EUROPA CLUB

AIRCRAFT MODIFICATIONS

MODIFIED INSTRUMENT PANEL
WITH
REMOVABLE SUB PANEL

(MOD NUMBER 10402)

Issue 1: May 2000

EUROPA CLUB AIRCRAFT MODIFICATIONS

These modifications are separate from those issued by the factory but have been approved by the PFA. They can be considered as build instructions and should be carried out in consultation with your PFA inspector before submitting the paperwork to the PFA for final approval. Most modifications add weight. Beware of incorporating too many at the expense of performance and payload. When following these instructions read at least three times, measure twice, cut once.

MODIFIED INSTRUMENT PANEL WITH REMOVABLE SUB PANEL

The existing instrument panel fitting has the following limitations:

1. It can be a tight fit due to its flange. In some cases if enough of the flange is filed away insufficient is left for fixings and the panel loses a significant amount of rigidity.

2. With a heavy panel it can become quite tricky lining up the panel with the bolts.

3. Clearance between panel and windscreen and avoiding the brake lever can be awkward.

4. Final electrical and pitot/static connections are made complicated as they have to be completed with the panel lodged in a partially fitted position.

All the above problems can be made easier with the two modifications described below. Be sure you fully understand the instructions before proceeding. Any queries please contact me on e-mail nigelcharles@compuserve.com or telephone 01380 860620. If you have any suggestions to improve the modification I would be pleased to pass them on to the PFA for their consideration. On completion get the modification checked and signed off by your inspector quoting the modification reference number on the front cover of this build instruction and submit the application to the PFA.

Nigel Charles

INSTRUMENT PANEL - REVERSE FLANGE AND STUDS

Overview

Problems 1 to 3 above are overcome using an extra internal flange which also improves rigidity of the panel. As this enables the fixings to be hidden the opportunity is taken to change the bolts and anchor nuts to studs and stiff nuts. Tapered rubber washers are use to give a small amount of protection against high frequency vibration. They also enable the holes in the firewall to be a little oversize making lining up easier on installation. If the panel is to be removed more than a few times it is easier to replace stiff nuts than anchor nuts.

PANEL MODIFICATION

If the panel is to be fitted after the windscreen care must be taken to avoid windscreen damage. Insulating tape and heavy grade polythene make a good protection layer. Remove enough of the existing top flange to enable easy fitting. This may leave only a minimum of material. This is not a problem as you will be laying up a reverse flange using 'bid'.

The two bolts exposed above the shelf on the starboard side are hidden by using countersunk MS24694-S** machine screws. The final two numbers will depend on the combination of panel, firewall and washer thicknesses (in my case -S50 were used). To totally recess the machine screws the panel backwall needs thickening. Make up two patches of 25mm x 35mm 5 ply 'bid'. Having abraded the panel in the appropriate places position them on the reverse side of the panel backwall (see Figure 1).

Abrade the inside of the rear panel to 25mm from the edge where the new flange is to be fixed (see Figure 1). A temporary former of shaped flat rigid board (with cut outs for access) is attached to the back edge using a hot glue gun around the panel edge with polythene on its inner face. This acts as a mould. Make up strips of 5 ply 'bid' 50mm wide on polythene to the dimensions shown in Figure 1. Wet the flange areas on the panel with resin and place the strips in position. To stop the strips moving it is probably better to have the panel supported with its face uppermost.

After cure remove the former and polythene, trim the new edge to about 20mm, abrade the remaining groove on the outside face and fill with a Redux flox filler. The four lower mounting points are easier to make using four pieces of angle aluminium. They are glued (with Redux) and riveted creating short lower internal flanges.

With the panel held in position drill 4.8mm holes through the firewall and the flanges from the engine compartment in the appropriate places. Remove the panel and open out the firewall holes to 1/4" and countersink them from both sides. With AN525 bolts (length determined by total thickness) fitted in the flange holes pointing forwards the heads are covered with Redux flox filler. Cone shaped rubber washers are pushed onto the bolts orientated so that the cone matches the countersink of the firewall. The panel is refitted and further cone washers are fitted followed by metal washers from the engine side (see Figure 2). Non locking nuts are spun on and tightened whilst gripping the bolts so that the bolts don't turn. The two shelf backwall machine screws are easier to fit. Make sure that the backwall is well countersunk first so that the screw heads are slightly recessed. Use more Redux filler over the heads of the machine screws . Leave the Redux slightly proud so that it will be flush when it is sanded later. With the panel firmly in place the whole assembly is left until the Redux has cured. You now have a stud fitting panel which has loose initial fitting which self aligns on tightening with a measure of vibration protection built in. For final fitting MS21042-3 nuts are used for security.

INSTRUMENT SUB PANEL

Overview

This has three purposes. Firstly it reduces panel weight during panel fitting and removal. Secondly it allows panel connections to be made after panel fitting. Thirdly access to the back of some of the panel is possible subsequently without panel removal. The sub panel consists of an aluminium panel holding up to six flight instruments. The flight instruments are grouped together as tightly as possible and the sub panel has just a small overlap with the main panel for bolt and insert fitting. A total of nine fixing positions are used as shown in Figure 3. The top left one is omitted due to lack of space but the sub panel is still secure. A narrow aluminium shelf with foam padding will help to provide support during fitting and removal.

SUB PANEL INSTALLATION

This should be manufactured once you have bought all the instruments which will go in it. A piece of 2mm aluminium sheet is used. The exact size will depend on the instruments you use (in my case 265mm x 180mm). Position the instruments together and decide on the minimum spacing that you can accept. With the necessary overlap required there is only just enough panel available for a standard set of instruments. Draw up the sub panel and instrument holes on graph paper. By curving the top left corner of the sub panel there should be enough space to fit a complete set of standard sized instruments. Cut both the aluminium and the graph paper to shape and tape the paper to the aluminium. Use a centre punch to mark the 6 centres of the instruments and the positions of the instrument fixing holes. Remove the paper and drill the aluminium. If you do not have access to a 3.125 inch hole cutter then it may be worth getting one of the avionics companies to do it for you. Temporarily fit the instruments. Now using a felt pen mark around the outer extremities of the instruments on the rear of the panel. Remove the instruments and drill 9 panel fixing holes as shown in Figure 3. Make a template of the panel using the outline on the back of the aluminium for its inner dimensions and include the newly drilled panel fixing holes. Allow the outline to curve inwards between instruments so that there will be sufficient of the GRP panel left for fixings. Now place the sub panel in position and drill the panel fixing holes using the sub panel as a template. Remove the sub panel and replace it with the template using the fixing holes for accurate alignment. Mark out the inner outline onto the GRP, remove the template and cut out the GRP (see Figure 4). Try to avoid cutting away more GRP than necessary to improve panel stiffness. It should now be possible to position the sub panel with instruments fitted into the aperture. Once you are happy with the fit use ATS2-632 Nutserts with fitting tool AAT-916-632 (available from Wicks - fax 001 618 654 6591 or e-mail aircraft@wick.com) to provide fixing. Bolts can be either black oxide (MS24693-BB28) or stainless (MS24693-C28). As the sub panel may be quite heavy fitting and removal can be made easier by making a narrow (40mm) shelf under the lower centre instrument for the panel to slide on (see Figure 5). A thin layer of foam on the shelf prevents abrasion. When it comes to final fitting use a small amount of Loctite on the bolt threads for security.

INSTRUMENT PANEL - REVERSE FLANGE AND STUDS

Figure 1 - Modified Panel (viewed from firewall)

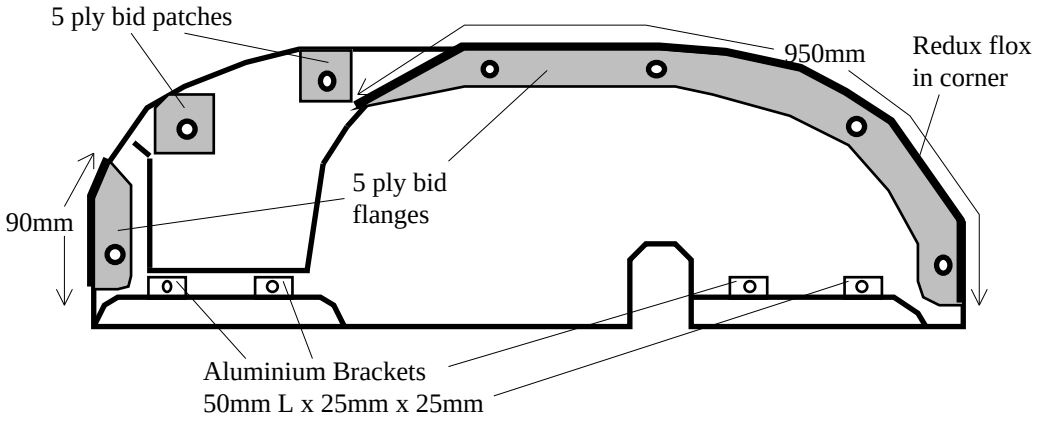
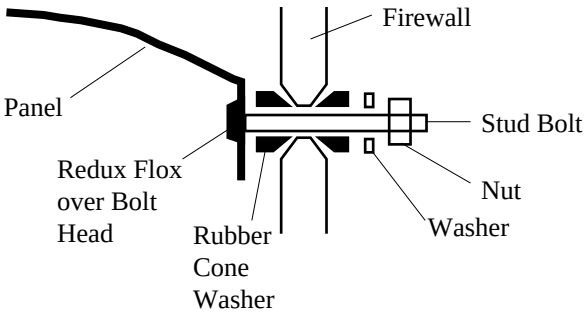
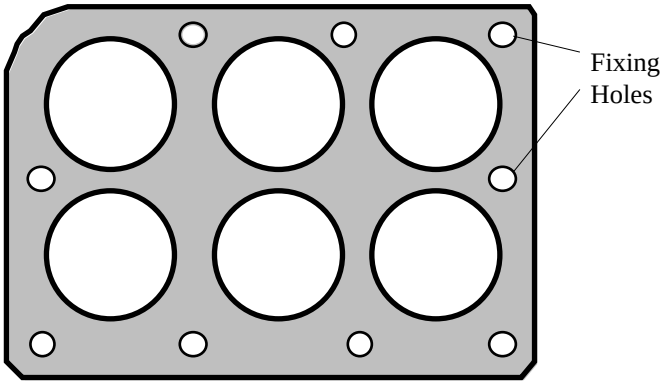


Figure 2 - Panel Fixing (side view)



INSTRUMENT SUB PANEL

Figure 3 - Removable Sub Panel



Instrument Fixing Holes omitted for clarity

Figure 4 - Panel Cut-Out

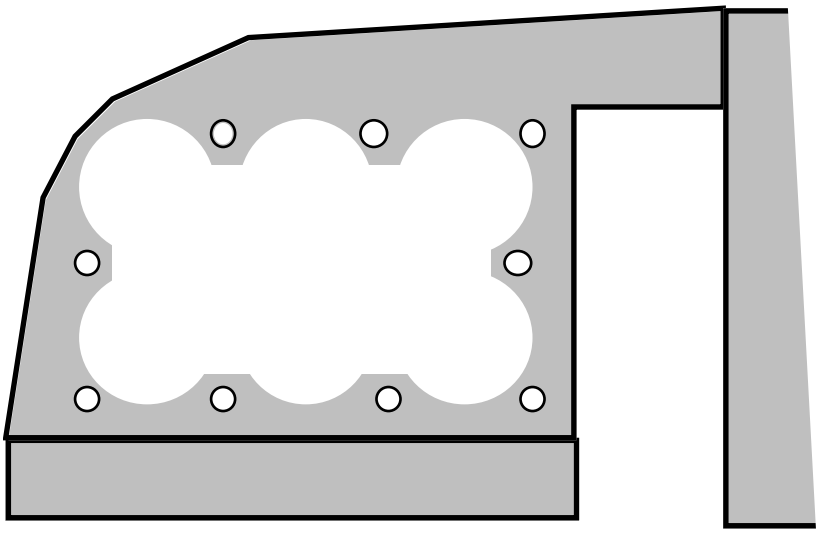
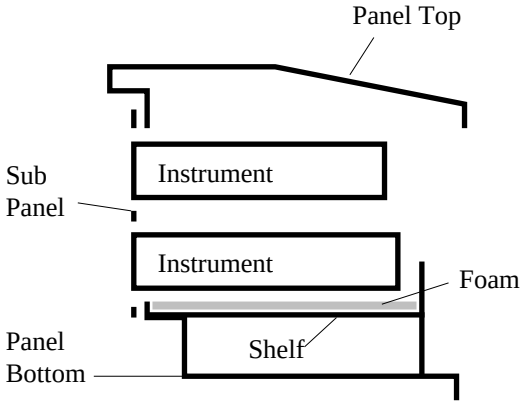


Figure 5 - Support Shelf (side view)



Shelf Dimensions

Length according to instrument
Width 40mm
Thickness 1mm