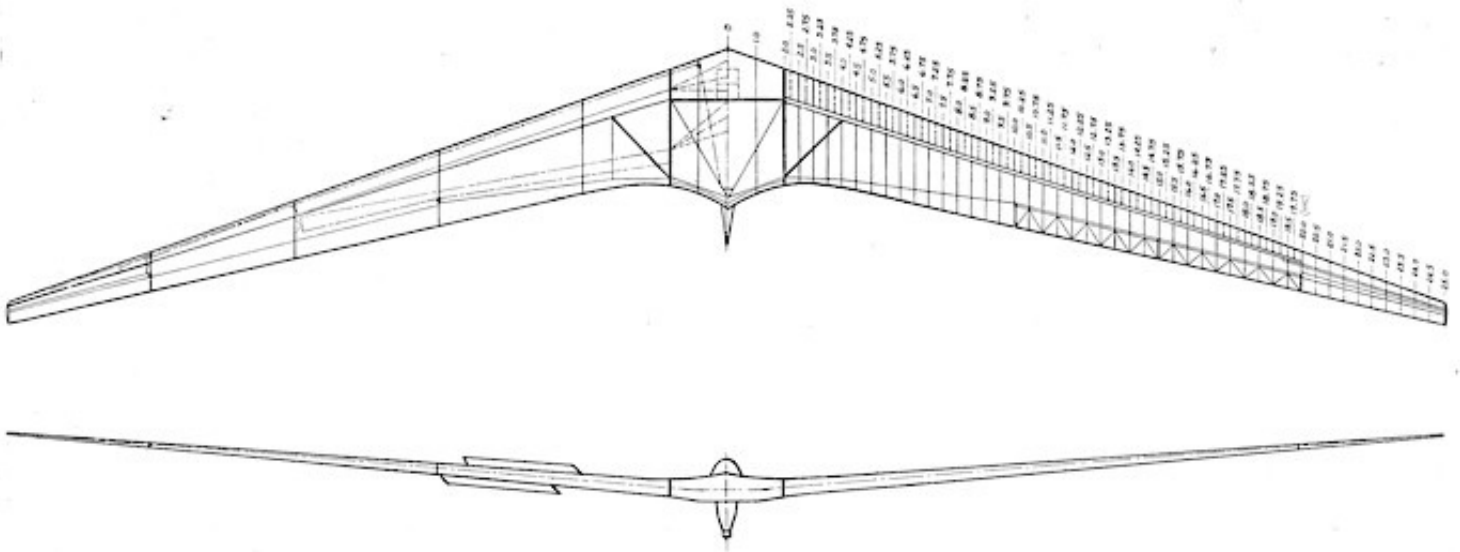


T.W.I.T.T. NEWSLETTER



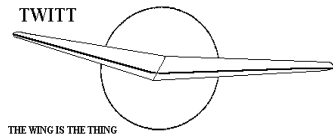
This is a portion of a Horten IV drawing located in our archives and the members only section of the website. There are a total of 21 drawings that contain a lot of detail on the structure of this historic sailplane.

T.W.I.T.T.

The Wing Is The Thing
P.O. Box 20430
El Cajon, CA 92021



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THE THING
(T.W.I.T.T.)**

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PRESIDENT'S CORNER

This issue is a little late since I fell under the weather just about the time I should have been putting it together for the print shop. Fortunately I am feeling much better and able to get everything pulled together to get it published during the week of the 10th. My apologies.

I need to make a correction to the October issue number. I did my usual check of the prior number as a reminder, moved to the computer and put in the number I just read instead of incrementing by one. So the October issue is really No. 340. I have corrected the issue available on the Internet if you want to print out a new cover page for your issue. Or you can just strike over the wrong number and print in 340 on your cover page.

I don't know how many of you subscribe to the Nurflugel Bulletin board but I have noticed there has been no activity for quite a while now. Not sure if my address got dropped or the system is down for some reason. If anyone knows, please let me know what's happening.

I found some interesting threads from the U-2 group and have included them in this issue. It seems strange that an aircraft like the U-2 that has been around for a long time generates so many questions by those just starting the building process or taking over an existing project. I would have expected the documentation to be more complete and sufficient information in the archives to cover things like those discussed here.



LETTERS TO THE EDITOR

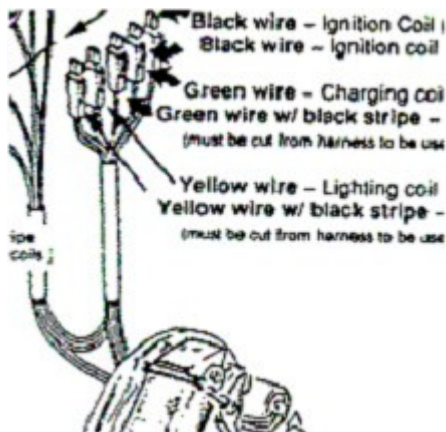
MITCHELL U-2 THREADS

Hi All

Ok so I have a Rotax 377 engine, looking at the wires and doing my research I have figured out where most of the wires go - but there is a few things I am hoping to get clarification.

Reading online it says the black wire is for a kill switch to shut the engine off - there is a mag wire and a pto side wire - it says the black wire goes to one side of a switch with the other side going to a ground. Now here are my questions:

- 1) Are we using the mag wire or the pto side - I am thinking mag?
- 2) What do we do with the other black wire - where does it go?
- 3) When connected to a switch, will that be the same as a key - when it is one way it will allow the engine to run - when it is the other way it will not let engine start or shut down when running?



It says in the manual that we can charge the battery whilst the engine is running - the green and green w black wires state charging wires.

How would I connect them to my battery to charge the battery whilst the engine is running, we have an electric start with the voltage regulator.

Where does the green wire go, where does the green w black wire go?

Any help would be greatly appreciated

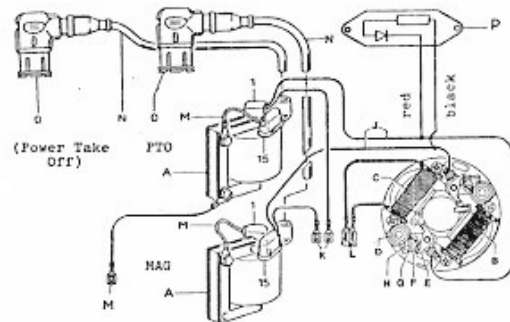
Ryan

The output from the motor is AC and has to go through a regulator rectifier. The power wires from the motor (and yours are different on color than my 503) go to the input side of the rectifier and the output of the rectifier go to the battery.

SECTION 15

WIRING DIAGRAM

Particular care has to be taken that the ignition generator cables (J) and the mass cables (M) be correctly connected to the ignition coils (A), see illustration.



- | | |
|---------------------------|-------------------------|
| A ignition coils | H adjusting groove |
| B generator coil (bottom) | J generator cables |
| lighting coil 30W (top) | K shorting cables |
| C lighting coil 110W | L lighting cables |
| D condenser | M mass cables |
| E contact breaker lever | N ignition cables |
| F breaker contacts | O spark plug protectors |
| G fixing screw | P ignition damping box |

■ To cut off the ignition, the two shorting cables K have to be connected together or to ground.

■ DAMPING BOX

Precaution check: Connect damping box with reversed polarity. There must be no spark on both plugs when cranking the engine. If there is still a spark, the damping box is defective.

In case of ignition troubles (no spark): disconnect damping box, if there is now a spark, the damping box is defective.

If the engine performance is bad with the damping box connected and good without it, this indicates a weak ignition system. Possible cause could be: Turned flywheel, faulty condenser, faulty ignition coil or spark plug.

Regulator # 866 080/
 Rotax rectifier 886 080 wiring diagram.
 Look at page 24 on attachment above

Mike

Dear Friends,

It seems that I finally tracked 4 (of 7 probably built) MW B10 (one is redesigned and built as two place and one should be finished as tailed UL. Also friend said that he give me his unused plans of B10 (I actually don't plan build it, maybe redesigned later). Two place version was redesigned by student, is fully enclosed and still flying - haven't much info about, only some photos - plan to visit and fly it (as owner offered to me).

Best Regards,

Jeri

Looking at the blueprints it says when setting up the stabilators to push the controls full forward (down) and set the stabilators at zero degrees. However that would mean when in level flight your stabilators would be at around 15 degrees - however looking at photos of other U2's in flight - there stabilators look like they level or zero degrees in level flight which would mean full forward? Can someone explain or help explain.

Attached please find some photos of my near competed U2, many of you have given advice and help during my build and I appreciate it. More pics will follow in near future.

Ryan





Back in the archives somewhere, there are numbers on the travel limits of the elevons. I remember that the information wasn't easy to find, and I think it came from Guy. I also remember that I was surprised to find that the movement is mostly up, and that the twist in the elevons resulted in the outboard end being always up. I had to shorten the horn lengths to get them to go to the limits.

Dave

So I have been doing lots of reading re the setting up of the stabilators and the flying of the u2. I have a little confusion with something... The blueprints say when setting up the stabilators that the control stick is to be pushed full forward and stabilator set to zero degrees which is easy enough. The confusing part is reading the archives re the flying of the plane - the one article says to mark positive 5, 10 and 15 degrees and negative 5, 10 degrees. Then it says in level flight if perfectly balanced we should have controls between 3 - 5 degrees. There is no negative if the control stick is full forward and at zero degrees - also if level flight is 3-5 degrees then we flying with almost full forward stick, which gives little movement of stick to go forward. I am obviously missing something or not understanding - can someone help break it down please... Thanks

Ryan

When the stick is full forward (centered) you still have to have some aileron. So when it is in a front corner, the outside elevon has to be negative. The elevons will be at their limits when the stick is in the corners. I don't remember the magic number, but it's in the literature somewhere.

Dave

So as long as the stick full forward has stabilator at zero degrees and full back is around 30 degrees with Aircraft perfectly balanced all should be fine?

Ryan

When holding the stick full back when you move the stick from side to side, the stick should still reach the control stop. The elevon should not stop the travel of the stick, it should reach the hard stop you have incorporated in the control mechanism. You did build a control stop right?

Joe Street

Never saw anything in blueprints re control stop?

When my stick full forward I am at zero degrees, when I pull it full back it is 30 degrees.

Where does it mention control stop?

Ryan

That V-mixer can only move so far whether or not there is a physical stop built into the system. With the stick full forward but centered moving it to one side moves the bottom end closer to one bell crank thus rotating it to its maximum position and moving the stab on that side a few degrees more.

Norm Masters

My elevons do not stop the control or movement of the stick, my stick has full movement and elevons stop when stick stops.

That's correct??

Ryan

On all controls there should be something to limit the travel at the input end. You don't want the limit of travel to be where the control surface, bell crank or cable binds on something.

Imagine someone throws the throttle closed and breaks the arm off the carburetor for example.

Joe Street

Can you recommend where to look to get info on adding this?

This is the first time I have heard of this

So should I not worry about trying to add something and just leave it alone if built as per plans? Is that considered control stops if it is already limited to travel by design?

Ryan

Sounds like that might be the case for the control mixer (I haven't seen one), but it is still something to consider for other controls on the aircraft.

Joe Street

Can anyone send any links or suggestions on how to make some control stops on the U2 and would you put them on the stick, control surface or both?
Any help would be appreciated.

Ryan

As I recall, the mixer gave limited movement to the pushrods. At the extremes, stick movement didn't result in any more movement of the pushrods, and there was resistance. I would consider that to be enough "control stop". The next step is to adjust the rest of the linkage so that the surfaces reach the appropriate angle limits when the mixer says it's through. That's the best you can do. Then that part of the project is ready to fly.

After you are routinely flying, then is the time to adjust the center of gravity so that the surfaces and stick are at the proper angle at cruise. (Bear in mind that I haven't actually finished and flown one.)

Dave

Just was a little confused cause everyone is talking control stops and I built as per plans.

When controls full forward we at zero degrees, when full back around 30 degrees. We have the counter balances on the stabilators which make movement fairly smooth and very little resistance which is nice.

Ryan

I guess that was my fault as I didn't realize the mixer is designed to act as the limit. My comment was meant in general that the inspector is going to be looking for a hard stop on all aircraft controls and that the item being controlled is not binding before the mechanism is stopped at the input end by some hard limit. You still need to ensure that that is the case. The mixer should limit the travel while there is still a little range of motion still possible on the surface, otherwise it is going to stress out your hinges and /or something else.

Joe Street

(ed. – I have included this one since he is going over covering and painting techniques that are applicable to any type of aircraft and there have been some other discussions on the Oratex fabric I thought would be of interest.)

Hi Guys.

I lately bought an Aviad Zigolo MG12 ultralight motorglider.
(<https://groups.yahoo.com/neo/groups/zigoloaviad/info>)

I plan to paint the fabric using latex paint. Because of the space I have available, I cannot use strong toxic products and I cannot use a paint gun. I have no choice to paint with a roller.

The Zigolo being a very light ultralight as 225 lbs empty, I aim for a light-covering job. I thought you guys would be interested about my experiment results with Latex.

Here is a copy of my latest post in our group.

Sylvain Belanger
Montréal QC Canada

Products used:

Benjamin Moore Primer
Benjamin Moore Aura 100% acrylic exterior semi-gloss waterborne paint
Expensive stuff at around 72\$ CAD a gallon, probably 65\$ USD a gallon. But I don't mind too much, I expect no more than 2 gallons will be needed.

Benjamin Moore Paint Extender

Windshield Washer Fluid (WWF) for dilution
The blue cheap one, no additives like Teflon or other stuff. I use it to dilute the paint. From my research, the Ammonia and detergent it contains mix well and help spreading and auto leveling.

My recipe for both primer and paint:
6% Extender (As recommended on the bottle)
40% WWF Mix well, that's all.

Note that the diluted paint and primer is fluid enough to make very light coats and at the same time without dripping. Apart for the first coat of primer that is applied with a brush, I apply the primer and paint with a 6 mm roller.

Applying the primer:

Before applying the primer, I wipe carefully the fabric with MEK to remove all grease, film and dirt. I guess Acetone would also do the job. The first coat of primer is applied with a brush to make sure to fill the weave of the fabric. This is in my opinion the touchiest part. Too much and it will drop behind the fabric. Not enough and it will not completely penetrate the fabric. For the other coats applied by roller, I really spread and stretch the primer to be sure not to leave too much, simply to cover. After applying 2 coats of primer, after drying, I could still see the weave of the fabric and even feel it with my fingers. My guess is after those 2 coats the fabric would be ready for

the colored topcoat. However, with the weight results I got, I will go with 3 coats of primer.

Applying the paint:

I apply the paint with a 6 mm roller. Again, the same way I do with the primer, I really spread and stretch the paint to be sure I won't leave too much and that it won't drip. I can usually see some bubbles just after applying but they disappear and the paint levels itself surprisingly well.

Finish appearance.

Up to now, I am quite satisfied with the finish I get after each coats; it has a quite smooth satin feel, no orange peel texture. Very acceptable in my opinion for being applied with a roller. I am quite sure with the same recipe and being applied with a paint gun, the results would be extremely good and would give a perfect finish.

Opacity and UV protection.

I rely entirely on the UV protection of the latex itself. The white color of the latex comes from Titanium Dioxide pigments which is a known UV protectant used in various applications including sunscreen. I also rely on long-term aging tests that were done quite successfully. I did not test it to the level of total opacity yet but my guess is it would unnecessarily heavy. From the research I did on the net I will assume that opacity is not necessary for adequate UV protection. And by the way, sunscreen does need to be completely opaque to give almost 100% UV protection. Nor does sunglasses... I also checked a Oratex 6000 sample which has 100% UV protection and it also lets light show thru, about the same as my results with 3 coats of primer and 3 coats of paint.

Final weight results.

Yesterday, I cut out my tests samples from the frames, weighted and measured. Here are the weight results:

Fabric used: Uncertified Light Ceconite at 1.87 oz/sq yd

Reference: Oratex 600, weight : 122g/sqm

My sample with 3 coats of primer and 3 coats of paint: 190.5 g/sqm

Difference: 56% more heavy than with Oratex 600.
14% heavier than Oratex 6000.

Difference in weight for the whole plane considering 55 sqm needed to cover: 4,34 Kg (Compared to Oratex 600)
 Weight of one coat of paint: 14,4g/sqm or 0,72 Kg for the plane
 Oratex 600 being known as the lightest covering system on the market, I am quite satisfied with the 190,5 g/sqm compared with the 122 g/sqm of the Oratex.

The appearance and feel on my sample with 3 coats of primer and 3 coats of paint is very good. It feels and looks a lot like Oratex 6000 and the weight is also quite close (160 g/sqm). I aggressively tried to scratch off the paint with my finger nail and no paint would come off. I strongly crushed the sample many times in my hand and absolutely no sign of cracking, it just stayed wrinkled. With the weight results I got, I am very satisfied with 3 coats of primer and 3 coats of paint. For someone wanting to save about 1,5 kg on the total covering weight, 2 coats of primer and 2 coats of paint could still be acceptable but it would be the minimum.

Cost difference:
 I made very approximate cost estimates:
 Oratex: 4000\$ - 5000\$ USD
 This described latex method: around 1000\$ USD

Final polishing:
 I did not experiment yet with polishing. I am working now on a final sample on a frame that I will let cure for about 2-3 months before experimenting with polishing. I however consider polishing a simple nice to have, The satin finish I get without polishing is satisfying enough for me.

Notes:
 When I will do the real paint job on my plane and not experiments on a frame, I expect the blue Stewart EcoBond blue will need to be primed with a brush with 3 or 4 coats of primer to make sure the color will not show thru.

Let me know how it goes and share photos.
 I would recommend paintbrush over a roller as I don't think you will get as smooth a finish with a

roller and rollers always suck up so much paint which ends up being wasted and not usable.

You also sometimes need to apply a descent pressure to use a roller which you may not want to do on the plane, brush is less pressure, less waste and I think better finish.

Just my thought.

Ryan

Years ago, I painted a canvas nose wheel cover that was on my twin Comanche. It was under the hood and was a splash protector. That Latex paint shrank and shrank and shrank and after about 2 years the fabric split and ripped and to reform the latex paint shrinkage. Plus the latex paint is very heavy. Instead why don't you look into an aircraft fabric primer made by Airtech. You can put it on by brush, isn't heavy, and will seal the pores of the fabric.

Austin Cole

AVAILABLE PLANS & REFERENCE MATERIAL

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BLUEPRINTS – Available for the Mitchell Wing Model U-2 Superwing Experimental motor glider and the B-10 Ultralight motor glider. These two aircraft were designed by Don Mitchell and are considered by many to be the finest flying wing airplanes available. The complete drawings, which include instructions, constructions photos and a flight manual cost \$250 US delivery, \$280 foreign delivery, postage paid.

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