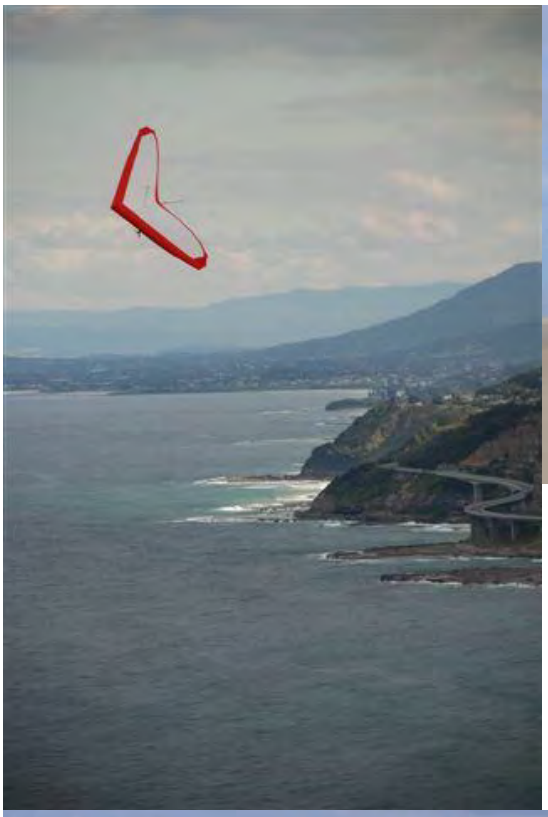
Malibu

Owner's manual

Moyes Delta Gliders Pty. Ltd.

Version 2.00



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CONTENTS

AMENDMENTS

Version	Date	Changes
1.00	23 March 2010	Initial release
2.00	8 April 2010	Include Malibu 166 specs

DOCUMENT FORMAT

This document is formatted for double sided printing, the odd numbered pages have a wider margin on the left and the even number pages have it on the right. That allows for binding along the edge.

INTRODUCTION

Thank you for choosing your Moyes Malibu. This glider epitomises all the qualities of safety, performance and handling that is the Moyes tradition. The development of the Malibu is indicative of the dedication of the Moyes design team who strive to offer a range of high quality hang gliders for all pilots.

This glider is intended for beginners and experienced pilots; beginners who need a safe and steady glider; experienced pilots seeking something for the sand dunes or a glider that can catch the smallest of thermal bubbles.

Please read this manual thoroughly, familiarise yourself with the set-up and pack up procedures and take the time to practice these before going out to your site.

If in doubt about any aspect of operating your Malibu, consult your manual or seek advice from your Moyes dealer. Moyes are happy to help with advice and hints.

Since 1967, Moyes Delta Gliders have been on the cutting edge of hang glider development. A family owned business operating under homespun values, we provide a comprehensive international network to service all pilots. We work with some of the best pilots in the world to ensure that our gliders are built to the highest standards and stringently tested in order to improve their performance, handling and safety.

We wish you the very best flying,

The Moyes Team

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WHAT IS THE MALIBU LIKE TO FLY?

From the moment you launch you can feel the Malibu is a calm steady glider and easy to control.

If you are a novice, the low speed capability and steadiness of this glider are keys to developing confidence, and with confidence, skills will follow. Use the Malibu to grow your skills in all areas; launching, landing, thermaling and dune flying. Most of all it is the easiest way to experience the joy of flight.

For pilots with more experience, this glider is a hoot to fly on sand dunes or to take thermaling. Because the Malibu can fly so slowly and in tight banked turns, you can core very small thermal bubbles and it is so easy to do. Make sure to use this characteristic to your advantage. Performance gliders cannot do it and don't be surprised if you find yourself circling more tightly than a gaggle of paragliders.

With sand dune flying, this glider lets you extract the last bit of lift from the dunes. The glider handles very well at low speed and you'll often find that when you think you are down you can nudge the bar out and there is a little more height to be gained.

When you need to make low and tight turns to stay in a narrow lift band, the Malibu keeps its nose up and the inner tip stays afloat. But please don't overdo it, gravity cannot be ignored.

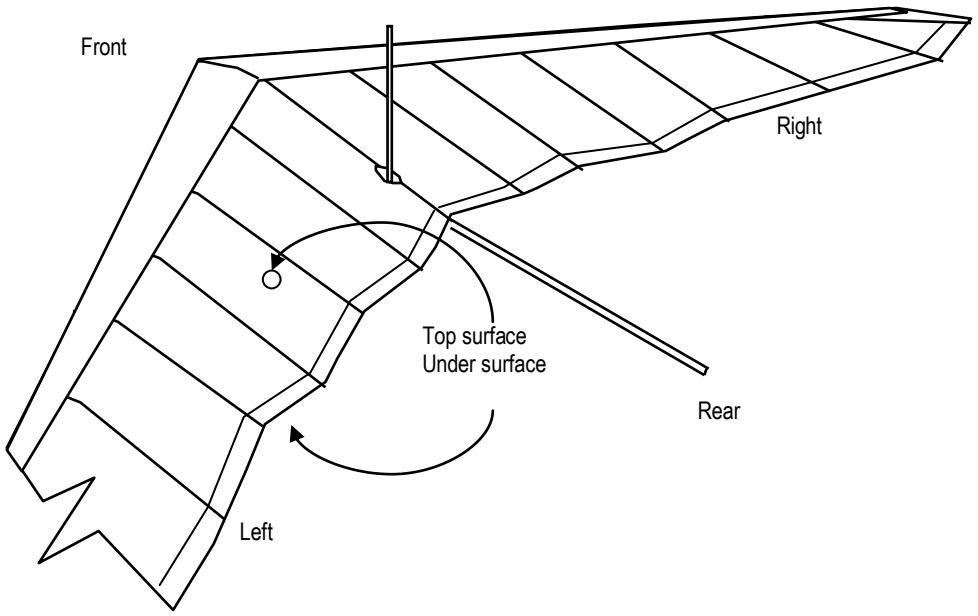
The stall is mild and progresses slowly. When it starts you can hear the sail ruffle but the glider continues to fly and handle. Push it a bit more and it begins to mush and settle without dropping a wingtip.

The glider has good energy retention for this style of glider. You can use this characteristic to zoom along the beach and pass through patches of nil lift then use the speed to climb onto the dune at the other side.

ASSEMBLY FROM SHORT PACK TO FULL LENGTH

You may have received your glider “short packed”. This is when the outer leading edges have been removed and packed in with the rest of the glider so the packed length is shorter. Normally your Malibu will have been assembled to full length by your dealer. If your glider is already full length, skip this section and go to the Set Up Procedures section.

All references to “top”, “bottom”, “left” and “right” are referred to in flying mode.



1. Unzip the glider bag and roll the glider so that the top is up. Undo the straps and extend the sail.
2. Open the wings about 40 degrees 
3. The rear leading edge tubes will be packed in the box with the glider. Locate them and remove the packaging.
4. On the glider, inside the leading edge pocket, remove the packaging from the end of the front leading edges.
5. On the rear leading edge tubes, identify the right and left sides by laying the leading edge on the ground in the approximate place along the wing where it will go. Fit the dive strut in its socket. The dive strut should be at the rear and pointing towards the keel. Now note the position of the plastic grey hook on the leading edge, it should be towards the bottom of the tube. If not, that leading edge belongs on the other side.

6. On the rear leading edge tubes, note the slot at the inner end. This slot locates the leading edge onto the locating pin when it fits into the front leading edge tube.

7. Take the rear leading edge for the right side and slide it inside the sail at the right wing tip. As you proceed, hold the dive strut against the leading edge so that it can slide in too and then make sure that the dive strut exits the sail via the small hole in under surface of the sail.

8. Move to the leading edge where the front and rear leading edges meet and open the inspection zip. Align the rear leading edge so that it slides inside the front leading edge. Rotate the rear leading edge until the slot (previously noted) locates into the locating pin that is in the front leading edge. Do NOT remove the locating pin, there is no need.

9. At the wing tip, check that the dive strut is exiting the sail correctly. If not, you may need to rotate the outer leading edge 180 degrees. Do this by sliding it partially out of the front leading edge so that it is free of the locating pin on the front leading edge.

10. At the wing tip, the sail is held in place by a strap that fits over the end of the leading edge. There is also a Velcro band that goes around the leading edge after the strap is fitted. To fit the strap, put your left hand inside the sail and grip the leading edge. With your right hand pull the sail strap over the leading edge. There is an extra loop on the sail tip that you put your fingers in to pull the sail. Fasten the Velcro band around the leading edge tube; the Velcro may get hidden between the leading edge tube and the sail and you will need to pull it out with your fingers.

    Tip 1: Before fitting the strap, put the Velcro band around the tube and just attach the very tips. This stops it getting caught behind the tube.

    Tip 2: If the strap is hard to fit, try spreading the wings a little more or less if you having difficulty.

11. Repeat steps 7 to 10 for the left wing.

CHECK

Verify that the straps are on the right way up. It's possible to have them 180 degrees out.

SET UP PROCEDURE

There are two set up methods and both are covered in this procedure.

- Standing on the control frame.
  Good for lighter winds. The glider stands on the control frame and then you open the wings and finish assembly. The glider stands rear to wind.

- Flat on the ground.
  Good for stronger winds. The glider is assembled flat on the ground with the nose into wind.

Choose the method you want and follow the steps below. Differences for each method will be described in the procedure.

1. Place the glider (still in the bag) on the ground with the nose into the wind and the zipper up. Undo the zipper.

2. Undo the ties that hold the control frame; remove padding and spread the uprights (downtubes).

3. The glider is fitted with a speed bar which has a top and bottom. When in flying mode the middle bend in the speed bar is forward and is angled downwards slightly. Connect it to the corner brackets with the pip pins.

CHECK

Check that all wires are outside the control bar.

CHECK

Check that the pip pins are pushed all the way through and secure.

4. Remove the batten bundle and any padding.

5. For standing set up, rest the glider standing on the control frame. Attach the nose wire. Move the glider so it is at right angles or slightly rear facing to the breeze. The glider may flop to one side of the control frame. This is normal.

   For flat set up, flip the glider over with the control frame folded back. The glider should be nose into the wind. Make sure the nose is flat on the ground; this will avoid the breeze lifting and flipping the glider when the wings are spread.

6. Remove the glider bag. For standing set up, take it from the nose first to avoid the bag pulling the glider over should it be caught by a fiendish gust. Remove remaining ties and padding,

7. Move to the nose of the glider and insert the nose batten checking that it fits over the lug on the keel. After initial assembly you can leave the nose batten in but pull it out slightly when packing up.

8. Spread the wings, taking care that any wires are not snagged around the keel or fittings. Do not force the wings open if they are stuck, check for snags.

CHECK

Check that your glider is in no danger of being blown over.

9. Erect the king post and attach the rear luff line wires to the top of the king post by clipping the small carabineer through the thimble.

CHECK

Check that the bridle lines are not twisted or kinked.

10. Move to the rear of the glider. At the keel, pull back the double wire crossbar restrainer cable so the stainless steel shackle will clip into the catch (Bailey Block) at the rear of the keel.

11. Take the rear top wire, feed it through the restraining loop on the back of the sail and clip the ring into the catch. The top wire can feel quite tight. Try pulling the ring end of the wire upwards with a little force and then put it down into the clip. If that does not work, unclip the nose wires, attach the rear top wire then re-attach the nose wires.

CHECK

Check that the rear top wire is free of any of the luff lines.
Check that the rear wire is through the restraining loop on the sail.

12. Take the battens from their bag and lay the green-tipped battens behind the right wing, starting with the keel (longest) batten, out to #7 near the wing tip. Take the red (left) battens and match them against their appropriate green partner and check for symmetry. If any inconsistencies occur, the full set of battens should be checked against the template and corrected. (Refer to General Tuning section.)

13. Familiarise yourself with the functioning of the batten flip tips. Do not use force to release them as that will break the clasp. To release them, squeeze the tip and lift. The batten length is adjusted by screwing the tips in and out. The length has been adjusted at the factory and should be correct.

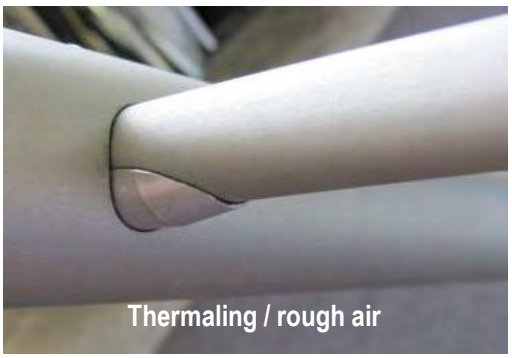
14. Starting at the centre of the glider, insert all the battens except the last one at the tip. Gently push them into their batten pockets and secure them by opening the batten tip, fitting it under the sail edging and closing the tip. Do not force the battens.

NOTE

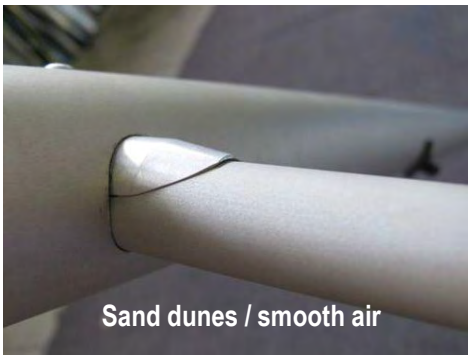
If the battens fail to slide in completely, first check if it is the correct batten for the pocket. It is most likely that the batten has stopped against the back of the leading edge and requires lifting over to the front. To do this either flick the sail up and gently push the batten at the same time, or walk to the front and lift the sail forward bringing the batten tips over the leading edge.

15. The tip (#7) batten can now be installed. It should be installed so that the bend is downwards. These battens locate onto the hook found on the back side of the leading edge about 45 centimetres (18 inches) inboard from the tip. Sight through the sail at the wingtip to ensure that the end of the batten is engaged on the hook and secure with the double cord. The cord maybe quite tight. There is a loop on the end of the cord to put for your finger through. Use it to pull the cord over the batten tip.

16. Insert the dive strut into the leading edge. The hole in the leading edge is oval shaped to accommodate the mound on the dive strut. For thermaling, put the mound at the bottom, this raises the dive strut for additional dive recovery. For dune flying put the mound at the top to allow more sail movement during big control inputs.



Thermaling / rough air



Sand dunes / smooth air

17. Fit the nose fairing by matching Velcro strips on the under surface. The top is permanently attached via bungee cord.

18. For flat set up, if there is wind, get an assistant. Have your assistant lift the keel while you lift the nose of the glider. Keep the angle of attack low so the wings do not get lifted. Raise the glider up onto the control frame and attach the front wires to the nose clip. From here on you will need your assistant to hold the nose while you prepare the harness and perform pre-flight checks.

WARNING

When lifting the nose in a significant breeze, there is a high risk that the wings could fold upwards before you can get the glider raised onto the control frame. Avoid this by having an assistant lift the keel while you lift the nose keeping the angle of attack down so that the wings do not fly up.

19. Check that the hang loop and back-up loop are in the correct position. The shorter loop (main) should be towards the rear. The longer loop (back-up loop) should be to the front. Check that the hang loops pass through the small restraining strap which stops them sliding forward on the keel.

CHECK

Check that hang loops are not damaged.

20. Clip your harness carabineer into both the main and backup loops. There should be no tension on the backup loop when the harness is in the flying position. Ensure that the carabineer is closed and the hang loops are hanging straight from the keel.

Harness Adjustment

It is best to have your hang loops and harness adjusted as low as possible within the control frame (2 – 7 cm above the base bar). This lower position gives maximum stability and allows greater control input. It also gives better glider feedback.

If you need to raise or lower your harness, change your hang loops. Do not tie knots in them. Your Moyes dealer can supply different length hang loops.

PRE-FLIGHT CHECK

Follow the same routine every time you set up. If you are distracted, begin again. A good habit is to touch or point to each component that you are checking. This ensures that the check is more than just a cursory glance.

Starting from the hang loops and harness:

Control frame:	- all nuts & bolts are secure - thread shows beyond the head of Nyloc nuts. - speed bar is angled correctly (downwards) - uprights straight.
King post:	- base bolts are secure.
Crossbar:	- ball is centred in socket joints - no bends or dents - side wire connects not twisted
Keel:	- sight for dents or bends - pullback cable is not twisted
Nose plates:	- nose plates straight - nuts and bolts done - wires, thimbles and tangs straight - Nose wire attached.
Leading edges:	- sight along leading edge for bends. - feel along wings for dents in tube - side wire connection, tangs, thimbles bolts.
Wing tips:	- tip batten is located on hook - sail straps over tip and right way up - dive struts fully inserted, raised lump at the bottom for thermaling
Battens:	- all battens tips done up.
Rear pullback:	- restraining cable shackle is secured in the Bailey Block - top wire is through the loop on the sail rear. - top wire is connected to Bailey block - bottom rigging has no twisted tangs
King post:	- top rigging and luff lines free from twists.
Next wing:	- continue around the glider performing same checks on other wing.
Rigging:	- look out for frayed or corroded rigging, especially near swages.
Hang loops:	- no cuts or frays - correct CG position - harness attached, carabiner done up and in correct loops.

NOTE

Never detach the harness from the glider until you are packing up. Climb into your harness AFTER it is attached to the glider. This will avoid the risk of taking off without being attached.

The glider is now ready to fly!

Climb into the harness making sure your legs are through the leg loops. Check harness height, helmet, instruments, wind at launch and broader conditions.

FLYING THE MALIBU

Ground Handling and Launching

The Malibu's launch characteristics are mellow and predictable. The glider will lift at low air speeds.

For ground handling in winds over 14 knots, you may find it difficult to keep the nose down due to the pitch up created by the luff lines. For this situation try holding the base bar instead of the conventional launch method of arms down the uprights.

In Flight

The glider is trimmed to fly a little faster than stall speed so you should not need to apply much pitch input. Due to the nature of single surface gliders, the glide angle drops off significantly at high air speeds. The best glide between thermals will be at lower speeds (38kph 24mph). Take care in stronger winds to be within glide angle of a landing area. If you find yourself "cornered" by a strong wind, look for landings downwind or wait patiently for extra lift or for the wind to drop.

For small thermals, the glider can turn in very tight circles if it suits you. The inside tip does not drop in and the glider does not spin.

Landing the Malibu

The success of any landing is linked to the accuracy and planning of its approach. Leave ample time to plan and set up a safe landing with room for variable conditions or misjudgement.

For this style of glider (single surface), fly fast to spoil your glide angle. To maintain your glide angle fly slower (this works well for single surface gliders like the Malibu but may not for high performance gliders).

While there is still enough airspeed left to flare, slowly increase your rate of push out bringing it to a full UP and OUT arm extension. If the glider is gusted up or you have too much airspeed, stop pushing (but do not pull in) until that energy has been used, then complete the flare. Never swing your legs forward in anticipation of landing as this can lead to a nose-in.

PACK UP

Two methods of packing up the glider are described below;

- Standing on the control frame.
  Good for lighter winds. The glider stands on the control frame and you fold the wings in and finish packing. The glider stands rear to wind.

- Flat on the ground.
  Good for stronger winds. The glider is packed flat on the ground with the nose into wind.

Laying the Glider Flat

If the wind is over 16 kph (10 mph) and you wish to park the glider safely, it is best to lay the glider flat on the ground with the nose into the wind. To do this, lift the nose fairing to expose the nose catch assembly. Whilst holding the keel so the glider can't blow over, remove the nose wire ring from the Bailey Block and carefully walk forward with the nose of the glider allowing the control bar to fold back under the glider until you have lowered the wing to the ground.

If the glider is to be parked for any length of time, or if the wind is quite fresh, it is also advisable to unclip the luff lines to prevent the nose from being lifted by the wind. From here the glider can be quickly reassembled or broken down.

Packing up

This covers flat and standing pack up.

1. Standing pack up: turn the wings so that the wind is blowing on to the back of the glider.
   Flat pack up: Leave glider in the "flat" position described above with the nose into wind.

2. At the wing tips, pull out the dive struts. Fold the dive struts in and attach them to the Velcro patch under the leading edge.

3. Starting at the wing tips, remove all the battens. Be careful opening the batten flip tips; no force is required other than squeezing. Do not force them open or the clasp will break.

4. Gather the batten curved ends together and feed them into the bag in a bundle.

5. At the nose, detach the nose cover Velcro from the under surface. Place nose cover on top of glider.

6. The nose batten stays in the glider. Lift it off its lug and let it sit over the front of the nose plate.

7. At the rear of the glider, unclip the crossbar pullback and kingpost wire.

8. At the rear of the glider and at the middle of one wing, lift the trailing edge of the sail so that the leading edge folds in about half way. Do the same on the other wing. Do not lift the leading edges too high when swinging them in. Repeat the process to bring the leading edges right in against the keel.

9. If any sail is trapped between the keel and leading edge, pull it out from the top and lay it out to the sides. Roll the sail until it lays against the leading edges. Roll loosely; tight rolls tend to encourage wrinkles.

10. At the wing tips, fit the tip bags over the rolled sail.

11. From the rear of the glider unclip the luff lines and lay the kingpost forward. Attach the luff line clip to the reinforced sail area around the king post base. Tuck the luff lines into the sail.

12. At the rear of the glider, slide the padded sleeve up the keel until it covers the tangs and fittings at the rear of the keel. Place a tie under the glider (around the middle) and fasten the tie but leave it reasonably loose. Repeat with three more sail ties, tidying the rolled sail as you go.

13. Place the cover bag over the glider.

14. Standing pack up: Unclip the front wires.

15. Carefully flip the glider onto its back.

16. Place the batten bag at the nose of the glider with the curves to the front. Put the glider ties over the battens to hold the battens in place.

17. On the base bar, detach the corner bolt and fold the uprights down along the keel; you may need to undo some ties. Fold the base bar down towards the rear. Put the bolt back in the upright and do it up well so that it doesn't come off during transport. Bring all the wires forward to make a neat bundle, avoid kinks. Refasten ties. Place padding around the bottom of the uprights.

18. Zip up the bag.

SPECIFICATIONS

	Malibu 166	Malibu 188
Area	15.4 sq m 166 sq ft	17.5 sq m 188 sq ft
Span	9.2 m 30 ft	10.1 m 33.1 ft
Nose Angle	120.5 degrees	120.5 degrees
Aspect Ratio	5.5	5.8
Glider Weight	23 kgs 51 lbs	26 kgs 57 lbs
Optimum Pilot Weight	60 kgs 132 lbs	85 kgs 187 lbs
Hook-In-Weight	60 -110 kgs 132 - 242 lbs	80 - 126 kgs 176 - 277 lbs
Packed-Length	5310mm 17.4ft	5950 mm 19.5 ft
Short-Packed Length	3510mm 11.5ft	4000 mm 13.1ft
C of G from Front of Keel	1658mm 65.3 inches	1750 mm 68.9 inches
Number of Battens: Top Bottom	 15 0	 15 0
VNE (Velocity Never Exceed)	85 kph 53 mph	74 kph 46 mph
VA (Design manoeuvring speed	55 kph 34 mph	55 kph 34 mph
Trim Speed	32kph 20mph	32kph 20mph
Stall Speed	22kph 14mph	22kph 14mph
Max Speed	70 kph 43 mph	65 kph 40 mph
Best Glide Speed	38 kph 24 mph	38 kph 24 mph
Best Glide Angle	9.5:1	9.5:1

DESIGN NOTES

This glider meets the Moyes standard for safety and performance.

Pitch stability and dive recovery come from the sail twist and the combination of the luff lines and the dive struts. It is important to understand that any alteration to luff line lengths or batten profile may reduce the glider's pitch stability.

The Malibu meets or exceeds all DHV airworthiness standards. DHV is a German standard broadly accepted in Europe.

OPERATING LIMITATIONS

The glider has been tested to these limits

- with a positive 30° angle of attack at 100 kph (65 mph);
- with a negative 30° angle of attack at 74 kph (46 mph);
- with a negative 150° angle of attack at 51kph (32 mph);
- Pitching moment tests at 32, 56 and 80 kph (20, 35 and 50 mph) to display the gliders inherent positive pitch stability.

The Malibu has been designed for foot-launched gliding or soaring flight with the following limitations:

The glider must not:

- be flown by more than one person;
- exceed 30 degrees nose up or down to the horizon;
- exceed 60 degrees bank angle to the horizon;
- be flown in excess of V.N.E. of 74 kph (46 mph);
- be flown inverted or backwards;
- be flown with auxiliary power without the approval of Moyes Delta Gliders Pty Ltd.

Adhere to the recommended pilot clip-in weights as detailed in the specification. Indicated stall speed is approximately 27 kph (17 mph) at maximum loading. Indicated maximum speed is approximately 56 kph (35 mph) at minimum loading.

DISCLAIMER

The owner and operator must understand that due to the inherent risk involved in flying such a unique vehicle, no warranty is made or implied of any kind against accidents, bodily injury or death. Operations such as aerobatic manoeuvres or erratic pilot technique may ultimately produce equipment failure and are specifically excluded from the warranty.

This glider is not covered by product liability insurance, nor has it been designed, manufactured or tested to any state or federal government airworthiness standards or regulations.

GENERAL TUNING HINTS

Your Malibu is test flown prior to delivery. Unless it has been damaged in transport it will arrive with standard factory trim.

The flight characteristics for proper "trim" setting are as follows:

- Trim speed without pilot input is approximately 4 kph (2 mph) above stall speed.
- The glider will produce bar pressure to return to this trim setting whether it is slowed below or accelerated above this speed.
- The glider will fly straight unless acted upon by variations in the air.
- The glider will bank evenly, both to the left and right, showing no differing tendency to increase the bank (wind in to the turn) or to flatten out in the turn, thus coordinating identically in both directions.

If you are unsure about making adjustments please seek assistance from your Moyes dealer or at least a more experienced pilot.

Whenever you make adjustments, only change one thing at a time.

Check the simple things first:

Hang loops: (centre of gravity) be sure the loops cannot slip fore or aft from the set position. Normal trim is to hang from the rear loop. The front loop is the safety and should not be bearing any weight. Make sure you put the harness in the flying position when you check this.

Batten tensions: the flip tips should be as loose as possible without leaving any wrinkles in the sail on top of the batten pocket. To adjust the batten length wind the flip tip in or out (they are threaded) Check the tip batten is inserted correctly (with the bend down).

Batten shape: compare the battens of each wing and make sure they match. If there are differences you will need to check them against profile that came with your glider.

NEVER alter the luff lines from original setting and specifications. Alteration of these could affect the glider's pitch stability and would possibly go undetected in normal flight conditions.

Trim Speed

Trim speed adjustment can be achieved by moving the hang loops forward to increase trim speed or aft to reduce trim speed. Move the loops less than (10mm) 1/2" at a time, ensuring that they are secured in their new position. Adjustment beyond 50mm (2") is normally not necessary. If greater adjustment is required please ask your dealer to retest the glider.

After many hours of flight time the trim speed may change as the sail shrinks. This is a normal process for all gliders.

Bent or Damaged Leading Edge:

A bent leading edge will create a turn. Mild bends may not be obvious when the glider is assembled.

Remove the leading edges (start with the one on the side to which the glider seems to turn) and check them for bends or dings. If you can not find a bend, one of them may have been stressed and as a result, now displays a slightly different flexing characteristic to the other. (You will find directions for sail removal and leading edge removal in the Maintenance section.)

If the leading edge is bent beyond straightening (ie. if grazing of the anodising is evident then the bar is likely to be beyond salvage.) or, is dinged then it will need replacing either as a front or back section, or both.

To straighten, place the centre of the bend mid-way between two well padded supports, with the bend curving up, apply a steady downward force releasing once the bar flexes just beyond a similar deflexion in the opposite direction to the bend. Carefully inspect the tube to assess any improvement and repeat, becoming gentler as the bend is reduced. Never over-straighten and if the bar seems to return to straight or beyond without much effort then it has been over-stressed and will need replacing. Always look for signs of crazing and feel for deformation around the vicinity of the bend.

NOTE

This repair is very delicate and should only be attempted if the bar is only slightly bent. It is always a good idea to consult your Moyes dealer before rushing in.

Sail Tension

Sail tension adjustment is not normally required but is achieved by shortening or lengthening the leading edge. At the wing tip, remove the sail and the plastic end cap. To lengthen, add spacer(s) to the end cap and reinstall it in the leading. To shorten, remove spacers (if any). Call Moyes for spacers and advice.

Glider Care

General Hint: If you are replacing any components, keep the old one so that you can check the dimensions of the new one when it arrives.

Post Flight

After coastal flying and particularly on sand dunes, the glider will be covered with a thin layer of salt spray. Wipe down the tubes and wires with a towel or cloth. Clear sand out of the wing tips and fittings so that it does not spread through the glider.

Storage

Keep the glider in its bag and store in a dry place out of the sun. It is best if the glider is stored on padded racks where the air can circulate. Avoid leaving the glider on the floor or ground for any length of time as this allows ground moisture to work its way in. Don't keep the glider in air tight tubes or bags; the slightest moisture trapped can cause mildew.

If you fly on the coast it is advisable to regularly flush your glider with fresh water.. Leave the glider open in the sun to dry COMPLETELY, including the inside of the bars, before packing away.

If the glider is damp after a days flying, dry it in the sun the next day. If this is not possible, place the glider bag zipper down on your storage rack, open the zipper full length and release all the glider ties. Loosen up the sail so that air can circulate as much as possible. Set-up and dry properly on the first sunny day.

Sail Care

Avoid contact with any oils, solvents, caustic or acidic substances. This includes salt water, salty sand, animal dungs, and preservative treatments such as Armour All. If the sail must be washed, use fresh water. For stubborn stains a weak detergent may be used provided it is THOROUGHLY rinsed from the sail cloth.

Sail materials are deteriorated by ultra violet light, keep the glider in its bag when not being flown and out of the sun.

For small rips and tears on non-stressed areas, sticky-back sail repair tape can be used. A sail maker should make any repairs to larger tears or damage on high-stress areas, such as along the trailing edge and at sail mounting grommets.

Use the protective padding supplied when packing up your glider and check that no sail is caught between metal fittings. Abrasion caused during transportation is common. Watch for rub spots on the sail or frame and add padding or change you pack up method to stop them.

Battens

The battens usually hold their shape well unless there has been an incident or undue wind pressure on the back. If reshaping is required, warm the tube first by rubbing and avoid over working the tube.

Sand in the batten pockets abrades the pocket ends. When inserting battens wipe off dirt and sand.

Rigging Wires

If there is any fraying or kinks, replace the wire immediately. Keep a constant eye for damage to the outer plastic coating or any discolouration as these are a sign that damage may exist either from an external force or from corrosion.

If the thimble has been elongated, then the cable, thimble and nico-press have been exposed to a force of over 300-400 lbs. Once again, replacement of the wire is advised.

If your wires are immersed in salt water, it is advisable to at least replace your bottom side wires.

Tubing

For heavy coastal use, you might try polishing exposed tubes with car wax to create a barrier. You can also coat the inside of tubes with linseed oil. That's a job for non flying days.

Contact with salt air and water are a major concern and removal of the tube end caps will be required to thoroughly flush out with fresh water. Corrosion and electrolysis set up amazingly fast.

Transportation

Use good padding between the glider and racks. Three support points should be used, with the glider being firmly tied at all three points. Avoid unequal overhang at the ends.

The glider can be transported on its back or bottom. When it is sitting on the racks feel around the pressure points for fittings and move the glider for or aft to get the least wearing position.

MAINTENANCE SCHEDULE

Every 10 hours:

- Check battens against template.

Every 50 hours (or 6 months):

- Inspect the sail. Apply sail repair tape to any small rips or tears. Check the stress areas of the sail, luff line attachment, sail mount screw grommets, king post opening. Tears or nicks in the trailing edge will need professional sail repair. Wire slots are also prone to wear under certain conditions. Critical damage should be repaired by a professional sail maker.
- Batten cords at wing tip
- Inspect crossbar tensioning rigging and fittings.
- Crossbar ball and socket joints, nuts, and bolts, and associated components.
- Check all tubing for dings, bends and wear damage.
- Inspect cables for broken strands with special attention to the thimbles and attachment points. Check any areas with plastic coating damage more closely.
- Check that thread shows beyond all locknuts and that safety pins and rings are serviceable and not prone to accidental opening.

Every 100 hours (or 12 months):

This is a complete strip down of the glider removing all components and tube end caps so that every component can be fully inspected.

This annual inspection can be done by you but preferably your Moyes dealer or a qualified hang glider technician.

CHECKING THE STABILITY SYSTEM

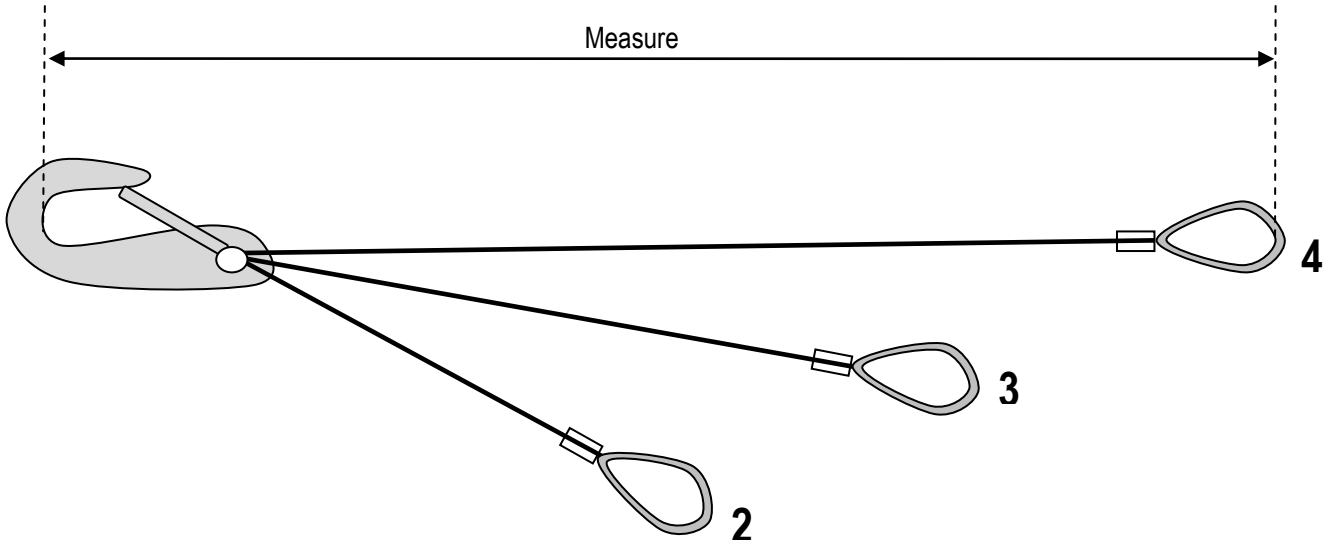
The stability system is the dive struts and the luff lines.

The dive struts have two settings and these are set by inserting the dive strut with the mound on the top or on the bottom. Putting the mound at the bottom raises the dive strut to provide greater dive recovery. This setting should be used where turbulent conditions may occur such as thermal flying.

There are three luff lines on each wing. Periodically check the lines for kinks and corrosion. Under normal flying conditions, the luff lines are slack. The length of the luff lines is set at the factory and should not be changed. You can verify the length of the luff lines if you wish. Measure from the hook underside to the top of the washer at the trailing edge.

Luff line lengths

Model	Batten Numbers		
	2	3	4
Malibu 166	1464 mm	2121 mm	2890 mm
Malibu 188	1612 mm	2363 mm	3243 mm



SPARE PARTS ORDERING

You can order spares from your Moyes dealer or directly from the Moyes Gliders factory.

Gliders have a unique serial number located on the nose plate and on the sail. The number is the same on both.

- On the nose plate, the serial number is attached with a sticker
- On the sail, the serial number is located inside the under surface zipper at the nose.

Photograph courtesy of www.flygirl.co.za

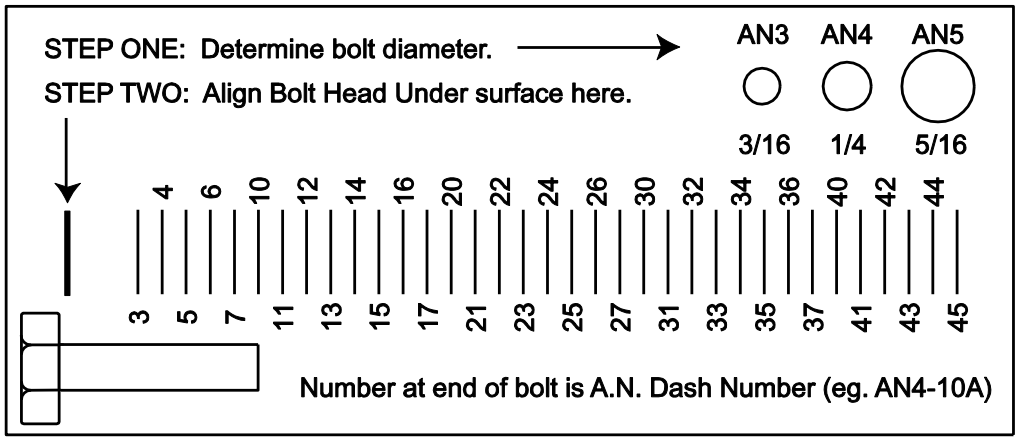
The serial number format is like this;

Database number				Month / Year manufacture				Model ID				Sequence no.		
1	2	3	4	0	3	1	0	M	1	8	8	1	2	9

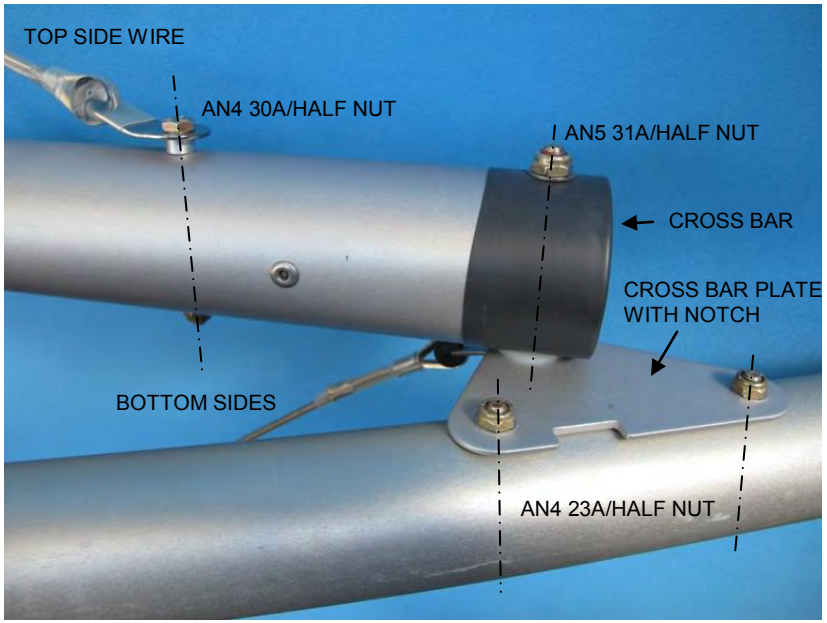
When ordering a part, specify the following details;

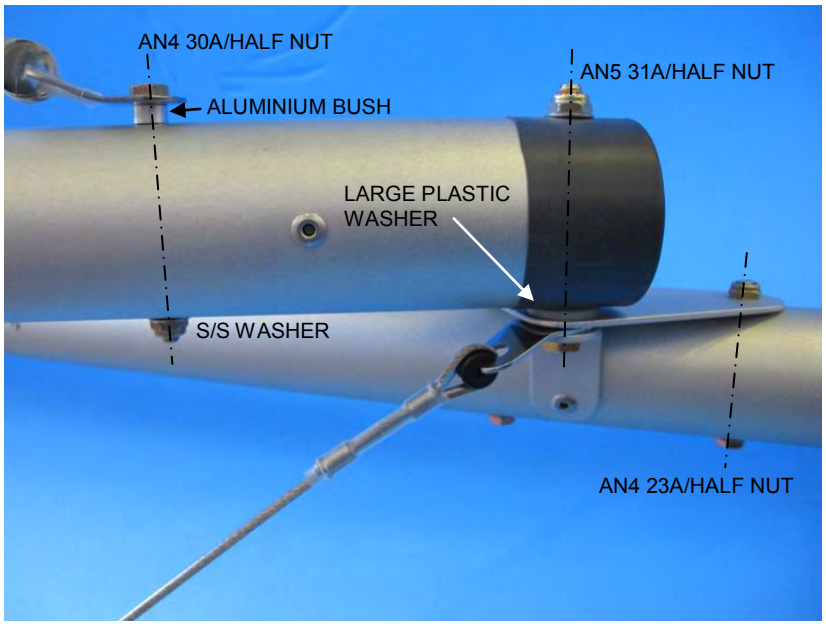
- Glider serial number
- Model – Malibu
- Size – 188 or 166
- Aerofoil or round uprights
- Left or right
- If you know the name of the person who ordered the glider new, that can also be helpful information as the factory can reference the original order specifications.

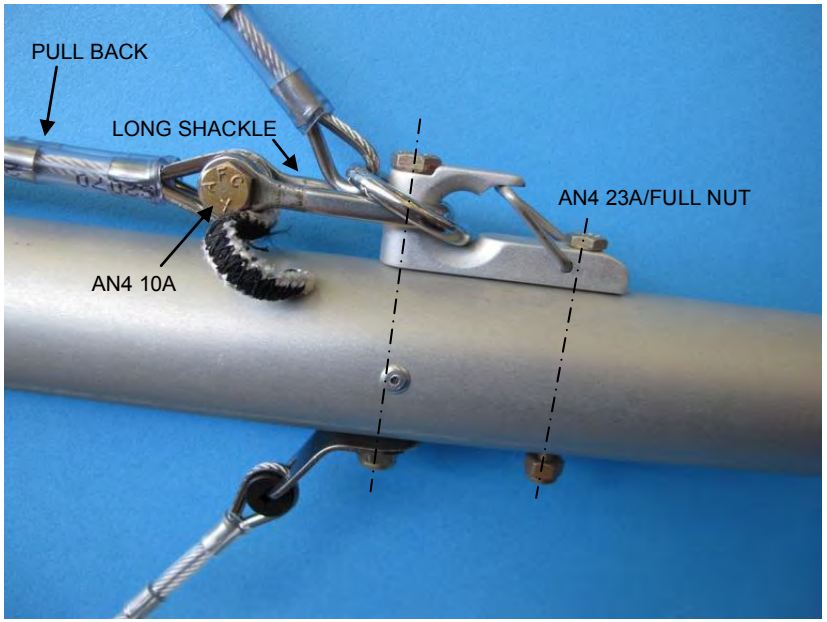
BOLT INDEX & LIST

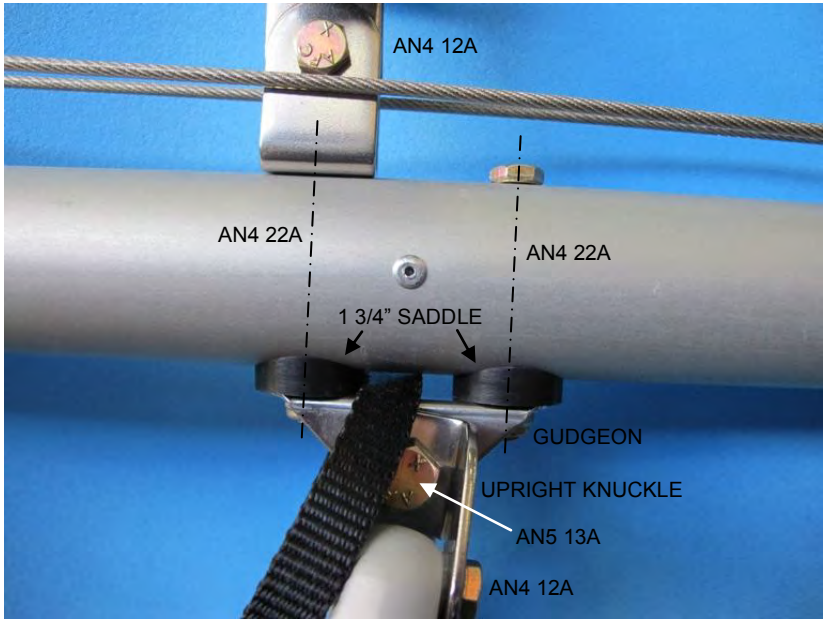


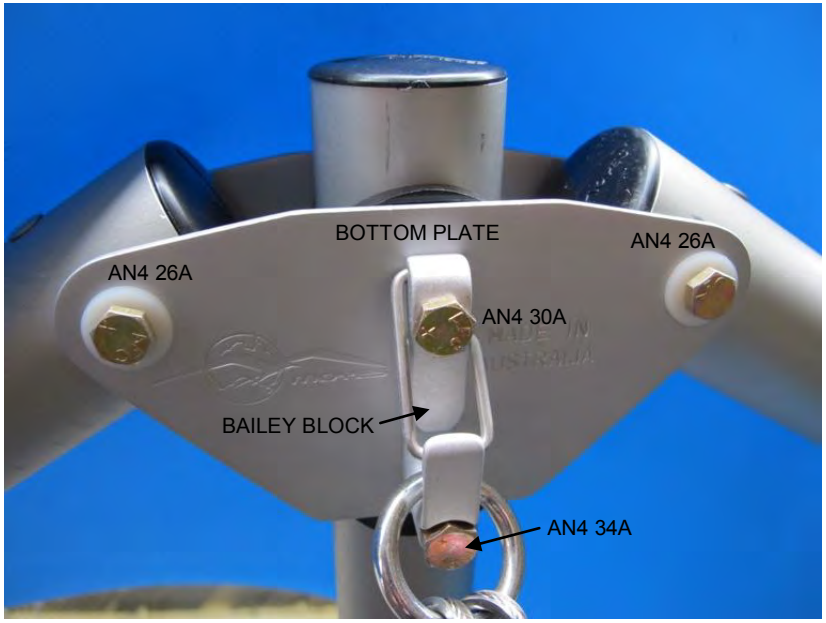
JUNCTION	PART NO.	QTY.	NUT	WASHERS
NOSE PLATE / LEADING EDGE	AN4-26A	2	H	4 MED PLA
NOSE PLATE / KEEL / FRONT	AN4-30A	1	H	S/S
NOSE PLATE / KEEL / REAR	AN4-34A	1	H	
KEEL / CONTROL BAR /("A" FRAME)	AN5-13A	1	H	2 MED PLA, 1 SS
KEEL / KING POST / GUDGEON	AN4-22A	1	H	
KEEL /GUDGEON	AN4-22A	1	H	SS
CROSS BAR / LEADING EDGE PLATE	AN5-31A	2	H	SS
CROSS BAR / TOP WIRE	AN4-30	2	H	ALU BUSH
CROSS BAR / PLATE / LEADING EDGE	AN4-23	4	H	ALU
CROSS BAR / CENTRE R/H REAR	AN4-30	1	F	2 PLA
CROSS BAR / CENTRE R/H FRONT	AN4-30	1	F	SS
CROSS BAR / CENTRE LHS / TANG	AN4-30	1	F	SS
CROSS BAR / CENTRE/ BALL / BRACKET	AN4-25	1	F	SS
CROSS BAR / HINGE / SADDLE SPACER	AN4-17	1	H	SS
KINGPOST / U BRACKET	AN4-12	1	H	SS
X BAR PULL BACK / SHACKLE	AN4-10	1	H	
DOWN TUBE TOP / STEEL BRACKET	AN4-12A	2	H	SS
DOWN TUBE TOP & BOTTOM / PLUG	2C35 C.PIN	4	RING	
DOWN TUBE / BASE TUBE KNUCKLE	AN4-12A	2	H	SS
BASE TUBE RIGHT	AN4-13A	1	H	
BASE TUBE LEFT	PIP PIN	1	CAP	

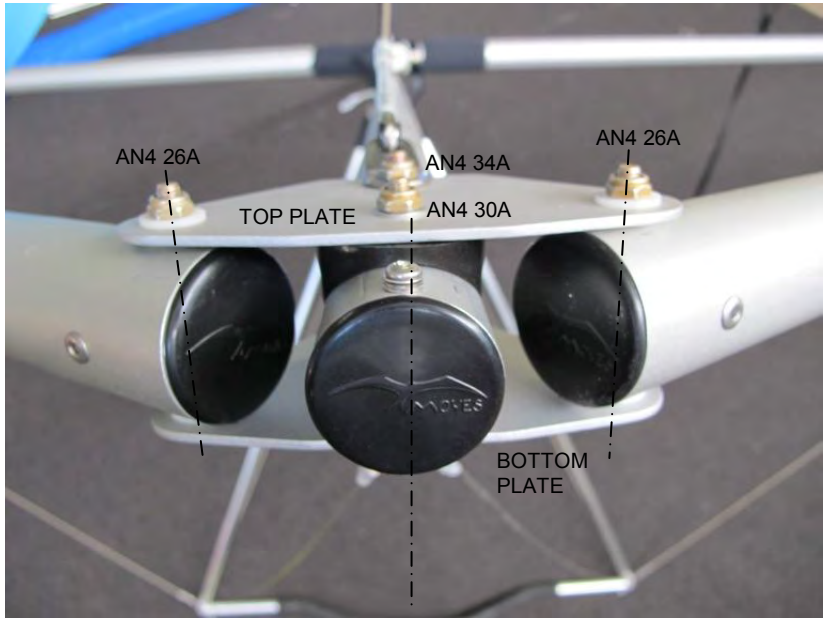

TOP SIDE WIRE
AN4 30A/HALF NUT
AN5 31A/HALF NUT
CROSS BAR
CROSS BAR PLATE WITH NOTCH
BOTTOM SIDES
AN4 23A/HALF NUT

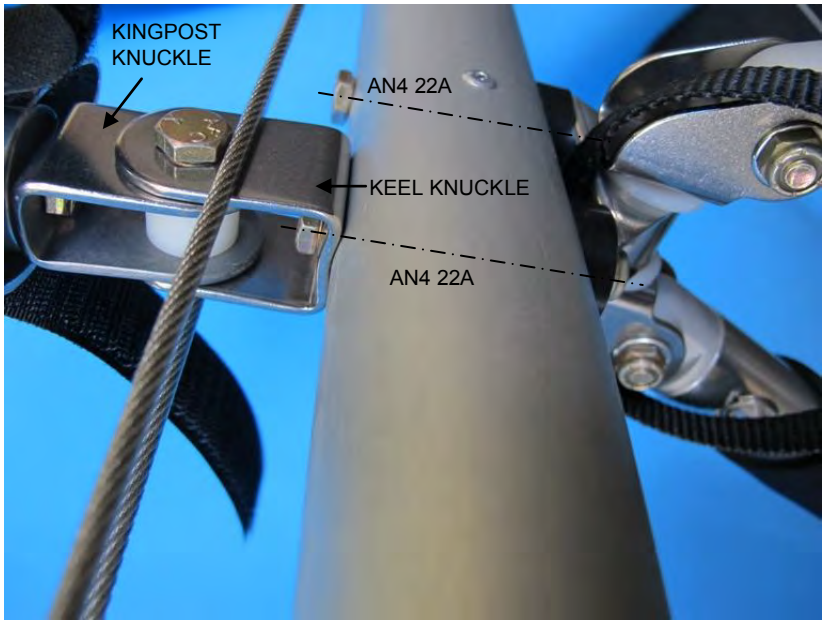

AN4 30A/HALF NUT
AN5 31A/HALF NUT
ALUMINIUM BUSH
LARGE PLASTIC WASHER
S/S WASHER
AN4 23A/HALF NUT

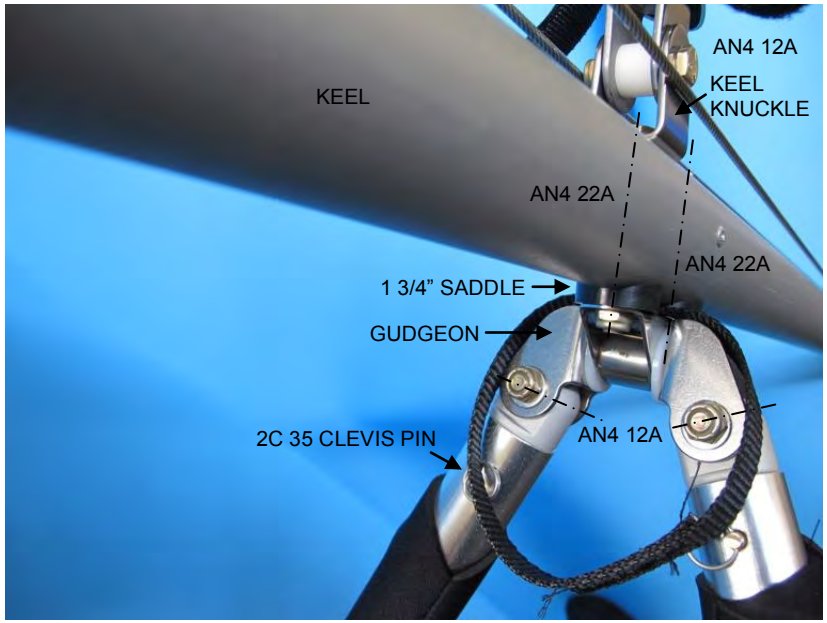

PULL BACK
LONG SHACKLE
AN4 23A/FULL NUT
AN4 10A

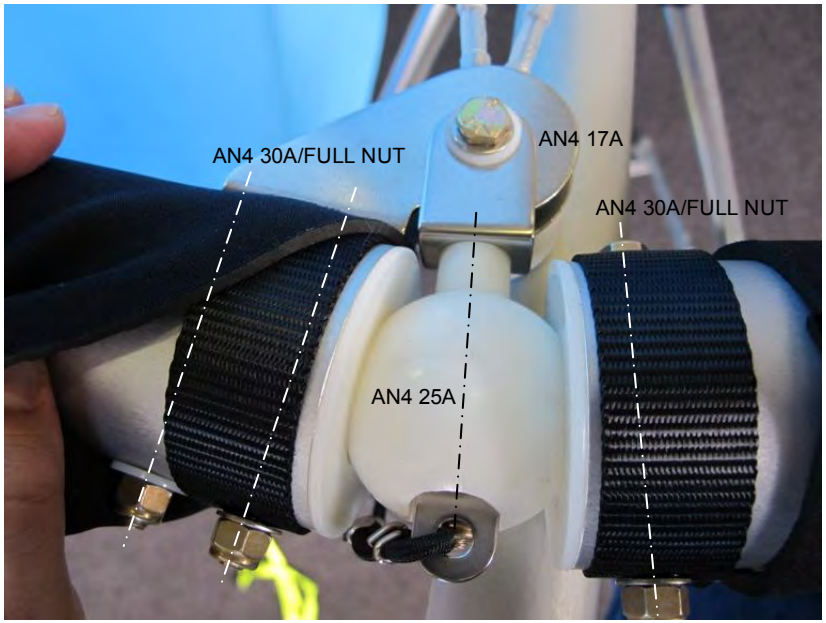

AN4 12A
AN4 22A
AN4 22A
1 3/4" SADDLE
GUDGEON
UPRIGHT KNUCKLE
AN5 13A
AN4 12A

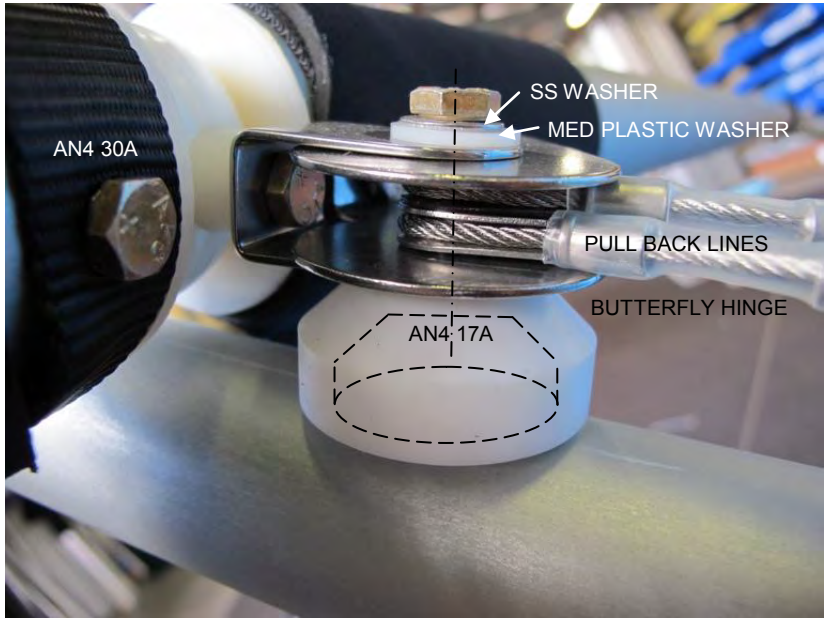

BOTTOM PLATE
AN4 26A
AN4 26A
AN4 30A
BAILEY BLOCK
AN4 34A

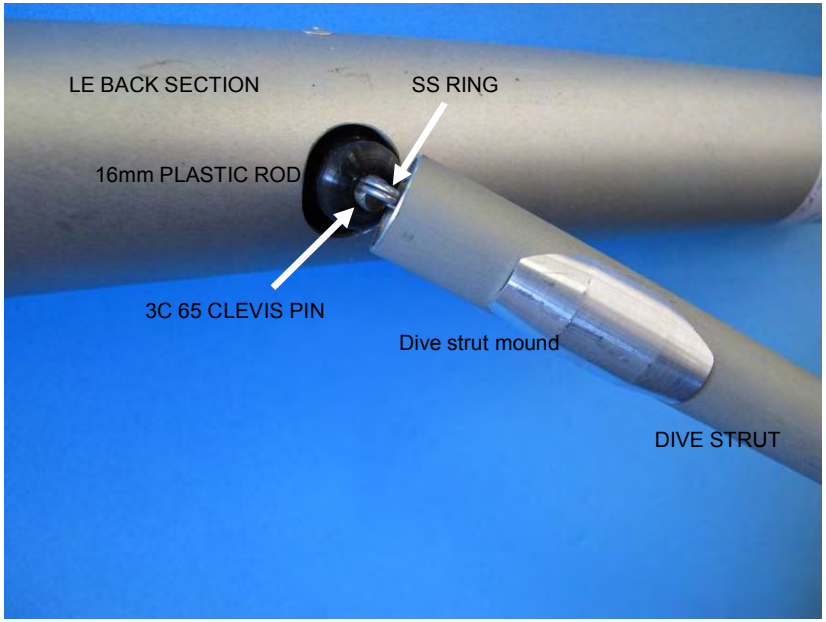

AN4 26A
AN4 34A
AN4 26A
TOP PLATE
AN4 30A
BOTTOM
PLATE

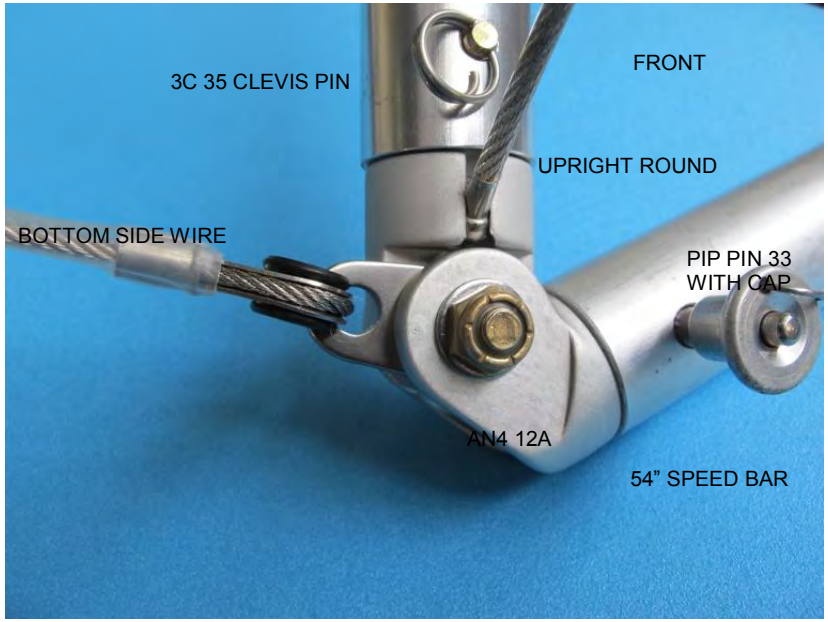

KINGPOST
KNUCKLE
AN4 22A
KEEL KNUCKLE
AN4 22A

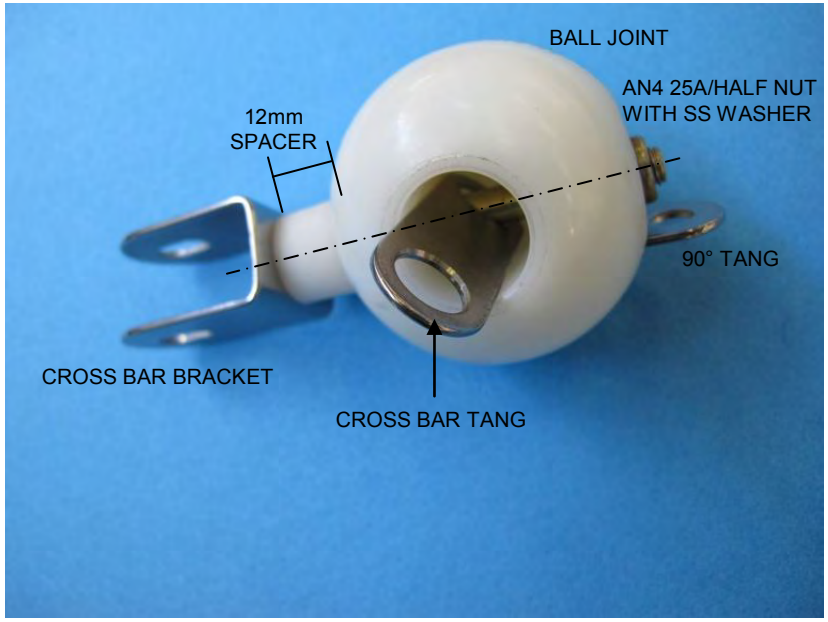

AN4 12A
KEEL
KEEL
KNUCKLE
AN4 22A
AN4 22A
1 3/4" SADDLE
GUDGEON
2C 35 CLEVIS PIN
AN4 12A


AN4 30A/FULL NUT
AN4 17A
AN4 30A/FULL NUT
AN4 25A


SS WASHER
MED PLASTIC WASHER
AN4 30A
PULL BACK LINES
BUTTERFLY HINGE
AN4 17A


LE BACK SECTION
SS RING
16mm PLASTIC ROD
3C 65 CLEVIS PIN
Dive strut mound
DIVE STRUT


3C 35 CLEVIS PIN
FRONT
UPRIGHT ROUND
BOTTOM SIDE WIRE
PIP PIN 33
WITH CAP
AN4 12A
54” SPEED BAR


BALL JOINT
AN4 25A/HALF NUT
WITH SS WASHER
12mm
SPACER
90° TANG
CROSS BAR BRACKET
CROSS BAR TANG

PURCHASE RECORD

Please complete this section for future reference.

Glider Model and Size	
Purchase Date	
Serial Number	
Dealer (purchased from)	
Dealer Address	

MAINTENANCE LOG

Date	Work Completed	By