THE
# **Fun** by Airborne

OWNER and
SERVICE MANUAL


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# TABLE OF CONTENTS

## Section 1 DESIGN FEATURES

The Fun is the latest hang glider from AirBorne Windsports, and is the result of continued testing and refinement by AirBorne's research and development team.

The philosophy behind the development of the Fun was to design a glider which was light weight, strong and set up quickly. The glider also needed to be easy to fly , take off and land.

We believe that we have succeeded in all aspects of our design parameters.

Landing is one of the best features of the Fun. The Fun is statically balanced with the control bar top well rearward whilst still allowing the glider to be assemble flat on the ground. Moving the top of the control bar back improves the static balance and also improves the flair authority.

Imported 7075-T6 Aluminium is used in the airframe construction of the Fun. The battens are also made from 7075-T6 aluminium which require almost no maintenance. The overall result is a very strong glider with minimum weight.

Pitch stability has been achieved using a split reflex bridle system to minimise drag and washout rods constructed from carbon fibre. The carbon washout rod is extremely strong and light weight.

The Fun maintains all the fast set-up features which have become a trade mark of AirBorne hang gliders. It can, as with all AirBorne gliders, be assembled flat or on the control frame.

AirBorne's quality assurance program, which is unique to the industry, ensures that every glider is built in accordance with the standard it was designed to. This gives even the most experienced pilot a sense of security when flying an AirBorne glider.

We hope that you have hours of great flying with your new glider. Fly high and safely.

Rick Duncan, Russell Duncan, Shane Duncan, Rob Hibberd and Paul Mollison

AirBorne WindSports

## Section 2 SPECIFICATIONS

| | FUN 160 | | FUN 190 | | FUN 220 | |
|---|---|---|---|---|---|---|
| | METRIC | IMPERIAL | METRIC | IMPERIAL | METRIC | IMPERIAL |
| SAIL AREA | 14.9 sq meter | 160 sq ft | 17.7 sq meter | 190 sq ft | 20.5 sq meter | 220 sq ft |
| WING SPAN | 9.07 m | 29.8 feet | 10.1 m | 33.1 feet | 10.8 m | 35.3 feet |
| ASPECT RATIO | 5.5 | | 5.8 | | 5.7 | |
| NOSE ANGLE | 118 degrees | | 118 degrees | | 118 degrees | |
| DOUBLE SURFACE % | 30% | | 30 % | | 30 % | |
| BATTENS | 13 | | 15 | | 15 | |
| GLIDER WEIGHT | 19 kg | 42 pound | 23 kg | 51 pound | 28 kg | 62 pound |
| ASSEMBLY TIME | 6 min | | 6 min | | 6 min | |
| PACK UP LENGTH | 5.31 meter | 17.4 feet | 5.9 0 meter | 19.5 feet | 6.34 meter | 20.8 feet |
| SHORT PACK LENGTH | 3.60 meter | 11.8 feet | 4.10 meter | 13.4 feet | 4.60 meter | 15.0 feet |
| RECOMMENDED PILOT HOOK IN WEIGHT RANGE (Includes Equipment) | 50-75 kg | 110-198 pounds | 70-120 kg | 154-265 pounds | 85-160 kg | 187-353 pounds |
| VNE (Velocity Never to Exceed) | 80 km/h | 50 mph | 80 km/h | 50 mph | 65 km/h | 40 mph |
| VA ( Maximum rough air manoeuvring speed) | 69 km/h | 43 mph | 69 km/h | 43 mph | 65 km/h | 40 mph |

Note The stall speed for of the Fun at maximum recommended wing loading is 25 mph (40 km/h) or less. The maximum, or steady state speed is at least 35 mph (56 km/h) for a prone pilot with correctly adjusted harness.

Conversions: * 0.4536 kg/pound * 25.4 mm/inch * 1.609 km/mile

- Va = Test speed x 0.707 * Vne = Test Speed x 0.816

## Section 3 OPERATING LIMITATIONS

**WARNING**

Hang Gliding is a high risk sport. The safe operation of this hang glider ultimately rests with you, the pilot. We believe that in order to fly safely you must maturely practice the sport of hang gliding. You should never fly this hang glider beyond the placarded limits.

The velocity never to exceed (VNE) for your glider is given in Section 2, as is the maximum speed for manoeuvres or flying in rough air (VA). The indicated airspeeds given are for calibrated instruments mounted on, or near, the base bar of the control frame. During your initial flights on the glider it is recommended that you fly with an airspeed indicator until you are able to recognise the control feel that produces the airspeeds shown.

Flight operations should be limited to non-aerobatic manoeuvres where the pitch angle does not exceed 30 degrees up or down to the horizon and where the bank angle does not exceed 60 degrees.

Aggressive stalls and spins should not be attempted. Operations outside the recommended flight envelope, such as aerobatic manoeuvres or erratic pilot technique may ultimately produce equipment failure.

Your glider was designed for foot launched soaring and should not be flown by more than one person at a time. It should not be flown backwards or inverted.

The setting up and breaking down of a hang glider, transportation on cars and flying itself, will have an effect over time on its structural integrity. The glider will require maintenance as outlined in the maintenance section of this manual. Like any aircraft safety depends on a combination of careful maintenance and your ability to fly intelligently and conservatively.

The owner and operator must understand that due to inherent risks involved in flying a hang glider, no warranty of any kind is made or implied against accidents, bodily injury and death, other than those which cannot by law be excluded.

We hope that your new glider will provide you with many hours of safe flying.

AIRBORNE.

## Section 4 WARRANTY STATEMENT

This warranty extends to new **Hang Gliders** and/or accessories and equipment manufactured by **AIRBORNE WINDSPORTS PTY LTD** ("Airborne") and shall not embrace any other accessories or equipment in the sale.

**AIRBORNE** warrants to the customer the hang glider and/or accessories manufactured or supplied by **AIRBORNE** to be free from defect in material and workmanship under normal use and service and of merchantable quality and fit the purpose for which they are ordinarily used. This Warranty will apply for a period of ninety (90) days from the date of dispatch of the hang glider not withstanding the number of hours flown but subject to the hang glider remaining the property of the customer. This warranty does not exclude any rights implied in favour of any customer by any applicable Federal and State legislation.

AIRBORNE will make good any parts required because of defective material or workmanship as set out in the Warranty.

*THE WARRANTY WILL NOT APPLY TO:*

- Any mechanical adjustments, parts, replacements, repairs or other servicing that in the judgement of **AIRBORNE** are made or should be made as maintenance.
- Any defect caused by any alteration or modification not approved by **AIRBORNE**.
- Any defect caused by the fitment of parts that are not made or approved by **AIRBORNE**.
- Any defect caused by misuse, accidents, negligence or failure to carry out proper maintenance service.
- Damage caused by continued operation of the hang glider after it is known to be defective.
- Any defect or consequential loss, damage or injury caused by overloading.
- Loss of use of the hang glider, loss of time, inconvenience, damages for personal injuries, loss of property or other consequential damages.
- Failure due to wear and tear, accident, fire, incorrect or incomplete rigging and/or assembly, exposure to the elements, operation outside the placarded limitations and repairs attempted or made other than by **AIRBORNE** or its authorised agent.

**AIRBORNE** will replace, free of charge, any original part that is determined by **AIRBORNE** to be defective under the terms of this Warranty and reserves the right to pay monetary compensation or make good the defect in any manner it deems appropriate.

he customer is responsible for transporting the hang glider or parts to and from **AIRBORNE** or its authorised agent when making claims under this Warranty. The hang glider or parts are at the customer's risk whilst in transit to and from **AIRBORNE** or its authorised agent.

**NOTE**: Warranty service is available to the customer from **AIRBORNE WINDSPORTS PTY LIMITED** or authorised agent.

AIRBORNE WINDSPORTS

## Section 5 ASSEMBLY PROCEDURE

The wing can be assembled in two positions, either lying flat or standing on the control frame.

Assembling the Fun on the control frame is the most popular method of assembly in light winds. This method is preferable as the sail is less prone to being soiled or damaged during assembly. In higher winds it is preferable to lay the glider flat for assembly with the nose into the wind until ready to launch.

Our suggested sequence is as follows:

- UNZIP THE BAG. Lay the wing down with zip up and the nose facing approximately 120 degrees from the wind direction. The nose should be facing into the wind when assembling flat. Unzip the bag and un clip centre ties.

- ASSEMBLE CONTROL FRAME. Spread the control bar down tubes and attach base bar to knuckle. The pip pin is then inserted with the cover firmly secured. Check that all the rigging wires are outside the control frame.

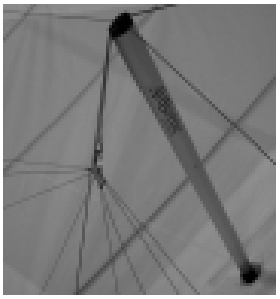
- STAND GLIDER UP. Rotate the control frame to the vertical position and rotate the wing 180 degrees so that it is sitting on the base bar. If assembling flat ensure that control bar is central and the wires are not tangled.

- REMOVE BAG. Remove the glider bag and un clip remaining ties.

- SPREAD LEADING EDGES. Carefully spread both leading edges out half way then spread leading edges to their approximate flying position.

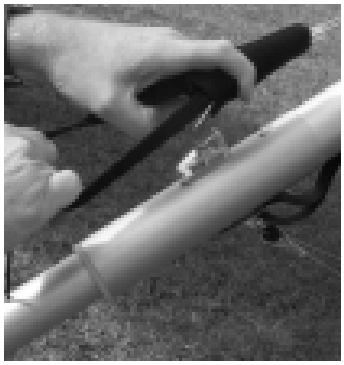
**IT IS ESSENTIAL THAT THE KEEL AND THE LEADING EDGES ARE KEPT IN THE SAME PLANE OR DAMAGE WILL RESULT.**

- RAISE KING POST. Raise the kingpost and attach the reflex bridles.



- INSERT MAINSAIL BATTENS. Remove the battens from the bag. The red battens are for the left side and the green for the right. Insert the battens from the centre to the tip with gentle pressure, until the batten meets resistance. Shake the sail at the trailing edge whilst maintaining gentle pressure on the batten to allow the batten to be inserted over the cross bar. **DO NOT FORCE THE BATTENS!** Locate batten in to sail pocket. It is advised not to insert the last cambered tip batten and tip strut until the crossbars are tensioned.

- TENSION CROSS BARS. The crossbars are now tensioned by pulling the webbing loop until the shackle is positioned on the Quick Clip. Ensure that the catch is positively locked. When tensioning the glider lying flat the keel can be raised slightly allowing the side flying wires to become looser.



- ATTACH REAR TOP WIRE. The rear top wire should now be attached to the rear Quick Clip block.

- INSERT TIP STRUTS. Insert the tip battens and locate tip struts on to leading edge fitting.

- ATTACH FRONT FLYING WIRES. The ring on the front flying wires can now be inserted in to the Quick Clip Block. Ensure that the catch is positively locked. If the glider has been assembled flat it should now be lifted on to the control frame. Be aware of the tip battens! Make sure you have a firm grip on the keel when raising the nose from the flat position in strong winds.

- INSERT NOSE BATTEN. Insert the nose batten tail end first and locate it on the fitting on the front of the keel. A visual check of the nose junction is advisable at this point.

- PREFLIGHT INSPECTION. You are now ready for the wing pre-flight inspection as outlined in the next section. It is imperative that you carry out this inspection every time you rig and before you fly.

# Section 6 PRE-FLIGHT INSPECTION

A thorough pre-flight inspection is mandatory for any aircraft, and the best technique is a circular walk around the wing. The nose area is the ideal place to start your pre-flight check, followed by each assembly point. Keep in mind the three most critical set up areas:

- The nose quick clip
- Control bar base tube connecters.
- The cross bar tension quick clip.

Starting at the nose we suggest the following checklist (ensuring all bolts and fasteners have the appropriate thread protruding beyond the nut).

- Check the nose plate assembly ensuring that the king post wire is not kinked. Sight along both leading edges checking for similar curves.
- Walk towards the tip feeling for dents in the leading edge.
- Check cross bar/leading edge junction through the zipper access.
- Check sail tip webbing is undamaged and is located properly on the fitting. Ensure velcro is in place.
- Crouch down and lift tip to eye level to inspect the tip strut and dive stick are properly located and that the rear leading edge is undamaged.
- Walk towards the keel checking all battens are secured and correctly loaded.
- Check all reflex bridle attachments are in order.
- Check that the cross bar retaining shackle and rear top wire are secured on the quick clip.
- Check the rear top rigging and that the reflex bridle carabina is properly closed.
- Check king post base.
- Repeat the above steps for the other side wing in reverse order.
- Check all lower rigging is correctly routed and free from damage. The most likely area for damage on wires is around the swage and thimble area.
- Check Control Bar corners are correctly assembled with pip pin and cover in place.
- Ensure hang loop is positioned correctly, secure and in good order.
- Check control bar top assembly and ensure that the down tubes are straight.
- Check cross bar hinge and retaining strap. Ensure cross bar ball and socket is properly located and cover is not caught in the joint.
- Clip your harness into the main and **back up** hang loops and perform a “hang check”. Make sure that your harness is the correct distance from the base bar, your leg loops are secure and your carabina is locked.

## *Hang Glider Daily Inspection*

Inspection of the following items after every assembly of the glider is required:

- Check for bends, dents, scratches in all tubes;
- Check wire ends for bolt and/or other fastener security;
- Check wires for twisted or jammed thimbles;
- Check wires are free of kinks, frays, abrasions, broken strands etc;
- Nose plate connections;
- Tips secure;
- Battens secure;
- A-frame connections at the top and base on both sides;
- Rear keel connections;
- Cross-bar tension wire;
- Cross-bar (free floating);
- King post connections;
- Reflex Bridles - attached and tension correct;
- Sail condition;
- Harness straps and webbing secure, height adjustment correct;
- Emergency parachute secure, attached and operating handle accessible.

## Section 7 BREAK DOWN PROCEDURE

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

It is possible to leave the nose batten in during daily operations!

- Remove tip struts and two tip battens.
- Let off the sail tension and pull each wing in slightly. Pull out all main sail battens.
- Disconnect reflex bridle and attach rear quick clip padding.
- Fold both wings in symmetrically, bringing both leading edges back at the same time. Disconnect carbon washout rods.
- Roll the sail up from the last reflex bridles. Roll the reflex bridles into the sail. This will avoid tangling of the bridles during the set up procedure. One tie should be wrapped around the keel and leading edge to hold them together whilst the other side wing is rolled.
- Place padding over the end of the keel.
- Place glider bag in position.
- Roll glider over, undo control bar pip pin. Fold base bar rearward. Attach base bar padding around down tube base. Place padding over the end of the base bar. Undo the two center ties and fold the control bar down between the leading edge pockets. Secure the center ties and zip up bag.

For de-rigging flat. Undo nose wires and pull wing forward. Follow steps as above.

**If resistance is encountered during any phase of set up or break down procedure stop and investigate.**

## Section 8 ASSEMBLY FROM SHIPPING LENGTH

If your Glider was delivered to you in the short pack form the following procedure should be used.

- Unzip bag and remove ties. Remove all padding from the tube ends.
- Assemble the control frame**.** Rotate the glider on to the control bar, lying flat on the ground.
- Spread both leading edges approximately ½ metre. Remove the tip bags which have been used as protection on the rear of the front leading edges.
- Check rear leading edge bungs for **R** (right) and **L** (left). Insert rear leading edges in the appropriate side of the front leading edge with the slot on the rear leading edge facing horizontally. Push on the leading edge and rotate slightly to ensure it is located correctly. It should be impossible to rotate the leading edge if correctly installed.
- You are now ready to tension the sail. Prior to tensioning ensure the wash out rods are through the sail hole. There are two webbing loops on the tip of the sail. The inside loop is for the sail tension and the outward loop is used to apply tension to locate the primary sail tension loop. Place one hand on the rear of the leading edge and the other through the tensioning loop. Pull sail firmly until the inside loop is located on the end of the leading edge fitting. Ensure the webbing is centrally located. Secure velcro tabs on the inside of the leading edge. Repeat for the other leading edge.
- Your glider can now be fully assembled as outlined in the Set Up Procedure.

### *Breakdown For Shipping*

Reverse the procedure above ensuring that all possible wear points are padded.

Be sure to remove the nose batten from the sail and place in batten bag. Be careful when folding the sail to avoid damage.

When you have finished packing the glider, place the front of the glider bag over the rear of the short packed glider. Zip up bag carefully and place the rest of the bag inside the package. The bag is installed back to front because it is tapered and the glider is bulkier at the rear when short packed.

## Section 9 FLIGHT TECHNIQUE

### *Take Off..Don't forget to hook in...*

The Fun has a slightly tail heavy static balance and is very easy to launch. Hold the nose in a slightly elevated position with the wings level, run hard keeping the nose at the same angle.

**It is important that the pilot accelerates smoothly during the launch run. A rapid acceleration will cause the nose to rise sharply with the risk of stall on launch.**

### *Turns*

The Fun can be easily directed into a turn even at slow speeds, however for a fast roll rate and easier handling, it is best to pull on a little extra flying speed.

The Fun will maintain a turn until the turn is removed by pilot input. Allow yourself plenty of margin for safety.

Don't fly too slowly when scratching close to the hill.

### *Stalls*

When practising stalls make sure you have sufficient altitude. Push out slowly (approx 1 mph per sec. speed reduction), the glider will tend to mush without dropping a wing. The sink rate will increase in this mush mode more than two fold.

If you push out faster the nose will pitch higher, this is followed by a gentle pitch down until the glider regains flying speed and recovers from the stall.

Never stall the glider with the nose pitched up too high. This is a dangerous manoeuvre and can result in a tail slide and severe tumble. As a guideline, the angle at which the glider stalls is about the same as the angle it will recover.

If you push out too much in a turn the glider will turn tighter unless you are flying very slow, in which case you may tip stall. So keep on a little extra speed in turns until you get used to the glider.

### *Spins*

The Fun will resist spinning. If you do stall a wing in a turn and enter the initial stages of a spin, move your weight forward and to the high side of the rotation and the glider will recover.

### *Thermalling*

The optimum speed for thermalling is a little above stall speed, it may be necessary to fly faster than this in rough conditions to maintain good control. Depending on the nature and area of the thermal a bank angle of between 10 and 50 degrees can be used.

### *Landing*

Landing is easy in the Fun.

Your final approach should be a straight glide into the wind faster than trim speed, approx 25 mph (40 km/h).

Reduce air speed slowly keeping wings level.

When the glider reaches trim speed a full flare is required. Flare aggressively holding the uprights out and up.

**It is important that the pilot does not swing the legs forward whilst flaring.** This results in the pilot's centre of gravity moving forward which will cause the nose to drop.

In strong wind it is possible to fly the glider onto the ground slowing up gradually. Be careful not to push out too hard in windy conditions.

# Section 10 TUNING

Your Fun was test flown and delivered to you in good trim. If, however, any adjustments are made to your glider, we recommend that they be recorded in your maintenance log at the rear of this manual.

If you feel that the glider requires adjustment to trim in the roll or pitch axis you should check that the problem is not caused by something asymmetrical in the frame or battens. In order of priority, check the following:

- Ensure that the wires, including reflex bridles, are correctly routed;
- Check the battens against the profile;
- Check that the keel is straight;
- Check that the sail is correctly mounted on the leading edges.
- Check leading edges are straight and the rear leading edges are located correctly;

## *Pitch Trim*

Standard position of the hang loop is outline in the compliance schedule at the rear of this manual.

To make the glider trim faster move the hang loop forward 10-15 mm. To make the glider trim slower move the hang loop rearward 10-15 mm. The velcro tensioner should be firm to secure the loop.

A heavier pilot may make the glider trim slower than a lighter pilot. The heavier pilot causes an increase in twist through extra leading edge flex. The hang loop should be moved forward if this is the case.

## *Pitch Stability System*

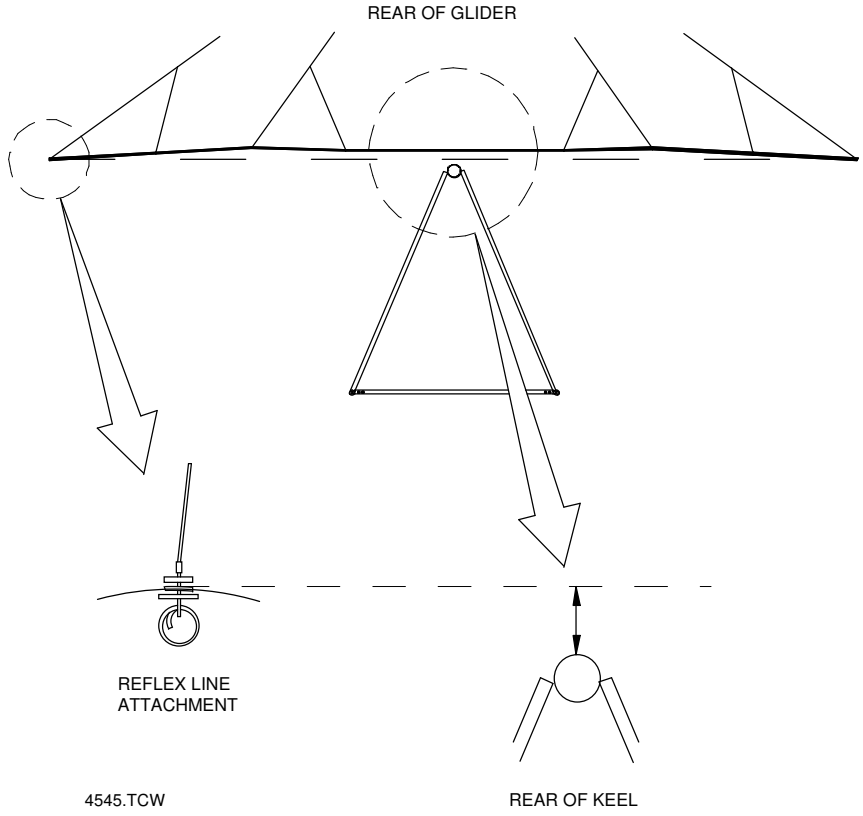
Stability in the pitch axis is provided by reflex in the root section. Alterations to the lengths of rigging, airframe or adjustments to the airfoil can have adverse effects on pitch stability.

Reflex bridles provide pitch stability at low angles of attack. Correct attachment and adjustment of the reflex bridles is essential for maximum stability.

A string line can be used to check the reflex bridles are correct. The line should be firmly stretched between the reflex bridle attachment eyelet on corresponding battens on the right and left side of the glider. Check the measurement from the string line to the top of the keel. **The glider should be standing on the control frame. It is important to support the keel off the ground from the rear flying wire attachment point otherwise the keel will flex and the measurements will be incorrect.**

String tension and measurement technique will cause variations of +/- 10 mm. This tolerance should be considered when checking against the chart below.

*Bridle Checking Specifications*




| | ***Fun 160*** | | ***Fun 190*** | | ***Fun 220*** | |
|---|---|---|---|---|---|---|
| **Batten Number** | Above Keel Metric | Above Keel Imperial | Above Keel Metric | Above Keel Imperial | Above Keel Metric | Above Keel Imperial |
| **1** | 245 mm | 9.7 “ | 225 mm | 8.9 “ | 245 mm | 9.6 ” |
| **2** | 315 mm | 12.4 “ | 350 mm | 13.8 “ | 325 mm | 12.8 “ |
| **3** | 385 mm | 15.2 “ | 465 mm | 18.3 “ | 385 mm | 15.2 “ |
| **4** | N/A | N/A | 430 mm | 16.9 “ | 425 mm | 16.7 “ |

### *Roll/Yaw Trim*

Through time and use it is possible that you glider may become “unbalanced”. The glider may turn one way or roll into a bank easier in one direction than the other. It is possible that the cloth may stretch asymmetrically if the pilot, over an extended period of time, consistently thermals in one direction. Hard landings or high “G” loads may also cause abnormal cloth stretch.

There are a couple of methods, which can be used to remedy a turn in your glider. It is important that you check the points at the beginning of this section before attempting the following adjustments.

- TIP PLUG ADJUSTMENT. The tip plug can be rotated to increase or decrease lift on either wing. To remove a persistent turn the fast wing should have the tip fitting rotated upward to decrease the lift on that side. To remedy a right hand turn, for example, rotate the left-hand tip fitting anti-clockwise if viewed from the rear of the leading edge. The tip fitting should be rotated a maximum of 5 mm from the standard position. The right side can be rotated anti-clockwise if the turn persists.

  The rivet retaining the tip fitting should be drilled out. The fitting should be drilled when adjustment is made and a new rivet installed.

  Ensure that the sail velcro is secure after sail is re tensioned.

- DIFFERENTIAL BUNGIE TENSIONING. The tension can be increased on the tip strut and tip battens to remove a turn. The increase in tension flattens out the sail, which causes more lift. This should be attempted on the slow wing. To remedy a right hand turn, for example, the tension should be increased by re tying the knot in the bungie closer to the sail.

**NB** If the glider turns to the right we refer to the right wing as the slow wing.

# Section 11 PERIODIC INSPECTIONS and MAINTENANCE

## *Maintenance Schedule*

| 1 - Clean and service, 2 - Check as directed, 3 - Check for security, cracks, wear and faulty operation, 4 Remove, inspect and replace if necessary, 5 Recommend replacement or overhaul. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **MAINTENANCE REQUIREMENT** | **Maintenance Period** | | | | | | | |
| | Period > | Daily | Monthly | Three Months | Six Monthly | Every Year | Every 2 Years | Every 4 Years |
| | Flying Days > | 1 | 10 | 30 | 50 | 100 | 200 | 400 |
| Wing Fabric deterioration and tears | | | 2 | 2 | 2 | 2 | 4 | 5 |
| Wing Fabric Stitching | | | 2 | 2 | 2 | 2 | 2 | |
| Wing Fabric attachment points | | | 3 | 3 | 3 | 3 | 3 | 3 |
| Batten Elastics | | | 3 | 3 | 3 | 3 | 4 | 4 |
| Check Battens against template supplied | | | 2 | 2 | 2 | 2 | 2 | 2 |
| Wing wires and attachment fittings | | 2 | 3 | 3 | 4 | 4 | 5 | 5 |
| Check leading edges, keel & A Frame for straightness, dents and corrosion | | | 2 | 2 | 2 | 4 | 4 | 4 |
| Remove leading edges, cross bar, keel & A Frame structural members and check for fatigue cracks radiating from drilled holes. | | | | | 2 | 4 | 4 | 4 |
| Check reflex bridle for kinks | | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Check Inspection Zips | | | 2 | 2 | 2 | 2 | 2 | 2 |
| All bolts, nuts, washers & safety pins. At least one thread showing outside each nut. | | | 2 | 2 | 2 | 2 | 2 | 2 |
| Check hang straps and karabiners for wear or damage | | | 2 | 2 | 2 | 4 | 5 | 5 |
| Check Saddles and fittings for cracks | | | 2 | 2 | 2 | 4 | 4 | 5 |
| Check Security of King Post Base. | | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Check Bottom Down Tube fitting and security of grub screws | | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

It is recommended that:

(a) those items marked 1,2 and 3 be performed by the owner of the glider;
(b) those items marked 4 be performed by the owner in conjunction with another pilot; and
(c) those items marked with a 5 should be performed by **Airborne** or an accredited **Airborne** service agent.

## *Log Book*

When maintenance is performed always check appropriate square and make an entry in the maintenance log at the rear of this manual.

## *Notes on Periodic Inspections*

### *Airframe Tubing*

- INSTALLATION & REMOVAL. When removing tubing do not bend or force tubes. When installing do not distort tubing from its original shape.
- INSPECTION. Inspect tubing for cracks, damage from abrasion, elongated holes or distortion in tube surface. Never attempt to repair tubing, always replace with new part. Inspect tubing for corrosion in and out. If corrosion is present the component should be replaced.
- REPLACEMENT. Aluminium tube comes in many different sizes and grades. It is important that the correct replacement parts are used.

### *Bolts*

- INSTALLATION & REMOVAL. After tightening, all bolts should have at least one and a half to two threads showing. All self-locking nuts should not be installed more than two times. Be sure not to over-torque bolts when installing.
- INSPECTION. Check bolts for worn shanks, bad threads or corrosion.

### *Sails*

**CONTINUED EXPOSURE TO SUN DRAMATICALLY SHORTENS THE LIFE OF SAILS**

- INSPECTION. Check for tears in the sailcloth or any loose or unravelled seams. Check all inspection zippers to see if they function smoothly and close completely. Inspect tip webbing for damage.
- REPAIR. The sail may be repaired with appropriate sail tape or a sewn on patch. Airborne or an authorised agent should be consulted about sail repairs. Keep the sail clean of oil and dirt by washing the sail with soap and water. Keep the sail covered when not in use.

### *Inspection after Hard Landing*

It is necessary to do a detailed inspection following any unusual stressing of the Hang Glider this full inspection should include all details listed for six monthly maintenance.

The inspection should be noted in the logbook, and any replacement to be recorded.

### *Defect Reports*

Details of any defect which develops in service and which, if kept uncorrected, would compromise the continued safe operation of the hang glider should be reported to Airborne as soon as practicable.

## Section 12 TRANSPORTATION AND STORAGE

Avoid damage to your glider by using well-padded racks.

We recommend that you support the glider in at least 3 places to spread the load.

Flat straps should be used for tie downs to avoid damage to leading edge mylar.

Store the glider in a dry room off the ground. Air the glider out regularly to avoid mildew, and never store wet.

*SAFE FLYING*

TEAM AIRBORNE

## Section 13 MAINTENANCE RECORD

| Date | Details of Repairs or Maintenance | Carried out by. |
|---|---|---|
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# Section 14 HANG GLIDER COMPLIANCE SCHEDULES

## *Fun 160*

***GLIDER MODEL: Fun 160***

***MANUFACTURED BY: AIRBORNE WINDSPORTS Pty Ltd***

NOTE: These specifications are intended only as a guideline for determining whether a given glider is a certified model and whether it is in the certified configuration.

Be aware, however, that no set of specifications, however detailed, can guarantee the ability to determine whether a glider is the same model, or is in the same configuration as was certified, or has those performance, stability, and structural characteristics required by the certification standards. An owner's manual is required to be delivered with each HGMA certified glider, and it is required that it contain additional airworthiness information.

| | Metric | Imperial |
|---|---|---|
| Weight of glider with all essential parts and without cover bags and non essential parts. | 19.0 kg | 42 lbs |
| Leading Edge Dimensions | | |
| Nose Plate anchor hole to crossbar plate attachment hole | 3130 mm | 123.23" |
| Nose Plate anchor hole to rear sail attachment point | 5235 mm | 206.10" |
| Outside diameter at nose | 50 mm | 1.97" |
| Outside diameter at cross bar | 52 mm | 2.05" |
| Outside diameter at rear sail attachment point | 50 mm | 1.97" |
| Crossbar Dimensions | | |
| Overall pin to pin length from leading edge attachment point to hinge bolt at glider centre line | 2755 mm | 108.46" |
| Largest outside diameter | 62 mm | 2.44" |
| Keel dimensions [1] | | |
| The cross bar centre load bearing pin | 1270 mm | 50.00" |
| The pilot hang loop Fwd<br>Rear | 1475 mm<br>1525 mm | 58.07"<br>60.04" |
| Sail Dimensions | | |
| Chord length at 3 ft outboard of centre line | 2100 mm | 82.68" |
| Chord length at 3 ft inboard of tip | 1225 mm | 48.23" |
| Span (extreme tip to tip) | 9075 mm | 357.28" |
| Location of Information Placard | Cross Bar | |
| Location of Test Fly Sticker | Front Keel | |
| Recommended Pilot Hook in Weight Range | 50-75 kg | 110-198 lbs |
| Minimum Recommended Pilot Proficiency | Novice | Novice |

NB: Conversions * 0.4536 kg/pound * 25.4 mm/inch

[1] least and greatest allowable distances, whether variable through tuning or through in-flight variable geometry, from the line joining the leading edge nose bolts to:

## *Fun 190*

***GLIDER MODEL: Fun 190***

***MANUFACTURED BY: AIRBORNE WINDSPORTS Pty Ltd***

NOTE: These specifications are intended only as a guideline for determining whether a given glider is a certified model and whether it is in the certified configuration.

Be aware, however, that no set of specifications, however detailed, can guarantee the ability to determine whether a glider is the same model, or is in the same configuration as was certified, or has those performance, stability, and structural characteristics required by the certification standards. An owner's manual is required to be delivered with each HGMA certified glider, and it is required that it contain additional airworthiness information.

| | Metric | Imperial |
|---|---|---|
| Weight of glider with all essential parts and without cover bags and non essential parts. | 23.0 kg | 51 lbs |
| Leading Edge Dimensions | | |
| Nose Plate anchor hole to crossbar plate attachment hole | 3530 mm | 138.98" |
| Nose Plate anchor hole to rear sail attachment point | 5810 mm | 228.74" |
| Outside diameter at nose | 50 mm | 1.97" |
| Outside diameter at cross bar | 52 mm | 2.05" |
| Outside diameter at rear sail attachment point | 50 mm | 1.97" |
| Crossbar Dimensions | | |
| Overall pin to pin length from leading edge attachment point to hinge bolt at glider centre line | 3100 mm | 122.05" |
| Largest outside diameter | 62 mm | 2.44" |
| Keel dimensions [2] | | |
| The cross bar centre load bearing pin | 1455 mm | 57.28" |
| The pilot hang loop Fwd<br>Rear | 1600 mm<br>1650 mm | 62.00"<br>64.96" |
| Sail Dimensions | | |
| Chord length at 3 ft outboard of centre line | 2280 mm | 89.76" |
| Chord length at 3 ft inboard of tip | 1225 mm | 48.23" |
| Span (extreme tip to tip) | 10100 mm | 397.63" |
| Location of Information Placard | Cross Bar | |
| Location of Test Fly Sticker | Front Keel | |
| Recommended Pilot Hook in Weight Range | 70-120 kg | 154-265 lbs |
| Minimum Recommended Pilot Proficiency | Novice | Novice |

NB: Conversions * 0.4536 kg/pound * 25.4 mm/inch

[2] least and greatest allowable distances, whether variable through tuning or through in-flight variable geometry, from the line joining the leading edge nose bolts to:

## *Fun 220*

***GLIDER MODEL: Fun 220***

***MANUFACTURED BY: AIRBORNE WINDSPORTS Pty Ltd***

NOTE: These specifications are intended only as a guideline for determining whether a given glider is a certified model and whether it is in the certified configuration.

Be aware, however, that no set of specifications, however detailed, can guarantee the ability to determine whether a glider is the same model, or is in the same configuration as was certified, or has those performance, stability, and structural characteristics required by the certification standards. An owner's manual is required to be delivered with each HGMA certified glider, and it is required that it contain additional airworthiness information.

| | Metric | Imperial |
|---|---|---|
| Weight of glider with all essential parts and without cover bags and non essential parts. | 28.0 kg | 62.0 lbs |
| Leading Edge Dimensions | | |
| Nose Plate anchor hole to crossbar plate attachment hole | 3730 mm | 146.85" |
| Nose Plate anchor hole to rear sail attachment point | 6240 mm | 245.70" |
| Outside diameter at nose | 50 mm | 1.97" |
| Outside diameter at cross bar | 52 mm | 2.05" |
| Outside diameter at rear sail attachment point | 50 mm | 1.97" |
| Crossbar Dimensions | | |
| Overall pin to pin length from leading edge attachment point to hinge bolt at glider centre line | 3280 mm | 129.13" |
| Largest outside diameter | 62 mm | 2.44" |
| Keel dimensions [3] | | |
| The cross bar centre load bearing pin | 1480 mm | 58.27" |
| The pilot hang loop Fwd<br>Rear | 1650 mm<br>1700 mm | 65.18"<br>66.99" |
| Sail Dimensions | | |
| Chord length at 3 ft outboard of centre line | 2400 mm | 94.49" |
| Chord length at 3 ft inboard of tip | 1225 mm | 48.22" |
| Span (extreme tip to tip) | 10800 mm | 425.10" |
| Location of Information Placard | Cross Bar | |
| Location of Test Fly Sticker | Front Keel | |
| Recommended Pilot Hook in Weight Range | 85-160 kg | 187-353 lbs |
| Minimum Recommended Pilot Proficiency | Novice | Novice |

NB: Conversions * 0.4536 kg/pound * 25.4 mm/inch

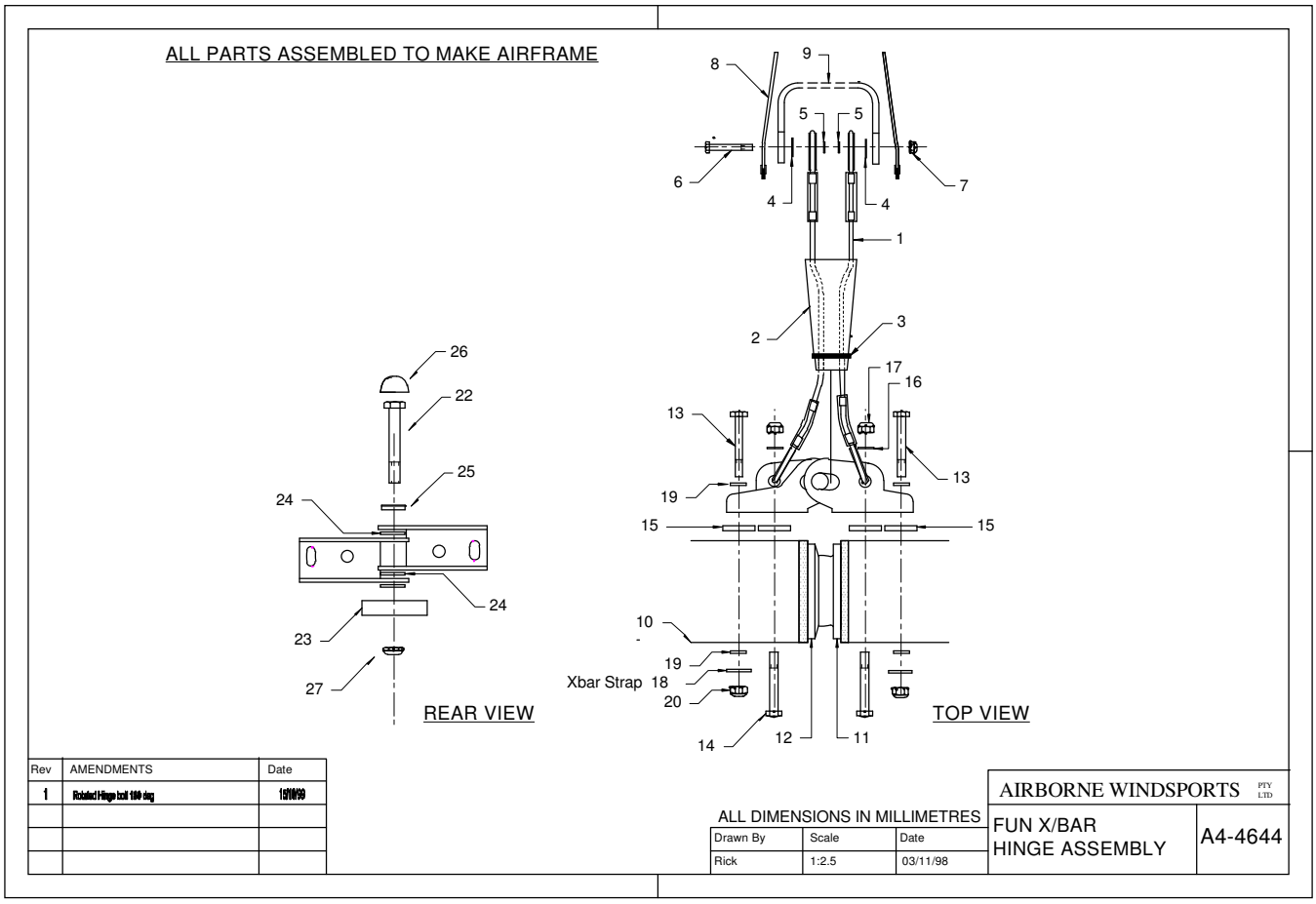
[3] least and greatest allowable distances, whether variable through tuning or through in-flight variable geometry, from the line joining the leading edge nose bolts to:

# Fun X/Bar Hinge Pull Back Assembly

| Fun X/Bar Hinge Pull Back Assembly<br>Dwg No A4-4644 20/09/2001 | | | | | |
|---|---|---|---|---|---|
| **Id** | **Part No** | **Details** | **FUN160** | **FUN190** | **FUN220** |
| 1 | 103360 | PULL BACK WIRE 1515 F190 | | 2 | 1 |
| | 103361 | PULL BACK WIRE 1670 F220 | | | 2 |
| | 103502 | PULL BACK WIRE 1435 F160 | 2 | | 1 |
| 2 | 101900 | PULL BACK COVER NEOPRENE | 1 | 1 | 1 |
| 3 | 101192 | CABLE TIE (SHORT) 98MM | 1 | 1 | 1 |
| 4 | 102018 | WASHER SS 1/4 X 3/4" | 2 | 2 | 2 |
| 5 | 101055 | NYLON WASHER M 6 XOD | 2 | 2 | 2 |
| 6 | 101333 | AN4-13A | 1 | 1 | 1 |
| 7 | 100035 | AN4 NUT HALF NYLOC | 1 | 1 | 1 |
| 8 | 101765 | PULL BACK STRAP HANDLE 305 | 1 | 1 | 1 |
| 9 | 102021 | SHACKLE PULL BACK | 1 | 1 | 1 |
| 10 | 103373 | X/BAR F190 | | 2 | 1 |
| | 103374 | X/BAR F220 | | | 2 |
| | 103530 | X/BAR F160 | 2 | | 1 |
| 11 | 102449 | X/BAR BALL SKT TYPE 2 | 1 | 1 | 1 |
| 12 | 102409 | X/BAR BALL TYPE 2 | 1 | 1 | 1 |
| 13 | 100629 | AN3-30A BOLT | 2 | 2 | 2 |
| 14 | 100011 | AN4-30A | 2 | 2 | 2 |
| 15 | 102424 | NYLON WASHER 1/4" OBA THICK | 4 | 4 | 4 |
| 16 | 100042 | AN4 WASHER | 2 | 2 | 2 |
| 17 | 100034 | AN4 NUT FULL NYLOC | 2 | 2 | 2 |
| 18 | 103286 | X/BAR STRAP TANG 280 | 1 | 1 | 1 |
| 19 | 100049 | AN3 WASHER | 4 | 4 | 4 |
| 20 | 100051 | AN3 NUT FULL NYLOC | 2 | 2 | 2 |
| 22 | 100015 | AN5-15A | 1 | 1 | 1 |
| 23 | 100804 | X/BAR BOLT COVER - NO SLOT | 1 | 1 | 1 |
| 24 | 100595 | NYLON WASHER M 8 STD | 2 | 3 | 3 |
| 25 | 100604 | CAP WASHER BASE CLIP 5/16 | 1 | 1 | 1 |
| 26 | 100603 | CAP WASHER COVER BLACK M8 | 1 | 1 | 1 |
| 27 | 100037 | AN5 NUT HALF NYLOC | 1 | 1 | 1 |

## Section 15 ASSEMBLY DRAWINGS

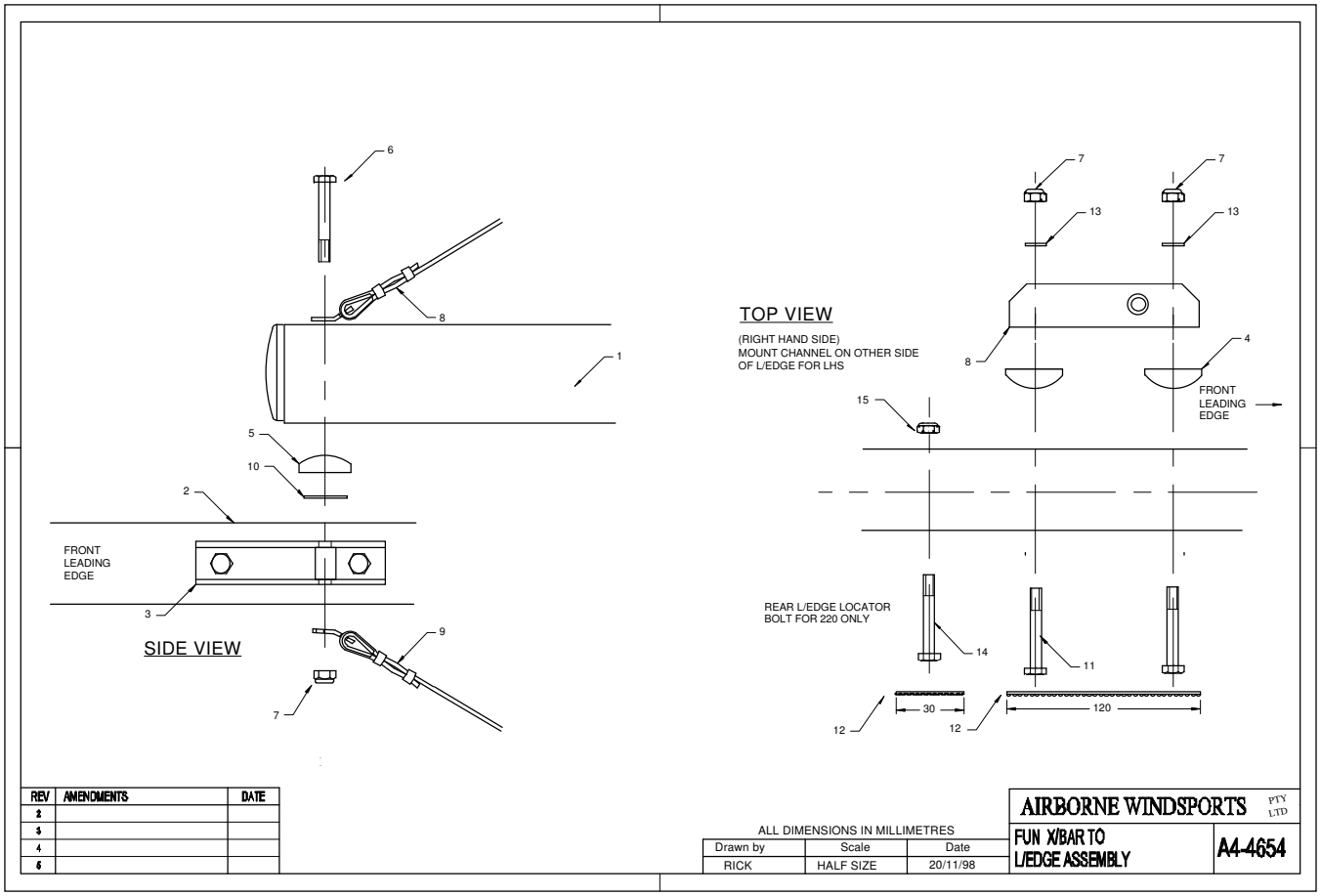
*A4-4644 Fun X-Bar Hinge Assembly*



# Fun X/Bar to L/edge Junction

| Fun X/Bar to L/edge Junction<br>Dwg No A4-4654 20/09/2001 | | | | | |
|---|---|---|---|---|---|
| **Id** | **Part No** | **Details** | **FUN160** | **FUN190** | **FUN220** |
| 1 | 103373 | X/BAR F190 | | 1 | |
| | 103374 | X/BAR F220 | | | 1 |
| | 103530 | X/BAR F160 | 1 | | |
| 2 | 103370 | L/EDGE FRONT F190 | | 1 | |
| | 103513 | L/EDGE FRONT F220 | | | 1 |
| | 103514 | L/EDGE FRONT F160 | 1 | | |
| 3 | 102006 | X/BAR MOUNT CHANNEL | 2 | 2 | 2 |
| 4 | 102271 | SADDLE TO SUIT 45MM TUBE | 4 | 4 | 4 |
| 5 | 100080 | SADDLE TO SUIT 60MM TUBE | 2 | 2 | 2 |
| 6 | 100965 | AN5-41A | | | 2 |
| | 103668 | AN4-42A | 2 | 2 | |
| 7 | 100034 | AN4 NUT FULL NYLOC | 6 | 6 | |
| | 100037 | AN5 NUT HALF NYLOC | | | 6 |
| 8 | 103406 | TOP SIDE WIRE HG 3305 F190 | | 1 | |
| | 103509 | TOP SIDE WIRE HG 2935 F160 | 1 | | |
| | 103526 | TOP SIDE WIRE HG 3510 F220 | | | 1 |
| 9 | 103398 | SIDE BOTT WIRE HGT 2860 1/8" | | 2 | 2 |
| | 103500 | SIDE BOTT WIRE HGT 2480 | 2 | | |
| 10 | 100820 | NYLON WASHER M 8 XOD | 2 | 2 | 2 |
| 11 | 100009 | AN4-26A | 4 | 4 | 4 |
| 12 | 103289 | VELCRO 50MM LOOP/BLACK ADHESIVE | 0.24 | 0.24 | 0.3 |
| 13 | 100042 | AN4 WASHER | 4 | 4 | 4 |
| 14 | 100549 | AN4-22A | | | 2 |
| 15 | 100035 | AN4 NUT HALF NYLOC | | | 2 |

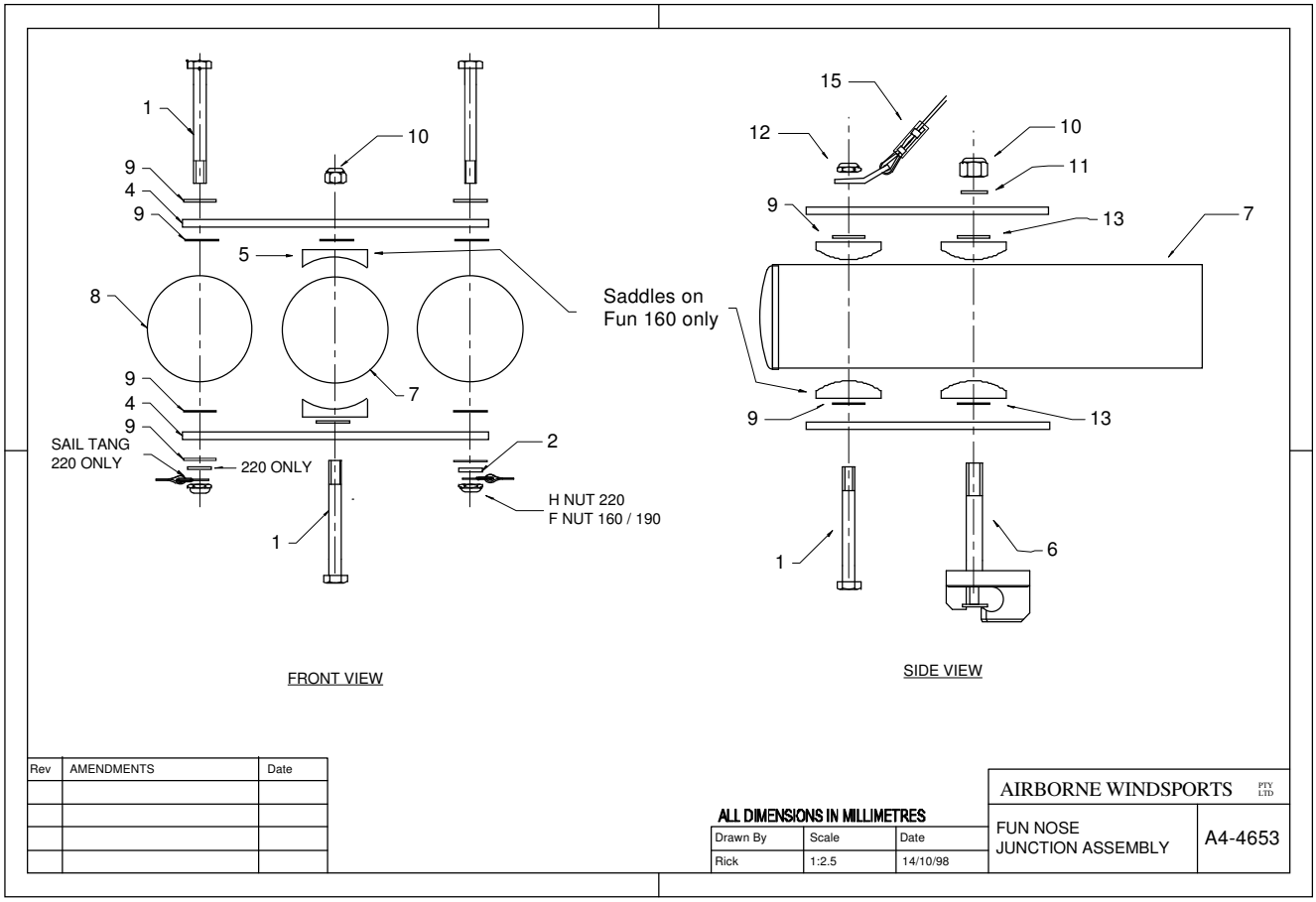
## *A4-4654 Fun X-Bar To L/E Assembly*



# Fun Nose Junction Assembly

| Fun Nose Junction Assembly<br>Dwg No A4-4653 20/09/2001 | | | | | |
|---|---|---|---|---|---|
| **Id** | **Part No** | **Details** | **FUN160** | **FUN190** | **FUN220** |
| 1 | 100009 | AN4-26A | 3 | 3 | 3 |
| 2 | 100042 | AN4 WASHER | | | 2 |
| 3 | 100034 | AN4 NUT FULL NYLOC | 3 | 3 | 1 |
| 4 | 102460 | NOSE PLATE HANG GLIDER 3MM | 2 | 2 | 2 |
| 5 | 102271 | SADDLE TO SUIT 45MM TUBE | 4 | | |
| 6 | 106152 | QUICK CLIP ASM 75MM | 1 | 1 | 1 |
| 7 | 103368 | KEEL TUBE ASSEM FUN 190 | | 1 | |
| | 103604 | KEEL TUBE ASSEM FUN 160 | 1 | | |
| | 103609 | KEEL TUBE ASSEM FUN 220 | | | 1 |
| 8 | 103370 | L/EDGE FRONT F190 | | 2 | |
| | 103513 | L/EDGE FRONT F220 | | | 2 |
| | 103514 | L/EDGE FRONT F160 | 2 | | |
| 9 | 101055 | NYLON WASHER M 6 XOD | 10 | 10 | 10 |
| 10 | 100915 | NUT NYLOC M 8 | 1 | 1 | 1 |
| 11 | 100043 | AN5 WASHER | 1 | 1 | 1 |
| 12 | 100035 | AN4 NUT HALF NYLOC | | | 2 |
| 13 | 100595 | NYLON WASHER M 8 STD | 2 | | |
| 15 | 103408 | TOP FRNT WIRE HGWR 3870 F190 | | 1 | |
| | 103409 | TOP FRNT WIRE HGWR 4090 F220 | | | 1 |
| | 103506 | TOP FRNT WIRE HGWR 3505 F160 | 1 | | |

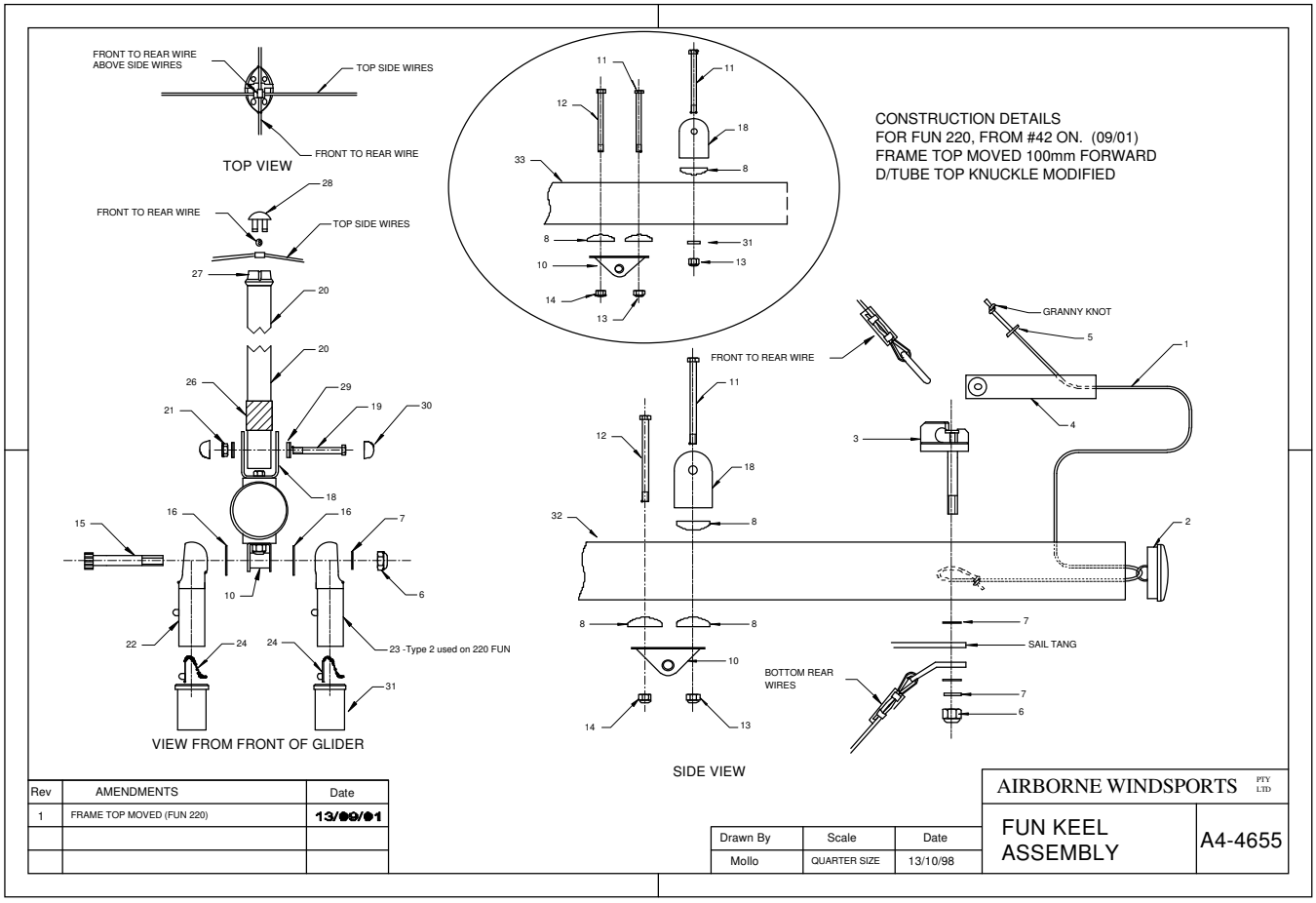
## *A4-4653 Fun Nose Junction Assembly*



# Fun A Frame Top Assembly

| Fun A Frame Top Assembly<br>Dwg No A4-4655 20/09/2001 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Id** | **Part No** | **Details** | **FUN160** | **FUN190** | **FUN220** | **FUN_160** | **FUN_190** | **FUN_220** |
| 1 | 100310 | SHOCK CORD 4MM | | | | 0.9 | 1.05 | 1.2 |
| 2 | 102379 | ENDCAP FOR 42MM TUBE LUG WITH HOLE | | | | 1 | | |
| | 103628 | ENDCAP TO SUIT 50X.9MM TUBE | | | | | 1 | 1 |
| 3 | 103278 | QUICK CLIP ASM 65MM | | | | 1 | | |
| | 106152 | QUICK CLIP ASM 75MM | | | | | 1 | 1 |
| 4 | 101765 | PULL BACK STRAP HANDLE 305 | | | | 1 | 1 | 1 |
| 5 | 100042 | AN4 WASHER | | | | | | 1 |
| 6 | 100915 | NUT NYLOC M 8 | | | | 2 | 2 | 2 |
| 7 | 100043 | AN5 WASHER | | | | 4 | 4 | 4 |
| 8 | 102271 | SADDLE TO SUIT 45MM TUBE | | | | 3 | 3 | 3 |
| 10 | 103362 | A FRAME SS TOP BRACKET FUN TYPE 1 | | | | 1 | 1 | 1 |
| 11 | 100009 | AN4-26A | | | | | 1 | 1 |
| | 100587 | AN4-24A | | | | 1 | | |
| 12 | 100558 | AN3-23A BOLT | | | | | 1 | 1 |
| | 101184 | AN3-21A BOLT | | | | 1 | | |
| 13 | 100034 | AN4 NUT FULL NYLOC | | | | 1 | 1 | 1 |
| 14 | 100051 | AN3 NUT FULL NYLOC | | | | 1 | 1 | 1 |
| 15 | 103358 | BOLT M8 A/FRAME TOP HG 53MM | | | | 1 | 1 | 1 |
| 16 | 102332 | WASHER SS 5/16 X 3/4" | | | | 2 | 2 | 2 |
| 18 | 103365 | K/POST BRACKET SS TYPE 2 | | | | 1 | 1 | 1 |
| 19 | 100967 | AN4-15A | 1 | 1 | 1 | | | |
| 20 | 103404 | K/POST HG 1200 TYPE 2 - NO SLEEVE | | 1 | | | | |
| | 103610 | K/POST HG 1100 TYPE 2 | 1 | | | | | |
| | 103948 | K/POST HG 1290 TYPE 2 - WITH SLEEVE | | | 1 | | | |
| 21 | 100035 | AN4 NUT HALF NYLOC | 1 | 1 | 1 | | | |
| 22 | 104083 | D/TUBE TOP KNUCKLE 28X1.6 HG TYPE 2 | | | | 1 | | |
| | 104084 | D/TUBE TOP KNUCKLE 28X2 HG TYPE 2 | | | | | 1 | |
| 23 | 103999 | D/TUBE TOP KNUCKLE FAIRED HG TYPE 2 | | | | | | 2 |
| | 104083 | D/TUBE TOP KNUCKLE 28X1.6 HG TYPE 2 | | | | 1 | | |
| | 104084 | D/TUBE TOP KNUCKLE 28X2 HG TYPE 2 | | | | | 1 | |
| 24 | 102015 | SPRING CLIP 1 PIN TYPE 1 | | | | 2 | 2 | 2 |
| 26 | 102020 | NEOPRENE D/TUBE CVR | 1 | 1 | 1 | | | |
| 27 | 106047 | K/POST HEAD PLUG | 1 | 1 | 1 | | | |
| 28 | 106138 | K/POST HEAD COVER | 1 | 1 | 1 | | | |
| 29 | 100602 | CAP WASHER COV WHITE 5/16 | 2 | 2 | 2 | | | |
| 30 | 100604 | CAP WASHER BASE CLIP 5/16 | 2 | 2 | 2 | | | |
| 31 | 103368 | KEEL TUBE ASSEM FUN 190 | | 1 | | | | |
| | 103604 | KEEL TUBE ASSEM FUN 160 | 1 | | | | | |
| | 103609 | KEEL TUBE ASSEM FUN 220 | | | 1 | | | |
| 32 | 104611 | KEEL TUBE ASSEM FUN 220 TYPE 2 | | | 1 | | | |

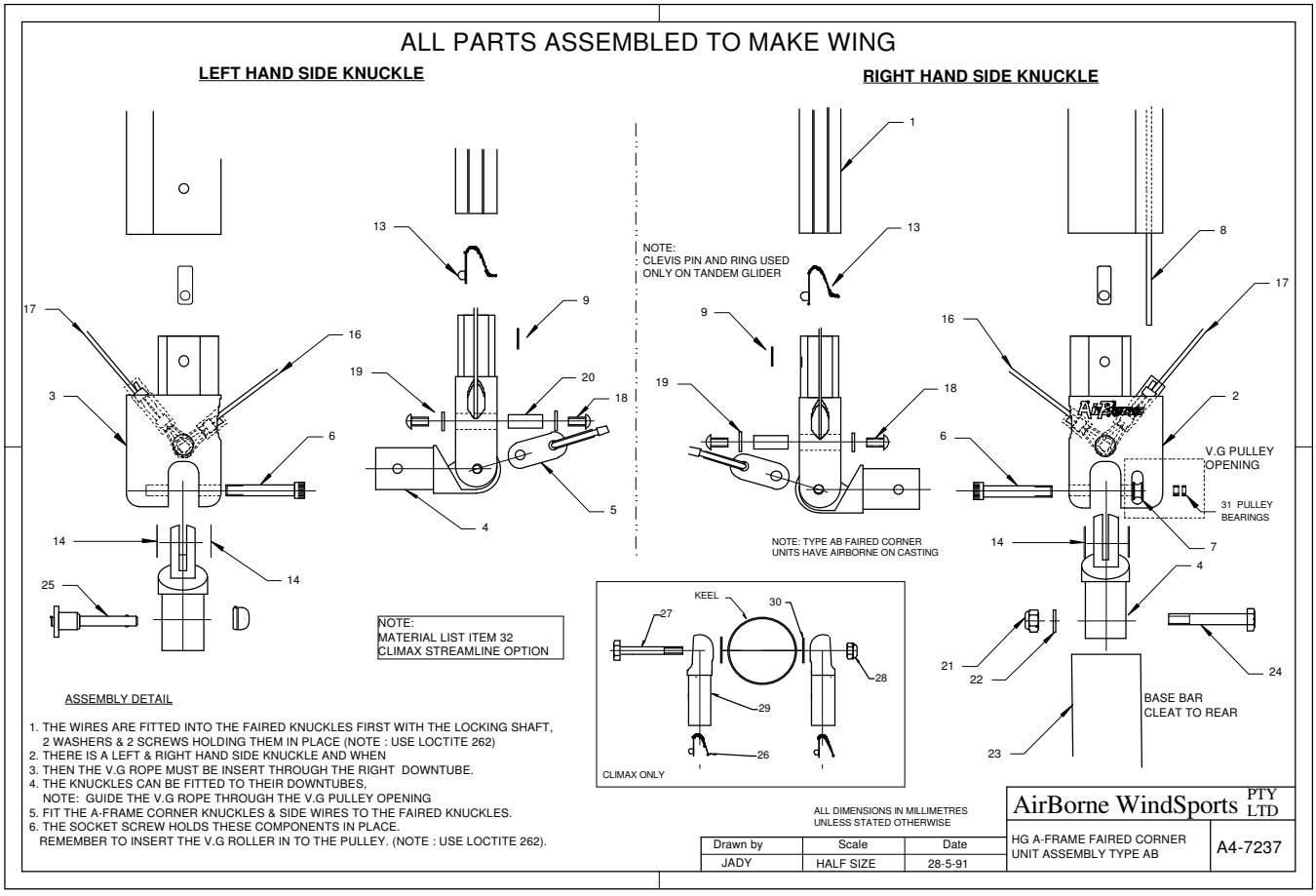
## *A4-4655 Fun Keel Assembly*



# HG AFrame Faired Corner Unit Assembly Type

| HG AFrame Faired Corner Unit Assembly Type 2<br>Dwg No A4-7237 20/09/2001 | | | |
|---|---|---|---|
| **Id** | **Part No** | **Details** | **FUN220** |
| 1 | 103957 | D/TUBE A/FOIL SILVER 1700 SLEEVED | 2 |
| 2 | 103988 | D/TUBE BTM KNUCKLE FRD LHS 1/4" HOL | 1 |
| 3 | 103989 | D/TUBE BTM KNUCKLE FRD RHS 1/4" HOL | 1 |
| 4 | 101713 | C/BAR KNUCKLE HG TYPE 2 | 2 |
| 6 | 101745 | BOLT M6 D/TUBE BOTTOM KNUCKLE | 2 |
| 9 | 100950 | LOCKING RING 12MM RF114 | 2 |
| 13 | 104001 | CLEVIS PIN 1/4"X 1 1/16" | 2 |
| 14 | 101055 | NYLON WASHER M 6 XOD | 4 |
| 16 | 103393 | FRNT FLYING WIRES HG 2225 NO THYMBL | 1 |
| 17 | 101449 | REAR FLYING WIRE HGNT 2075 | 1 |
| | 103949 | REAR SINGLE FLYING WIRE F220 | 2 |
| 18 | 106172 | SKT BUTTON SCREW M5 X 10 | 4 |
| 19 | 100055 | WASHER SS 3/16 X 7/16" 304 FLAT | 4 |
| 20 | 106171 | A FRAME LOCK SHAFT 20MM | 2 |
| 21 | 100035 | AN4 NUT HALF NYLOC | 1 |
| 22 | 100042 | AN4 WASHER | 1 |
| 23 | 102737 | SPEED BAR TYPE 2 1400 W/OUT CLEAT | 1 |
| | 103525 | C/BAR STRAIGHT 28X2 INC GRIPS 1640 | 1 |
| 24 | 101333 | AN4-13A | 1 |
| 25 | 106050 | PIP PIN 33 WITH CAP | 1 |

## *A4-7237 HG A-Frame Faired Corner Unit Assembly*



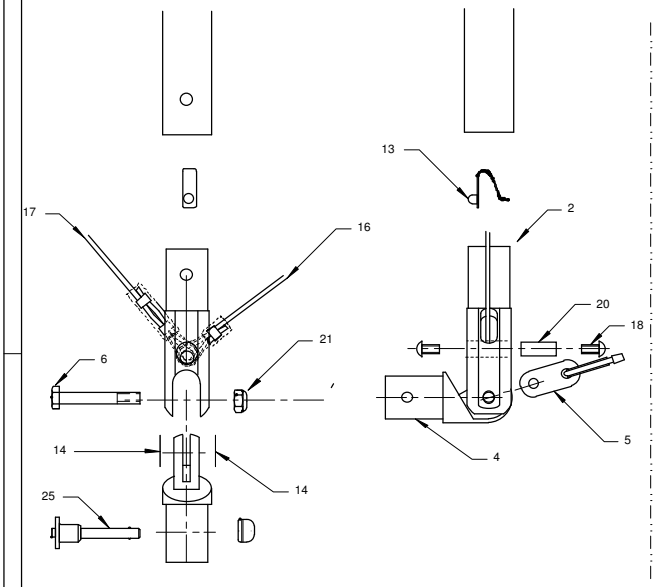
# HG SA Frame Corner Unit Assembly Round Type

| HG SA Frame Corner Unit Assembly Round Type<br>Dwg No A4-4651 20/09/2001 | | | | |
|---|---|---|---|---|
| **Id** | **Part No** | **Details** | **FUN160** | **FUN190** |
| 1 | 103401 | D/TUBE ROUND TYPE 2 28X2 1645 | | 2 |
| | 103524 | D/TUBE ROUND TYPE 2 28X1.6 1480 | 2 | |
| 2 | 103391 | D/TUBE BTM KNUCKLE FOR 28X2 TUBE | | 2 |
| | 103629 | D/TUBE BTM KNUCKLE FOR 28X1.6 TUBE | 2 | |
| 4 | 101713 | C/BAR KNUCKLE HG TYPE 2 | 2 | 2 |
| 6 | 100547 | AN4-12A | 2 | 2 |
| 13 | 102015 | SPRING CLIP 1 PIN TYPE 1 | 2 | 2 |
| 14 | 100624 | MYLAR WASHER | 4 | 4 |
| 16 | 103392 | FRNT FLYING WIRES HG 2160 NO THIMBL | | 1 |
| | 103487 | FRNT FLYING WIRES HG 1945 NO THIMBL | 1 | |
| 17 | 103399 | REAR FLYING WIRE HG 2025 NO THIMBLE | | 1 |
| | 103492 | REAR FLYING WIRE HG 2115 NO THIMBLE | 1 | |
| 18 | 106172 | SKT BUTTON SCREW M5 X 10 | 4 | 4 |
| 20 | 103403 | A FRAME LOCK SHAFT 24.5MM | 2 | 2 |
| 21 | 100035 | AN4 NUT HALF NYLOC | 3 | 3 |
| 22 | 100042 | AN4 WASHER | 1 | 1 |
| 23 | 102210 | C/BAR STRAIGHT 28X1.6 INC GRIPS 134 | 1 | 1 |
| 24 | 101333 | AN4-13A | 1 | 1 |
| 25 | 106050 | PIP PIN 33 WITH CAP | 1 | 1 |

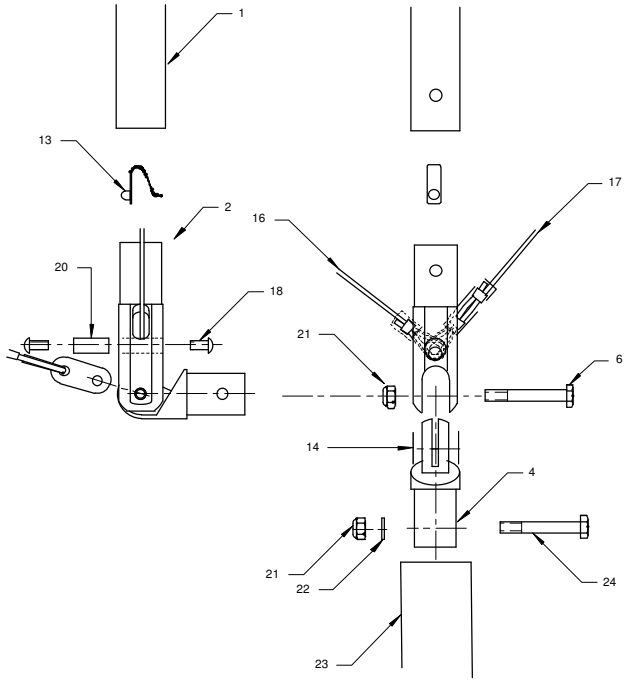
## *A4-4651 HG A-Frame Round Down Tube Corner Assembly*

ALL PARTS ASSEMBLED TO MAKE WING

**LEFT HAND SIDE KNUCKLE**




**RIGHT HAND SIDE KNUCKLE**




ASSEMBLY DETAIL

1. THE WIRES ARE FITTED INTO THE FAIRED KNUCKLES FIRST WITH THE LOCKING SHAFT, 2 WASHERS & 2 SCREWS HOLDING THEM IN PLACE (NOTE : USE LOCTITE 262)
2. THERE IS A LEFT & RIGHT HAND SIDE KNUCKLE AND WHEN
3. THEN THE V.G ROPE MUST BE INSERT THROUGH THE RIGHT DOWNTUBE.
4. THE KNUCKLES CAN BE FITTED TO THEIR DOWNTUBES, NOTE GUIDE THE V.G ROPE THROUGH THE V.G PULLEY OPENING
5. FIT THE A-FRAME CORNER KNUCKLES & SIDE WIRES TO THE FAIRED KNUCKLES.
6. THE SOCKET SCREW HOLDS THESE COMPONENTS IN PLACE. REMEMBER TO INSERT THE V.G ROLLER IN TO THE PULLEY. (NOTE : USE LOCTITE 262

ALL DIMENSIONS IN MILLIMETRES

| Drawn by | Scale | Date |
|---|---|---|
| MOLLO | HALF SIZE | 12/11/98 |

AirBorne WindSports PTY LTD

HG A-FRAME ROUND D/TUBE CORNER ASSEMBLY

A4-4651