OWNERS MANUAL

Airwave Gliders

K4 Owners Manual

Congratulations on your purchase of an Airwave Gliders *K4+*
We hope to provide you with many hours of enjoyable flying.
If you ever need any spare parts or advice do not hesitate to contact your nearest Airwave Gliders dealer, or contact us direct.

INDEX

DIMENSIONS

Wing area is ..... 155 Ft 2..... 14.4m 2.
Wing Span is ..... 33.8 Ft 10.25m
Aspect Ratio 7.3
Nose Angle ..... 132°
Luffline heights, trimmer tight

No. 1 (Inner).....	0	to	2mm
No. 2	10	to	15mm
No. 3	minus 27	to minus	23mm
No. 4 (Outer).....	minus 42	to minus	37mm

Luffline heights, trimmer loose

No. 1 (Inner).....	30	to	25mm
No. 2	35	to	30mm
No. 3	5	to	0mm
No. 4 (Outer)	minus 29	to minus	24mm

Anhedral..... 131 - 135mm
Keel bend ..... 0 - 12mm

OPERATING LIMITS

Certified weight limits ..... 132 - 220lbs ..... 60 - 100 kg
Optimum pilot weight range..... 143 - 209lbs..... 65 - 95 kg
Indicated stall speed ..... 15 m.p.h. with max. pilot weight.
Indicated maximum speed ..... 55 m.p.h. with minimum pilot weight.
Flight operations must be limited to non-aerobatic manoeuvres.
It is recommended that this glider be flown by a pilot who is trained to a B.H.P.A. XCPC or equivalent.
Load should only be applied to the glider through the pilot's hang point. Towing devices which load the glider elsewhere can be dangerous.

This glider must not:
a) exceed 30 degrees nose up or down to the horizon.
b) exceed 60 degrees bank angle left or right to the horizon.
c) be flown inverted or backwards.
d) be flown with auxiliary power unless designed, installed and tested by the factory.

This Glider Was Test Flown By .....
Date ..... Place .....

SECTION 1: RIGGING INSTRUCTIONS

Your ***K4+*** has been designed to be rigged simply and efficiently. The instructions given below provide you with the step-by-step procedure for rigging your glider. By closely following these instructions, you can ensure that your glider will rig easily and that you will not cause damage to the structure.

The ***K4+*** has a king-post hang point which helps the pilot to need only comfortable control forces in both pitch and roll whilst still retaining the basic stability of the wing. The hang-point can be adjusted (see "Tuning") by moving the kingpost base block either forwards (for a faster trim speed) or backwards as required. The central position is the normal setting.

The ***K4+*** may be set up in either of two ways. The first procedure is preferable, in which the glider is left on the ground, nose into the wind until ready to launch. In this procedure, the control frame is set into position last and it reduces possible damage to the glider in the event of a sudden gust of wind. The second technique is with the control frame set into position at the beginning of the procedure. This allows the glider to be set up off the ground which is better in lower wind conditions or on rough terrain and it is effective in keeping the sail clean.

1) Place the glider in it's bag on the ground with the nose into the wind and the zip facing upward. Unzip the cover bag, remove the battens from the nose area, undo the glider ties and assemble the control frame. NOTE: Check that all the rigging is outside of the control frame triangle and check that the bolt, wingnut and safety split-ring are fully assembled, and that the base bar is the right way up. (the trimmer cleat should line up with the trimmer rope and the front of the base bar should angle up slightly towards the nose plates)

2) Roll the glider over so that it is the right way up and flat on the ground. Ensure that the control frame is central and that the rigging is unsnagged. Thread the timmer rope into the cleat and tie a stop knot.

3) At this stage you must decide to rig the glider standing on it's 'A' frame or flat on the ground. If you decide on the former, then stand the glider on it's 'A' frame, but do not fasten the nose catch. Both rigging proceedures now continue in the same way.

4) Remove the cover and all the ties. Carefully walk each wing half way out to its approximate flying position before walking them all the way out. Clear the side wires through the top surface of the sail to ensure that they do not catch. **AT THIS STAGE IT IS ESSENTIAL TO ENSURE THAT THE KEEL AND LEADING EDGES ARE ALWAYS IN THE SAME PLANE OR DAMAGE WILL RESULT.**

5) Raise the kingpost and attach the luff lines to the hard eye, at the end of the compensator wire protruding from the kingpost top. This is a short length of wire and should not be confused with the top aft rigging which is a long wire also coming from the king post top.

6) Check the battens against template and for symmetry. Place all **green** tipped battens in the **right wing.** Working from the centre to the tip, but do not insert the tip battens insert all the top battens with gentle pressure until they meet resistance. Lift the sail at the trailing edge and gently shake, this enables the batten to slide into place over the cross tube. **DO NOT USE FORCE!** Do the same with the red battens in the left wing. All battens are secured in position with a **"double purchase"** method. To secure, place the bottom loop onto the batten end fitting and pull the top loop over and into the fitting notch.

7) Lift the nose batten with the attached string onto the rivet on the keel.

8) You should now find the cross tube tension webbing appearing immediately at the rear of the keel pocket. It is automatically pulled into this position by the elastic cord which runs down into the rear of the keel tube. Pull on the webbing loop handle. Keep about 50 cm to the rear of the glider for max leverage with your knees against the base bar. Pull the cross boom tensioner cables back until the shackle can be inserted into the alloy catch on the keel tube. The spring pin will lock the shackle in its proper position. Secure the top rear rigging ring onto the same catch.

9) To install the tip batten, look through the leading edge pocket at the wing tip and guide the tip batten onto the tip batten hook. Secure it with the double string. These strings are often quite tight and the easiest way to get them onto the batten end is by using a straight lower surface batten looped through the end of the string as a handle. Tip fairings are not recommended on the ***K4+*** due to the effect they have on yaw stability and trim speed.

10) If it is not already standing, lift the glider onto the control frame (be careful of snagging the tip battens), ensure that all the lower rigging is untangled. Attach the forward lower rigging by putting the goose catch inside the goose channel and securing with the pip pin provided.

11) Install the glider's nose fairing, starting with the two top velcro tabs and gently pulling the fairing down and around the nose plate to connect the two bottom velcro tabs on the shroud to its corresponding tab sewn on the double surface.

12) Insert the three lower surface battens carefully, as there is the possibility of missing the batten pocket as battens enter the sail. Push the batten until it reaches the end of the pocket. With the batten installed correctly, the cord loop should be visable behind the Double surface.

Never fly your *K4+* with the double surface zip undone or without its nose fairing as this adversely effects the glider's pitch stability characteristics.

Your *K4+* is now ready for a pre-flight inspection. It is important that this is carried out every time you rig the glider and before you fly.

SECTION 2: PREFLIGHT INSPECTION

The nature of the *K4+* is such that many of the pre-flight checkpoints common to other flex wings are hidden to eliminate parasitic drag. A thorough pre-flight procedure is mandatory with all aircraft, and the best technique is a circular walk around the glider.
Start at one location, the nose plate is ideal, and check each assembly point available for inspection. Keep in mind the **THREE MOST CRITICAL** set-up factors. These are the nose catch, the control frame base tube bolts and the cross tube tensioner. As stated in the set-up procedure, **ENSURE THAT ALL SECURING PINS ARE PROPERLY POSITIONED AND CANNOT PULL THROUGH.**

Starting at the nose, a suitable pre-flight checklist would be:
1) Sight along both leading edges checking for similar curves.
2) Walk towards the port wing tip feeling for dents in the tube.
3) Pause at the wing bolts and look into the sail through the zipper inspection access,refasten the zipper.
4) Continue to the tip and check the TRIM TIPS for security and symmetry.
5) Sight the leading edges and cross tube down the inside of the sail at the tip.
6) Walk to the keel checking the battens to ensure that they are properly secured.
7) Check the luff line attachment points, both at kingpost and trailing edge grommets.
8) Ensure that the luff lines are not wrapped around the batten ends.
9) Check the cross tube wire to keel catch connection.
10) Check that the rear top rigging is seated securely in the hook clamp.
11) Continue with items 2 to 6 in reverse order on starboard wing.
12) Check the nose catch.
13) Check all the lower rigging.
14) Check that the control frame uprights are straight and that the bolts are correctly assembled with their wing nuts and rings.
15) Check cross tube plates and related assemblies.
16) Ensure double surface zip is done up and the nose fairing is on.
17) ensure that the trimmer operates freely.
18) **HOOK IN AND HANG CHECK.**

SECTION 3: FOLD DOWN PROCEDURE

To fold down your ***K4+***, just reverse the set-up procedure steps as described. Included here are a few guidelines to follow which will save you time and prevent wear areas on your sail:

1) Always let off the Magic trimmer before de-rigging the glider. It is best to Remove the tip battens before de-tensioning the cross tubes.
2) While tensioning or de-tensioning the ***K4+***'s cross tubes, **ensure the keel and leading edges are all in the same plane.**
3) The nose batten can be left in place when the glider is de-rigged. It should be pulled off the rivet on the keel after the wings have been folded.
4) Always try to fold the wings in symmetrically, bringing both leading edges back together at the same time.
5) If you are de-rigging the glider on the A frame, before you fold the wing undo the nose catch.
6)The first glider tie should hold the keel in the same plane as the leading edges. To do this fasten the two leading edges together, but position the keel underneath the bottom strap.
7) Generally, if anything offers you resistance during any phase of the ***K4+*** set-up or fold-down procedure, be sure to **stop and investigate.**
8) Make sure that the cross-tube tension cable is free to run forward.
9) Roll or fold the sail from the outer luff line into the Mylar reinforced leading edge pocket.
10) Put one glider tie just behind where the top laterals emerge from the sail, a second one half way between the A-frame apex and the nose plate holding the leading edge pockets overlapped and the third sail tie provided with your glider about 60cm inboard from the leading edge tip. **Do not over-tighten your sail ties.** This keeps the mylar pockets and the rest of your sail free of wrinkles and creases.
11) Pads are provided to eliminate wear. The control frame bottom pad should include the keel, and the main span cables (side cables) must point to the rear of the glider. The control frame top padding should be pushed down to the sides of the kingpost this eliminates wear on the double surface but it is easier to push this pad into place before the glider ties are tightened.

REMEMBER NEATNESS COUNTS!

SECTION 4: TRANSPORTATION AND STORAGE

The ***K4+*** should always be laid **zipper facing up** especially during transportation.
Avoid hard spots pressing on the glider at any time and have as many supports as possible. During transportation use rope or webbing rather than elastic to secure the glider and tie both ends of the glider to a support or down to the ends of the vehicle in order to stop the glider flexing. If the glider bag is loose and the glider is travelling at high speed on a car roof, it will chafe the glider's sail. This 'glider flog' can be easily prevented by tying up the bag. It is preferable to keep the glider dry and **ensure that the glider is dry before storing.**

SECTION 5: FLYING TECHNIQUES

Take Off
The ***K4+*** is slightly tail heavy and is very easy to launch in both calm and windy conditions. When you hold the glider prior to your take off run, you should have the nose slightly elevated and the wings level. **AGAIN MAKE SURE THAT YOU ARE HOOKED IN!** Run hard and ease the bar out for lift-off.

Turns
The ***K4+*** has straight-forward flight characteristics, typical for a defined aerofoil flex-wing. The glider can be easily directed into a turn, even at very low flying speed. However, to obtain the best handling characteristics and fast roll rate, it is advisable to pull in for a little extra flying speed. To enter the turn, pull on some speed, move to one side and push out slightly, then centralise. The ***K4+*** will maintain in a turn of a required bank angle and radius until the turn is removed. It is possible to trim the neutral bank angle of the glider by adjusting the TRIM TIPS, see the section "Handling/Speed & Glide".
Give yourself an extra margin of safety and DON'T fly your glider at the slowest possible airspeed when scratching for lift close to the terrain.

Straight Flight
The ***K4+*** requires relatively light pitch inputs. This means that it is quite easy to increase airspeed rapidly and the useable speed range of the glider is quite wide. Until fully familiar with the flight characteristics of the glider, care should be taken when accelerating to higher speeds. Practise accelerating your glider in smooth conditions until you are fully familiar and comfortable with it. You will find the ***K4+*** to have excellent straight line stability at speed. For max glide performance pull the trimmer on all the way.

Thermalling
This is best done with the trimmer slack and is also very straight-forward. The optimum speed for thermalling is a little above the min sink flying speed, but it may be necessary to fly faster than this in rough conditions to maintain good control. Once a turn is initiated a bank angle of anywhere between 10 and 50 degrees can be used, depending on the nature and diameter of the thermal. The ***K4+*** is a precise glider to fly. It can accelerate quickly from small pilot inputs and will turn fast. It is a well co-ordinated and very easy glider to fly but requires precise pilot inputs and should be treated with respect whilst learning to fly it.

Trimmer Operation
Your ***K4+*** is fitted with a ***Magic Trimmer*** system. Use the trimmer to maximise straight line gliding performance between thermals. For maximum manouverability, landing and thermaling performance, leave the trimmer fully off. For optimised gliding perfomance, pull the trimmer on all the way, but expect a slight deterioration in turning co ordination.

Stalls

The stall characteristics of the ***K4+*** are very straight forward. If you push out slowly it is hardly possible to stall the glider at all and the ***K4+*** will mush without a tendency to drop a wing. is If you push out harder, the nose of the glider will come up a little higher. This is followed by a pitch down and the glider will regain flying speed. The stall break is sharper and the recovery longer with the trimmer on. The stall speed will increase by approx 5 - 6 mph when the wing is wet.

Never stall your glider completely with the nose pitched-up very high. This is one of the most uncontrollable and dangerous manoeuvres for any tail-less aircraft and can result in a tail slide and severe tumble. Stalls in a coordinated turn are difficult to do by mistake. If you push out too much in a turn the glider will turn tighter, unless you are flying very very slowly in which case you may enter a spin (see Spins).

Spins

The ***K4+*** will strongly resist spinning. However should you stall one wing in a turn, move your weight forward and the glider will recover quickly from a spin (half a turn) without entering extreme attitudes and without extreme loss of height. This is due to the ***K4+***'s positive roll-yaw coupling and a neutrally balanced roll characteristic. The tendancy to stall the inside wing, in a turn, is increased when the trimmer is on.

Landing

This is a simple matter. Your final approach should be a straight glide into the wind at faster than best glide airspeed. Bleed your speed off slowly, wings level and ground skim onto your chosen landing spot. In light or no wind conditions a full flare is required. When it is time to flare, flare aggressively and abruptly and hold the 'A' frame out.

IMPORTANT NOTICE

As with any high performance aircraft, special care should be taken to note the operating limitations which have been ascertained by careful testing.

Flight operations should not exceed those laid down in the operating limits at the front of this manual.

No aircraft is totally safe; there are inherent risks involved in flying a hang glider. It is quite possible to fly the ***K4+*** beyond its operating limits, **DO NOT DO IT**. The responsibility for safety rests ultimately with the pilot who must decide whether the aircraft he/she is about to fly has been properly maintained, preflight checked and is in an airworthy condition.

SECTION 6: TUNING

The ***K4+*** has undergone a rigorous test-flying programme in a wide range of conditions. As a result, it is precisely tuned to achieve maximum flying performance. Therefore, it should not be necessary to make any changes in your glider's tuning or configuration. If, however, you have any questions, please contact your authorised **AIRWAVE** dealer.
If any adjustments are made on your glider, we recommend that they be noted in your Maintenance Log which you will find at the end of this Manual. It is then easy to go back and trace occasional problems.

Turns
If your ***K4+*** develops a slight tendancy to want to turn. Check the following :-
Check your battens against the batten plan. Check that the batten elastic tensions are the same on both sides. Check that the keel is straight. Check that the leading edges are straight. When you have checked that everything is correct and if your glider still has a turn, then it may be necessary to adopt the following technique.
Your ***K4+*** is fitted with adjustable lockable **MAGIC TRIM TIPS.** These fittings allow you to tune turns out of the glider:-
To adjust the **TRIM TIPS:** partially unscrew the stainless steel locking screws and push them in (this releases the locking wedge) the fitting is then free to turn. To lock the tips, do up the stainless steel locking screws. **The TIPS should be locked for flight.**

Turn adjustment

If your glider has a right hand turn
Turn the right hand **TRIM TIP** anti clockwise approx 2mm (viewed from end)
OR
Turn the left hand **TRIM TIP** 2mm anti clockwise

If your glider has a left hand turn
Turn the left hand **TRIM TIP** 2mm clockwise
OR
Turn the right hand **TRIM TIP** 2mm clockwise

To gradually tune out a turn, use increments of 2mm only, use the reference line on the leading edge as a guide.
After tuning both tips should visually look the same. Large asymmetrical differences should be avoided. **Consult your AIRWAVE dealer if in doubt.**

Pitch Trim
This is accomplished by moving the kingpost base block within the adjustable heart bracket. This requires the use of two 7/16"AF(11mmAF) spanners in order to undo the bolt securing the king post base block. To make the glider fly faster, simply move the kingpost base block forward one hole. The distance tube in the base block will prevent the pullies falling out of the cluster. The trim speed will change by approx 5 mph between the forward, and rearwardmost positions.
Other factors that will affect pitch trim are: Leading edge tension, Trim tip angle and wing loading.
Adding a small shim to the leading edge will increase the trim speed.
Flattening the trim tips will increase the trim speed.
A pilot at max wing loading should need to move the hang point forward.
NOTE : The **back-up loop** is hung from the keel and always located directly behind the adjustable heart bracket.

Handling / Speed &Glide

The only adjustable settings on the ***K4+*** are batten tensions, leading edge tension and TRIM TIP adjustment. Tighten the battens for more performance,and sharper handling.
Add a 3mm shim to the leading edge to enhance performance, but expect a deterioration in handling. Remove the standard shim to improve handling especially if you want your battens really tight. Adding a shim will also give a small increase in trim speed.
By adjusting both TRIM TIPS to give more washout at the tips, the stability of the glider will be improved
By 'flattening' the tips the performance of the glider will be improved.
These adjustments will affect :
Trim speed (flattening the tips will speed up the glider)
Co- ordination (flattening the tips will steepen the bank)
Roll inputs (flattening the tips will stiffen the roll)
Our experience has shown that setting the trim tips at a position which allows easiest thermalling for your weight will in the end produce optimum performance.

SECTION 7: MAINTENANCE SCHEDULE

Your new ***K4+*** will require very little in the way of maintenance if you care for it properly in your day to day use. Here are some general points to follow in maintaining your new ***K4+*** which will help ensure the safety of your flying and the performance retention of your glider. We suggest you follow this maintenance schedule faithfully. Your care will always pay off in the future.

Every 10 Hours

— Check all ribs against the batten pattern.

Every 50 Hours

—Inspect all cross tube support cable components (tangs, pins, nuts, bolts, cross tube plates, and cable itself).
—Inspect all batten elastics.
—Check all tubing for possible wear damage which could occur during set-up, fold-down, or transportation.
—Inspect sail mounting grommets and webbing at tips.

Every 100 Hours

A complete inspection of your glider is recommended, check all components, replace any worn or bent bolts or locknuts connecting 2 moving parts together (i.e., cross tube plate junction bolt, cross tube / leading edge bolt, etc.)
If any tube is badly scratched, dented, or damaged, it should be replaced.
Check all rigging and replace flying wires (mainspans and tension strop)
Check the critical airframe measurements. (See Airframe Maintenance)
Critical sail tears should be mended by a professional sailmaker. (See also Sail Maintenance below.)
Check trimmer ropes and compensator lines for abrasions and wear.

Please contact your AIRWAVE dealer for a complete and professional inspection of your glider.

Sail

1) If you must wash the sail, wash it with a light detergent only. Better still, wipe the sail down frequently with a soft, damp cloth and that will keep detergent washing to a minimum.
2) Acetone or alcohol can be used to remove stubborn stains without harming the sail. (Do not use any solvents on the mylar portions of the sail).
3) **Rinse very thoroughly after cleaning with any detergent or solvent.**
4) For oil stains or particulary resilliant grass or insect marks you can use a product called 'Bogod spot remover'. Available from marine hardware stores or your Airwave dealer.
5) Apply sail repair tape to any rips or tears in your sail. This will prevent fraying on the edges where the tear is located. However, do not worry about small tears continuing unless they are located at stress points around the tip panel, nose or trailing edge panel.
6) Keep an eye on all the grommets and all areas of the sail that take extra abuse.
7) The best thing you can do for your sail is to always use the glider bag. Do not carry your glider on top of a car, even for short distances, without one. Sun and weather cause more deterioration than hours of flying. Keep your ***K4+*** covered when not in use.
8) Be careful and precise when you re-pack your glider after each flight. Keep all the padding that arrived with the glider when it was new, pack everything the same way. A few extra moments when you de-rig the glider will give you many extra hours of noiseless and anxiety-free flight.

Cables

1) Naturally any frays or kinks in your cables should be examined with great care and any frayed cables should be replaced immediately.
2) AIRWAVE recommend that the flying wires are replaced every 100 hours or yearly, whichever comes first. Each cable has a breaking strength in excess of 400 Kg. Actual non-aerobatic in-flight loads seldom exceed 200 kg. Inspect the thimbles; if elongation is evident that cable should be replaced. If you must constantly set your glider up and break it down in rough, rocky areas, you will need to replace your cables more frequently than someone who flies the grasslands. Most damage is done to cables by 'heavy landings' or crashes. Use your best judgement - those cables hold the frame together.

Lufflines and Compensator

The luff line heights should be checked with the Magic Trimmer both on and off. To measure the luff line heights fully rig the glider and stretch a Airwave style, elasticated string across each of the four pairs of luff lines. Thread the string from the top, down through the luff line eyelet, to fasten in position whilst measuring. With the string tight, measure the distance between the string and the top of the keel.

The luff lines are named according to their position. the inner luff line is No 1 and the outer is No 4. The measurements for their heights can be found at the front of this manual. Minus dimensions are below the top of the keel, they can be measured by inserting a pair of spacers under the measuring string, at the luffline eyelet position.

The compensator adjusts the height of the luff lines automatically as the trimmer position is varied it is hidden neatly within the kingpost. It is precisely set in the factory and should not require adjusting. It should be regularily inspected for wear. If replaced for any reason an authorised Airwave spare part should be used and the compensator string should be carefully and precisely set to the marks provided.

Airframe

Examine your tubes for dents, wear spots, corrosion and bends.

The critical dimensions for the airframe are listed at the front of this manual and should be checked. These are the luffline heights as described above, the anhedral, and the keel bend. With the glider lifted to make sure that the mainspans are tight, the anhedral is the distance between the bottom of the keel and a tight string held between the two wing bolts. The bend in the keel is measured with a tight string between the aft lowers exit hole and the bottom of the keel behind the nose plate. The measurement is taken at the heart bracket.

Hardware and Bolts

1) For all practical purposes, AIRWAVE hardware exceeds all required and maximum load tests in hang gliding (flight) applications. "AN" bolts, however, are not indestructible and bending them even in light crashes is common. Check them periodically to be safe. Discard and replace any bent bolts.

2) All bolts, of course, should show an exposed thread above the locknut during pre-flight.

Battens

When inserting battens, place them in their pockets smoothly and gently to avoid wear on the sail and on the batten ends. Pushing them rapidly into the pockets at an angle will wear out the stitching on the edge of the pockets. The friction will wear the batten ends rapidly, and will damage the sail itself.

Annual Inspection

Even if yours is the best kept ***K4+*** you should have the glider stripped down for a **full inspection at least once a year.** This can be done by yourself or preferably us, or by one of our professional AIRWAVE DEALERS.

SECTION 8: TAKING APART AND REBUILDING YOUR GLIDER

Preparation

In order to best perform this operation, you must first assemble the base bar, and place your glider "right side up" on two saw horses located 1 m from both ends, with all ties removed and with the leading edge spread approx. 30 cm apart. (You can actually perform the same operation on a clean floor or lawn.) Next, you need to flip the sail on the outside and the top of the airframe in a manner to expose the under-surface facing upwards. Your glider is equipped with X-tube to Leading Edge junction inspection zippers, open the zippers and move the sail around to allow you to work on the X-tube to L.E. junction. You may want to dismount the sail at the L.E. Tips and slip the sail slightly forward to provide better working access to the X-Tubes junction.

Stripdown

1) Remove the lock nuts that are retaining both side cable tangs onto X-Tube bolt. Slip the top side and mainspan cables off the sail and replace nuts.
2) Undo the double surface zip and the small velcro keel pocket. With a pen, mark the compensator line, where it is tied to the double pulley block. Then untie the compensator line where it attaches to the trimmer,
3) Undo the bolt securing the hang strap to the kingpost and the lower pin at the bottom of the kingpost attaching the kingpost to the glider. Slip the sail back a bit and remove the top front cable tang off the top nose plate. Slip the cable off its sail slot running along side the nose rib pocket.. At this point, we would recommend that you "coil" all the free top rigging into rolls in order to keep the procedure organized.You can now remove the entire kingpost tube off the glider with the top rigging attached. Do not remove the kingpost base block.
4) Remove the screws securing the sail at the nose plate junction, and keel pocket, turn the glider over the 'right' way up,
5) Now you must detach the lower rear rigging from the keel tube. The wire is fastened to the keel with a short clevis pin located directly below the machined slot.
6) You can now proceed to slip the sail off the rear of the airframe, taking great care not to catch the sail on any parts of it. Be especially careful when nearing the cross tubes centre junction, the control bar apex and the wingbolt area.

Rebuilding the glider

The re-assembly procedure of your ***K4+*** is best achieved by simply reversing the steps described above. When the glider is complete, rig it as if to go flying. Inspect all joints and connections. Check the anhedral, keel bend and luff line heights.
Please remember that the disassembly and re-assembly of your glider provides the best opportunity to give it an extensive and thorough inspection to each and every component. **Take advantage of it !**

SECTION 9: GLIDER BREAKDOWN

It is possible to short pack your ***K4+*** to 3.9m, for transportation or storage purposes.

Procedure:-

To break the glider down:
1. Slide the end fitting off the TRIM TIP.
2. Remove the leading edge outer section, by pulling it out of the inner section.
3. Cover the end of the inner section to avoid chaffing the inside of the sail
4. Fold the sail leading edge back on itself, around a large radius (to avoid creasing) and continue to pack as usual.

When packing the (tubular) leading edges into the glider, any unprotected edges may chafe the sail during subsequent transportation.

To reassemble the glider:
1. Slide the leading edge outer back into the inner, locate the outer section by pushing and rotating until the clevis pin locates in the index slot.
2. Slide the end fitting back onto the TRIM TIP.
3. Proceed to rig the glider as usual.
4. Carry out a full pre-flight check before flying the glider.

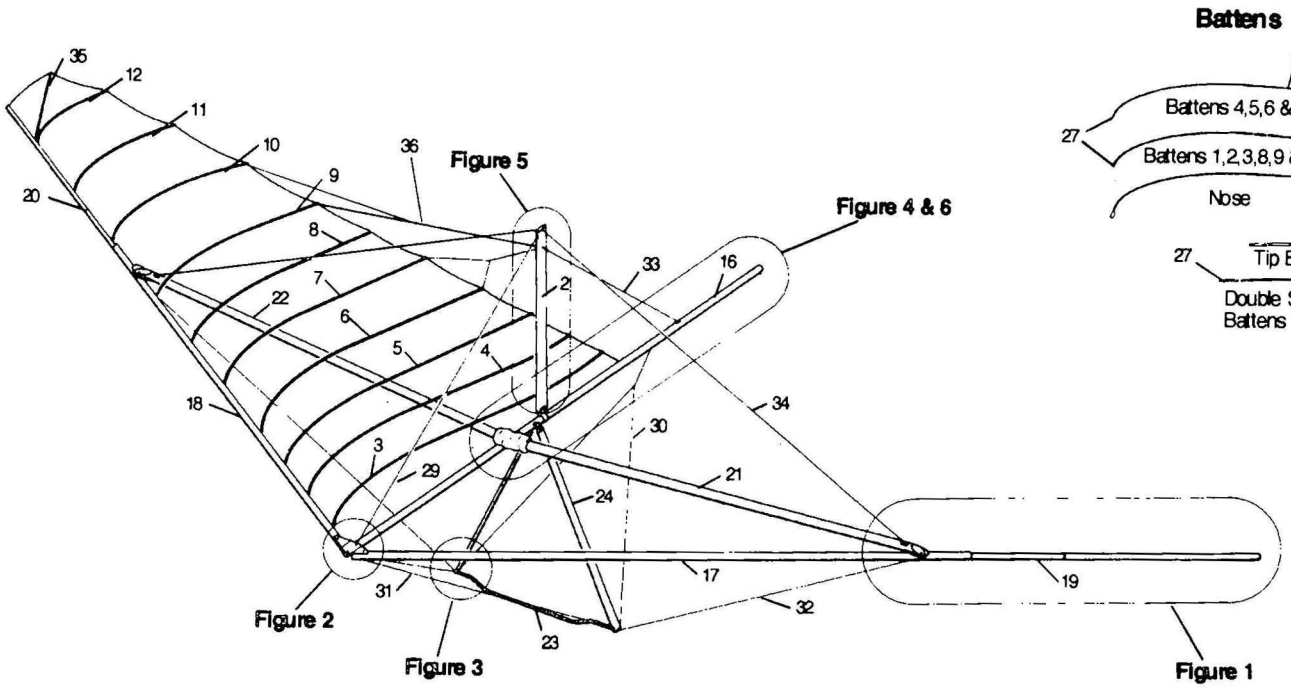
When breaking your ***K4+*** down, the TRIM TIPS are not undone or adjusted in any way, thus ensuring the glider is always rebuilt in the same state of tune as the last time it was flown.

Hint: If your glider is tuned with a lot of leading edge tension it may prove quite hard to either remove or relocate the end fitting to the TRIM TIP. Removing the nose screws will make this easier but the glider will then have to be fully rigged before they can be put back in place.

SECTION 10: PARTS AND DRAWINGS

Use the following pages to identify part numbers for any spares you may require.

Always quote as much information about your glider as possible when ordering spares.



Battens

General Assembly

General Assembly

Key Number	Part number	Description
1	K3/K4 B NOSE	K3/K4/K5 Nose Batten
2	K3/K4 K POST	K3, K4 & K5 King Post
3	K4 B1 GRN	K4 No 1 Batten Green
4	K4 B2 GRN	K4 No 2 Batten Green
5	K4 B3 GRN	K4 No 3 Batten Green
6	K4 B4 GRN	K4 No 4 Batten Green
7	K4 B5 GRN	K4 No 5 Batten Green
8	K4+ B6 GRN	K4+ No 6 Batten Green
9	K4 B7 GRN	K4 No 7 Batten Green
10	K4+ B8 GRN	K4+ No 8 Batten Green
11	K4 B9 GRN	K4 No 9 Batten Green
12	K4 B10 GRN	K4 No 10 Batten Green
13	K4 DS 1 GRN	K4/K5 No 1 DS Batten Green
14	K4 DS 2 GRN	K4/K5 No 2 DS Batten Green
15	K4 DS 3 GRN	K4/K5 No 3 DS Batten Green
16	K4 K	K4 Keel
17	K4 LE I LH	K4 Leading Edge Inner LH
18	K4 LE I RH	K4 Leading Edge Inner RH
19	K4 LE O LH	K4 Leading Edge Outer LH
20	K4 LE O RH	K4 Leading Edge Outer RH
21	K4 XT LH	K4 Cross Tube Left Hand
22	K4 XT RH	K4 Cross Tube Right Hand
23	M KISS SB	Speed Bar 1500mm (K Series)

Key Number	Part number	Description
24	M4 AF UP/M	A/foil up medium
25	PM AG 1/2T	Batten Tip 1/2"1,0X"
26	PM BJS GRN	Batten Joint Sleeve Green
27	PM BTF GRN	Batten Tip Front Green
28	PM BTR GRN	Batten Tip Rear Green
29	RGK4 TF	K4 Top forward
30	RGK4 ALA	K4 Aft Lowers
31	RGK4 FLA	K4 Forward Lowers
32	RGK4 MS	K4 Main Spans
33	RGK4 TA	K4 Top Aft
34	RGK4 TL	K4 Top Laterals
35	TB CF	Carbon Fibre Tip Batten
36	RGK4+ LL	K4+ Lufflines

Part numbers for complete items

K4 LE LH	K4 leading edge left hand
K4 LE RH	K4 leading edge right hand
K4 BS	K4 Batten Set

Please note that battens with green in the description are for right hand parts.
For left hand parts replace green with red and RED for GRN in the part no

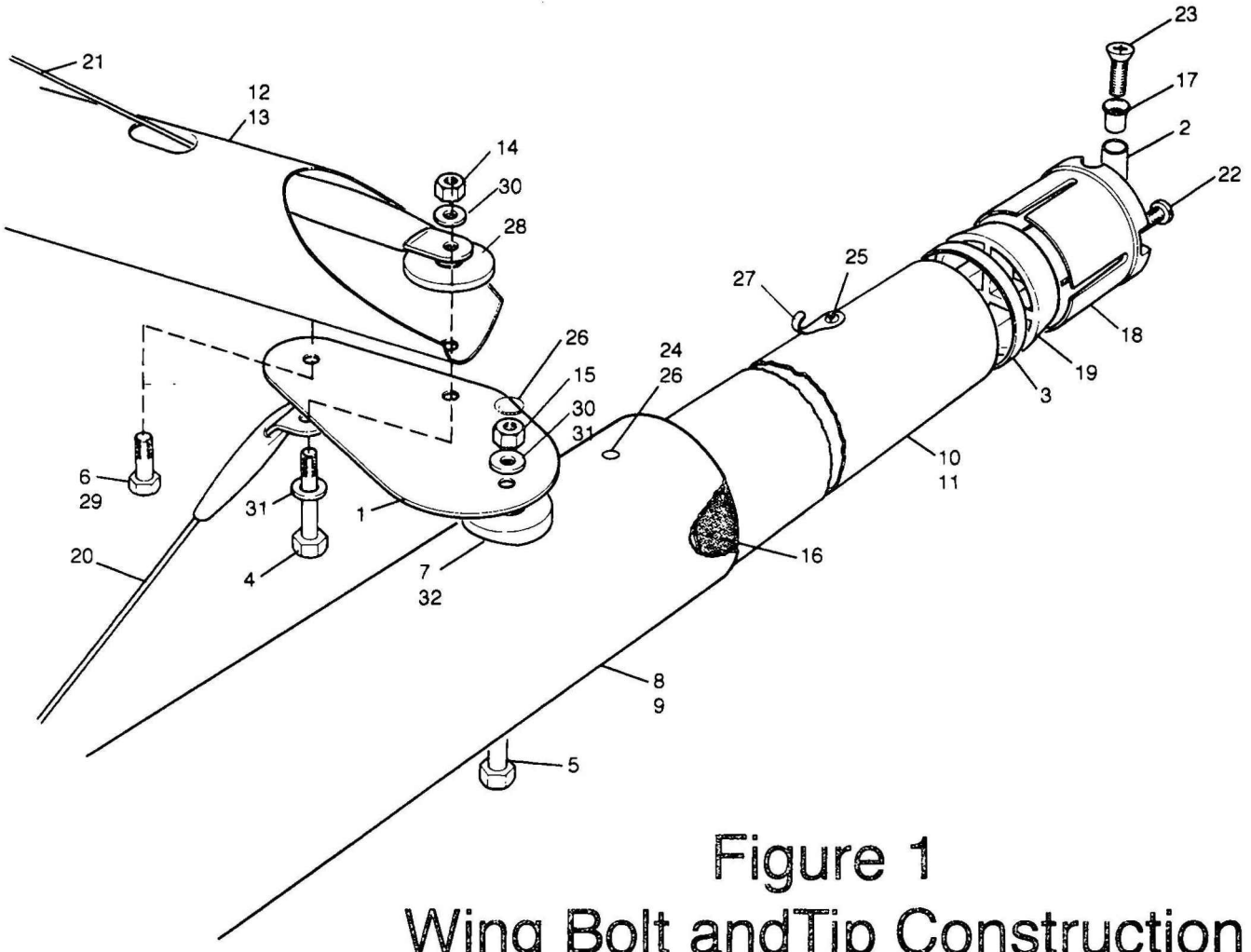


Figure 1
Wing Bolt andTip Construction

Figure 1 Wing Bolt and Tip Construction

Key Number	Part number	Description	Key Number	Part number	Description
1	AF CXTP	Cross Tube Plates	17	PM CSS	Ball Tip Spacer
2	AF ES	End Spacer	18	PM EC	End Cap
3	AT LES 50	Leading Edge Shim 50mm dia	19	PM WE	Wedge for Trim Tip
4	BT 4 10A	Bolt AN4 10A	20	RGK4 MS	K4 Main Spans
5	BT 4 26	Bolt AN4 26	21	RGK4 TL	K4 Top Laterals
6	BT 4 6A	Bolt AN4 6A	22	SC 1 1/4 10	Screw Self Tapper
7	BU 67MM	5/16 Bush 67mm"	23	SC 6*25MM	Machine screw 6x25mm
8	K4 LE I LH	K4 Leading Edge Inner LH	24	SF CP 2 1/2 x 1/4	Clevis pin carbon stl cad plat
9	K4 LE I RH	K4 Leading Edge Inner RH	25	SF D639BS	Pop Rivets TLP D 639 BS
10	K4 LE O LH	K4 Leading Edge Outer LH	26	SF SR 1	Split Ring
11	K4 LE O RH	K4 Leading Edge Outer RH	27	SF TBH 15	Hook Tip Batten 27-60
12	K4 XT LH	K4 Cross Tube Left Hand	28	WA 1 1/4"	Washer 1 1/4 PlasticRef7809"
13	K4 XT RH	K4 Cross Tube Right Hand	29	WA 1/4"	Washer 1/4 Plastic"
14	NT 1/4"	1/4 AerotightNut"	30	WA M6	Washer 6mm
15	NT 1/4" NL	1/4 ThinNylocNut"	31	WA M6 B	Washer M6 Thin
16	PM AGD 162/INJ	Eccentric Spacer	32	WA SW 39	Washer Saddle Large

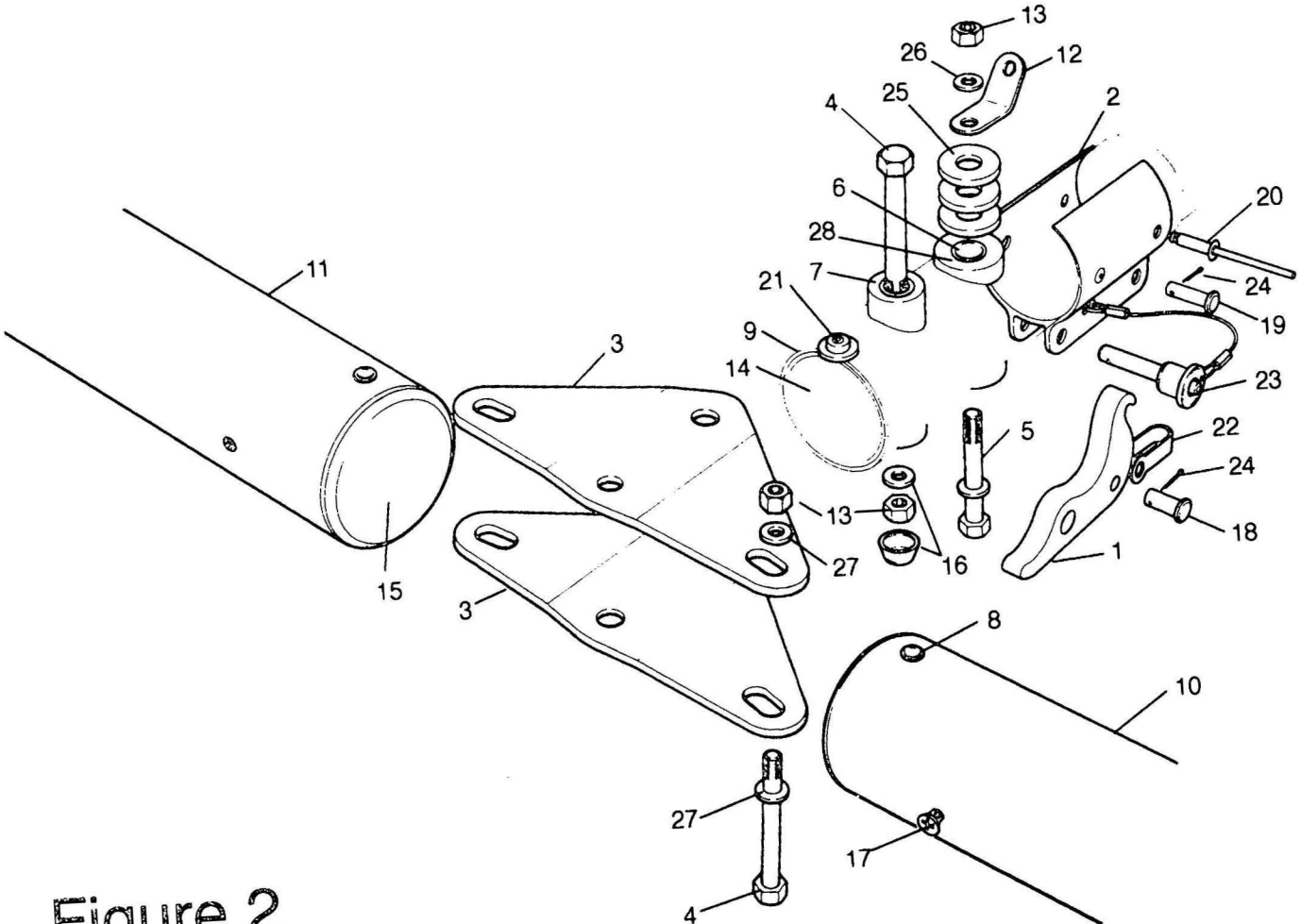


Figure 2
Nose Construction

Figure 2 Nose Construction

Key Number	Part number	Description	Key Number	Part number	Description
1	AF GC	Catch Goose	15	PM 60.3MM	End Plug 50mm
2	AF GCX	Channel Goose	16	PM MV NCW	Nutcaps & Washers
3	AF KNP	Nose plates (Kiss,K2)	17	SC SMF AB8	Screw S/Tappers 8x3/4 ss
4	BT 4 30A	Bolt AN4 30A	18	SF CP 5/8"	Clevis Pin 3/16 x 5/8"
4	BT 4 31A	Bolt AN4 31A	19	SF CP 7/8"	Clevis Pin 1/4 x 7/8"
6	BU 1 15/16	5/16 Bush Keel-Nose	20	SF D639BS	Pop Rivets TLP D 639 BS.
7	BU 2 9/16	5/16 Bush	21	SF D665BS	Pop Rivets TLP D 665 BS.
8	BU 66MM	5/16 Bush 66mm	22	SF LS 23	Shackle Long
9	K4 K	K4 Keel	23	SF PP 22	Pip Pin Nose/Goose Catch
10	K4 LE I LH	K4 Leading Edge Inner LH	24	SF SP	Split Pin
11	K4 LE I RH	K4 Leading Edge Inner RH	25	WA 1 1/4"	Washer 1 1/4 PlasticRef7809"
12	SF BT	Bent Tang	27	WA M6 B	Washer M6 Thin
13	NT 1/4"	1/4 AerotightNut	28	WA SW 36	Washer Saddle Medium
14	PM 1 1/2"	End Plug 1 1/2"			

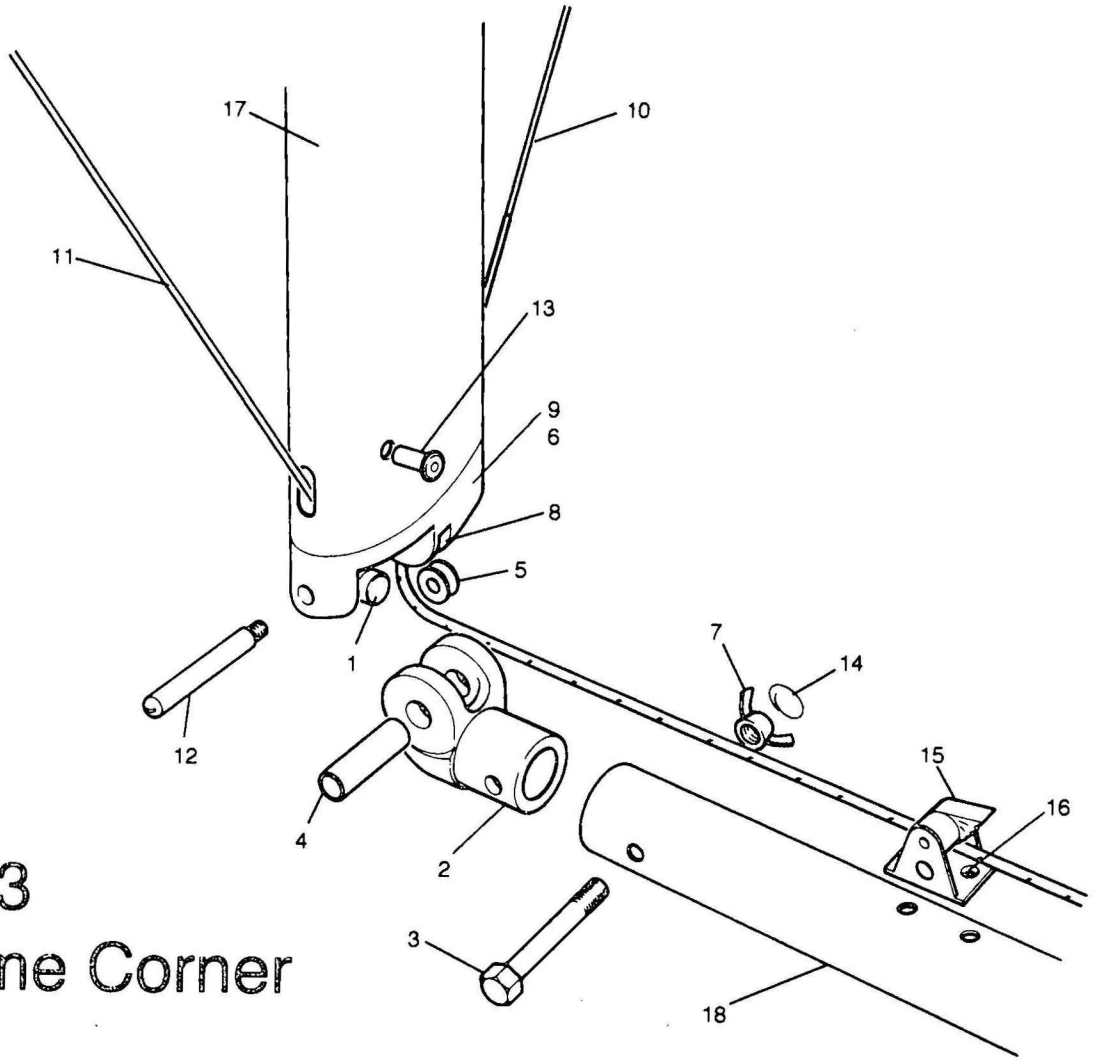


Figure 3
'A' Frame Corner

Figure 3 A Frame Corner

Key Number	Part number	Description
1	AF ARP	Rigging Pins Alloy
2	AF FPB	Fork Plug Base Aerofoil
3	BT 4 14A	Bolt AN4 14A
4	BU DBS	Bush Delrin Drg No AGD114.
5	M TSBS	Trimmer sheave/brg small
6	NT A125 D66	3/16 AerotightNutDUFP1Phil"
7	NT WN	Wing Nut
8	PM AEP	End Plug for Aerofoil Up
9	PM AEP SC	End Plug Aero - Small Cap
10	RGK4 ALA	K4 Aft Lowers
11	RGK4 FLA	K4 Forward Lowers
12	SF AEP	Aero End Pin
13	SF D639BS	Pop Rivets TLP D 639 BS.
14	SF SR 1	Split Ring
15	SF R3596	Jam Cleat(Magic Trimmer)
16	SC AB 6X1/2	Screw s/tappers 6x1/2 ss
17	M4 AF UP/M	A/foil up medium
18	M KISS SB	Speed Bar 1500mm (Kiss,K2,3,4,5)

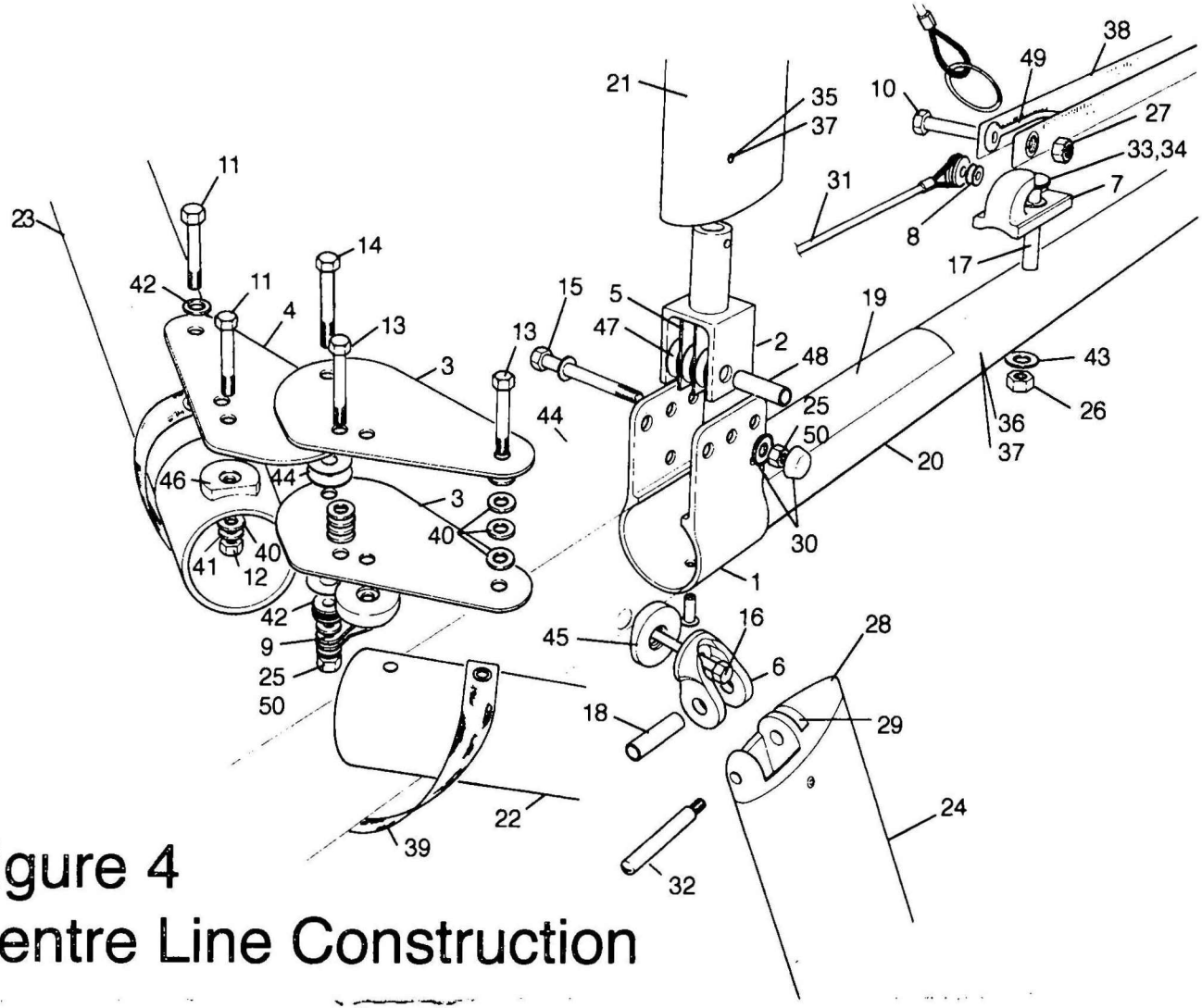


Figure 4
Centre Line Construction

Figure 4 Centre Line Construction

Key Number	Part number	Description	Key Number	Part number	Description
1	AF AHB	Adjustable Heart Bracket	26	NT 5/16"	5/16 AerotightNut"
2	AF BBA	Base Block Adaptor	27	NT A125 D66	3/16 AerotightNutDUFP1Phil"
3	AF CXTP	Cross Tube Plates	28	PM AEP	End Plug for Aerofoil Up
4	AF CXTP5	C/Tube Plate Thick	29	PM AEP SC	End Plug Aero - Small Cap
5	AF DPL	Divider plate large	30	PM MV NCW	Nutcaps & Washers
6	AF FPT	Fork Plug Top Aerofoil	31	RGK4 XTT	K4 XT Tension strop
7	AF HC	Hook Clamp	32	SF AEP	Aero End Pin
8	AF TSS	Trimmer Sheave Small	33	SF CBB	Catchbolt Button
9	BL RF 1950	Block and shackle	34	SF CBS	Catchbolt Spring
10	BT 3 13A	Bolt AN3 13A	35	SF CP 1 1/4	Clevis Pin 3/16 x11/4""
11	BT 4 10A	Bolt AN4 10A	36	SF CP 1 3/4"	Clevis Pin 1/4 x13/4""
12	NT 1/4"	1/4 AerotightNut"	37	SF SP	Split Pin
13	BT 4 12A	Bolt AN4 12A	38	SL WH	Webbing Handle XT Tension
14	BT 4 13	Bolt AN4 13	39	SL XTWL	Webbing Loop Cross Tube
15	BT 4 17	Bolt AN4 17	40	WA 1/4"	Washer 1/4 Plastic"
16	BT 4 30A	Bolt AN4 30A	41	WA M6	Washer 6mm
17	BT CB21	Catchbolt AN5 21A	42	WA M6 B	Washer M6 Thin
18	BU DB	Bush Delrin	43	WA M8	Washer 8mm
19	FM Z74531	Tape - Safety Walk	44	WA MW	Washer Mylar
20	K4 K	K4 Keel	45	WA SW 36	Washer Saddle Medium
21	K3/K4 K POST	K3/K4 & K5 King Post	46	WA SW 39	Washer Saddle Large
22	K4 XT LH	K4 Cross Tube Left Hand	47	AF TSL	Trimmer Sheaves Large
23	K4 XT RH	K4 Cross Tube Right Hand	48	BU 28.5	5/16 BushBaseBlock"
24	M4 AF UP/M	A/foil upright medium	49	SF SH S	Forged Shackle Small AIR 7
25	NT 1/4" NYL	1/4" Thin Nyloc Nut	50	SF SR 1	Split Ring

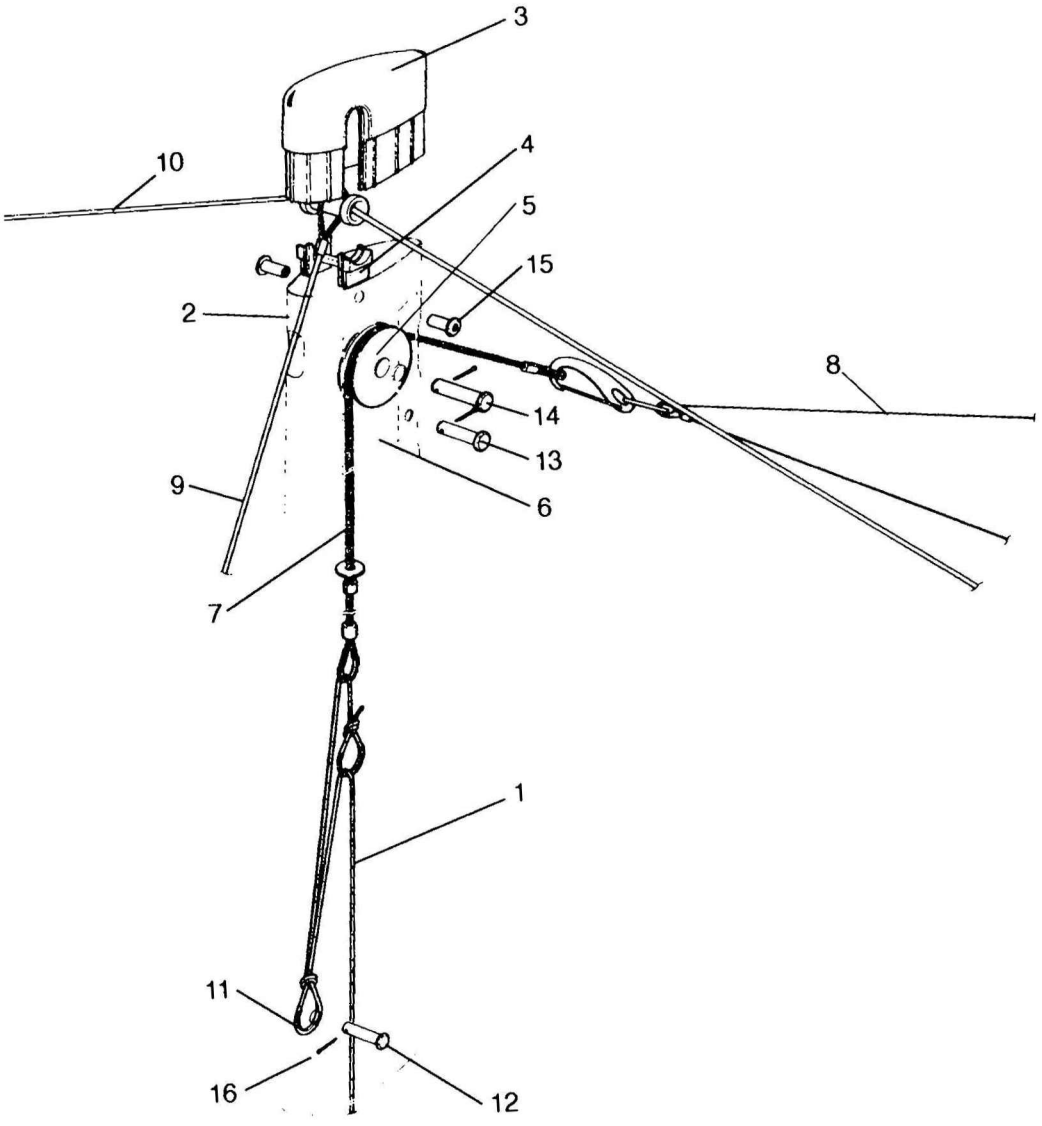


Figure 5
King Post Construction

Figure 5 King Post Construction

Key Number	Part number	Description
1	K3/K4 COMP	K3,4 & 5 Compensator L Line
2	K3/K4 K POST	K3, K4 & K5 King Post
3	PM AKPP	Plug Aerofoil King Post
4	PM AKPP I	Plug - Insert Aero KP
5	PM LLSB	Luff line sheave/brg
6	PM SH	Sheave Housing
7	RGK3/K4 COMP	K3,4 & K5 Compensator Strop
8	RGK4 LL	K4 Luff Lines
9	RGK4 TF	K4 Top forward
10	RGK4 TL	K4 Top Laterals
11	SF 2.5MM	Rigging Thimble 11-42.
12	SF CP 1 1/4	Clevis Pin 3/16 x 1 1/4"
13	SF CP 4.6 X 19	Clevis Pin 4.6mmx19mm
14	SF CP 6.2 X 25.4	Clevis Pin 6.2mm x 25.4mm
15	SF D639BS	Pop Rivets TLP D 639 BS.
16	SF SP	Split Pin

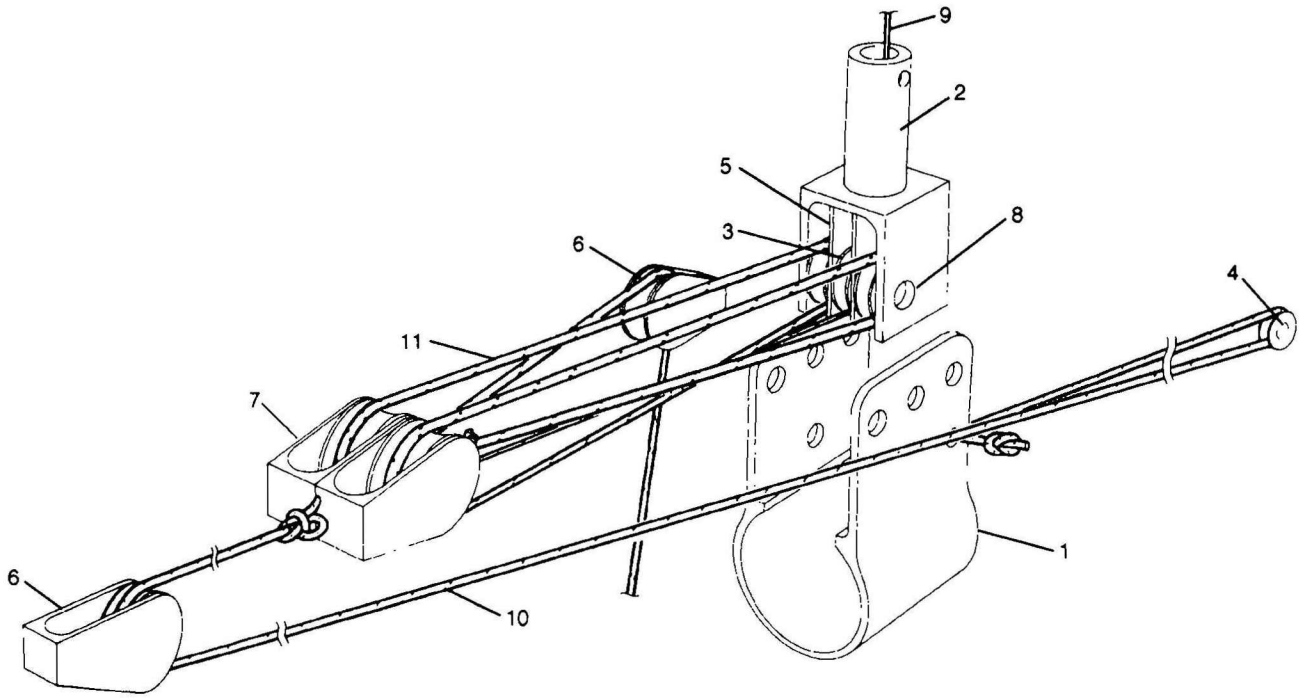


Figure 6 Trimmer layout

Figure 6 Trimmer Layout

Key Number	Part number	Description
1	AF AHB	Adjustable Heart Bracket
2	AF BBA	Base Block Adaptor
3	M TSBL	Trimmer Sheave/brg large
4	AF TSS	Trimmer sheave small
5	AF DPL	Divider plate large.
6	BL RF 1950	Block and shackle
7	BL HA 4450F	Block HA4450F
8	BU 28.5	5/16 Bush Base Block"
9	K3/K4 COMP	K3/K4/K5 Compensator L Line
10	RP MT 4MM	Rope 4mm prestretched white
11	RP MT 4MMCOL	Rope 4mm prestretched coloured

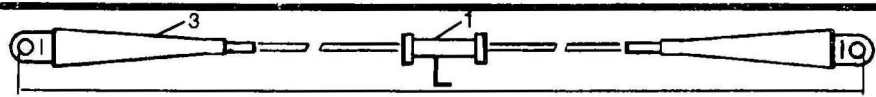
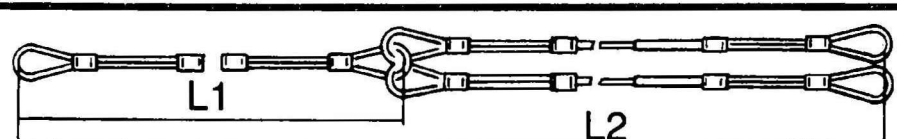
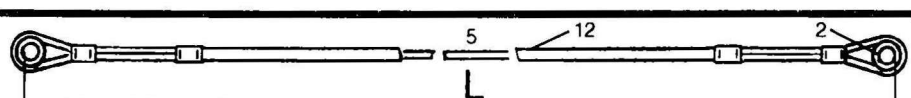
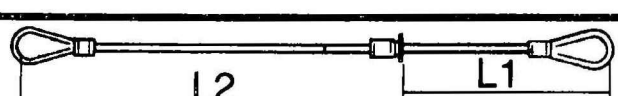
Top Lateral 11		6470
Top Front 10		1920
Top Aft 9		1518
Main Span 8		2570
Front Lowers 7		1912
Aft Lowers 6		L1 = 310 L2=2040
Cross Tube Tension Strop		1420
Compensator Strop		L1=182 L2=580

Figure 7 Rigging

Key Number	Part number	Description
1	AF AFKPS	King Post Top Slug
2	AF AS	Dead Eye (Alloy Sheave)
3	PM DMD	Rigging Sheath
4	PM NK	Never Kinks
5	PM R XTT PT	Rigging Clear PVC Tube
6	RGK4 ALA	K4 Aft Lowers
7	RGK4 FLA	K4 Forward Lowers
8	RGK4 MS	K4 Main Spans
9	RGK4 TA	K4 Top Aft
10	RGK4 TF	K4 Top forward
11	RGK4 TL	K4 Top Laterals
12	RGK4 XTT	K4 XT Tension strop
13	SF 2.5 WIRE	Rigging Wire Coated
14	SF 2.5MM	Rigging Thimble
15	SF BT	Bent Tang
16	SF N 32	Nicopress 2.5mm
17	SF RR	Rigging Ring

A FEW LAST WORDS

Your AIRWAVE *K4+* is a sophisticated high performance hang glider, that will give you years of safe and enjoyable soaring, provided that you treat it properly and always maintain a healthy respect for the demands and potential dangers of flying. Please remember that aviation is always potentially dangerous and that your safety depends on you.
With proper care and maintenance your *K4+* will remain for some years at a high level of airworthiness. The *K4+* has been tested internationally to beyond all current airworthiness standards, and these represent the best accumulated knowledge of what constitutes airworthiness in a hang glider. There is a lot that is still unknown, for example; what is the effective lifetime of a hang glider, and how much material degradation is acceptable without compromising airworthiness. We are sure, however, that there are forces in nature which can severely compromise your safety, regardless of the quality of design or condition of the aircraft you are flying. Your safety is ultimately your own responsibility. We strongly recommend that you fly conservatively, both in your choice of the conditions in which you fly, and in the safety margins you allow in your flying.

You are reminded that you fly a hang glider at your own risk.

We recommend that you only fly with a harness and helmet that have been tested for stength and that you always fly with an emergency parachute system.

At Airwave, our best source of feedback is from you, the pilot. If you have any comments or suggestions, please send them to us. We are always very pleased to listen to what you have to say.

SEE YOU IN THE SKY!

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Fax 0983 531552

CUSTOMER'S PURCHASE RECORD

Fill this section in for future reference

1st Owner..... Date .....

2nd Owner..... Date.....

3rd Owner..... Date .....

K4+ Serial No. ..... Size .....

Main Body Colour ..... Leading Edge Colour .....

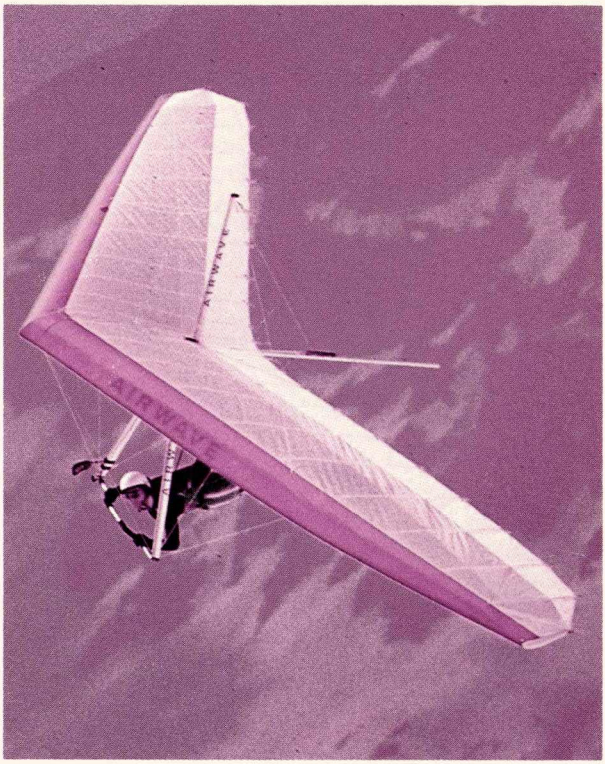
Double Surface Colour.....

Tuning Notes and Maintenance Record	Date and By whom

Conditions for the continuing validity of the BHPA Certificate of Airworthiness

1. The Glider shall be maintained in an airworthy condition.
2. All repairs must be to Airwave Gliders original standards.
3. Major repairs to the sail shall only be carried out by Airwave Gliders or an Airwave authorised sail loft.
4. Modifications must be approved by an airworthiness inspector nominated by the B.H.P.A.
5. Repairs and /or modifications must not impair standards of airworthiness or operational safety.
6. Change of ownership shall be notified to Airwave Gliders.

Notes



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