

THE
Sting 3 by Airborne

OWNER and
SERVICE MANUAL, Rev 0



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Section 1 DESIGN FEATURES

Classed as our "recreational" glider the Sting 3 is for the pilot that desires good performance with exceptional climb. A glider that is still very easy to launch and land.

Flying the new Sting 3, the things that stand out about the flying characteristics are:

- The very much improved glide performance.
- Ease of steering with the VG on.
- Great handling at low speed and maintaining manoeuvrability & controllability making it a very nimble yet stable glider to climb in thermals.

The Sting 3 has an increased range of travel on the VG system. Landing the Sting is fun, with great low speed handling authority right up to an easy flare and touch down.

The Sting 3 has a new luff curve at the heart of the design meaning that the sail has been entirely redesigned. Looking at the sail, the most recognisable difference is the undersurface layout and the increased amount of undersurface, particularly at the tips to improve the high speed glide performance.

The Sting is constructed using 7075 airframe, fitted with faired king post, downtubes and speed bar as standard. The Sting includes a VG system as standard.

Features:

- Improved glide angle at inter thermal glide speeds.
- Lighter roll control at low speeds.
- Lighter roll control and more predictable docile stall with vg on.
- Lighter pitch pressures and easy aerotow using a shoulder attached tow bridle.
- Wider range of travel for the variable geometry system.
- New control frame, using the same control frame as used on the C4, with streamline downtubes, interchangeable control bar options including round speedbar, airfoil aluminium and airfoil carbon control bars - all changed by pip pins.
- New 7075 airframe.
- New sail luff curve.
- New airfoils.
- New top surface.
- New under surface, with increased double surface area for long XC glides.
- Improved under surface control with an additional batten.
- King post hang.

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

AirBorne WindSports

Section 2 SPECIFICATIONS

	STING 3 154		STING 3 175 (TBA)	
	METRIC	IMPERIAL		
SAIL AREA	14.33 sq meter	154 sq ft		
WING SPAN	9.1 m	29.8 feet		
ASPECT RATIO	5.7			
NOSE ANGLE	121 degrees			
DOUBLE SURFACE %	75%			
BATTENS	22			
GLIDER WEIGHT	26 kg	57 pound		
ASSEMBLY TIME	7 min			
PACK UP LENGTH	5.5 meter	18.1 feet		
SHORT PACK LENGTH	3.9 meter	12.8 feet		
RECOMMENDED PILOT HOOK IN WEIGHT RANGE (Includes equipment)	50-100 kg	120-220 pounds		
VNE (Velocity Never to Exceed)	85 km/h	53 mph		
VA (Maximum rough air manoeuvring speed)	74 km/h	46 mph		

Note: The stall speed of the Sting 3 at maximum recommended wing loading is less than the minimum requirement of 25 mph (40 km/h). 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
 $V_a = \text{Test speed} \times 0.707$ * $V_{ne} = \text{Test Speed} \times 0.816$

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 basebar 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 notwithstanding 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.
- 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 it 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.

The 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.

Signed for and on behalf of 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 Sting 3 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.

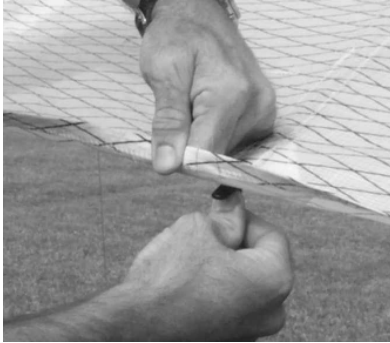
Our suggested sequence is as follows:

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

- **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 unclip centre ties. Remove the bag of battens.
- **ASSEMBLE CONTROL FRAME.** Spread the downtubes out. Connect the base bar using the pip pins, inserting them from front to rear. When a pip pin is secured correctly it passes completely through the downtube and base bar. Check that all the rigging wires are outside the control frame. Route the VG cord if necessary.
- **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 unclip all of the ties.
- **SPREAD LEADING EDGES.** Carefully spread both leading edges out half way then spread leading edges to their approximate flying position.

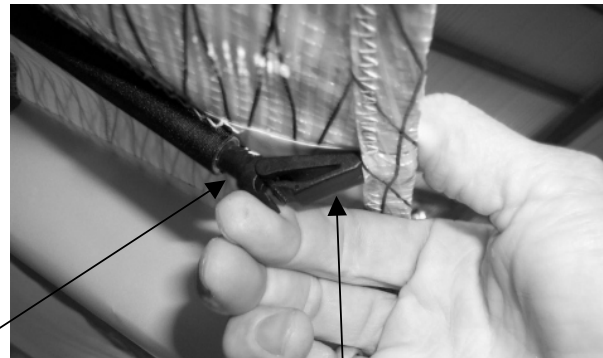
IT IS ESSENTIAL THAT THE KEEL AND THE LEADING EDGES ARE KEPT IN THE SAME PLANE OR DAMAGE WILL RESULT.

- **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!**
- It is advised not to insert the last cambered tip batten and tip strut until the cross bars are tensioned.

- CLIPPING MAINSAIL BATTENS. Unclip 'pivot beak' from 'threaded end'. Rotate *pivot beak* and locate in sail as shown. While supporting the underside of the batten, clip the *pivot beak* into the *threaded end*. To adjust batten load tension, release *pivot beak* from sail and rotate batten clip.



THREADED END

PIVOT BEAK



- TENSION CROSS BARS. The cross bars 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 with the glider **lying flat** the keel should be raised up to approximately 200 mm to allow the side flying wires to be loose.

- **ATTACH REAR TOP WIRE.** The rear top wire should now be attached to the rear quick clip block.

- **INSERT TIP BATTENS AND STRUTS.** Remove tip bags. There is a strut each for the left side and right side. When holding the strut with the clip end toward you and with the clip hook facing up, the white clip should be outboard and then rotate toward the keel to tighten. The left hand side is pictured as a guide. The struts are floating and do not locate at the front other than by sliding them into their pockets. Locate the hook in the sail eyelet by moving the trailing edge onto the batten hook. Close the clip along the shaft gently but firmly.



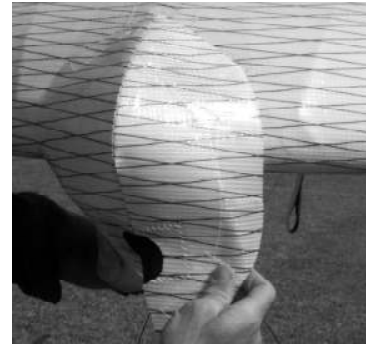
- **INSERT UNDER SURFACE BATTENS.** The under surface battens are inserted and pulled back into the rear of the batten pocket.
- **ATTACH FRONT FLYING WIRES.** The ring on the front flying wires can now be inserted in to the quick clip block. Ensure that the catch is positively locked. If the glider has been assembled flat it should now be lifted on to the control frame. Take care to avoid the tip battens catching on the ground as you raise it. Keep a firm grip on the keel when raising the nose from the flat position in strong winds.





- **INSERT NOSE BATTENS.** Insert the nose battens tail end first and locate them on the fittings on the front of the keel.

- **INSTALL NOSE FAIRING.** Attach the nose fairing by applying the top velcro first then gently tension over the nose plates and attach the velcro to the undersurface.



- **PRE-FLIGHT 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

The wing was designed so that parasitic drag would be kept to a minimum. This means that most of the pre-flight checkpoints are enclosed.

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 corner assembly.
- The cross bar tensioner 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 in the slot.
- Crouch down and lift wing tip to eye level to inspect that the rear leading edges is not damaged.
- Walk towards the keel checking all battens are secured.
- Check reflex bridle attachments are in order.
- Check that the cross bar retaining shackle is secured on the quick clip.
- Check the rear top rigging and that the reflex bridle wishart clip 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 while kinks are more likely along the length of the wire.
- Check control bar corners are correctly assembled with pip pins in place.
- Ensure hang loops are correctly positioned and in good order.
- Check control bar top assembly and ensure that the downtubes are straight.

- Unzip undersurface and check cross bar hinge and restraining strap. The VG should be operated and inspected to ensure it is functioning properly.
- Ensure that the double surface is zipped up and nose fairing is secure.
- 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 karabiner 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;
- A-frame connections at the top and base on both sides;
- Variable geometry operation (full and free movement);
- Rear keel connections;
- Cross-bar tension wire;
- Cross-bar operation (free floating);
- King post connections;
- Reflex bridles - attached and tension correct;
- Sail condition;
- Harness straps and webbing secure, height adjustment correct;
- Emergency parachute secure, correctly mounted and attached, operating handle accessible.

Section 7 BREAK DOWN PROCEDURE

To break down your Sting 3, 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 battens in during daily operations!

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

- Remove nose fairing.
- Remove tip struts and outer battens, and put on tip bags.
- Let off the sail tension and pull each wing in slightly.
- Pull out all the battens.
- Attach top control bar padding.
- Disconnect reflex bridle, attach wishart clip onto hole in sail, and attach rear quick clip padding.
- Fold both wings in symmetrically, bringing both leading edges back at the same time.
- Roll the sail up from the last reflex bridle. Roll the 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 keel end and pullback clip.
- Ensure that the sail is rolled into the leading edge pockets. It is important that the ties are not over tensioned as this can damage the mylar insert. Put tip bags on.
- Place glider bag in position.
- Roll the glider down gently onto its leading edges and undo the control bar pip pins. Remove the base bar. The VG cord can be left connected to the base bar. Attach downtube padding around the bottom of the downtubes. Undo the two centre ties and lay the downtubes between the leading edge pockets taking care not to kink any wires.
- Place the battens between the outer leading edges with the curved ends toward the wing tips. Slide on the base bar padding and place the base bar alongside the battens. Secure the centre ties and zip up bag.

For **de-rigging flat**, attach top control bar padding. Undo nose wires and pull wing forwards then follow steps as above.

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 as described in the **set up procedure section**. 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 edges for **R** (right) and **L** (left), a sticker on the end of the tubes defines the side. Insert rear leading edges in the appropriate side of the front leading edge with the slot on the rear leading edge facing upwards. 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. 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 inside sail tension loop. A glider tie should be passed through the outward loop. Place one hand on the rear of the leading edge and the other through the tie. Pull sail firmly until the inside loop is located on the end of the leading edge. Rotate sail until the webbing is correctly located in the slot. Repeat for the other leading edge.

If you find the above technique to tension the sail difficult the following method can be used:

Remove the sail webbings from the front leading edge bolts.

Locate the tip webbing in the slot on the rear leading edge.

Slowly spread the leading edges out. Ensure the sail is able to move forward as the leading edges are spread, and is not caught on the front wire tang or damage will result.

The cross bars can now be tensioned. Check once again the sail is OK at the nose.

Re-attach nose webbing then let cross bar tension off.

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 battens from the sail and place in batten bag. Be careful when folding the sail as the mylar leading edge insert may be damaged.

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 VG should be in the full off position. The Sting 3 has a slightly tail heavy static balance and is very easy to launch. Hold the nose approximately 20 degrees to the relative airflow with the wings level, accelerate quickly and smoothly to a fast run keeping the nose at the same angle.

It is important that the pilot accelerates smoothly during the launch run. Too fast an acceleration will cause the nose to rise rapidly with the risk of stall on launch.

TURNS

The Sting 3 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 Sting 3 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, a gentle pitch down follows 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 results in a similar negative angle to recover.

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

SPINS

As with all the later design gliders the Sting 3 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 Sting 3.

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

Reduce air speed slowly keeping wings level.

When the glider reaches trim speed a full flare is required. Flare smoothly and confidently by holding the uprights and pushing 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 Sting 3 was test flown and delivered to you in trimmed ready to fly. 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 are correctly routed;
- Check the battens against the profile;
- Check that the battens have the same tension on both sides. Battens should be checked for normal and even operation;
- 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

To make the glider trim faster move the main hang strap forward and to trim slower move the hang loop rearward. This is done by moving the king post forward or rearward, one hole at a time only.

To move the hang strap, note the current position of the king post on the keel (eg using a pencil), unclip the front wire, let the tension off the cross bar, and ensure the side wires are loose. Undo the nut holding the king post in place, and carefully move the king post assembly to the new hole. The reserve hang loop can be moved as the king post assembly is moved. Re-attach the nut securing the king post being careful not to over-tighten, inspect and test fly.

PITCH STABILITY SYSTEM

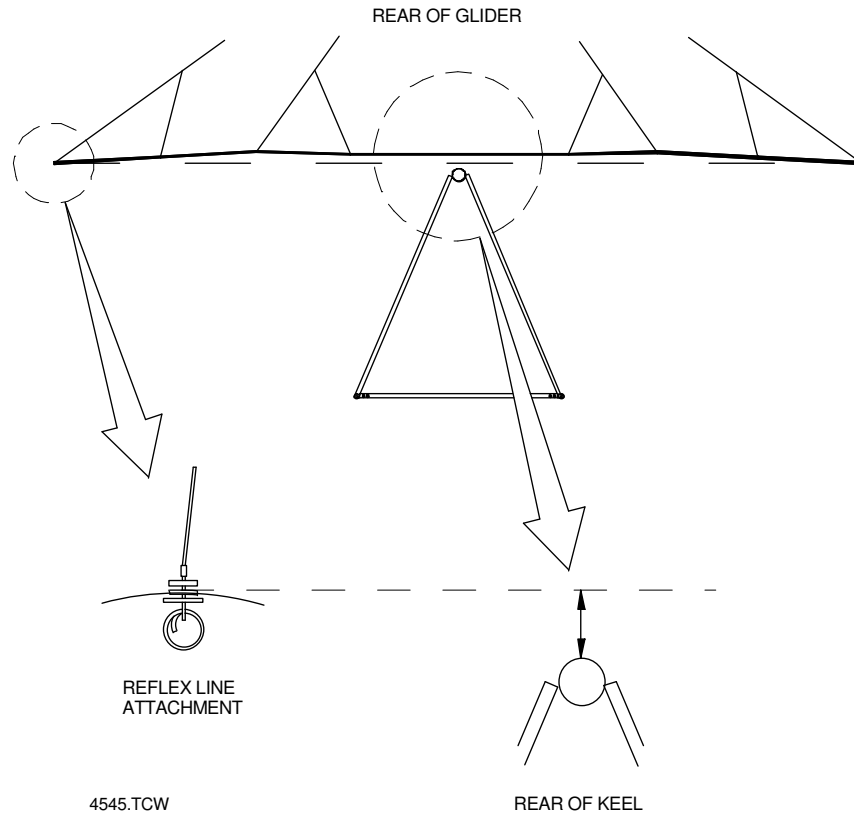
Stability in the pitch axis is provided by reflex in the root section. Alterations to the lengths of rigging, airframe or adjustments to the airfoil can have adverse effects on pitch stability.

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 with the VG pulled all the way on. **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 following chart.

BRIDLE CHECKING SPECIFICATIONS



Batten #	Sting III 154		Sting III 175	
	Metric	Imperial	Metric	Imperial
1	50 mm	1.9 "		
2	100 mm	3.9 "		
3	110 mm	4.3 "		
4	95 mm	3.7 "		
5				

Note: VG is set full on.

ROLL/YAW TRIM

Turns in gliders occur when they are asymmetrical. If you have a turn in your glider you should confirm that the six possible variables outlined at the beginning of this section have been checked.

The following tables outline procedures for adjustments. Adjustments should be made to the glider in the sequence as listed. The glider should be tuned firstly in the VG off setting and then checked with the VG 1/2 and full on.

NOTE: We refer to the fast wing as the wing on the high side of the turn i.e. The right wing is the fast wing if the wing is turning left and vice versa.

ADJUSTMENTS WHEN THE GLIDER IS CONFIGURED VG OFF TO 1/2 ON			
	ADJUSTMENT METHOD	Remedy left turn	Remedy right turn
MILD TURN VG OFF	DIFFERENTIAL BATTEN TENSION. If the turn is mild, then increasing and decreasing the batten tension on either side can adjust it. If you increase the tension on the slow side you are effectively putting more camber in the airfoil therefore creating more lift on that side. If you decrease the tension on the fast side you are decreasing the camber and reducing the amount of lift. The batten hinge clip can be rotated clockwise to decrease tension or anti-clockwise to increase tension.	Increase tension on last 3 battens on left hand side by 2 turns at a time. Decrease tension on last 3 battens on right hand side by 1 turn at a time.	Decrease tension on last 3 battens on left hand side by 1 turn at a time. Increase tension on last 3 battens on right hand side by 2 turns at a time.
	TIP PLUG ADJUSTMENT The tip plug can be rotated to increase or decrease lift on either wing. The fast wing should have the tip fitting rotated upward to increase washout on that side. Requires 5/32" drill and rivet once rotated.	Rotate the right hand tip fitting clockwise if viewed from the rear of the leading edge. The tip fitting should be rotated a maximum of 5 mm.	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.

ADJUSTING MAINSAIL BATTEN TENSION

Batten tension can be set using the following guide:

- Check batten is inserted fully into its pocket by pressing firmly on the end of the batten beak with the heel of your hand. The batten beak should protrude 5-7mm past the trailing edge when clip is closed.
- Hook the beak in the sail and start to clip the batten, the beak should be at approximately 30 degrees to the batten shaft as tension starts to come on the clip, and should not be difficult to close.
- With your eyes level with the trailing edge, look along the length of the batten toward the leading edge. As you close the clip and the sail tightens, the batten should start to make a small ridge on the sail near the leading edge - no more than a couple of millimetres.
- Make adjustments of one full-turn at a time in between checking.

ADJUSTING BATTEN STRUT TENSION

- As you start to close the folding clip, tension should start to come onto the clip at approximately 30 degrees.
- As the clip is closed, the sail should become tighter without obvious wrinkles. The clip should not be difficult to close.
- Make adjustments of one full-turn at a time in between checking.

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	Monthl y	Three Month s	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 clip fittings			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 luff lines for kinks.		2	2	2	2	2	2	2
Check Inspection zips.			2	2	2	2	2	2
Check variable geometry and compensator ropes, pulleys and cleats.		2	3	3	3	4	4	5
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

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
- (b) those items marked with a 5 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 thread showing.
- All self-locking nuts should not be installed more than two times.
- Be sure not to over-torque bolts when installing.
- Never deform a tube when tightening a bolt.

Inspection

Check bolts for bends, worn shanks, bad threads or corrosion.

SAILS

Sail Inspection

- Check for tears in the fabric or any loose or unravelled seams.
- Check all inspection zippers to see if they function smoothly and close completely.
- Inspect tip webbing for damage.

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.

CONTINUED EXPOSURE TO SUN DRAMATICALLY SHORTENS THE LIFE OF SAILS -
possibly to as little as six months.

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 replacements 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

Section 14 HANG GLIDER COMPLIANCE SCHEDULES

GLIDER MODEL: Sting 3 154

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.

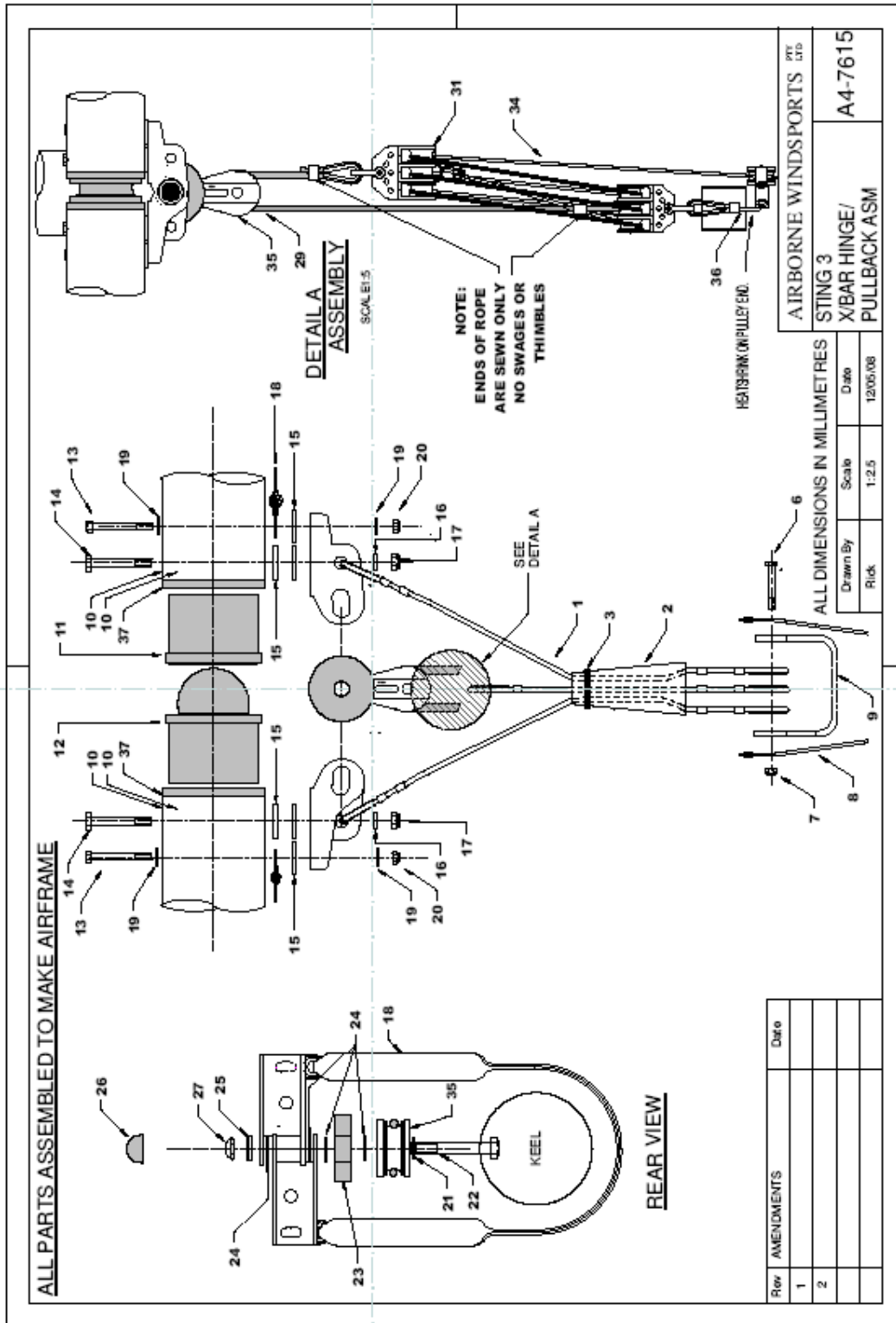
	Metric	Imperial
Weight of glider with all essential parts and without covers, padding and non-essential parts.	26.0 kg	57. lbs
Leading Edge Dimensions		
Nose plate anchor hole to crossbar attachment hole	3097 mm	121.92"
Nose plate anchor hole to rear sail attachment point	5420 mm	213.39"
Outside diameter 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	2680 mm	105.51"
Largest outside diameter	62 mm	2.44"
Keel dimensions		
The cross bar centre load bearing pin	1290 mm	50.79"
The pilot hang loop	Fwd Rear	1600 mm 1630 mm
		63.00" 64.17"
Sail Dimensions		
Chord length at 3 ft outboard of centre line	2095 mm	82.48"
Chord length at 3 ft inboard of tip	1070 mm	42.13"
Span (extreme tip to tip)	9090 mm	357.87 "
Location of Information Placard	Cross Bar	
Recommended Pilot Hook in Weight Range	55-100 kg	120-220 lbs
Recommended Pilot Proficiency	Intermediate	Intermediate

NB: Conversions * 0.4536 kg/pound * 25.4 mm/inch * 1.609 km/mile
All measurements taken with VG in the full on position.

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Section 15 ASSEMBLY DRAWINGS AND MATERIAL LISTS

STING 3 X/BAR HINGE / PULLBACK ASM A4-7615

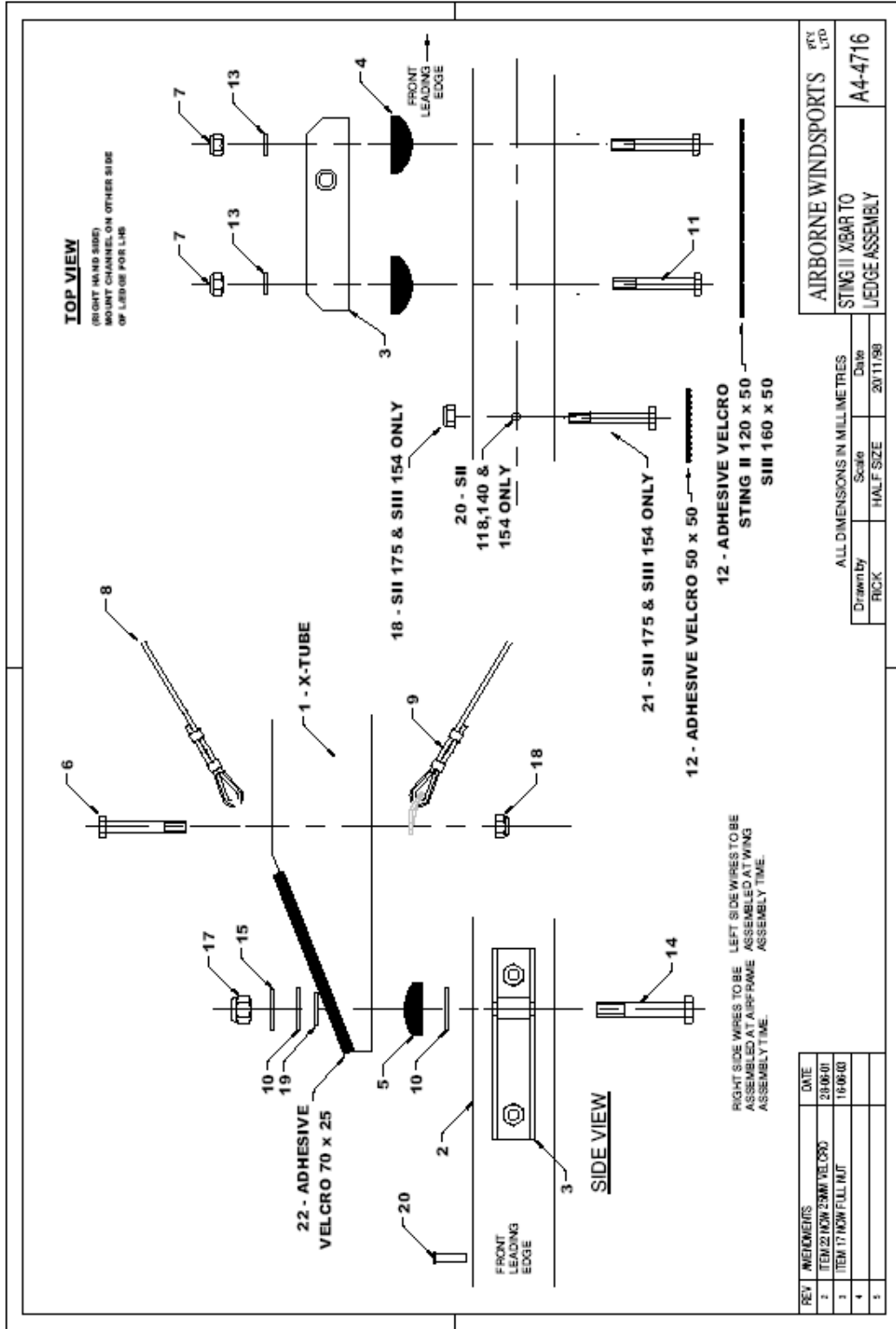


STING 3 X/BAR HINGE / PULLBACK ASM A4-7615 MATERIAL LIST

STING 3 X/BAR HINGE / PULLBACK ASM**Part No - 108838 Material List for Drawing A4-7615**

Item No	Description	Drawing No	Part No	Quantity
1	PULL BACK WIRE 1450 SIII 154	A3-4506	109170	2
2	PULL BACK COVER NEOPRENE	A4-4789	101900	1
3	CABLE TIE (SHORT) 100 X 2.5MM BLACK	A4-5605	101192	1
6	BOLT AN4-12A	A4-5450	100547	1
7	NUT NYLOC AN4 HALF	A4-5561	100035	1
8	PULL BACK STRAP WITH TANGS	A4-4633	104291	1
9	SHACKLE BODY 1/4IN PULL BACK	A4-6338	102021	1
10	X/BAR SII 154	A4-4678	103529	2
11	X/BAR BALL SKT TYPE 2 (WILLS WING)	A4-6460	102449	1
12	X/BAR BALL TYPE 2 (WILLS WING)	A4-6459	102409	1
13	BOLT AN3-30A	A4-5449	100629	2
14	BOLT AN4-30A	A4-5450	100011	2
15	WASHER NYLON 1/4IN OBA THIN	A4-5540	103961	6
16	WASHER AN4	A4-5540	100042	2
17	NUT NYLOC AN4 FULL	A4-5535	100034	2
18	X/BAR STRAP TANG 230	A4-4633	103626	1
19	WASHER AN3	A4-5540	100049	4
20	NUT NYLOC AN3 FULL	A4-5535	100051	2
21	WASHER AN5	A4-5540	100043	1
22	BOLT AN5-17A	A4-5493	101244	1
23	X/BAR BOLT COVER - 19MM SLOT	A4-3090	103701	1
24	WASHER NYLON M 8 STND	A4-5540	100595	4
25	CAP WASHER BASE CLIP M8	A4-5667	100604	1
26	CAP WASHER COVER BLACK M8	A4-5666	100603	1
27	NUT NYLOC AN5 HALF	A4-5561	100037	1
29	X/BAR ROPE SIII 154/175	A4-4726	108833	1
31	PULLEY BLOCK RF20312 VG 3P		102023	1
33	POP RIVET 5/32 LONG(5-8)	A4-5515	102417	2
34	CORD NYLON STARTER WHITE 3.5 MM 16		109169	4.15
35	PULLEY 30100NC X/BAR ROPE		102027	1
37	BUSH X/BAR BALL/SOCKET	A4-6448	102603	2

STING II X-BAR LEADING EDGE JUNCTION A4-4716




STING II X-BAR LEADING EDGE JUNCTION A4-4716 MATERIAL LIST

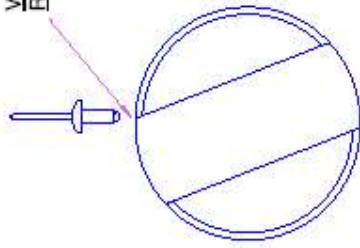
STING II, III X/BAR TO L/EDGE ASSEMBLY				
Part No - 108838 Material List for Drawing A4-4716				
Item No	Description	Drawing No	Part No	Quantity
3	X/BAR MOUNT CHANNEL	A4-7009	102006	2
4	SADDLE 45MM TUBE	A4-6842	102271	4
5	SADDLE 60MM TUBE	A4-7166	100080	2
6	BOLT AN4-27A	A4-5450	100010	2
7	NUT NYLOC AN4 FULL	A4-5535	100034	4
8	TOP SIDE WIRE HG 2760 SIII 154	A4-7208	109150	1
9	SIDE BTM WIRE SIII 2350	A4-7202	108830	2
10	WASHER NYLON M 8 XOD	A4-5540	100820	4
11	BOLT AN4-26A	A4-5450	100009	4
12	VELCRO 50MM LOOP/BLACK ADHESIVE		103289	0.32
13	WASHER AN4	A4-5540	100042	4
14	BOLT AN5-17A	A4-5493	101244	2
15	WASHER SS 5/16 X 1IN X 16G	A4-5540	100714	2
17	NUT NYLOC AN5 FULL	A4-5535	100036	2
18	NUT NYLOC AN4 HALF	A4-5561	100035	2
19	WASHER NYLON M 8 STND	A4-5540	100595	2
20	POP RIVET STST 6 - 6 3/16	A4-5515	102205	2
21	BOLT AN4-22A	A4-5450	100549	2
22	VELCRO 25MM LOOP/BLACK ADHESIVE		104447	0.28

REAR LEADING EDGE ASSEMBLY STING A4-6859

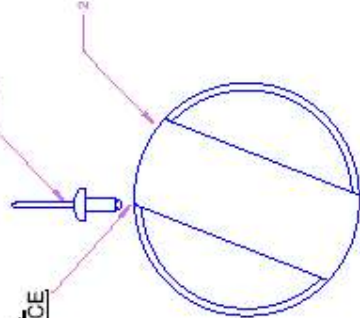
ASSEMBLY INSTRUCTIONS

1/ INSERT TIP BUNG AND ALIGN FOR LEFT OR RIGHT
2/ DRILL TIP FITTING AND RIVET TO LEADING EDGE





LHS ALIGNMENT



RHS ALIGNMENT

VERTICAL REFERENCE

ALL DIMENSIONS IN MILLIMETRES

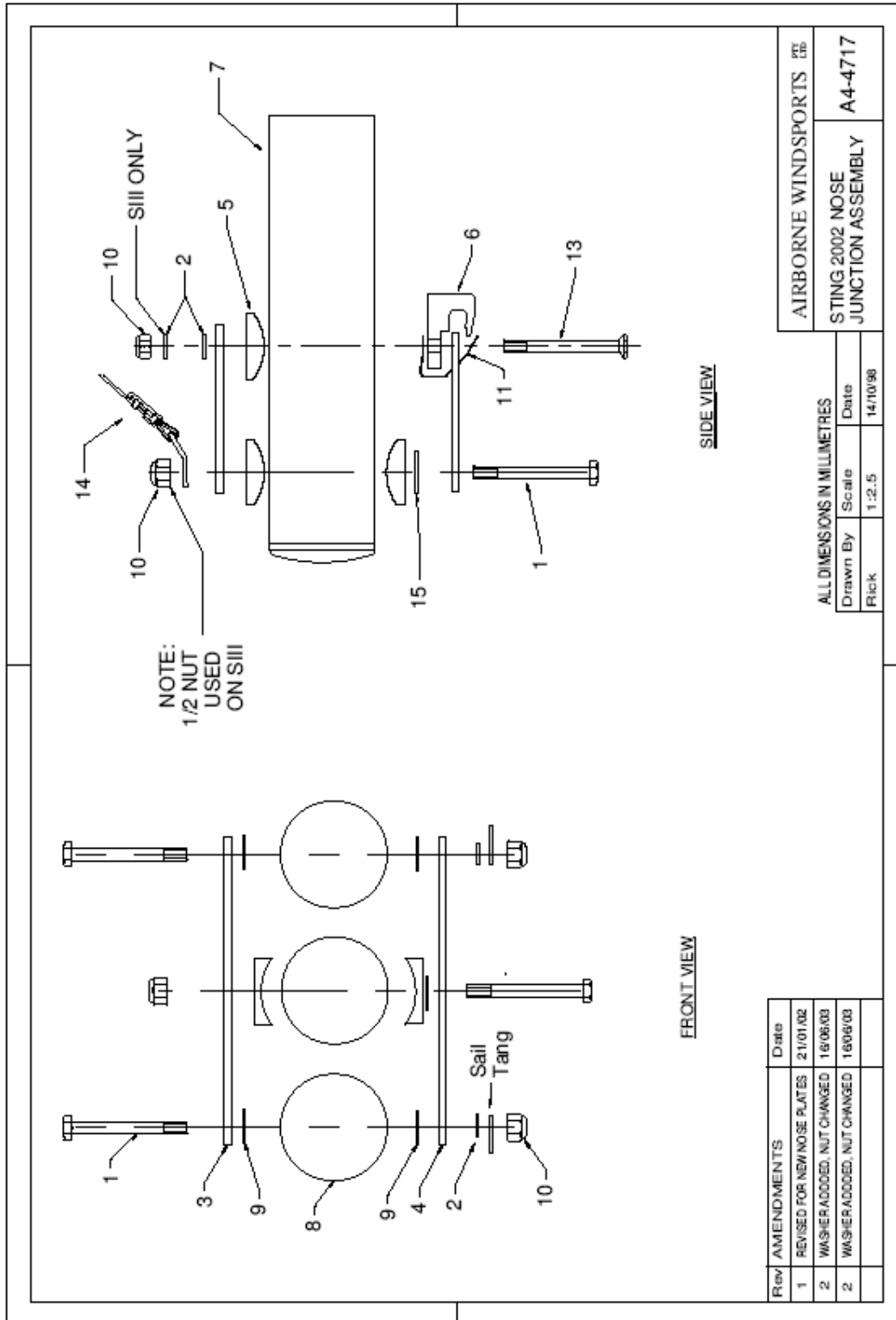
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MATT	NTS	27/09/05

Rev	AMENDMENTS	Date
1	DCR 2364, ADDED STING III	26/04/08

AIRBORNE WINDSPORTS ^{EST}	A4-6859
REAR LEADING EDGE ASSEMBLY STING	

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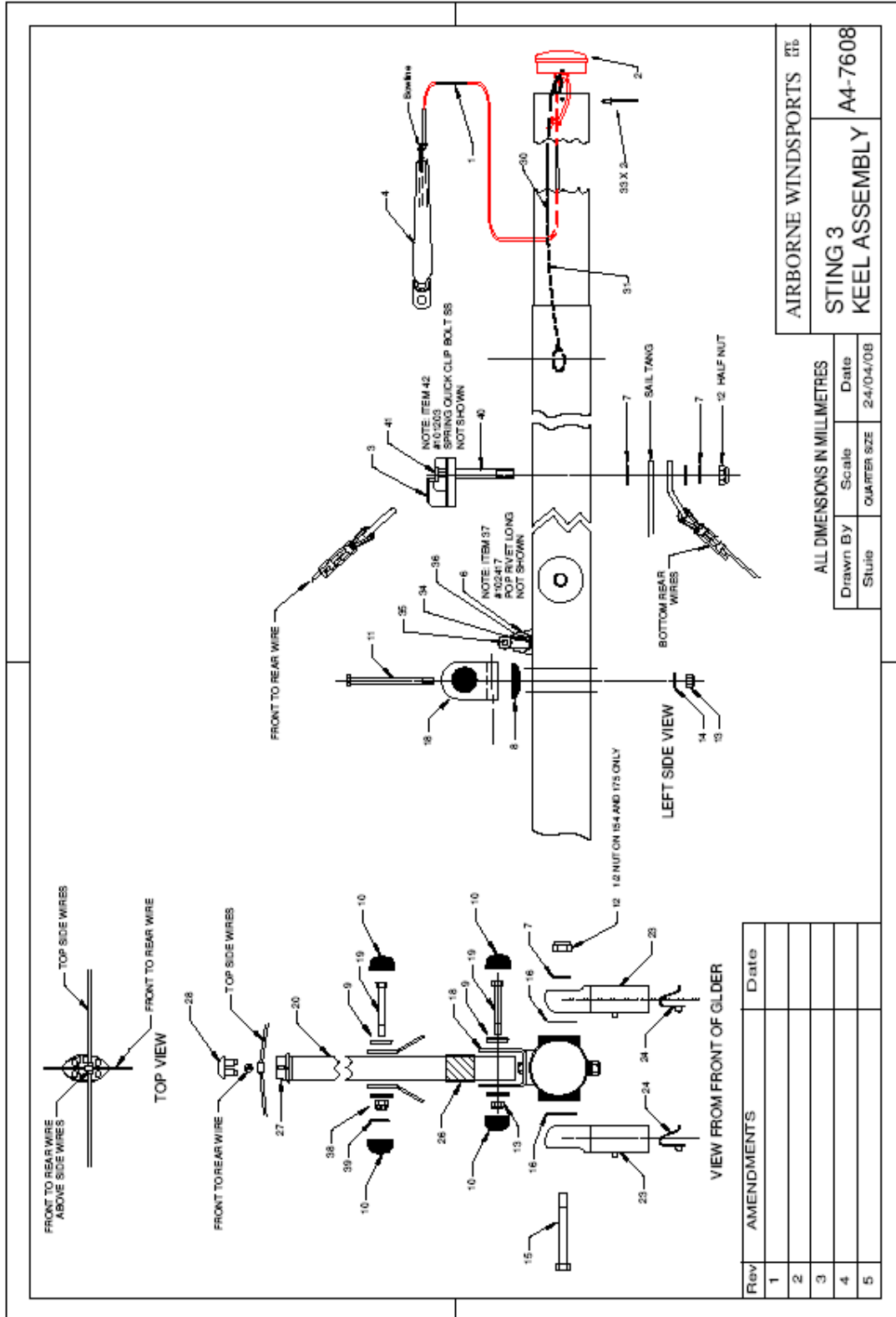
STING II NOSE JUNCTION ASSEMBLY A4-4717



STING II NOSE JUNCTION ASSEMBLY A4-4717 MATERIAL LIST

STING 2002 NOSE JUNCTION ASSEMBLY				
Part No - 108838 Material List for Drawing A4-4717				
Item No	Description	Drawing No	Part No	Quantity
1	BOLT AN4-26A	A4-5450	100009	3
2	WASHER AN4	A4-5540	100042	4
3	NOSE PLATE HG TYPE 2 4MM TOP	A4-4864	104273	1
4	NOSE PLATE HG TYPE 2 4MM BTM	A4-4864	104274	1
5	SADDLE 45MM TUBE	A4-6842	102271	3
6	NOSE CLIP BLOCK TYPE 3	A4-4991	104520	1
7	KEEL TUBE ASM SIII 154	A4-7522	108827	1
8	L/EDGE FRONT S154 III	A4-5139	104640	2
9	WASHER NYLON M 6 XOD	A4-5540	101055	4
10	NUT NYLOC AN4 FULL	A4-5535	100034	4
11	SPRING QUICK CLIP GATE	A4-7240	104275	1
13	BOLT AN4-26 MODIFIED	A4-4510	104664	1
14	TOP FRNT WIRE HGWR 3415 SII,SIII 154	A4-7308	103505	1
15	WASHER NYLON M 8 XOD	A4-5540	100820	1

STING III KEEL ASSEMBLY A4-7608



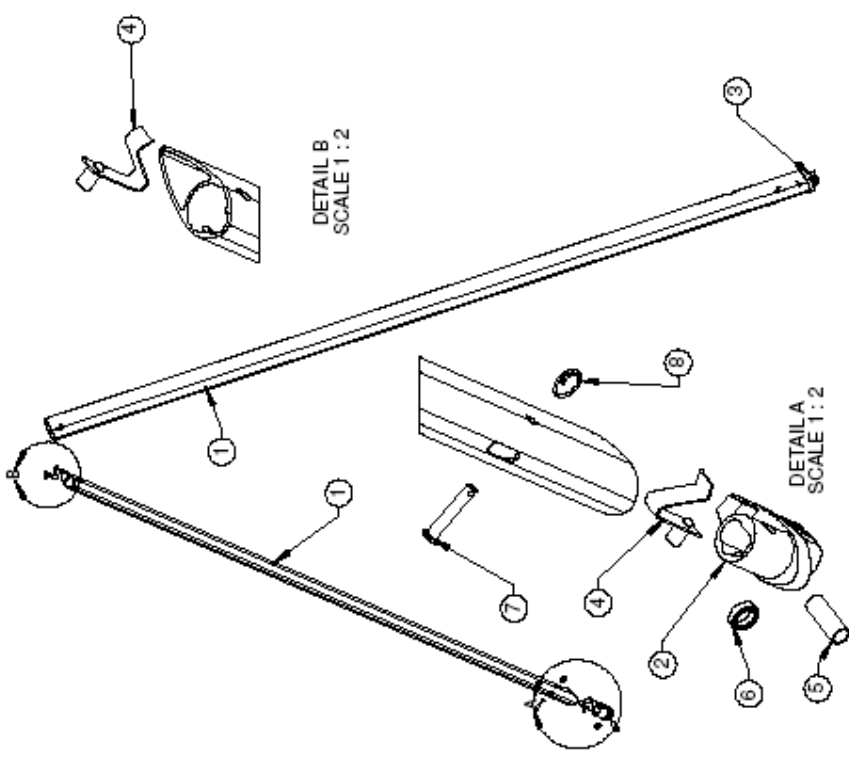
STING III KEEL ASSEMBLY A4-7608 MATERIAL LIST

STING 3 KEEL ASSEMBLY				
Part No - 108838 Material List for Drawing A4-7608				
Item No	Description	Drawing No	Part No	Quantity
1	SHOCK CORD 4MM		100310	1.15
2	ENDCAP FOR 42MM TUBE LUG NO HOLE		101728	1
3	SPRING QUICK CLIP BOLT SS	A4-6468	101203	1
3	QUICK CLIP BOLT PIN (AL)	A4-6467	103277	1
3	QUICK CLIP BLOCK	A4-7002	106153	1
3	BOLT QUICK CLIP AN5-24A TYPE 3	A4-6453	106561	1
6	PULLEY RF20151ANC CHEEK BLOCK RVT M		104215	1
7	WASHER AN5	A4-5540	100043	4
8	SADDLE 45MM TUBE	A4-6842	102271	1
9	CAP WASHER BASE CLIP M8	A4-5667	100604	2
11	BOLT AN4-22A	A4-5450	100549	1
12	NUT NYLOC AN5 HALF	A4-5561	100037	2
13	NUT NYLOC AN4 HALF	A4-5561	100035	2
14	WASHER AN4	A4-5540	100042	1
15	BOLT AN5-34A	A4-5493	100025	1
16	WASHER SS 5/16 X 1-1/4 304 FLAT	A4-5540	100045	2
18	K/POST BRACKET SS TYPE 2	A4-6873	103365	1
23	D/TUBE TOP KNUCKLE S/LINE HG	A4-4947	104308	2
24	SPRING CLIP 1 PIN TYPE 1	A4-7464	102015	2
30	SHOCK CORD 4MM		100310	1.2
33	POP RIVET 1/8	A4-5515	100162	2
34	PULLEY BRACKET VG CLIMAX	A4-4914	104252	1
35	POP RIVET 5/32 SHORT(5-3)	A4-5515	102418	1
36	POP RIVET 5/32 MED 5-5	A4-5515	100161	1
37	POP RIVET 5/32 LONG(5-8)	A4-5515	102417	1
38	NUT CASTLE AN4	A4-6297	100040	1
39	SPLIT PIN M2.0 X 20	A4-6296	100308	1

CONTROL FRAME STING 3 PREASM A4-7625

ITEM NO.	NAME	DWG PART NO.	QTY.
1	DTUBE SILINE SILVER 1650	4970	104458 2
2	DTUBE BTM KNUCKLE SILINE AEROS RHS	8797	107149 1
3	DTUBE BTM KNUCKLE SILINE AEROS LHS	8797	107149 1
4	SPRING CLIP 1 PIN TYPE 1	7464	102015 4
5	BUSH SS CO.8X21.5 LAEROS	5451	104964 1
6	BEARINGS 12x8x2.5 (MICRODRAG VG)	5608	105823 1
7	CLEVIS PIN 3/16" X 29-32"	5536	104572 2
9	SPLIT RING 12MM PF 114	5726	100950 2
9	FRONT FLYING WIRES SHI 1.54 2030 NO THMB	4688	108828 1
10	REAR FLYING WIRE HG SHI 154 20 65 NO TH1	4688	108829 1
11	NEOPRENE DTUBE CVR	4791	102020 2

NOTES:
PARTS NOT SHOWN IN THIS ASSEMBLY,
AND THE MAIN ASSEMBLY ARE FOR BOM
PURPOSES ONLY.



DETAIL B
SCALE 1:2


DETAIL A
SCALE 1:2

REV	AMENDMENTS	DATE

PART NO. 109208

LAST ACCESSED: Wednesday, 21 May 2008
ALL DIMENSIONS IN MILLIMETERS UNLESS STATED OTHERWISE

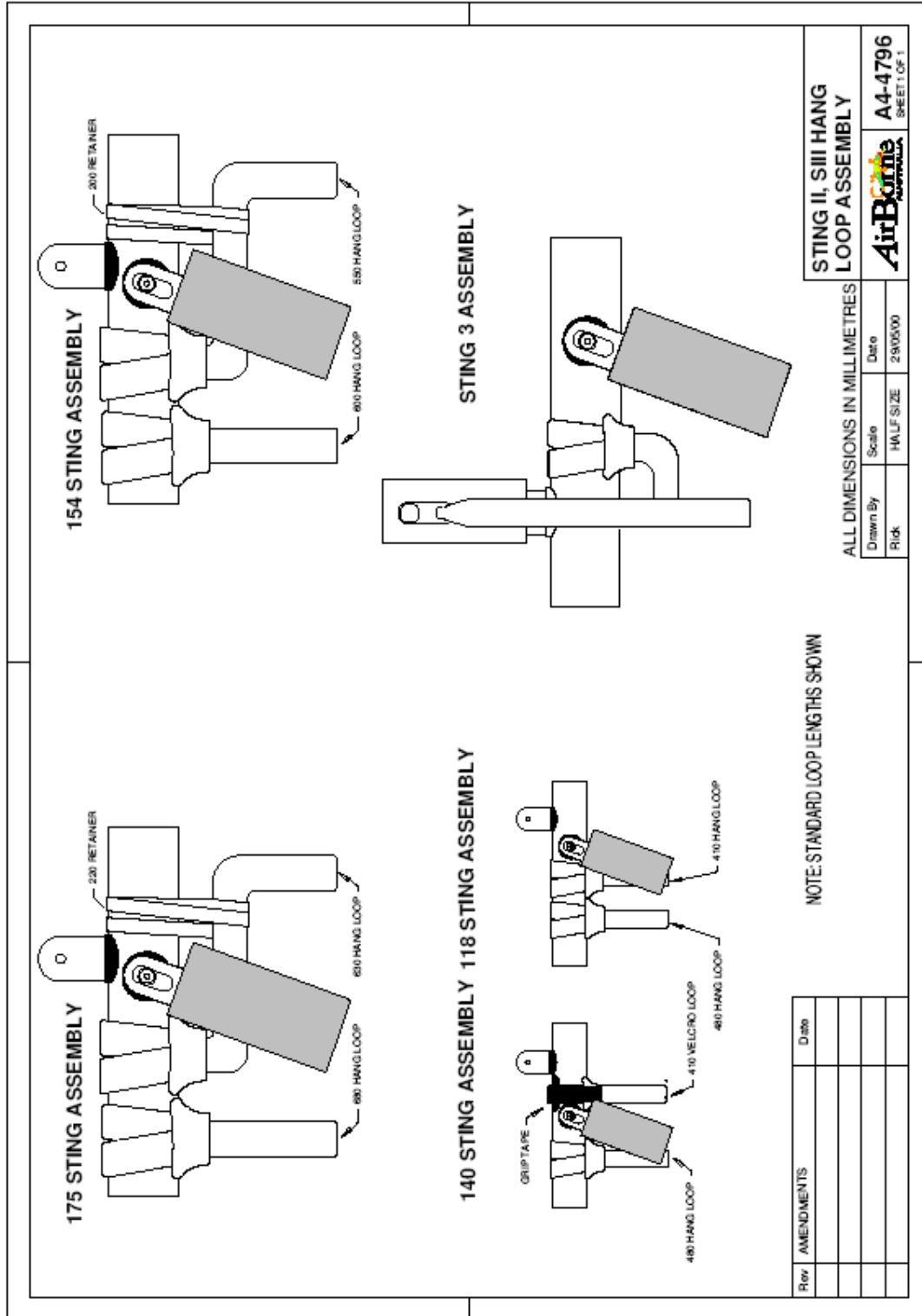
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CONTROL FRAME STING 3 PREASM A4-7625 MATERIAL LIST

CONTROL FRAME STING 3 PREASM				
Part No - 108838 Material List for Drawing A4-7625				
Item No	Description	Drawing No	Part No	Quantity
1	D/TUBE S/LINE SILVER 1650	A4-4970	104458	2
2	D/TUBE BTM KNUCKLE S/LINE TYPE 2 RH	A4-6797	107149	1
3	D/TUBE BTM KNUCKLE S/LINE TYPE 2 LH	A4-6797	107148	1
4	SPRING CLIP 1 PIN TYPE 1	A4-7464	102015	4
5	BUSH SS OD8X21.5L AEROS	A4-5451	104964	1
6	BEARING 12X8X3.5 (VG M/DRAG)	A4-5608	105833	1
7	CLEVIS PIN 3/16 X 29/32IN	A4-5536	104572	2
8	SPLIT RING 12MM RF114	A4-5720	100950	2
9	FRNT FLYING WIRES SIII 154 2030 NO	A4-4666	108828	1
10	REAR FLYING WIRE HG SIII 154 2065 N	A4-4668	108829	1
11	NEOPRENE D/TUBE CVR	A4-4791	102020	2

STING HANG LOOP ASSEMBLY A4-4796



STING II, SIII HANG LOOP ASSEMBLY

ALL DIMENSIONS IN MILLIMETRES

Drawn By	Scale	Date
Rick	HALF SIZE	29/05/00

NOTE: STANDARD LOOP LENGTHS SHOWN

Rev	AMENDMENTS	Date

AirBorne
AUSTRALIA

A4-4796
SHEET OF 1

STING 2 & 3 SAIL TO AIRFRAME ASSEMBLY A4-4723 MATERIAL LIST

(Parts that may be purchased for repair/maintenance but are not listed on assembly drawings.)

GLIDER STING 3 154				
Part No - 108836 Material List for Drawing A4-4723				
Item No	Description	Drawing No	Part No	Quantity
1	SAIL STING III 154	A4-7632	108837	1
2	AIRFRAME STING 3 154	A4-7608	108838	1
3	REFLEX BRIDLE 2X4 2925 SIII 154	A4-7312	108831	1
4	WASHER SS 1/8 X 3/8IN	A4-5540	101883	8
5	WASHER SS 3/16 X 1/2IN	A4-5540	100569	8
6	SPLIT RING 12MM RF114	A4-5720	100950	8
8	BATTEN SET SIII 154 HINGE	A4-7597	108839	1
9	PLACARD HANG GLIDING GENERIC	A4-6809	107188	1
10	L/EDGE REAR SIII LHS ASM	A4-6859	109175	1
10	L/EDGE REAR SIII RHS ASM	A4-6859	109176	1
12	FLIGHT MANUAL STING 3	A4-4492	108841	1
13	BATTEN PROFILE STING 3		108840	1
14	COVER TIP BAG ELASTIC	A4-6500	106481	2
15	BATTEN BAG LONG 2650	A4-7151	106180	2
16	COVER KEEL QUICK CLIP HG 42MM	A4-7148	106183	1
17	COVER C/BAR CARBON S/LINE	A4-6951	107835	1
18	COVER CONTROL FRAME TOP HG	A4-7150	106184	1
19	COVER HG FRAME BTM	A4-7154	106181	1
20	GLIDER TIE	A4-7153	100139	4
21	COVER X/BAR SMALL	A4-7146	102730	1
22	GLIDER BAG S/BZ154	A4-7149	101669	1
23	HANG LOOP 540 KPH RED	A4-7234	101972	1
23	HANG LOOP 630MM	A3-7181	102120	1
24	MYLAR L/E INSERT SIII 154	A4-7143	108832	2
25	RETAINER LOOP 200MM	A4-7183	103667	1
26	D/TUBE TOP KNUCKLE 28X2 HG TYPE 2	A4-4797	104084	2
27	COVER D/TUBE HG DOUBLE MITT	A4-6948	107779	1
28	COVER REAR KEEL	A4-4499	102436	1
29	HAT AIRBORNE LOGO ONLY		106513	1

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