



**OZONE**  
**SPYDER**



# **SPYDER** MANUAL

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Thank you for choosing to fly an Ozone Spyder.  
As a team of flying enthusiasts and adventurers, Ozone's mission is to build sweet handling, agile paragliders which produce 'cutting edge' performance, whilst still keeping you safe in rough air.

All our research and development is concentrated on creating the best handling characteristics possible with optimum security. Confidence and belief in your paraglider is a far greater asset than any small gains in performance - ask any of the Ozone pilots on your local sites, or those who have taken our gliders on ground-breaking adventures and stood on podiums around the world.

Our development team is based in the south of France. This area, which includes the sites of Gourdon, Monaco and Lachens, guarantees us more than 300 flyable days per year. This is a great asset in the development of the Ozone range.

As pilots we fully understand just how big an investment a new paraglider is. We know that quality and value for money are essential considerations when choosing your new paraglider; so to keep costs low and quality high we now build all our wings in our own production plant. This way we can guarantee that all our paragliders meet the same high standards that we expect ourselves.

This manual will help you get the most out of your Spyder. It details information about the Spyder's design, tips and advice on how best to use it and how to care for it to ensure it has a long life and retains a high resale value.

If you need any further information about Ozone, the Spyder, or any of our products please check [www.flyozone.com](http://www.flyozone.com) or contact your local dealer, school or any of us here at Ozone.

It is essential that you read this manual before flying your Spyder for the first time.

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

Ozone's web site, [www.flyozone.com](http://www.flyozone.com) carries up-to-date information, including any safety issues or issues specific to your Spyder. Please check it regularly.

Safe Flying

All the team @ Ozone

## WARNING

Paragliding/Paramotoring is a potentially dangerous sport that can cause serious injury including bodily harm, paralysis and death.

Flying an Ozone paraglider is undertaken with the full knowledge that paramotoring involves risks.

As the owner of an Ozone paraglider you take exclusive responsibility for all risks associated with its use. Inappropriate use and/or abuse of your equipment will increase these risks.

Ozone paragliders are only suitable for qualified pilots or those under instruction. This manual does not replace proper instruction. Make sure you seek professional tuition and learn with a reputable school.

Use only certified paragliders, harnesses with protector and reserve parachutes that are free from modification, and use them only within their certified weight ranges. Please remember that flying a glider outside its certified configuration may jeopardise any insurance (e.g. liability, life etc) you have.

All pilots should have the appropriate level of license for their respective country and third party insurance.

Make sure that you are physically and mentally healthy before flying. Choose the correct wing, harness and conditions for your level of experience.

Pay special attention to the terrain you will be flying and the weather conditions before you launch. If you are unsure do not fly, and always add a large safety margin to all your decisions.

Avoid flying your glider in rain, snow, strong wind, and turbulent weather conditions or clouds. Any liability claims resulting from use of this product towards the manufacturer, distributor or dealers is excluded.

Be prepared to practice as much as you can - especially ground handling, as this is a critical aspect of paramotoring. Poor control whilst on the ground is one of the most common causes of accidents. Be ready to continue your learning by attending advanced courses to follow the evolution of our sport, as techniques and materials keep improving.

Make sure you complete a thorough daily and pre-flight inspection of all of your equipment. Never attempt flying with unsuitable or damaged equipment. Always make sure your engine is pre-flight checked and warmed up ready for flight. (See manufacturer's recommendations).

Always wear a helmet, ear defenders, gloves and boots.

If you use good, safe judgment you will enjoy many years of paramotoring.

Remember, PLEASURE is the reason for our sport

## TEAM OZONE



Everyone at Ozone continues to be driven by our passion for flying, our love of adventure and our quest to see Ozone's paraglider development create better, safer and more versatile paragliders.

Paragliding design is led by the ever thoughtful David Dagault; Dav has a wealth of experience both in competition, adventure flying and paraglider design. Also on the design team are Russell Ogden, Luc Armant and Fred Pieri.

Russ is a top competition pilot and ex paragliding instructor, he can usually be found putting Dav's latest creation through a series of test manoeuvres. Luc, a dedicated XC addict has a background in naval architecture. He brings a wealth of knowledge and ideas to the design team and works closely with Dav in the design process. Fred is the latest addition to the team. He is a mathematician, mechanical engineer and vol Biv specialist and works closely with Dav and Luc.

Former female World champion, Emilia Plak manages the paramotor department. She is helped by Mathieu Rouanet and Alex Mateos, two of the finest pilots in the world holding World, European and French Paramotoring champion titles amongst them. They both offer valuable advice and feedback throughout the development process, helping to produce the perfect blend of safety, speed and performance.

Back in the office Mike Cavanagh generally keeps control of the mayhem. Promotion and Team pilots are organised by Matt Gerdes. Karine Marconi and Chloe Vila make sure we don't spend too much money and look after the ordering system.

Our manufacturing facility in Vietnam is headed up by Dr Dave Pilkington, who works relentlessly manufacturing gliders and producing prototypes as well as researching materials and manufacturing processes for our future products. He is backed up by Khanh and 700 production staff.

## YOUR SPYDER

The Spyder as a fully reflexed, light-weight paramotoring wing based on the successful Roadster 2. It is suitable for a wide range of pilots from beginners to experienced XC pilots alike who are looking for a safe and fun all-round wing.

The Spyder incorporates the knowledge gained from the development of our lightweight paragliding range along with the experience of our world championship winning Paramotor design team. Made from a hybrid mix of lightweight materials; strong and UV resistant Dominico N20D and long-proven Porcher Skytex 27gr, the reduced weight allows for easier manoeuvres on the ground so the preparation process is easier and less tiring. Nil wind inflation is exceptional and it can remain overhead in lighter winds than a standard wing, also the take-off speed is generally lower requiring less engine power and a shorter runway to become airborne.

The Spyder features a Shark Nose Ozone Reflex Profile (OZRP) tuned specifically for powered flight. The Shark nose profile maintains a constant level of lift and internal pressure over a wide range of angles of attack. This profile increases levels of stability whilst accelerated so is very collapse resistant - even in turbulent air - and increases levels of forgiveness due to its acceptance of deep brake inputs before the stall point. The wing includes a host of other technical details, a refined sail tension to absorb turbulence and filter the feedback for a comfortable ride; efficient and light plastic nose reinforcements and a line plan optimised to balance low drag efficiency and long term durability. The risers feature long range trimmers and a long range accelerator system for high cruise speeds and a high top speed. The accelerator and trimmers integrate seamlessly - using the speed system has exactly the same effect as releasing the trimmers. The risers also feature a tip steering system (TST) for accurate, agile handling during accelerated flight and adjustable brake handle attachment points to suite different motor and trike units.

Although designed for pilots who fly mainly (if not exclusively) under power, the Spyder also performs excellently un-powered in free flight. The sink rate is low enough to soar in light lift, thermal in all conditions and the glide performance is good enough to fly cross country.

## RISERS

The updated risers feature TST, Trim tabs, adjustable brake pulley heights and a huge accelerator range. The A riser is covered with a blue coloured webbing for easy identification. See page 21.

### ➤ Brake Lines

The brake line lengths have been set carefully during testing. 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, if you do choose to adjust them, please bear in mind the following:

- Ensure both main brake lines are of equal length.
- If a brake handle has been removed, 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 must be a substantial "bow" in them to guarantee no deformation of the trailing edge.
- There must be a minimum of 10cm of free play before the brakes begin to deform the trailing edge. This prevents the trailing edge from being deformed when using the speed system.

**IMPORTANT: 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) or the Tip Steering System line for directional control.**

### ➤ Trimmers

The Spyder is supplied with a trim riser set. The 'neutral' or standard position is when the trimmers are pulled all the way down. It is in this position that the wing is certified. The trimmers can be set to the white line for better inflation behaviour during take-off. This is especially useful in light winds and/or at high altitudes. The standard (certified) trim setting is ideal for climbing under power, whilst thermalling and when the air is turbulent. Brake pressure is lighter and the handling at its best in the standard (certified) trim setting. To increase cruise speed you can use the speed system,



release the trimmers, or do both. Using the speed system has exactly the same effect as releasing the trimmers so it is safe and possible to fly with the trimmers in the standard position whilst using the full range of the speed system.

Unlike the majority of reflex PPG wings, to increase cruise speed you can use the speed system, release the trimmers, or do both. It is not necessary to release the trimmers before accelerating. Using the speed system has exactly the same effect as releasing the trimmers so it is safe and possible to fly with the trimmers in the neutral position whilst using the full range of the speed system.

In turbulent air the reflex profile is very stable. It will resist reasonable levels of turbulence with a high resistance to collapse without pilot input. The faster the wing is flown the more inherent stability there is, as the reflex has a greater effect. In mild turbulence it may be best to not attempt to fly the wing actively and let the profile absorb the turbulence itself, indeed small applications of the brakes can reduce the inherent stability of the profile. However in very strong turbulence Ozone recommends to return the trimmers to the neutral position (pulled down) and flying the glider actively. This way, you will be in the best position to react correctly should an incident occur.

**IMPORTANT: The certified position of the risers is when the trimmers are pulled down to the slowest position. Flying with the trimmers released and/or with the speed bar accelerated is safe to do under the correct circumstances but takes the wing outside of its EN certified status.**

**NOTE: The white line on the trimmer is the recommended position for Take off.**

### ➤ Accelerator System

To set up an accelerator on the ground, ask a friend to pull your risers into their in-flight position while you sit in your harness. Now adjust the length of the line so that the main bar sits just beneath your seat. You should now be able to hook your heel in to the sec-

ondary (lower) loop of the accelerator.

The accelerator must be slack enough to ensure that the front risers are not pulled down in normal flight, but not so long that it is impossible to use the full range of the speed system.

Once set up, test the full range of the speed system in calm flying conditions: ensure that both risers are pulled evenly during operation. Fine-tuning can be completed when you are back on the ground.

**IMPORTANT: Using the accelerator decreases the angle of attack and can make the gliders recovery from a collapse more aggressive, therefore using the accelerator near the ground or in turbulence should be avoided.**

**IMPORTANT: When fully accelerated directional control should be maintained with the Tip Steering System. Do not use the brakes.**

**IMPORTANT: Using the speed system has exactly the same effect as releasing the trimmers so it is safe and possible to fly with the trimmers in the fully slow (neutral) position whilst using the full range of the speed system. However it is not EN certified with the speed bar activated.**

### ➤ Tip Steering System TST

The Tip steering system is for precise handling at high speeds without the need to use the brakes. Located on the risers the small handle is linked to the very tip of the wing giving you high levels of precision and comfort for high speed cruising or low level stick kicking.

**IMPORTANT: Ozone recommends that whilst at low level, brakes should always be kept in the hand in case of collapse, engine failure or impromptu landings.**



**IMPORTANT: If you change the brake pulley position, you MUST re lengthen the brake and TST lines accordingly.**

### ➤ Adjustable Brake Pulley Position

The brake line pulley position can be adjusted according to pilot preference to suite the power unit's hang points height. There are 2 settings: Upper and Lower. The upper setting (as set by the factory) is for low hang point motors whilst the lower setting is for units with higher hang points.

If you change the pulley position you must also change the length of the brake lines accordingly, For example moving to the lower pulleys requires the addition of approximately 15cm to the overall brake line length (measured from the mark on the brake line).

To change the pulley position, remove the brake line from the pulley by taking off the brake handle. Re-route the brake line through the other pulley before attaching the brake handle at the new adjusted length.

**IMPORTANT: If you change the brake pulley position, you MUST re lengthen the brake and TST lines accordingly.**

**IMPORTANT: 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) or the tip steering system for directional control.**

## TOTAL WEIGHT IN FLIGHT

Each Spyder has been certified for a defined weight range. We strongly recommend that you respect these weight ranges and fly the wing most suited to your weight. That way you can get many hours of flight both powered and un-powered with the same wing.

## HARNESS AND MOTOR

It will be in your harness that you will enjoy flying. Therefore, we recommend you spend the time on the ground to adjust your harness' different settings. Hang from a solid beam and double check that you are comfortable and that you can reach the brake handles, tip steering handles and that you can achieve the full range of speed bar travel before flying.

The Spyder is suitable for all types of motor. There are many different motor units available and it is vitally important that you choose one that is suitable for your needs, weight and skill level. Always seek assistance and advice from your instructor or experienced pilots before choosing equipment for yourself.

## BASIC FLIGHT TECHNIQUES

To familiarise yourself with the glider it is a good idea to perform practice inflations and ground handling with and without the motor. You should have no difficulties flying the Spyder for the first time in suitable conditions, but as with all new equipment; only fly in conditions that you would normally fly in, on a familiar site and do so progressively.

### ➤ Preparation

Lay out the Spyder downwind of your motor on its top surface in a pronounced arc, with the centre of the wing higher than the tips. Lay out the lines one side at a time. Hold up the risers and starting with the brake lines, pull all lines clear. Repeat with the D, C, B and A lines, laying the checked lines on top of the previous set, and making sure no lines are tangled, knotted or snagged. Mirror the process on the other side.

**IMPORTANT: Always lay out your glider downwind of the motor, never leave the motor downwind of the wing or connected to the motor if unattended.**

**Take-off checklist:**

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. Holding the A's, your brake handles and throttle
6. Leading edge open
7. Aligned directly into wind
8. Engine warm and able to deliver full power
9. Trimmers set correctly
10. Prop clear of lines
11. Airspace and visibility clear

**➤ Launching**

Your Spyder will launch with either the forward or reverse launch techniques.

When taking off under power, make sure there is enough clear space upwind of you to launch and climb out safely, avoiding trees, power lines and any other obstacles that may affect you should you have a power failure. Always fly with a safety margin so that power failures do not leave you compromised. You should always be able to glide power off to a suitable landing place.

Whilst inflating your wing, you should hold both of the A risers on each side. Once clipped in, and you have gone through the take-off check list (above), stand central to the wing to ensure an even and progressive inflation.

Run in an upright position so that the motor is generating forward thrust, do not lean too far forward otherwise the power of the motor will attempt to push you into the ground! When you have enough airspeed a gentle application of brake will help you lift off. Do not stop running until your feet have left the ground and you are sure of a safe climb out.

**Forward Launch - Nil to Light winds**

When the wind is favourable, move forward positively: your lines should become tight within one or two steps. The Spyder will immediately start to inflate. You should maintain a constant pressure on the risers until the wing is overhead.

Do not pull down or push the risers forward excessively, or the leading edge will deform and possibly collapse making taking-off more difficult and potentially dangerous. Move smoothly throughout the entire launch, there is no need to rush or snatch at it. You should have plenty of time to look up and check your canopy before committing yourself. Once you are happy that the Spyder is inflated correctly, progressively apply full power and accelerate smoothly for the launch.

**NOTE: The trimmers can be set to the white line for better inflation behaviour during take-off. This is especially useful in light winds and/or at high altitudes.**

**Reverse Launch -Light to Strong Winds**

Lay out your Spyder as you would for the forward launch. However, this time face the wing, and attach the risers in the correct manor (half a turn in each riser, and crossed in the direction you want to turn). Now you can pull up the Spyder by its A-risers. Once the wing is overhead, brake it gently, turn and launch. In stronger winds, be prepared to take a few steps towards the glider as it inflates. This will take some of the energy out of the glider and it will be less likely to over-fly you. Once stable and above your head apply progressive power and accelerate smoothly for a controlled take off.

**IMPORTANT: Never attempt to take off with a glider that is not fully inflated, directly overhead or if you are not fully in control of the pitch/roll of the wing.**

Practice ground handling and launching as much as possible! It is great fun, and will give you a much better feel for your Spydery flight characteristics. It will also improve your overall enjoyment of flying by making your launches easier and safer.

**➤ The Climb Out**

Once in the air you should continue flying into wind whilst gaining height. By setting the trimmers to the standard (certified) position you will achieve the best climb rate. Do not attempt to climb too steeply or too quickly by using the brakes. The wing already has a high angle of attitude, coupled with a higher AoA (if you use the brakes) plus the engine's full thrust acting on the pilot, this could contribute to make the glider more prone to stall. Furthermore, in the event of an engine failure the resulting backward pendulum motion of the pilot and the forward dive of the wing may bring you back to the ground very hard. Do not initiate turns until you have sufficient height and airspeed. Avoid low turns downwind with insufficient airspeed.

The Spyder is well damped in roll but under certain circumstances it is possible for the pilot to induce oscillations. This is caused by a combination of the engine/propeller torque and pilot weightshift and/or brake inputs. To stop oscillations it is best to reduce the power slightly and ensure that you remain static with weight-shift and brake inputs. Once settled you can once again apply full power.

Under full power the torque effect will attempt to gently turn the wing, using weightshift or adjusting the trims asymmetrically is the best method to correct this.

**NOTE: Using the trims asymmetrically will invalidate certification**

The handling characteristic of the Spyder is truly amazing. We have worked hard on tuning the wing so that it turns tightly but also efficiently, as the ability to climb in a turn is very important for powered and free flight, making the climb out fun and thermalling easy.

**➤ Normal Flight**

Once at a safe height you can release the trimmers for a faster cruise speed. If your motor has enough power, the Spyder will achieve very good straight line speeds whilst maintaining level

flight with trims fully released and full speed bar applied.

For better penetration in headwinds and improved glide performance in sinking air, crosswinds or headwinds, you should fly faster than trim speed by using the accelerator system, or the trimmers. For maximum efficiency whilst flying downwind, release the speed bar and return the trimmers to the standard (certified) position.

By pulling the trimmers to the standard position and applying the brakes approximately 30cm, the Spyder will achieve its best minimum-sink rate; this is the speed to use for thermalling and ridge soaring whilst free flying.

**➤ Turning**

To familiarize yourself with the Spyder your first turns should be gradual and progressive.

To make efficient and coordinated turns with the Spyder first look in the direction you want to go and check that the airspace is clear. Your first input for directional change should be weight-shift, followed by the smooth application of the brake until the desired bank angle is achieved. To regulate the speed and radius of the turn, coordinate your weight shift and use the outer brake.

**IMPORTANT: Never initiate a turn at minimum speed (i.e. with full brakes on) or under full power in a steep climb as you may risk entering a spin.**

**➤ Active Flying**

In turbulent air the Ozone reflex profile (OZRP) is very stable. It will resist reasonable levels of turbulence without pilot input. The faster the wing is flown the more inherent stability there is as the reflex has a greater effect. Using the speed system has exactly the same effect as releasing the trimmers so it is safe and possible to fly with the trimmers in the standard (certified) position whilst using the full range of the speed system.





In mild turbulence it may be best to not attempt to fly the wing actively and let the profile absorb the turbulence itself, indeed small applications of the brakes can reduce the inherent stability of the profile. However in very strong turbulence Ozone recommends to return the trimmers to the standard position and fly the glider actively. This way, you will be in the best position to react correctly should an incident occur.

The key elements of effective active flying are pitch control and pressure control:

In very turbulent air, if the glider pitches hard in front of you, use the brakes to slow it down. Equally, if the glider drops behind you, release the brakes to allow it to speed up.

In severe turbulence, flying with a small amount of brake applied (approx. 20cm) will give you tension in the brakes and feedback from the wing. In turbulent conditions the internal pressure of the wing can change and you can feel this through the brakes. The aim is to maintain a constant pressure through the brakes. If you feel a loss in pressure apply the brakes until normal pressure is resumed then raise hands back to original position (this must be done quickly).

Avoid flying with continuous amounts of brake in rough air as you could inadvertently stall the wing. Always consider your airspeed.

**IMPORTANT: The OZRP is a very stable profile and can accept large amounts of turbulence before collapsing. If the turbulence is not too severe it may be best to not fly actively and let the profile absorb the turbulence itself. However, no pilot and no glider are immune to collapses. In severe turbulence active flying will virtually eliminate any tendency to collapse. When the conditions are very turbulent, be more active and anticipate the movements of your wing. Always be aware of your altitude and do not over-react. We advise you to keep hold of your brakes at all times and not to fly in turbulent conditions.**

## ➤ Landing

The Spyder shows no unusual landing characteristics. We recommend the trimmers be returned to the normal slow position for landings. You can land un-powered or powered, here are some tips:

- Always set up your landing early, give yourself plenty of options and a safe margin for error and make sure you are heading INTO wind.
- Once below 30 metres avoid turning tightly as the glider will have to dive to accelerate back to normal flight.
- Allow the glider to fly with speed for your final descent until you are around 1 metre above the ground. Apply the brakes slowly and progressively to slow the glider down until the glider stalls and you are able to step onto the ground.
- It is safest to perform un-powered landings as this reduces the likelihood of propeller damage caused by either falling over or allowing the lines to foul the prop. Turn off the engine at around 30m and glide in like a normal paraglider.
- Powered landings offer the chance to power up and continue with the flight if you misjudge your final approach, but can be more expensive if you get it wrong!
- Choose the appropriate approach style in function of the landing area and the conditions.
- In light winds you need a strong, long and progressive flare to bleed off all your excess ground speed. In strong winds your forward speed is already low so you are flaring only to soften the landing. A strong flare may result in the glider climbing upwards and backwards quickly, leaving you in a vulnerable position.
- In strong winds you need to turn towards the glider the second your feet touch the ground. Once facing the wing pull smoothly and symmetrically down on the brakes to stall the wing. If the glider pulls you, run toward it.
- If the wind is very strong, and you feel you might be dragged, stall the glider with the C risers. This stalls the Spyder in a very quick and controllable way and will drag you less than if you use the brakes.

## ADVANCED FLIGHT TECHNIQUES

### ➤ Rapid Descent Techniques

Ozone would like to remind you that these manoeuvres should be learnt under the supervision of a qualified instructor and always used with caution. Never forget that properly analysing the conditions before launch will help avoid the need to use these techniques.

### ➤ Big Ears

Folding in the wingtips of the Spyder increases its sink rate. This is useful for staying out of cloud or descending quickly. To pull big ears on the Spyder take hold of the outermost A-line (Baby A) on each side whilst keeping the brake handles in your hand. Pull down the baby A risers until the tips of the wing fold under.

Do not use the brakes other than for re-inflation. For directional control while using the Big Ears, you should use weight shift steering. To reopen your big ears, release both baby As at the same time. To help re-inflation, brake gently one side at a time until tips regain pressure. Avoid deep symmetric applications of the brake as this could induce parachutal or full stalls.

**IMPORTANT: You can land with the ears (you should release the ears before final flare). Ozone does not advise you to do this when it is turbulent or windy due to the risk of a possible stall and lack of precision in steering.**

### ➤ Big ears and accelerator

Once the big ears are in you can further increase the sink rate by pushing on the accelerator bar.

**NEVER try to pull the Big Ears in with the speed bar on already. This can lead to a major asymmetric deflation.**

### ➤ Big ears and spiral dive

Whilst it is possible to enter a spiral dive whilst holding in Big Ears, the high forces applied to the lower lines could exceed the breaking strain of the lines leading to equipment failure!

**Ozone does not recommend the use of this manoeuvre!**

### ➤ Wingovers

The OZONE Spyder is not designed for aerobatic flying. The limit is tightly banked S-turns, commonly known as wingovers. These must not exceed 90 degrees of bank.

**Warning: Uncoordinated wingovers can lead to large asymmetric collapses, even cravats and therefore should never be executed near the ground.**

### ➤ B-Line Stall

B-stall is for fast descents in emergency situations only. B-stall is performed by symmetrically pulling down on the B-risers.

To initiate the B-stall place your fingers between the lines above the maillons on the B risers. Do not release the brake handles. As you pull the B-lines down the airflow over the wing is broken and the glider loses its forward speed but remains open and you will descend at around 6 m/s. If you pull too much B-line the glider may horseshoe and move around a lot. If this happens, release the B risers.

To exit the B-stall the B-risers should be released symmetrically and in one smooth, progressive motion. The glider will resume normal forward flight without further input. Check you have forward flight again before using the brakes.

**IMPORTANT: The pitching movement on exiting the B stall is small but necessary. We recommend you do not apply brake to the glider until you are sure that the wing is flying fully again.**





## ➤ Spiral Dives

If you turn your Spyder in a series of tightening 360's it will enter a spiral dive. This will result in rapid height loss. To initiate a spiral, look and lean in to the direction you want to go, then smoothly pull down on the inside brake. The Spyder will first turn almost 360 degrees before it drops into the spiral. Once in the spiral you must apply a little outside brake to keep the outer wing tip pressured and inflated.

Safe descent rates of 8m/s (1500 ft/min approx.) are possible in a spiral dive, but at these rates the associated high speeds and G-forces can be disorientating, so pay particular attention to your altitude.

To exit the spiral dive, return your weight shift to a central position and then slowly release the inside brake. As the Spyder decelerates allow it to continue to turn until enough energy is lost for it to return to level flight without an excessive climb and surge. The Spyder shows no tendency to remain locked in a spiral dive; however some parameters could interfere with its behaviour. These might include: wrong settings of the chest strap (too wide); total weight in flight outside of the certified weight range, or being in a very deep spiral at a very high sink rate. You should always be prepared to pilot the wing out of such a spiral dive. To do so smoothly use opposite weight shift and apply a small amount of outside brake and the glider will start to resume normal flight. Never attempt to recover from a spiral with hard or quick opposite inputs as this will result in an aggressive climb and surge.

**IMPORTANT: 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. Spiral dives cause disorientation and need time and height to recover. Do not perform this manoeuvre near the ground.**

## INCIDENTS

### ➤ Deflations

Due to the flexible form of a paraglider, turbulence may cause a portion of the wing suddenly to collapse. This can be anything from a small 30% (asymmetric) collapse to a complete (symmetric) collapse.

If you have a collapse, the first thing to do is to control your direction. You should fly away from the ground or obstacles and other pilots. Asymmetric collapses should be controlled by weight shifting away from the collapse and applying enough brake to control your direction. This action alone will be enough for a full recovery of the wing most of the time.

Once a glider is deflated it is effectively a smaller wing, so the wing loading and stall speed are higher. This means the glider will spin or stall with less brake input than normal. In your efforts to stop the glider turning towards the collapsed side of the wing you must be very careful not to stall the side of the wing that is still flying. If you are unable to stop the glider turning without exceeding the stall point then allow the glider to turn whilst you reinflate the collapse.

If you have a deflation which does not spontaneously reinflate, make a long smooth progressive pump on the deflated side. This pumping action should take about 1-2 seconds per pump. Pumping too short and fast will not reinflate the wing and pumping too slow might take the glider close to, or beyond, the stall point.

Symmetrical collapses reinflate without pilot input, however 15 to 20cm of brake applied symmetrically will speed the process. After a symmetric collapse always consider your airspeed. Make sure the glider is not in parachutal stall before making any further inputs. If your wing collapses in accelerated flight, immediately release the accelerator and manage the collapse using the same methods described above.

### ➤ Cravats

If the tip of your wing gets stuck in the lines, this is called a 'cravat'. This can make your glider go into a spiral, which is difficult to control. The first solution to get out of this situation is to stabilise the glider into normal flight, i.e get control of your direction and then pull down the stabilo line (Green line on the B riser) until the wing tip frees itself. You must be careful with any brake inputs or you may stall the opposite wing. You can also use strong deep pumps on the brake to the cravated side, when doing so it is important to lean away from the cravat otherwise you risk spinning or deepening the spiral. The aim is to empty the air out of the wing tip, but without spinning. Correctly done, this action will clear the cravat.

If it is a very large cravat and the above options have not worked then a full stall is another option. This should not be attempted unless you have been taught how to do it and can only be done with a large amount of altitude. Remember if the rotation is accelerating and you are unable to control it, you should throw your reserve parachute whilst you still have enough altitude.

**IMPORTANT: A bad preparation on launch, aerobatic flying, flying a wing of too high a level or in conditions too strong for your ability, are the main causes of cravats.**

### ➤ Deep Stall / Parachutal Stall

It is possible for gliders to enter a state of parachutal stall. This can be caused by several situations including; a very slow release from a B-line stall; flying the glider when wet; or after a front/symmetric deflation. The glider often looks as though it has recovered properly but carries on descending vertically without full forward motion. This situation is called 'deep stall' or 'parachutal stall'.

It is unlikely to happen on any Ozone glider, but should it happen, your first reaction should be to fully raise both brakes. This normally allows the glider to return to normal flight. If nothing happens after a few seconds, reach up and push the A-risers forwards

or apply the speed bar to regain normal flight. Ensure the glider has returned to normal flight (check your airspeed) before you use the brakes again.

**IMPORTANT: Only a few cms of input from your brakes can maintain your wing in the stall. Always release your wraps if you have taken them!**

**IMPORTANT: Do not fly in rain, doing so significantly increases the likelihood of parachutal stalls occurring. To reduce the chance of stalling in rain avoid using deep brake movements or Big Ears. Find a safe area to land and using the speed bar, maintain a good airspeed at all times.**

## ACROBATIC / SIV FLYING

The Spyder has been designed as a beginner/intermediate PPG wing and is not suitable for acrobatic manoeuvres.

A specific standard of certification for acrobatic flying has not been set up yet. Ozone wings although designed to the highest specifications are, therefore, not certified for this type of flying. As acrobatic manoeuvres are very difficult and incorrectly performed manoeuvres can put abnormal stresses on the glider and lead to loss of pilot control, Ozone strongly recommend you do not undertake this style of flying.

During SIV only trim speed collapses should be performed. Due to the nature of the profile and tab positioning it is unsuitable for performing induced accelerated collapses without the addition of collapse lines. All other manoeuvres are permitted.

**IMPORTANT: Do not perform induced accelerated collapses.**



## CARING FOR YOUR SPYDER

### ➤ Packing

To prolong the life of your wing and to keep the plastic reinforcements in the best possible condition it is very important to pack the wing carefully.

Ozone strongly recommends to use the concertina packing method exactly as shown so that all of the cells rest alongside each other and the plastic reinforcements are not unnecessarily bent. Using the Ozone Sauscisse pack will help preserve the life of the wing and aid with the speed and ease of packing.

**Step 1.** Lay mushroomed wing on the ground. It is best to start from the mushroomed position as this reduces the dragging of the leading edge across the ground.



**Step 2.** Group LE reinforcements with the A tabs aligned, make sure the plastic reinforcements lay side by side.



**Step 3.** Lay wing on its side and Strap LE...Note the glider is NOT folded in half; it is folded with a complete concertina from tip to tip. It is really important to not stress the middle cell or bend the plastic too tightly.



**Step 4.** Group together the centre of the wing.

**Step 5.** Carefully zip up the saucisse pack without trapping any material or lines.



**Step 6.** Make the first fold after the LE reinforcements. Do not fold the plastic reinforcements, use 3 folds around the LE.



**IMPORTANT: Do NOT lay the wing flat on the ground before packing the glider, this will cause abrasion damage to the top surface as you pull the glider towards the middle. ALWAYS pack from a mushroom or lift the wing off the ground when gathering the wing and grouping the leading edge.**



**Important: Do not fold the glider in the centre, you will bend the plastics, instead pack the wing with a full concertina method from tip to tip before packing into the stuff sac.**



### ➤ Cleaning

Any kind of wiping/scratching can damage the coating of the cloth. We recommend for cleaning your Spyder, you use a soft cloth dampened only with water and to use gentle movements little by little across the surface.

Never use any detergent or chemical cleaners

### ➤ Storage and Transport

Always store all your flying equipment in a dry room, protected from direct heat. Your wing should be dry before being packed away. Moisture, heat and humidity are the worst elements for damaging your glider. Storing a damp glider in your car under the sun would be terrible for example.

If you land in salt water, you must first rinse it thoroughly with clean fresh water. Dry the wing completely, preferably out of the sun, in the wind. Never use a hair dryer, etc.

Take care that no insects get packed away with the wing. They may eat the cloth and make holes in a bid to escape. They can also leave acidic deposits if they die and decompose.

Transport the wing in the supplied bags and keep away from oils, paints, chemicals, detergents etc.

If you need to dispose the wing, do so in an environmentally responsible manner. Do not dispose of it with the normal household waste.

**IMPORTANT: Never pack away or store your glider wet.**

### ➤ Wing Repairs

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

**If you damage the sail:**

If the rip is small, you can fix it yourself. You'll find all the materials in the repair kit you need. The fabric can be simply mended with the sticky rip stop / spinnaker tape.



When cutting out the patch remember to allow ample overlap around the tear and round the corners of the patch.

You can find more information about repairing your wing on the Ozone website, including step by step instructions with pictures.

#### **If you damage a line:**

Any line that is damaged should be replaced. It is important that the replacement line is from the same material, has got the same strength and the same length. You can check its length against its counterpart on the other side of the wing, to make sure that it is symmetrical. Once the line has been replaced, inflate and check the glider before flying. If you do not have access to an Ozone dealer you can order individual lines at [www.flyozone.com](http://www.flyozone.com)

#### **➤ Caring Tips**

- Your Ozone wing has an opening on the trailing edge of the tip, closed using Velcro, called the 'butt hole'. This has been designed to easily empty all the things which have been accumulating in your wing (sand, leaves, rocks, mobile phones etc).
- If you fly with a wrap, you should regularly undo the twisting that appears on the main brake lines. By twisting the line they become shorter and you can end up with a constant tension on the trailing edge (which can lead to problem on launch, stalling, glider not flying symmetrically ...)
- Change your main brake lines if they are damaged.

Careless ground handling damages many paragliders. 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. Lift it up and carry it.
- 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 repeatedly 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.
- DO NOT slam your Spyder down on the ground leading edge first! This impact puts great strain on the wing and stitching and can even explode cells.
- FLYING in salty air, in areas with abrasive surfaces (sand, rocks etc.) and ground handling in strong winds will accelerate the aging process.

It is recommended that you regularly CHECK your Spyder, especially after a heavy period of use, after an incident or after a long period of storage.

## MAINTENANCE CHECKS

Your wing, like a car, should be technically checked to ensure proper airworthiness. Your wing should be checked by a qualified professional for the first time after 24 months, or after 80 hours. However, if you are a frequent flyer then we recommend you get your glider checked annually.

The checker should inform you about the condition of your glider and if some parts will need to be checked or changed before the next normal service check period. The sail and the lines do not age in the same way or at the same rate; it is possible that you may have to change part or all of the lines during the wing's life. For this reason it is important to do regular inspections so that you know the exact condition of all of the components of your glider. We recommend that inspections are carried out by a qualified professional.

You alone are responsible for your flying kit and your safety depends on it. Take care of your equipment and have it regularly inspected. Changes in inflation/groundhandling/flying behaviour indicates the gliders aging, if you notice any changes you should have the wing checked before flying again. These are the basic elements of the check up (full details and permissible figures can be found on our website):

Porosity is measured with a porosity meter, the time taken by a certain volume of air to go through a certain surface of the cloth. The time in seconds is the result. A measurement is done in several places on the top surface along the span of the glider behind the leading edge.

The tearing resistance of the cloth - A non-destructive test following the TS-108 standard which specifies minimum tear strength for sky diving canopies should be made using a Bettsometer. (B.M.A.A. Approved Patent No. GB 2270768 Clive Betts Sails)

Strength of the lines - An upper, middle and lower A line, along with a lower B and a lower C (and lower D if applicable) line should be tested for strength. Each line is tested to breaking point and the value recorded. The minimum value is 8 G for all lower A+B lines and 6 G for all lower remaining lines, calculated from the maximum certified flying weight of the glider. The added minimum strength for the middle lines and for the top lines should be the same. If the breaking strength is too close to the minimum value calculated, the professional should give a period after which you will have to test the strength of the lines again.

Lengths of the lines - The overall length (riser lines + mid lines + upper lines) has to be checked under 5Kgs of tension. The difference between the measured length and the original length should not exceed +/- 10mm. The changes that could appear are a slight shrink on the C or Ds and/or a slight stretch on the A, B. The consequences of these changes can include a slower trim speed, difficult inflation etc.

Full check - A full visual check should be carried out: All the components of the wing (stitching, ribs, diagonals, lines, tabs, ...) should be checked for signs of deterioration.

Finally, a flight test to confirm that the wing behaves normally should be carried out by the professional.

**IMPORTANT: Take care of your glider and make sure you have it checked according to the above schedule: This will ensure you hours of safe flying.**

## MODIFICATIONS

Your Ozone Spyder was designed and trimmed to give the optimum balance of performance, handling and safety. Any modification means the glider loses its certification and will also probably be more difficult to fly. For these reasons, DO NOT modify your Spyder in any way.

## TOWING

The Spyder may be tow-launched. It is the pilot's responsibility to use suitable harness attachments and release mechanisms and to ensure that they are correctly trained on the equipment and system employed. All tow pilots should be qualified to tow, use a qualified tow operator with proper, certified equipment, and make sure all towing regulations are observed.

When towing you must be certain that the paraglider is completely over your head before you start. In each case the maximum tow force needs to correspond to the body weight of the pilot.



## OZONE QUALITY & SERVICE

At Ozone we take the quality of our products very seriously, all our gliders are made to the highest standards in our own manufacturing facility. Every glider manufactured goes through a stringent series of quality control procedures and all the components used to build your glider are traceable. We always welcome customer feedback and are committed to customer service. We will always undertake to fix problems not caused by general wear and tear or inappropriate use. If you have a problem with your glider please contact your dealer/distributor who will be able to decide upon the most appropriate action. If you are unable to contact your dealer then you can contact us directly at info@flyozone.com

### ➤ Ozone Guarantee

Ozone guarantees all of its products against manufacturer's defects or faults. Ozone will repair or replace any defective product free of charge.

Ozone and its distributors provide the highest quality service and repair, and damage to products due to wear and tear will be repaired at a reasonable charge.

## SUMMARY

Safety is paramount in our sport. To be safe, we must be trained, practised and alert to the dangers around us. To achieve this we must fly as regularly as we can, ground handle as much as possible and take a continuous interest in the weather. If you are lacking in any of those areas you will be exposing yourself to more danger than is necessary.

Flying is an immense subject which takes years to learn, so let your experience build slowly, do not put pressure on yourself, you have plenty of time to learn as many people fly well into old age. If conditions are not good now then pack up and go home, there is always tomorrow.

Do not overestimate your abilities, be honest with yourself. As the wise saying goes, 'it is better to be on the ground wishing you were in the air, than to be in the air wishing you were on the ground'.

Every year many pilots get hurt launching; do not be one of them. Launching is the time that you are most exposed to danger so practice it as much as possible. Ground handling teaches you to be sensitive to your glider and to understand the feedback it sends you. If you're good you will be able to confidently and safely launch whilst others struggle and you will be less likely to get hurt and more likely to have a great days flying.

Finally, RESPECT the weather, it has more power than you can ever imagine. Understand what conditions are right for your level of flying and stay within that window.

Happy, safe flying & enjoy your Spyder.

Team Ozone

## MATERIALS

All OZONE gliders are made from the highest quality materials available.

### ➤ Cloth

#### Upper-surface

Dominico DOKDO 20D MF / Porcher Skytex 7000 E71

#### Lower-surface

Porcher Skytex 7000 E71

#### Internal Ribs

Dominico DOKDO 30D FM/ Porcher Skytex 7000 E29.

#### Leading- edge reinforcement

P18 plastic pipe

### ➤ Lines

#### Lower cascade

Edelrid 7343 -190/230

#### Middle Cascade

Liros DSL - 70/140

#### Upper cascade

Liros DSL - 70

### ➤ Risers and hardware

#### Shackles

Link Lites.

#### Riser webbing

20mm zero stretch polyester webbing.

#### Pulleys

Ronstan ball bearing

## LINK LITE CONNECTIONS

To open the Link Lite in order to change lines:



1. Loosen loop that holds the black tag.



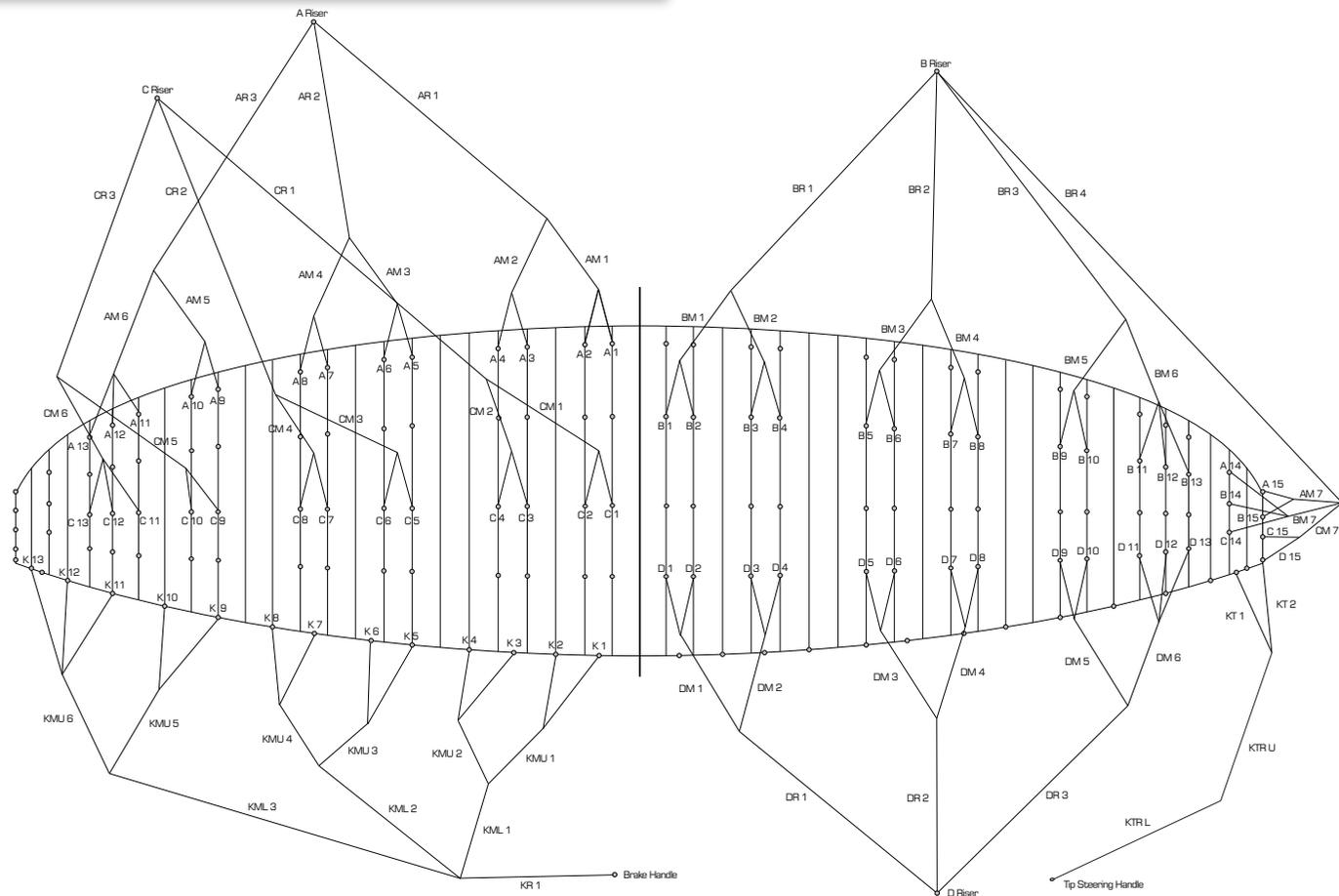
2. Feed black tag through loop



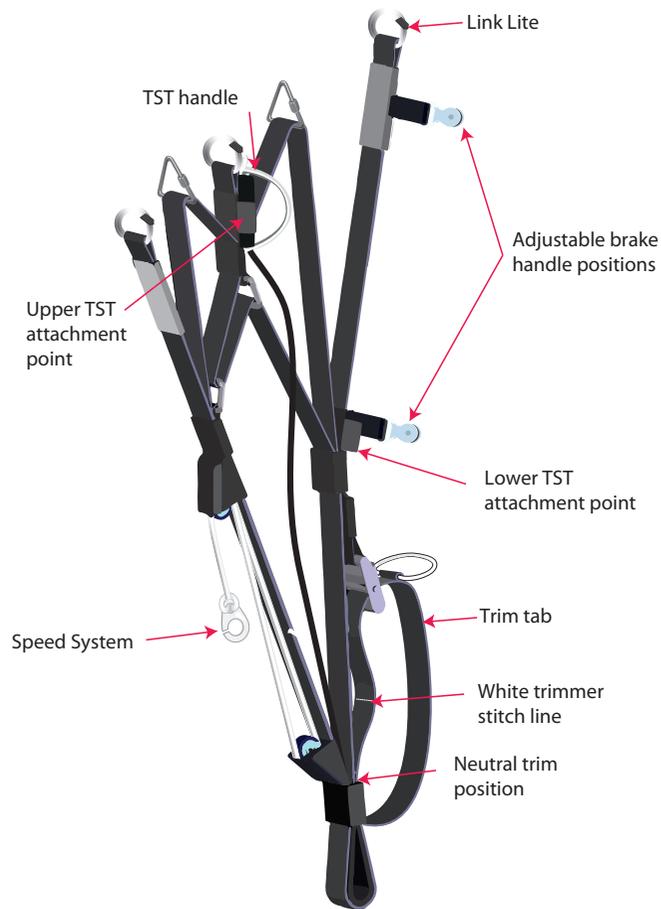
3. Pull out Loop.

To re connect the Link Lite connections reverse the above procedure but use 2 turns. Ensure that the connecting loops are correctly and neatly in place before flying.

## LINE DIAGRAM



## RISER DIAGRAM / LENGTHS (mm)



## TECHNICAL SPECIFICATIONS

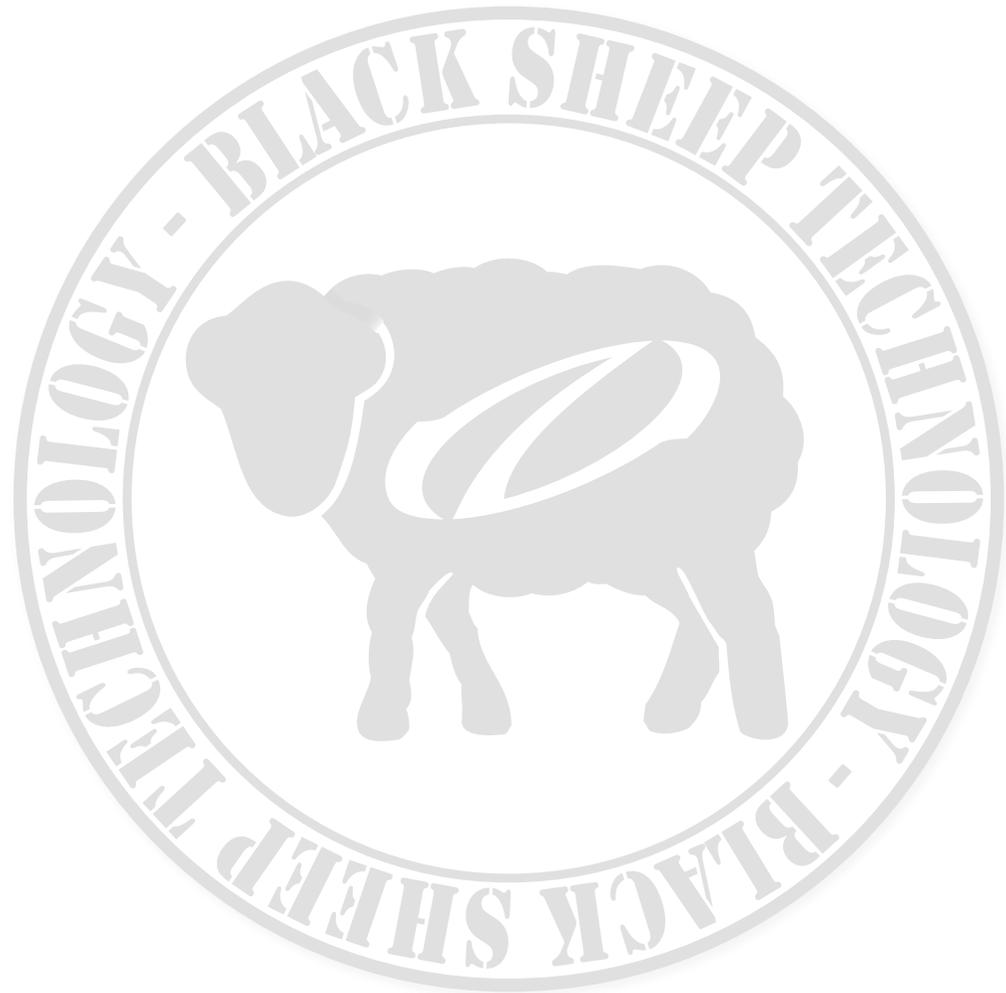
	20	22	24	26	28
No. of Cells	48	48	48	48	48
Projected Area (m <sup>2</sup> )	17.2	18.9	20.6	22.4	24.1
Flat Area (m <sup>2</sup> )	20	22	24	26	28
Projected Span (m)	7.93	8.32	8.69	9.04	9.39
Flat Span (m)	10.1	10.59	11.06	11.52	11.95
Projected Aspect Ratio	3.7	3.7	3.7	3.7	3.7
Flat Aspect Ratio	5.1	5.1	5.1	5.1	5.1
Root Chord (m)	2.54	2.67	2.79	2.9	3.01
Glider Weight (kg)	4.00	4.25	4.50	4.75	5.00
PG Weight Range	50-70	55-80	65-85	80-100	95-120
PPG (DGAC) Weight Range	55-100	55-105	65-120	80-140	95-160
DGAC certification	YES	YES	YES	YES	YES
Load test (8G) up to	150KG	150KG	150KG	150KG	150KG
Load test (5G) up to	229KG	229KG	229KG	229KG	229KG

Non Accelerated		Fully Accelerated	
A	500	A	340
a	490	a	382
B	480	B	423
C	460	C	506
D	440	D	590

Accelerator range - 16cm

Trimmer range - 15cm

22 Trimmer range - 14cm



**SPYDER**

[WWW.FLYOZONE.COM](http://WWW.FLYOZONE.COM)