

AIR INLET

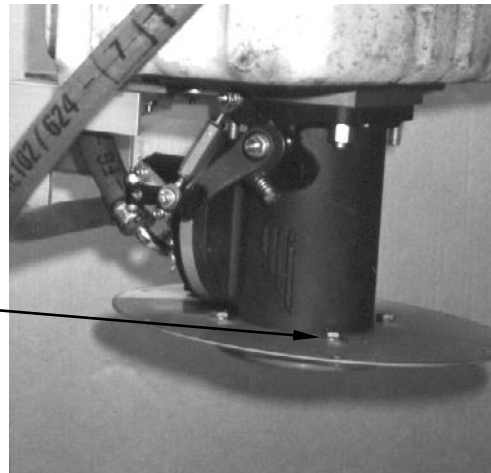
The following photos show examples of possible air inlet configurations. It is important to get cold outside air for maximum engine performance. It is also wise to have an alternate source of air in case the primary source of air to the engine is obstructed.

Installations using Airflow Performance air box inlet. These approach clamp rings are used with Van's airbox. The air box mount plate is positioned on the throttle body and a pinch bolt (1/4 - 20 X 7/8 soc hd cap screw) is used to secure the approach clamp ring to the throttle body. Apply some Loctite to the pinch bolt.



The air box mount plate is secured to the approach clamp ring with four 1/4 - 20 X 3/8 hex head bolts with star lock washers and plain washers. The plain washer goes against the mount plate, the star washer goes against the bolt head.

Air box mount plate bolts.



WARNING

The approach clamp ring must be on the inside of the air box. The air box mount plate bolts must be on the outside of the air box

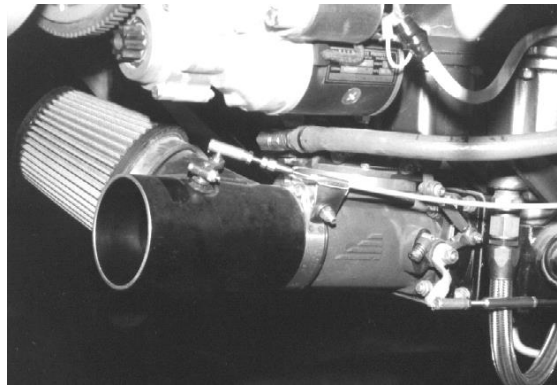
Due to the high gain venturi that is used on the Airflow Performance fuel controllers, direct ram air can be introduced to the throttle body with no adverse effects on fuel metering.

Ram air inlet.



APPENDIX C (Continued)

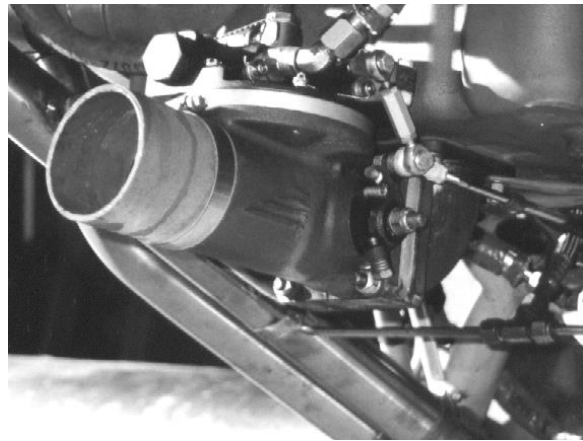
When using Airflow Performance alternate air duct, the assembly is attached directly to the throttle body and secured in place with a tee bolt band clamp. This assembly provides a means to have unfiltered ram air and filtered alternate air. On this Skybolt installation the alternate air valve is actuated with a cable. The cable bracket is attached to the tee bolt band clamp.



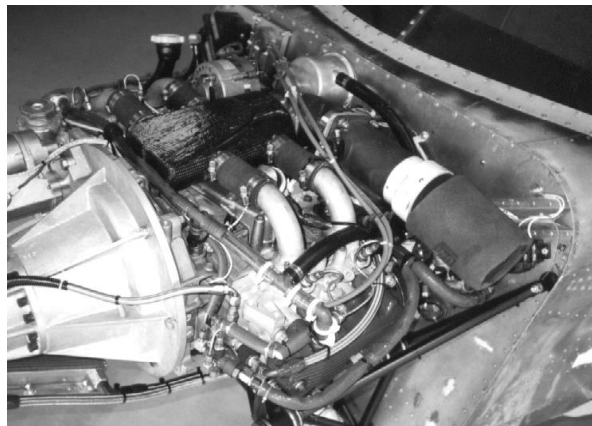
Filtered air is pulled into the engine when the alternate air duct valve is closed. A K&N filter provides air filtration in this case. Scat hose could also be attached to this leg to a remote air filter.



A simple hose mates up to the cowl opening to duct the ram air into the throttle body.



Pulling inlet air directly from the cowl area can cause rich mixture and poor engine performance due to heated air under the cowl. Care must be taken on installations like this to insure adequate supply of cold outside air to the air cleaner.



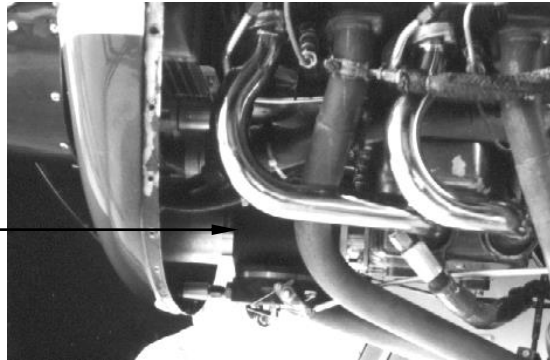
APPENDIX C (Continued)

An opening in the cowl with clearance to provide for engine movement ducts ram air directly into the throttle body on this aerobatic airplane. Keeping the annular clearance less than 1/4 inch will minimize the amount of hot air from the engine leaking into the inlet.



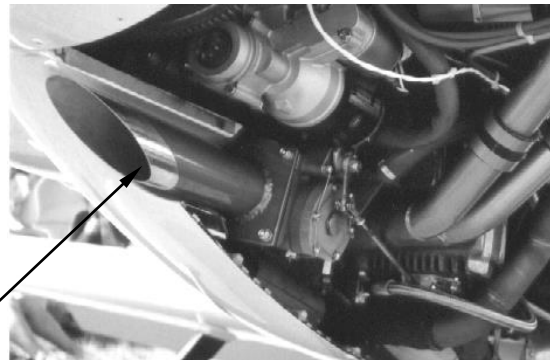
A short piece of aluminum tubing is used to duct the air into the fuel controller.

Aluminum tubing ducts air into the fuel controller. Clearance is provided to the cowl to provide for engine movement



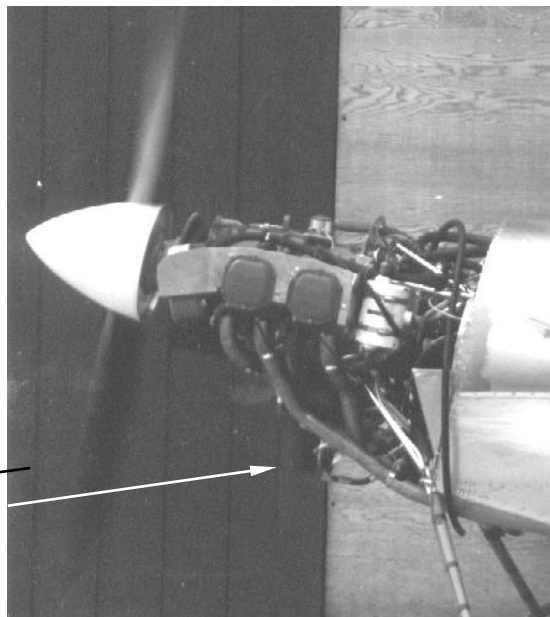
While this looks like a swoopy installation, the tube protruding through the cowl to provide inlet air creates a large pressure drop into the fuel control inlet. A large increase in performance can be gained by radiusing the tube inlet.

Sharp edge entrance. Poor for air flow.



Poor engine performance, surging, rich or erratic operation may result when test running the engine with the cowl off. Here the engine is run up with the fuel control inlet perpendicular to the prop blast. The blast air flowing across the fuel control inlet will give incorrect air flow measurement of the venturi causing incorrect fuel metering.

Fuel control inlet perpendicular to prop blast.

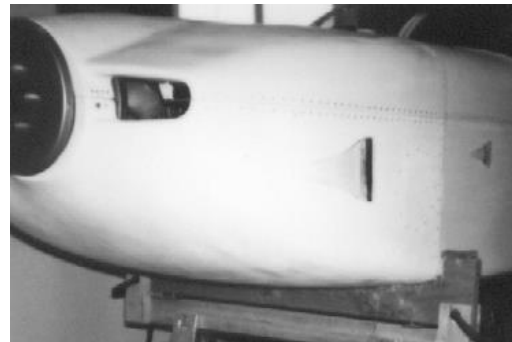


APPENDIX C (Continued)

A smooth radiused inlet on this cowl will provide maximum air to the fuel controller. Care must be taken to place the inlet in a high pressure area on the cowl. Screens in front of the inlet will restrict airflow and cause turbulence in the throttle body inlet.



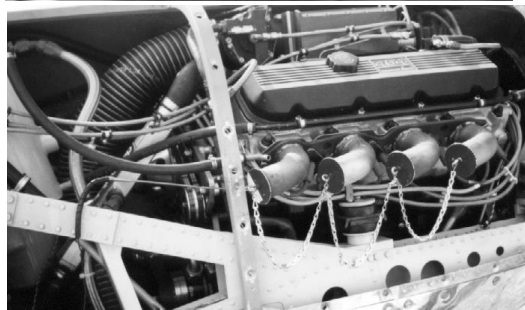
Some engines have rear entrance sumps. On these installations it may be simpler to pull the inlet air from a flush scoop on the side of the cowl. This will not provide as high of inlet ram as an opening on the front of the cowl.



A Bracket air cleaner is adapted to an aluminum air box. The air cleaner assembly is below the cowl to pick up outside air. Not exactly a low drag installation but it works well on this aerobatic aircraft.



Scat hose is a simple way to duct air into the fuel controller. Care must be taken to reduce pressure drop through the duct. A larger size than the throttle body should be used to reduce flow loss through the hose. Keep bends and run length to a minimum.

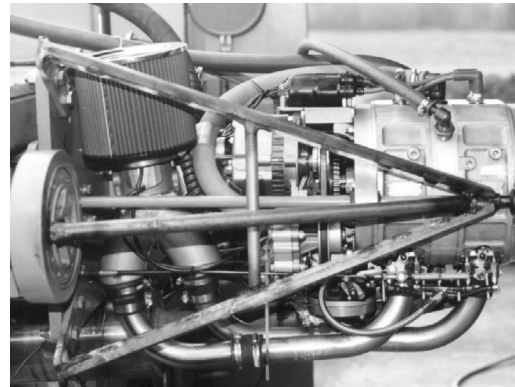


APPENDIX C (Continued)

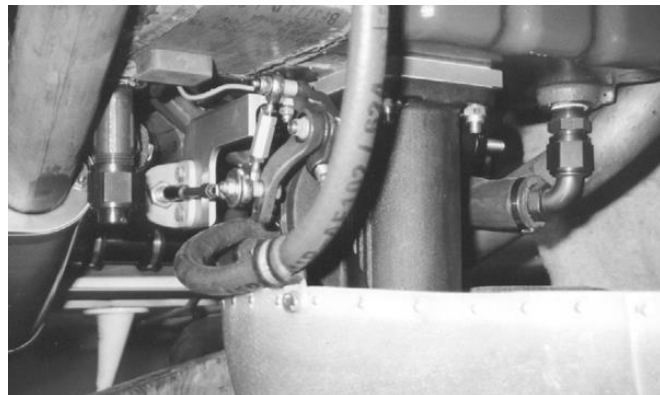
An automotive air cleaner is mounted directly to the fuel controller throttle body. There is no need to duct air in on this installation since this automotive V-8 conversion installed in a helicopter is exposed to outside air.



A large K&N filter is used on this rotary engine. Consideration must be given to air cleaner area with respect to engine brake specific air consumption (BSAC). Two stroke in particular have a higher BSAC and are sensitive to inlet pressure drop than four stroke engines. Therefore a larger than normal air filter is required on these engines.

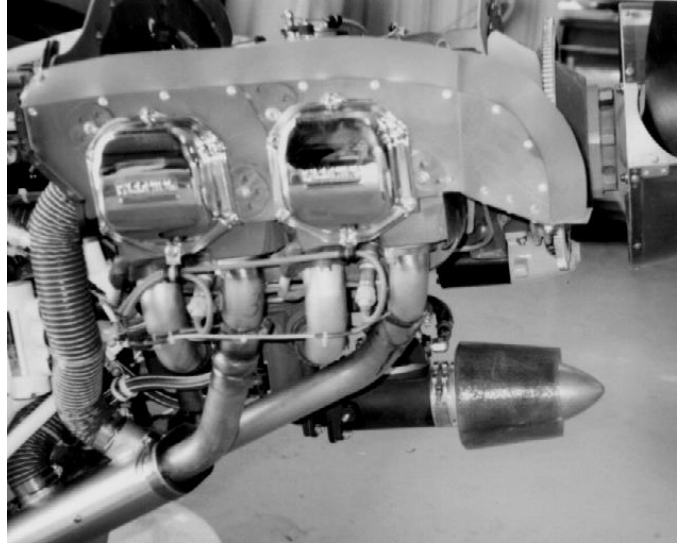


Lycoming 320 with Van's air box installation. As with the 360 installation, the bottom of the fiberglass box holds the air cleaner element against the air box mount plate. There is no intermediate plate holding the air filter in place.



APPENDIX C (Continued)

This installation uses filtered ram air only. A tapered fiberglass duct surrounds a tapered air filter. A model airplane spinner gives smooth air flow around the air filter



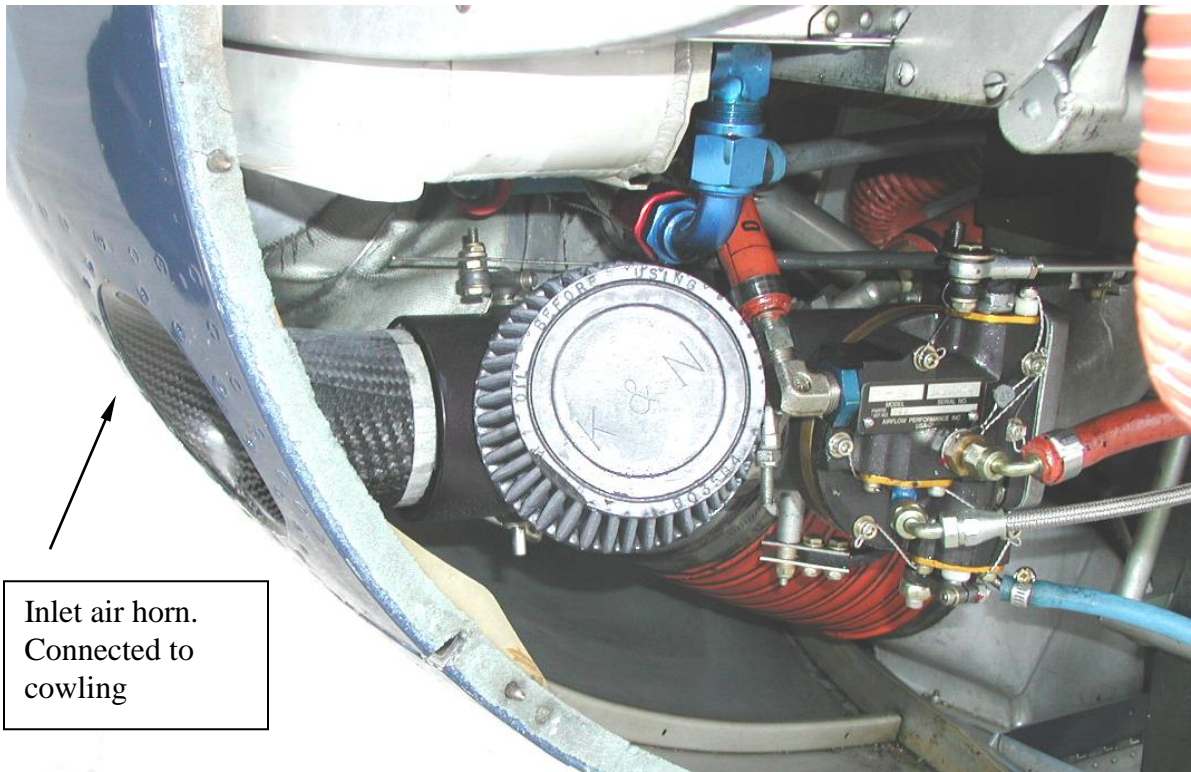
Here's the same installation with the cowling on. The tapered duct mates up with a radiused inlet on the cowling.



This unfiltered ram air inlet on this EDGE 540 gives optimal manifold pressure during aerobatics. The inlet has a 7 degree taper into the throttle body. Notice the radius right at the air inlet.



APPENDIX C (Continued)



Inlet air horn.
Connected to
cowling

This installation uses a carbon fiber inlet that is attached to the cowl. The snout of the air horn lines up with the inlet of the alternate air duct. A 1/8" gap between the air horn snout and the alternate air duct allows engine movement but there is no flexible connection to the alternate air duct. The close clearance allows immeasurable air leakage to the ram inlet.

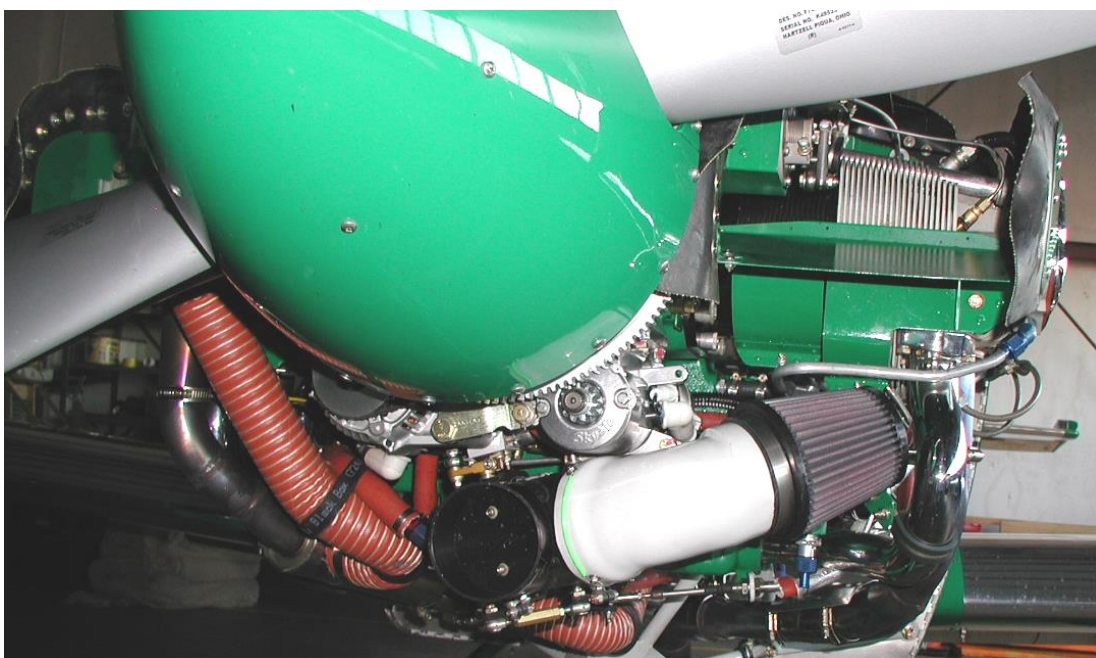
Cowling installed with Ram air
door open.



APPENDIX C (Continued)



Composite air inlet attached to FM-100 in Long EZ installation. Air inlet points into duct that feeds cold air into the engine compartment.

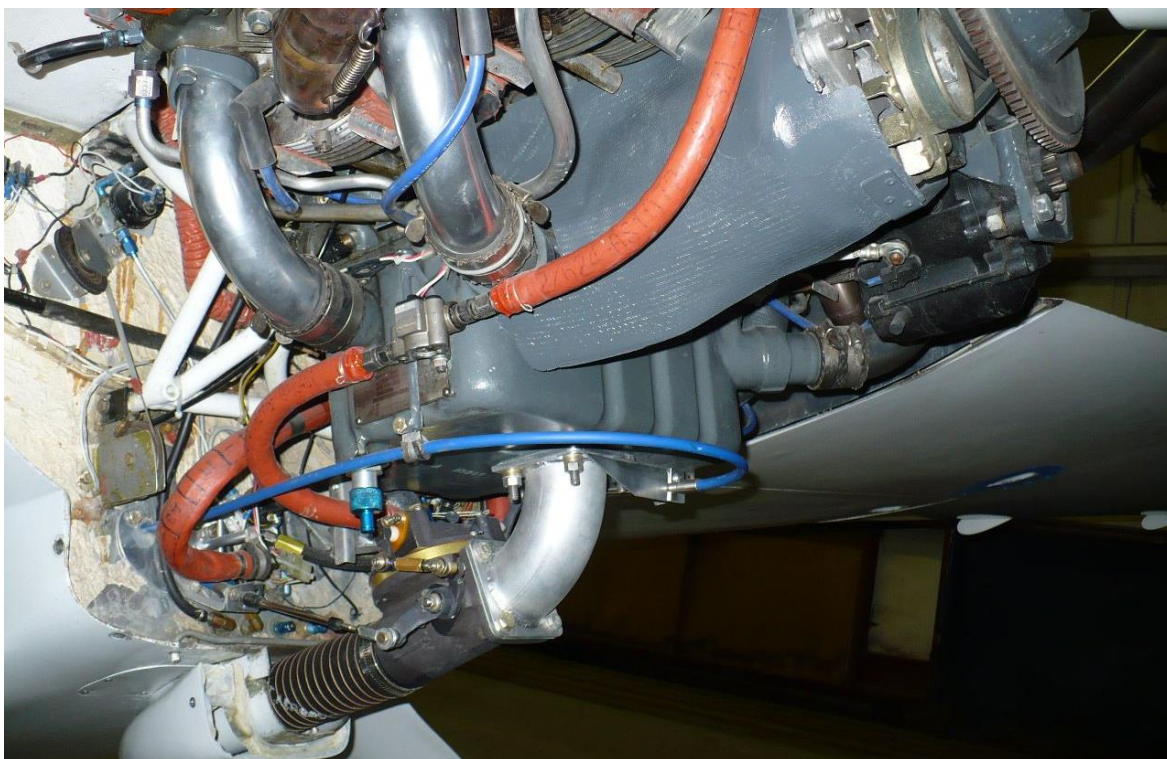


Ram/Alternate Air Duct on RV-8A.

APPENDIX C (Continued)



Ram/Alternate Air Duct on RV-8A



Down draft cooled Long EZ.

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