trike wing "PROFI"

owner/service MANUAL



Size: _

Manufactured by:

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Date of production:	
Serial number:	

Table of Contents

Section 1. General Information	3
1.1. Introduction	3
1.2. Main Data	
Section 2. Set Up Procedure	4
2.1. Set Up Procedure From The Package 4 Meters Long	4
2.2. Set Up Procedure From The Package 6 Meters Long	
Section 3. Preflight Inspection Of The Glider	14
3.1. Beginning At The Nose	14
3.2. Along The Left Leading Edge	14
3.3. At The Left Wingtip	14
3.4. Along The Trailing Edge, Left Wing	14
3.5. From The Rear Keel	15
3.6. Along The Trailing Edge, Right Wing	15
3.7. At The Right Tip	15
3.7. At The Right Tip 3.8. Along The Right Leading Edge	15
3.9. Under The Wing At The Control Bar	16
3.10. Fit The Nose Cone	16
Section 4. Inspection Of The Wing	17
4.1. Sail Check-Up	17
4.2. Cable System	17
4.3. Checking The Tubings	18
4.4. Checking The Battens	18
4.5. Fasteners	18
Section 5. Maintenance	19
5.1. Wing Tuning	19
5.1.1. Cg Adjustment	
5.1.2. Turn Trim	
5.2. Maintenance	20
5.3. Storage	20
5.4. Transportation	20
5.5. Sail Removal	21
5.6.Reinstalling the sail on the Frame	
In Closing – A Few Final Words On Your Safety	25
Log Book	26
Schemes	28

Section 1. GENERAL INFORMATION

1.1. INTRODUCTION

Thank you for purchasing an Aeros wing.

The **Profi** is the wing for two-seater trikes - is a product of Aeros Ltd. It is the result of an extensive design and development program aimed at optimizing your level of safety and satisfaction as a pilot, through their high performance and strength of construction.

These wings are safely controllable and stable at a wide range of operating speeds. The strength of the wing is sufficient for different conditions of flight with defined load.

Please read and be sure you thoroughly understand this manual before flying your **Profi**. Be sure you are thoroughly familiar with set up, break down, preflight and maintenance procedures as described in this manual.

If you have access to the Internet, please visit us regularly at http://www.aeros.com.ua

We wish you a safe and enjoyable flying career.

Aeros Ltd.

1.2. MAIN DATA

Profi are high performance flexible wing for a double seater trike.

Wing type	Profi
Sail area, sqm	14.5
Wing span, m	10.0
Aspect ratio	6,9
Nose angle, deg	128
Max airspeed, kmph	110+
Stall speed, kmph (with max load)	52
Speed of max glide angle, kmph (with max load)	70
Range of operating overloads	+4/-2
Ultimate tested strength, G	+6/-3
Total load max, kg	470
Weight without bag, kg	48

Profi were not designed to fly at bank angle over 60 degrees or pitch angle exceeding 30 degrees. Operation in any of these modes may severely compromise your safety.

The flying of any trike in presence of turbulence or gusty wind can result in flight inversion, structural failure of the wing and possible fatal injuries.

Performance of the wings with trilam leading edge can worsen in wet (rain, thick fog, dew, etc.) and ice-covering conditions, therefore we do not recommend to use wings in such conditions, as this can compromise your safety.

Section 2. SET UP PROCEDURE

2.1. SET UP PROCEDURE FROM THE PACKAGE 4 METRES LONG

Having used the specific techniques described in this manual you will perform the set up and break down procedures without any difficulties.

However, the following procedural descriptions are not intended to be a substitute for the familiarization procedure of your dealer at the time the wing is delivered.

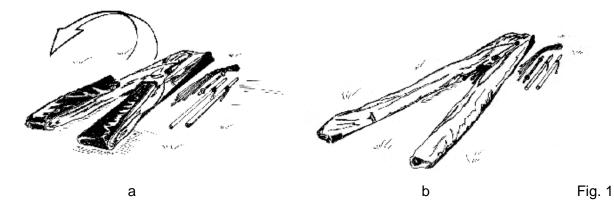
The set up procedure should be carried out on a clean, not abrasive surface. Before performing the set up procedure you must place the glider nose to the wind. During this procedure you must make a preflight inspection of the wing.

2.1.1. With the glider in the bag (4 meters long) lay the glider on the ground.

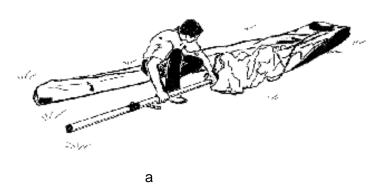
2.1.2. Undo the zipper. Untie the Velcro straps. Remove the battens, the control bar and the leading edge tubes N3 from the bag.

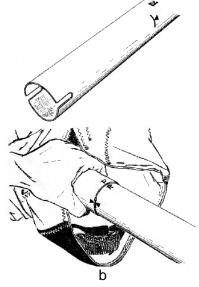
2.1.3. Turn the glider so that the downtubes packed into the safety bags are on the bottom and kingpost is on the top.

2.1.4. Unfold the sail along the leading edge (Fig. 1).

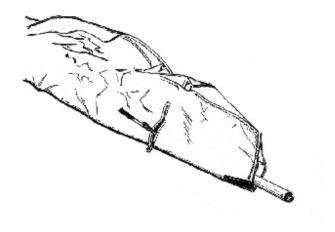


Attach the leading edge tubes N3 to the leading edge tubes N2 according to the marking (L-left, R-right, marks must be on the top) (Fig. 2).



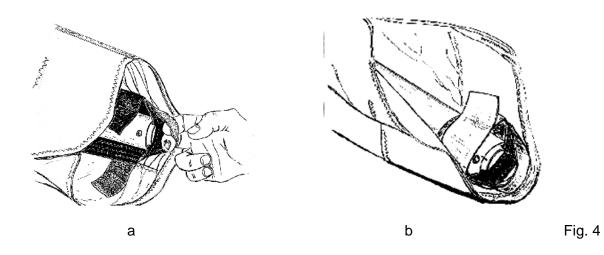


2.1.5. While installing the leading edge tubes into the sail, place the washout struts facing forward toward the nose of the wing and along the leading edge tubes (Fig. 3). Put washout tips outside of the sail through the access zippers. Make sure that the leading edge tube #3 is properly installed.



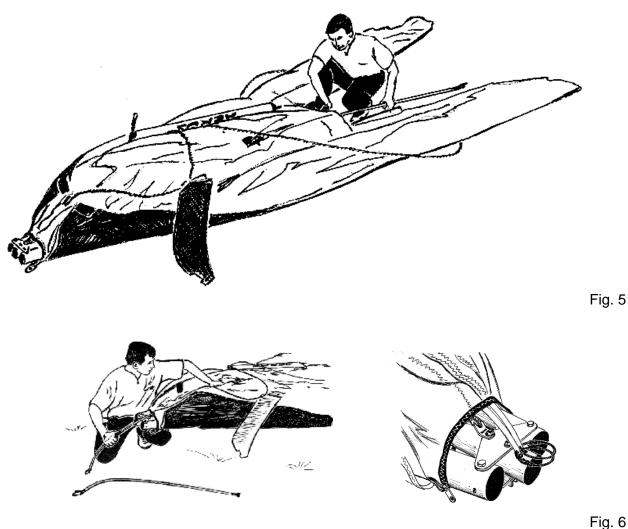


2.1.6. Tighten the sail along the leading edge and mount it to the rear leading edge, make sure to align the sail mount webbing squarely in the slot and attach the securing velcros (Fig. 4). The sail is mounted to the leading edge by the inner (forward) of the two loops of webbing. The outer loop is a pull handle only.



2.1.7. If the keel and #1 battens don't installed in the sail, it's necessary to make this. Remove the battens from the batten bag and install the #1 battens to the wing. Next step is to install the keel battens (Fig. 5 and 6)

Aeros convention is that red marked battens go in the left wing and green marked battens in the right. But you can feel free to install them the other way around, i.e. red marked battens go to the right and green marked battens go to the left. This is because Aeros do not tune glider's turn by changing battens camber, so originally your glider comes with left and right corresponding battens symmetrical between each others. Battens are numbered from the center outwards, and the longest batten in a Profi is designated as the "# 1" batten.



2.1.8. Spread the wings all the way. Pay attention to the nose bottom part of the sail, it has to be located between the keel tube and nose channel!

Near the kingpost hole find the shackle of the sweep wire. Pull the shackle out the rear end of the keel pocket, and check that the sweep wire is not wrapped around the keel. Install the pin of the kingpost to the corresponding place on the keel tube. Attach the shackle of the sweep wire to the hook, which is placed on the keel tube. Install the tangs on the nose of the sail over the bolt and secure the assembly with a nut (Fig. 7).

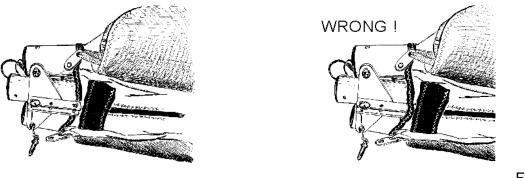


Fig. 7

2.1.9. Release the sweep wire from the hook on the keel tube to loose a tension of the sail.

2.1.10. The further set up procedure is similar the one from a 6-meter long bag (Section 2.2, except points 2.2.1-2.2.4).

2.2. SET UP PROCEDURE FROM THE PACKAGE 6 METRES LONG

2.2.1. With the glider in the bag (6 meters long) lay the glider on the ground (Fig. 8).

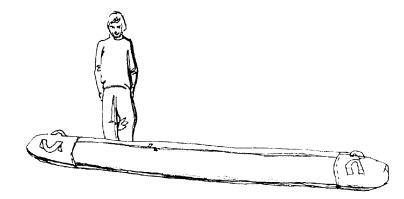


Fig. 8

2.2.2. Undo the zipper. Remove the battens and the control bar from the bag.

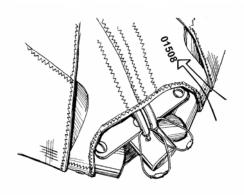
2.2.3. Untie the velcro straps.

2.2.4. Turn the glider so that the downtubes packed into the safety bags are on the bottom and kingpost is on the top (Fig. 9).

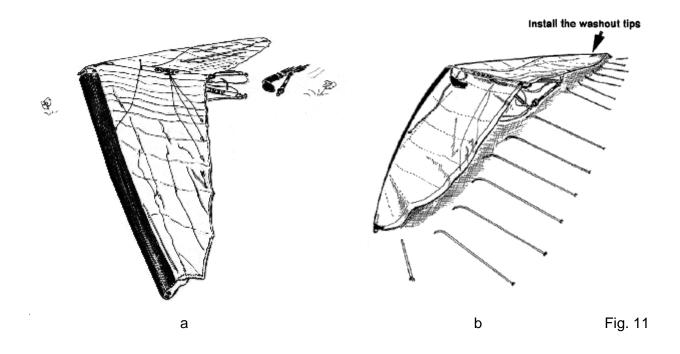


Fig. 9

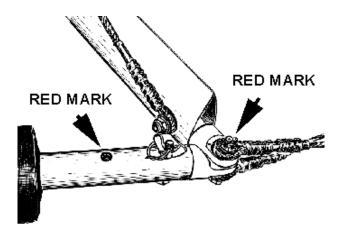
2.2.5. By lifting up and back on the nose batten strings; push the nose battens fully back into the sail so that the tips rest on top of the keel tube (Fig. 10).



2.2.6. Spread the wings so, that the sail is a little loose and the glider is resting flat on the ground (Fig. 11).



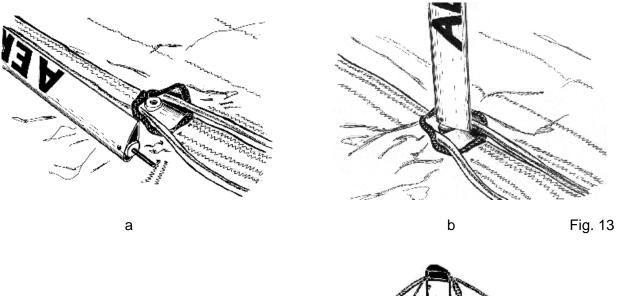
2.2.7. Remove the protective <u>bags</u> from the downtubes. Spread the downtubes. Install the control bar according to the marking. Fix the control bar using nuts and safety rings (Fig. 12).



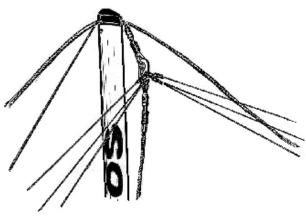
NOTE: Take care that the reflex wires and the top wires are not wrapped around the keel and are free from the keel hardware.

Put out of the sail the cross tube tension wire and install the pin of the kingpost to the corresponding place on the keel tube (Fig. 13a).

The kingpost has to be placed between cross tube tension wires (Fig. 13b)!



2.2.8. Attach the hook of the top rear wire with the washout wires to the thimble of the top front wire (Fig. 14). Make sure that the hook is not inverted and the reflex wires or top wires are not twisted.

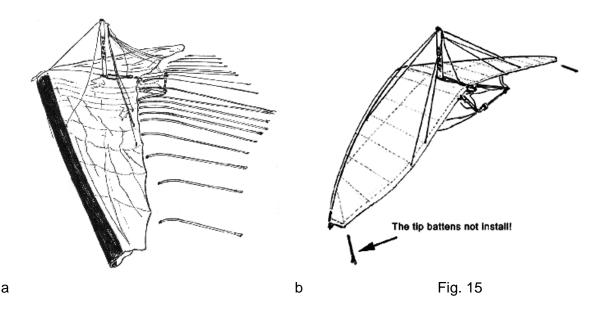




2.2.9. Remove the battens from the batten bag, and check each batten for symmetry against the corresponding batten from the other wing. Align the battens at the nose, and at about the 60% chord point. There should not be any deviation of more than 3 mm (1/8") from one batten to the other along the full length of the battens. Correct any that are asymmetric using the template (Fig. 15).

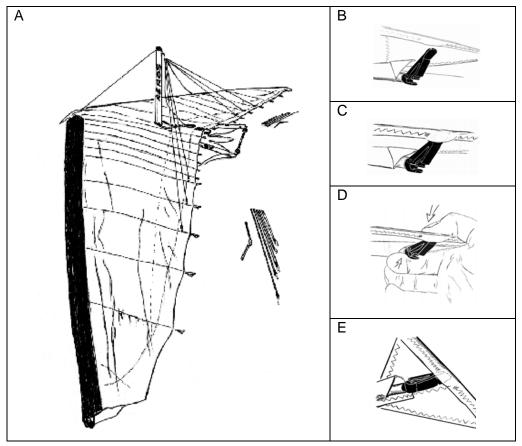
NOTE: Two longest battens are not removed from the battens pockets during the break down procedure.

Aeros convention is that red marked battens go in the left wing and green marked battens in the right. But you can feel free to install them the other way around, i.e. red marked battens go to the right and green marked battens go to the left. This is because Aeros do not tune glider's turn by changing battens camber, so originally your glider comes with left and right corresponding battens symmetrical between each others. Battens are numbered from the center outwards, and the longest batten in a Profi is designated as the "# 1" batten.



Install the cambered top surface battens in the sail, leaving out the shortest two on each side for now. Insert the battens carefully, so as to minimize stress and wear on the sail. Never insert or remove top surface battens with the crossbar tensioned (except for up to the last two on each side) and never insert or remove battens with heavy wind pressure on the top of the sail or in any condition which causes the battens to slide with great resistance in the pockets. If you choose not to check your battens for symmetry before each flight, you should, at a minimum, check them once a month.

2.2.10. Install the lever batten tips into the hem of the trailing edge. At each batten, make sure the opening in the underside of the trailing edge hem is spread to accept the tab on the batten tip. Make sure the tab slides fully into the hem (Fig. 16). Except battens #9, 10, 11 (it should be making after sail tensioning).



2.2.11. Check all wires for twisted thimbles or tangs (Fig. 17).

Fig. 17

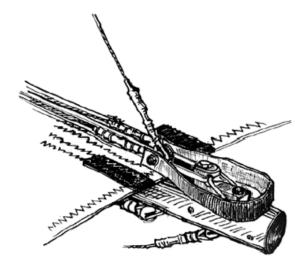
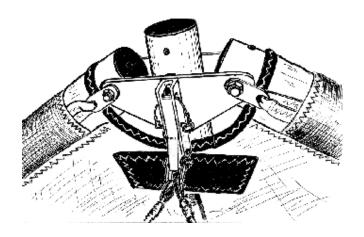


Fig. 18

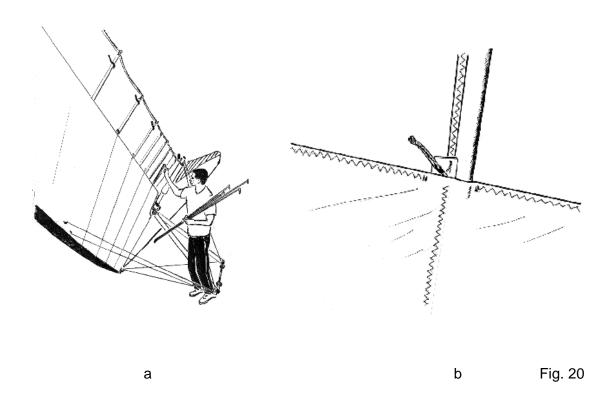
2.2.12. Attach the shackle of the sweep wire to the hook, which is placed on the keel tube (Fig. 18).

An in-flight disengagement of this attachment will cause a complete loss of structural support of the glider and a total loss of control. Never attach the pull handle of the shackle to the hook, even temporarily.

2.2.13. Put the glider on the A-frame. Secure the nose catch of the bottom wires on the nose junction channel using the clevis pin and the safety ring (Fig. 19).

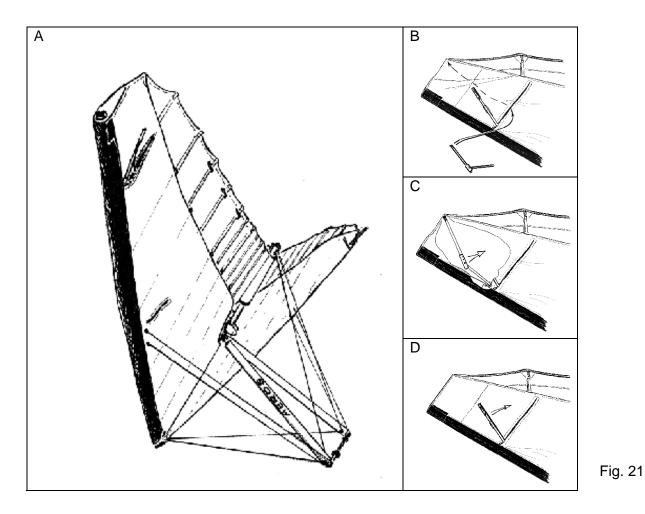


2.2.14. Install the bottom surface battens. The longest bottom surface batten is inboard batten. Push the battens all way into the pocket until the rear end is secure in the batten pocket. The strings on the rear ends of the bottom surface battens are to facilitate removal of the battens from the sail during breakdown (Fig. 20).



2.2.15. Install the tip battens through the access zipper in the bottom surface:

- bend the tip batten with angle approx 60 degrees;
- install the batten into the sail with bend going towards the wing tip;
- install flat end of the batten to the angle of the sail tip;
- straighten it a little bit and guide another end of the batten onto the leading edge batten hook;
- pull the bend towards the keel and gently straighten the batten completely (Fig. 21).



2.2.16. Install the washout tips; just swing them to the right place underneath the corresponding top surface battens through the access zipper in the bottom surface.

2.2.17. Remove the protective bag from hang detail.

2.2.18. Do a complete preflight inspection of the glider, Section 3.

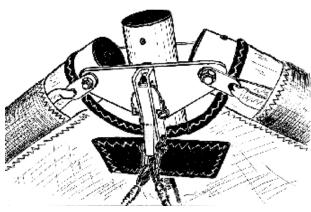
Section 3. PREFLIGHT INSPECTION OF THE GLIDER

Conduct a complete preflight inspection of the glider, checking all assemblies, which have not already been checked. Every bolt, nut, pin, safety ring, and fastener of any kind should be checked during every pre-flight. A full pre-flight inspection should precede every flight you make, not just the first flight of the day.

Carefully check the entire length of the leading edge pocket to insure that the mylar insert is lying flat in the pocket. If any section of the mylar is folded under, de-tension the crossbar, remove the batten closest to the area of distortion, and unfold the mylar.

3.1. BEGINNING AT THE NOSE

Check all self-locking nuts, the clevis pin and the safety ring, which secure the lock of the bottom front wires (Fig. 26).





3.2. ALONG THE LEFT LEADING EDGE

Open the crossbar junction access zipper and look inside, making sure that side wires are properly secured to the crossbar, that the thimbles are not cocked on the tang.

Check the splint pin and the nut, which secures the leading edge – crossbar junction.

Check that the sail is not caught on the crossbar end, or on any of the hardware.

Remember to close the access zipper (Fig.27).

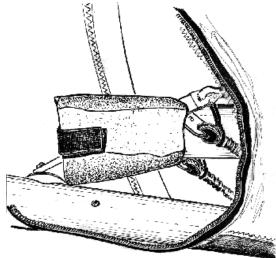


Fig. 27

3.3. AT THE LEFT WINGTIP

Look into the sail at wing tip, and check that the tip batten are properly seated and fixed.

Check that the washout tips are installed properly.

3.4. ALONG THE TRAILING EDGE, LEFT WING

Check that there are no tears in the sail material along the trailing edge. Check that all battens are properly secured.

Check that the washout tip is properly secured in position supporting the batten, and that the washout tip access zipper is properly closed.

Check that the bridles are properly engaged.

Check the trailing edge for any cuts, tears or broken stitching (Fig. 28).

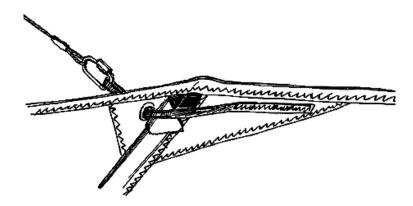
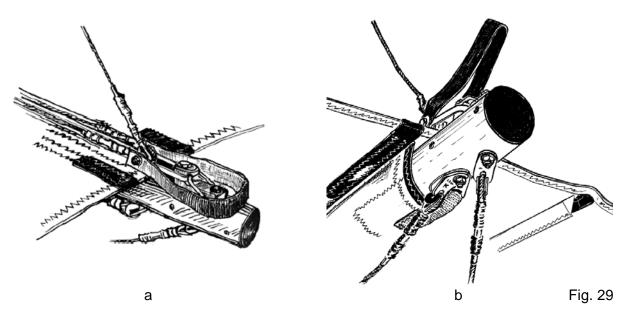


Fig. 28

3.5. FROM THE REAR KEEL

Check that the sweep wires are tight and secured on the hook on the keel tube (Fig. 29).



Check the kingpost top for proper attachment of the bridles and condition of the top rear wire and bridle wires.

Check the keel mount webbing, and bottom rear wires are safely secured to the keel tube.

3.6. ALONG THE TRAILING EDGE, RIGHT WING

Same as for the left wing.

3.7. AT THE RIGHT TIP

Same as for the left tip.

3.8. ALONG THE RIGHT LEADING EDGE

Same as for the left leading edge.

3.9. UNDER THE WING AT THE CONTROL BAR

Check the cables at the control bar corners, making sure there are no kinks or twisted thimbles. Inspect each Nicopress sleeve for slippage and/or corrosion.

Check each thimble for distortion, flattening or wear where it touches a bolt, shackle or tang.

Check for proper installation of all nuts and safety rings at the control bar corners. Check that the downtubes are straight and undamaged.

Unzip the center zipper. Check that all bottom surface battens are under the leading edge tube.

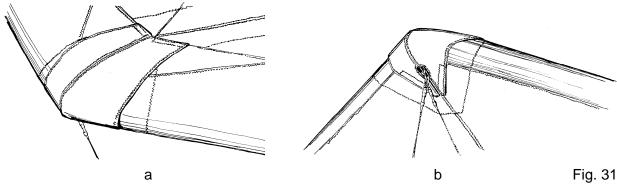
Check the sweep wire for wear.

Check the crossbar center plates assembly including the sweep wire/X-bar junction and the center bolt.

Also, visually inspect the crossbars by sighting along the length of the crossbars looking for any evidence of damage.

3.10. FIT THE NOSE CONE

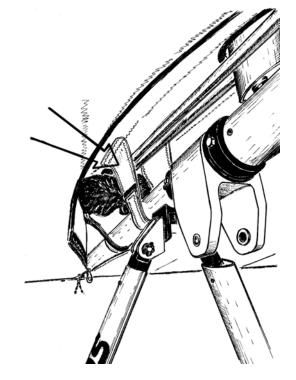
over the front of the keel and attach the Velcro at the top rear of the nose cone. Pull the bottom corners of the nose cone back until the nose cone is tight around the nose and secure the Velcro on the bottom of the nose cone (Fig. 31).



Now your glider is ready for mounting on the trike.

Don't fly without the nosecone!

Check all bolts, nuts and the safety rings, which secure the downtubes to the channel. Make sure that the channel and hang detail are secured (Fig. 30).



Section 4. INSPECTION OF THE WING

The sail should be inspected once every three months or after each 50 flying hours. The frame should be inspected once a year, after every 100 flying hours, and after every hard landing.

4.1. SAIL CHECK-UP

4.1.1. Sail seam and cloth strength are assessed by testing the strength of the control clouts on the top surface (TS) of the wing. The control clouts are incorporated in the cloth piece (designated by letters UV) that is sewed onto the trailing edge close to the keel tube. For sail assessment cut control clout in the drawing and forward it to your Aeros dealer or directly to Aeros.

The first sample is to be cut out after 300 flying hours and thereafter a sample must be submitted after every 150 flying hours.

4.1.2. Checking the sail surface and seams

There should be no cuts, ruptures, threadbare holes and torn seams on the sail. Any torn seams should be re-stitched. Cuts and ruptures on the fairing and bottom surface (BS) of the sail that are not longer than 30 mm can be patched up with self-adhesive Dacron. The Dacron must be of a weight of not less than 100 g/m. larger cuts and ruptures are to be repaired by stitching on a reinforcing piece of the same fabric (stitched along the edges). Any rupture shorter than 50 mm can be repaired in this manner, but more complicated repairs and **all cuts near the trailing edge** should be carried out in the workshop of producing company. If any of the batten tightening cords are torn or heavily worn they must be replaced.

4.1.3. Keep an eye on the sail grommets/eyelets and all areas of the sail that are subject to extra stress, especially the keel section, the nose section of leading edge and the outer tip section of leading edge.

4.2. CABLE SYSTEM

The cables must be checked for broken wires and corrosion. If any defect on a wire is observed, no matter how small, the cable in question **MUST BE REPLACED**. It is recommended that the entire cable system be replaced once every four years irrespective of service conditions.

A NOTE ABOUT CABLES AND CABLE MAINTENANCE

The cables which support the wing's airframe are critical components of the wing's structure, and must be maintained in an air worthy condition. It is a general practice in the design of aircraft structures to design to an ultimate strength of 1.5 times the highest expected load in normal service.

Profi cables, like other structural components on the wing, are typically designed with a structural safety factor of only about 50% above the expected maximum load. No significant loss in cable strength can be tolerated.

A cable with even a single broken strand must be replaced before the wing is flown again. A cable which has been bent sharply enough to have taken a permanent set must also be replaced immediately.

Some degree of fatigue due to repeated bending of cables is almost unavoidable in an aircraft that is assembled and disassembled with every flight. Bottom side wires are subject to the highest loads in flight, and are therefore the most critical.

4.3. CHECKING THE TUBINGS

To check the condition of the wing tubes the sail should be removed from the wing frame and the tubes should be detached at the joints. The tubes are to be inspected visually. When there is suspicion of damage, the points in question should be inspected using a magnifying glass of (5-10) X magnification. There should be no trace of corrosion, cracks, bends or dents.

4.4. CHECKING THE BATTENS

The batten profiles should be checked against the template and the bends should be adjusted if necessary. Check all the plastic batten heads and tails and replace if necessary.

4.5. FASTENERS

Check all fasteners (bolts, screws, rollers, nuts, splint pins etc.) for corrosion. Any corroded fasteners should be replaced. Bolts should not be worn and/or bent. Key bolts should be checked most thoroughly for cracks between the head and the bolt body. These are the bolts at the control bar side and bottom joints, the central spreader bar tensioning cable attach point and the rear cable attachment point on the keel tube. If any cracks are observed - **REPLACE IMMEDIATELY!**

Section 5. MAINTENANCE

5.1. WING TUNING

- The Profi wing should fly straight and level without any pilot input with a cruising speed of between 75 kph and 90 kph.
- Before making any adjustments to the wing, first check that the wing is in the standard condition and that the battens all conform to the Profi batten profile.
- If the wing is not new, check the condition of the frame especially the outer leading edge tubes. The best is to remove the leading edges and check that they have the same bend in them and when under load they flex equally.
- Do not exceed the adjustment limitations.
- Do one adjustment at a time and test fly each time to measure the effect of each change.
- Note all adjustments and changes in the log book.
- Only tune the wing in perfect flying weather.

5.1.1. CG Adjustment

- Move the wing hang block forward on the wing keel will speed the wing up.
- Swivel both wing tips down equally will speed the wing up.

5.1.2. <u>Turn Trim</u>

Each wingtip has a slotted plastic end cap with a webbing strap over it. The plastic end is kept in place and at the correct angle with a small self-tapping screw.

By adjusting a wingtip down, the lift on the end of that wing will be increased and that will lift that wing in flight. Adjust the screw down by 2 mm at a time.

Do not exceed 6 mm away from the original position.

By adjusting the wingtip up, the lift will be decreased on that side and the wing will drop on that side. Adjust the screw up by 3 mm at a time.

Do not exceed 6 mm away from the original position.

Adjust one wingtip at a time and test fly after each adjustment.



Fig. 32

5.2. MAINTENANCE

- With correct maintenance your wing will retain its good condition for many years.
- We recommend that do you not expose your wing to any more direct sunlight than necessary. Do not leave it standing in the sun for long periods of time when you are not flying it.
- Do not leave your wing on the trike for a long period of time when the wind is strong. It will decrease the life of the sail; hang junction and frame of your wing.
- Your wing should be dried thoroughly after being exposed to rain or any other source of moisture.
- Your sail should never be washed with anything other then fresh water, as any soap or detergent will most likely degrade the cloth and may adversely affect the flight characteristics of your wing.
- If your wing is ever exposed to salt water you will need to have the wing completely disassembled in accordance with the recommended annual inspection procedure. All frame parts will need to be disassembled, including the removal of all sleeves and bushings, flushed liberally with fresh water, dried completely.
- When you set up or break down your wing, take care not to allow sand, soil and dirt to enter the sail, batten pockets or tubes. Keep the leading edge tube telescopic connectors thoroughly clean as set up or break down will become difficult or impossible if they are dirty. Swab the tubes with a rag.
- Keep all the wing's foam padding that was originally supplied and use in the same places when re-packing the wing.

5.3. STORAGE

- You must store the wing in its bag in a dry place on soft bedding. Before storage you must ensure that the sail is dry.
- The frame of the wing must not be subjected to load during storage and the tubes must not be bent under their own weight.
- The wing can be storage in temperatures ranging from -10°C to +25°C.

5.4. TRANSPORTATION

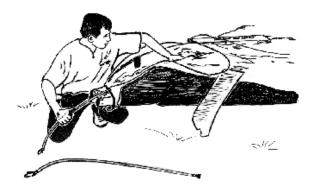
- The wing may be transported in its bag in any vehicle that offers protection from mechanical damage, soiling and long exposure to rain. It is not recommended that the wing be carried or transported without its bag.

5.5. SAIL REMOVAL

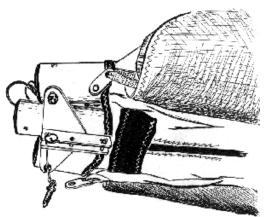
You will need an unobstructed area 2 m by 9 m. Make sure the surface is clean. If it is abrasive, you should either put down a protective tarp or be extremely careful not to scrape your sail.

5.5.1Unzip and remove the glider bag, all protective bags and pads. Put the battens and the base tube aside.

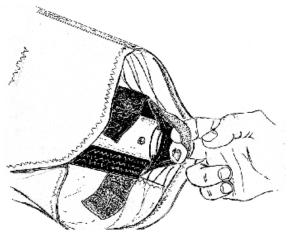
5.5.2.Remove the number 1 battens and nose battens from the sail.



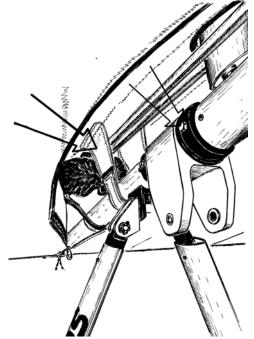
5.5.3.Remove the tangs that tether the nose part of the sail at the nose plate / leading edge junction . Detach the front top wire.



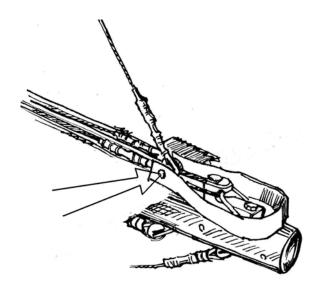
5.5.4.Undo the Velcro from the leading edge sail mount webbing . Dismount the sail from from the rear leading edges.



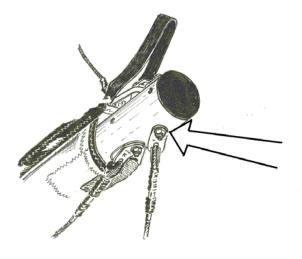
5.5.5.Undo the Velcro that tethers the sail to the keel tube. Remove the bolts from the rings that fix the U-bracket in place.



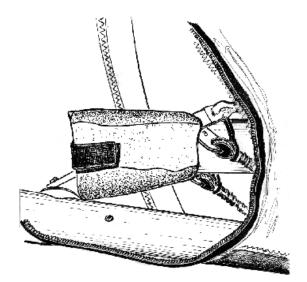
5.5.6.Unbolt the sweep wire shackle assembly.



5.5.7.Unbolt and remove the bottom rear wires and dismount the sweep wire hook.

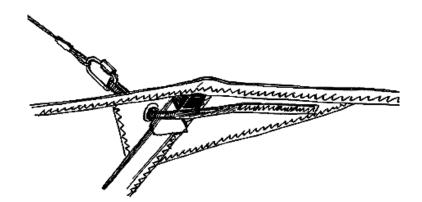


5.5.8.Remove top and bottom side wires.



5.5.9.Unzip the main under surface zipper completely.

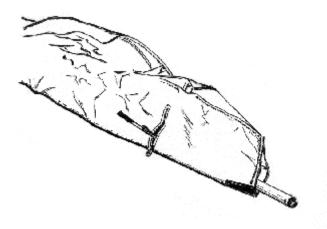
5.5.10.Remove the reflex bridles with the carbines from the sail.



Reassemble the hardware removed from the bolts in the original order so it doesn't get lost. All

disassembled assemblies on the wing must be reassembled in the proper order and orientation.

5.5.11.Slide the sail out from the frame through the open center zipper. Check that the washout tip and the lever batten hook do not get caught on the sail, otherwise the sail can be torn. If you encounter resistance, stop and find out what is hanging up.



5.6.REINSTALLING THE SAIL ON THE FRAME

Reinstalling the sail on the frame is the reverse of the sail removal.

IN CLOSING - A FEW FINAL WORDS ON YOUR SAFETY

- UL flying is an active air sport with associated risks. Your safety can be greatly enhanced by following a few simple rules:
- Your wing is delivered to you ready to fly. Do not make any adjustments, which are not described in this manual.
- If you are in doubt about any aspect of your wing you should consult your dealer or Aeros for advice.
- Only fly after having attended a good school.
- Fly a wing suited to your level of ability. A new risk may arise when you first fly a new type of the wing.
- The reactions of your new wing may well differ from those of the wing you where used to. In order to keep this risk low, we recommend that you gradually become familiar with your new wing.
- Before every take-off always do both an assembly check and a pre-flight check.
- Do not take off if the sail is wet, especially the leading edge, as the stall speed will increase significantly.
- Always fly with a dry sail!
- Take special care to avoid ice covering the glider, particularly the leading edge in wintertime.
- A wet wing must be dried before storing. Do not leave your glider wet for more than one day, because corrosion may result.
- Never fly alone.
- Don't push your luck. It is your responsibility to know the limits of your wing and the limits of your own experience. Remember, that ultimately your safety is your responsibility.
- Fly only in places, which are suitable for flying.
- With proper care and maintenance, your wing will retain a high level of airworthiness for many years.

Have fun. Fly safely.

Aeros Team

LOG BOOK

TABLE OF FLIGHT HOURS

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