Clubman Owners Manual

The Aerial Arts Clubman is a light-weight, high performance flexwing hang glider designed specifically for P1 pilots.

Its broad speed range and controllability will assist your transition from slope-soaring to cross-country thermal soaring.

Good Flying!

Ian Grayland

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Serial Number: C140/124

This manual contains a record of inspection and maintenance done on this glider. If the glider is sold, this manual should be forwarded to the owner.

2. Operational Limitations

This glider must not:-

1. Be flown by more than one person at a time.
2. Be allowed to exceed 60 degrees nose up or down.
3. Be allowed to exceed 90 degrees bank angle.
4. Be flown inverted or backwards.
5. Be flown with auxiliary power unless designed, installed and tested by Aerial Arts.

Flight operation is to be limited to non-aerobatic manoeuvres.

This glider is characteristically incapable of spinning.,

Maximum payload shall not exceed 215lbs.

Prior to flying this glider the pilot should thoroughly have read the appropriate owner's manual for complete operating and tuning instructions.

The glider should be protected in transit by a padded roof rack. Nearly all wear and tear occurs in transit.

3. Specifications

	C140	C160	C180
Empty Weight	46 lbs	47 lbs	52 lbs
Wing Span	29ft	29ft	30.5ft
Wing Area	138sqft	154sqft	176sqft
Aspect Ratio	6	5.4	5.4
Folded Length	17.5ft	17.5ft	18.5ft
Breakdown Length	12.5ft	12.5ft	14.5ft
Min Sink Rate*	185ft/min	190ft/min	190ft/min
Max L/D Ratio	10	9.5	9.5
Speed Range	12-45mph	12-42mph	12-42mph
Pilot Weight (in socks)	110-150lbs	140-180lbs	

Designed and solely manufactured by Aerial Arts.

*w/s = 1.2 lbs/sq ft.

4. Assembly Procedure

Lay the machine on its back on the ground, nose end into wind. Unzip the bag and assembly the A frame using the two stainless steel Quickpins to attach the control bar Microlinks. Fit the pins with the rings underneath so that the rings will not get damaged on the ground when you turn the glider over.

Check that no wires have been looped through the A frame by mistake and turn the machine over. Lay it flat on it's a frame keeping the nose wires in a convenient position.

Remove the bag and undo the sail ties. Take out the bundle of ribs from inside the front of the furled sail, remove their tie elastics and lay them on the ground at the nose end of the glider.

The sail ties should be put inside the A frame protection bag and this can be attached to the keel tube with the rib tie elastics.

It is a good idea to keep any miscellaneous items or unfinished actions at the nose end of the glider in one pile – this way nothing gets lost or forgotten.

Now walk to the rear of the machine, spread the wings a couple of feet each by lifting the leading edges up slightly (to prevent the sail scraping across the ground and getting dirty), and engage the washout limit tubes ("Tipsticks"). Ensure that these are in full engagement in their bushings and are at the correct angle (30 degrees).

Raise the king post by pulling on the rear top wire and locate the Reflex Bridle Loop above the stop crimp on the front wire. Note that the rear wire goes under this loop. Poke the rear wire through the webbing loop at the rear of the sail and leave it loose there for the time being. (See diagram). N.B. On the C140, the rear wire should be tied in the webbing loop permanently.

Spread the wings, doing so a few feet at a time each side alternately until they are fully spread. Insert the nose rib and engage it over the bolt end at the front of the to nose plate.

Take the rest of the ribs to (say) the right wing tip. Lay the ribs on the ground one at a time behind the appropriate rib pocket until you arrive at the other wing tip with only one rib left in your hand. Insert the ribs working from each wing tip towards the centre. Keep the back ends low down to facilitate insertion and slide them in slowly so as to minimise wear and tear. The elastics are best fitted by poking both forefingers down through the loops and putting both thumbs on the rib ends (see diagram).

Reach inside the rear of the keel pocket and get hold of the cross-tube tensioner wires. Ensure they are not snagged under the king post, then pull these smoothly and evenly back. Engage the adjuster shackle over the tensioner catch eyebolt locking it in place with the rear top wire quick-link (make sure this wire passes through the sail rear-loop, and that the Reflex Bridle loop is correctly positioned).

Close off the nose velcro. Raise the nose of the glider – gently does it or you could damage the keel tube.

Finally, engage the nose catch tang over its eyebolt and secure it with the pip pin (see diagrams).

Your Clubman is now ready for a pre-flight check.

5. Pre-Flight Checklist

Detailed pre-flight checks must be carried out during the assembly. Always adopt the same assembly and disassembly procedure. The following points must be checked:-

1. All tubes straight and undented.
2. All fittings viz: cross-tube hinge, nose plates and a frame microlinks, undistorted.
3. All cables unkinked, unfrayed and correctly terminated.
4. All sail seams intact with no frayed stitching, particularly in high stress areas, (e.g. wing tips, rear of keel, etc..)
5. No tears in sail, particularly in high stress areas.
6. Wing ribs correct shape and undented, with no cracks or splits in fibreglass sections.
7. All nuts and bolts secure.
8. All quick release fittings secure (cross-tube tensioner, nose-catch, washout limit tubes fully engaged, outboard section of leading edge tubes fully engaged, A frame quick pins secure).
9. Hang loop in good condition and on correct trim setting.
10. Sail tension settings correct and symetrical.

Immediately before launch, check the following:-

1. Glider symmetrical when viewed from the nose, and Reflex Bridle secure and correctly adjusted.
2. All quick release fittings secure.
3. All trailing edge elastics secure.
4. Cable tensions correct.
5. Harness fitted correctly.
6. Helmet fitted correctly.
7. Instruments fitted and set correctly.
8. Carabiner attached and secured.
9. Hang check.
10. Pick up glider and check for correct static “feel”.

6. Flight Characteristics

In general, the Clubman is a very easy and forgiving machine to fly and will give excellent results for very little effort. However, one or two points are worth consideration:-

The Clubman's low drag and high conversion efficiency give it excellent energy retention. This makes diving off height for landing approaches rather impractical. An easier technique is to make use of the glider's superb low speed control to "mush" off height.

"Parachute" landings are easy, and there is no tendency to drop a wing or spin, but the high stability of the glider in pitch means a firm decisive flare is needed. The slightly tail-heavy static balance will leave the glider neatly balanced on your shoulders, with no nose-over tendency.

The Clubman is very positive-pitching at low angles of attach and is almost impossible to hold "neutral" on the ground in high winds. This presents no problem provided the glider is kept loaded, either through the harness or the bottom bar. For this same reason, always tie down the nose of your glider when it is parked flat on the ground – it is very light and very little wind is needed to blow it away!

7. Disassembly Procedure

This is the exact reverse of the assembly sequence:
Disconnect the nose catch and lay the glider flat. Remove the nose rib and de-tension cross-tubes. Swing the wings in a few degrees and remove the ribs from the centre outwards.

Close the wings until only a couple of feet apart. Lower the king post, making sure that the tensioner wires do no get caught under it, and furl one side of the sail, putting a temporary tie around it. Disconnect the tipstick on that side and a temporary tie around it. Fold the other wing right in and furl its sail. Tie the sail with one tie just aft of the A frame and one at the rear, and remove the temporary ties.

Bundle the ribs together with the rib tie elastics and stow them inside the leading edge mylar at the nose end. The remaining two ties go on now, one going through the nose catch tang to hold the nose wires in place and the other going around the remaining wires keeping them as far forward as possible.

Now fit the bag over the glider and turn it over. Note the flag end goes forward (it balances better on your car that way round). Disassemble the A frame and stow the control bar with the Quick pins in, in the rear of the furled sail.

8. Tuning Instructions

Your Clubman has been test flown and set up by an experienced factory test pilot, and as such, should be in good tune when you receive it. Should you need to make adjustments, the following are available:

Trim The trim speed of the glider is adjustable at the hang point via a series of holes at ½" intervals. Movings the hang strap forward will speed up the glider, whilst moving rearward will slow it down.

Cross Tube Section The cross tube tension adjuster allows adjustment of the washout (wing twist) in the loaded state. The tighter the setting the "hotter" the glider becomes. This will not usually require adjustment for some time as the sailcloth used is extremely stable.

Turn Compensation Any tendency to turn one or the other can be compensated adjusting the wing tip sail tension cords a small amount (try 1/8" at a time). If the glider turns right then tighten the right cord or loosen the left. Note the double reef knot system used – Always tie off these cords in this way.

Reflex The standard setting on the reflex bridle, (often incorrectly referred to as "luff lines"), is such that the cords are just slack at normal hands off cruise, If the sail tension is altered, it will affect the required setting of these, so they should be re-checked.

In the event of any problems or confusions, call Aerial Arts.
DO NOT SEEK ADVICE FROM ANY OTHER "AUTHORITY"

9. Inspection and Maintenance Record

Date	Work Performed	By Whom	Remarks