



S.E.A. PARAGLIDERS

BIPLACE PARAGLIDER
AERO MASTER

PILOT MANUAL v.3, 06.10.2017



WARNING

Paragliding, like any other aviation sport, is an activity associated with increased danger to life and health. It is strongly recommended that you take training in a proven paragliding school, as well as choose the equipment and flight conditions appropriate to your level of training.

Paraglider AeroMaster designed for different purposes – learning, fun, commercial flights.

Very easy take-off and landing, the dynamic and comfortable handling, very good aerodynamic efficiency and ease of use - this is what we think and got in our tandem.

AeroMaster is biplace paraglider EN B class, intended for suitable qualification pilots. These pilots must be competent enough. AeroMaster is not a training wing for unexperienced pilots.



PREFLIGHT PREPARATION



Risers

- ◆ Risers are designed to connect the lines system of the paraglider with the pilot's suspension system.
- ◆ Tandem AERO MASTER is equipped with risers with trim tabs and several eyelets for fastening leash levers.
- ◆ These leashes can be installed in two different positions (but only symmetrically!) Depending on the preference or composition of the pilot.
- ◆ Lines are attached to the risers using soft links - strong connecting elements from the dyneema, which are fixed in the ring by a knot-hammer.
- ◆ It is necessary to regularly check the correctness of installing and securing soft links under protective covers on risers.



Trimming system

- ◆ Trimmers are designed to increase the speed range of the paraglider by reducing and / or increasing the angle of the wing.
- ◆ The maximum increase in speed is achieved with fully released trimmers.
- ◆ Clamped trim tabs reduce the balancing speed with the released control lines.
- ◆ When taking off from a very steep slope or with a heavy passenger, it is recommended to tighten the trim tabs a little.
- ◆ It is recommended to work with trim tabs strictly symmetrically.



PREFLIGHT PREPARATION



Tandem spreader bars

- ◆ The wing is equipped with standard spreader bars.
- ◆ To the central power loop, the main carabiners are attached, which, in turn, are attached to the tandem Risers.
- ◆ Connect the attachment loops in the centre of the spreader to the riser of the glider. Connect your passenger to the appropriate loop in order to balance the relative difference in height and weight between you and your passenger. Always use carabiners of enough breaking strength for main attachment and for rescue system.



Harnesses

- ◆ The manufacturer recommends the use of suspension systems with a height of the main carabiners of at least 42 cm and a distance between them of 42-45 cm.



Adjusting the length of the brake

- ◆ The wing is delivered with the optimum length of the brakes.
- ◆ If you need to adjust the length of the brake in accordance with the settings of your suspension system or with your own equipment, we strongly recommend that you do this by changing the length of the brake no more than 2 cm at a time.
- ◆ In free flight, with the brakes left, the rear edge of the wing must not be deflected in all positions of the trim tabs.





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Check before takeoff

- ◆ Spread the wing of the “horseshoe” - the wing center should be further from the pilot than the tips.

Before each take-off, we recommend the following check:

1. the lines are untied, there are no damages or knots;
2. all surfaces of the wing do not have strong scuffing and damage;
3. risers are untangled, soft links on them are fixed in working position;
4. all carabiners (the main ones, for the pilot and for the passenger) are in order, securely locked and stand in the correct position in the main loops of the spreaders;
5. the suspension systems are OK;
6. the rescue parachute is connected, correctly fixed in the suspension system;
7. the parachute lock pin is installed correctly;
8. the passenger is instructed;
9. the helmet of you and the passenger is locked;
10. the trim tabs are in the correct and symmetrical position;
11. the buckles of the suspension systems are fastened and tightened to a comfortable position;
12. the air intakes of the wing are open, the arc of the wing is directed against the wind;
13. brakes are taken correctly;
14. wind power and weather conditions are safe;
15. the airspace ahead is free.



Takeoff

- ◆ To take off the “alpine” start, you need to pull the straps of A-risers and put the wing in a position vertically above the pilot.
- ◆ As soon as the wing reaches this position, make sure that the space before the start is free and begin an energetic take-off to the point of separation.
- ◆ For the “reverse” start, turn your face to the wing and lift it in this position. To compensate for the draft of the wing during the ascent, it is necessary to deflect the hull backwards.
- ◆ In a strong wind you need to be ready to take a few quick steps to the wing. When the wing is overhead, run vigorously to break away from the ground.



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Landing

- ◆ For a safe landing, select a suitable platform of sufficient size without obstacles on or near it, and also assess the direction and strength of the wind.
- ◆ When landing, it is necessary to withstand the direction of flight against the wind.
- ◆ It is recommended to land with trimmers in a neutral position (all straps of Risers are the same length from the main carbine).
- ◆ In advance, take the necessary position in the suspension system and warn the passenger about the landing.
- ◆ On the final flight before touching it is recommended to keep the brakes released. If there is some turbulence, for safety reasons, you can keep a slight pull on the brakes for better control of the wing.
- ◆ Avoid unnecessary retarding of the wing, as this can lead to excessive acceleration and landing with a dangerous vertical speed.
- ◆ At an altitude of about 1 meter, progressively and smoothly tighten the brakes to a sufficient stroke so as to execute a soak ("pillow").
- ◆ When landing in a strong wind, it is necessary, after touching, to douse the dome as quickly as possible - by fast and large tightening of the brakes or straps of the B-Risers. Be ready to run to the wing.
- ◆ At the landing, do not allow the paraglider to overtake you and hit the ground with the leading edge. This leads to a sharp increase in pressure in the dome and may cause damage to it.



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Normal flight

- ◆ Trimmers are in neutral position, brakes are released. In this mode, the AERO MASTER paraglider has the best gliding angle in the calm air.
- ◆ To obtain a minimum sink rate in the same position of the trim tabs, press the brakes slightly.



Accelerated flight

- ◆ When flying against a strong wind and / or in a downstream zone, you need to release the trim tabs completely to improve the planning angle.
- ◆ For this, it is necessary to press the keys of trim tabs on both risers symmetrically.
- ◆ Also such an accelerated flight mode can be used in a dynamic ascending flow in order to break through against the increased wind from the slope of the slope.
- ◆ It is important to always remember that possible collapses in this mode of flight can occur more dynamically than in an ordinary flight.
- ◆ AeroMaster has no accelerator.



Maneuvering

- ◆ For turning smoothly, start to tighten one brake, while simultaneously transferring the weight of the body in the suspension to the same side of the turn. The wing will smoothly enter the turn. When it reaches the required turning radius, you can control this radius and the rate of descent by changing the weight shifting and / or slight pulling of the external brake.
- ◆ When soaring in weak thermal, you can lightly press the trim tabs to reduce the physical load on the hands.
- ◆ It must always be in mind that braking the wing with trim tabs reduces the operating limit of the brake and increases the possibility of failure if the pilot does not react correctly. Be always ready to let the trimmer go neutral.
- ◆ Maximum symmetric control travel at maximum weight in flight is about 90 cm.





FLYING AERO MASTER



Active piloting

- ◆ For safe flights in turbulent air, it is strongly recommended to training actively in piloting.
- ◆ The essence of this is the continuous maintenance of a constant load on the brakes and risers of the paraglider.
- ◆ Under the influence of a sufficiently strong turbulence when the pilot is inactive, the paraglider swings in pitch and roll, which can lead to collapse.
- ◆ If the wing dives forward, brake it by clamping the brake until it returns from the position in front, almost over the pilot's head. Operate the brakes with sufficient speed, but smoothly, with anticipation, given the inertia of the wing. Do not allow the oscillations to increase.
- ◆ If the wing throws back on the pitch, start releasing the brakes. And when the wing returns to the vertical, you must restore the previous tension to the brakes to prevent a peck forward.
- ◆ In this way, a sufficiently experienced pilot can avoid folding even in very turbulent air.
- ◆ Nevertheless, it is important to remember that there is the potential for turbulence, which the pilot can not cope with, so the most important safety is a sober assessment of his piloting skills and given weather conditions.



Non-standard flight situation

- ◆ In very strong turbulence, folding of a dome of various sizes is possible.



Asymmetric collapses

- ◆ With asymmetrical folding of the wing, stabilize the wing at the rate of weight transfer from the folding and some effect of the brakes on the open side of the wing. This impact should not be too great to cause a stall, otherwise it could lead to an uncontrolled sequence of dangerous regimes.
- ◆ Then a series of powerful and deep impacts of the brake on the folded side of the wing must be performed "pumping" to open it.





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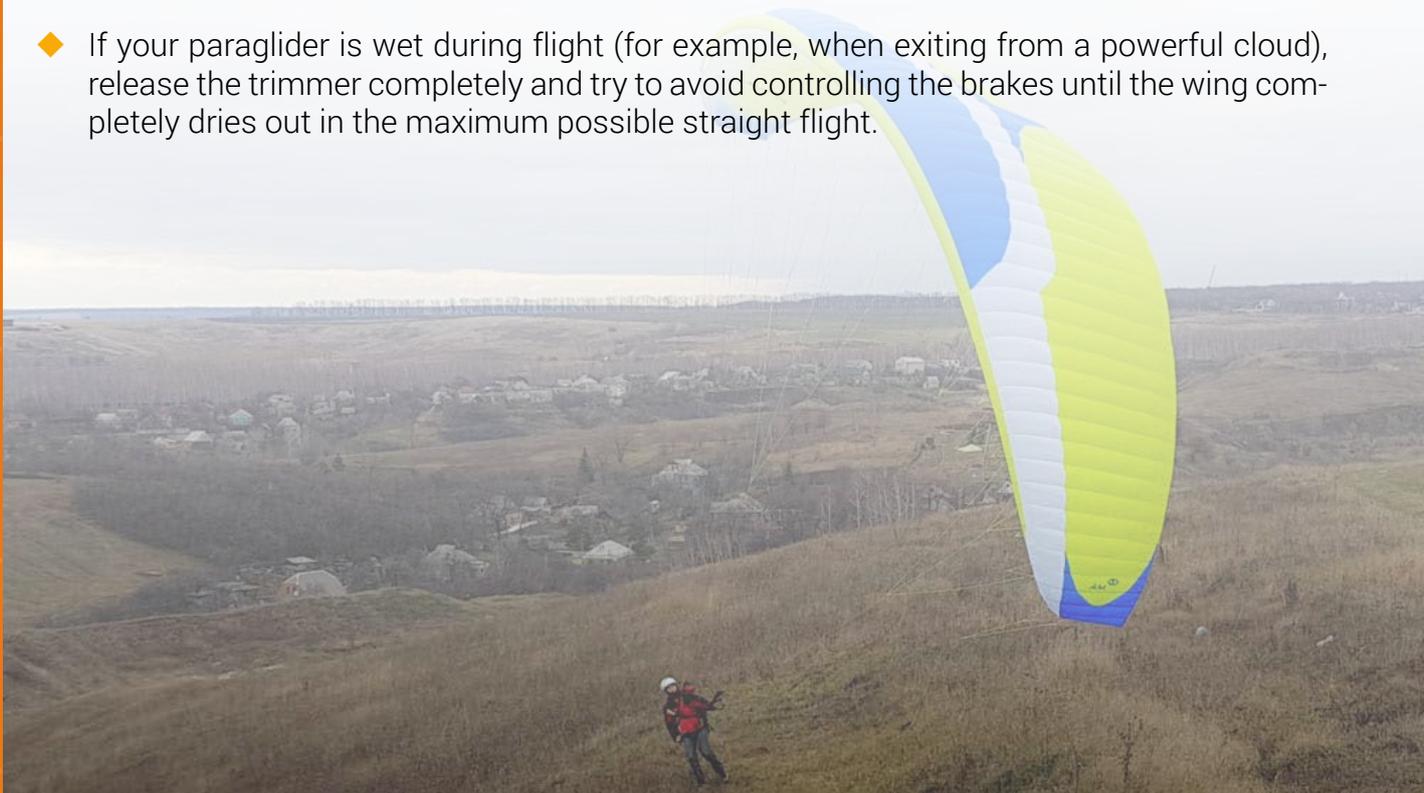
Symmetrical collapses

- ◆ Symmetrical frontal folding usually reveals itself even without the pilot's influence.
- ◆ You can accelerate the opening of one or two quick pumping the brakes. Be careful while doing this and do not allow excessive braking of the wing, which very quickly (in the event of a pilot error) can lead to a break in the flow on the wing.



Stall

- ◆ Failure can occur when overshoots are too large and sloppy when too sharp maneuvering, as well as some unfavorable factors - wetting the wing, a critical change in the geometry of the sling system.
- ◆ In a deep detachment, the wing can be filled, but it does not have a horizontal speed and very quickly decreases.
- ◆ To exit the stall immediately raise your hands with the brakes up to the released position of the control lines. If the paraglider continues to be in disarray, take the straps of the A-risers and push them forward and slightly downwards or quickly, symmetrically and completely release the trimmer.
- ◆ Never try to fly on a wet paraglider! You can take off only on a completely dry wing!
- ◆ If your paraglider is wet during flight (for example, when exiting from a powerful cloud), release the trimmer completely and try to avoid controlling the brakes until the wing completely dries out in the maximum possible straight flight.





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Cravats

- ◆ A tie can arise when a part of the wing is entangled in the slings of a paraglider. This happens with inaccurate prelaunch preparation or as a result of a strong collapse in turbulence.
- ◆ When a tie occurs, the most important action is keeping the flight direction of the paraglider. Otherwise, autorotation can occur very quickly - a powerful spontaneous rotation of the paraglider with huge vertical and horizontal velocities.
- ◆ To open the tie, pull the "tie" (stabilizer) line. It may take a lot of stretching this line.
- ◆ Also for the disclosure of a tie, you can perform a full or asymmetrical wedge. This technique is very effective, but may require sufficient altitude over the terrain for exit and high skill of the pilot.



Control without brakes

- ◆ In the event that normal paraglider control by means of brakes is not possible (for example, if one control line is loosened or torn) piloting by pulling the D-riser is possible.
- ◆ It is necessary to remember that the required course for such piloting is much less than when controlling the brakes, so you have to pull the D-Risers carefully, to avoid stalls or spins.



Methods for rapid descent

- ◆ Try to avoid these maneuvers whenever possible.
- ◆ Carefully assess the weather conditions before take-off.
- ◆ If there is a probability of deterioration of weather conditions, choose a landing pad and approaches to it in advance.





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«Big ears»

- ◆ To accomplish this maneuver, take the most external slings of A-risers (which go to the outer edges of the wing) and tighten them until the wing ends are folded.
- ◆ To simplify the tightening of these lines they are put on separate straps on the risers.
- ◆ To increase the horizontal and vertical speeds in this mode, you can release the trim tabs, but only AFTER folding the ears.
- ◆ During this maneuver, it is strictly recommended not to make deep spirals, as this negatively affects the strength and geometry of the sling system.
- ◆ To exit, simply release the held lines and fill the wing yourself. It is possible to accelerate the opening with the help of a not very intensive pumping of the wing by the brakes.



Deep spiral

- ◆ Before performing a deep spiral, make sure that there is sufficient margin of elevation above the terrain.
- ◆ To enter the spiral, transfer the weight in the suspension system to one side and gently tighten the brake on the same side until the wing starts to rotate.
- ◆ When the wing increases the angle of heel and accelerates to a certain reduction, hold the brake in this position.
- ◆ The rate of decrease can be controlled by weight transfer in the suspension system and small impacts of the external (from the rotation) brake.
- ◆ To exit from a deep spiral simply smoothly release the internal (working) brake and the paraglider will start its own exit.
- ◆ For a smoother exit, it may sometimes be necessary to apply a slight brake to the wing to compensate for small wing movements in the pitch before final exit into a normal straight flight.
- ◆ AERO MASTER under normal flight conditions has no tendency to remain in the spiral on its own.
- ◆ It should always be remembered that the greater the rate of decline in the spiral, the more time it can take to exit into a normal flight.
- ◆ Never attempt an abrupt escape from a deep spiral - this can lead to very dangerous abnormal flight situations.



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WARNING: prolonged overloads during a deep spiral can lead to deterioration of the pilot's well-being and even loss of consciousness. Constantly monitor your condition with this maneuver, and at the first signs of deterioration of well-being, start out of the regime. It is strongly recommended not to perform deep spirals for a long time at a speed of more than 11 m / s. Train in making spirals in a safe environment - with a large margin of height above the water and under the supervision of an experienced instructor. Too frequent execution of deep spirals with high rates of descent can cause premature violation of the geometry of the line system and the dome of the wing with the subsequent deterioration of flight characteristics up to dangerous ones.



B-stall

- ◆ To perform this maneuver, symmetrically tighten the B-risers before mechanically restricting the free ends. The dome of the paraglider will be deformed along the span, lose the horizontal speed and increase the speed of descent. The decrease can reach values of 7-8 m / s.
- ◆ Never do not release the risers until the moment when the wing does not stabilize vertically above the pilot! In the opposite case, a very strong wing can be pushed forward with subsequent dangerous flight situations!
- ◆ To exit the Z-B-stall quickly and symmetrically release the straps of the B-Riser. The wing itself will come out on a normal flight with a slight pitch movement.



Aerobatics

- ◆ Double paraglider AERO MASTER is intended primarily for recreational and training flights together, so it is strongly advised not to perform acrobatic figures in order to avoid getting into dangerous flight situations.



Flying Towing

- ◆ Tandem AERO MASTER allows you to fly with the use of various types of winches. Before flying, make sure that your equipment meets the safety requirements for towing. It is strongly recommended to set the trimmer 1-2 cm above the neutral mark before take-off on the winch.
- ◆ Always remember that a non-towing paraglider can react differently to pilot control actions. When towing, it is necessary to control the wing with less brake effects than normal flight to avoid dangerous flight situations.



CARE, STORAGE AND REPAIR



General rules

- ◆ put the wing in a bag or backpack as carefully as possible;
- ◆ do not pack the wing with foreign objects and debris inside;
- ◆ gently fold up the nasal stiffeners of the paraglider, avoiding their crease, use the method of "lathering" or cover-contraceptin when laying;
- ◆ do not leave the paraglider in the sun for a long time;
- ◆ do not leave equipment in a closed car in the sun;
- ◆ do not drag the wing on the surface of the earth;
- ◆ avoid contact of the paraglider with hot objects and open fire;
- ◆ avoid wetting the paraglider;
- ◆ do not walk in the shoes on the dome and the slings of the paraglider;
- ◆ do not start in a strong wind before the complete unleashing of possible nodes on the lines;
- ◆ do not put heavy objects on the packed wing and do not sit on it;
- ◆ in case of contamination - never wash the wing using chemicals, only wipe it with a slightly damp soft sponge;
- ◆ do not store the paraglider in a damp, not ventilated room;
- ◆ after getting soaked in sea water, immediately rinse the wing outside and inside in plenty of fresh water (for example, in a car wash), only then dry it in the shade in the wind.

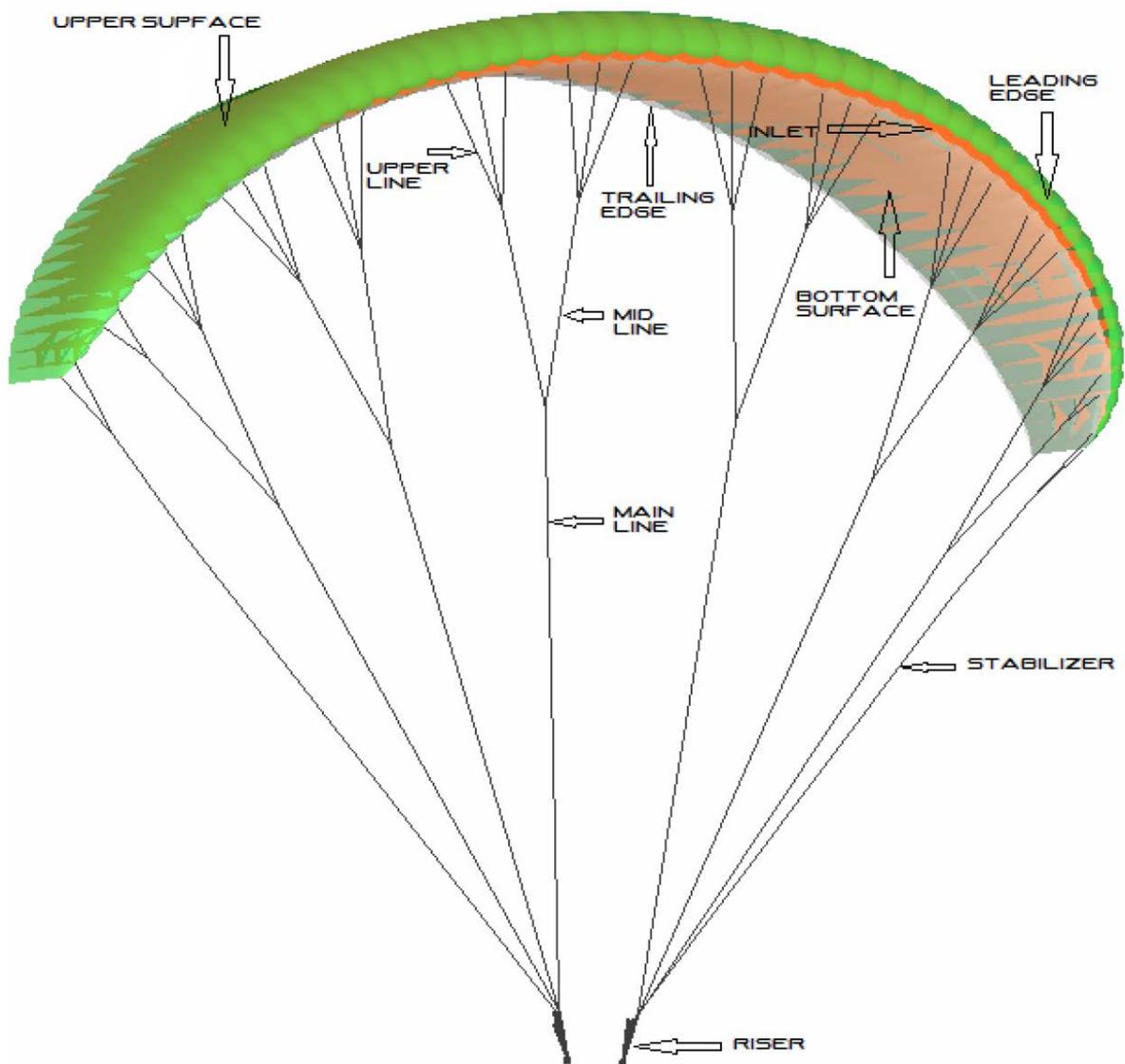


Wing inspection and repair

- ◆ The manufacturer strongly recommends checking the paraglider before each take-off - dome, slings, installation of soft links, risers.
- ◆ It is recommended to conduct a qualified check of the paraglider every 100 hours of flight or a year.
- ◆ In case of glider damage small holes in surfaces and ribs(which are not bigger than 2 cm and not affect seam) can be repaired by sticky ripstop.
- ◆ Damaged lines can be replaced by repair kit from manufacturer. Strongly recommended to do inflation test after lines replacement.
- ◆ For more complex repair recommend to ask manufacturer.



GENERAL VIEW OF THE PARAGLIDER

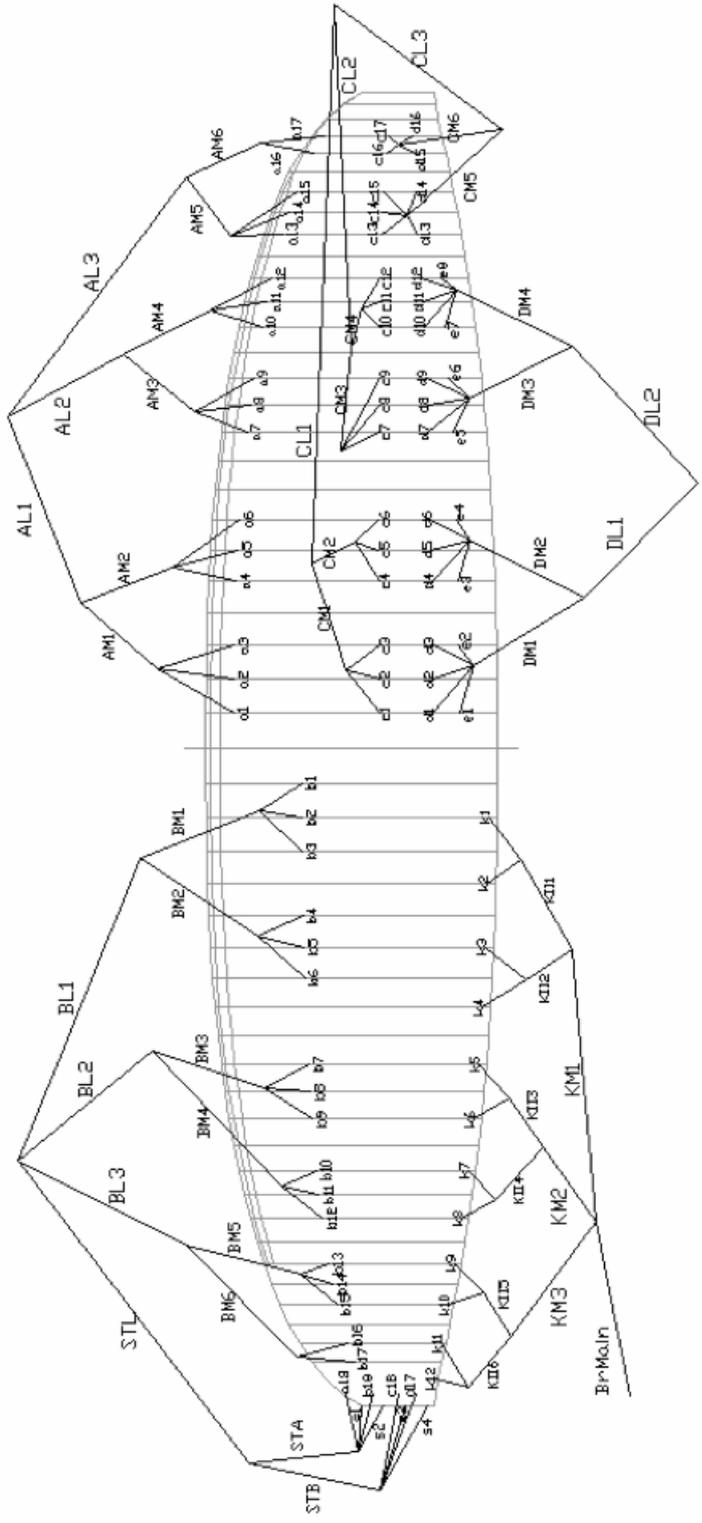


TECHNICAL DATA

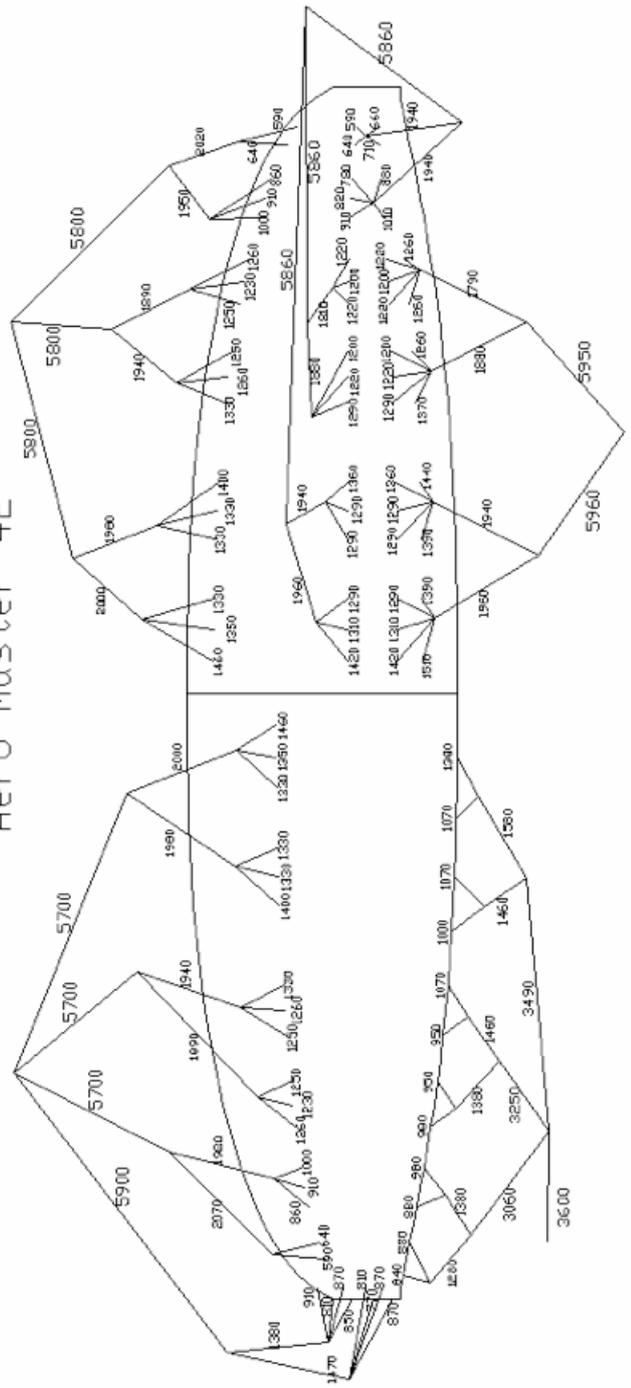
| | Area, m ² | Span, m | AR | Projected area, m ² | Projected span, m | Projected AR | Root chord, m | Tip chord, m | Cells number | Glider weight, kg | Take-off weight, kg |
|-----------------------|----------------------|---------|-----|--------------------------------|-------------------|--------------|---------------|--------------|--------------|-------------------|---------------------|
| AERO MASTER 38 | 38 | 14.5 | | 32.7 | 11.64 | 4.15 | 3.19 | 0.8 | 52 | 7.6* | 120-180 |
| AERO MASTER 42 | 41.55 | 15.1 | 5.5 | 35.7 | 12.16 | 4.15 | 3.34 | 0.84 | 52 | 7.9 | 140-220 |
| AERO MASTER 44 | 44 | 15.56 | | 37.9 | 12.52 | 4.15 | 3.45 | 0.86 | 52 | 8.2* | 170-250 |



LINES DIAGRAM



Aero Master 42





LINES CHECK TABLE

Total line length

| A | | B | | C | | D | | E | | S | | Br | |
|------|--|------|--|------|--|------|--|------|--|------|--|-------|--|
| 9300 | | 9160 | | 9240 | | 9340 | | 9430 | | 8090 | | 10050 | |
| 9190 | | 9050 | | 9130 | | 9230 | | | | 8130 | | 9740 | |
| 9170 | | 9030 | | 9110 | | 9210 | | 9310 | | 8140 | | 9620 | |
| 9150 | | 9010 | | 9090 | | 9190 | | 9290 | | 8240 | | 9550 | |
| 9150 | | 9010 | | 9090 | | 9190 | | | | | | 9380 | |
| 9220 | | 9080 | | 9160 | | 9260 | | 9340 | | | | 9260 | |
| 9110 | | 8970 | | 9030 | | 9120 | | 9200 | | | | 9180 | |
| 9040 | | 8900 | | 8960 | | 9050 | | | | | | 9210 | |
| 9030 | | 8890 | | 8940 | | 9030 | | 9090 | | | | 9020 | |
| 8980 | | 8840 | | 8890 | | 8960 | | 9000 | | | | 8920 | |
| 8960 | | 8820 | | 8870 | | 8940 | | | | | | 8820 | |
| 8990 | | 8850 | | 8890 | | 8960 | | 9000 | | | | 8780 | |
| 8790 | | 8680 | | 8710 | | 8810 | | | | | | | |
| 8700 | | 8590 | | 8620 | | 7800 | | | | | | | |
| 8650 | | 8540 | | 8580 | | 8680 | | | | | | | |
| 8490 | | 8410 | | 8440 | | 8510 | | | | | | | |
| 8440 | | 8360 | | 8390 | | 8460 | | | | | | | |
| 8210 | | 8150 | | 8180 | | 8140 | | | | | | | |

Compliance of the test samples' suspension lines, control lines and risers with the dimensions given in the user's manual has been checked by the testing laboratory after the test flights.



LIST OF MATERIALS

| CANOPY | FABRIC CODE |
|---------------------|-------------|
| UPPER SURFACE LE | 9017 E25 |
| UPPER SURFACE TE | 9017 E65 |
| BOTTOM SURFACE | 9017 E65 |
| RIBS | 9017 E29 |
| DIAGONALS | 9017 E29 |
| LOOPS | LTKP-15-185 |
| REINFORCEMENT LOOPS | SR-170 |
| REINFORCEMENT | |
| RIBS | NYLON STICK |
| THREAD | SERAFIL 60 |



LIST OF MATERIALS

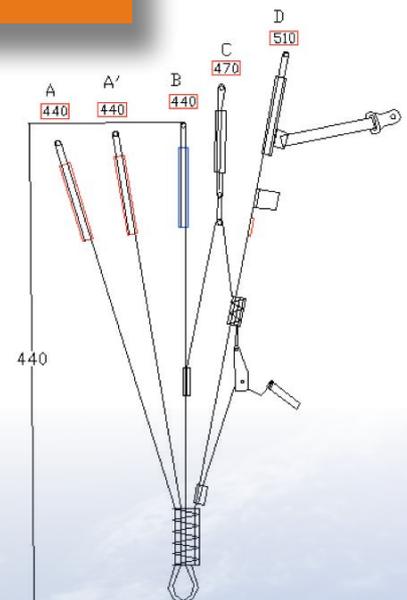
| SUSPENSION LINES | FABRIC CODE |
|------------------|-------------|
| UPPER CASCADES | DSL35 |
| UPPER CASCADES | DSL70 |
| UPPER CASCADES | DSL140 |
| MIDDLE CASCADES | DSL70 |
| MIDDLE CASCADES | DSL140 |
| MIDDLE CASCADES | TSL190 |
| MIDDLE CASCADES | TSL280 |
| MAIN LINES | TSL190 |
| MAIN LINES | TSL220 |
| MAIN LINES | TSL280 |
| MAIN LINES | TSL380 |
| MAIN LINES | TSL500 |
| MAIN BRAKES | DFLS-200 |



RISER DIAGRAM

| Riser | A | B | C | D |
|--------------------------------|-----|-----|-----|-----|
| Neutral length, mm | 440 | 440 | 440 | 440 |
| Length with closed trimmer, mm | 440 | 440 | 425 | 410 |
| Length with open trimmer, mm | 440 | 440 | 475 | 510 |

Number of risers – 5 (A, A', B,C,D)





GLIDER DATA

| SIZE | COLOR | DATE OF MANUFACTURING |
|---------------|-------|-----------------------|
| | | |
| Serial number | | |
| Start date | | |
| Pilots Name | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |



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