



# **ELECTRON PILOT'S MANUAL**





## THANK YOU...

for flying an OZONE glider. Our philosophy is to produce sweet-handling aircraft which give a special blend of safety and performance, so we are confident that you will enjoy every minute of it.

This manual will help you to get the most from your glider. If you would like to know more about it, don't hesitate to contact your dealer, school, distributor or any of us here at OZONE.

We are confident your glider will satisfy your flying needs for a long time. This booklet gives advice on keeping it safe and in the sort of condition which will give you the best resale value if you ever want to change. You can help this by logging all your flights and maintenance.

Please ensure that this manual is passed on to the new owner if you do resell the glider.

*Dave Pilkington*      *Mike Cavanagh*  
*Bruce Goldsmith*      *Rob Whittall*  
*John Pendry*

Rob Whittall, John Pendry, Bruce Goldsmith, Dave Pilkington and Mike Cavanagh



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## THE OZONE PEOPLE

**Rob Whittall:** Testing, teaching, competing and winning: Rob has flown on most flyable days for the last 14 years. His passion for free flying burns as strong as ever. Rob is a complex personality whose flying style can be extreme, yet he is driven by the development of safety in paragliding. It is not a paradox: who understands the limits better than someone who is capable of pushing a wing far beyond them?

**David Pilkington:** Doctor of aerodynamics and computer star. David has developed OZONE'S ultra-advanced design software that slices the time from drawing board to sky. Relaxation? Fortunately for us he just loves playing with gliders.

**John Pendry:** The legend in foot-launched flight. His 25 years of experience and outstanding competition record make him the most respected pilot ever. John's cool style is the perfect counterpoint to Rob's passion and they both agree perfectly on OZONE'S philosophy that safety and fun are what paragliding is all about.

**Mike Cavanagh:** Mike has plenty of international paragliding experience as British Team Manager and a keen competitor too. It's OZONE'S good fortune that he is a fully trained accountant who can keep a close eye on the numbers and what they mean to the customers. Mike's managerial skills and easygoing character make him popular with pilots and dealers alike.

**Bruce Goldsmith:** Bruce is a classic all-rounder: designer, test-pilot, competitor and cross-country enthusiast. Although he has been flying for more than twenty years, he still enjoys the simplicity of free flight and has a gift for passing his knowledge on. Bruce's 'Icaristics' column in Cross Country magazine has become essential reading for enthusiasts throughout the world.

## OZONE PEDIGREE

In 1998 Bruce was awarded the Royal Aero Club's Salomen Trophy for design excellence by Prince Andrew, as well as being British Champion. John and Rob have each won two World Championships and twice been awarded the Gold Medal of the Royal Aero Club. OZONE is proud that they have brought such experience to this young company.

## OZONE MATERIALS

The best part about starting a new company is that you get the opportunity to choose the ideal materials. We have put together what we think is the best possible combination for durability, performance and longevity.

We started to develop our first wing on a clean sheet of paper. The choice of materials was one of the first problems to solve. In the end we chose the material that we knew would do its particular job best. End of story. Here's what OZONE gliders are made of:

### **Upper-surface**

Gelvenor silicone-coated sailcloth from South Africa. High tenacity 100% polyamide, weight 49g/m<sup>2</sup>. We consider that this has the best resistance to ageing of any sailcloth currently on the market.

### **Lower-surface**

Porcher-Marine sailcloth from France. High tenacity Skytex+ Ripstop Nylon 45g/m<sup>2</sup> SO finish. This tried-and-tested cloth gives the best strength-for-weight ratio going, combined with good durability.

### **Ribs**

Porcher-Marine again. High tenacity Skytex+ Ripstop Nylon 45g/m<sup>2</sup> FM finish. This has been selected for stability and resistance to stretch - vital if a glider is to keep its safe-flying characteristics for a long time.

### **Leading-edge reinforcement**

Double-laminated Mylar. Selected for long-term durability, this ensures that your glider's take-off characteristics will remain consistently good for season after season.

### **Lines**

Edelrid has long been one of the market leaders in the manufacture of suspension line. We chose their High Modulus Aramid for its stretch resistance, high thermal tolerance and acknowledged durability. The lower lines are strength and age tested by the DHV. The supple sheath helps prevent lines tangling and kinking, which is important for longevity.

Line specifications: 80/120/160/200 kg breaking strength.

### **Risers and hardware**

Riser webbing - 20/25mm zero-stretch polyester webbing.

Shackles - High quality Delta maillons from Maillon Rapide.

Pulleys - AustriAlpin aluminium mini pulleys with brass roller.

All these components have been chosen for their renowned quality and durability.



## CHECKING AND MAINTENANCE

Your glider will have undergone thorough checks at every stage of manufacture and have been signed-off by skilled inspectors. But don't believe us! Do a pre-flight check for your first flight and then at least at the start of every flying day.

## PRE-FLIGHT CHECK

It is very important that you perform regular maintenance checks on your glider especially before and after long flights, flying trips and long periods of storage.

To avoid forgetting points it is helpful to always use the same procedure:

1. Inspect all sewing on the harness, rescue bridle and risers.
2. Check all quick links, maillons and karabiners.
3. Check brake handle knot. Follow brake lines up to the wing, checking for knots and damage.
4. Check all other lines up to the wing.
5. Inspect all line attachment points to the wing.
6. Inspect upper and lower surface for damage and ageing.
7. Interior inspection: inspect ribs for damage or fatigue.

If you find any signs of damage or abnormal wear, consult your dealer, school or OZONE for advice.

## BRAKE LINES

The brake lines connect to the trailing edge via a series of subsidiary lines. Because of their positions they are more easily scuffed than other lines on your glider, so they should be checked extra frequently.

The main brake lines run through pulleys connected to the rear risers. The brake handles are tied to the main lines and conveniently positioned press-studs attach them to the risers when not in use. This should prevent them twisting and tangling.

### Adjusting brake lines

Important: the lengths of the brake lines will have been set carefully during testing and manufacture. At OZONE we feel it is better to have slightly long brake lines and to fly with a wrap (one turn of line around the hand). However, we know that some pilots prefer the lines slightly shorter and may wish to adjust them.

Whatever you choose, make the following checks:

- Ensure both main brake lines are of equal length.
- If a brake handle has been removed for any reason, check that its line is still routed through the pulley when it is replaced.
- When the brake handles are released in flight the brake lines should be slack. There should be a substantial "bow" in them and absolutely no deformation of the trailing edge.

We recommend a minimum of 10cm of free play between the brake release position and the start of deformation on the glider. This will prevent the trailing edge from being deformed when using the speed system.

In the unlikely event of a brake line snapping in flight, or a handle becoming detached, the glider can be flown by gently pulling the rear risers (D-risers) for directional control.

## ACCELERATOR SYSTEM

It is important to have your accelerator system correctly rigged before take-off. It must be long enough not to pull down on the front risers while in normal flight, but not so long that it fails to work effectively. The best way to start is to get someone to hold the risers and harness taut while you adjust the bar so that it can just be found with your foot during flight. Then test the full range of the accelerator in calm flying conditions, ensuring that both risers are pulled evenly during operation. Fine-tuning can be completed when you are back on the ground.

We advise you not to use more than half the accelerator's travel when flying in turbulence. Inexperienced pilots are recommended not to use the accelerator system until they are fully accustomed to the glider.

## PREPARING FOR TAKE-OFF

To familiarise yourself with the glider it is a good idea to perform practice inflations and small flights on a training hill. This will enable you to set up your equipment correctly.

Lay the canopy out on its top surface ensuring that the leading edge is in a pronounced arc with the centre of the wing further up the slope than the tips. Lay out the lines one side at a time. Hold up the risers and starting from the brake pull all lines clear, then proceed through the D, C, B and A lines. Mirror the process on the other side. Take care to ensure that no lines are tangled, twisted or knotted. It is always important to check brake lines are clear of rocks and twigs that may snag during launch.

### **Take-off check list:**

1. Check reserve parachute - pin in and handle secure
2. Helmet on and fastened
3. All harness buckles closed - check leg-loops again
4. Karabiners and maillons tight
5. Lines cleared
6. Leading edge open
7. Aligned directly into wind
8. Airspace and visibility clear

## LAUNCHING

It is possible to launch your OZONE glider with the usual forward or reverse techniques. You should make sure that you are standing central to the wing, this will ensure that it inflates evenly and progressively. On OZONE gliders the outer main A-line is attached to a mini-riser to assist the pulling of big-ears ('split A-risers'). We advise using all the A-risers during launch

**Light or nil-wind technique:** Start your run so that the lines become tight within one or two steps. The glider will immediately start to inflate and you should maintain a constant pressure on the risers until the wing is overhead. It is important not to pull down or push the risers forward excessively as this can result in the leading edge deforming and the take-off procedure becoming difficult. You must accelerate smoothly through the entire launch procedure. There is no need to rush or snatch, and you should have plenty of time to look up and check your canopy before taking to the air.

**Strong wind technique:** The reverse launch method is recommended. For this you set everything out exactly as for a forward launch, clip in, take hold of the brakes and then turn to face the wing, passing one entire set of risers over your head as you turn. Then gently try the brakes to see that they are free, check all is clear and pull the wing up on the A-risers. When the wing is overhead, check it gently with the brakes, turn and launch. The technique is simple, but can feel strange at first. We advise you to practice in a flat open area before taking to the hill.

In stronger winds, a helpful tip is to be prepared to take a few steps towards the glider as it inflates and rises. This reverse-launch technique can be used in surprisingly light winds too.

**IMPORTANT: NEVER TAKE OFF WITH A GLIDER THAT IS NOT FULLY INFLATED.**

## GROUND HANDLING

Practice your ground handling! It will improve your overall enjoyment of the wing by making your launches easier and giving you a better feel for its flight characteristics.

## NORMAL FLIGHT

In the hands-up position in calm air, your glider will be stable in pitch and roll and achieve its 'best glide' speed. By applying the brakes approximately 20cm, the minimum-sink rate will be found. For increased speed or headwind glides, use the accelerator bar which will give you an increase in speed of up to 10km/h.

### Active Flying

Active flying is the technique of using input to keep the wing as stable and efficient as possible. All good pilots do it. For example, on entering a thermal your glider will rock back slightly behind you; at this point you should reduce brake to allow the glider to come overhead again. As you leave the thermal your glider will try to accelerate and dive forward slightly, so apply a little brake to stabilise the wing overhead.

When flying in turbulent air, you should be able to sense pressure loss in parts of the wing through the brake lines. You can then compensate by using a little of the appropriate brake until you feel the pressure return.

This should all be done smoothly and progressively: over-braking your glider is dangerous and could lead to a stall.

## TURNING & THERMALLING USING WEIGHT SHIFT

To familiarise yourself with your glider your first turns should be gradual and progressive.

For efficient coordinated turns: look in the direction of your intended course, then lean into it. Your first input for directional change should be weight-shift, followed by smooth application of the brake until the desired bank angle is achieved. To regulate the speed and radius of the turn the outer brake should be used.

Never initiate a turn at minimum speed (i.e. with full brakes on) as you could risk entering a spin.

## WING-OVERS

OZONE paragliders are not designed for aerobatic flying. The limit is tightly banked S-turns, commonly known as wing-overs. These must not exceed 45 degrees of bank. Uncoordinated wing-overs can lead to large asymmetric collapses and therefore tight turns should never be executed near the ground.

## DRAG INDUCERS (BIG EARS)

Folding in the tips increases the sink rate of your glider. This is useful for staying out of cloud or descending in strong winds. You 'pull big ears' by drawing in the outermost A-lines until the tips of the wing fold under and drag behind. OZONE gliders are fitted with split A-risers to make this procedure easy.

To increase the sink rate further the accelerator bar may be employed, but pull the tips in first. Remember that when the tips are in, you have reduced the area of wing supporting you, so your stall speed will have increased. Be sure to keep speed on and not to use the brakes other than cautiously for reinflation. For directional control while using the drag inducers, you should rely on weight shift alone.

To reopen the wing tips, release the small A-risers. Normally the tips will reinflate automatically, but you can help the process by careful use of the brakes. This is best done one tip at a time to minimise the chance of inducing a stall. You will find that there is surprisingly little tendency for the glider to deviate during the process.

**CAUTION: do not use Drag Inducers near the ground.**

## B-LINE STALL

B-stall is used for fast descents in emergency situations only. B-stall is performed by symmetrically pulling down on the B-risers. This takes quite a lot of effort. The best way to do this is to place your fingers between the lines above the maillons at the top of the risers. You should not release the brake handles while B-stalling. As you first pull the B-lines down the airflow over the wing is broken and the glider loses its forward speed but remains open. By pulling the B-risers further the sink rate can be increased as the chord is effectively reduced.

To exit the B-stall the B-risers should be returned to their normal flight position symmetrically in one smooth progressive motion. The glider should then resume normal forward flight without further input. Always be sure of this before using the brakes again.

It is possible for the wing to resume its normal shape on release of the B-lines, but to remain in steep descent without full forward motion. This is called 'deep stall'. It is unlikely to happen on OZONE gliders, but you should be aware of the possibility. If you suspect it has happened, simply push the A-risers forwards until normal flight returns. Only then should you use the brakes again.

## SPIRAL DIVE

When you turn a series of tightening 360s the paraglider will enter a spiral - a highly banked turn with rapid height loss. The longer you hold the inside brake on, the faster the turn becomes. Safe descent rates of 8metres/second (500 ft/min approx.) are possible in a spiral dive, but at these high speeds and G-forces it is easy to become disorientated, so you must pay particular attention to altitude.

To exit the spiral dive, slowly release the inside brake and apply a small amount of outside brake. As the glider begins to decelerate it is important to allow it to continue in its turn until enough energy has been lost for it to return to level flight without excessive surging.

Spiral dives with sink rates over 8 m/s are possible, but should be avoided. They are dangerous and put unnecessary strain on the glider.

**IMPORTANT: SPIRAL DIVES CAUSE DISORIENTATION AND NEED TIME AND HEIGHT TO RECOVER. DO NOT PERFORM THIS MANOUVER NEAR THE GROUND.**

## DEEP STALL

Your glider is designed to exit immediately from any deep-stall configuration within four seconds of the brakes or B-line stall being released. If you find yourself in a deep-stall situation (loss of forward speed, low internal wing pressure) ensure your brakes are up. If your glider does not return to normal flight, you should gently push the A-risers forward until the glider surges slightly and normal flight is resumed.

## DEFLATIONS

Due to the flexible form of a paraglider, turbulence may cause a portion of the wing suddenly to collapse.

An asymmetrical collapse can be easily controlled by weight shifting to the open side and applying the minimum amount of brake required to control your direction. A long, smooth progressive pump on the deflated side will assist reflation. (Flapping your arms uncontrollably will not help).

A symmetrical collapse should reflate quickly without pilot input, however 15 to 20cm of brake applied symmetrically will speed the process.

Active flying will virtually eliminate any tendency to collapse.

## LANDING

**Light wind:** The landing approach should be flown using only light input on the brakes. When you are one or two metres above the ground, apply the brakes progressively so that the full brake position is attained just before your feet touch down. Always approach with plenty of speed so that it that can be converted into a full flare.

**Strong wind:** You should regulate your speed facing into wind. Use the minimum of brake needed to touch down smoothly, then immediately turn 180 degrees, reach up and pull down both C-risers while moving towards the glider. This will bring the wing down quickly without pulling you off your feet.

**IMPORTANT:** Always land into wind in a clear obstacle-free zone.

## PACKING YOUR PARAGLIDER

1. Lay the glider out on its top surface, check the lines are not tangled, then lay them on the wing, free of kinks. The risers should be laid together at the centre of the trailing edge.
2. Fold the wing from each tip to the centre cell by cell, making sure that the leading edge is in one straight line, until it is one or two cells wide.
3. Push any remaining air out by flattening the folded wing from the trailing edge to the leading edge.
4. Make four or five folds from the trailing edge up to the leading edge so that the bundle is approximately the size and shape of the OZONE rucksack. Never roll the wing up as this introduces unnecessary stresses into the fabric. Finally, wrap the velcro band around the bundle and put it in the rucksack.

**Note:** Making sure not to pack the paraglider too tightly and taking care that the leading edge is folded carefully will increase its life. Always pack as loosely as you can, while still being able to fit it in the rucksack - every fold weakens the cloth on any paraglider. It is best not to keep folding the glider along the same lines, so don't worry if it is not completely tidy every time.



## GLIDER CARE

The life of your paraglider depends largely on how you look after it. A well looked-after glider can last twice as long as a badly treated glider with the same number of flying hours! Your glider was a major investment and should be worth looking after carefully. Do not forget that your life may depend on the good condition of your wing.

### **UV damage**

It is now commonly known that UV rays from the sun degrade paraglider cloth. Do not leave the wing lying out in the sun for a moment longer than necessary.

### **Storage**

Moisture is the enemy! Always store paraglider/harness/reserve parachute in a dry room. Do not pack the paraglider away for any length of time until it is completely dry. A damp paraglider can be dried by hanging it over a washing line - preferably out of the sun. Allow it to dry naturally, never use a hair dryer etc. Even when the paraglider is dry, leave the rucksack zip open when possible to allow residual moisture to evaporate. Do not store the paraglider in company with chemicals such as dyes, paints or gasoline.

### **Cleaning**

Any abrasion or water will age the cloth of your paraglider, even if only slightly. Therefore we recommend that stains or marks which have dried into the cloth should be left uncleaned. The glider may not look so pretty, but it will certainly last longer! If you still feel that the wing must be cleaned, then use only a soft cloth moistened with water on small areas and remember that the most sensitive area of the wing is the leading edge top surface - which should on no account be cleaned.

Don't even think of putting your glider in the washing machine or using any sort of chemical cleaners!

### **Wing Repairs**

Amateur repairs can do more harm than good. Always let a registered dealer or the manufacturer carry out glider repairs.

Very small holes in the wing undersurface can be repaired using sticky-back Porcher Marine Sailcloth as long as the tear is not on the stitching of the wing and a large overlap is used. Stick repair cloth on the inside and outside of any area you are repairing. The silicone coating on the Gelvenor cloth used to enhance the life of the of the upper surface makes the use of adhesive repair cloth difficult, so repairs should be professionally stitched. Please consult your dealer.

### **Line repairs**

Any damage to the lines (even if it is only the outer sheath) means a new line should be ordered immediately. Ideally a dealer should replace the line. Before fitting a replacement line, check it for length against its counterpart on the other side of the wing. When a line has been replaced, always inflate the glider on flat ground to check that everything is in order before flying.

### **Ground handling**

Many paragliders are damaged by careless ground handling. Here are some things to avoid in order to prolong the life of your aircraft :

DO NOT drag your wing along the ground to another take-off position - this damages the sailcloth.

DO NOT try to open your wing in strong winds without untangling the lines first - this puts unnecessary strain on the lines.

DO NOT walk on the wing or lines.

DO NOT inflate the glider and then allow it to crash back down. Try to keep this movement as smooth as possible by moving towards the glider as it comes down.

NEVER allow the glider to crash back down to ground leading edge first! This puts great strain on the wing and stitching and can even explode cells. Almost all claims of 'faulty stitching' or 'weak sailcloth' originate from leading-edge slams.

### **Insects**

Take care that no insects get packed away with the wing. Some insects (grasshoppers for example) decay into an acidic substance which can then burn holes in the sailcloth!

## **TOWING**

OZONE gliders may be tow-launched. It is the pilot's responsibility to ensure that suitable harness attachments and release mechanisms are used and that she/he is correctly trained on the equipment and system employed. OZONE make no specific recommendations.

## **MODIFICATIONS**

When your glider leaves the factory, it is trimmed for the optimum balance between performance, handling and safety. It should be noted that any modification will mean that the glider loses any certification and will also probably be more difficult to fly. For these reasons, we strongly recommend that modifications should only be made after contacting OZONE directly.

## THE ELECTRON

The perfect recreational wing.

The ELECTRON has been designed to give you pure enjoyment. It has the performance to satisfy most pilots flying needs and a high degree of built in safety to give you the security to make the most of your flying. Added to the performance and security is OZONE'S sweet handling. The Electron has been designed to have an extended brake range which is positive throughout, meaning that the glider is responsive to your inputs.

The Electron has also benefited from OZONE'S low speed developments. We have reduced the stall speed whilst maintaining trim speed. This means that you can optimise your sink rate with added security. Since most flying, such as thermalling and ridge soaring, is done at these low speeds OZONE see this as an important development in the safety of paragliding.

The performance, stability, sweet handling and low speed developments found on the Electron have all been designed to ensure that you get maximum enjoyment from your flying.

## GLIDER SPECIFICATIONS

	Small	Medium	Large	X-Large
<b>Number of Cells</b>	43	43	43	43
<b>Projected Area (m2)</b>	21.89	23.75	25.69	27.7
<b>Flat Area (m2)</b>	24.68	26.78	28.96	31.24
<b>Projected Span (m)</b>	8.86	9.23	9.6	9.97
<b>Flat Span (m)</b>	11.02	11.48	11.94	12.4
<b>Projected Aspect Ratio</b>	3.57	3.59	3.57	3.57
<b>Flat Aspect Ratio</b>	4.78	4.92	4.78	4.78
<b>Root Chord (m)</b>	2.880	3.000	3.120	3.24
<b>In-Flight Weight Range (Kg)</b>	55 - 85	80 - 100	95 - 115	110 - 135
<b>Certification</b>	DHV 1 - 2	DHV 1 - 2	DHV 1 - 2	DHV 1 - 2
<b>Speed km/h (Unaccelerated)</b>	19 - 35	19 - 35	19 - 35	19 - 35
<b>Max Speed Accelerated km/h</b>	45	45	45	45

Bundesrepublik Deutschland

Der Beauftragte



## MUSTERZULASSUNGSSCHEIN

für Luftsportgeräte

Nr.: **MZL GS-01-673-99**

Das nachstehend bezeichnete Luftfahrtgerät ist als Muster zugelassen auf Antrag von:

*Aerosport International GmbH, Grafenstraße 26, D-83098 Brannenburg*

Dieser Musterzulassungsschein ist auf Grund der die Musterzulassung betreffenden Bestimmungen des Luftverkehrsgesetzes und der Luftverkehrs-Zulassungs-Ordnung in der am Tage der Ausstellung geltenden Fassung erteilt.

*Befristungen und Auflagen siehe Musterzulassungsbescheid vom 12.05.99.*

Die Musterzulassung gilt gemäß zugehörigem Geräte-Kennblatt Nr.: **MZL GS-01-673-99**

Bezeichnung des Gerätemusters:

*Ozone Electron S*

Geräteart:

*Gleitsegel*

Die Musterzulassung kann in den in § 4 Abs. 2 der Luftverkehrs-Zulassungs-Ordnung vorgesehenen Fällen widerrufen werden.

Datum der Ausstellung

Unterschrift

12.05.99

Referat Technik Harry Buntz  
Deutscher Hängegleiterverband e.V.  
Miesbacher Straße 2, 83703 Brannenburg

Bundesrepublik Deutschland

Der Beauftragte



## MUSTERZULASSUNGSSCHEIN

für Luftsportgeräte

Nr.: **MZL GS-01-661-99**

Das nachstehend bezeichnete Luftfahrtgerät ist als Muster zugelassen auf Antrag von:

*Aerosport International GmbH, Grafenstraße 26, D-83098 Brannenburg*

Dieser Musterzulassungsschein ist auf Grund der die Musterzulassung betreffenden Bestimmungen des Luftverkehrsgesetzes und der Luftverkehrs-Zulassungs-Ordnung in der am Tage der Ausstellung geltenden Fassung erteilt.

*Befristungen und Auflagen siehe Musterzulassungsbescheid vom 07.04.99.*

Die Musterzulassung gilt gemäß zugehörigem Geräte-Kennblatt Nr.: *MZL GS-01-661-99*

Bezeichnung des Gerätemusters:

*Ozone Electron M*

Geräteart:

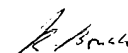
*Gleitsegel*

Die Musterzulassung kann in den in § 4 Abs 2 der Luftverkehrs-Zulassungs-Ordnung vorgesehenen Fällen widerrufen werden.

Datum der Ausstellung

07.04.99

Unterschrift

  
Deutscher Hängegleiterverband e.V.  
Miesbacher Straße 2, 83703 Gmund

Bundesrepublik Deutschland

Der Beauftragte



## MUSTERZULASSUNGSSCHEIN

für Luftsportgeräte

Nr.: *MZL GS-01-666-99*

Das nachstehend bezeichnete Luftfahrtgerät ist als Muster zugelassen auf Antrag von:

*Aerosport International GmbH, Grafenstraße 26, D-83098 Brannenburg*

Dieser Musterzulassungsschein ist auf Grund der die Musterzulassung betreffenden Bestimmungen des Luftverkehrsgesetzes und der Luftverkehrs-Zulassungs-Ordnung in der am Tage der Ausstellung geltenden Fassung erteilt.

*Befristungen und Auflagen siehe Musterzulassungsbescheid vom 20.04.99.*

Die Musterzulassung gilt gemäß zugehörigem Geräte-Kennblatt Nr.: *MZL GS-01-666-99*

Bezeichnung des Gerätemusters:

*Ozone Electron L*

Geräteart:

*Gleitsegel*

Die Musterzulassung kann in den in § 4 Abs. 2 der Luftverkehrs-Zulassungs-Ordnung vorgesehenen Fällen widerrufen werden.

Datum der Ausstellung

20.04.99

Unterschrift

Deutscher Hängegleiterverband e.V.  
Miesbacher Straße 2, 83723 Garmisch

Bundesrepublik Deutschland

Der Beauftragte



## MUSTERZULASSUNGSSCHEIN

für Luftsportgeräte

Nr.: MZL GS-01-661-99

Das nachstehend bezeichnete Luftfahrtgerät ist als Muster zugelassen auf Antrag von:

*Aerosport International GmbH, Grafenstraße 26, D-83098 Brannenburg*

Dieser Musterzulassungsschein ist auf Grund der die Musterzulassung betreffenden Bestimmungen des Luftverkehrsgesetzes und der Luftverkehrs-Zulassungs-Ordnung in der am Tage der Ausstellung geltenden Fassung erteilt.

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Die Musterzulassung gilt gemäß zugehörigem Geräte-Kennblatt Nr.: MZL GS-01-661-99

Bezeichnung des Gerätemusters:

*Ozone Electron XL*

Geräteart:

*Gleitsegel*

Die Musterzulassung kann in den in § 4 Abs. 2 der Luftverkehrs-Zulassungs-Ordnung vorgesehenen Fällen widerrufen werden.

Datum der Ausstellung

07. 09. 99.

Unterschrift

Deutscher Hängegleiterverband e.V.  
Miesbacher Straße 2 83703 Brannenburg

## DHV FLIGHT TEST REPORT

### Ozone Electron S

DHV Certification Number: MZL GS-01-673-99  
 Classification / Harness group: 1 - 2 / GH  
 Number of seats: 1  
 Trimming system: Accelerator  
 Winch towing: Yes

	Behaviour at min. take-off weight (55 kgs)	Behaviour at max. take-off weight (85 kgs)
<b>TAKE-OFF</b>	<b>1</b>	<b>1</b>
Inflation	evenly, immediately	evenly, immediately
Rising behaviour	immediately comes over pilot	immediately comes over pilot
Lift off speed	average	average
Take-off behaviour overall	easy	easy
<b>LEVEL FLIGHT</b>	<b>1 - 2</b>	<b>1 - 2</b>
Trim speed	33km/h	35km/h
Speed accelerated		45km/h
Roll damping	average	average
<b>TURN BEHAVIOUR</b>	<b>1 - 2</b>	<b>1</b>
Spin tendency	slight	not available
Control travel	average	average
Agility	high	high
<b>SYMMETRIC STALL</b>	<b>1</b>	<b>1</b>
Deep stall limit	average 60 cm - 75 cm	average 60 cm - 75 cm
Full stall limit	average 65 cm - 80 cm	average 65 cm - 80 cm
Control pressure increase	average	average
<b>SYMMETRIC TUCK</b>	<b>1 - 2</b>	<b>1 - 2</b>
Tendency to shoot forward	average	average
Opening behaviour	spontaneous, delayed	spontaneous, delayed
<b>SYMMETRIC TUCK (ACCELERATED)</b>	-	<b>1 - 2</b>
Tendency to shoot forward	-	slight
Opening behaviour	-	spontaneous, delayed
<b>ASYMMETRIC TUCK</b>	<b>1 - 2</b>	<b>1 - 2</b>
Turn	90 - 180 degrees	90 - 180 degrees
Rate of turn	average with deceleration	average with deceleration
Loss of altitude	average	average
Stabilization	spontaneous	spontaneous
Opening behaviour	spontaneous, delayed	spontaneous, delayed



## DHV FLIGHT TEST REPORT

### Ozone Electron S (continued)

	Behaviour at min. take-off weight (55 kgs)	Behaviour at max. take-off weight (85 kgs)
<b>ASYMMETRIC TUCK (ACCELERATED)</b>	-	1 - 2
Turn	-	90 - 180 degrees
Rate of turn	-	average with deceleration
Loss of altitude	-	average
Stabilization	-	spontaneous
Opening behaviour	-	spontaneous, delayed
<b>COUNTERSTEERING AN ASYMMETRIC TUCK</b>	1	1
Stabilization	spontaneous	spontaneous
Control travel	average	average
Control pressure increase	average	average
Opposite turn	easy, no tendency to stall	easy, no tendency to stall
Opening behaviour	spontaneous, delayed	spontaneous, delayed
<b>FULLSTALL (symmetric exit)</b>	1 - 2	1 - 2
<b>FULLSTALL (asymmetric exit)</b>	1 - 2	1 - 2
<b>SPIN AT TRIM SPEED</b>	1 - 2	1 - 2
<b>SPIN IN STATIONARY TURN</b>	1 - 2	1 - 2
<b>SPIRAL DIVE</b>	1 - 2	1 - 2
Entry	easy	easy
Spin tendency	slight	not available
Exit	turn continues through 180-360 degrees	turn continues through 180-360 degrees
<b>B-LINE STALL</b>	1 - 2	1 - 2
Entry	easy	easy
Exit	delayed acceleration < 4 sec	delayed acceleration < 4 sec
<b>LANDING</b>	1	1
Landing behaviour	easy	easy
<b>ADDITIONAL FLIGHT SAFETY REMARKS</b>		

## DHV FLIGHT TEST REPORT

### Ozone Electron M

DHV Certification Number: MZL GS-01-661-99  
 Classification / Harness group: 1 - 3 / GH  
 Number of seats: 1  
 Trimming system: Accelerator  
 Winch towing: Yes

	Behaviour at min. take-off weight (80 kgs)	Behaviour at max. take-off weight (100 kgs)
<b>TAKE-OFF</b>	<b>1</b>	<b>1</b>
Inflation	evenly, immediately	evenly, immediately
Rising behaviour	immediately comes over pilot	immediately comes over pilot
Lift off speed	average	average
Take-off behaviour overall	easy	easy
<b>LEVEL FLIGHT</b>	<b>1</b>	<b>1</b>
Trim speed	34km/h	35km/h
Speed accelerated		45km/h
Roll damping	average	average
<b>TURN BEHAVIOUR</b>	<b>1</b>	<b>1</b>
Spin tendency	not available	not available
Control travel	average	average
Agility	high	high
<b>SYMMETRIC STALL</b>	<b>1 - 2</b>	<b>1 - 2</b>
Deep stall limit	average 60 cm - 75 cm	average 60 cm - 75 cm
Full stall limit	average 65 cm - 80 cm	average 65 cm - 80 cm
Control pressure increase	high	high
<b>SYMMETRIC TUCK</b>	<b>1</b>	<b>1</b>
Tendency to shoot forward	slight	slight
Opening behaviour	spontaneous, quickly	spontaneous, quickly
<b>SYMMETRIC TUCK (ACCELERATED)</b>	-	<b>1 - 2</b>
Tendency to shoot forward	-	slight
Opening behaviour	-	spontaneous, delayed
<b>ASYMMETRIC TUCK</b>	<b>1 - 2</b>	<b>1 - 2</b>
Turn	90 - 180 degrees	90 - 180 degrees
Rate of turn	average with deceleration	average with deceleration
Loss of altitude	average	average
Stabilization	spontaneous	spontaneous
Opening behaviour	spontaneous, delayed	spontaneous, delayed

## DHV FLIGHT TEST REPORT

### Ozone Electron M (continued)

	Behaviour at min. take-off weight (80 kgs)	Behaviour at max. take-off weight (100 kgs)
<b>ASYMMETRIC TUCK (ACCELERATED)</b>	-	1 - 2
Turn	-	90 - 180 degrees
Rate of turn	-	average with deceleration
Loss of altitude	-	average
Stabilization	-	spontaneous
Opening behaviour	-	spontaneous, delayed
<b>COUNTERSTEERING AN ASYMMETRIC TUCK</b>	1 - 2	1 - 2
Stabilization	countersteering easy	countersteering easy
Control travel	average	average
Control pressure increase	high	high
Opposite turn	easy, no tendency to stall	easy, no tendency to stall
Opening behaviour	spontaneous, delayed	spontaneous, delayed
<b>FULLSTALL (symmetric exit)</b>	1 - 2	1 - 2
<b>FULLSTALL (asymmetric exit)</b>	1 - 2	1 - 2
<b>SPIN AT TRIM SPEED</b>	1 - 2	1 - 2
<b>SPIN IN STATIONARY TURN</b>	1 - 2	1 - 2
<b>SPIRAL DIVE</b>	1	1
Entry	easy	easy
Spin tendency	not available	not available
Exit	spontaneous	spontaneous
<b>B-LINE STALL</b>	1	1
Entry	easy	easy
Exit	spontaneous	spontaneous
<b>LANDING</b>	1	1
Landing behaviour	easy	easy
<b>ADDITIONAL FLIGHT SAFETY REMARKS</b>		

## DHV FLIGHT TEST REPORT

### Ozone Electron L

DHV Certification Number: MZL GS-01-666-99  
 Classification / Harness group: 1 - 2 / GH  
 Number of seats: 1  
 Trimming system: Accelerator  
 Winch towing: Yes

	Behaviour at min. take-off weight (95 kgs)	Behaviour at max. take-off weight (115 kgs)
<b>TAKE-OFF</b>	<b>1</b>	<b>1</b>
Inflation	evenly, immediately	evenly, immediately
Rising behaviour	immediately comes over pilot	immediately comes over pilot
Lift off speed	slight	slight
Take-off behaviour overall	easy	easy
<b>LEVEL FLIGHT</b>	<b>1 - 2</b>	<b>1 - 2</b>
Trim speed	34km/h	35km/h
Speed accelerated		44km/h
Roll damping	average	average
<b>TURN BEHAVIOUR</b>	<b>1</b>	<b>1</b>
Spin tendency	not available	not available
Control travel	high	high
Agility	average	average
<b>SYMMETRIC STALL</b>	<b>1</b>	<b>1</b>
Deep stall limit	late > 75 cm	late > 75 cm
Full stall limit	late > 90 cm	late > 90 cm
Control pressure increase	average	average
<b>SYMMETRIC TUCK</b>	<b>1 - 2</b>	<b>1 - 2</b>
Tendency to shoot forward	slight	slight
Opening behaviour	spontaneous, delayed	spontaneous, delayed
<b>SYMMETRIC TUCK (ACCELERATED)</b>	-	<b>1 - 2</b>
Tendency to shoot forward	-	slight
Opening behaviour	-	spontaneous, delayed
<b>ASYMMETRIC TUCK</b>	<b>1 - 2</b>	<b>1 - 2</b>
Turn	90 - 180 degrees	90 - 180 degrees
Rate of turn	average with deceleration	average with deceleration
Loss of altitude	slight	slight
Stabilization	spontaneous	spontaneous
Opening behaviour	spontaneous, delayed	spontaneous, delayed

## DHV FLIGHT TEST REPORT

### Ozone Electron L (continued)

	Behaviour at min. take-off weight (95 kgs)	Behaviour at max. take-off weight (115 kgs)
<b>ASYMMETRIC TUCK (ACCELERATED)</b>	-	1 - 2
Turn	-	90 - 180 degrees
Rate of turn	-	average with deceleration
Loss of altitude	-	average
Stabilization	-	spontaneous
Opening behaviour	-	spontaneous, delayed
<b>COUNTERSTEERING AN ASYMMETRIC TUCK</b>	1	1
Stabilization	spontaneous	spontaneous
Control travel	high	high
Control pressure increase	average	average
Opposite turn	easy, no tendency to stall	easy, no tendency to stall
Opening behaviour	spontaneous, delayed	spontaneous, delayed
<b>FULLSTALL (symmetric exit)</b>	1 - 2	1 - 2
<b>FULLSTALL (asymmetric exit)</b>	1	1
<b>SPIN AT TRIM SPEED</b>	1 - 2	1 - 2
<b>SPIN IN STATIONARY TURN</b>	1	1
<b>SPIRAL DIVE</b>	1	1
Entry	easy	easy
Spin tendency	not available	not available
Exit	spontaneous	spontaneous
<b>B-LINE STALL</b>	1 - 2	1 - 2
Entry	easy	easy
Exit	delayed acceleration < 4 sec	delayed acceleration < 4 sec
<b>LANDING</b>	1	1
Landing behaviour	easy	easy
<b>ADDITIONAL FLIGHT SAFETY REMARKS</b>		

## DHV FLIGHT TEST REPORT

### Ozone Electron XL

DHV Certification Number: MZL GS-01-701-99  
 Classification / Harness group: 1 - 2 / GH  
 Number of seats: 1  
 Trimming system: Accelerator  
 Winch towing: Yes

	Behaviour at min. take-off weight (110 kgs)	Behaviour at max. take-off weight (135 kgs)
<b>TAKE-OFF</b>	<b>1</b>	<b>1</b>
Inflation	evenly, immediately	evenly, immediately
Rising behaviour	immediately comes over pilot	immediately comes over pilot
Lift off speed	slight	slight
Take-off behaviour overall	easy	easy
<b>LEVEL FLIGHT</b>	<b>1 - 2</b>	<b>1 - 2</b>
Trim speed	34km/h	35km/h
Speed accelerated		47km/h
Roll damping	average	average
<b>TURN BEHAVIOUR</b>	<b>1 - 2</b>	<b>1 - 2</b>
Spin tendency	slight	slight
Control travel	high	high
Agility	average	average
<b>SYMMETRIC STALL</b>	<b>1</b>	<b>1</b>
Deep stall limit	late > 75 cm	late > 75 cm
Full stall limit	late > 90 cm	late > 90 cm
Control pressure increase	average	average
<b>SYMMETRIC TUCK</b>	<b>1 - 2</b>	<b>1 - 2</b>
Tendency to shoot forward	slight	slight
Opening behaviour	spontaneous, delayed	spontaneous, delayed
<b>SYMMETRIC TUCK (ACCELERATED)</b>	-	<b>1 - 2</b>
Tendency to shoot forward	-	slight
Opening behaviour	-	spontaneous, delayed
<b>ASYMMETRIC TUCK</b>	<b>1 - 2</b>	<b>1 - 2</b>
Turn	90 - 180 degrees	90 - 180 degrees
Rate of turn	average with deceleration	average with deceleration
Loss of altitude	slight	slight
Stabilization	spontaneous	spontaneous
Opening behaviour	spontaneous, delayed	spontaneous, delayed

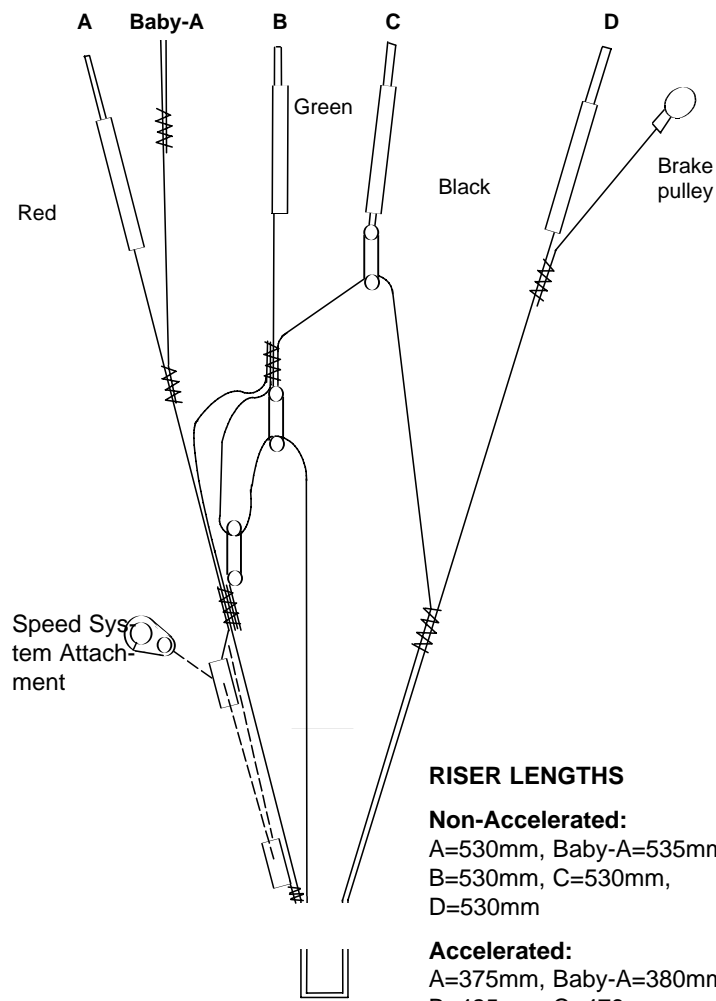
## DHV FLIGHT TEST REPORT

### Ozone Electron XL (continued)

	Behaviour at min. take-off weight (110 kgs)	Behaviour at max. take-off weight (135 kgs)
<b>ASYMMETRIC TUCK (ACCELERATED)</b>	-	1 - 2
Turn	-	90 - 180 degrees
Rate of turn	-	average with deceleration
Loss of altitude	-	average
Stabilization	-	spontaneous
Opening behaviour	-	spontaneous, delayed
<b>COUNTERSTEERING AN ASYMMETRIC TUCK</b>	1 - 2	1 - 2
Stabilization	spontaneous	spontaneous
Control travel	high	high
Control pressure increase	average	average
Opposite turn	easy, no tendency to stall	easy, no tendency to stall
Opening behaviour	spontaneous, delayed	spontaneous, delayed
<b>FULLSTALL (symmetric exit)</b>	1 - 2	1 - 2
<b>FULLSTALL (asymmetric exit)</b>	1 - 2	1 - 2
<b>SPIN AT TRIM SPEED</b>	1 - 2	1 - 2
<b>SPIN IN STATIONARY TURN</b>	1 - 2	1 - 2
<b>SPIRAL DIVE</b>	1 - 2	1
Entry	easy	easy
Spin tendency	slight	not available
Exit	spontaneous	spontaneous
<b>B-LINE STALL</b>	1 - 2	1 - 2
Entry	easy	easy
Exit	delayed acceleration < 4 sec	delayed acceleration < 4 sec
<b>LANDING</b>	1	1
Landing behaviour	easy	easy
<b>ADDITIONAL FLIGHT SAFETY REMARKS</b>		

# RISER ARRANGEMENT

## ELECTRON S



### RISER LENGTHS

#### Non-Accelerated:

A=530mm, Baby-A=535mm,  
B=530mm, C=530mm,  
D=530mm

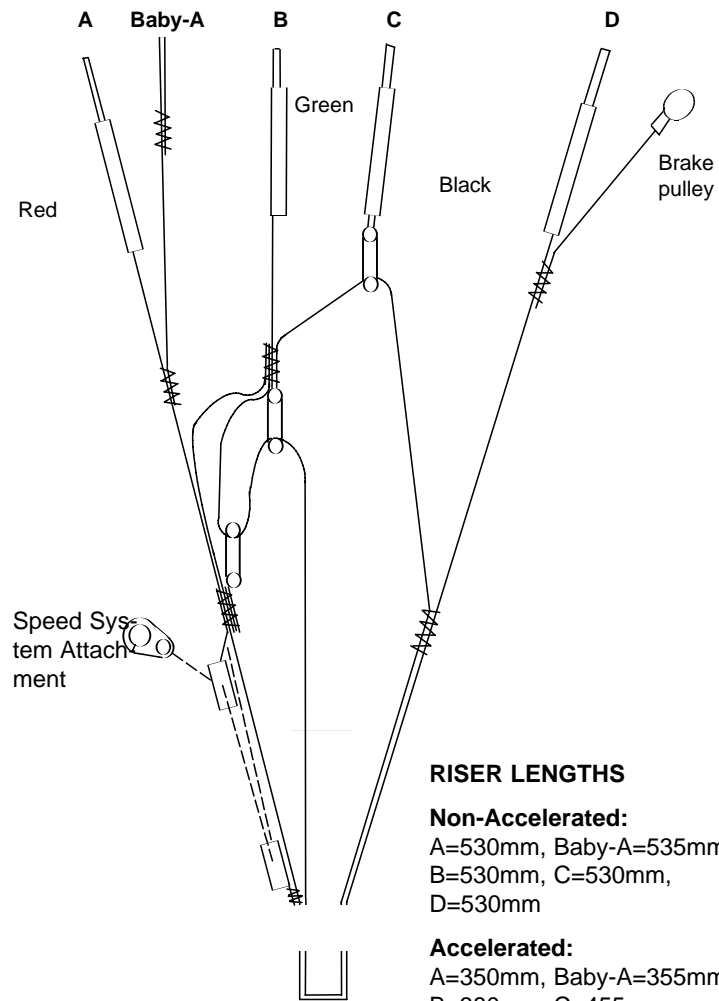
#### Accelerated:

A=375mm, Baby-A=380mm,  
B=425mm, C=479mm,  
D=530mm



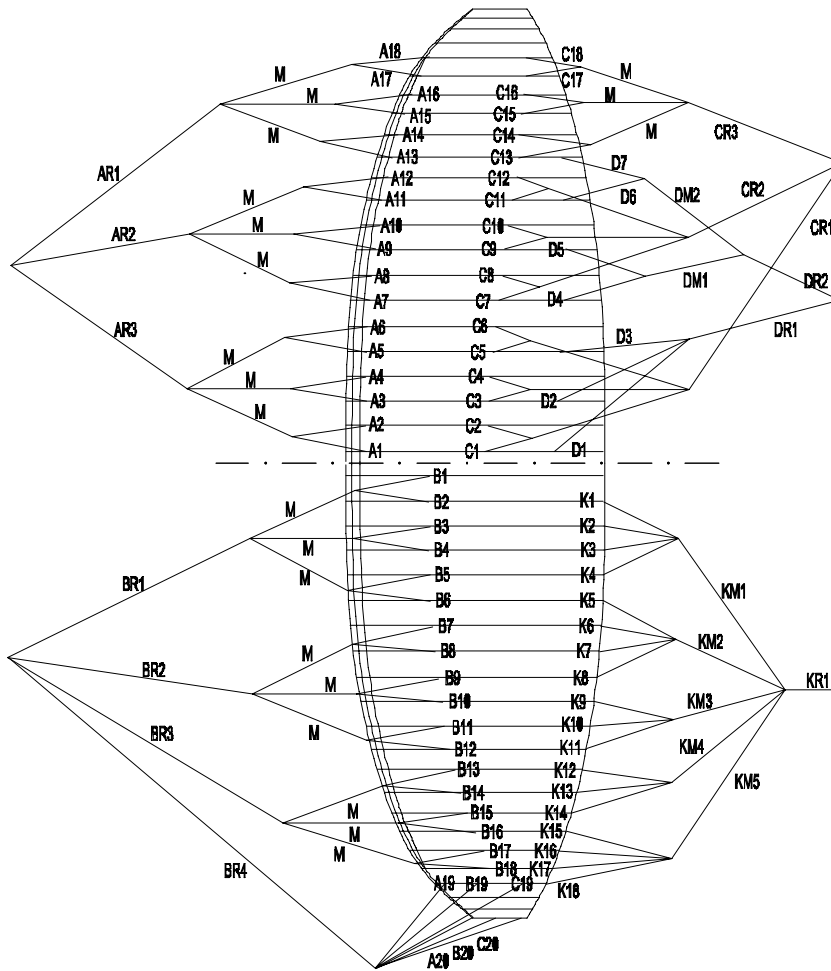
## RISER ARRANGEMENT

ELECTRON M, L and XL



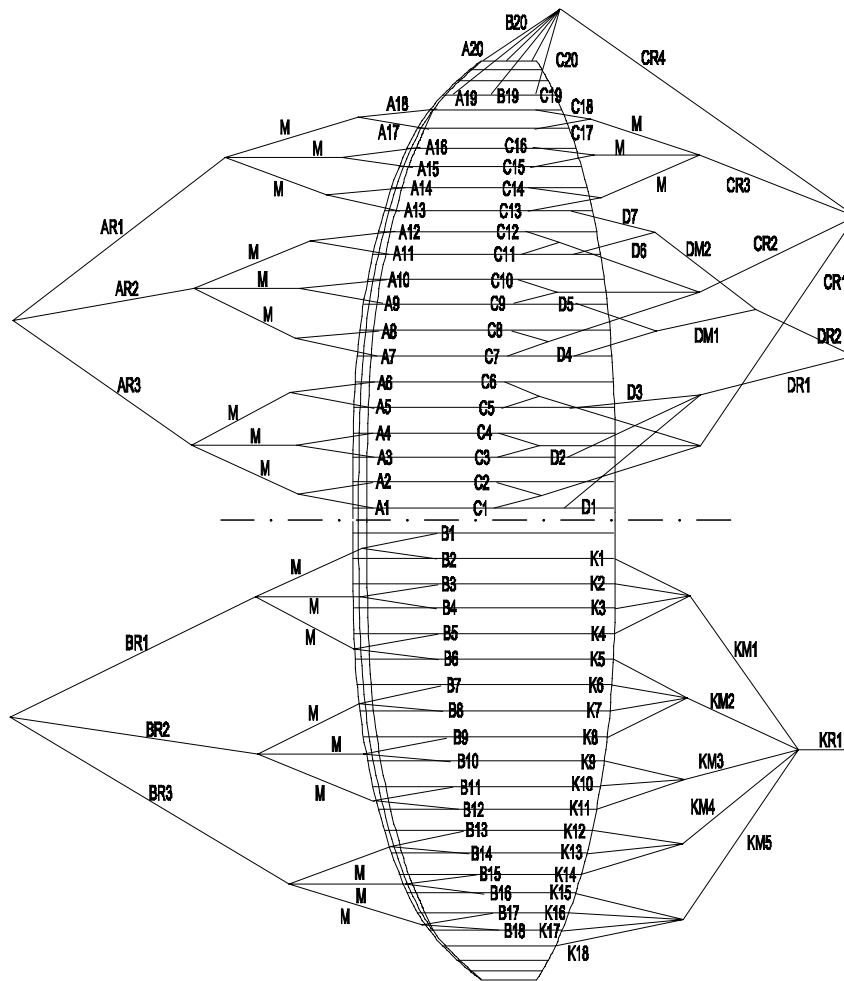
# LINE ARRANGEMENT

## ELECTRON S



# LINE ARRANGEMENT

ELECTRON M, L and XL



## LINE CHECK SHEET

### ELECTRON Small (DHV 1-2)

	Line No.	A	B	C	D	Brakes	Brake No.
Tip	20	6002	5972	5972			
	19	6272	6202	6252		6866	K18
	18	6317	6294	6334		6841	K17
	17	6357	6324	6364		6826	K16
	16	6387	6344	6394		6846	K15
	15	6417	6364	6414		6820	K14
	14	6437	6384	6444		6800	K13
	13	6467	6414	6484	6614	6830	K12
	12	6497	6444	6534		6850	K11
	11	6477	6424	6514	6604	6850	K10
	10	6467	6414	6504		6910	K9
	9	6467	6414	6504	6634	6990	K8
	8	6487	6424	6524		6990	K7
	7	6517	6454	6544	6684	7050	K6
	6	6517	6454	6544		7150	K5
	5	6497	6424	6514	6682	7230	K4
	4	6487	6414	6504		7270	K3
	3	6497	6424	6504	6642	7350	K2
2	6517	6444	6524		7470	K1	
1	6557	6484	6564	6692			
Centre							

Notes: Measurements comply to the official DHV measurement method.  
 Lines measured from the bottom of the sail to the inside of the maillon.  
 Measurements made under 5 daN load.

## LINE CHECK SHEET

### ELECTRON Medium (DHV 1-2)

	Line No.	A	B	C	D	Brakes	Brake No.
<b>Tip</b>	<b>20</b>	6170	6150	6160			
	<b>19</b>	6510	6435	6470		7120	<b>K18</b>
	<b>18</b>	6610	6553	6560		7125	<b>K17</b>
	<b>17</b>	6660	6588	6615		7120	<b>K16</b>
	<b>16</b>	6700	6638	6670		7150	<b>K15</b>
	<b>15</b>	6720	6658	6700		7160	<b>K14</b>
	<b>14</b>	6750	6678	6740		7130	<b>K13</b>
	<b>13</b>	6780	6698	6775	6910	7150	<b>K12</b>
	<b>12</b>	6795	6725	6830		7150	<b>K11</b>
	<b>11</b>	6765	6695	6800	6885	7140	<b>K10</b>
	<b>10</b>	6755	6680	6805		7190	<b>K9</b>
	<b>9</b>	6755	6680	6795	6920	7240	<b>K8</b>
	<b>8</b>	6775	6705	6810		7240	<b>K7</b>
	<b>7</b>	6805	6735	6830	6980	7295	<b>K6</b>
	<b>6</b>	6815	6735	6830		7400	<b>K5</b>
	<b>5</b>	6785	6705	6800	6970	7470	<b>K4</b>
	<b>4</b>	6775	6695	6790		7530	<b>K3</b>
	<b>3</b>	6785	6695	6790	6940	7620	<b>K2</b>
<b>2</b>	6805	6725	6810		7745	<b>K1</b>	
<b>1</b>	6845	6765	6850	6990			

**Centre**

Notes: Measurements comply to the official DHV measurement method.  
 Lines measured from the bottom of the sail to the inside of the maillon.  
 Measurements made under 5 daN load.

## LINE CHECK SHEET

### ELECTRON Large (DHV 1-2)

Tip	Line No.	A	B	C	D	Brakes	Brake No.
		20	6518	6508	6518		
	19	6848	6788	6838		7478	K18
	18	6914	6894	6945		7458	K17
	17	6956	6934	6999		7448	K16
	16	6996	6964	7051		7458	K15
	15	7016	6984	7081		7494	K14
	14	7046	7004	7101		7454	K13
	13	7076	7024	7131	7261	7474	K12
	12	7106	7044	7138		7484	K11
	11	7086	7014	7111	7218	7464	K10
	10	7066	6994	7091		7514	K9
	9	7066	6994	7091	7221	7564	K8
	8	7086	7004	7091		7574	K7
	7	7116	7024	7121	7261	7629	K6
	6	7126	7034	7111		7734	K5
	5	7096	7004	7079	7253	7804	K4
	4	7086	6994	7061		7864	K3
	3	7096	6994	7071	7213	7954	K2
	2	7116	7014	7091		8089	K1
	1	7156	7054	7131	7273		

Centre

Notes: Measurements comply to the official DHV measurement method.  
 Lines measured from the bottom of the sail to the inside of the maillon.  
 Measurements made under 5 daN load.

## LINE CHECK SHEET

### ELECTRON Extra Large (DHV 1-2)

Tip	Line No.	A	B	C	D	Brakes	Brake No.
		20	6787	6792	6817		
	19	7127	7077	7142		7823	K18
	18	7202	7155	7187		7803	K17
	17	7242	7195	7237		7803	K16
	16	7282	7247	7290		7833	K15
	15	7312	7267	7320		7715	K14
	14	7342	7287	7357		7785	K13
	13	7372	7307	7387	7526	7805	K12
	12	7402	7339	7419		7805	K11
	11	7382	7309	7389	7486	7785	K10
	10	7362	7289	7369		7835	K9
	9	7362	7279	7359	7486	7895	K8
	8	7382	7299	7359		7895	K7
	7	7412	7319	7389	7526	7945	K6
	6	7422	7329	7379		7055	K5
	5	7392	7299	7349	7523	7125	K4
	4	7382	7279	7329		7185	K3
	3	7392	7289	7339	7483	7275	K2
	2	7412	7309	7359		8405	K1
	1	7452	7349	7399	7533		
Centre							

Notes: Measurements comply to the official DHV measurement method.  
 Lines measured from the bottom of the sail to the inside of the maillon.  
 Measurements made under 5 daN load.