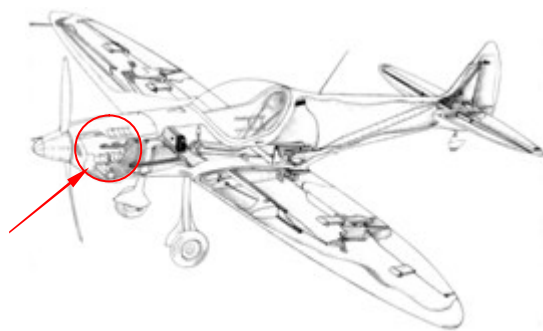


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## 5 Engine Assembly

Install the motor assembly according to the instructions of the engine manufacturer Jabiru. The following instructions cover only the tasks specific to the Twister.

- 5.1 Painting and masking the firewall
- 5.2 Installing the engine mount on the firewall
- 5.3 Installing the engine on the engine mount
- 5.4 Installing firewall reinforcement support beams (**PFA MOD329/005**)
- 5.5 Installing the cooling air ducts
- 5.6 Installing the air-intake casing
- 5.7 Installing the crankcase ventilation with separator
- 5.8 Mounting the propeller and the spinner
- 5.9 Assembling the throttle and brake assembly
- 5.10 Installing the control cables on the engine
- 5.11 Installing the Fuel system including(**PFA MOD329/002**)
- 5.12 Installing the cowling



### 5.1 Painting and Masking the Firewall

The firewall will be painted with two different fire-retardant coatings which, when heated, react with each other to form an insulating foam.

Proceed as follows:

1. Apply one coat of the white fire-retardant coating Pyroplast no. 30000296 with a brush and let the coat dry overnight.
2. Apply a second coat of the white fire-retardant coating Pyroplast no. 30000296 with a brush and let the coat dry overnight.
3. Apply one coat of the black topcoat Pyroplast no. 30000297 with a brush and let the coat dry overnight.
4. Mask the coated area completely with aluminum adhesive tape no. 70000259. Let the tape seams overlap by at least 3mm (0.12").

### 5.2 Installing the Engine mount on the Firewall

Install the engine mount on the firewall with four hexagon screws M8x50 no. 45001030. Install washers no. 52080020 on both sides of the firewall.

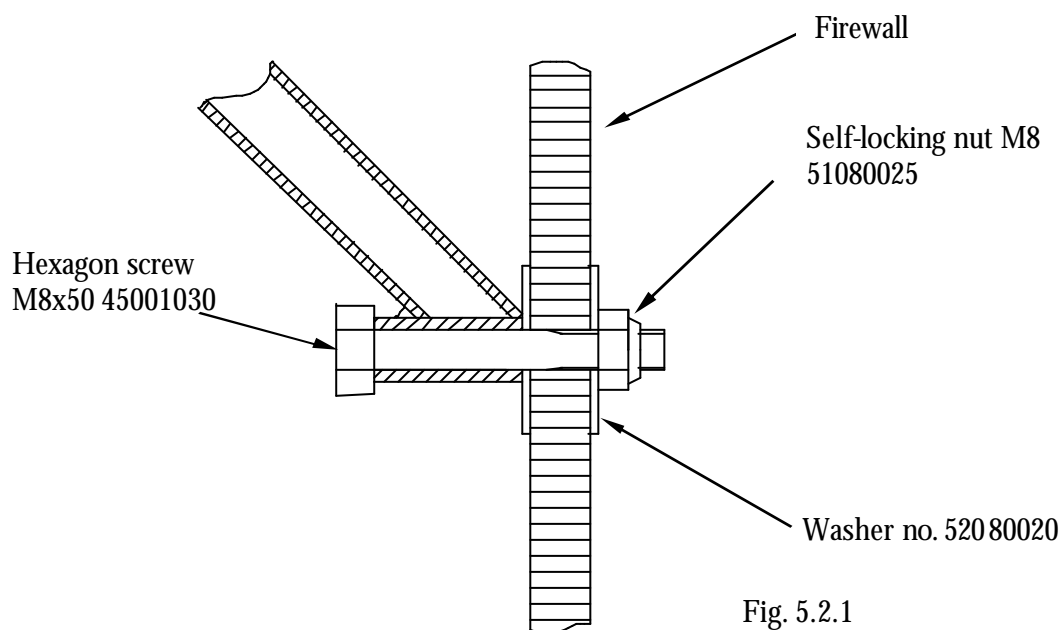
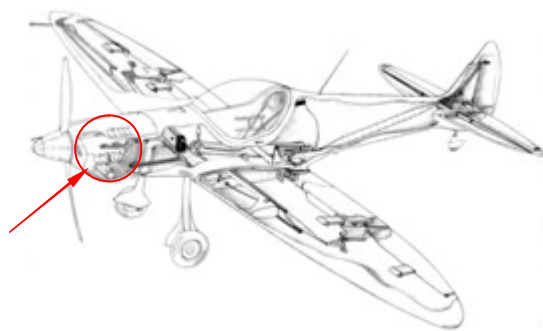


Fig. 5.2.1  
Installing the engine mount  
on the firewall



### 5.3 Installing the Engine on the Engine Mount

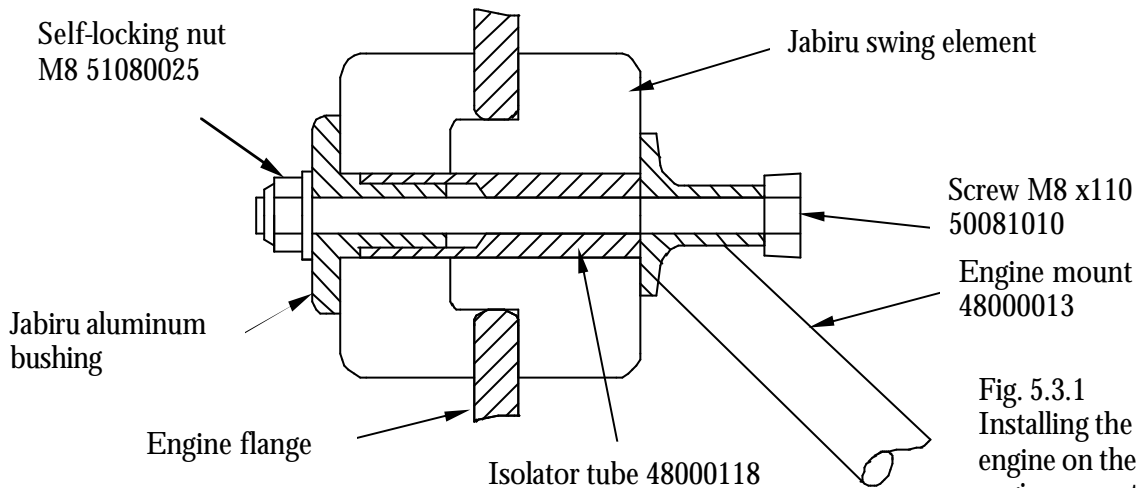


Fig. 5.3.1  
Installing the engine on the engine mount

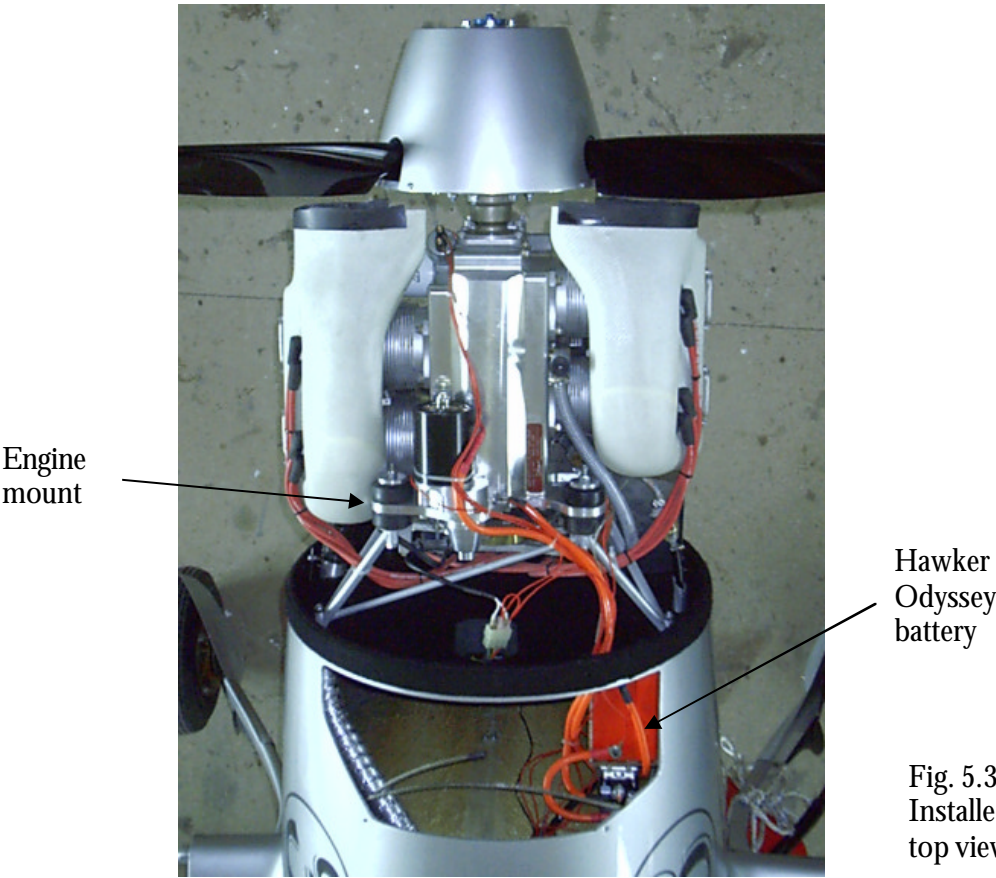
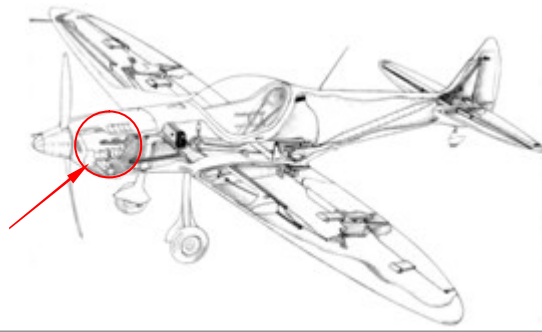


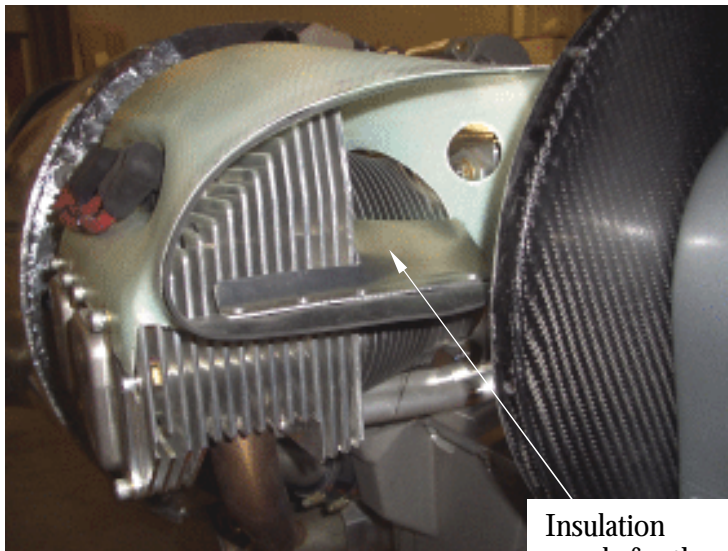
Fig. 5.3.2  
Installed engine, top view



#### 5.4 Installing firewall reinforcement support beams ( PFA MOD329/005)

##### 5.5 Installing the Cooling Air Ducts

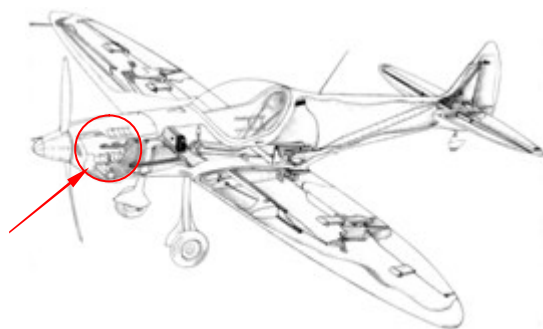
1. Install the cooling air ducts according to the instructions of the manufacturer.
2. Cover the front cylinders with an additional metal sheet to ensure even temperature distribution over the four cylinders. Cut an aluminum panel according to the contour of the cylinders and rivet it to the cooling air ducts with four pop rivets (see fig. 5.4.1).



Insulation  
panels for the  
front cylinder

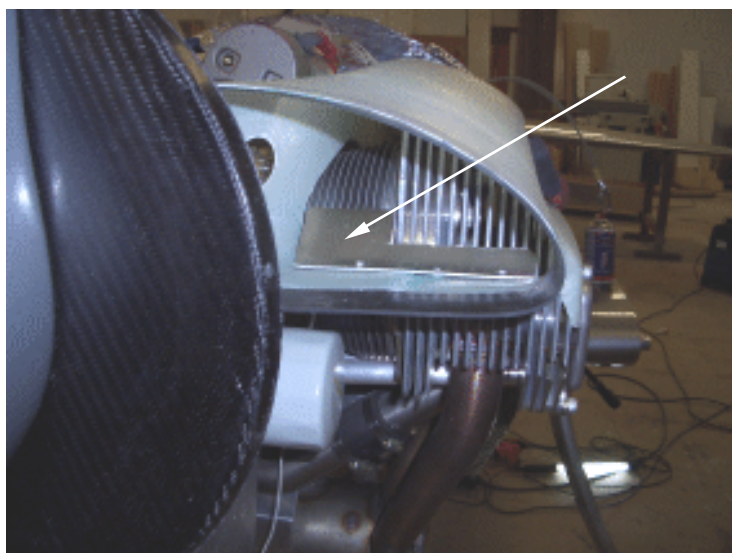
5.4.1  
Right cylinder with cooling-  
air guide panel

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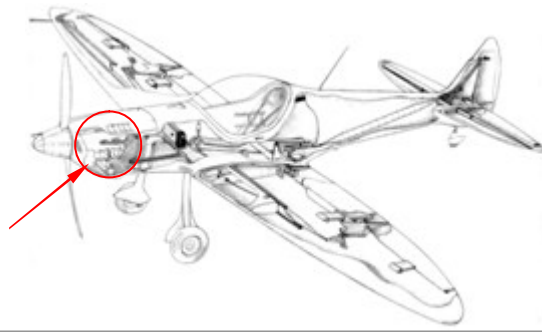


Engine

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5.4.2  
Left cylinder with  
cooling-air guide panel



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## 5.6 Installing the Air-Intake Casing

1. Use a 3mm (0.12") bit to drill bores in the rear casing shell at a distance of 10mm (0.39") from the edge with 50mm (1.97") hole spacing (see fig. 5.5.2).
2. Bond the felt strip centered over the bores into the rear shell.
3. Slide the rear shell with the felt strip onto the front shell.
4. Fix the casing on the carburetor with a metal clamp as shown in figure 5.5.2. If necessary, grind the nozzle to the correct diameter and cut it as shown in figure 5.5.1, so that the dome of the casing starts at the end of the carburetor intake port.

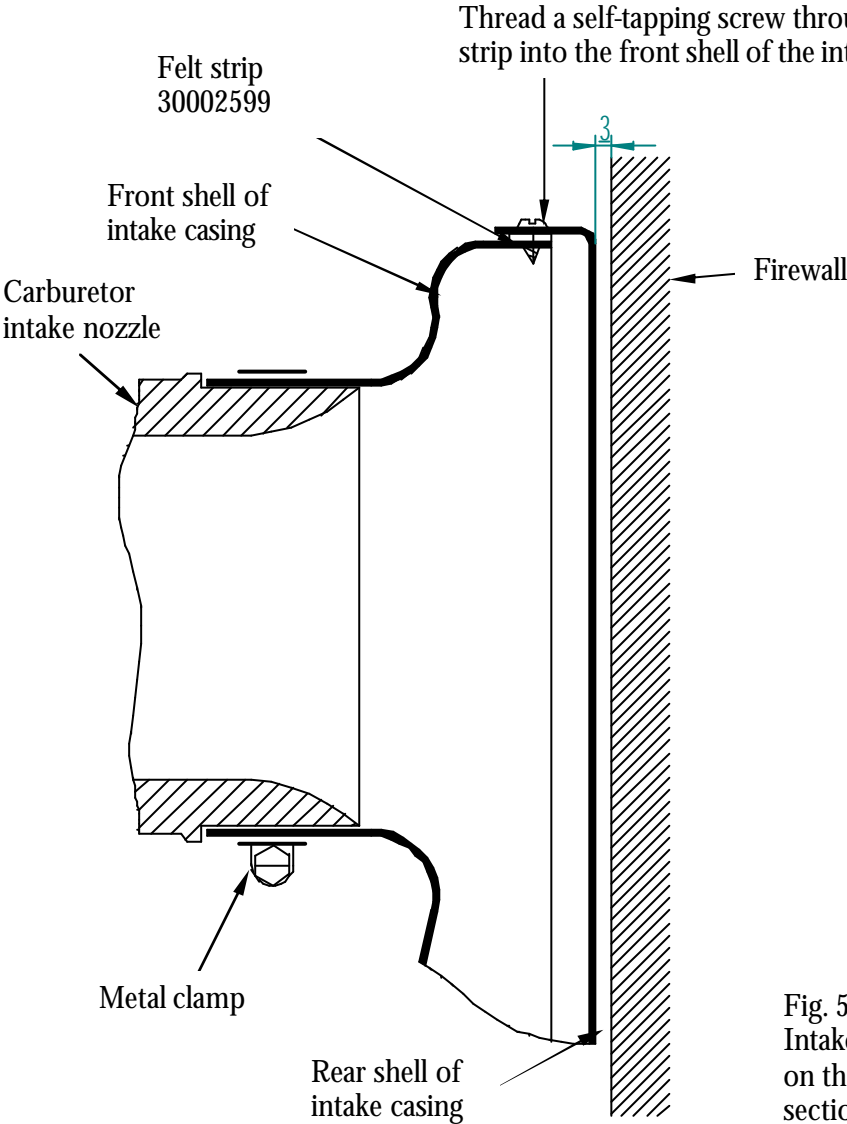
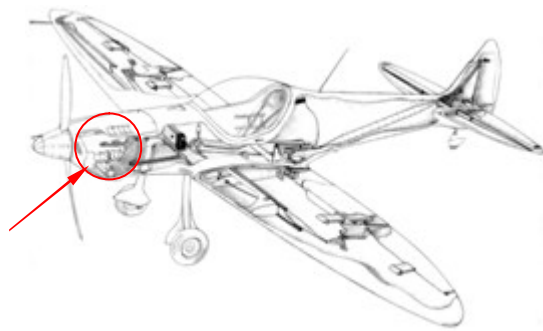
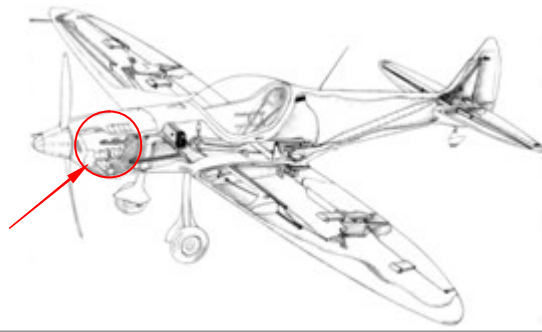


Fig. 5.6.1  
Intake casing mounted  
on the carburetor,  
section





5. Pull the rear shell away from the front shell as far as possible to create a 3mm (0.12") gap parallel to the firewall.
6. Thread self-tapping screws from the exterior into the intake casing as shown in figure 5.5.2 (predrill 1.5mm [0.06"] holes).



Figure 5.5.2  
Mounted intake casing  
with air filter



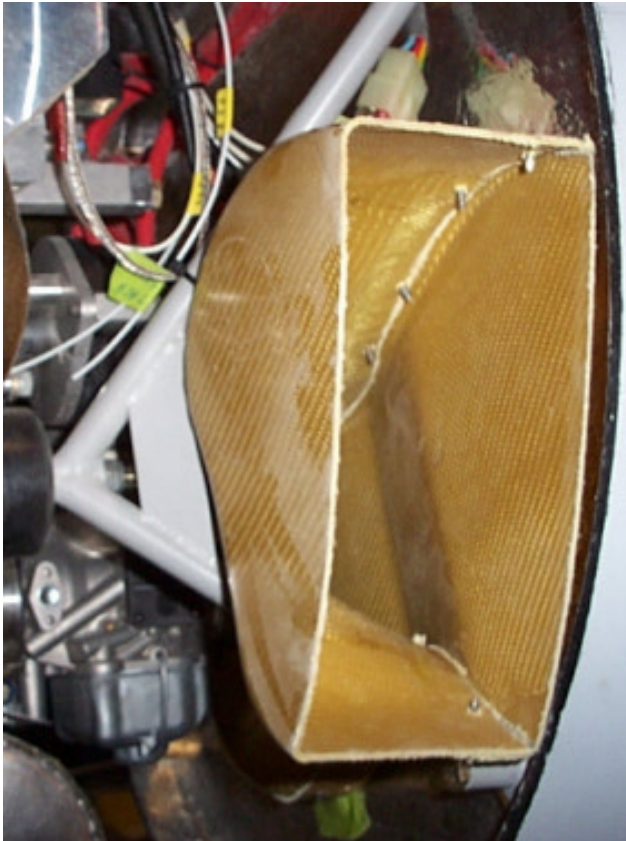
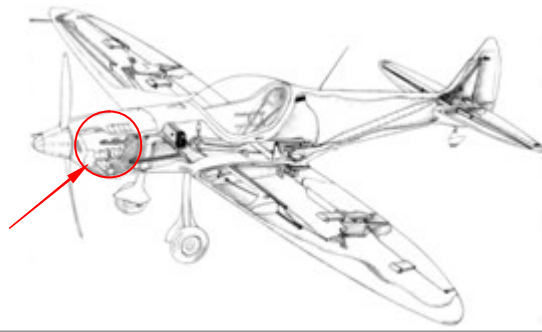
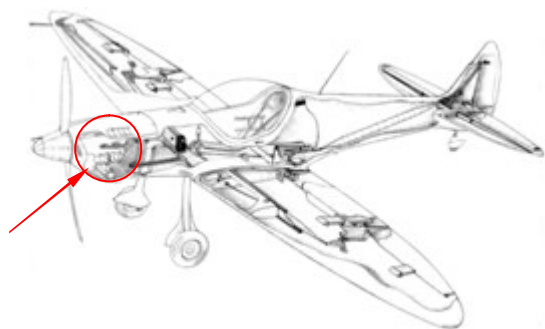


Fig. 5.5.3  
Intake casing fixed with self-tapping  
screws on the circumference

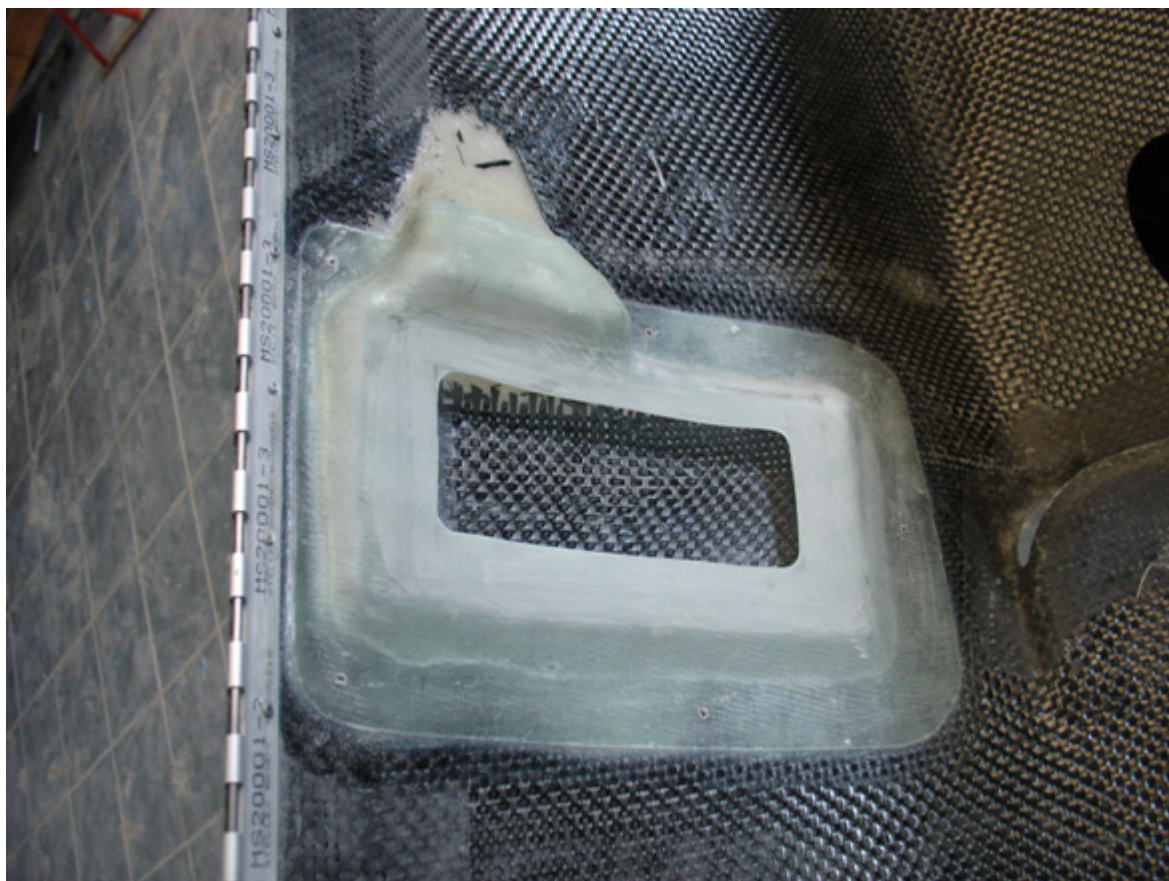
7. Place the air filter in the intake casing and hold the lower part of the cowling to the fuselage.
8. Cut the intake casing so that the cowling, when it lies flush on the fuselage, pushes slightly against the rubber lip of the filter.

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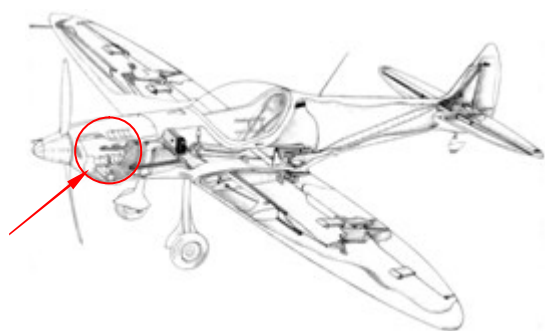


Engine

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Revision 1.5



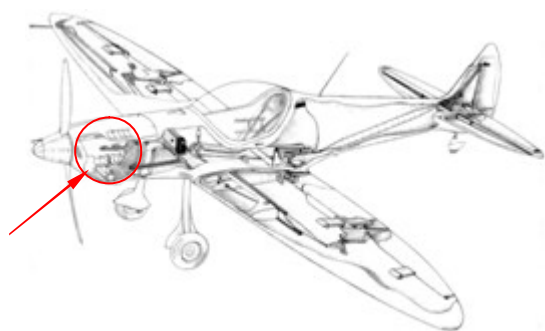
Engine

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Revision 1.5

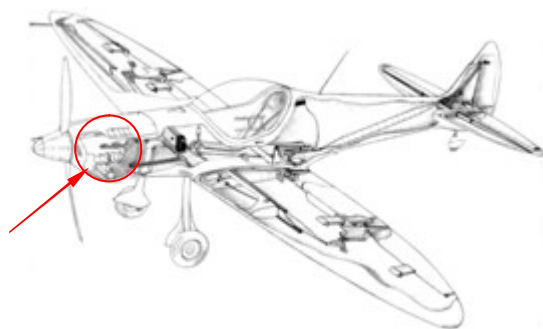


Engine

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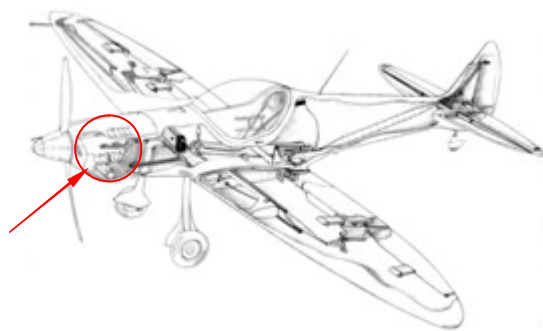


Revision 1.5



Engine

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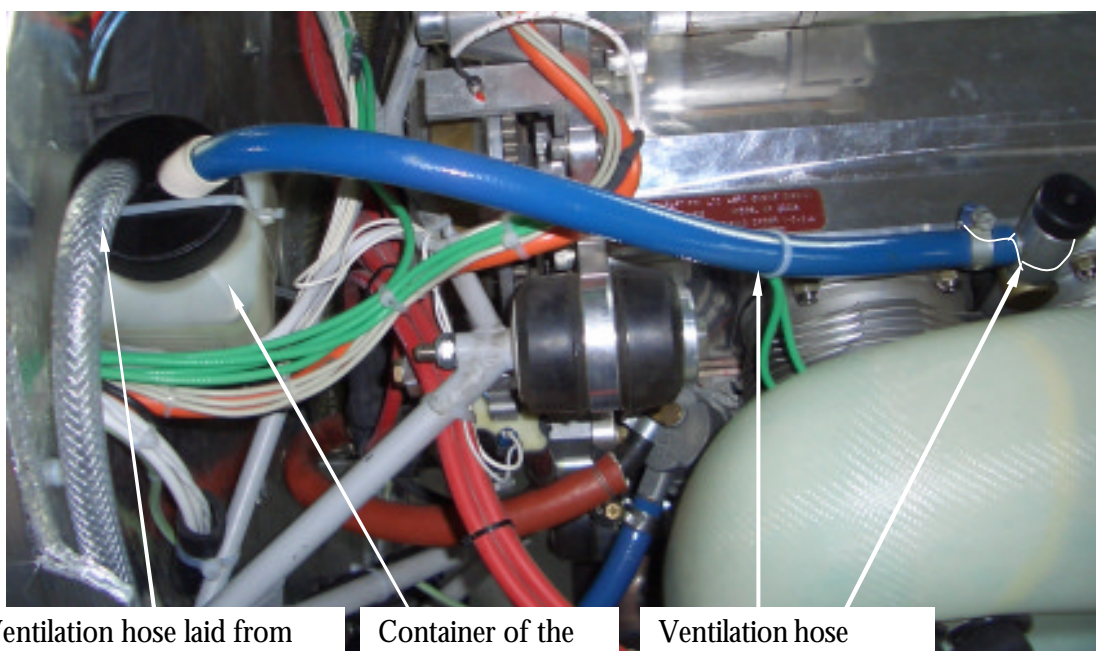


### 5.7 Installing the Crankcase Ventilation with Separator

1. Use a hose clamp to connect a hose to the ventilation nozzle at the oil dip stick.

Note: Since the surface of the hose nozzle at the dip stick is smooth, the hose can slip off easily. Secure the hose clamp with a wire.

2. The empty container of the Pyroplast fire-retardant coating can be reused as an air chamber. Thoroughly clean the container and attach it to the upper rear of the firewall in such a way that it can be detached.
3. Drill two bores with a diameter corresponding to that of the hoses into the screw cap of the container.
4. Lay a second hose from the container through one of the lower air outlet openings in the cowl to the exterior.



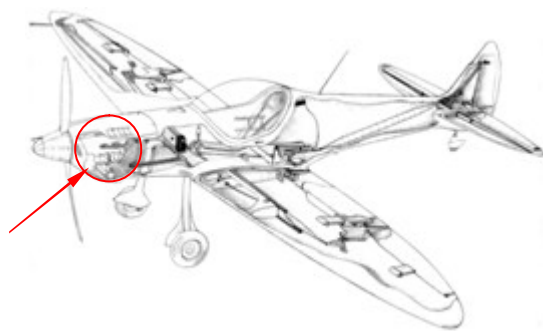
Ventilation hose laid from the container through one of the air outlets in the cowl to the exterior

Container of the Pyroplast fire-retardant coating

Ventilation hose secured with clamp and wire

Fig. 5.6.1  
Crankcase ventilation





### 5.8 Mounting the Propeller and the Spinner

1. Place the propeller on the carbon back plate. Use a cardboard template to record the exact contour of the propeller at the spinner.
2. Scribe and cut the spinner using the template.

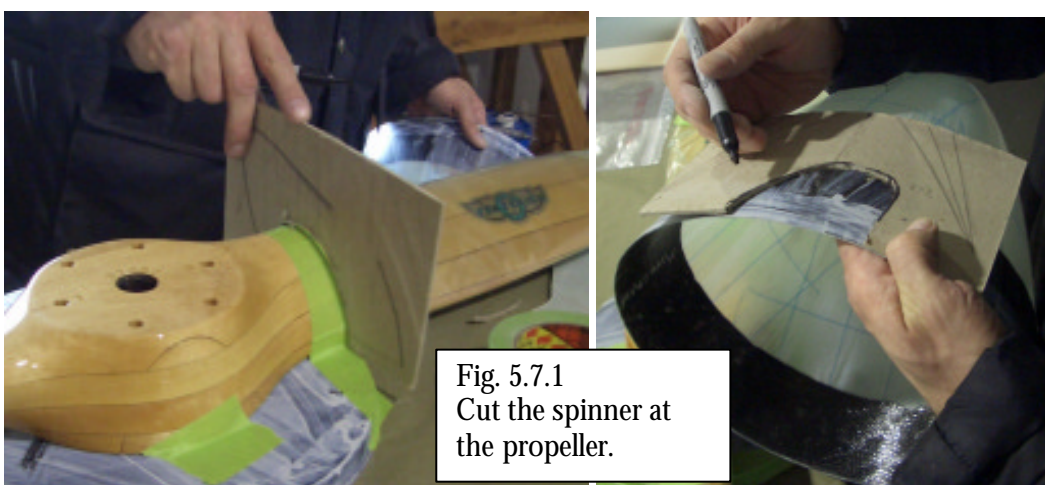
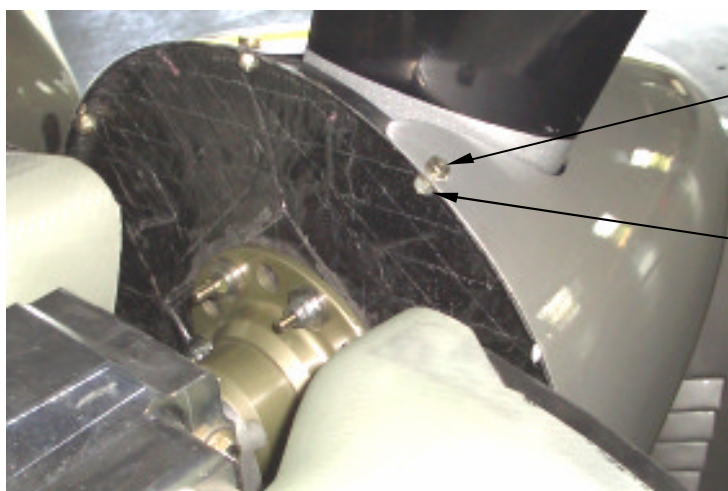


Fig. 5.7.1  
Cut the spinner at  
the propeller.

3. Place carbon back plate no. 28000071 for the spinner between the propeller hub and the propeller. Mount the propeller according to the manufacturer's instructions (with the required screws and torques).
4. Fix the spinner cap with six M5 bolts and self-locking nuts on the circumference (see fig 5.7.1).

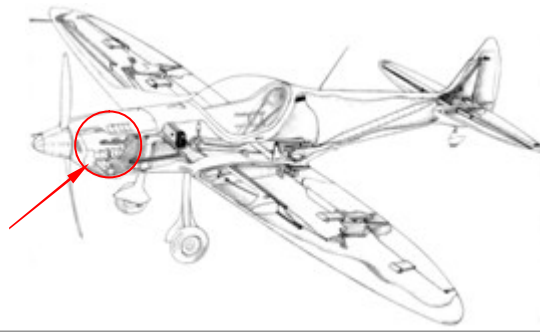


M5 bolt 50051003  
with washer 52060001

Self-locking nut M5  
51050020

Fig. 5.7.2  
Installing the  
spinner cap





## 5.9 Assembling the Throttle and Brake Assembly

1. Assemble the throttle and brake assembly as shown in figure 5.8.1. Proceed from right to left.

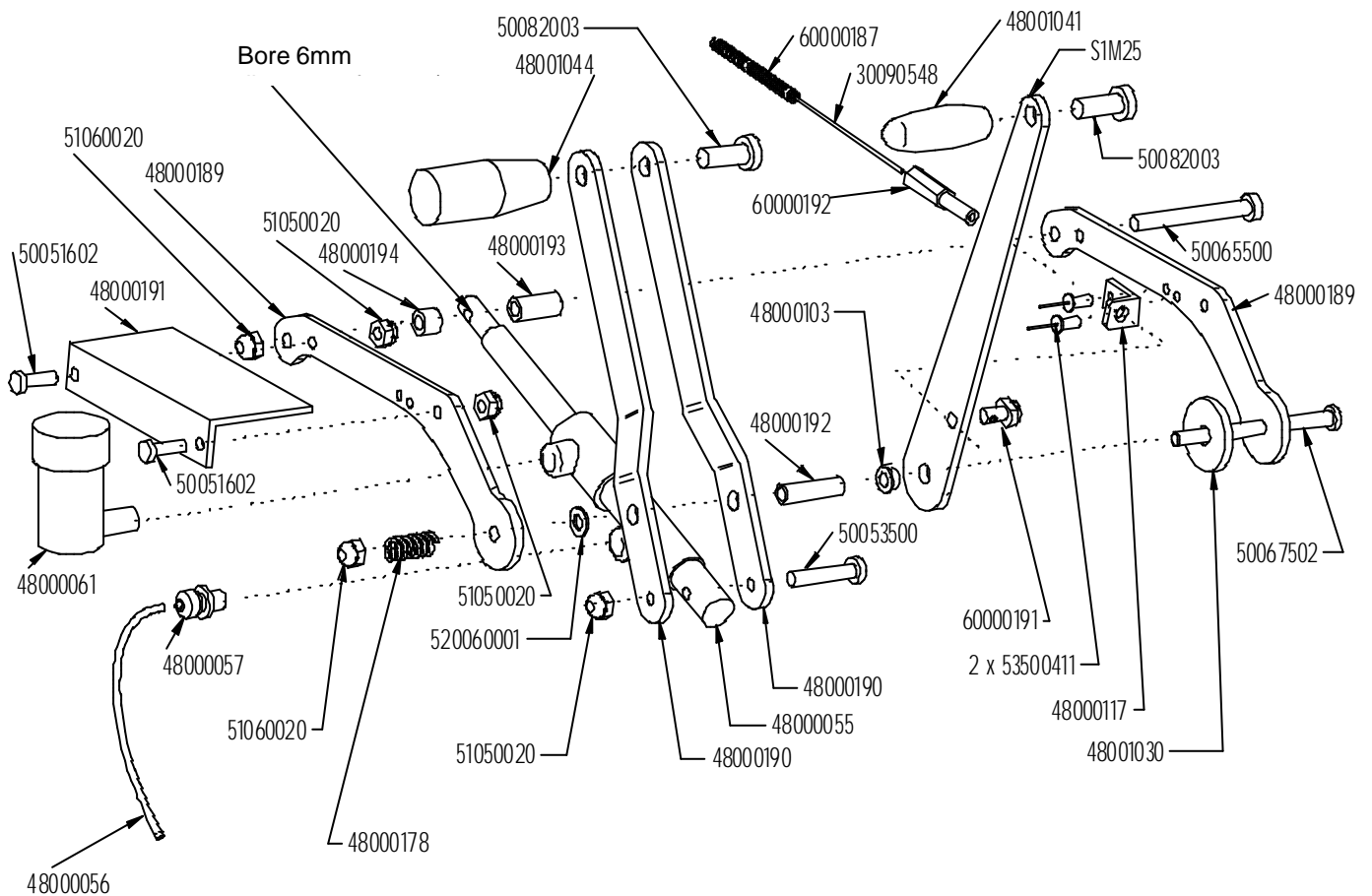
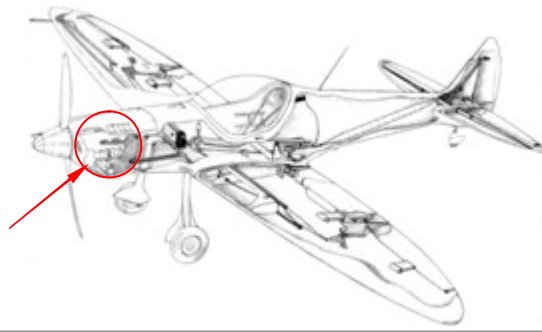


Fig. 5.8.1  
Assembling the throttle and brake  
assembly



2. Scribe the position for the throttle lever and cut the corresponding slot into the safety cell.

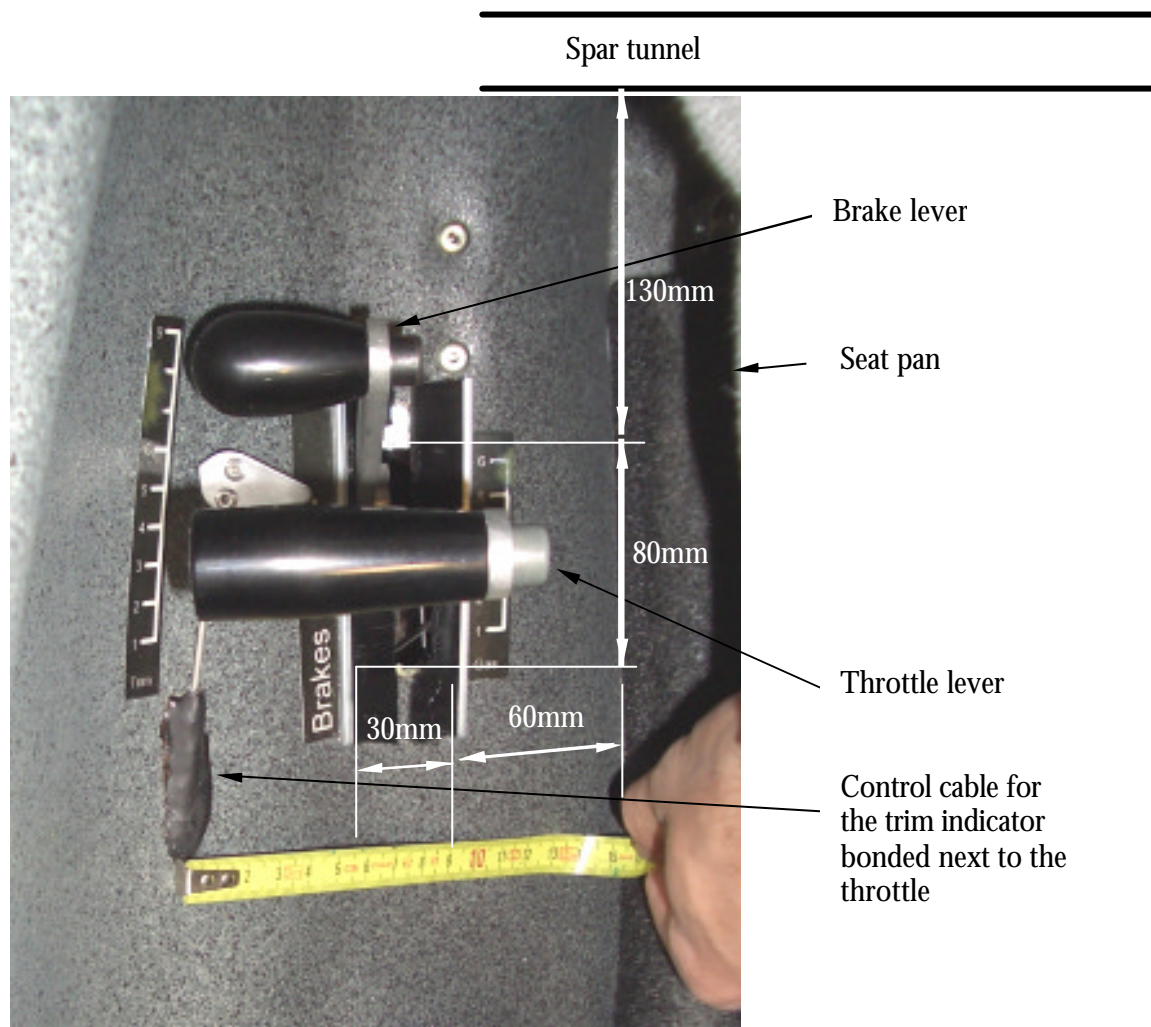
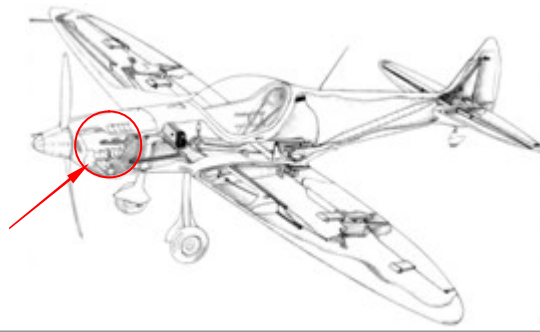


Figure 5.8.2  
Dimensions for the installation of  
the throttle and brake assembly



3. Use CF to bond the aluminum bracket for attaching the throttle lever onto the underside of the safety cell.
4. Install the throttle lever with two M5 screws on the side of the bracket.



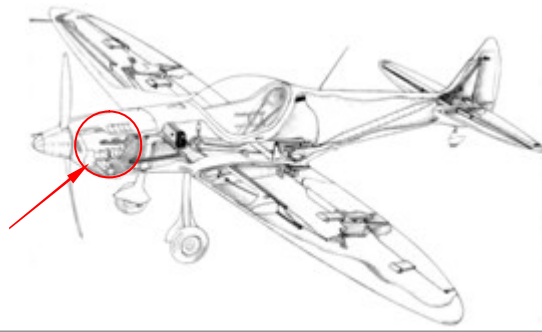
CF

Brake  
hose

Brake actuator

Brake fluid tank

Fig. 5.8.3  
Attaching the throttle and  
brake lever to the safety cell

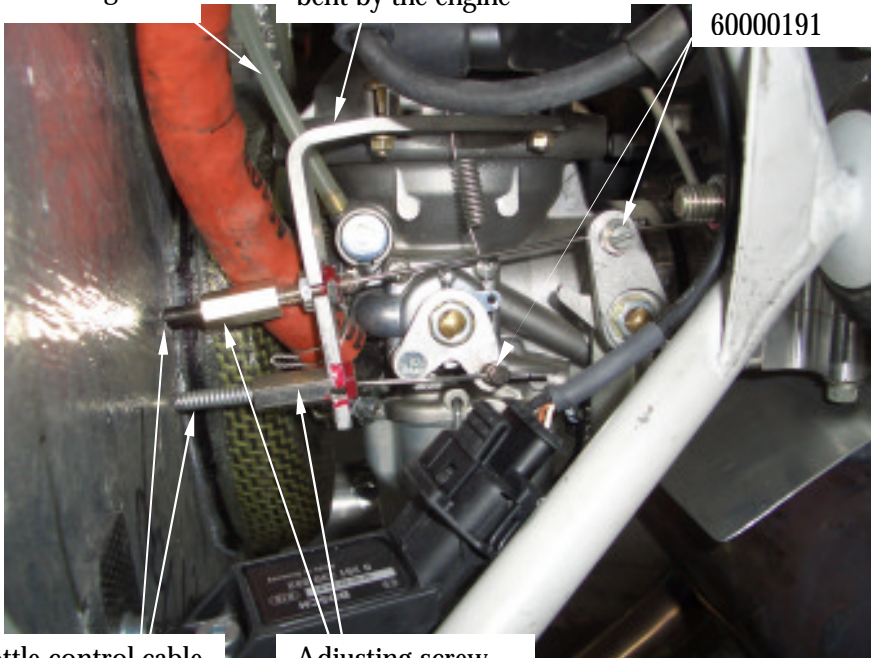


## 5.10 Installing the Control Cables on the Engine

Ventilation hose placed  
in air-intake casing

Mounting bracket slightly  
bent by the engine

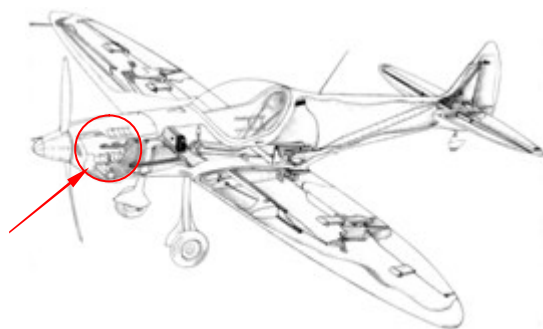
Cable-end clamp  
60000191



Throttle control cable  
and choke control  
cable passed through  
the firewall

Adjusting screw  
60000192 secured  
with two nuts

**Important: When connected, the control cables must move easily and must not have any kinks or bends.**



### 5.11 Installing the Tank and Fuel System Incorporating PFA MOD 329/002

The tanks were installed in the wings in section 2.3.6. The following steps will complete the tank system with the lines to the engine.

1. Pass a vent line from the drainer mounting washer through the holes in the two tank ribs to the highest point of the tank. Bond the line there with epoxy resin and fiberglass fabric. Ensure that the bonding does not block the line!

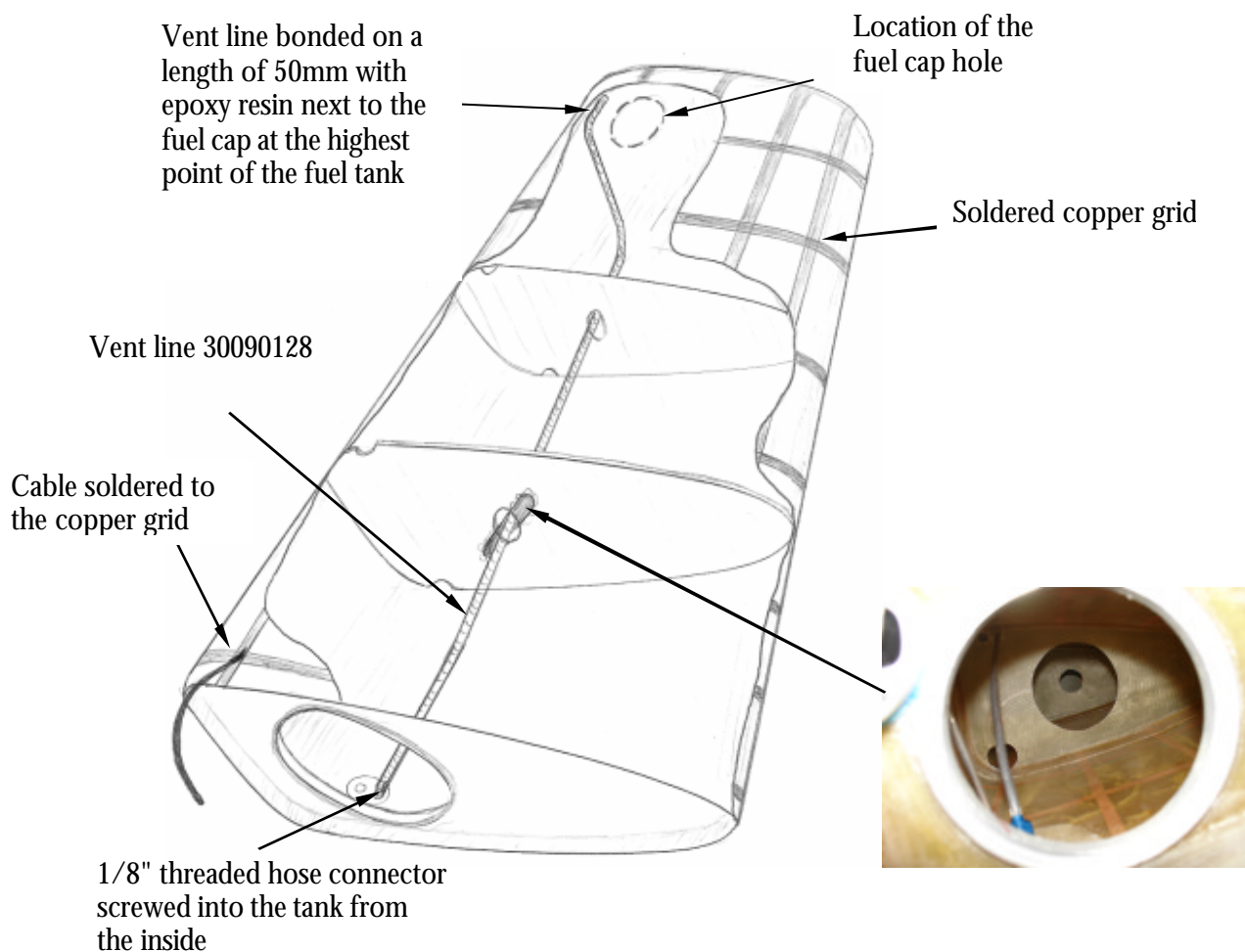
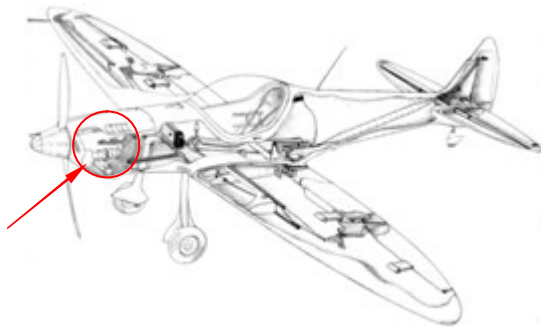


Fig. 3.12.1  
Laying the vent line  
in the fuel tank





2. Install the coarse finger strainer in the fuel tank root ribs.

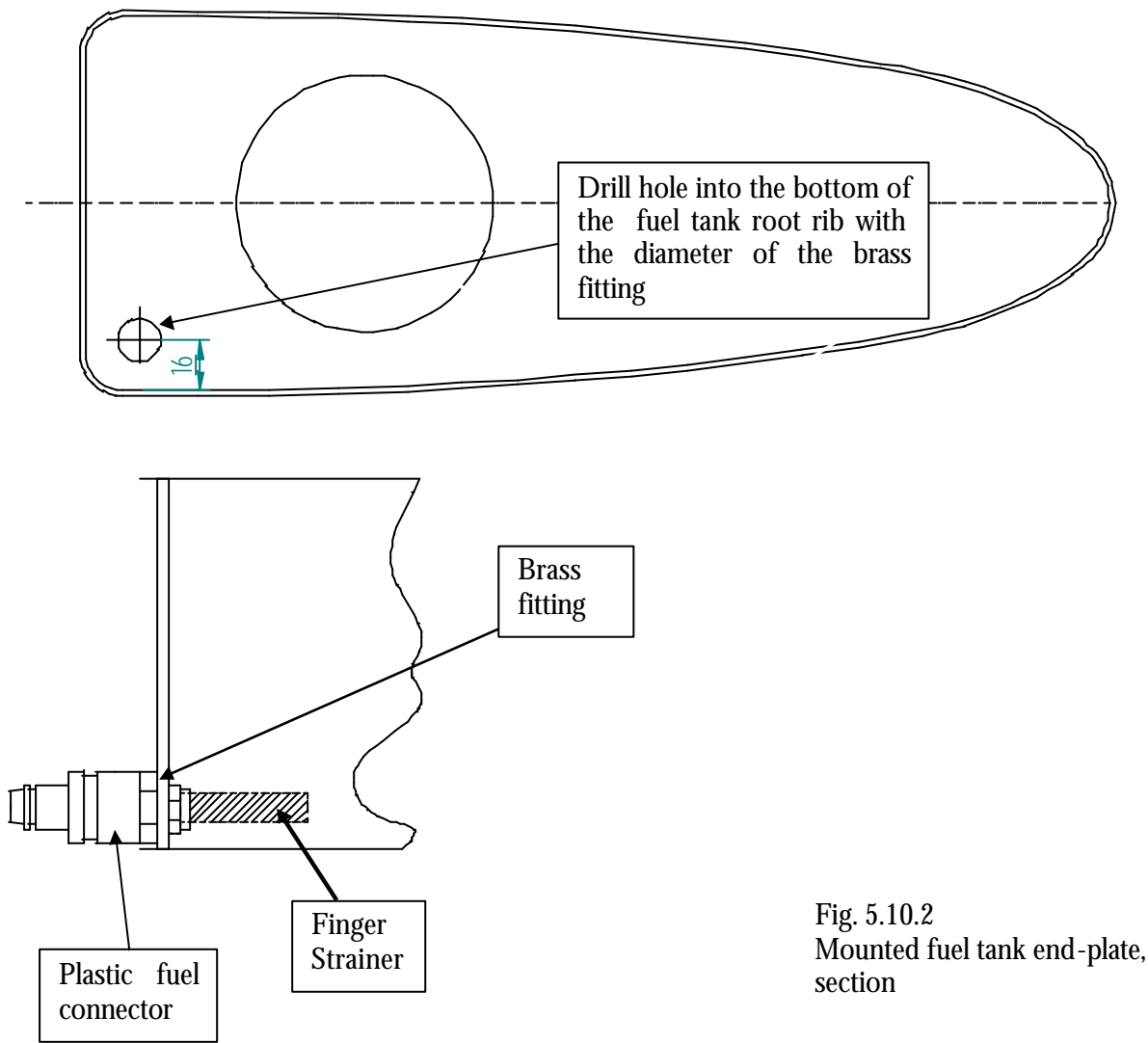
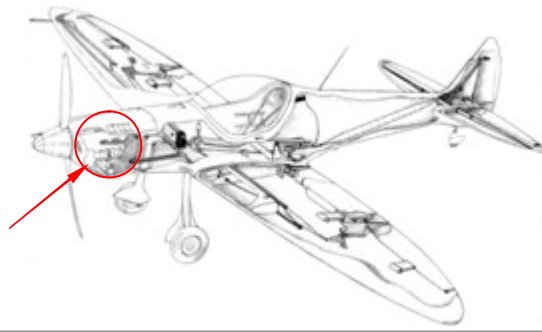


Fig. 5.10.2  
Mounted fuel tank end-plate,  
section



Move the wings with the mounted fuel tank end-plate up to the fuselage so that the fuel tank nozzle pushes against the fuselage in front of the root rib. Scribe the root rib at the indicated location and drill a bore with a diameter of 38mm (1.50").

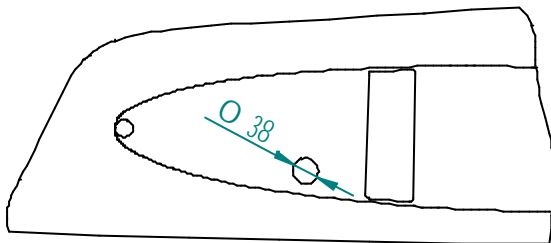
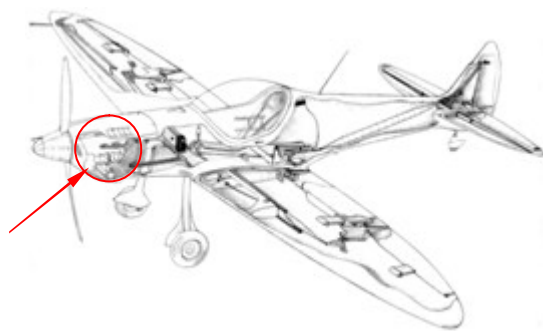


Fig. 5.10.4  
Bore for the fuel tank connection in  
the root rib





## The Fuel system incorporating PFA MOD 329/002

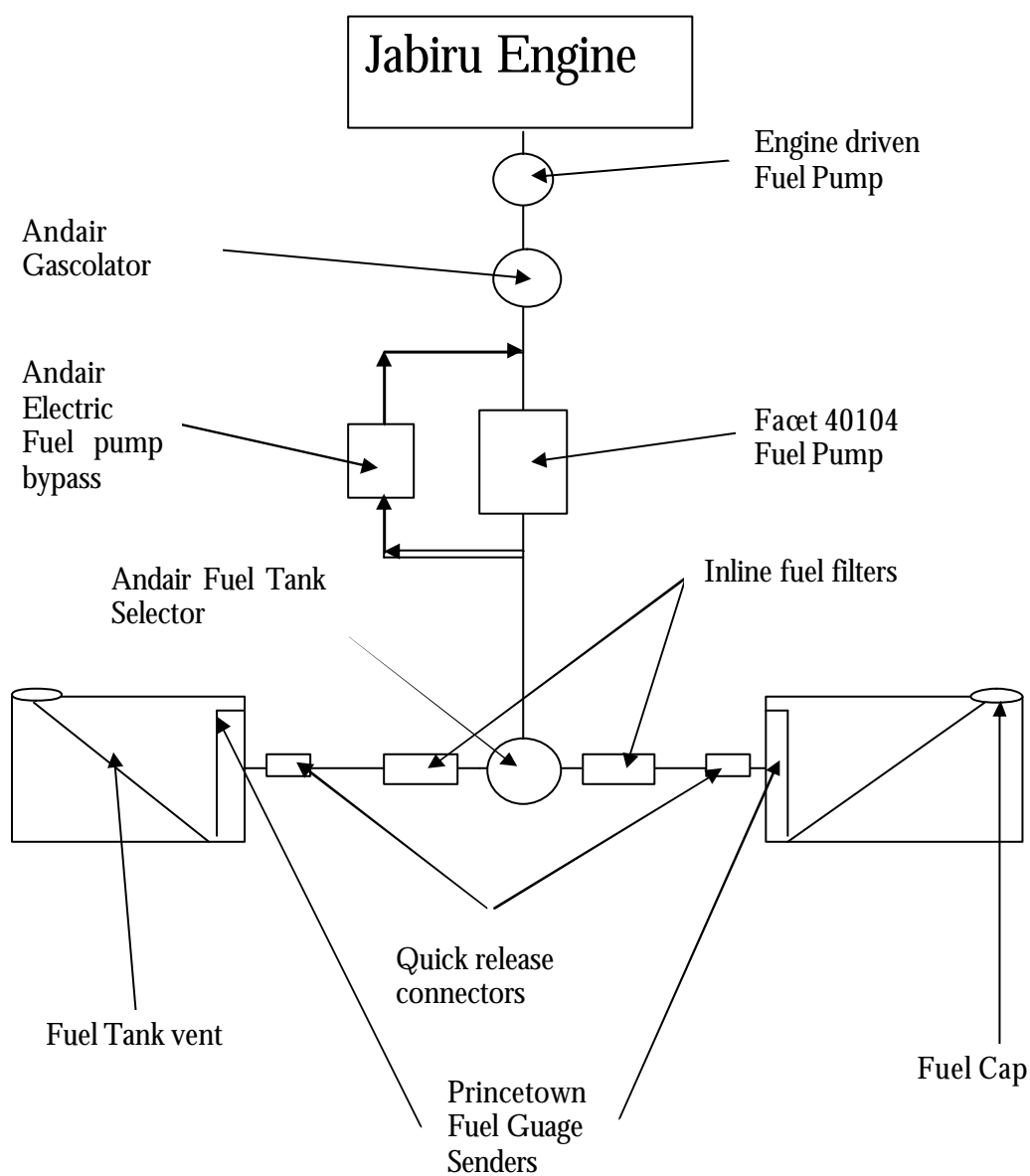
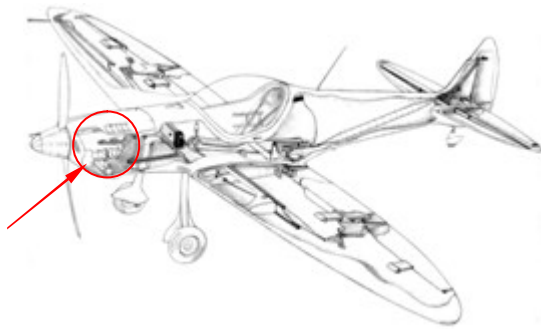
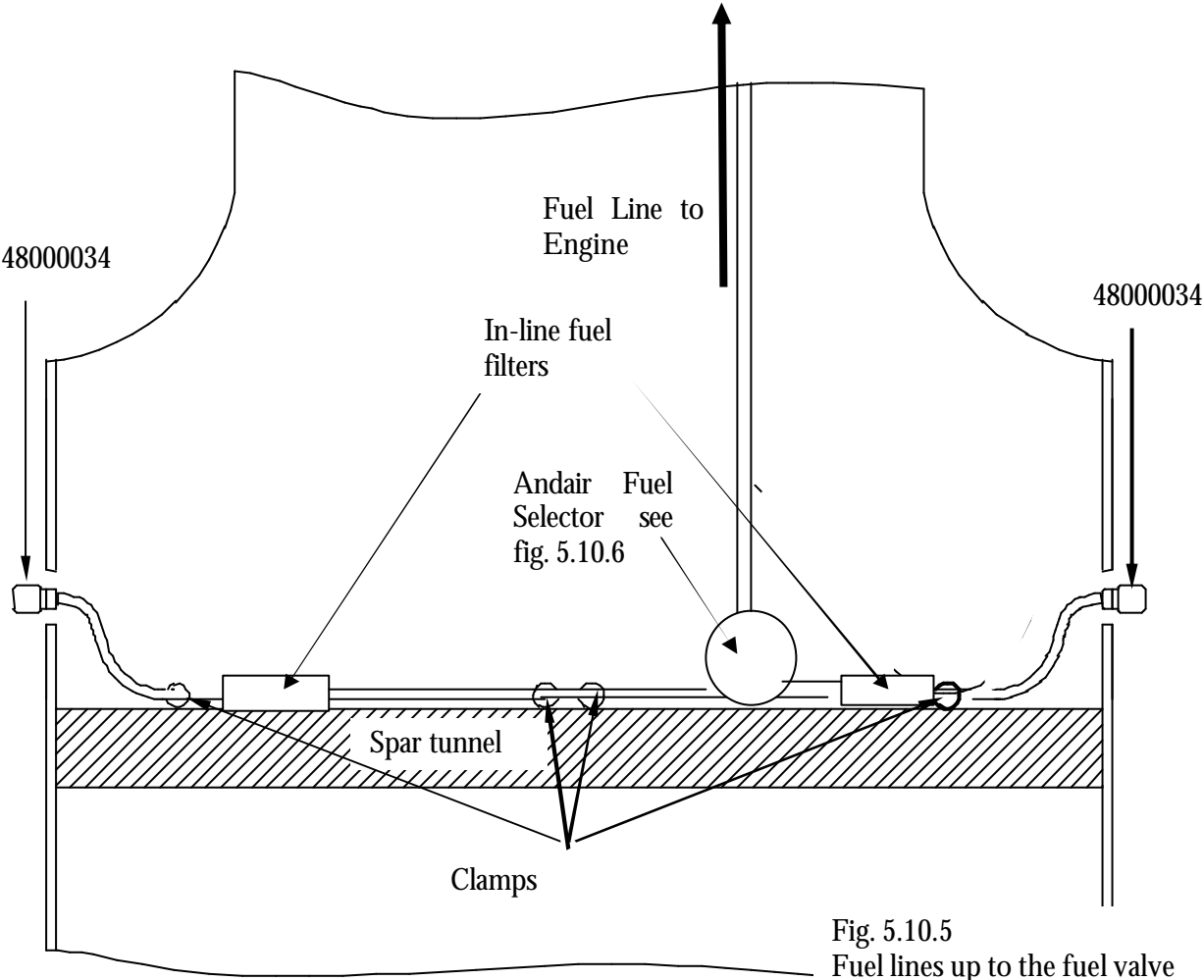


Fig. 5.10.5  
Schematic diagram of the  
fuel line connections



Engine

# 5



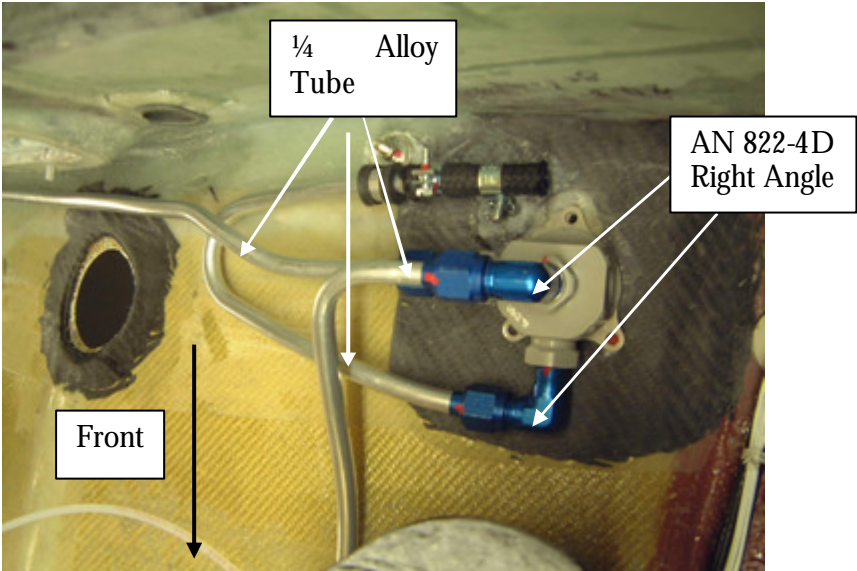
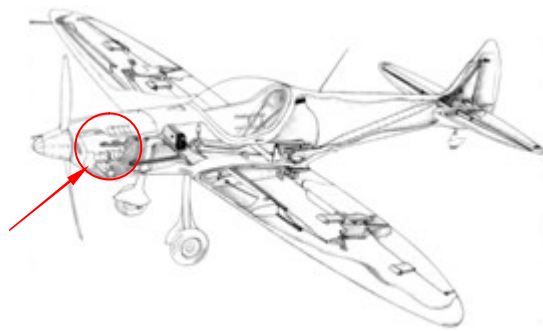
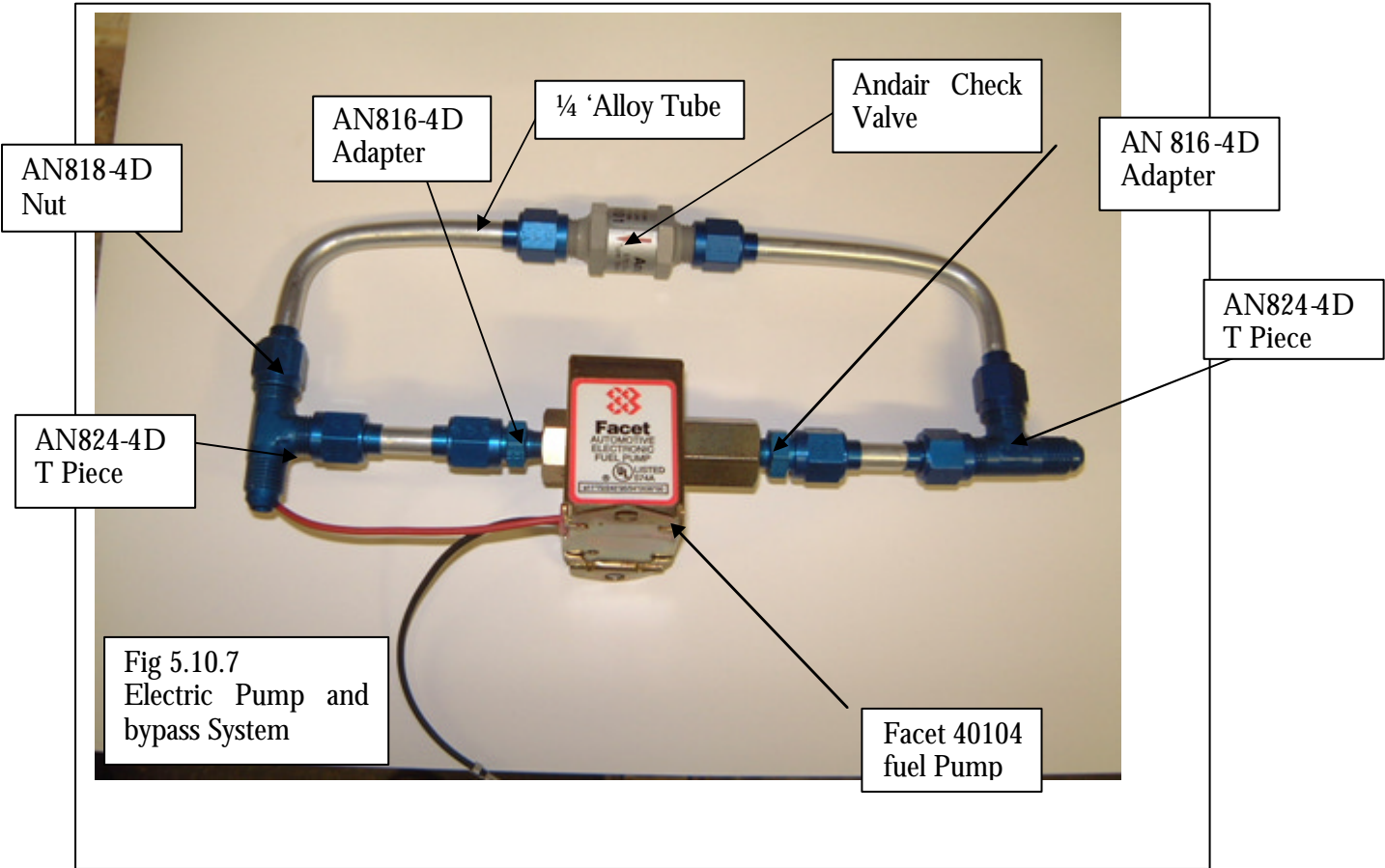
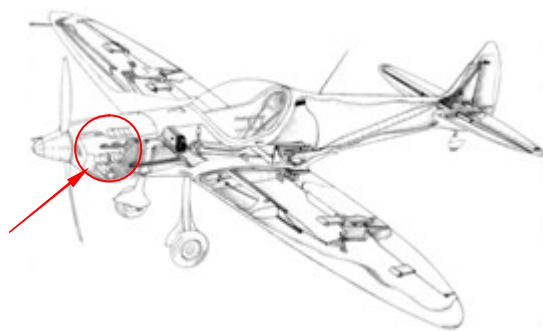


Fig. 5.10.6  
Andair fuel valve installed in the  
safety cell





1. Cut a 15mm hole 95mm forward of the main spar tunnel and 260 mm right of the cockpit center line.
2. Using carbon fiber reinforce the mounting area on the lower cockpit skin in a radius of 50mm around the mounting hole.
3. Mount the Andair fuel selector.
4. Whilst fitting the alloy fuel pipes ensure that they do not foul the undercarriage legs during retraction see fig 5.10.10.
5. Attach the self connecting fuel fittings to the flexible fuel hose part no to the inline filters and use alloy fuel tube to connect inline fuel filters to the Andair fuel selector. Ensure that rubber fuel hose does not foul the undercarriage mechanism during retraction.
6. Using a suitable pipe bending tool route the alloy fuel tube forward to the firewall see fig 5.10.11
7. Attach fuel line to the electric fuel pump and bypass system see fig 5.10.7. This system should be fitted beneath the battery mounting box and pipes held secure using the lower battery box mounting bolt and a suitable p-clip

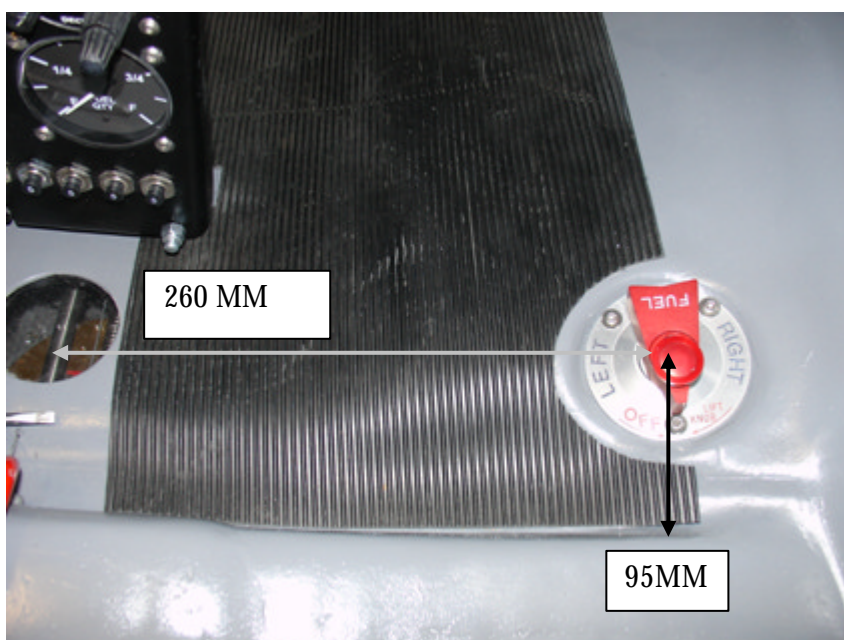


Fig 5.10.8  
Fuel Selector Mounting Position

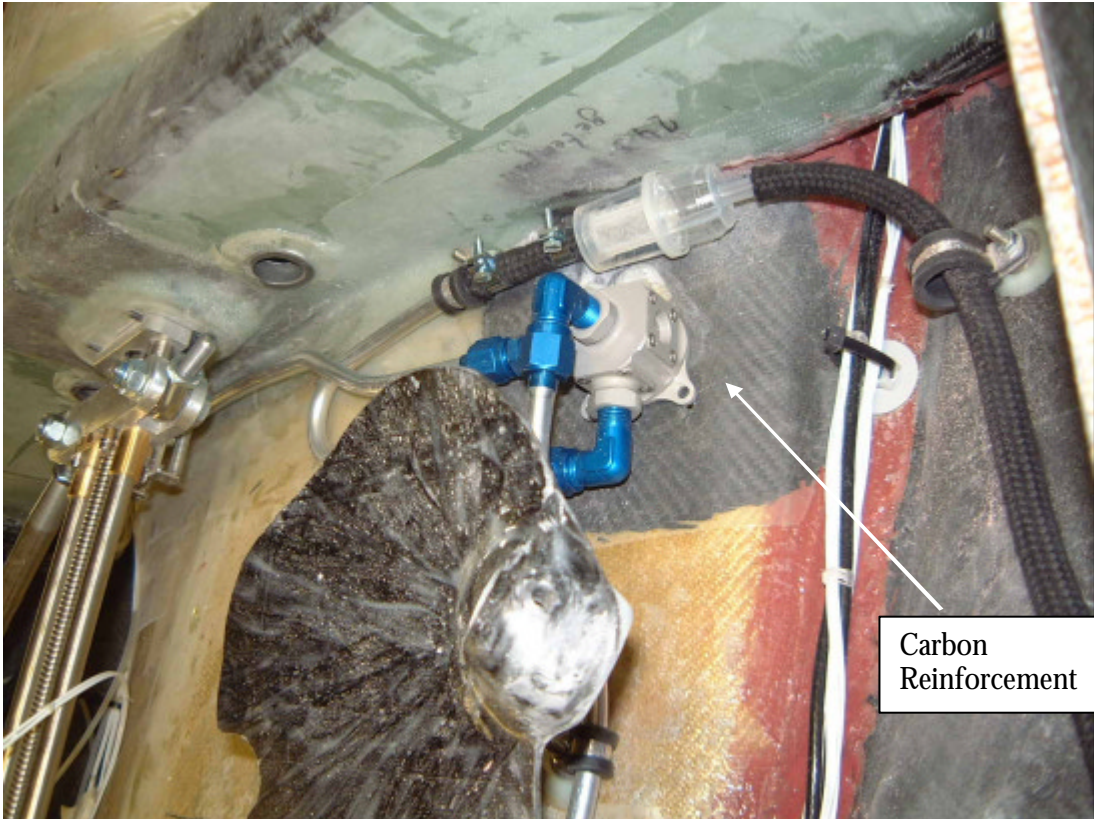
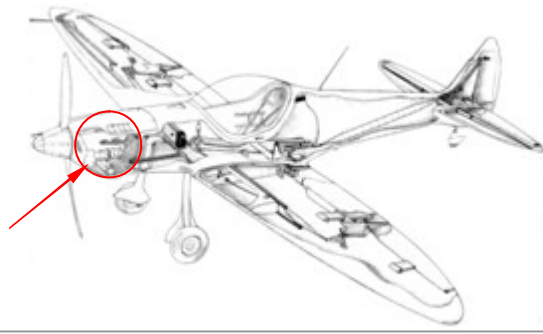
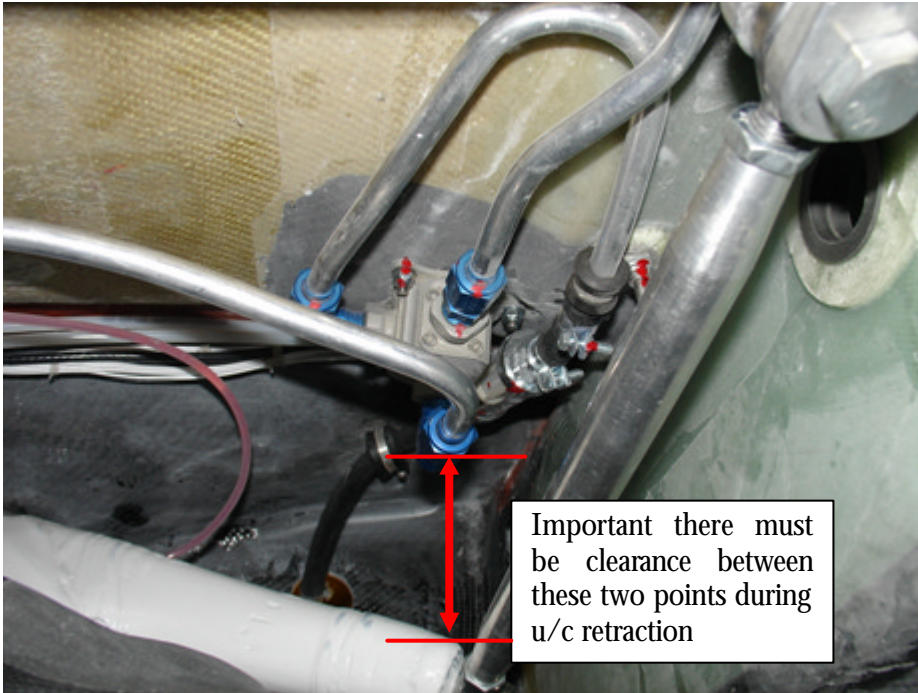
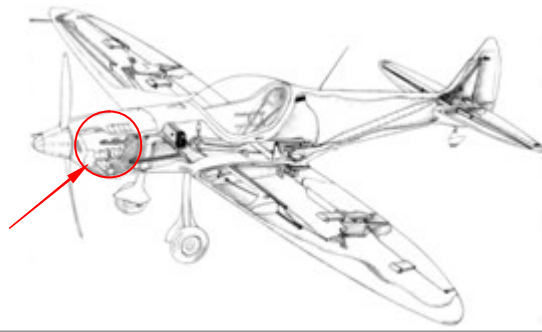


Fig 5.10.9 Fuel Selector and in line filter





Important there must be clearance between these two points during u/c retraction

Fig5.10.11 Completed Fuel Selector system

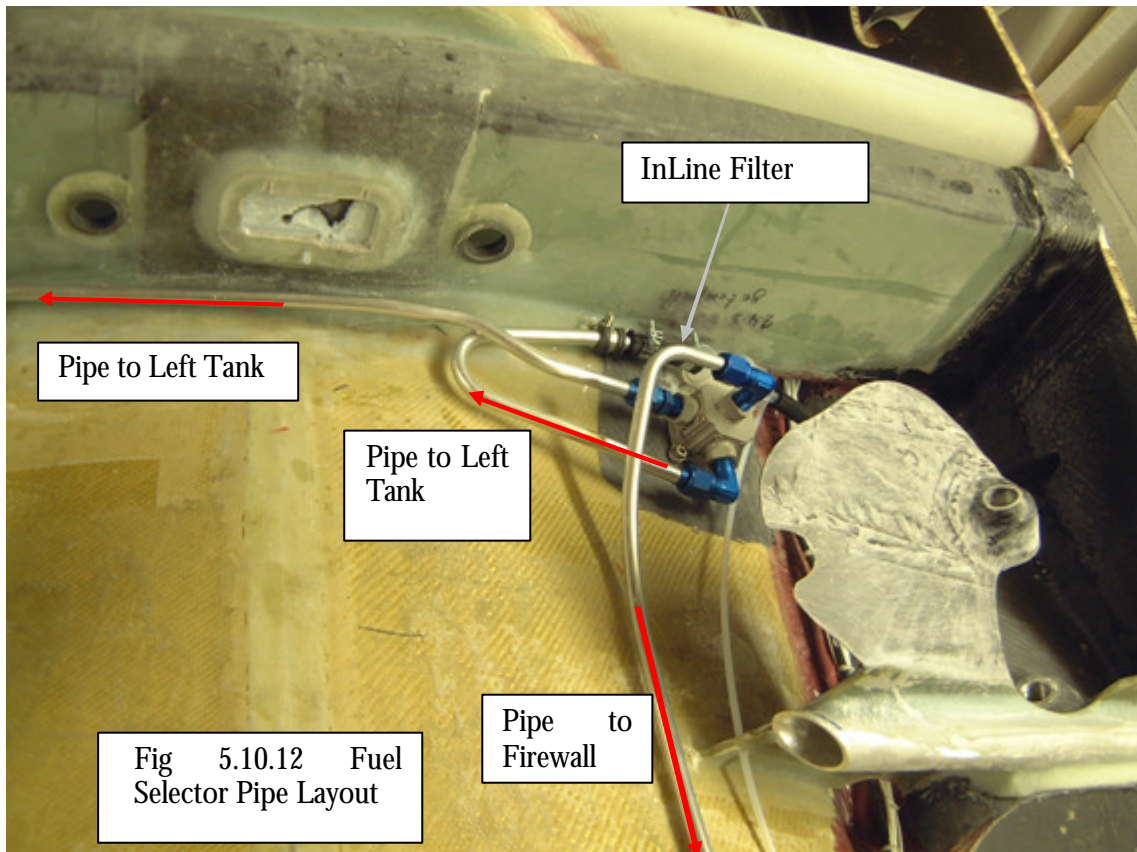
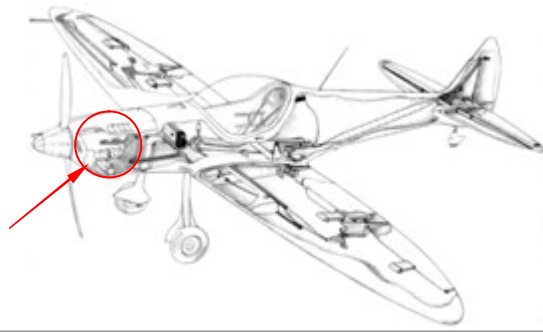


Fig 5.10.12 Fuel  
Selector Pipe Layout

8. Lay a fuel line from the fuel valve through the firewall to the fuel filter or gascolator (filter with drainer). Use reducer fitting no. 60000221 to connect the line to the narrower 6mm (0.24") line which can be connected to the mechanical fuel pump.

Note: If the aircraft is subject to frequent climatic changes, it is recommend to use a gascolator (filter with drainer). Attach the gascolator to the firewall as shown in figure 5.10.13.



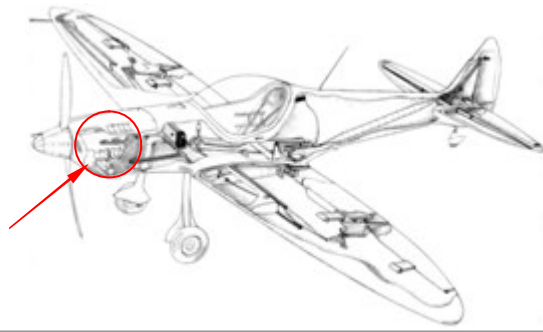
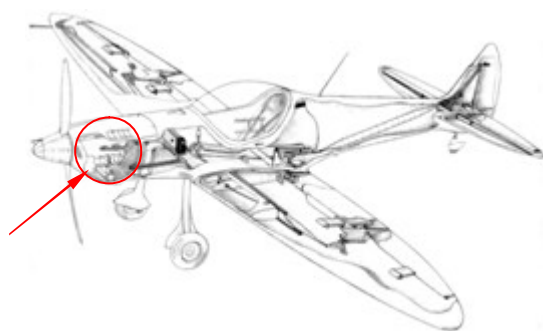


Fig. 5.10.13  
Optional installation of a gascolator  
(filter with drainer) on the firewall

**Important:** The fuel lines must be laid in such a way that they cannot come into contact with any hot parts like manifold and muffler. In case of a leak the fuel must not drip onto the manifold and muffler.



## 5.12 Installing the Cowling

1. Cut the front cooling air inlets as shown in figure 5.11.2.

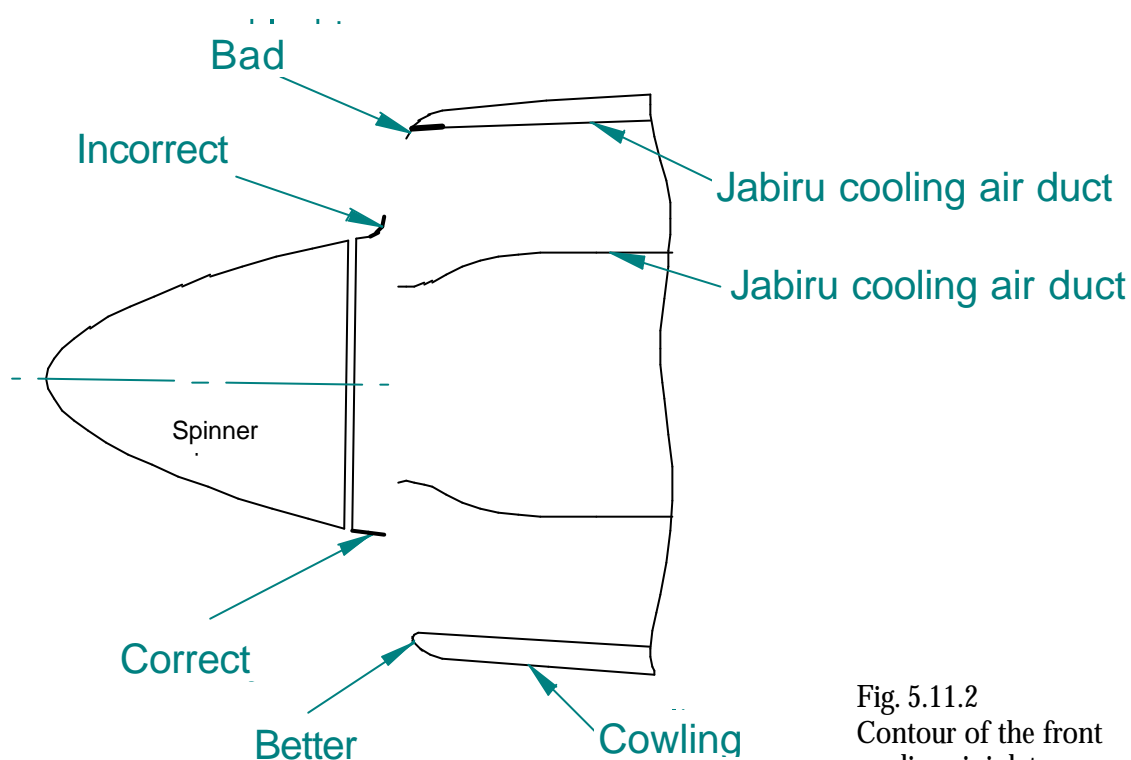


Fig. 5.11.2  
Contour of the front  
cooling air inlets

2. Avoid any sharp edges in the air vents. Cut the inlet to such a width that it is flush with the air inlets of the Jabiru.

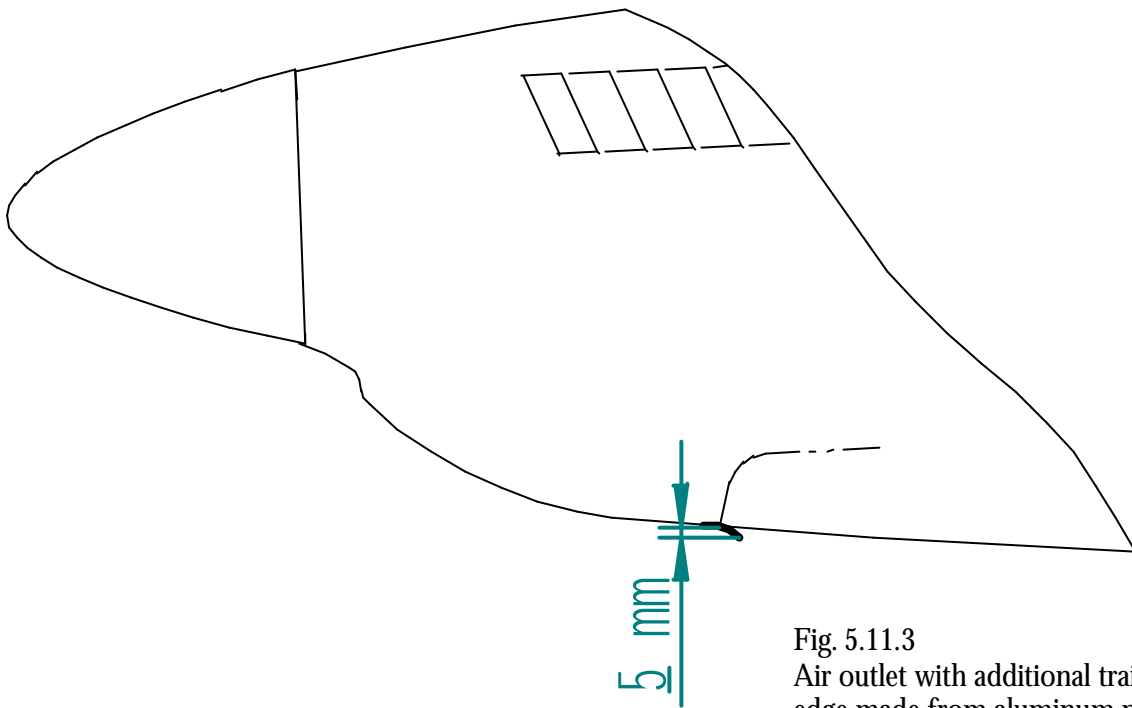
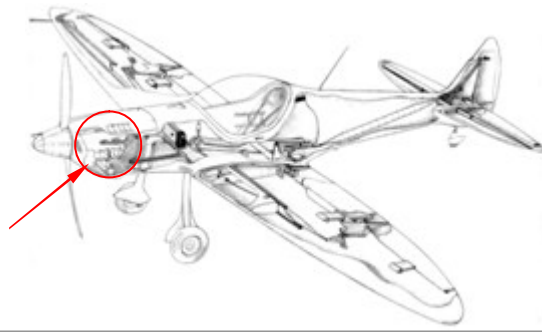
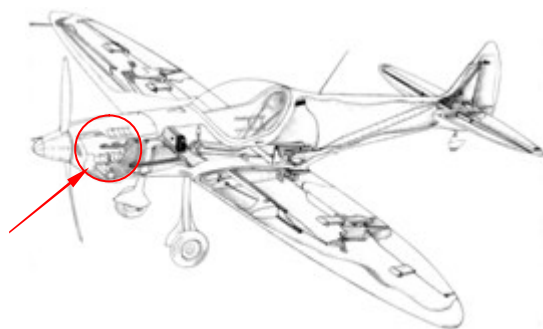


Fig. 5.11.3  
Air outlet with additional trailing  
edge made from aluminum panel

3. If the cooling is insufficient, rivet a 40mm (1.57") wide aluminum strip to the air outlet and bend the strip downwards. The strip creates additional suction.
4. Build two air ducts from fiberglass or carbon fiber panels as shown in figure 5.11.4.
5. Bond the air ducts into the cowling shell according to the dimensions shown in figure 5.11.5. The two air ducts are aligned parallel to each other at a distance of 150mm (5.91"). When the aircraft is assembled, they must be at an equal distance from the oil pan.

Note: Fix the air ducts in the lower engine cowling shell with superglue. Hold the cowling to the fuselage and check the distance from the oil pan.

Revision 1.5



Engine

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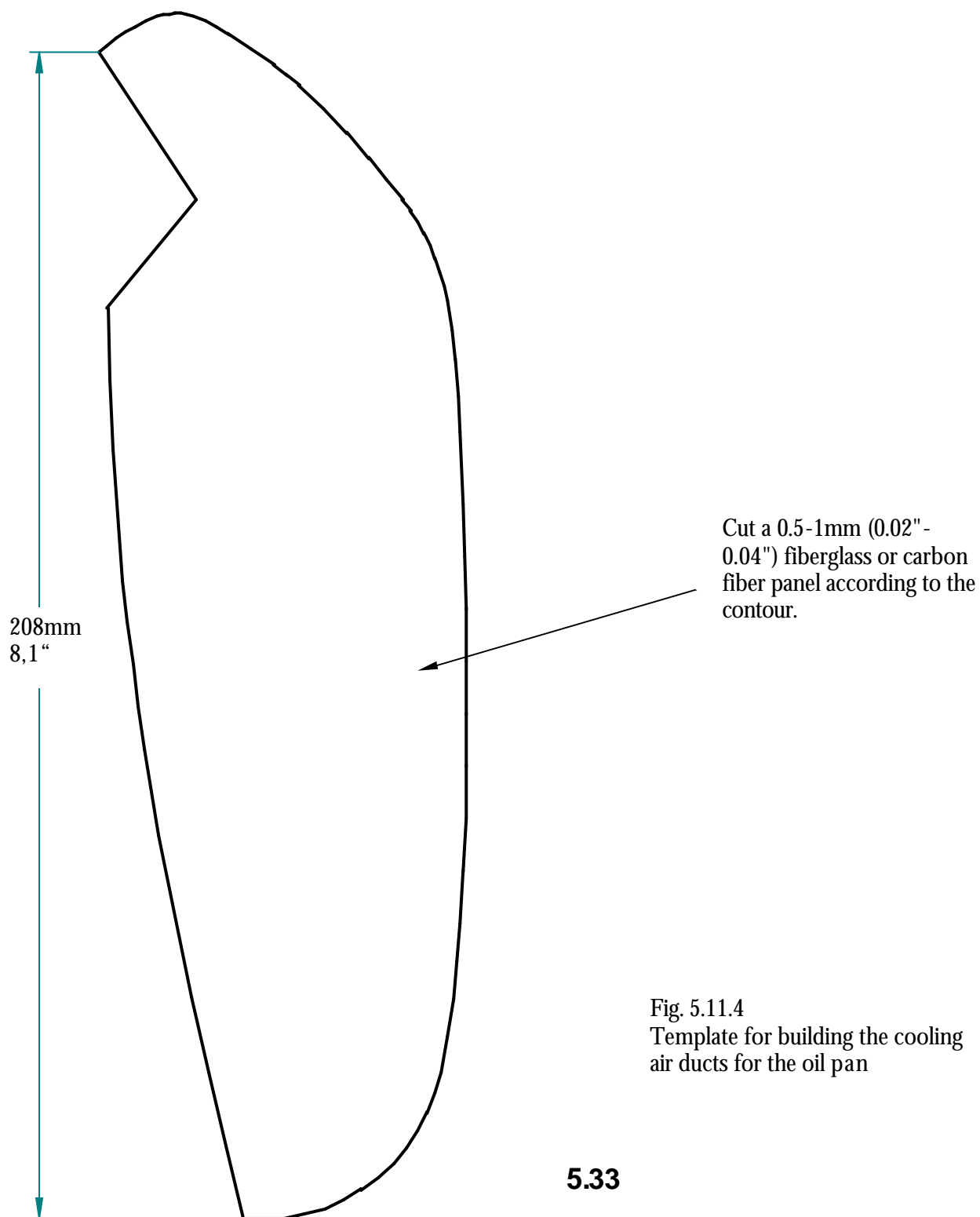


Fig. 5.11.4  
Template for building the cooling  
air ducts for the oil pan

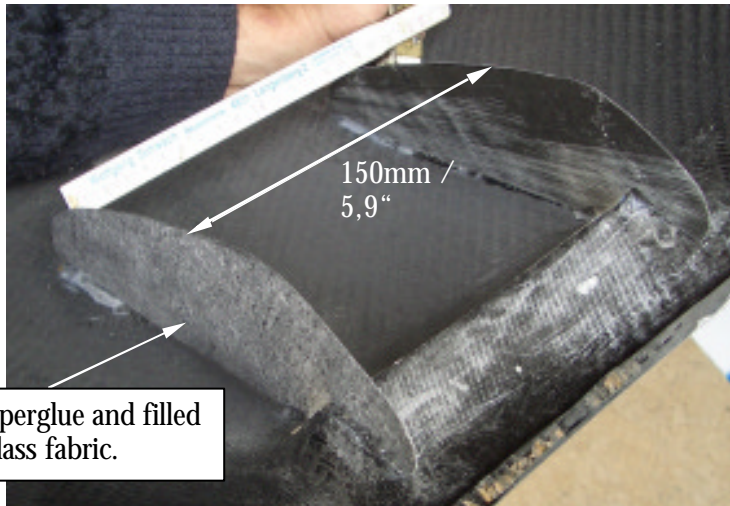
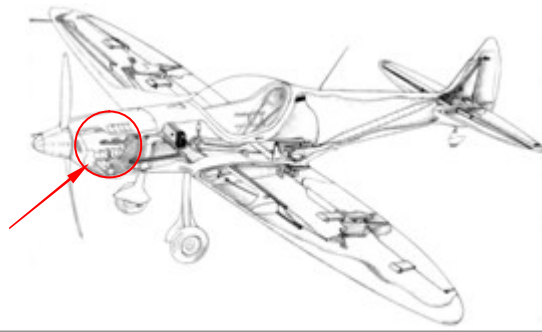


Fig. 5.11.5  
Bonding the cooling  
air ducts into the  
cowling



Fig. 5.11.6  
Mounted cowling with  
cooling air ducts

6. Connect the two cowling shells with a piano hinge which is riveted to the inside of the shells.
7. Cut two piano hinges no. 60000625 to a length of 600mm (23.62").

**Important: Do not cut the hinge wire at this point!**

8. Rivet the piano hinge to the cowling shells as shown in figures 5.11.7 and 5.11.8. Insert the countersunk rivets no. 53510308 from the exterior.

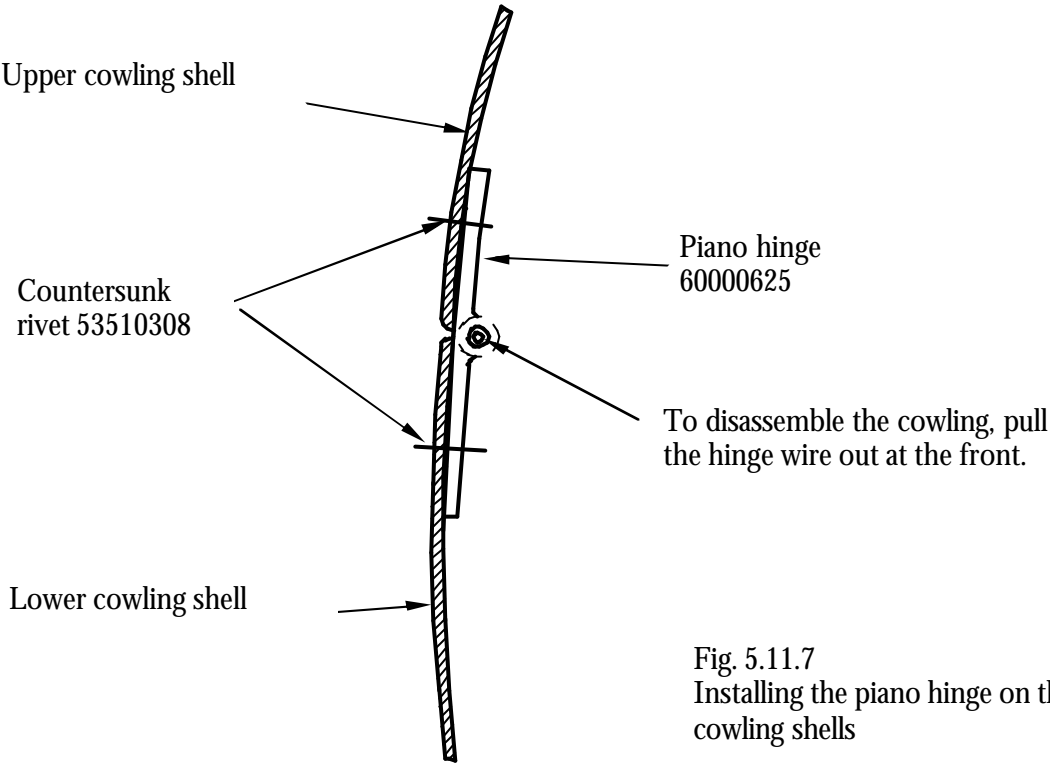
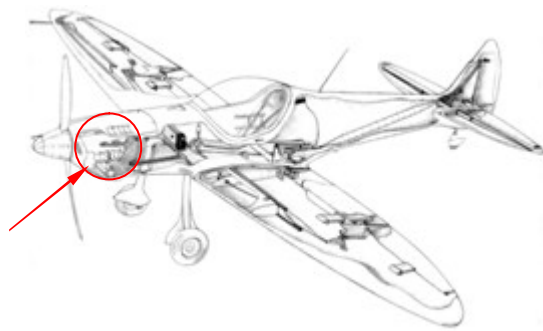


Fig. 5.11.7  
Installing the piano hinge on the  
cowling shells

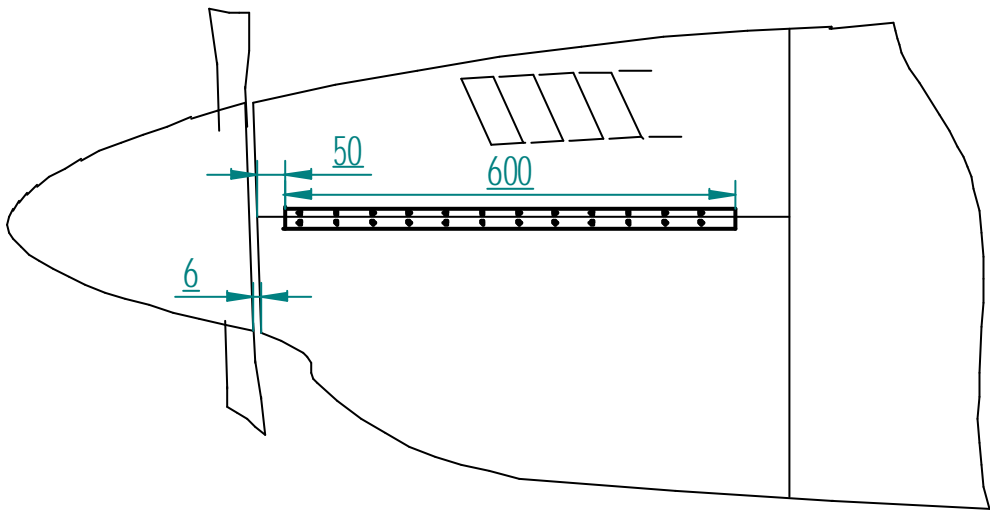
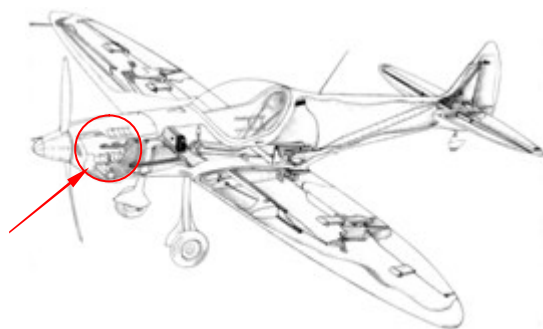


Fig. 5.11.8  
Location and length of the  
piano hinge to connect the  
cowling shells



9. Bend the securing wire as shown in figure 5.11.9.

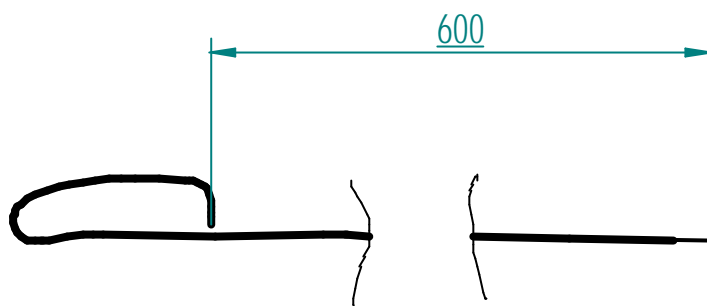


Fig. 5.11.9  
Bend the securing wire  
as shown

10. Grind the cowling so that you can slide the securing wire into the hinge without use of force.
11. Prestress the securing wire to ensure that the tension secures the wire in the hole and prevents it from sliding forwards into the propeller due to vibrations.

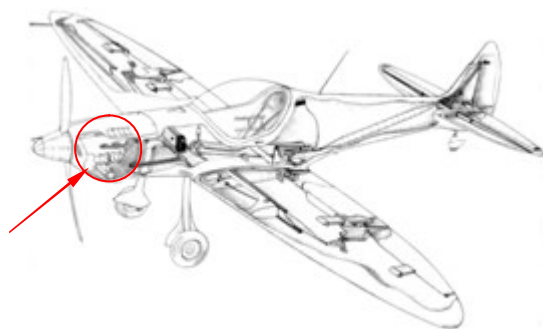


Bore for fastening the  
securing wire



Fig. 5.11.10  
Securing wire slid into  
cowling and fastened





12. Assemble the cowling shells on the fuselage with the engine and the propeller and align the parting line horizontally.

Note: If the cowling sits too tight on the fuselage, shorten the cowling at the rear by up to 20mm (0.79").

13. Align the front of the cowling with the spinner.

**Important:** The spinner back plate must be separated from the cowling by at least 6mm (0.24"). If the gap is too narrow, vibrations and accelerations can cause the spinner to collide with the cowling.

14. Secure the upper shell with four M5 screws or cam locks on the fuselage.
15. Attach the lower shell to the fuselage with seven M5 screws.

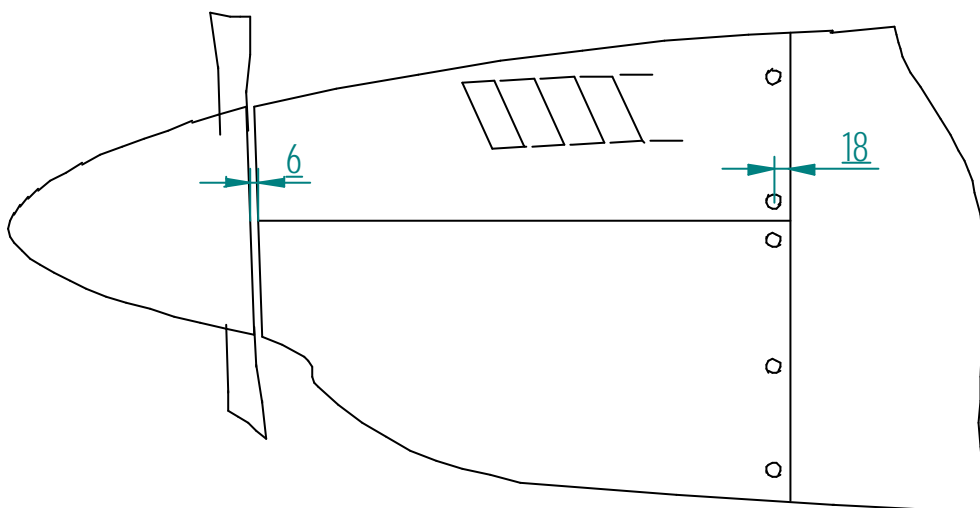
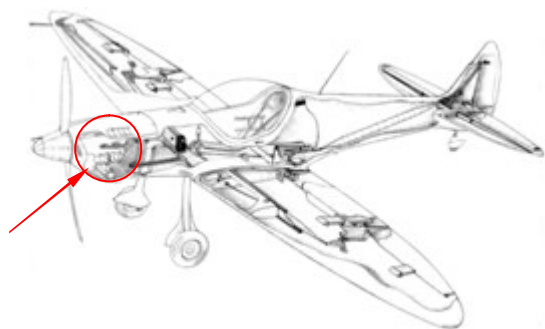


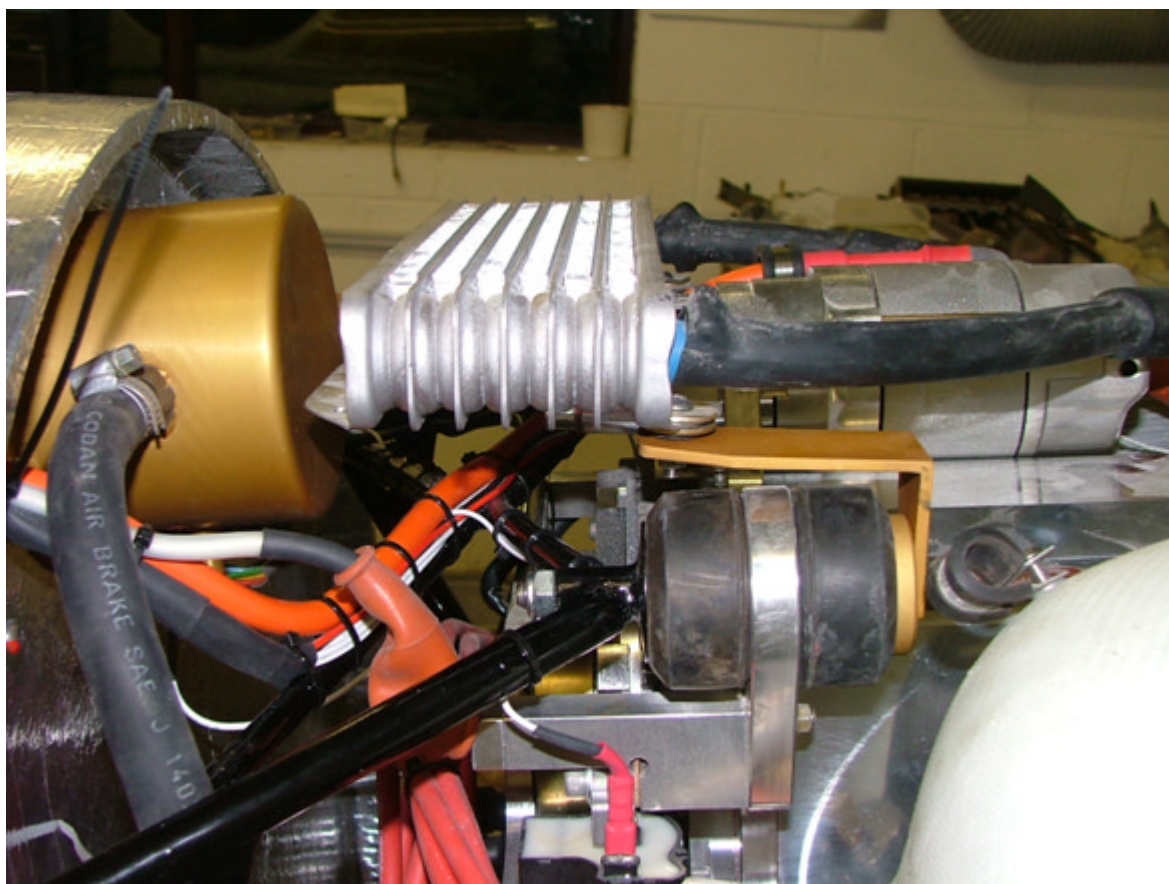
Fig. 5.11.11  
Installing the cowling  
on the fuselage

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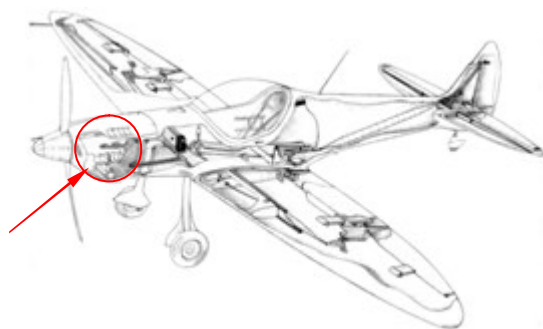


Engine

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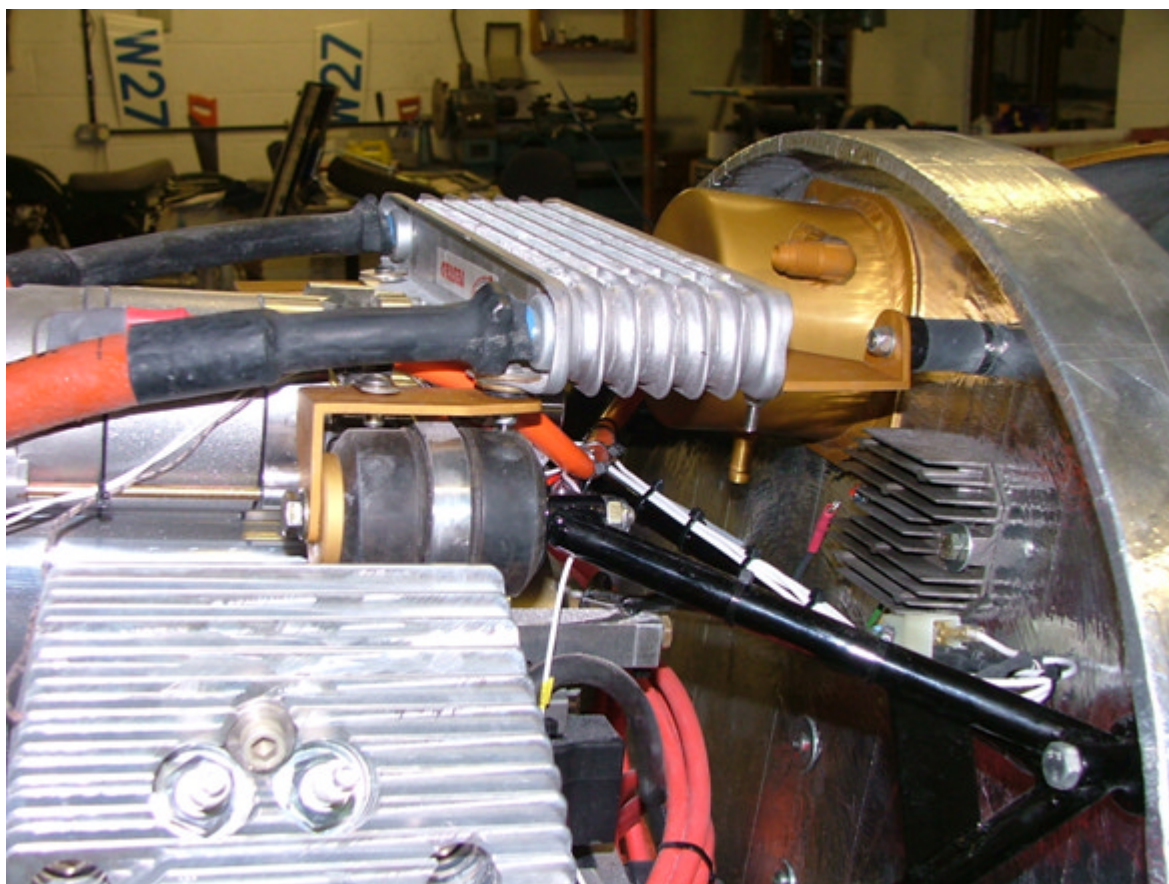


Revision 1.5

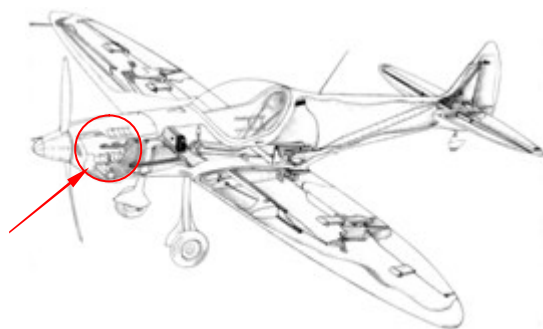


Engine

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Revision 1.5



Engine

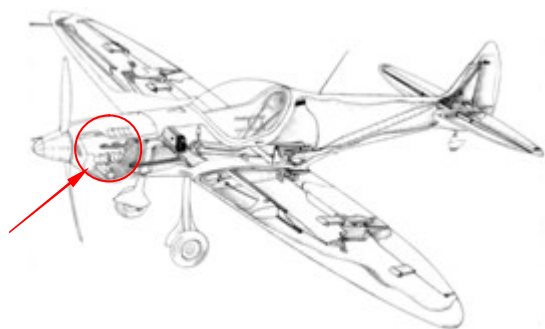
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Oil Access  
Door





Revision 1.5



Engine

5

