent) are recommended due to their high boiling point which reduces pressure in the system.

The capacity of the system is approximately 1.5 pints (24 fl. oz., .75 liters)

Filling the Coolant System

1. Add coolant until the catch can no longer accepts more coolant.
2. Leave the filler cap off and run the pump to purge air from the system.
3. Add more coolant as described in step 1.
4. Repeat steps 2 and 3 until the catch can remains full.
5. Install the filler cap.
6. Operate the pump and inspect for leaks.

Ground Testing the Installation

Perform the initial post-installation tests with the cowl removed.

IMPORTANT: Keep the CHT within limits while ground running the engine.

1. Tie down the aircraft.
2. Have someone watch for coolant leaks.
3. Run the engine until the bearing block reaches approximately 230^{O}F or its temperature stabilizes below 230^{O}F.

   Note: Oil flow through the bearing block may prevent the temperature from getting to 230^{O}F.
4. Turn the pump/fan switch to "On."
5. Shut down the engine.
6. Listen for both the pump and fan running. Positive operation will also be indicated by air being forced through the radiator.
7. Observe the bearing block temperature for a marked decrease in the indicated temperature of the bearing block.
8. If there are coolant leaks or the fan or pump do not operate, allow the engine to cool before investigating and correcting the problem. Repeat the test.
9. Repeat the test with the switch turned to the "Automatic" position.
10. Listen for both the pump and fan running. Operation will also be indicated by air being forced through the radiator and a marked decrease in the indicated temperature of the bearing block.
11. Confirm the fan and pump shut off automatically when the bearing block temperature falls near, or below, 160^{O}F.
12. If the fan or pump do not operate properly, allow the engine to cool before investigating and correcting the problem. Repeat the test.

Post Installation / Pre-Flight Requirements

Weight and Balance Calculation

The empty weight and balance of your aircraft must be recalculated and the appropriate log book entries made.

If you have a computer or phone app, or an EFIS programed to calculate your weight balance, that data must also be updated to reflect the aircraft's new empty weight and balance.

Logbook Entries

Your engine and airframe logbooks must be updated to reflect the installation of the radiator.

Sonex Aircraft would not consider this a "major alteration or repair," requiring the aircraft to be placed in Phase I flight testing, however you may wish to contact your local FAA office for guidance.

Operational Notes

The bearing block temperature is typically under 230^{O}F while the engine is running. The purpose of the cooler is to prevent oil coking by maintaining the temperature below 250^{O}F after shut down.

Prior to Takeoff

There is no benefit to operating the pump prior to take-off or in flight.

Always check turbo operation with a proper engine run-up prior to takeoff. **DO NOT take off if a power loss is indicated.**

Post Landing / Pre-Shut-Down Pump Operation

The pump should be switched to "On" or "Automatic" while taxiing after landing or immediately before shut down.

Automatic pump/fan shut down occurs near the thermostat's rated temperature when the switch is placed to "Automatic."

Manual shut-down is required when the switch is placed to "On."

Maintain Battery Heath

When possible, connect a battery maintainer after shutdown. Normally, battery drain is not significant during the automatic cool-down cycle but poor battery condition due to battery age or other factors could prevent engine restart.

Keep Informed

Check for, and follow, all Service Bulletins relative to AeroVee engines and turbos at:

www.aeroconversions.com/support/

B-Model Prototype Radiator Installation